Duffy, Daniel

From: chris@dcmerectors.com
Sent: Wednesday, March 07, 2012 8:28 AM
To: Duffy, Daniel
Cc: Torres Rojas, Genara; Van Duyne, Sheree
Subject: Freedom of Information Online Request Form

Information:

First Name: Chris
Last Name: Koehnken
Company: DCM Erectors
Mailing Address 1: 110 E 42nd Street
Mailing Address 2: Suite 1704
City: New York
State: NY
Zip Code: 10017
Email Address: chris@dcmerectors.com
Phone: 2125991603
Required copies of the records: Yes

List of specific record(s):
World Trade Center Transportation Hub Procurement File for Contract WTC 234.544-Structures to Grade-DCM Erectors

THE PORT AUTHORITY OF NY & NJ

FOI Administrator

August 15, 2013

Mr. Chris Koehnken
DCM Erectors
110 East 42nd Street, Suite1704
New York, NY 10017

Re: Freedom of Information Reference No. 13048

Dear Mr. Koehnken:

This is a response to your March 7, 2012 request, which has been processed under the Port Authority's Freedom of Information Code (the "Code") for copies of records related to Contract No. WTC 234.544

Material responsive to your request and available under the Code can be found on the Port Authority's website at http://www.panynj.gov/corporate-information/foi/113048-WTC-1.pdf and http://www.panynj.gov/corporate-information/foi/113048-WTC-2.pdf. Paper copies of the available records are available upon request.

Certain material responsive to your request is exempt from disclosure pursuant to exemptions (1), (2.a), (4) and (5) of the Code.

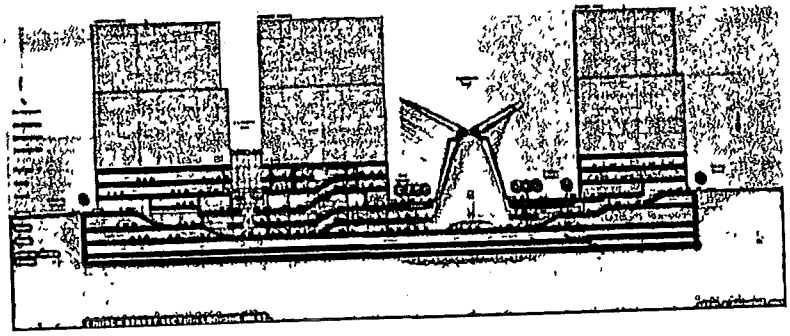
Please refer to the above FOI reference number in any future correspondence relating to your request.

Very truly yours,

Daniel D. Duffy
FOI Administrator

225 Park Avenue South, 17th Floor
New York, NY 10003
T: 212 435 3642
F: 212 435 7555

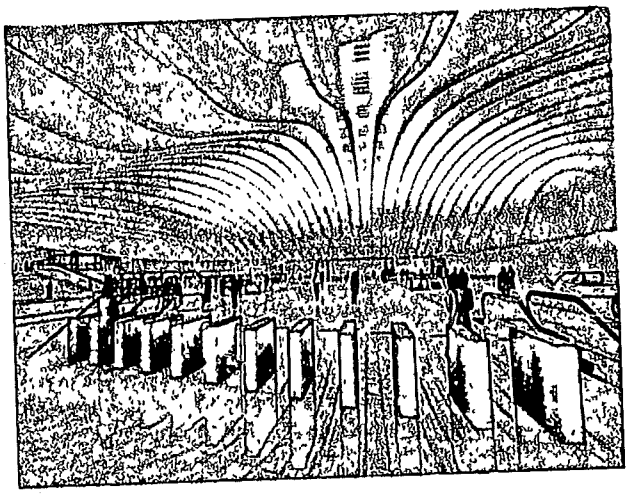
DCM
ERECTORS INC.

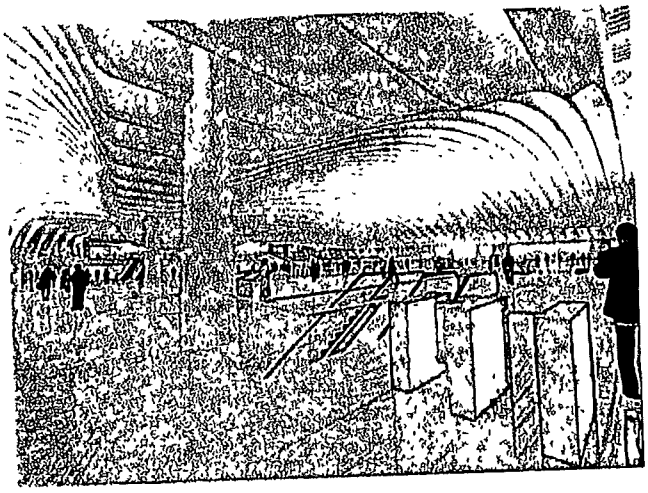


phoenix
constructors JV

RFP/CONTRACT NO.: WOTC-GC1-2-KNO186-020
STATION CONSTRUCTION AND TRANSIT
HALLS STRUCTURE TO GRADE FINISH,
FABRICATE &ERECT STRUCTURAL STEEL'
INTUMESCENT FIRE RESISTANT COATING,
METAL DECK & PRECAST CONCRETE WORK

TECHNICAL PROPOSAL





DCM ERECTORS INC.

110 East 42nd Street
Suite 1710
New York, NY 10017
Tel. (212) 599-1603 Fax (212) 599-1615

February 22, 2009

Phoenix Constructors, JV
115 Broadway, 18th Floor
New York, NY 10006

Attention: Mr. Javed Qureshi, Contract Administrator

Reference: Technical Proposal Submission
World Trade Center Transportation Hub
Bid Package 20
RFP/Contract:W0TC-GC1-2 KN0186-020 Station Construction and Transit Hall Structure to Grade Furnish, Fabricate and Erect Structural Steel, Intumescent Fire Resistant Coating, Metal Deck & Precast Concrete Work
DCM Erectors, Inc Bid 801E054

Gentlemen:

We are pleased to submit our Technical Proposal in original and three copies as requested. Kindly contact the undersigned should you have any questions relative to this document.

Very truly yours,
DCM Erectors, Inc

Jeffrey S. Gannett
Vice President

DCM ERECTORS INC.

RFP/Contract: W0TC-GC1-2KN0186-020

Table of Contents

- 5.1.1 Organizational Chart
- 5.1.2 Management Approach to the Project
- 5.1.3 Annual Construction Volume-Past and Future
- 5.1.3 Contingency Planning
- 5.1.4 Progress Schedule-Review/Controls/Reporting/Recovery Planning
- 5.2 Schedule &5.3 Cost/schedule Controls
- 5.4 Quality Assurance, Quality Control and Quality Management
- 5.5 Safety
- 5.6 M/WBE Utilization
- 5.7 Equipment and Material List
- 5.8 Exceptions and Alternate Proposals
- 10 Means and Methods Plan
- 10.1 Means and Methods Plan Area 1
- 10.2 Means and Methods Plan Area 2
- 10.3 Means and Methods Plan Area 3

DCM ERECTORS INC.

110 East 42nd Street
Suite 1704
New York, NY 10017
Tel. (212) 599-1603 Fax (212) 599-1615

Technical Proposal Item No.: ***5.1 Management Plan***
RFP/Contract No.: W0TC-GC1-2-KN0186-020
Station Construction and Transit Hall Structure to Grade
Structural Steel, Intumescent Coating, Metal Deck & Precast Work
New York, NY
February 22, 2009

DCM Erectors, Inc's ***Management Plan*** consists of the following:

1. 5.1.1 ***Organizational Chart***
2. 5.1.2 ***Management Approach to the Project***
3. 5.1.3 ***Annual Construction Volume – Past and Future***
4. 5.1.4 ***Contingency Planning***
5. 5.1.5 ***Progress Schedule – Review/Controls/Reporting/Recovery Planning***

DCM ERECTORS, INC. - TRANSPORTATION HUB - PACKAGE 20

PROJECT ORGANIZATIONAL CHART

DAVIS GROUP OF COMPANIES

DCM ERECTORS INC

SOLERA/DCM

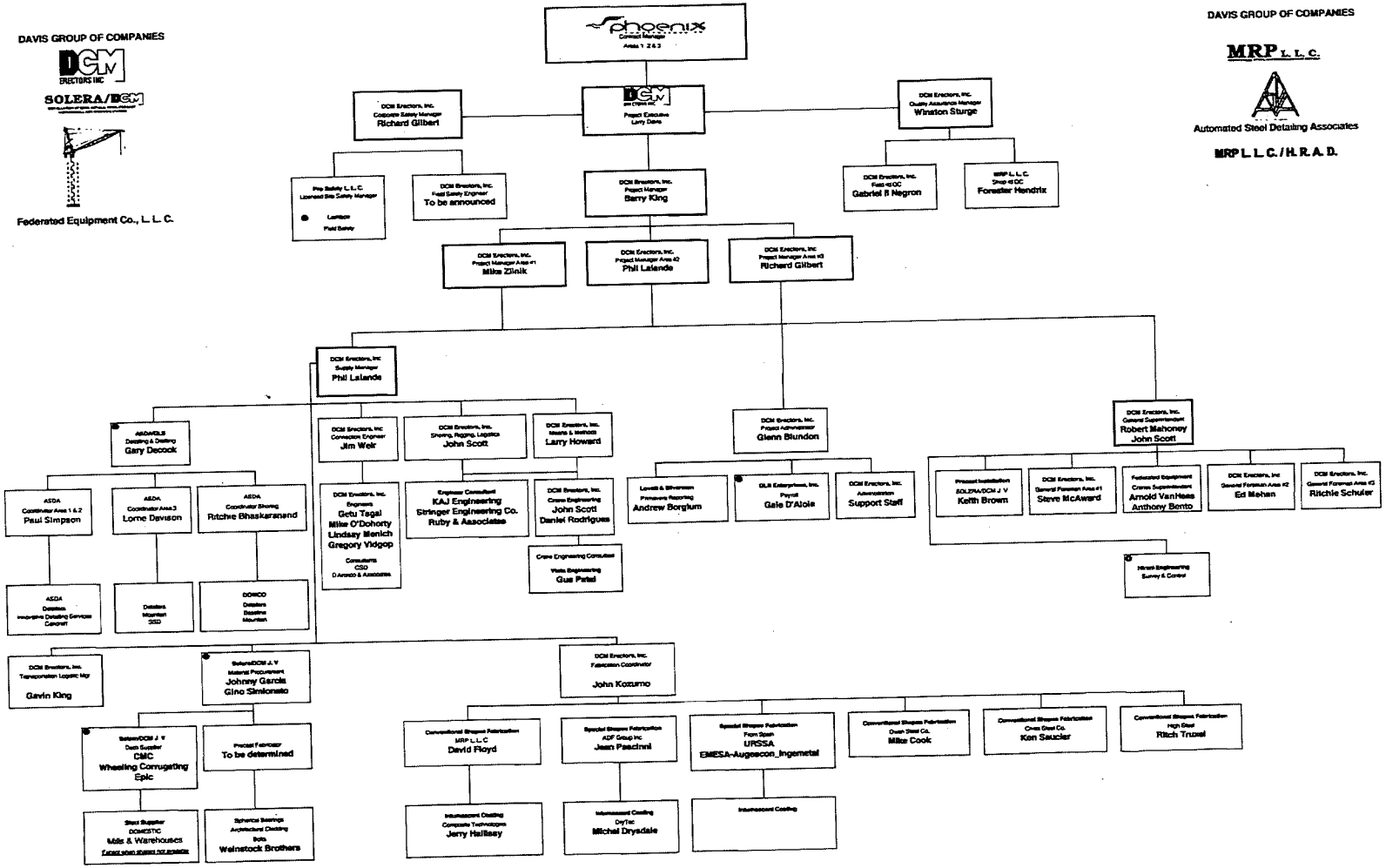
Federated Equipment Co., L. L. C.

DAVIS GROUP OF COMPANIES

MRP L. L. C.

Automated Steel Detailing Associates

MRP L. L. C. / H. R. A. D.



● - MINORITY COMPANY PARTICIPATING IN PROJECT

Larry Davis, P. Eng.

Career scope

1998 to present	President DCM Erectors Corp (Canadian and United States) • Structural Steel Fabricator Erector New York, NY Develop US market for Steel Construction Services for ADF Inc.
1996 - 1998	Vice President Midwest Steel Inc. • Structural Steel Fabricator & Erector Detroit, MI Orchestrated Canron Inc. took over and helped increase sales to $104 million US.
1975 – 1996	Shop Inspector Quality assurance department Project Engineer Engineering department Sales Engineer & Project Manager Field Engineer Container crane division Construction Manager Battery Park City Project in New York City Night Shift Supervisor Montreal Olympic Stadium precast erection New York City Construction Manager General Construction Manager Vice President / General Manager Canron Inc., Rexdale, Ontario

Academic

- Bachelor of Science, University of Waterloo, Ontario, Canada (1975)

Associations

- Member Canadian Welding Institute and Canadian Welding Bureau
  Member of Ontario Health & Safety Government Committee

Project Name	Construction Manager/ General Contractor	Scope of Work	Dollar Value
Credit Suisse Trading Floor Addition One Liberty Plaza New York, New York	MBA 212/213-6824 Jay Russin	Furnish and install 115T structural steel, metal deck, shear stud connectors, metal stairs for a 2nd floor mezzanine trading floor Renovation of existing building.	$550,000
Sludge Storage Facility City Wide Queens, Manhattan and Staten Island, New York	Slattery Associates, Inc. 212/361-5013 Todd Sutton	Furnishing only 1,900T structural steel and metal deck for silo buildings.	$1.7-million
Japan Airlines Rack Support Structures Jamaica, New York	Lehrer McGovern Bovis 212/576-4000 Glen Ravn	Furnish only 2,900T structural steel.	$2.8-million
500 Cell Addition Otis Bantum Correction Facility Rikers Island, New York	Morse Diesel International 718/728-4265 Robert Schwartz	Furnish and erect 941T of structural steel, metal deck and shear stud connectors for a 500 cell prison.	$2.0-million
Westchester Pavilion White Plains, New York	Gilbane Building Company 914/630-1060 Denis Beique	Furnish and erect 780T structural steel, metal deck and shear stud connectors for a two floor retail addition on top of Existing parking garage. Perform major Structural renovation of existing store.	$1.7-million
500 Cell Addition Otis Bantum Correction Facility Riker Island, New York	Morse Diesel International 718/728-4265 Robert Schwartz	Furnish and erect 500 precast concrete cells.	$8.4-million
500 Cell Addition Otis Bantum Correction Facility Rikers Island, New York	Morse Diesel International 718/728-4265 Robert Schwartz	Furnish and erect Building B - Pre-Engineered Building.	$4.0-million
New York Hospital Platform expansion	Lehrer McGovern Bovis 212/746-5888	Furnish and Erect Steel Structure Supply and install concrete	$9.0-million
Hospital for Special Surgery Steel Platform/Renovation	Barr & Barr Joe LaRocca 212/563-2330	Furnish and erect structural steel metal deck, grating, precast plank	$7.0-million
1133 Avenue of the Americas New York, NY	Tishman Construction Tom Troiano 212/399-3600	Furnish and erect 135 T Steel and metal deck. Renovate/reinforce existing structure	$ 900,000
Lincoln Triangle/Millenium Partners New York, NY	Lehrer McGovern Bovis 212/724-7300	Furnish and erect 200T structural steel and metal deck Kevin Murphy	$ 550,000
Emergency Roof Girder Repair Grand Central Terminal New York, NY	Metro North Bernadette Vero 212/340-3000	Reinforce/repair eight overstressed roof girders over operating commuter railroad central control room	$ 1.1-million

Project Name	Construction Manager/ General Contractor	Scope of Work	Dollar Value
Grand Central Terminal Priority Structural Repairs 7929	Metro-North Brian Bell 212/340-2414	Furnish construction services to repair major New York City Landmark	$ 5.6-million
New York Hospital FDR Tower	Lehrer McGovern Bovis Dave Haller 212/746-5888	Furnish and erect 8500 T Structural Steel, Metal Deck, and precast accent arches	$19.1-million
Mt. Sinai Hospital Biomedical Research Building	Morse Diesel International Andy Sosa 212/987-0741	Furnish and erect 7000 T Structural Steel and Metal Deck	$ 12.8-million
S. T. Olin Hall Renovation Ithaca, NY	Gilbane Building Company John Parrinello 607/255-6621	Furnish and erect 100 T Structural Steel, metal deck and miscellaneous metals at Cornell University	$ 500,000
John Jay College of Criminal Justice 899 Tenth Avenue New York, New York	KM/Turner Joint Venture 212/315-0961 Peter Davoren	Furnish and erect 2,000T structural steel, metal decks and shear studs. Perform major interior/exterior Renovation work of existing structure.	$6.2-million
Energy Control Center New York State Electric & Gas Corp. Binghamton, New York	Cowper Construction 607/729-2551 Eugene Partridge	Furnish and erect 280T structural steel, metal deck, steel joists and shear studs	$414,000
Willow Point Nursing Home Addition 'estal, New York	Burton-Markoff Construction 607/723-3506 Ronald Trawinski	Furnish and erect 160T structural steel, metal deck, miscellaneous steel and shear studs.	$210,000
Norwich Eaton Pharmaceutical Woods Corner Plant Building No. 99	Gilbane Building Company 607/335-5322 Jack White	Furnish and erect 360T structural steel, metal deck, steel joists and shear studs.	$457,500
World Financial Center Battery Park Buildings "B" and "C" New York, New York	Olympia & York Develop. 212/907-9505 Jay Seligman	Furnish and erect 75,000T structural steel, shear studs; erect only metal deck.	$85- million
Macys Department Store Albany, New York Sam Grossberg	R. L. Macy 212/560-4594	Furnish and erect 1,400T structural steel, metal deck, steel stairs and shear stud connectors.	$2.1-million
East End Terminal LaGuardia Airport Queens, New York	Morse Diesel International 718/476-6770 Steve Pressler	Furnish and install 3,600T structural steel, metal decks and shear studs.	$6.9-million
U.S. Postal Service General Mail Facility Queens, New York	George A. Fuller Company 718/886-0639 Andris Eiland	Furnish and install 350T structural steel joists, metal deck, shear studs for a major interior/exterior renovation project.	$1.3-million
Madison Square Garden New York, New York	Herbert/HRH - A JV New York, New York 212/268-7090 David Llewelyn	Furnish and install 770T structural steel, metal deck for major structural interior/exterior renovation project.	$5.5-million

Project Name	Construction Manager/ General Contractor	Scope of Work	Dollar Value
elt Forum/8th Avenue Addition Madison Square Garden New York, New York	Herbert/HRH - A JV New York, New York 212/268-7090 David Llewelyn	Furnish and install 940T structural steel, metal deck and shear studs for major structural interior/exterior renovation project. Steel and precast Demolition included in our scope of work.	$4.5-million
PS279 Bronx, New York	Turner/Santa Fe, JV 212/584-4062 Phil Solomsy	Furnish and install 660T of steel, deck joists, studs, plus miscellaneous steel.	$2.7-million
Swiss Bank 49th & 5th Avenue New York City, New York	Tishman Construction 212/399-3600 Robert Eckstein	Furnish and install 9,000T structural steel, shear stud connectors and erect only metal deck.	$17-million
200 East 87th Street New York, New York	Marson Construction 718/654-2800 Tony Bochichio	Furnish and install 1,500T structural steel, metal decks and studs. Install only precast plank.	$3.1-million
SIMA Naval Building Staten Island, New York	William L. Crow Constr. 212/594-0860 Bernard Monahan, VP	Furnish and install 900T structural steel, metal deck, purlins, and shear studs and crane rails.	$2.4-million
Port Authority Trans Hudson Corp. Harrison & Kearney, New Jersey	Joseph L. Muscarelle/ Gemini Construction Corp.	Furnish and install 630T structural steel, roof deck and shear studs.	$1.2-million
East Academic Building eHostos Community College Bronx, New York Frank Powell	HRH/Arawak-Joint Venture New York, New York 212/751-3100	Furnish and install 1,580T of structural steel and metal deck	$5.5-million
Resource Recovery Facility Chester, Pennsylvania 412/384-1074 Dan Martin	Dick Corporation Pittsburgh, Pennsylvania	Furnish and install 4,500T structural steel, plus miscellaneous steel, grating and metal decking.	$11-million
CityPlace II Hartford, Connecticut John S. Coutsouridis	Walsh Construction 203/373-7900	Furnish and install 3,200T steel, deck and studs.	$5.8-million
Continuous Strip Caster Addition Allegheny Ludlum Lockport, New York	Voest Alpine 716/439-5363 Ernst Drab	Furnish and install 174T structural steel, floor plate, water tankage and misc. for a specialty steel mill addition.	$600,000
Physical Education Bldg. Herbert Lehman College Bronx, New York	Lehrer McGovern Bovis 212/576-3774 Jerry Dorost	Furnish and install 1,600T structural steel, steel joists, steel pan stairs, metal deck and shear studs.	$6.1-million

Project Name	Construction Manager/ General Contractor	Scope of Work	Dollar Value
ierpont Morgan Library Addition New York, New York	Lehrer McGovern Bovis 212/576-4000 Sandor Goldman	Furnish and erect 95T structural steel and metal deck.	$1.0-million
SEMASS Waste-To-Energy Plant Expansion Rochester, Massachusetts	Bechtel Corporation 301/417-3508 Phil Jones	Furnish and deliver 800T structural steel, metal deck, handrail, grating, stairs and checkered floor plate.	$2.2-million
Column and Wind Bracing Enhancements Roosevelt Field Mall Garden City, New Jersey	McLean Steel 516/248-9241 Tracey Cody	Furnish and install 30T of structural steel to reinforce existing one floor mall to accept new second floor.	$800,000
22 Floor Addition 730 Third Avenue New York, New York	Cauldwell-Wingate, Inc. 212/916-5781 Fran Ambrosio	Furnish and erect 1,500T structural steel, metal deck, shear studs, plus major structural renovation.	$3.0-million
American Museum of Natural History Library/Link Addition 79th St. & Columbus Ave. New York, New York	Lehrer McGovern Bovis 212/769-5771 Robert Salpeter	Furnish and install 400T structural steel, metal deck and shear studs.	$1.0-million
Terminal Station Hammerhead and Column lodifications Newark International Airport Newark, New Jersey	Von Roll Transport Systems 201/622-0119 Doug Jory	Furnish and install 235T of weldments to support future elevated guide way.	$600,000
S. T. Olin Hall Renovation Ithaca, NY	Gilbane Building Company John Parrinello	Furnish and erect 100 T Structural Steel, metal deck and miscellaneous	$ 500,000

Gerardus (Gary) Henricus Decock

(Ex. 1)

CAREER OBJECTIVE

A leadership role in an organization advising and directing individuals on tasks. To analyze activities and to identify objectively weaknesses and strengths, and then to implement a solution for improvement in the organization.

To communicate with individuals in order to achieve maximum performance. To apply my proven experience in supervising and instructing committees and individuals, and to utilize the time and resources available to accomplish outstanding production under tight schedules.

To develop and expand on the high performance of the firm with enthusiasm, hard work, and reliable policies in the competitive market.

QUALIFICATIONS

Supported by more than 24 years working experience encompassing

* Leadership
* Managing
* Communication
* Analyzing

SELECTED ACHIEVEMENTS

Operations Manager for a structural steel drafting office with a personal of 20 people. Direct and advise individuals on procedures that are required to meet customer's requirements, while maintaining tight schedules for completion on the project. Report up-dates to Company President about the daily operations.

Examine customer drawings of concept for *NASDAQ* sign structure in New York, NY. Use Engineer's design of one-panel, to engineer 9 different panels while coordinating with the lighting manufacture and existing building window locations. Design splice connections to have each panel divided into 3 separate sections. This met the requirements of both erector and mechanical supplier.

Coordinator on the steel construction for *USTA Arthur Ashe Stadium,* NY (130 million dollar) project with all sub-trades involved. Analyze customer design changes and expedite these revisions to individuals to minimize cost and/or labor that would escalate as a result. Review the ongoing activities on site, to direct solutions for field complications.

Advised the structural and miscellaneous steel detailers/fabricators for *Site#22 Building (Battery Park Authority Inc.)* New York. This 1.1 million-dollar project involved R.F.I.'s and coordination meetings with General Contractor, Architect, Engineer, and other Professionals.

Re-designed the site drawings involved in the *G.M.-Oshawa,* construction project, with a mandate of reducing the amount of steel required. Examined drawings and site conditions, to cut back on steel, while maintaining the same design. This change reduced labour in the field, increased the productivity and met the tight deadline due to the company's shut down period.

Investigated discrepancies in design drawings, as project manager, from both architects and engineers. Consulted with these professionals to obtain technical information, resolved problems or difficulties in the development and design of both shop and erection drawings.

BUSINESS EXPERIENCE

Structural Steel Drafting (Checker) / Project Coordinator / Office Manager
(For both in Heavy and Light Construction)

Automated Steel Detailing Associates Ltd.	1998-	self employed
-associated with ADF / DCM Erectors & Federated Equipment		
Canron / Midwest Steel Inc.	1995 - 1998	self employed
Dominion Bridge	1994 - 1995	self employed
Tripart Drafting	1994	self employed
Harold Hodgson & Assoc.	1994	self employed

Canron Inc.	1985 - 1994
Ferro Steel Inc.	1981 - 1985
Canron Inc.	1980 - 1981

- Responsible for preparing and/or checking shop, erection, and fieldwork drawings, with insight to perform connection design within the scope of a project.
- Knowledgeable on structural hip and valley connections
- Responsible for on-site field measurements and correction of erection problems, and instructing field supervisor in the repair of the construction
- Headed and/or assisted the operation of projects
- Design structural steel connections in CISC and AISC
  (Limit States Design, Allowable Stress Design)
- Familiar in the use of AutoCAD 2000, Excel, Word, Windows 2000
- Ensuring steel connections meet all specifications and codes
- Directly involved with Federated Equipment LLC in the design of both Tower and/or Kangaroo Cranes
  Sample Jobs: 383 Madison N.Y., Random House N.Y., AOL Time/Warner N.Y., 731 Lexington Ave. N.Y.

EDUCATION

Project Management Principles Certificate	Humber College, Etobicoke, Ontario Fall 1994
CSIC Level II Certificate	Structural Connections Course Spring 1981
C.A.A.T. Diploma Civil Engineering Technician	Fanshawe College of Applied Arts and Technology London, Ontario 1978 – 1980

ACTIVITIES AND INTERESTS

- Organized and participated in a number of company social functions
- Participate in summer and winter organized hockey leagues

(Ex. 1)

Jeffrey S. Gannett

Objective

To obtain a top level sales position with large National Steel Fabricator/Erector

Experience

1996–Present Midwest Steel, Inc. Detroit, MI

Senior Sales Manager

- Increased sales from $26 million to $104 million.
- Exposed company to Nationwide Marketing of National Clients & Structural Engineers.
- Helped launch Caribbean Division

1986–1996 Canron Construction Corporation Conklin, NY

District Sales Manager

- Responsible for Metropolitan NY, NJ and Philadelphia.
- Managed 3 Estimators and Estimating Manager at Upstate NY Structural Steel Fabricating Plant.
- Coordinated with subcontractors and Construction Department to provide single source responsibility for large steel construction projects
- Took company into General Contracting to survive 1990-1995 recession.

1976–1986 Cives Steel Company Conklin, NY

Project Sales Representative

- Developed Industrial Clients in fields of Power, Pulp & Paper and Petrochemical from National Account List until plant acquired by Canron in 1986.
- Served as Estimator and Contract Administrator
- Subcontract coordinator

1973–1976 Harris Structural Steel, Inc. South Plainfield, NJ

Project Sales Coordinator

- Sold and administered large bridge and steel building contracts
- Received AISC Award of Merit for Vertical Lift Bridge Contract
- Served as Estimator and Contracts Materials Purchasing Agent

1971–1973 Bethlehem Fabricators, Inc. Bethlehem, PA

Purchasing Department Expediter

- Developed reliable supplier network to support Car Carrier Division
- Located parts and materials to keep assembly line working
- Initially began work as general laborer in plant after college graduation

Education	1967-1971 ▪ B. A., 1971	Temple University ▪ Psychology	Philadelphia, PA
	1977-1985 ▪ A. S., l985	Broome Community College ▪ Industrial Technology ▪ Mechanical Emphasis	Binghamton, NY

Interests

Personal watercraft, computers, automobiles, personal finance, do it yourself home improvement, fishing, multimedia presentations

GREGORY VIDGOP, P.E.

(Ex. 1)

Phone:
Fax:

EXPERIENCE:

July 2006 to Date

The Davis Group – DCM Erectors / MRP
New York, NY - South Plainfield, NJ
Principal Structural Engineer
Responsible for structural analysis and design of steel framing elements and its connections, review of engineering standards and calculations, shop standards and drawings.

Projects: Goldman Sachs, New York, NY
Flushing Town Center, New York, NY
WTC. Freedom Tower, New York, NY
Columbia University N-W Science BLDG, New York, NY

2003 to 2006

Thornton-Tomasetti
New York, NY
Senior Project Engineer
Responsible for successful project execution providing documenting, reporting of activities and field problem solving; lead multidiscipline team to successful project completion and maintain team flexibility in response to aggressive time schedules within a potentially changing environment. Responsible for strong customer relations and communication.

Projects: Pier 79 Ferry Terminal, New York, NY
Saint John's University, New York, NY
Sport-Entertainment Complex, Moscow, Russia
87-Story Federation Tower, Moscow, Russia

1997 to 2003

Foster Wheeler USA Corporation
Clinton, New Jersey – Power & Fired Heaters Dept.
Senior Structural Engineer

Responsible for structural analysis and design of steel and concrete structures for new construction, additions and building rehabilitation for heavy industrial buildings and open structures (power generation, pharmaceutical and petrochemical industry), utilizing structural software and graphic applications: **STAAD/Pro, ETABS, SAP 2000, RAM Steel, SAFE, Foundation 3D, Mat 3D, Frame Works Plus, Enercalc, Microstation and AutoCAD (rel. 12-2006).**

Projects: University of Minnesota, SE Power Plant.
St. Paul Power Plant, Minnesota.
Bristol Myers Squibb, New Jersey.
Sincor – Delayed Coker Unit, Venezuela, Citgo - Fired Heaters,
Syncrude Fired Heater– Canada.

1994 to 1997

EI Associates
East Orange, New Jersey
Structural Engineer

Provided structural static and dynamic analysis (2D and 3D analysis, FEA), calculations and design of major steel framing and building elements (pharmaceutical and petrochemical industry):

- columns, trusses, joints, girders and beams, composite floor deck, walkways.
- roof top unit and equipment platforms, pipeline supports, racks and bridges:

Projects: Merck & Co., Morton Chemical Co., Betz Laboratories, Cabot, Bristol-Myers Squibb Co., Church & Dwight Co., Givaudan-Roure Corp.
CPC International, Nestle & Co., Bell Atlantic Mobile.

EXPERIENCE:

1991 to 1994

Laurencelle Engineering P.C.
Springfield, New Jersey
Structural Engineer

Provided structural analysis and design of steel and concrete structures:
Projects: JFK International Airport – Admiral's Club
Newark International Airport – Terminal "B", "B-2" Connector

1977 to 1990

A/E Consulting Co., International Dept.
Ukraine
Structural Engineer

Responsible for structural analysis, steel and concrete design, using pre-engineered building systems for low-rise and multistory nonresidential structures, precast prestressed concrete (long span elements). Provided international assistance according to local standards, codes and requirements.
Designed foundations and framing of Steel Mills in India, Nigeria and Yugoslavia; foundations and pipe supports for St. Petersburg Nuclear Power Plant.

COMPUTER EXPERIENCE:

Acquainted with Windows environment.

Structural Analysis and Design:
STAAD/Pro, Ram Structural System, SAP 2000, ETABS, SAFE, CSTRAAD-3D (FEA), PCA Programs, CRSI-Piles Analysis and Design, FWC E1033-Dynamic Analysis, DESCON Connection Design, Mat 3D, Foundation 3D, Enercalc
Graphics:
Frame Works Plus (rel. 7.1) – "INTERGRAPH" certified
Microstation, Smart Sketch.
AutoCAD (rel. 12-2006) incl. 3D Design
Other:
Microsoft Office, Lotus Applications

PROFESSIONAL AFFILIATIONS:

Licensed Professional Engineer in the State of NY, DE
Member of American Institute of Steel Construction (AISC)
Member of American Concrete Institute (ACI)

EDUCATION:

1991

Manhattan Technical Institute
Civil Engineering Training Program
New York, NY

1980 to 1984

Building Structures Research Institute
Ukraine
Degree: M.S. in Structural Engineering

1972 to 1977

College of Civil Engineering
Ukraine
Degree: B.S. in Civil Engineering

REFERENCES:

Available upon request.

Larry Howard

Career scope

July 1998 to present	Construction Estimator ADF Steel Corp (Canada) & ADF Steel Corp. (US) • Structural Steel Fabricator Erector Toronto, On and New York, NY Construction estimating, planning and project management assistance in the early stages of new projects.
January 1996 to June 1998	Construction Estimator. Midwest Steel Inc. Take off material and provide construction estimates. Some project management in the U.S. and continuation of attending meetings as at Canron, in July 1996, when they purchased Canron's Construction Divisions.
January 1990 to January 1996	Construction Estimator Canron eastern Division Estimate construction projects in Canada and U.S. Required making layout drawings for the crane positioning for bridge erection.
August 1989 to January 1990	Construction Estimator Dominion Bridge, Ontario Estimate construction projects and size equipment required for these.
August 1988 to July 1989	Salesman Cooper's Crane Rental On the road sales of cranes, sizing cranes for projects and late day dispatching of cranes as required for the next day.
January 1988 to August 1988	Dispatcher Kanes Crane Service Working out rigging schemes, setting up projects, sizing cranes for jobs, on site rigging of equipment installation.
August 1964 to January 1988	Construction Estimator Frankel Steel

Academic

- Graduated from Danforth Technical School (1963), with secondary School Diploma in Architectural Drafting.
- Completed three years Apprentiship in Structural Steel Drafting (1997).

JAAK JURIMAE, P.ENG.

Career scope

1980 – 1981 Ebastec Lavalin Inc., Toronto, Ontario
- SENIOR ENGINEER for large multi-discipline firm of Thermal Power Consulting Engineers.

1979 – 1980 Kodiak Crane Corporation, Richmond Hill, Ontario
- PROJECT ENGINEER for manufacturer of luffing and hammerhead tower cranes.

1977 – 1979 Canron Inc., Eastern Structural Division, Rexdale, Ontario
- DESIGN ENGINEER for company involved in the design, fabrication and erection of large steel structures. 1977 - 1979.

19070 – 1977 Great West Steel Industries Ltd., Mississauga, Ontario
- SENIOR STRUCTURAL DESIGNER for firm involved in design, fabrication and erection of open-web steel joists, structural steel, and cold-roll formed steel products. 1970 - 1977.

Academic

- Registered Professional Engineer in Ontario, 1978. Recipient of the V.G. Smith Award, 1978; presently annually by APEO to the individual with the highest standing of those completing registration by examination.
- Designated Consulting Engineer in Ontario, 1986.
- Diploma in Civil Engineering Technology - Structural Option, Ryerson Polytechnical Institute, 1970.
- Courses: Various continuing education courses and seminars including: Wind Engineering, Fatigue and Fracture Mechanics, Welding Design and Applications, Steel Design and Construction, Project Management, Prevention of Construction Failures, Seismic Design.

Associations

Association of Professional Engineers of Ontario
Association of Professional Engineers of British Columbia
Licensed Professional Structural Engineer in Massachusetts
Canadian Society for Civil Engineering
American Society of Civil Engineers
American Society of Mechanical Engineers
Canadian Welding Society

QUALIFICATIONS

Twenty-eight years responsible cross-discipline experience (structural, mechanical, electrical) in construction and related industries. Licensed Professional Engineer in Ontario, British Columbia, Massachusetts and New York (project permit). Designated Consulting Engineer in Ontario. Principal of KAJ Engineers Inc.

Background in the following areas:

- Structural and Mechanical Design and Construction:
  Design, fabrication and installation of engineered structures, equipment and machinery.

- Tower cranes, derricks, hoisting equipment, highrise building window washing systems:
  Responsible for projects from development through commissioning.

- Construction Engineering:
  Responsible for developing erection procedures and the design of temporary works permitting the construction of or modifications to major structures.

- Welding Design and Practice:
  Canadian Welding Bureau approved as Designated Welding Engineer.

- Management/Administration and Advisory Services:

  - Project management and contractual negotiations;
  - Preparation of project tender documents plus soliciting bids and evaluating bidders' proposals and qualifications;
  - Proposal preparation: estimates, submission writing, scheduling, insurance and bonding, financing;
  - Quality Assurance: preparation of manuals and protocol, system implementation and monitoring of procedures;
  - Preparation of equipment operation and maintenance manuals;
  - Participation in industry association committees: National Erectors Association Safety and Health Committee and contributor to NEA chapter on steel bridge erection for the American Institute of Steel Construction *Highway Structures Design Handbook;*
  - Expert assistance to legal counsel and regulatory bodies investigating hoisting equipment and/or construction safety related incidents.

EXPERIENCE

STRUCTURAL AND MECHANICAL DESIGN OF CRANES, HOISTS, EQUIPMENT AND CONSTRUCTION PRODUCTS: As Engineer-of-Record responsible for the following work:

Campeau Corporation, Toronto, Ontario

Scotia Plaza East,
Toronto, Ontario
Design, fabrication and installation of rail-mounted roof car type window washing equipment for 70 storey building.

Monank Welding & Fabricating Inc., Aurora, Ontario

Skydome Stadium,
Toronto, Ontario
Design and fabrication drawings for hydraulically-actuated 10 ton operable closure for Panel 3 of the stadium's retractable roof.

Portable 28 Ton Capacity Stiffleg Derrick
Design and fabrication drawings. Equipment has features of hydraulic powered slew and mast luffing (for unaided erection/dismantle). Derrick is fully approved by New York City Building Department, Cranes and Derricks Division.

In-Building Climbing System for FMC TG1900 Tower Cranes
Design and fabrication drawings. System replaces equipment available from the original crane manufacturer which is limited to 15 foot climbs (i.e. nominally one floor). The four retrofitted systems supplied permit up to six floor climbs with a proportional decrease in crane-support related building construction cost using the 115 ton capacity crane. System has been used for the construction of several highrise buildings, primarily in New York City, and is fully approved as original equipment by NYC Cranes and Derricks Division.

One London Place,
London, Ontario
Design, fabrication and installation of rail-mounted roof car type window washing equipment for 26 storey building.

Portable 10 Ton Capacity Jib Crane
Design and fabrication drawings. Appliance used to remove/replace heavy mechanical equipment in highrise buildings that cannot be accommodated by the building elevators. Device proportioned to permit manual assembly/dismantle, flexible support arrangements, and the least disruption to as-built work.

Window Washing Roof Anchor and Davit Systems
Various projects.

Tishman Midwest Management Corp., Chicago, Illinois

North Western Atrium Center, Chicago, Illinois
Design, fabrication and installation of two rail-mounted roof car type window washing machines for 42 storey building. The large (30 ton) trolley-equipped long boom machines permit the platform suspension point to be varied from 10 to 60 foot radius.

EMMPCO, East Moline, Illinois

400 Metre-Tonne Capacity Hammerhead Tower Crane

Design and fabrication drawings for the Champion 3000H tower crane. Boom lengths to 200 feet with boom/radius capacities from 28000 to 6750 lbs. Freestanding mast heights to 180 feet. Topclimbing mast extension system. DC SCR controlled drives for hoist, trolley and slew. 200 HP hoist winch with line speeds to 1400 fpm.

Thor Group, Mississauga, Ontario

Ontario Hydro at Darlington N.G.S., Bowmanville, Ont.
Design and fabrication drawings of 30 foot span frames to support Kroll K400 tower cranes to 220 foot freestanding mast heights.
Canadian Department of National Defence,
CFB Esquimalt, BC
Design, fabrication and installation of two shipyard tower cranes. Boom length 75 m on 40 m mast height. Hoist capacity of 20 tonnes to 17 m and 3 tonnes at 75 m. DC SCR controlled drives. Slewing ring mounted at mast base. Rack-and-pinion hoist mounted operator's cab/elevator for crane operation from any point of 40 m mast track.

Bungy Adventures & Ontario Place Corporation, Toronto, Ontario

Bungee Jump Tower, Ontario Place, Toronto
Slender 4 foot by 164 foot high tower supporting 47 foot jump platform. Platform equipped with luffing mechanism for out-of-service stowage during high storm winds. Provision for powered rope-climbing passenger elevator.

CONSTRUCTION ENGINEERING SERVICES: As Engineer-of-Record responsible for the design of temporary construction works for contractors:

Dorel Steel Erection Corporation, North Quincy, Massachusetts

Two International Place,
Boston, MA
Crane application engineering for 2 Kodiak K300L tower cranes to construct 40 storey steel framed building.
125 Summer Street,
Boston, MA
Crane application engineering for 2 Kodiak K300L tower cranes to construct 24 storey steel framed building. Construction system used the up/down technique.
Massachusetts GeneralHospital, Boston, MA
Crane application engineering for 2 Kodiak K300L tower cranes to construct 25 storey steel framed building.
745 Atlantic Avenue,
Boston, MA
Crane application engineering for Kodiak K250L tower crane to construct 14 storey steel framed building.
500 Boyleston Street,
Boston, MA
Crane application engineering for Kodiak K250L tower crane to construct 26 storey steel framed building.

United Steel Erectors Inc., Everett, Massachusetts

125 High Street,
Boston, MA

Crane application engineering for 2 Kodiak tower cranes and 125 ton mobile crane to construct dual tower 34 and 24 storey steel framed buildings. Temporary bracing and construction sequencing to permit construction of 29 floors without the building's permanent stabilizing system for the first 5 floors.

75 State Street,
Boston, MA

Crane application engineering for Kodiak K300L and K250L tower cranes to construct 32 storey steel framed building. Construction system used the up/down technique.

Marr Companies, South Boston, Massachusetts

101 Merrimac,
Boston, MA

Crane application engineering for Kodiak K250L tower crane to construct 12 storey steel framed building.

Atlas-Gem Erectors Co. Inc., New York, NY

1585 Broadway,
New York, NY

Crane application engineering for 3 FMC TG1900 tower cranes to construct 44 storey steel framed building.

1325 Avenue of the Americas, New York, NY

Crane application engineering for Favco 1000 tower crane to construct 35 storey steel framed building.

World-Wide Center,
New York, NY

Crane application engineering for 2 FMC TG1900 tower cranes to construct 54 storey steel framed building. Project's construction was the subject of the Public Broadcast System's multipart documentary, *Skyscraper*.

Kelley Steel Erectors Inc., Bedford, Ohio

900 North Michigan Avenue, Chicago, Illinois

Crane application engineering for Kodiak K400L and K300L tower cranes to construct 75 storey building.

Society National Bank,
Cleveland, Ohio

Crane application engineering for installation of Kodiak K300L tower crane.

Steel Structures Corporation, New York, NY

Citicorp Court Square,
Long Island City, NY

Crane application engineering for 2 American AAA guy derricks and 25 ton mobile crane on jump frame to construct 50 storey steel framed building. The mobile crane was used to place infill steel and was relocated upward by the derricks as erection proceeded.

Fly-Form Structures Inc., Woodbridge, Ontario

Carlyle Residences,
Mississauga, Ontario
Crane application engineering for installation of Liebherr 180HC tower crane freestanding 257 feet.

Marshall Steel Limited, Milton, Ontario

Toronto-Dominion Centre, Tower 5,
Toronto, Ontario
Construction falsework and crane application engineering for Kodiak K250L tower crane and American 4-110 guy derrick to construct 32 storey steel framed tower over the existing 4 storey Toronto Stock Exchange building.

Brennan Rigging & Erecting Co. Inc., New York, NY

Swiss Bank Tower.
New York, NY
Crane application engineering for roof-top installation of 2 Favco 750 tower cranes and 40 ton stiffleg derrick to install building cladding.
Houston Ship Channel Bridge, Houston, Texas
Modifications to American 115 ton stiffleg derrick for operation with short sills and legs.

Pre-Con Company, Brampton, Ontario

Pre-Con Company Yard,
Brampton, Ontario
Crane application engineering for installation of 2 Liebherr 750C tower cranes.
Pre-Con Schokbeton,
Kalamazoo, Michigan
Crane application engineering for installation of Liebherr 750C tower crane.

Construction Equipment Corporation, Yorktown Heights, NY

Hotel Maclowe,
New York, NY
Crane application engineering for roof installation of 28 ton stiffleg derrick on 48 storey concrete building.
Regent Hotel,
New York, NY
Crane application engineering for 2 Kodiak K300L tower cranes and 28 ton stiffleg derrick for 56 storey building.

All-On Crane Service Ltd., Bolton, Ontario

Toronto-Dominion Centre, Tower 5,

Toronto, Ontario
Crane application engineering for installation of 35 ton stiffleg and 6 ton guy derricks on 32 storey steel framed building.
One Queen Street East,
Toronto, Ontario
Equipment as above for installation on 28 storey concrete building.
Toronto, Ontario
Equipment as above for installation on 21 storey steel framed building.
Metro Hall,
Toronto, Ontario
Equipment as above for installation on 29 storey concrete building.

Ellis-Don Construction Ltd., London, Ontario

Princess Margaret Hospital, University Ave.
Toronto, Ontario
Crane application engineering for installation of 35 ton stiffleg and 6 ton guy derricks on 21 storey concrete building.

Avenue Structures Corporation, Rexdale, Ontario

The Terrace, Jarvis St., Toronto, Ontario — Crane application engineering for installation of 28 ton stiffleg derrick.

Workers Compensation Board, Toronto, Ontario — Crane application engineering for installation of 28 ton stiffleg derrick.

Midwest Steel, Inc., Detroit, Michigan

Four Times Square tower New York, NY — Crane application engineering for FMC TG1900 and TG1500 cranes to construct 49 storey steel framed building.

Triborough Bridge New York, NY — Construction procedures and temporary works for the rehabilitation of the anchorages and main cable repairs for suspension bridge.

US Courthouse Louis, Missouri — Crane application engineering for installation of 25 ton stiffleg derrick St. on 55 foot temporary tower on 29 storey steel framed building.

RETAINED ENGINEER SERVICES: Professional Engineering services for clients:

NEI Agra, Inc./The State Group, A Joint Venture, Toronto, Ontario

Cardinal Cogeneration Facility, Cardinal, Ont.
Constructability and code compliance reviews of the Heat Recovery Steam Generator (HRSG) structure for the 125 MW cogeneration plant.

Aluma Systems Corporation, Downsview, Ontario

Hibernia Gravity Base Structure Forming System

Assisting the UMACS Division with the preparation of its bid proposal primarily in areas of sourcing potential subcontractors, preparing tender documents, soliciting and evaluating bids, and proposal estimating.

Northumbrian Strait Crossing
Borden, PEI
Main Girder Forms

Assisting the UMACS Division, the girder form supplier for the 7 mile long precast segmental concrete bridge, with the preparation of contract documents for subcontracted work. Design and fabrication drawings for the Pier Segment Template structure and trunnion drive used to produce 110 ton match-cast concrete pier segments. The apparatus permits the segments to be cast horizontally and then rotated 180 degrees for release and subsequent matching to the supported main girders.

Morrison Hershfield Limited, North York, Ontario

Bell Canada Second Digital Route West Microwave Towers
Structural design and preparation of specifications services.

Sebba Steel Construction Ltd., Richmond Hill, Ontario
Monank Welding & Fabricating Inc., Aurora, Ontario

Canadian Welding Bureau Certification in Division 2 to CSA W47.1
Retained Engineer responsible for welding design and practice.

Canron Inc., Eastern Structural Division, Rexdale, Ontario

Various projects for fabricator and erector of heavy steal construction. Examples are:
- General Motors Oshawa Plant Expansion
- Dofasco No. 2 Melt Shop, Hamilton, Ontario

Structural design services

Butler Manufacturing Co. (Canada) Ltd., Burlington, Ontario

Open web steel joist design for approximately 70 projects.

Structural design services

MRM Ltd., Milliken, Ontario

Approximately 30 projects for fabricator and erector of structural steel and aluminum.
Structural design services

C.J. Rush Inc., Agincourt, Ontario

Application design for custom architectural entrances - approximately 40 projects.
Structural design services

Engineered Design Inc., Toronto, Ontario

Various projects for Industrial Design firm primarily involving the use of plastics. Examples are:

- FRP Operator's Cabs for shiploaders and cranes
- Child's automobile restraint seats

Structural design services

McCavour Engineering Ltd., Etobicoke, Ontario

Various projects for Consulting Structural Engineering firm. Examples are:

- Segmented FRP covers for stadium's 3.6 m wide perimeter ring beam, BC Place Stadium, Vancouver
- 10,000 ton capacity iron ore concentrate storage bin, Westfrob Mines, Queen Charlotte Islands, BC

Structural design services

Spark Steel Erectors Ltd., Richmond Hill, Ontario

Static fall-arrest system to protect erectors.
Design services

Avenue Structures Corporation, Rexdale, Ontario

Inspection of tower cranes for structural integrity.
Inspection and certification services

Sebba Steel Construction Ltd., Richmond Hill, Ontario
Shiplake Management Company, Toronto, Ontario
Camdev Corporation, Toronto, Ontario
Markborough Properties Inc., Toronto, Ontario

Highrise building window washing systems
Design and inspection services

Department of National Defence, CFB Esquimalt, British Columbia

Shipyard cranes
Inspection and certification services

Midwest Constructors/Canron Construction, Toronto, Ontario

Second Blue Water Bridge
Point Edward, Ontario

Niagara Interim Casino
Niagara Falls, Ontario

Davy Sheafer Townsend Ltd., Hamilton, Ontario

Imperial Oil Limited
Esso Nanticoke Refinery
Nanticoke, Ontario

Site construction engineering services

Site construction engineering services

Dual crane engineered lifts of heavy refinery vessels.
Come By Chance Refinery
Come By Chance, Nfld.

Petro Canada Refinery
LEGS Hydro Treater Project
Clarkson, Ontario
Dual crane engineered lift of heavy refinery vessel.

Single, dual and triple crane engineered lifts of heavy refinery vessels and equipment.

PREVIOUS EMPLOYMENT

Ebastec Lavalin Inc., Toronto, Ontario

SENIOR ENGINEER for large multi-discipline firm of Thermal Power Consulting Engineers. 1980 - 1981.

Kodiak Crane Corporation, Richmond Hill, Ontario

PROJECT ENGINEER for manufacturer of luffing and hammerhead tower cranes. 1979 - 1980.

Canron Inc., Eastern Structural Division, Rexdale, Ontario

DESIGN ENGINEER for company involved in the design, fabrication and erection of large steel structures. 1977 - 1979.

Great West Steel Industries Ltd., Mississauga, Ontario

SENIOR STRUCTURAL DESIGNER for firm involved in design, fabrication and erection of open-web steel joists, structural steel, and cold-roll formed steel products. 1970 - 1977.

EDUCATION

Registered Professional Engineer in Ontario, 1978. Recipient of the V.G. Smith Award, 1978; presently annually by APEO to the individual with the highest standing of those completing registration by examination.

Designated Consulting Engineer in Ontario, 1986.

Diploma in Civil Engineering Technology - Structural Option, Ryerson Polytechnical Institute, 1970.

Courses:
Various continuing education courses and seminars including: Wind Engineering, Fatigue and Fracture Mechanics, Welding Design and Applications, Steel Design and Construction, Project Management, Prevention of Construction Failures, Seismic Design.

PROFESSIONAL ASSOCIATIONS

Association of Professional Engineers of Ontario
Association of Professional Engineers of British Columbia
Licensed Professional Structural Engineer In Massachusetts
Canadian Society for Civil Engineering
American Society of Civil Engineers
American Society of Mechanical Engineers
Canadian Welding Society

PERSONAL

Citizenship: Canadian Birth: 1947

Barry King

Experience

July 1998 – Present
Vice-President DCM Erectors
Responsibilities
- Engineering and Drafting Department
- Project Management /Production
- DCM Erectors Canada

April 1989 – June 1998
Project Manager
- Construction Coordinator

May 1985 – March 1989
Structural Steel Draftsman/Checker

Education

Graduate of Fanshawe College, London Ontario
Civil Engineering Technician

Major Projects

Structural Steel Detailing

Battery Park City – Highrise Construction New York, N Y, 1988
Toronto Skydome – Stadium Construction Toronto, Ontario 1988 – 1989
Structural Steel Detailing/Checker
Design Build of Tower Crane Support and Jumping System for High Rise Construction
Toronto Eaton's Center – High Rise Construction Toronto, Ontario 1990
Construction Coordinator
BCE Place Toronto, Ontario
High Rise Construction & Dismantling of Tower Cranes
Erection of Architecturally Exposed Steel ,1991
Construction Coordinator
Madison Square Garden, New York, NY
Renovation Addition of Theaters and Private Boxes , 1992

Cont'd page 2

Construction Coordinator

INCO, Sudbury Ontario

Nickel Smelter Renovation and Expansion of Furnace, 1993

Construction Coordinator

New York Hospital, New York, NY

Construction of New High Rise Hospital Project over FDR Drive utilizing a heavy lift barge crane which lifted 800 ton modular building sections, 1994

Project Manager

Mount Sinai Hospital, New York, NY

New Eighteen Floor Biomedical Research Facility, 1995

Project Manager and Construction Coordinator

New Stadium 1 for USTA, Flushing Meadows, NY.

Coordinated Structural Steel, Metal Deck, Miscellaneous Steel, Precast Stadia and Hollow Core Plank Materials, 1996-1998

Project Manager/Crane Consultant

Chapultepec Tower, Mexico City, Mexico

Coordinate design and installation of self climbing crane system utilized to construct a new 55 story High Rise Office Building, 1998-1999

Project Coordinator

Construction of ABC Times Square Studios, New York, NY

Lead design team, pre-assembly and construction of electronic billboards and recording studio for new times square studios and home of "Good Morning America", 1999

Construction Coordinator

Rockefeller University, New York, NY

Supervise reconstruction of open-air public space with stainless steel canopies, benches and fences. Also supervised constructions of a 180-foot span, cable stay pedestrian bridge over 64th street to link residence building to university, 1999

Project Manager

Lester B. Pearson International Airport, Toronto, ON

Oversee design, drafting, fabrication and construction of infill steel contract and liner steel contract. Total estimated structural steel tonnage 16,000 metric tonnes. 1999-2004

Project Manager

Pierpont Morgan Library Renzo Piano designed expansion. 680 tons of complex structural steel to provide new book storage vaults, lecture theatre and common space. 2003-2005

Project Manager

Metropolitan Museum of Art 700 tons of renovation type construction in the Rockefeller, Greek and Roman wings of the MET. Including installation of a 200-foot long transfer truss installed in 3 major components. 2004-2005

RESUME

Juan (John) J. Kozurno

Date of Birth:

Education:

Public and Technical High School in Argentina
Graduate University of La Plata, Buenos Aires, Argentina, Metallurgical Eng.

Non Destructive Testing Certificates
Buenos Aires, Argentina,
Radiography
Ultrasound
Magnetic Particle

Employment History:

2006 – Present	Fabrication, DCM, Toronto, Ontario.
2003 – 2006	Operation Manager, Azimuth Three Enterprises Inc. Brampton, Ontario
1995 – 2003	Chief Inspector and Safety Coordinator, **Canron Construction Corp. East** Toronto, Ontario
1994 - 1995	Project Assistant - Argentina Project - **Canron Inc.** Argentina / Mexico
1990 - 1994	Plant Manager - **Canron Inc.** Toronto, Ontario
1989 - 1990	Shop Office Manager - **Canron Inc.** Toronto, Ontario
1981 - 1989	Chief Inspector - **Canron Inc.** Toronto, Ontario
1979 - 1981	Assembly Supervisor - **Canron Inc.** Toronto, Ontario
1977 - 1979	Welding Leadhand - **Canron Inc.** Toronto, Ontario
1974 - 1977	Fitter First Class, CNC Programmer - **Canron Inc.** Toronto, Ontario

Relevant Experience: 33 years experience in steel fabrication, including assembly, welding, numerical control programming, estimating, quality control, supervision and management.

Additional Certification: Industrial Accident Prevention Association-Certificate of Training Level III, Canadian Welding Bureau-Welding Supervisor Certification

Robert J. Mahoney, Jr.
Structural Ironworker Local 40 General Superintendent

Career History

1999 - Present	DCM Erectors, Inc. General Superintendent	New York, NY
1996 - 1999	American Bridge General Foreman	Pittsburgh, PA
1995 - 1996	Jersey Steel Erectors General Foreman	Highlands, NJ
1993 - 1995	Burgess Steel Foreman	Englewood, NJ
1983 - 1993	Canron Construction Corp. General Foreman	New York, NY
1976 - 1983	Ermco Erectors Foreman	Corona, NY

Professional Education

40 & 20 Hour OSHA Safety Courses -including Sub Part R Training
Certified Fire Watch & Burning
Advanced Blueprint Reading Course
Four Year Mechanical Drafting Experience

Partial List of Projects Worked on

383 Madison Avenue
New York, NY

- 45 Story, 18,000 ton High Rise Office Building for Bear Stearns
- Stair and Net Superintendent

Meyers Parking Garage
New York, NY

- 9 Floor Steel and Precast Double Tee Parking Garage
- Installed and Removed FMC 1500 Favco Tower Crane

Robert J. Mahoney, Jr.
Structural Ironworker Local 40 General Superintendent

1500 Broadway, Times Square Studios
New York, NY

- Walt Disney Imagineering LED Sign Structure & Window Mullion
- Extremely Intense Building Renovation performed at night

Rockefeller University
New York, NY

- Cable Stayed Pedestrian Walkway Bridge and plaza/canopy renovation
- Night Erection of 100 ton bridge over FDR

Williamsburg Bridge
New York, NY

- South Outer Roadway progressive demolition of roadway and bridge deck orthotropic panels
- Supervised 260 employees

125 East 57th Street
New York, NY

- 34 Floor 4500 ton Office Building, 1 Tower Crane

Swiss Bank Tower
New York, NY

- 44 Floors, 9000 Ton Office Building

Union County Resource Recovery Facility
Rahway, NJ

- Boiler, Turbine, Receiving/Tipping Hall Buildings - 4500 tons
- Erected Structural Steel, Stairs, Handrails, Grating, Ladders

330 Jay Street
Brooklyn, NY

- 34 Floor, 16,000 Ton Office Building, 3 Tower Cranes

Robert J. Mahoney, Jr.
Structural Ironworker Local 40 General Superintendent

New US Federal Courthouse
Brooklyn, NY

- 17 Floor, 3500 Ton Courthouse, 2 Tower Cranes

731 Lexington Avenue
New York, NY

- 30 Floor, 23,000 Ton Composite High Rise with 20 additional concrete residential on top of steel, 3 Tower Cranes

Whitehall Ferry Terminal
New York, NY

- Three Phase replacement of existing Manhattan side of Staten Island Ferry Passenger Terminal constructed over the intersection of four existing/operating subway lines, Brooklyn Battery Tunnel, FDR Roadway Tunnel, 4500 tons, three mobile cranes

AOL/Time Warner
10 Columbus Circle
New York, NY

- Two block size site, One Tower 24 Steel Floors, Second Tower 19 Steel Floors, Middle Podium Section 9 Floor Jazz Theatre, 22,000 Tons Composite High Rise topped with 30 floors of residential reinforced concrete, Four Tower Cranes

Kevin Murphy
Structural Ironworker Local 40 Superintendent

Career History

1999 – Present	DCM Erectors, Inc. Superintendent	New York, NY
1995 – 1999	Canron Construction Corp. Foreman	New York, NY
1987 – 1995	Various Companies Connector,etc	New York, NY

Professional Education
40 & 20 Hour OSHA Safety Courses –including Sub Part R Training
Certified Fire Watch & Burning
Certified Welder

Partial List of Projects Worked on

DCM Erectors, Inc.
New York Times Building, New York, NY
54 Floor High-rise, erected with 3 Tower Cranes.

Maimonides Medical Center, Brookly, NY
Started this 9 story structural steel, deck, precast and curtain wall expansion. All components to be erected with a free standing tower crane

Fulton Fish Market, Hunts Point, NY
Structural steel and precast planks
Erected with 2 crawler cranes, had to meet FAA regulations

Columbia University, New York, NY
Erected an 11 story structural steel and deck structure for a mid-rise building with an internal jumping tower crane.

White Hall Ferry Terminal, New York, NY
Public building erected in four phases over three years.
Erected over the Battery Tunnel with crawler or hydraulic cranes

WWF – 1601 Broadway, New York, NY
Field preparation to erect large component od sign structure over sidewalk.

4 Time Square, New York, NY
Sign structure at roof of building

ABC Studios on Time Square –
Complex Sign Structure erected at night in large components.

Meyers Parking Garage, New York, NY
9 story structure with precast concrete planks, erected with a free standing tower crane.

Planet Hollywood – Broadway, New York, NY
Erected a 15 story super sign structure plus roof sign structure with tower crane.

Random House, New York, NY
Structural steel structure for the first 27 floors, erected with two internal jumping tower cranes.

Prior companies

1998 to 1999 – In crew (raising gang, signalman or connector) with Falcon Steel.

1996 to 1998 – Foreman for American Bridge.

1994 to 1996 – Decking Superintendent or foreman for Interstate Iron

1986 to 1994 – A. C. Associates as deck foreman.

1981 to 1994 – Various companies in the crews.

Specific Training for Steel Erection

2004 – 30 Hours OSHA Safety Course

2002 – 10 Hours OSHA Safety Course

2001 – Sub-Part "R" Training.

2000 – Iron Workers "User/Erector/Dismantler Training Course" (Scaffold).

Construction Fire Guard - Certificate of fitness by NYFD

Torch Handling – Certificate of fitness by NYFD

Zoom Boom and Scissor Lift training by United Equipment.

Education

Graduated from College in 1986 with a BA degree.

Steve McAward
Structural Ironworker Local 40 Superintendent

Career History

1999 - Present	DCM Erectors, Inc. Superintendent	New York, NY
1995 - 1999	Canron Construction Corp. Foreman	New York, NY
1987 - 1995	Various Companies Connector,etc	New York, NY

Professional Education

40 & 20 Hour OSHA Safety Courses -including Sub Part R Training
Certified Fire Watch & Burning
Certified Welder

Partial List of Projects Worked on

Meyers Parking Garage
New York, NY

- 9 Floor Steel and Precast Double Tee Parking Garage
- Installed and Removed FMC 1500 Favco Tower Crane

330 Jay Street
Brooklyn, NY

- 34 Floor, 16,000 Ton Office Building, 3 Tower Cranes

New US Federal Courthouse
Brooklyn, NY

- 17 Floor, 3500 Ton Courthouse, 2 Tower Cranes

Jamaica Station, AirTrain
Queens, NY

- 350 Ton Three Level High People Mover Station, 1 Hydraulic Crane

Steve McAward.
Structural Ironworker Local 40 Superintendent

Four Times Square
New York, NY

- 50 Floor, 24,000 ton High Rise, 2 Tower Cranes

New York Hospital over FDR Drive
New York, NY

- 12 Floor, 15,000 ton Hospital, 3 Tower Cranes, One Heavy Lift Marine Crane

Hospital for Special Surgery over FDR Drive
New York, NY

- 6 Floor, 4,500 ton Hospital, 1 Tower Crane, One Heavy Lift Marine Crane

Planet Hollywood Sign Structures
Times Square
New York, NY

- 291 foot tall Free Standing Sign Structure
- Four Sided Crown Sign Structure @ 52nd Floor
- East Face Structure

Lyric Theater
New York, NY

- 800 Ton Historic Landmarked Theater, One Tower Crane

St. Francis College
Brooklyn, NY

- 140 Ton gymnasium addition, One Large Capacity Hydraulic Crane

Pierpont Morgan Library
New York, NY

- 600 Ton Atrium Renovation, One Tower Crane

Michael P. O'Doherty, P.Eng

(Ex. 1)

CAREER OBJECTIVES

Continued involvement in medium and large scale **Bridge and Structural Projects** where I can continue to utilize and expand my engineering, construction, and management experience.

SUMMARY OF QUALIFICATIONS

- Professional Engineer, Province of Ontario, Canada since 1995.
- Design experience in structural steel for new and temporary structures, reinforcing, and construction / erection methods. Experience in the application of cables, wire rope, pre stressing strands, and post tensioning rods to the solution of specialty construction problems.
- Computer literate - proficient in Primavera SureTrack & Microsoft Project (Construction Scheduling), STAAD Pro 2001 (Structural Analysis), AUTOCAD (Structural Detailing) as well as word processors, spreadsheets, graphics and database applications.
- 16 years of involvement in large, medium, and small-scale construction projects acting as an Engineer, Project Manager and Superintendent dealing with a variety of owners, contractors and union labor.
- Experience in developing and negotiating contract claims, extras, payments and schedules.

PROFESSIONAL EXPERIENCE

Engineering

- Construction Engineer – Various High Rise Projects in NYC including **731 Lexington Place, AOL Time Warner Center, Random House & the Metropolitan Museum of Art.** Responsibilities including Tower Crane & Derrick installations, stability analysis for construction, member & connection design.
- Construction Engineer – Various Projects including the **Terminal Development Project** for GTAA. Developed erection procedures for new steel construction including subassembly, transportation & erection of the new control tower.
- Construction Engineer - **Triborough Bridge Prototype Deck Replacement**, New York, N.Y. Develop construction methodology for 3 types of deck replacement for Authority's performance evaluation.
- Construction Engineer -various projects for Midwest Steel / Canron Construction's New York Office including false work for an external tower crane at Reuters **Building (3 Times Square)**, the erection procedure for the removal of an internal tower crane at **42nd Street Development (Madame Toussaud's).**
- Site Engineer - **2nd Bluewater Bridge**, Point Edward, Ontario, Canada. Continuous Tied Arch- ½ Span 226m, 3,500 tonne International span involving cable stayed false work and cantilevered construction methods. Flanking and Approach spans consisted of 162m and 200m of Open box girder construction. Construction planning, design and implementation.
- Site Engineer - Corel Center, Ottawa, Ontario, Canada. Field modifications to new structural steel stadium roof, fast track construction.
- Construction Engineer - various projects for Midwest Steel / Canron Construction's Toronto Office involving Ironworker, Boilermaker & Pipe-fitter trade jurisdictions including. **Stelco PCI Modification** - Erection of ductwork and support steel and **St. Lawerence Cement** - Design of personnel support system for modifications to 180m (600 ft) chimney / exhaust stack.
- Other Projects have included;

- **New York Hospital** - Connection Design, planning stages for erection of 700 ton panels.
- **INCO SO2AP Phase 2** - Modifications to existing structural steel.
- **Hibernia - Erection Hall** - 3,000 tons new steel, site engineer and surveyor
- **Toronto Airport Hilton** - Reinforcing existing concrete structure.
- **INCO SO2AP Phase 1** - Field engineer - Modifications to new and existing steel. False work and connection design. Erection and rigging layouts.

- University cooperative work term assignments have included.
  - Marshall Steel Erectors - **Algoma Steel**, Sault Ste. Marie, Ontario.
  - Marshall Steel - Estimating department
  - Marshall Steel Erectors - **Sydney Steel Modernization**, Sydney, Nova Scotia
  - Ministry of Transport (Ontario) - **Bridge Design Group** - Reinforced Concrete Bridge Design utilizing Finite Element Analysis.
  - Ontario Hydro - **Darlington N.G.S.**, Design and Construction Division. Design Exposure to Structural Steel and Concrete (Reinforced, Pre stressed and Post tensioned concrete design.) in a Nuclear Containment Environment.

Project Management

- Project Manager - **Triborough Bridge Anchorage Rehabilitation**. Responsible for Cable / Strand re-anchoring, structural steel reinforcement and rehabilitation. Extras increased contract value by 40 % and returned 35 % margin.
- Project Manager - **Triborough Bridge Prototype Deck Replacement**. Responsible for finishing the contract and developing the factual, engineering and legal basis for a substantial claim for compensation.
- Project Manager - **Humber River Bridge** - Responsible for taking over the first phase of the project and bringing it back on schedule and budget.
- Scheduler - Various Projects including **Terminal 4 Pearson International Airport**, Reuters Building (3 Times Square), and 745 Seventh Ave (50 story, 7,000 tons).

Supervision

- General Superintendent - **Triborough Bridge Anchorage Rehabilitation**. Responsible for finishing an overdue and over budget project expediently at minimal cost. Negotiate sub contracts, union conflicts, pay quantities and schedule extensions.
- General Superintendent - **Triborough Bridge Prototype Deck Replacement**. Responsible for implementing construction methodology and completing the project while developing improvements and changes to increase efficiency and lower costs for future Authority projects.
- General Superintendent - Piccioni Bros. Construction. General contracting works with emphasis on road, water main and sewer construction.
- Ironworker Superintendent - **Hibernia Development Project**. Responsible for completing the erection and bolting of a 3000 ton building.

EMPLOYMENT HISTORY

2000-Present	DCM Erectors Inc.
1995 2000	CANRON Construction Corp (a division of Midwest Steel Inc)
1994 –1995	Piccioni Bros. Construction
1990 – 1993	CANRON Inc.

EDUCATION

Awarded **BASc. Civil Engineering Department**, University of Waterloo, 1990, Waterloo, Ontario
Major Course of Study - Structural Engineering -Minor Course of Study - Business Administration

John James Salvarinas, P.Eng.

Home: (Ex. 1)
Fax:
Cell:

Profile

A well-organized, motivated, creative, team-oriented individual, with extensive experience in contract management, negotiating, marketing, sales, procurement, manufacturing, distribution and construction. Has held senior managerial positions in the steel fabrication industry and has been self-employed in the food packaging industry.

A forward-thinking, down-to-earth individual with a common sense approach to problem solving. Outgoing, confident and relates well with others. Focuses on priorities and is diligent in his work habits. Adapts well to new situations. A person with integrity and high moral standards.

Experience

2004 - Present

John J. Salvarinas Inc.
Contract position for engineering and project management consulting with AMEC Construction Management Inc., New York, and DCM Erectors Inc., Toronto, specifically for the New York Times Project, New York.

2003 – 2004

Director - Sales & Projects, Walters Inc.
Performed all duties related to market development for fabricated steel products in New York State. Pursued leads, reviewed tender documents, determined course of action, reviewed estimates, determined pricing, and prepared and presented sales submissions.

2002 – 2003

Director – Sales & Projects, Structal-Walters LLC
Performed all duties related to market development for fabricated steel products in New York City. Pursued leads, reviewed tender documents, determined course of action, reviewed estimates, prepared and presented sales submissions, and determined pricing.

2001 – 2002

Manager, Sales & Project Management, New York Region
Canron East, a Division of Canron Corporation Inc.
In addition to the responsibilities of sales and marketing, specifically in New York City as outlined below, coordinated individual Project Managers for the $100 Million US of sales already generated. This included reviewing schedules, reviewing and awarding sub-contracts, coordinating work with other department managers, reviewing impact of changes, reviewing and setting pricing for changes, negotiating changes, and maintaining a positive cash flow for each contract. Projects included: 7 Times Square, 300 Madison Avenue, NY Presbyterian Children's Hospital, Sloan-Kettering Hospital Addition, Toys R US @ Times Square, 7 WTC Steel Removal and the Winter Garden Reconstruction.

2001

Sales Manager, Canron Construction Corp. East
Pursued leads, reviewed tender documents, determined course of action, reviewed estimates, prepared and presented sales submissions, determined pricing, negotiated and signed contracts. Sales volume exceeded $100 Million US, all in New York City. Some of the specific projects are listed above.

1988 – 2001

Vice-President & General Manager, Prespa Foods Company Ltd.
Procured, manufactured, distributed and merchandized a complete line of spices and legumes retailed in the Oshawa–Toronto–Cambridge corridor. Responsibilities included negotiating all raw material contracts, negotiating and awarding all sub-contracts, setting and maintaining production requirements and controls, negotiating retail pricing structures, establishing labour requirements and coordination of all financial functions.

1983 – 1988

Project Manager, Frankel Steel Limited
Responsible for the day-to-day project management functions for several structures in Toronto and New York City. Individual contract values ranged from $500,000 CDN to $38 Million US. Most notable: 7 World Trade Center, New York, 60 Wall Street, New York, 17 State Street, New York, Towers-on-the-Park, New York and the SkyDome Hotel, Toronto.

1980 – 1983

Regional Manager, Canadian Institute of Steel Construction
Promoted the use of steel as a construction material in the Ontario market place. Maintained a liaison with member companies, as well as with architects, consulting engineers, contractors and government agencies across the Province of Ontario. Made presentations at regional and national conferences and to University and College students on the use of steel as a construction material, and on structural steel systems.

Publications

Seven World Trade Center New York, Fabrication and Construction Aspects: Canadian Structural Engineering Conference, Vancouver, British Columbia, February 1986

Memberships

Member, Professional Engineers Ontario

Education

Master of Applied Science, University of Toronto, 1977
Department of Civil Engineering

Bachelor of Applied Science, University of Toronto, 1975
Department of Civil Engineering

Interests

Travel, golf, tennis and cycling

References

Andres Sosa	AMEC Const. Management	212-484-0300
Hugh Krentz	Canadian Institute of Steel Const	403-605-1101
Dave Pisacrita	Metropolitan Metals Corp., NY	212-563-7177
Peter Kranendonk	Walters Inc., Hamiltion	905-388-7111

Resume
Arnold Van Hees

May, 2003 - Present	Foreman,	Torway Construction Co., Ltd Nassau, NP, The Bahamas
2001 - 2003	Erection Superintendent	DCM Erectors, Inc New York, NY
1973- 2001	Erection Superintendent Equipment Manager	Canron, Inc Toronto, Ontario & New York, NY
1967 - 1973	Crane Operator	Dominion Bridge Toronto, Ontario

James S. Weir, P.Eng. (Ex. 1)

29 years in the structural steel industry with emphasis on connection design, specialized connection software development, fabrication and erection procedures, and 3 dimensional geometric modeling.

2004 – 2005	Project Engineer	
	ASDA, Etobicoke, Ontario, (416) 241-4350	
	Projects include - Metropolitan Museum of Art, renovation,	New York
	580 – 5th Ave, addition,	New York
1988 – 2003	Senior Project Engineer	
	Canron Construction Corp. East, Rexdale, Ontario, (416) 675-6400	
	Projects include - Times Square Tower Site I,	New York
	300 Madison Ave,	New York
	Sloan-Kettering Cancer Ctr, addition,	New York
	Swiss Bank Tower,	New York
	Westin Hotel, addition,	New York
	42 St Renewal, Times Square Hilton,	New York
	Lehman College Sports Complex, Bronx,	New York
	USTA Stadium, Flushing Meadows,	New York
	New York Hospital, addition,	New York
	Hospital for Special Surgery, addition,	New York
	Terminal One, Kennedy International,	New York
	US Air Terminal, La Guardia,	New York
	Felt Forum, Madison Square Gardens,	New York
	Pierpont-Morgan Library,	New York
	PeopleMover, Newark Airport,	New Jersey
	Davie Boulevard Overpass,	Ft. Lauderdale
	Humber River Bridges,	Toronto, Ont.
	Oxford Street Extension,	London, Ont.
	Castlefrank Overpass,	Ottawa, Ont.
	Black River Bascule Bridge	Wisconsin
	Heritage Square, Galleria,	Toronto, Ont.
1975 – 1987	Project Engineer	
	Frankel Structural Steel, Rexdale, Ontario	
	Projects include - 60 Wall Street,	New York
	7 World Trade Center,	New York
	599 Lexington Ave.,	New York
	Battery Park Building 'A',	New York
	Pierpont Plaza, Brooklyn,	New York
	53 State Street,	Boston
	Chrysler Paint Shop,	Windsor, Ont.
	Standard Life Bldg.,	Toronto, Ont.
	Chapparell Steel Melt Shop,	Texas
	Stelco Slab Caster Bldg.,	Hamilton, Ont.
	Burlington Bay Skyway Approach Spans,	Burlington, Ont.

Certification Licensed Professional Engineer, Province of Ontario

Education B.A.Sc. (Civil Engineering), 1975
University of Waterloo, Waterloo, Ontario

Richard Gilbert

Career scope

1998 (June) - Present Health and Safety Manager, Project Management, Equipment Procurement.
1301148 {DCM Erectors Inc. (CDN) and DCM Erectors Inc (US)}

- Structural Steel Fabricator/Erector and retrofitting for High-rise, bridges or commercial buildings.

Toronto, On and New York, NY

1987 – 1998(June) Project manager, Estimating, Corporate Safety, Site Coordination, Site Clerk
Midwest Steel / Canron Inc.

- Structural Steel Fabricator Erector
- Toronto, ON and New York, NY

1975 – 1987(October) Store Manager
Montreal Stereo and Video Corp.
Montreal, St. Jerome, Tascherau, St. Laurent, Verdun
Administration, advertising, inventory control, marketing, training of franchise

1971 - 1975 Assistant Store Manager
K-Mart
Valleyfield, Qc, Montreal, Qc, London, ON, Stratford, ON
Inventory control, schedule, budget, and administration.

\cademic

Mohawk College - Hamilton, Ontario.

1993: Technical college where I took some night courses aimed at increasing my knowledge of construction

Ecole Secondaire Edgar Hébert - Valleyfield, Québec.

1970: Grade 12.

Certifications

2006	New York City Building Department - Site Safety Manager – NYC License # 803 Renewal
2003	New York City Building Department - Site Safety Manager – NYC License # 803 Renewal
2002	30 Hours OSHA course
2002	Building Trade Employers Association – OSHA 300 Log
2001	Modern Group - Forklift Operator Trainer
1999	New York City Building Department - Site Safety Manager – NYC License # 803 Renewal
1999	Propane Handling Certificate of Fitness NYC #80251655
1996	New York City Building Department - Site Safety Manager – NYC License # 803
1995	30 Hours OSHA course
1995	Certified Member Workplace Health and Safety Agency # CSAO00643
1995	Dupont – Safety training for construction sites.
1995	Steel Structures Painting Council – Lead Abatement
1994	30 hrs OSHA Training Course
1993	J. J. Keller – Federal Motor Carrier Safety Codes
1991	Mohawk College – Plane Surveying
1991	Ontario General Contractors Association – Planning and Scheduling.
1990	Ontario General Contractors Association – Construction Safety and First Aid.
1990	Mohawk College – Estimation and Construction Management
1989	HAZCOM (Hazardous Materails on site) Certificate
1988	Mohawk College – Welding and Blue Print Reading

On site Experience

1301148 {DCM Erectors Inc. (CDN) and DCM Erectors Inc (US)}: 1998(June) - Present:

Responsibilities:

PROJECT MANAGEMENT, SCHEDULING, COORDINATION WITH CUSTOMER/ ENGINEERS/CONTRACTORS, SAFETY MANAGER, PROCUREMENT, PUBLIC RELATIONS. Developed computerized forms/procedures for the above mentioned duties which are currently used on all projects. The different programs used were Microsoft Word, Microsoft Excel, Microsoft Project.

Also involved in the following

Safety for all projects in the United States

Web page development – ongoing project

Internal jumping system patent for the US, Canada and Europe is ongoing (US is pending)

Connectivity between our office in Toronto, New York and South Plainfield

Present WTC-TowerOne – Structural steel for 10 floors Phase 1 – Project Management Starting December 2006
Queens Pool and Ice Rink – Cable stay curved roof. Structural Steel, precast seating, precast roof planks and 2 mast with 12 3 inche cables attached to aech. Completed December 2006.
Maimonides Hospital Expansion – Structural steel, curtainwall, precast for 9 floors. Project Management
Brooklyn Post Office – Completion of curtainwall – Project management
Brooklyn Federal Courthouse Completion – Structural steel and curtainwall. Project management
Fulton Fish Market – Structural steel and concrete pre-stressed planks. Project management
77 South Waker drive Chicago - Tower crane rental with internal jumping system
111 Soulth Waker drive Chicago – Tower crane rental with internal jumping system
WTC-Ground Zero – Removal structural steel – Safety, Project management
731 Lexington – High rise of 54 floors - Safety
Grand Central ADA Renovation – miscellaneous metals – Project management
330 Jay Street – Precast walls and structural steel 15 floors mid rise – Project management
Grand Central terminal – Service Platforms – Project management
Columbus Circle _ Twin 54 floors tower – Safety, Project management team
NY Public Library Expansion – Erection – Coordination, Project Management, Safety.
Museum of Natural History – Window Washing System Installation – Safety, Project Management.
Brooklyn Courthouse – High-rise building erection – Safety, Project Management team.
Random House – Erection of High-rise – Planing, Safety, Project Management team.
Whitehall Ferry Terminal – Erection of structural Steel – Planning, Safety, Project Management.
360 Madison Avenue – Retrofitting – Planing, Safety, Project Management
Toronto Airport – Erection of structural steel – Planification, Safety, procurement of equipment.

1999 ABC-Walt Disney Imagineering – New York – Safety,Erection/ Fabrication/Expediting of LED Sign. (Done)
Planet Hollywood – 52 story sign structure- Safety, Project Management (Done)
383 Madison, - New York, NY – 47 floor Higrise occupational safety (On going)
Rockefeller University Pedestrian Bridge – Cable Stay Bridge erection – Safety, coordination (Done)
NASDAQ Sign – Structural Frame Assembly – Coordination (Done)
Discovery Camp – Nassau, Bahamas - Management and expediting (Done)

1998 Midway Airport Terminal - Chicago - On site Coordination
Goodmans Bay Office Bldg,- Nassau - Estimating, project management, safety

British Colonial Hotel – Nassau	-	Estimating, project management, safety
Atlantis II Phase II – Paradise Island	-	Site coordination, administration, safety
Setting up new offices for ADF Steel Corp. in Toronto		

Midwest Steel / Canon Inc.: 1987 - 1998 (June):

Responsibilities:

PROJECT MANAGEMENT, ACCOUNTS PAYABLE AND RECEIVABLE, FILING, SITE SAFETY COORDINATOR, PROCUREMENT, PUBLIC RELATIONS, TIME KEEPING:
Developed computerized forms/procedures for the above mentioned duties which are currently used on all other projects. The different programs used were Microsoft Word, Microsoft Excel and Macdraw.

On site Experience:

1998	Yerba Buena Sony Center	- Project management, Safety.
	Rehabilitation CN Bridge Fort Erie	- Project Management, Safety.
1997	Lyric Theater NYC	- Estimating, take-off, sales, project management, Safety.
	Yerba Buena Sony Center	- Project management, Safety.
1996	Setting up a new office for Midwest Steel in Oakville,	
	Niagara falls Casino	- Estimating, take-off and sales.
	Lyric Theater NYC	- Estimating, take-off, sales, project management, Safety.
	Yerba Buena Sony Center	- Estimating, take-off, sales.
1995	Occupational Health and Safety	- Overseeing all construction projects in East Coast Canada and United States.
	Project management.	- Putting together a project management manual (with a team) for standardization of forms and procedures.
	Telecom Building	- Buenos Aires, Argentina – arranging for sending five iron worker on a high rise project for teaching local workers the erection procedures such as rigging, sequencing, plumbing and safety.
1994	Occupational Health and Safety	- Overseeing safety for all construction projects in East Coast Canada and United States.
	Project management.	- Putting together a project management manual (part of team) for standardization of forms and procedures.
	Intercontinental Building	- Buenos Aires, Argentina – arranging for sending five iron worker on a high rise project for teaching local workers the erection procedures such as rigging, sequencing, plumbing and safety and project management
1993	Head Office Rexdale	- Overseeing safety for all construction projects in East Coast Canada and United States.
	Project management.	- Putting together a project management manual (with a team) for standardization of forms and procedures.
	Below is work done with Burlington Steel while on temporary layoff from Canron.	
		Part of working crew, surveyor, safety rep.
	Standard Tube, Woodstock	- Installing a new oven and parts washer system for production line.
	Coating 85, Mississauga	- New plating line installation and some maintenance work.
	A. G. Simpson, Oshawa	- New plating line installation and some maintenance work.

(Ex. 1)

1992	Ivaco, Hawkesbury Valleyfield, Québec	- Overhead Crane Rails Repair Project Manager. - Negotiate in French with potential subcontractors for possible work coming.
	Ford, Oakville	- Roof Reinforcing- Project Management and Health & Safety Rep.
1991	#9 Flash Furnace, Inco, Sudbury Cold Mill, Dofasco, Hamilton	- Project management and Health & Safety Rep. - Project management.
1990	Cold Mill, Dofasco, Hamilton	- Project management. - Rehabilitation of #3 Ore Bridge - Administration.
1989	Over & Under Pinning, Inco, Sudbury Maint. #1 & #2 Melt Shop, Dofasco	- Administration. - Administration.
1988	#3 Galvanizing Line Dofasco, Ham.	- Administration.
1987	Container Crane, Montreal	- Administration.

HOBBIES:

Reading in French and English, building/refinishing objects in wood/metal using some hand or power tools. Occasional camping. I also like to listen to various type of music from pop rock to classical. Being a homeowner I do most repairs such as electrical, plumbing or mechanical myself. Like traveling and have been in Europe (France and England), Argentina, Bahamas and United States.

ERECTORS INC.

110 East 42nd Street
Suite 1704
New York, NY 10017
Tel. (212) 599-1603 Fax (212) 599-1615

Technical Proposal Item No.: ***5.1.2 Management Approach to the Project***
RFP/Contract No.: W0TC-GC1-2-KN0186-020
Station Construction and Transit Hall Structure to Grade
Structural Steel, Intumescent Coating, Metal Deck & Precast Work
New York, NY
February 22, 2009

DCM Erectors, Inc's ***Management Approach to the Project*** will support the project from multiple locations with proposed staff listed on our Organizational Chart coordinated and directed by DCM Erectors, Inc Project Executive and Manager(s). The amount of time each staff member will be dedicated to the project will vary depending upon their location in the organizational chart. Procurement, Engineering and Drafting will be performed/supervised from our Toronto, Ontario, CANADA Offices. Scheduling, Project Management, Field Operations and Administration will be performed/supervised from our New York City Administrative and Field Offices. Quality Assurance operations will alternate between New York City Administrative, Toronto, and Shop Fabrication/Subcontractor/Vendor locations.

DCM ERECTORS INC.

110 East 42nd Street
Suite 1704
New York, NY 10017
Tel. (212) 599-1603 Fax (212) 599-1615

Technical Proposal Item No.: ***5.1.3 Annual Construction Volume – Past and Future***
RFP/Contract No.: W0TC-GC1-2-KN0186-020
Station Construction and Transit Hall Structure to Grade
Structural Steel, Intumescent Coating, Metal Deck & Precast Work
New York, NY
February 22, 2009

DCM Erectors, Inc's ***Annual Construction Volume for the past five years is as follows:***

1. 2008 $ 144 Million Projected – Financial Statements not completed
2. 2007 $ 179 Million
3. 2006 $ 116 Million
4. 2005 $ 54 Million
5. 2004 $ 32 Million

We are proud of our growth from our founding in 1999 to present and attribute it to our skilled work force and faith of our clients in us from our previous careers.

DCM Erectors, Inc's ***Projected Annual Construction Volume for 2009*** should approximate $ 166 Million. This excludes projects not awarded at this date.

DCM Erectors, Inc ***Projected Annual Construction Volume for the next five years.*** Current economic conditions indicate a somewhat bleak outlook for private sector construction for at least the next two years and spirited competition for public sector construction work. It is our opinion that private sector work will gradually return to health sometime in the third to fourth year as construction is the last sector to go down in a recession and the last to recover in a thriving economy. DCM Erectors, Inc is also targeting other market areas for work in Canada, the Caribbean and USA.

- Stadium, Vancouver, British Columbia
- Airport, Nassau, Bahamas
- Stadium, Florida

ERECTORS INC.

110 East 42nd Street
Suite 1704
New York, NY 10017
Tel. (212) 599-1603 Fax (212) 599-1615

Technical Proposal Item No.: ***5.1.4 Contingency Planning***
RFP/Contract No.: W0TC-GC1-2-KN0186-020
Station Construction and Transit Hall Structure to Grade
Structural Steel, Intumescent Coating, Metal Deck & Precast Work
New York, NY
February 22, 2009

DCM Erectors, Inc will require all subcontractors/vendors to execute waivers of lien and provide bills of sale/lease agreements giving DCM Erectors, Inc the right to remove material from their premises and send to another designated subcontractor/vendor. In addition, subcontractors will bond to DCM Erectors, Inc to insure their performance. We believe that these measures will protect us and Phoenix Constructors, JV/Port Authority of New York & New Jersey should a subcontractor become bankrupt or fall behind.

ERECTORS INC.

110 East 42nd Street
Suite 1704
New York, NY 10017
Tel. (212) 599-1603 Fax (212) 599-1615

Technical Proposal Item No.: ***5.1.5 Progress Schedule/Review/Controls***
RFP/Contract No.: W0TC-GC1-2-KN0186-020
Station Construction and Transit Hall Structure to Grade
Structural Steel, Intumescent Coating, Metal Deck & Precast Work
New York, NY
February 22, 2009

DCM Erectors, Inc utilizes management tools such as FABTROL MRP, Primavera Scheduling, Tekla's X-Steel 3-D Real Time Modeling Steel Detailing Software and Microsoft Excel custom designed management reporting spreadsheets to gage progress and project actual versus desired project requirements. We tend to place more assets toward achieving an aggressive milestone than might at first seem required in order to achieve that milestone in case there is a hiccup in one of the assets deployed to achieve the milestone. We hold weekly project schedule meetings and take action to assure milestone achievement and/or create/embark upon a recovery plan. We include Lovett & Silverman's credentials.

LOVETT
SILVERMAN

World Trade Center Transportation Hub Transit Hall Structure to Grade

Management of Schedule and Cost

LOVETT SILVERMAN

Goals of Schedule

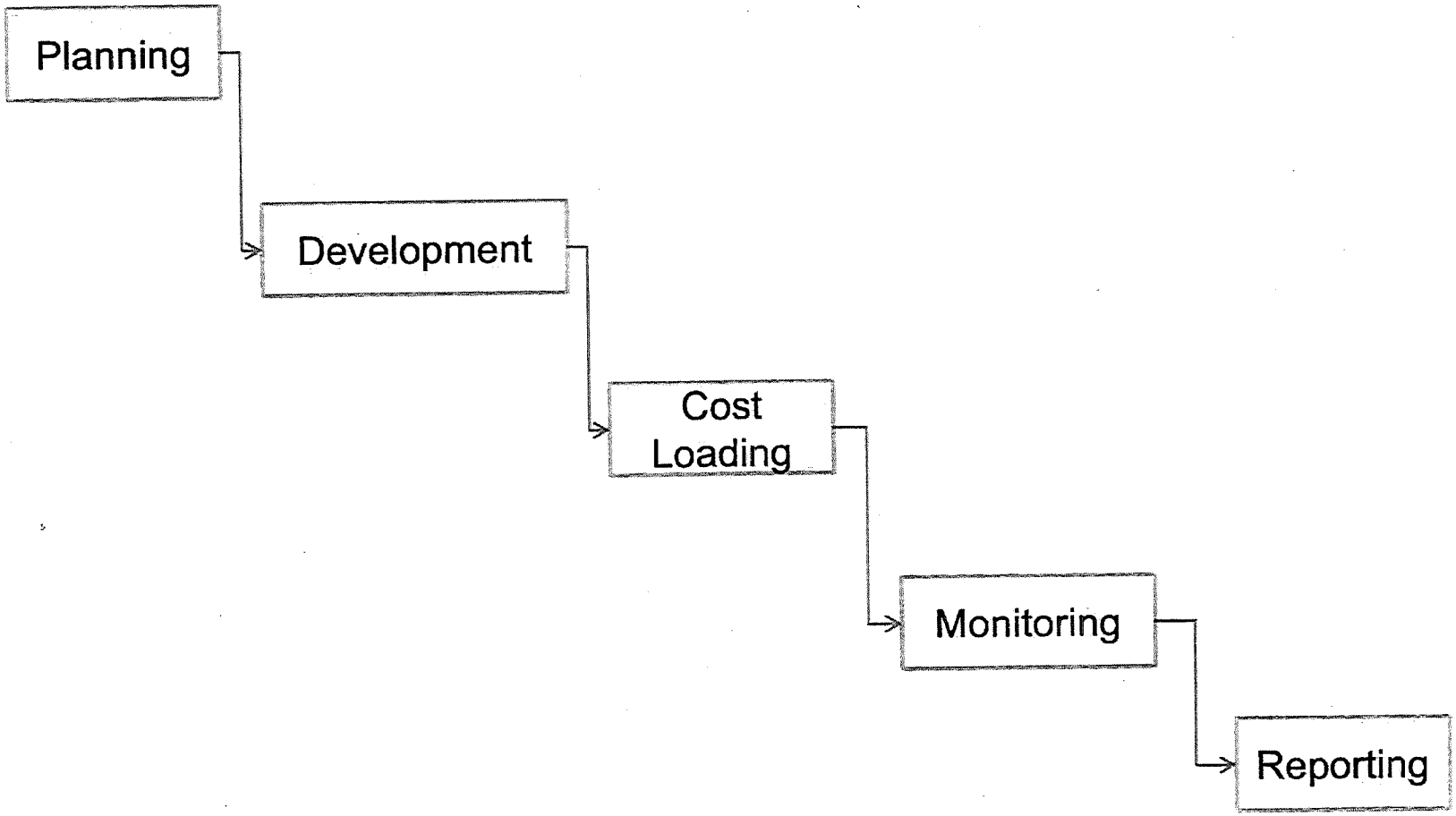
DCM ERECTORS INC.

- Management tool
- Risk management/early warning
- Communication & collaboration

LOVETT SILVERMAN

Process Overview

DCM ERECTORS INC.



LOVETT SILVERMAN

Planning

DCM ERECTORS INC.

Planning

Development

Cost Loading

Monitoring

Reporting

Changes

- Meet with project personnel
- Review drawings/scope
- Create hi-level global perspective
- Organize, categorize, distinguish
- Identify key milestones
- Determine level of detail
- Identify access milestones/dates

LOVETT SILVERMAN

Development

DCM ERECTORS INC.

Planning

Development

Cost Loading

Monitoring

Reporting

Changes

- Breakdown scope into the reasonable tasks (~1-3 weeks long)
- Establish reasonable durations and key interdependences.
- Review gaps and float
- Identify and analyze the project's critical and near critical path(s)
- "Rinse and Repeat" – creating a baseline is an iterative process
- Verify that global perspective is reflected in detail

LOVETT SILVERMAN

Development

DCM ERECTORS INC.

Planning

Development

Cost Loading

Monitoring

Reporting

Changes

Baseline schedule points:

- Activity duration v. level of detail
- Embrace explicit definitions
- Cultivate realism (learn to be less optimistic)
- Limit bad logic
- Don't try to "fit"

LOVETT SILVERMAN

Cost Loading

DCM ERECTORS INC.

Planning

Development

Cost Loading

Monitoring

Reporting

Changes

- If you're not measuring progress and performance using earned value – you're not measuring progress or performance
- Earned value measurements can be skewed by major equipment, materials and erection equipment

LOVETT SILVERMAN

Cost Loading

DCM ERECTORS INC.

Planning

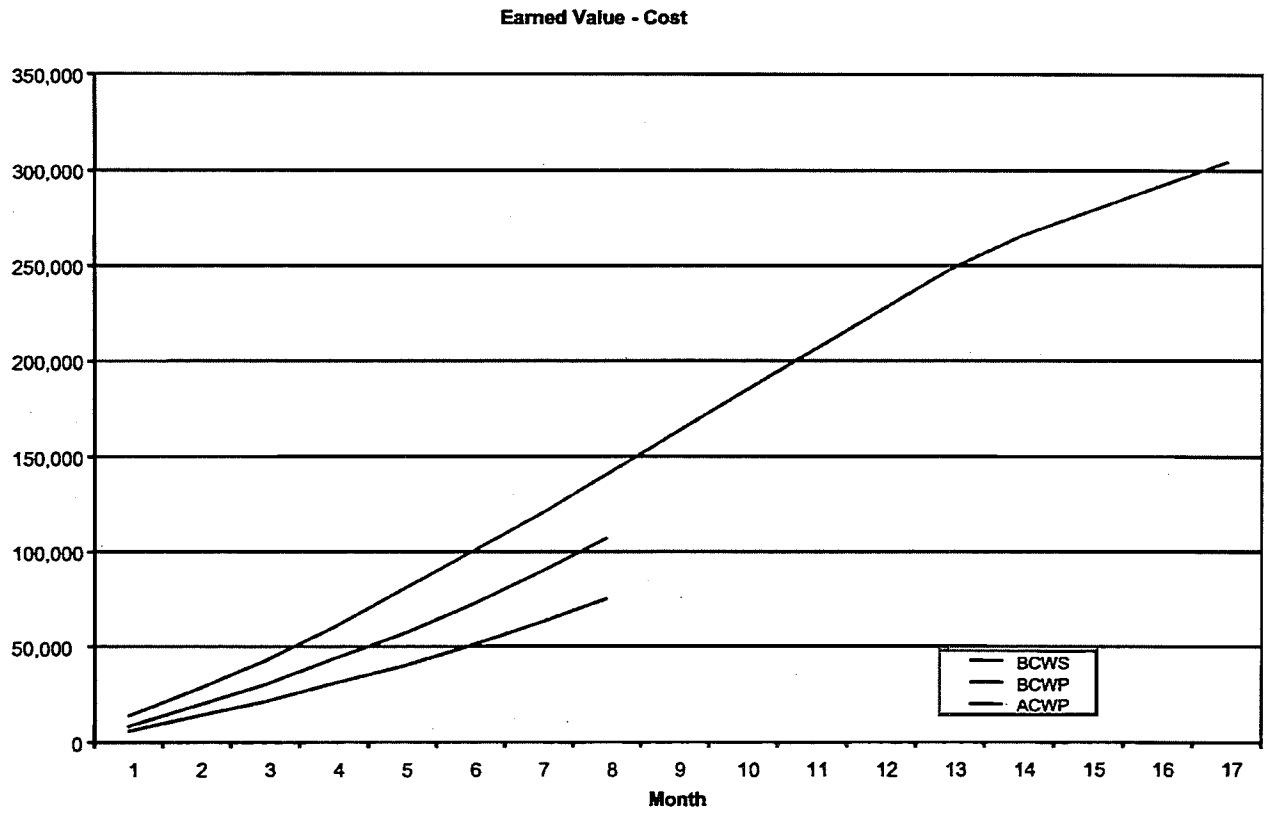
Development

Cost Loading

Monitoring

Reporting

Changes



LOVETT SILVERMAN

Monitoring

DCM ERECTORS INC.

Planning

Development

Cost Loading

Monitoring

Reporting

Changes

- Monthly progress, adjust for change and adjust for performance
- Verify future plan
- Engineering/fabrication interface with Fabtrol
- Field status
- Review and fix out-of-sequence
- Cost status

LOVETT SILVERMAN

Reporting

DCM ERECTORS INC.

Planning

Development

Cost Loading

Monitoring

Reporting

Changes

- Monthly report
- Variances
- Changes
- Technical issues
- Cost reporting – earned value
- Bar charts, graphs

LOVETT SILVERMAN

Changes

DCM ERECTORS INC.

Planning

Development

Cost Loading

Monitoring

Reporting

Changes

- Establish change procedure for schedule
- Insert Fragnets as needed

I. APPROACH to SCHEDULE AND COST CONTROLS

PHILOSOPHY

An accurate and well thought out CPM Schedule is a tool for the use of all parties to plan projects, monitor progress and assure timely completion. By contrast, a poorly prepared and monitored schedule fails to provide the proper early warning to make adjustments to meet milestones or completion dates. It is Lovett Silverman's proven philosophy that delays/risks on any construction project can be effectively minimized and/or avoided by applying the following fundamental principles:

I. Develop a schedule in a team effort with all parties
II. Pro-actively use the schedule to monitor progress
III. Document issues contemporaneously
IV. Resolve disputes in a timely manner

PROJECT MANAGEMENT TOOLS

Lovett Silverman uses the latest version of Primavera exclusively for all of our consulting assignments. Our staff attends user seminars when upgrades are being introduced to keep abreast of software innovations and to help us maintain our competitive edge.

Lovett Silverman utilizes PDF file format for all electronic transfer of schedule documents. This enables instantaneous access to schedules. It also provides a more secure document format that is not subject to alteration by a third party.

METHODOLOGY and APPROACH: SCHEDULE DEVELOPMENT

Described below is Lovett Silverman's detailed approach to the proposed assignment. Note that our development of the detailed CPM Schedule will follow the same basic work plan which has proven successful on similar previous assignments.

Phase I: Preliminary Planning, Plans Review and Establishment of Milestones

The development of the Project Baseline is the most critical phase of the Project. To establish a project schedule, Lovett Silverman will begin by meeting with Project personnel and reviewing the drawings in detail for familiarity with all required aspects of the project. Working with project staff, Lovett Silverman will determine the appropriate level of detail required for the project. This will include the development of a work breakdown structure. Included in this first phase will be identification of high-level project milestones and definitions, which will be reviewed with Team members to ensure that they will meet the project objectives.

Phase II: Development of Detailed Project Schedule

Utilizing the bid schedule and the information obtained in our Phase I, Lovett Silverman will develop a detailed CPM schedule in sufficient detail, and indicate all required work tasks, including:

- Site access milestones from PCJV
- Material engineering, fabrication
- Erection

We will meet with team members to understand and identify all necessary work scope to an appropriate level of detail. The most probable duration for each activity will be determined, factoring in the planned level of resources and risk. Predecessor and successor relationships will be identified between activity pairs and also milestones. Risk-based schedule contingency will be determined and allocated.

Review and Revise Schedule

After the Phase II tasks are completed, Lovett Silverman will submit same to PCJV for review and comment. Lovett Silverman will hold meetings with the PCJV personnel to facilitate the process of review and revision. Once this process is completed, the schedule will reflect all requirements for completing the project in accordance with all contract requirements.

Cost/Resource Loading

As part of the development process, each activity in the master schedule will also contain cost loading which will match the current DCM's bid.

Bar Chart and Tabular Reporting

Lovett Silverman will generate bar charts, which can be organized by area, phase, or according to any other activity code which may be required. Lovett Silverman may also recommend other bar charts as the particular circumstances of the project may dictate. Examples are look-aheads, procurement activities, and variance reports.

Lovett Silverman will also generate computerized tabular activity listings of all activities in the schedule. The typical tabular reports would include total float/early start sort, and early start/early finish sort. Additional activity sorts can be included, as required.

Cost and Resource Reporting

Lovett Silverman will also generate the required cost curves and reports when required. These reports and curves will include:

- Detailed earned value report by activity
- Summarized earned value report
- Earned value vs. Actual curve
- Cumulative cost and percent distribution curves (early, late, earned and actual)

THE UPDATE PROCESS

Attendance at Meetings

After approval of the CPM schedule, Lovett Silverman will meet with the DCM personnel at the site on a monthly basis to gather update information. This information gathering process will include a job site walk through so that site progress can be directly seen by our personnel. Status of each activity will be recorded and incorporated into the schedule.

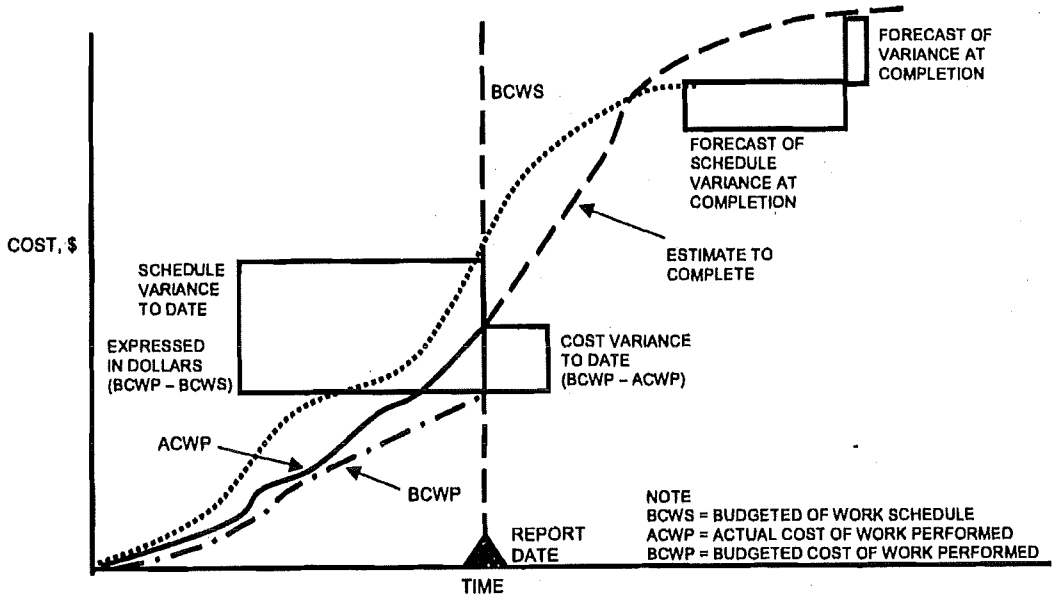
Monthly Update and Report

Lovett Silverman will incorporate actual start and finish dates, remaining duration, and percent complete of cost/resources earned into the updated schedule. The same typical tabular reports, bar charts, and cost curves and reports discussed above will be submitted as part of the overall update package.

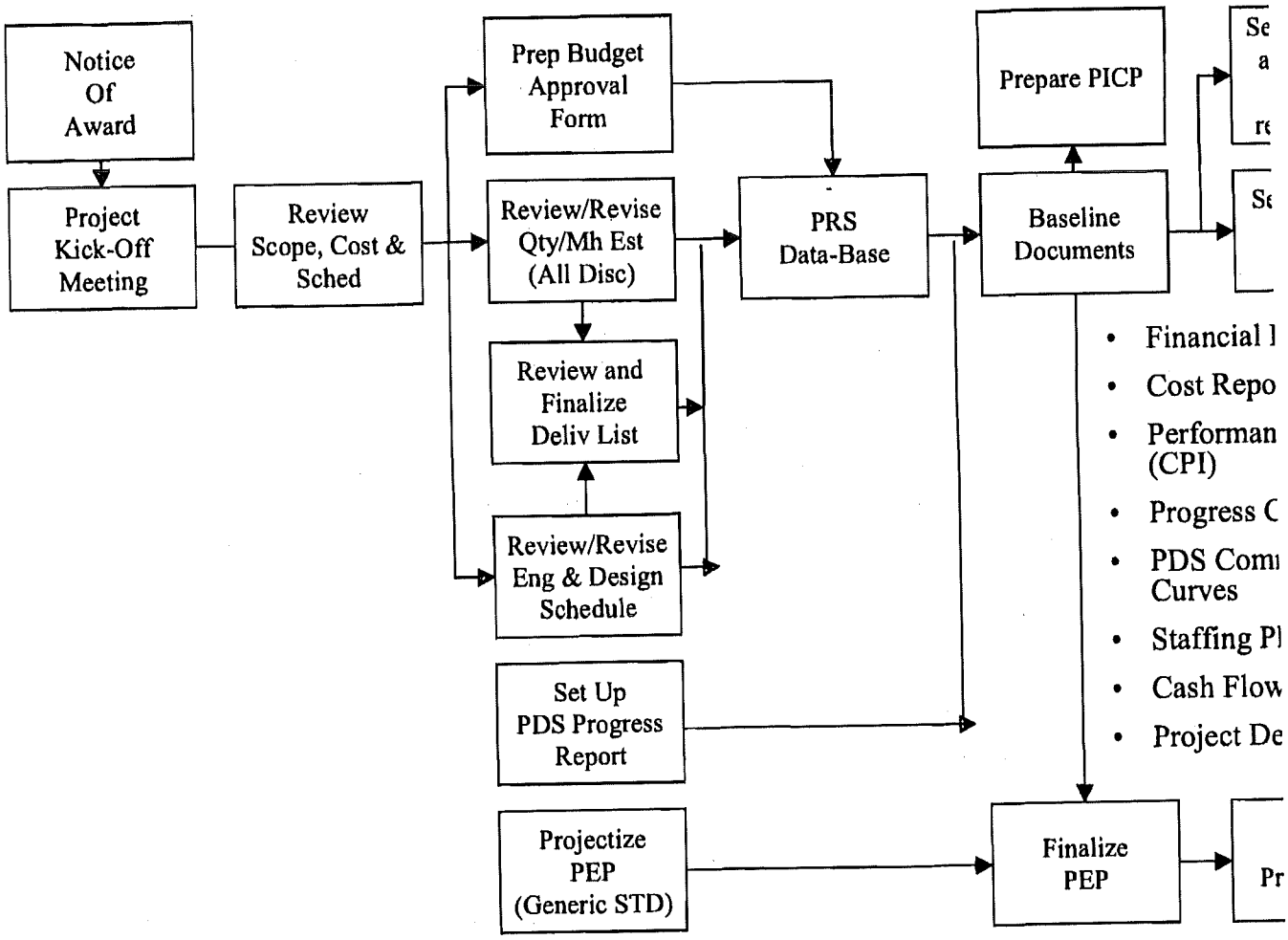
The WBS and the schedule cost summary will be analyzed to compare the percent completed and actual costs versus earned costs. Change order and delays will also be discussed and Lovett Silverman will make appropriate revisions to the CPM system so the impact of the project can be analyzed.

Although a narrative report is not specified as a requirement, Lovett Silverman would recommend that PSE&G require one as a necessary part of the update process. Our narrative report, if requested, would summarize the following information:

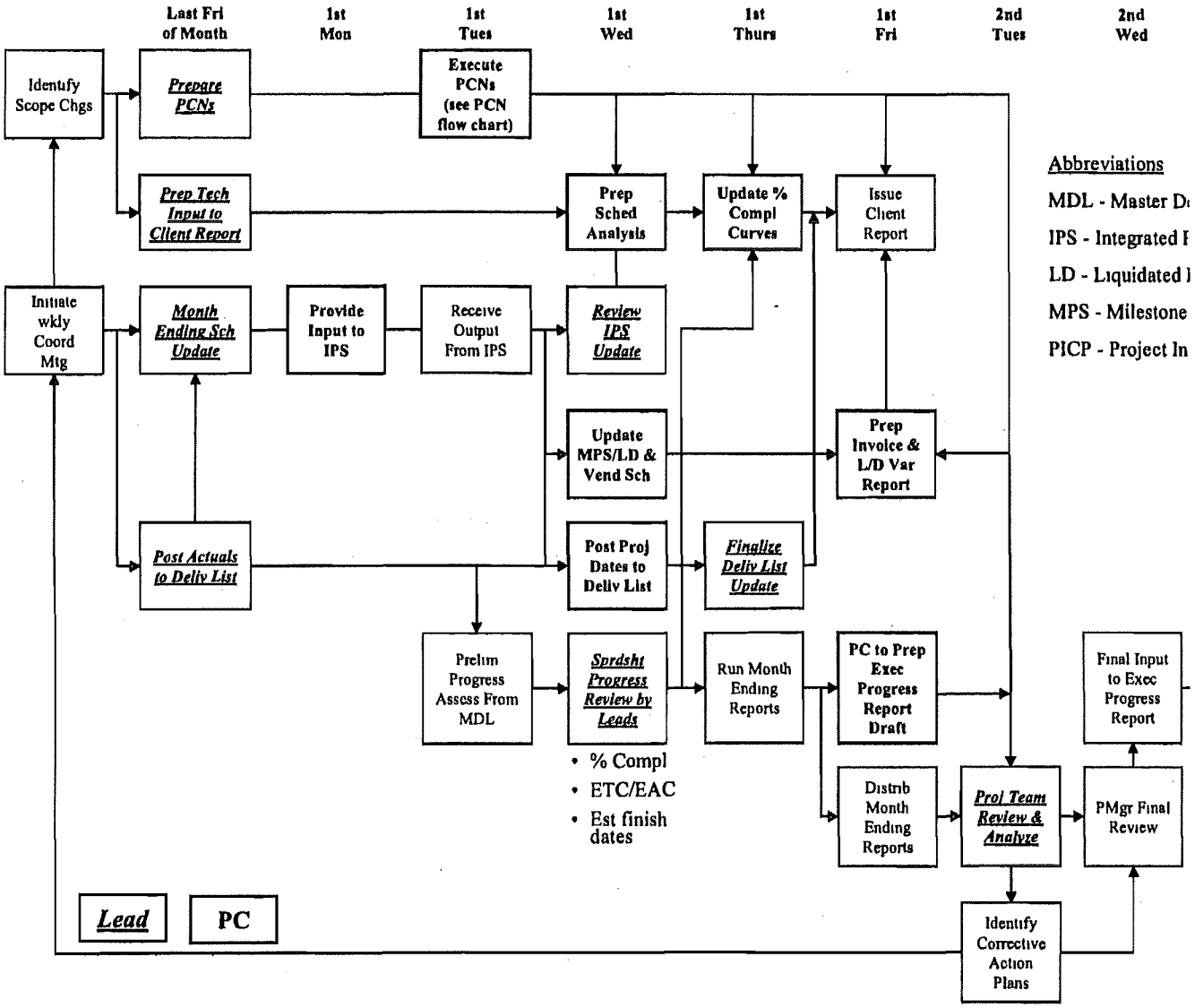
- Progress Analysis
- Critical Path Analysis
- Priority Areas
- Procurement and Submittal Status
- Impact Analysis of Each Change Order
- Impact Analysis of Delays
- Potential Problem Areas
- Corrective Action Recommendations


FORECAST OF VARIANCE AT COMPLETION
BCWS
FORECAST OF SCHEDULE VARIANCE AT COMPLETION
COST, $
ESTIMATE TO COMPLETE
SCHEDULE VARIANCE TO DATE
EXPRESSED IN DOLLARS (BCWP – BCWS)
COST VARIANCE TO DATE (BCWP – ACWP)
ACWP
BCWP
NOTE
BCWS = BUDGETED OF WORK SCHEDULE
ACWP = ACTUAL COST OF WORK PERFORMED
BCWP = BUDGETED COST OF WORK PERFORMED
REPORT DATE
TIME

PCARP Flow Chart
Baseline Phase



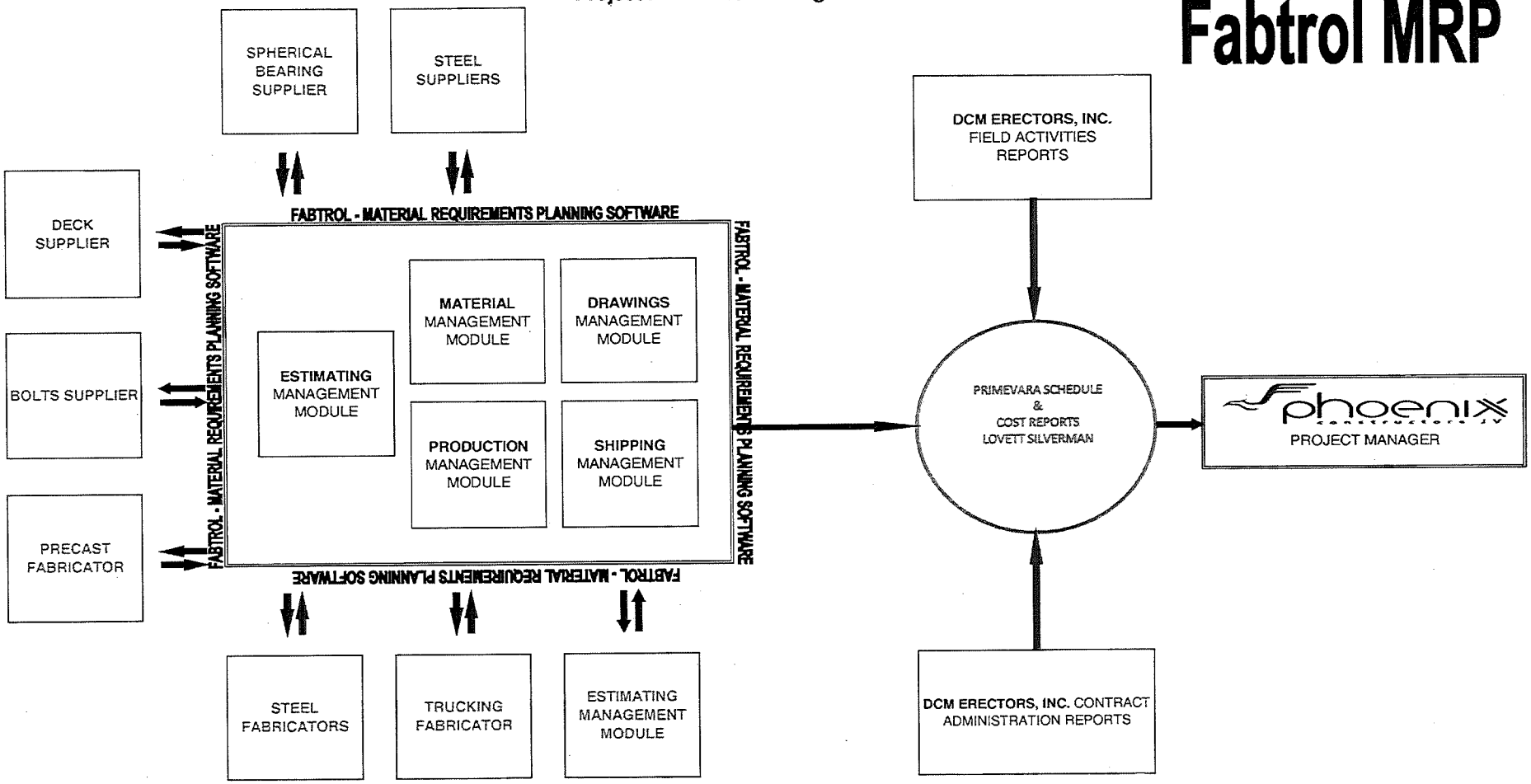
PCARP Flow Chart Execution Phase



DCM Erectors, Inc. - WTC TRANSPORTATION HUB - PACKAGE 20

Project Information Management Plan

Fabtrol MRP



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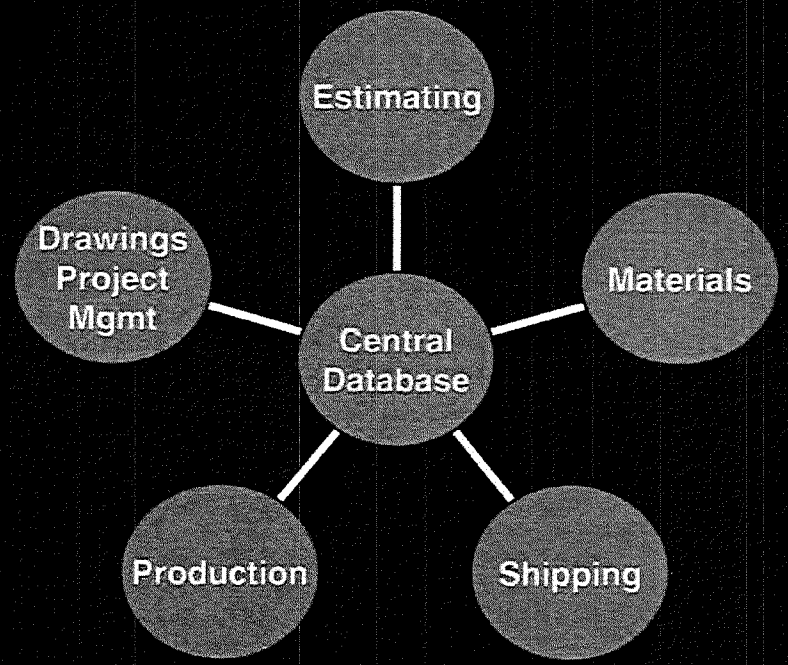
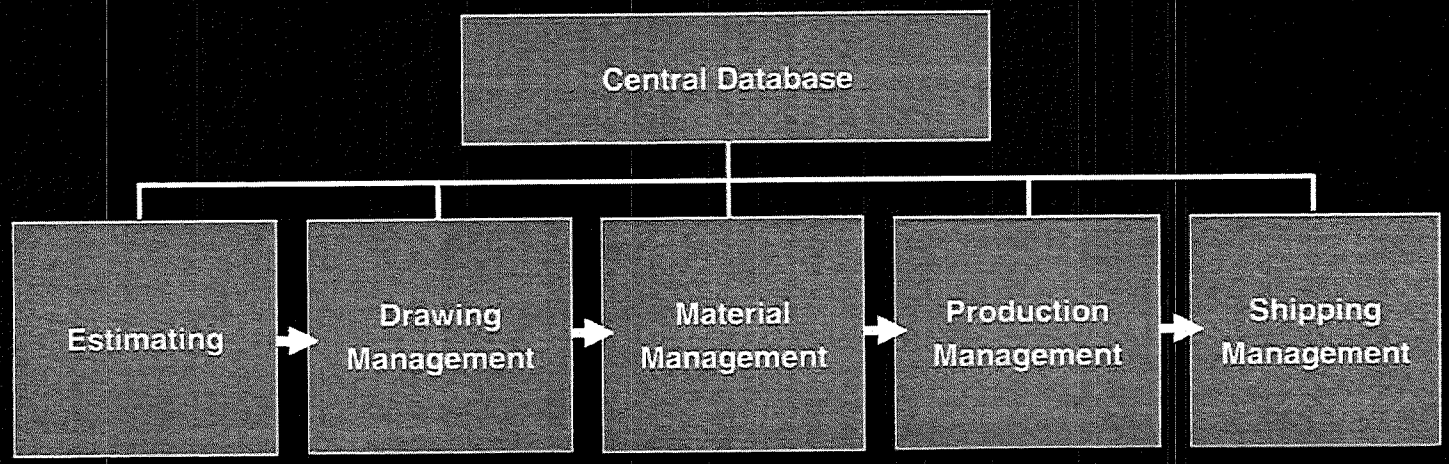
Integrated software for steel fabricators

- Estimating
- Drawing Management
- Material Management
- Production Management
- Shipping Management

FabTrol MRP
An integrated system



Areas of functionality



- Fast takeoffs
- Import from model with labor

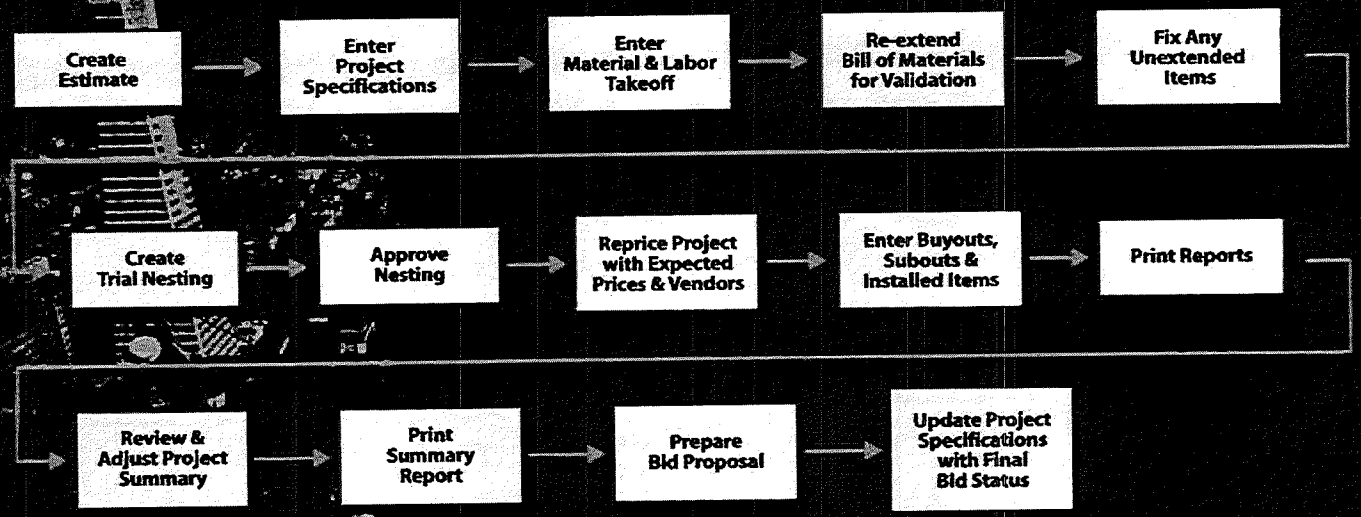
- BOM imports
- Drawing log
- Approval and DWG revision management

- Material nesting
- Purchasing and receiving
- Stock control

- Planning production
- Tracking work completed
- CNC integration

- Planning loads
- Tracking left to load to subcontractors and to the job site

ESTIMATING



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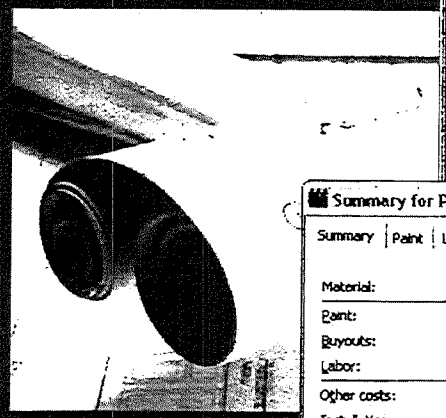
Estimating & Production Control Software for Steel Fabricators

Estimating



Bill of Materials - Sorted by Type_Size_Length

Item #	Drawing	Type	Size	Grade	Length	Notes	Fin	Freight	Phase	LM Hours	Hard Cost	Selling Price
192.0000	1002	PL	3/4"x 254	A36	559 mm		1	S	TWO	0.24	$6.20	$6.83
80.0000	1001	PL	3/4"x 254	A36	406 mm		1	S	ONE	0.39	$9.89	$10.88
38.0000	1001	PL	3/4"x 254	A36	254 mm		1	S	ONE	2.06	$51.61	$56.77
82.0000	1001	PL	3/4"x 254	A36	254 mm		1	S	ONE	0.29	$7.37	$8.11
71.0000	1001	PL	1"x 254	A36	254 mm		1	S	ONE	1.19	$29.91	$32.91
305.0000	1002	RB	3/4"	A36	1372 mm		4	S	TWO	0.55	$13.81	$15.20
425.0000	1003	W	200x31.3	A992	5263 mm	COLUMN	1	S	THREE	1.16	$29.14	$32.05
470.0000	1003	W	200x31.3	A992	5263 mm	COLUMN	1	S	THREE	1.16	$29.14	$32.05
								S	THREE	1.16	$29.14	$32.05
								S	THREE	1.16	$29.14	$32.05
								S	THREE	6.91	$172.84	$190.12
								S	THREE	1.16	$29.14	$32.05
								S	ONE	9.01	$225.32	$247.85
								S	THREE	4.42	$110.65	$121.72
								S	THREE	4.42	$110.65	$121.72
								S	THREE	0.74	$18.67	$20.54
								S	THREE	0.74	$18.67	$20.54
								S	THREE	0.74	$18.59	$20.45
								S	THREE	0.74	$18.59	$20.45
								S	THREE	0.57	$14.43	$15.88
								S	THREE	0.57	$14.33	$15.77
								S	THREE	3.32	$83.13	$91.44
								S	TWO	4.62	$115.58	$127.14
								S	THREE	2.65	$66.47	$73.11
								S	THREE	0.76	$19.21	$21.13

Assign to Sequence... Close

Summary for Project #4000E Eugene Hilton

Summary | Paint | Labor | Other Costs | Averages

	Weight:	Hard cost:	Selling price:	% of project:
Material:	133,392.05#	$41,847.35		34.33 %
Paint:		$5,846.88		4.79 %
Buyouts:	6,100.00#	$2,807.00	$3,087.70	2.30 %
Labor:		$43,937.57	$48,331.49	36.05 %
Other costs:		$5,952.89	$11,661.39	4.88 %
Installation:		$5,000.00	$5,000.00	4.10 %
Subouts:	3,450.00#	$1,200.00	$1,320.00	0.98 %
Total material:		$52,076.23		42.73 %
Total hard cost:		$106,591.69		87.46 %
Markup on material:	@ 10.00 %	(Includes markup on buyouts)	$5,207.62	4.27 %
Added profit:	@ 0.00 %		$0.00	0.00 %
Total installed price:			$121,626.65	99.80 %
Gross margin:		$15,272.55		12.53 %
Bottom line:	142,942.05#	$0.85 /#	$121,864.23	
	71.47 Tons	$1,705.09 /Ton		

☑ Use alternate summary report

Save As Defaults | Print Summary... | Okay | Cancel

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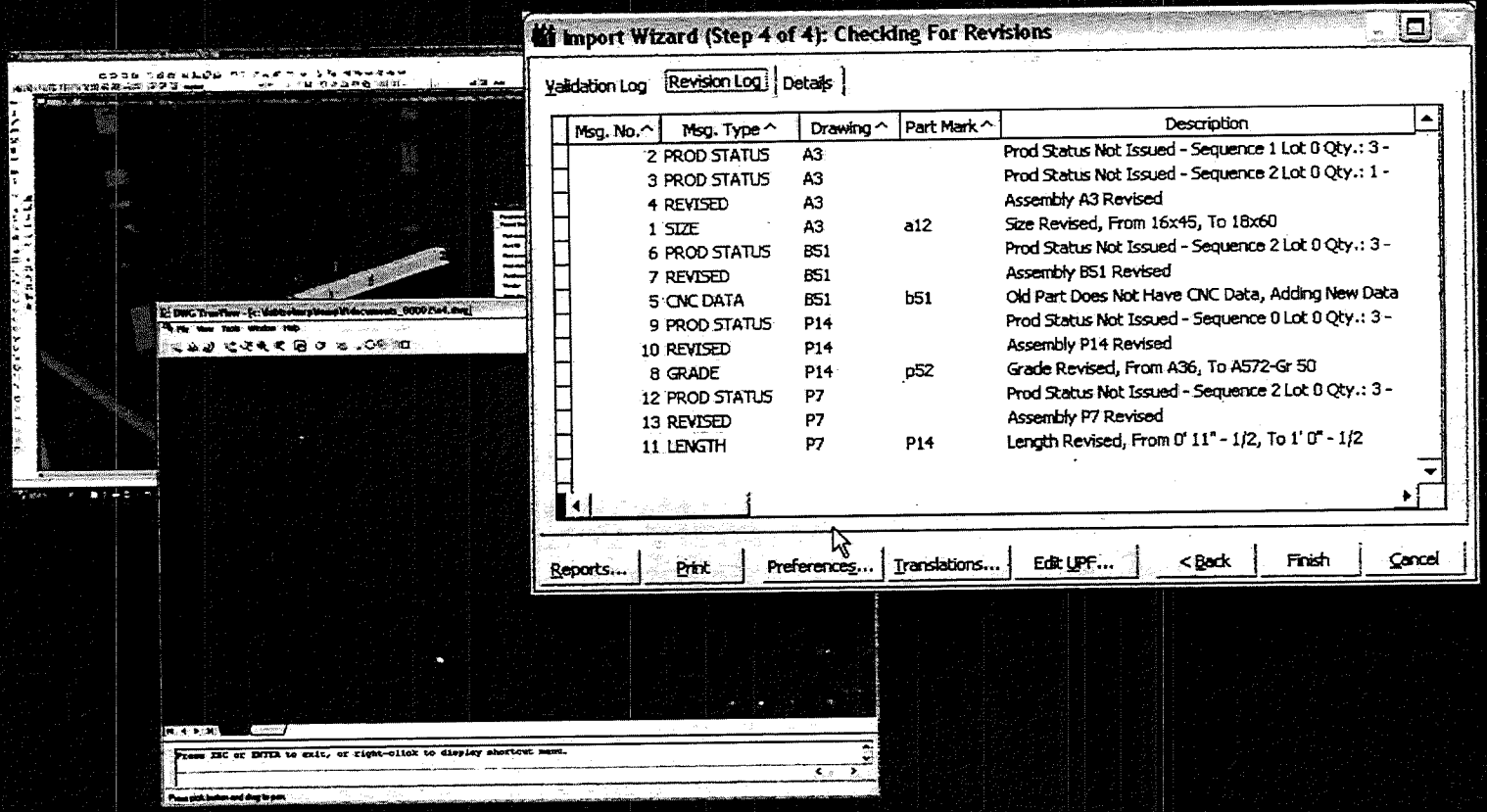
Drawing Management



Msg. No.	Msg. Type	Drawing	Part Mark	Description
2	PROD STATUS	A3		Prod Status Not Issued - Sequence 1 Lot 0 Qty.: 3 -
3	PROD STATUS	A3		Prod Status Not Issued - Sequence 2 Lot 0 Qty.: 1 -
4	REVISED	A3		Assembly A3 Revised
1	SIZE	A3	a12	Size Revised, From 16x45, To 18x60
6	PROD STATUS	B51		Prod Status Not Issued - Sequence 2 Lot 0 Qty.: 3 -
7	REVISED	B51		Assembly B51 Revised
5	CNC DATA	B51	b51	Old Part Does Not Have CNC Data, Adding New Data
9	PROD STATUS	P14		Prod Status Not Issued - Sequence 0 Lot 0 Qty.: 3 -
10	REVISED	P14		Assembly P14 Revised
8	GRADE	P14	p52	Grade Revised, From A36, To A572-Gr 50
12	PROD STATUS	P7		Prod Status Not Issued - Sequence 2 Lot 0 Qty.: 3 -
13	REVISED	P7		Assembly P7 Revised
11	LENGTH	P7	P14	Length Revised, From 0' 11" - 1/2, To 1' 0" - 1/2

MATERIAL MANAGEMENT

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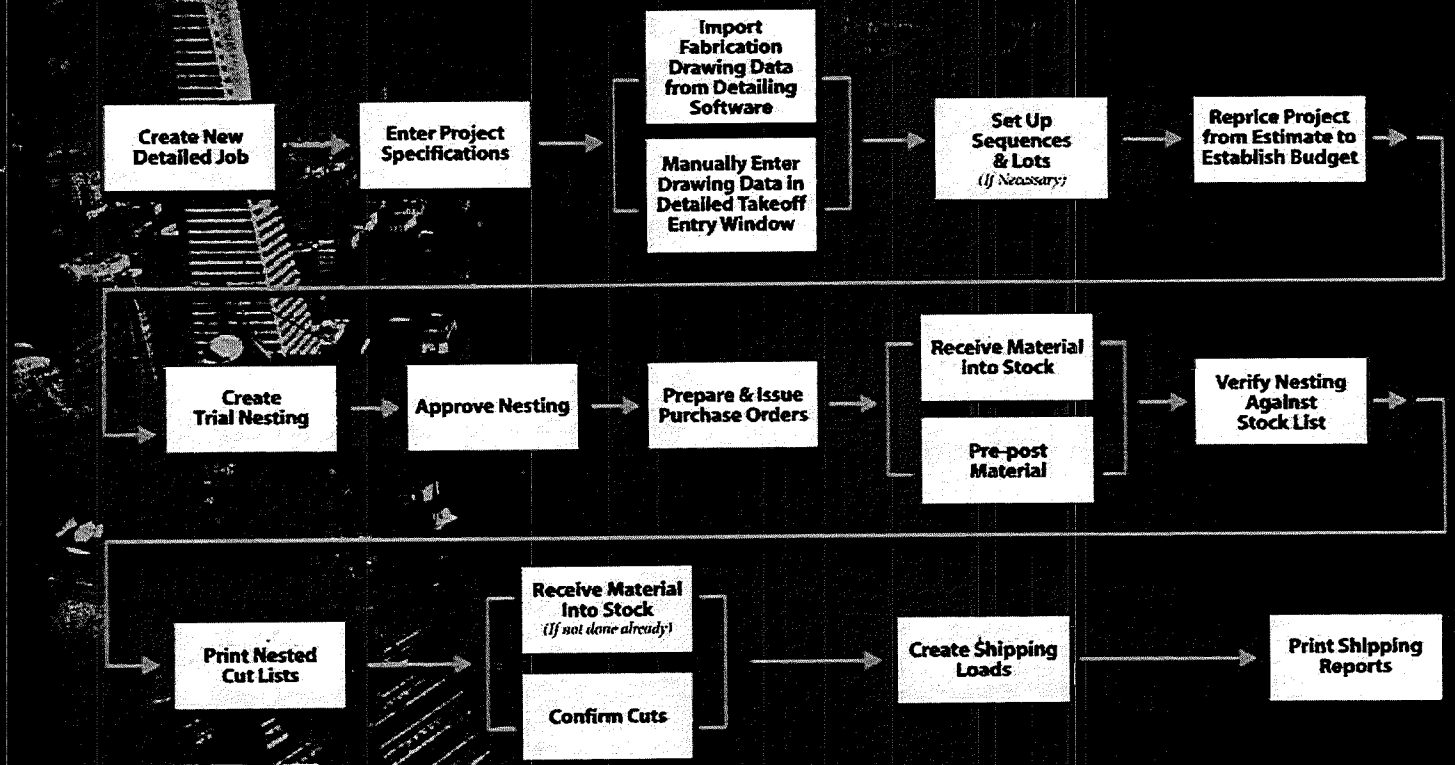

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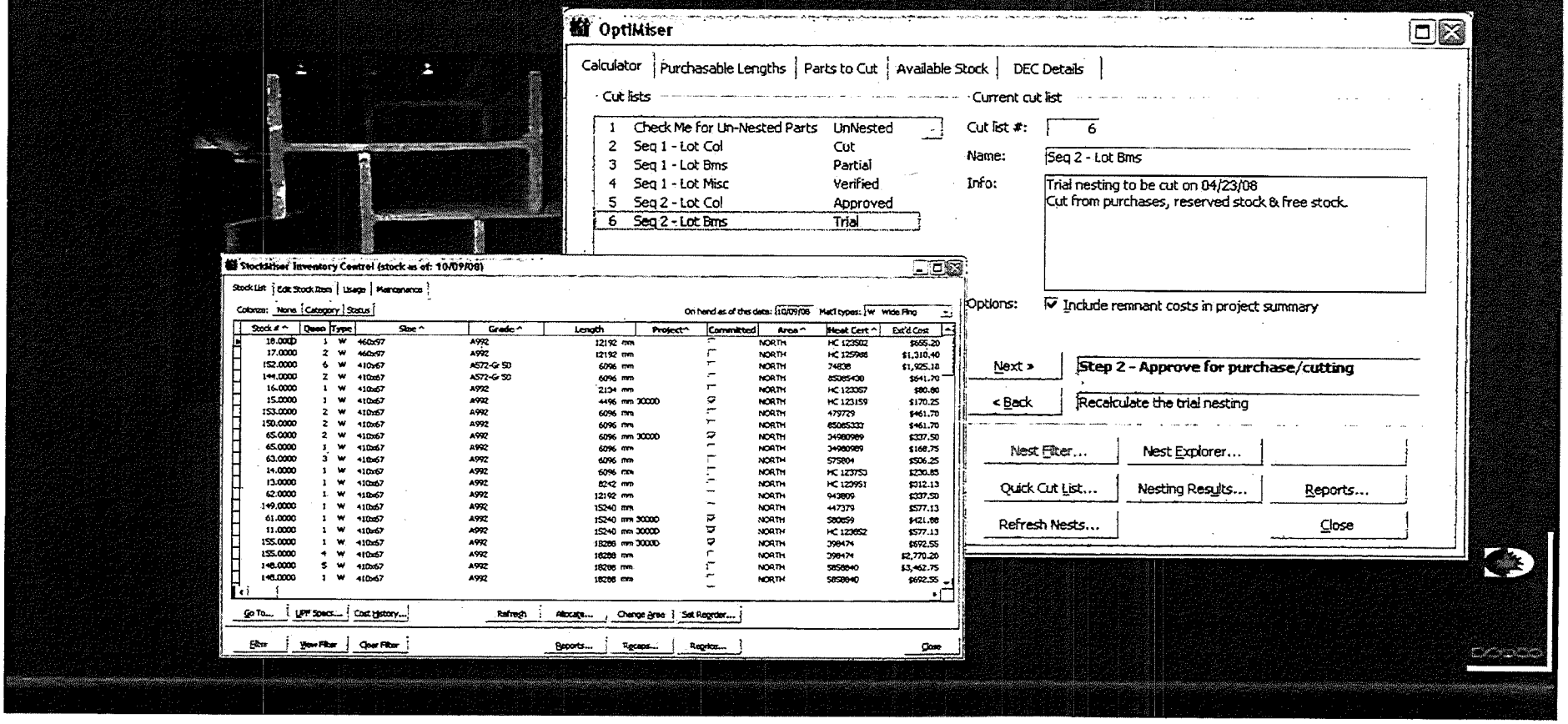
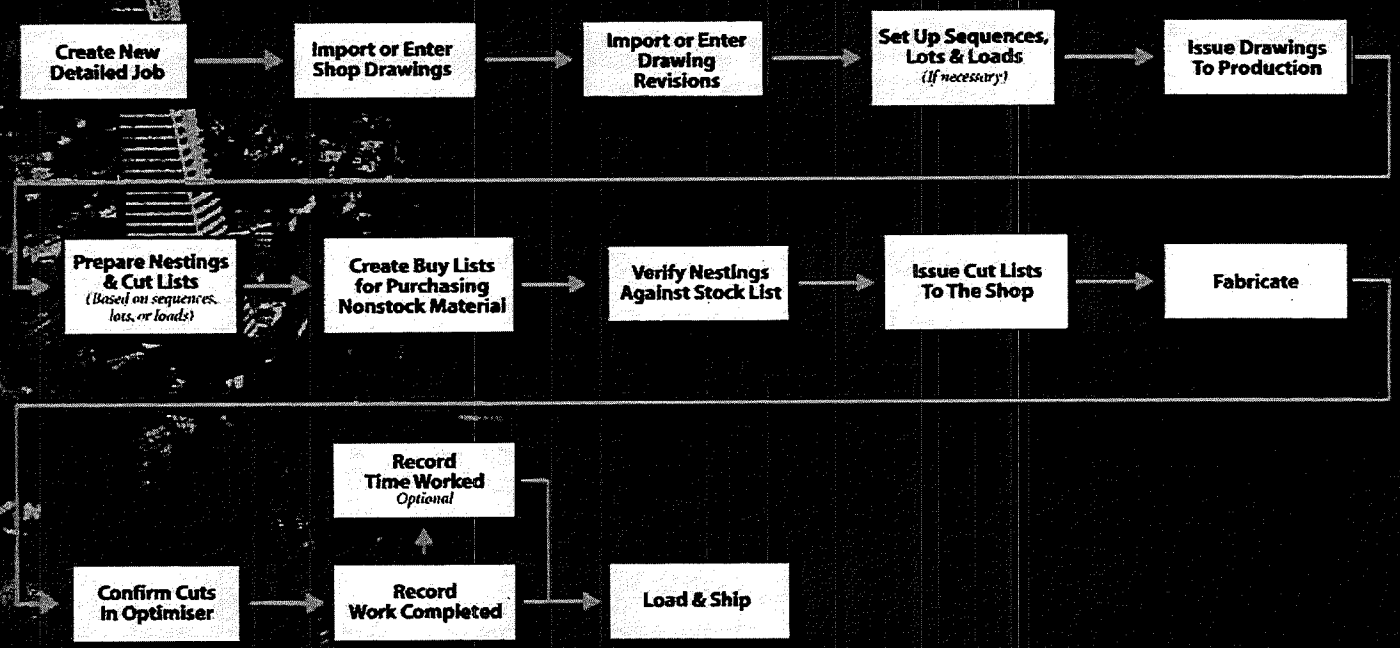
Material Management



BASIC PRODUCTION



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ADVANCED PRODUCTION

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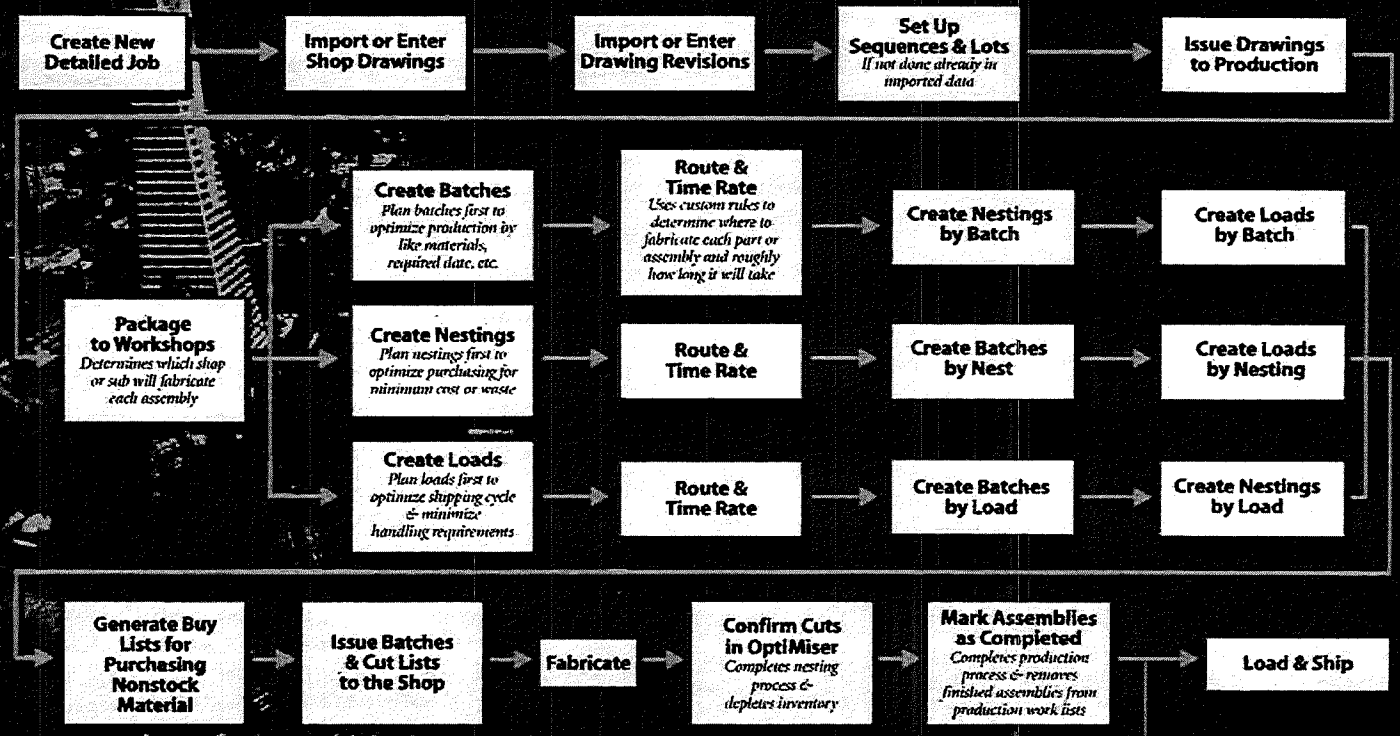

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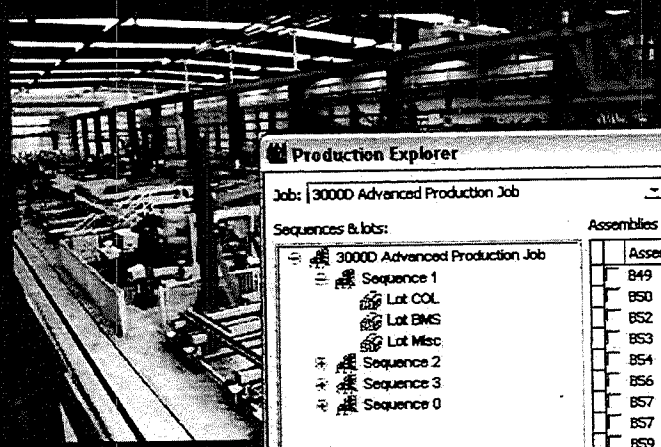
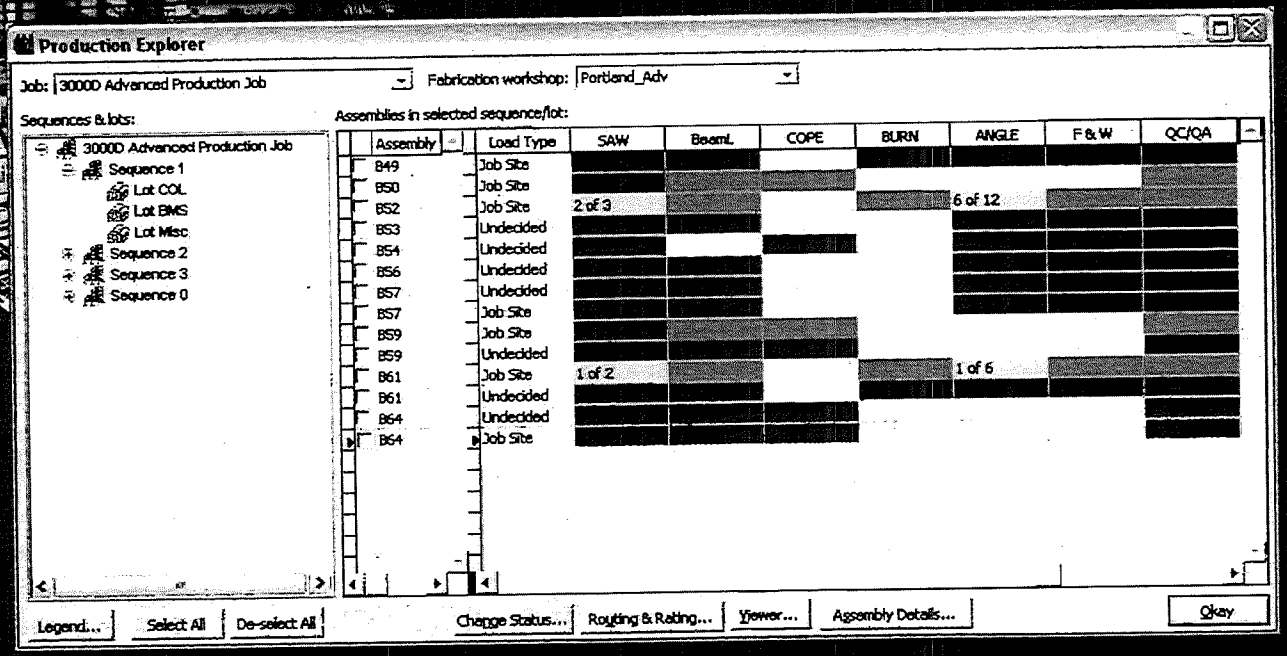
Production Management





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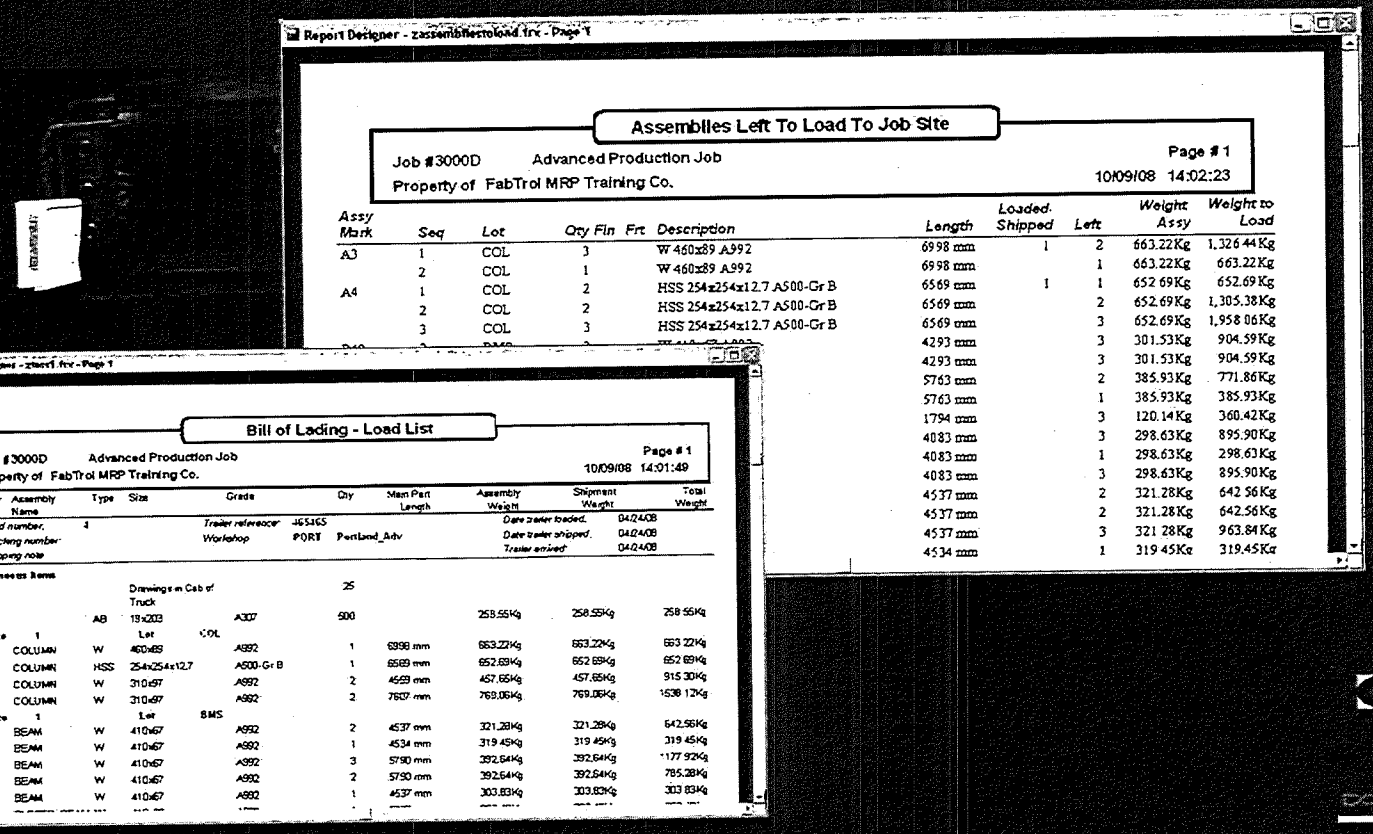
Software for Steel Fabricators

Shipping Management



Report Designer - zassemblestoload.frx - Page 1

Assemblies Left To Load To Job Site

Job #3000D Advanced Production Job — Page # 1
Property of FabTrol MRP Training Co. — 10/09/08 14:02:23

Assy Mark	Seq	Lot	Qty	Fin	Frt	Description	Length	Loaded Shipped	Left	Weight Assy	Weight to Load
A3	1	COL	3			W 460x89 A992	6998 mm	1	2	663.22Kg	1,326.44Kg
	2	COL	1			W 460x89 A992	6998 mm		1	663.22Kg	663.22Kg
A4	1	COL	2			HSS 254x254x12.7 A500-Gr B	6569 mm	1	1	652.69Kg	652.69Kg
	2	COL	2			HSS 254x254x12.7 A500-Gr B	6569 mm		2	652.69Kg	1,305.38Kg
	3	COL	3			HSS 254x254x12.7 A500-Gr B	6569 mm		3	652.69Kg	1,958.06Kg
							4293 mm		3	301.53Kg	904.59Kg
							4293 mm		3	301.53Kg	904.59Kg
							5763 mm		2	385.93Kg	771.86Kg
							5763 mm		1	385.93Kg	385.93Kg
							1794 mm		3	120.14Kg	360.42Kg
							4083 mm		3	298.63Kg	895.90Kg
							4083 mm		1	298.63Kg	298.63Kg
							4083 mm		3	298.63Kg	895.90Kg
							4537 mm		2	321.28Kg	642.56Kg
							4537 mm		2	321.28Kg	642.56Kg
							4537 mm		3	321.28Kg	963.84Kg
							4534 mm		1	319.45Kg	319.45Kg

Report Designer - ztest1.frx - Page 1

Bill of Lading - Load List

Job #3000D Advanced Production Job — Page # 1
Property of FabTrol MRP Training Co. — 10/09/08 14:01:49

Assembly Mark	Assembly Name	Type	Size	Grade	Qty	Main Part Length	Assembly Weight	Shipment Weight	Total Weight
Load number:	4			Trailer reference: 465465			Date trailer loaded:	04/24/08	
Tracking number:				Workshop: PORT	Portland_Adv		Date trailer shipped:	04/24/08	
Shipping note:							Trailer arrived:	04/24/08	
Miscellaneous Items									
			Drawings in Cab of Truck		25				
		AB	19x203	A307	500		258.55Kg	258.55Kg	258.55Kg
Sequence	1		Lot	COL					
A3	COLUMN	W	460x89	A992	1	6998 mm	663.22Kg	663.22Kg	663.22Kg
A4	COLUMN	HSS	254x254x12.7	A500-Gr B	1	6569 mm	652.69Kg	652.69Kg	652.69Kg
C21	COLUMN	W	310x97	A992	2	4569 mm	457.65Kg	457.65Kg	915.30Kg
C23	COLUMN	W	310x97	A992	2	7607 mm	769.06Kg	769.06Kg	1538.12Kg
Sequence	1		Lot	BMS					
B53	BEAM	W	410x67	A992	2	4537 mm	321.28Kg	321.28Kg	642.56Kg
B54	BEAM	W	410x67	A992	1	4534 mm	319.45Kg	319.45Kg	319.45Kg
B56	BEAM	W	410x67	A992	3	5790 mm	392.64Kg	392.64Kg	1177.92Kg
B57	BEAM	W	410x67	A992	2	5790 mm	392.64Kg	392.64Kg	785.28Kg
B59	BEAM	W	410x67	A992	1	4537 mm	303.83Kg	303.83Kg	303.83Kg

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The Dowco Group of Companies

Our mission: To improve the management of the steel fabrication industry, making it more productive and profitable.

We focus on ways to provide companies with competitive advantages in the marketplace:

- Lower costs
- Increase revenue
- Improve quality
- Improve schedule

- Evidence → After 20+ years, 87% of FabTrol customers are still in business, compared to an industry average of roughly 50%.

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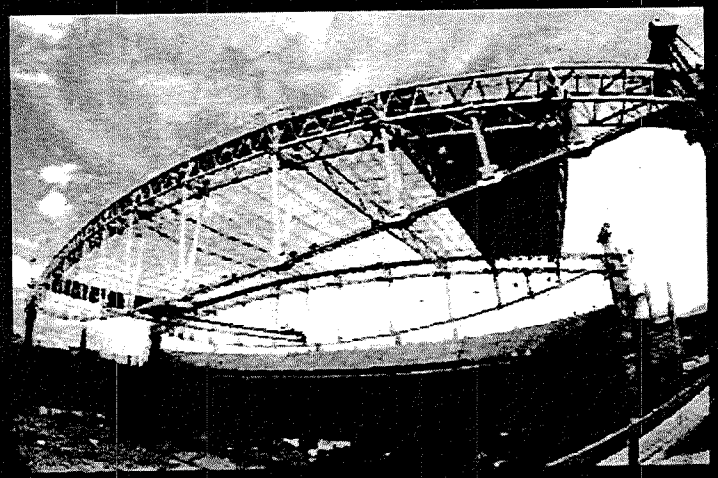
Customer projects



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Global influence

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FabTrol MRP

A better way to manage

About FabTrol Systems, Inc.

- Founded in 1984 by experienced steel fabrication business owners
- Leading provider of management software for steel fabricators
- 1,000+ installed sites worldwide, including 280 AISC fabricator members
- Member of AISC, NOMMA, and other industry organizations

LOVETT
SILVERMAN

Quality Construction Consulting Services

Statement of Qualifications
CPM Scheduling

February 20, 2009

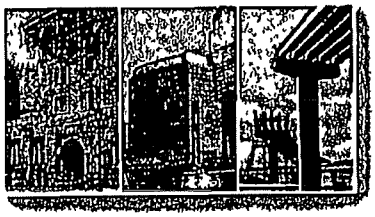


Table of Contents

Section 1 ..... **Company Background and CPM Scheduling Services**

Section 2 ..... **Project Profiles**

Section 3 ..... **Resumes**

MRP, LLC.
1640 New Market Ave.
S. Plainfield, NJ 07080
Phone (732) 968-6061 Fax (732) 968-5675

RED TAG LOG

TAG #	JOB #	DWG.	PIECE MARK	NUMBER OF PCS.	REASON	INSPECTED	DATE	RE-INSPECT	DISPOSITION

MRP, LLC Paint Form
DEW POINT CHECK LOG

DATE	CONTRACT NUMBER	TEMP WET BULB	TEMP DRY BULB	W - D	TEMP STEEL	BAROMETRIC PRESSURE	% REL HUMIDITY	DEW POINT	DEW POINT PLUS 5 DEGREES
		W	D						

STEEL MUST BE EQUAL TO OR GREATER THAN THE DEW POINT PLUS 5 DEGREES.
DRY BULB IS AIR TEMPERATURE (AMBIENT)
"TEMP" IS TEMPERATURE IN DEGREES FAHRENHEIT

SURFACE PREPARATION METHODS

SSPC- SP 1-63	SOLVENT CLEANING- Removal of oil, grease, dirt, soil, salts and contaminants by cleaning with solvent, vapor, alkali, emulsion or stem.
SSPC- SP 2-63	HAND TOOL CLEANING- Removal of loose rust, loose mill scale and loose paint to degree specified, by hand chipping, scraping, sanding and wire brushing.
SSPC- SP 3-63	POWER TOOL CLEANING - removal of loose rust loose mill scale and loose paint to degree specified by power tool chipping, descaling, sanding, wire brush and grinding.
SSPC- SP 6-63	COMMERCIAL BLAST CLEANING- Blast cleaning until at least two-thirds of each element of surface is free of all visible residues.
SSPC- SP 7-63	BRUSH-OFF BLAST CLEANING- Blast cleaning off all except tightly adhering residues of mill scale, rust and coating, exposing numerous evenly distributed flecks of underlying metal.

EXHIBIT 5 - 5

MRP, LLC Paint Form
PAINT RECORD LOG

DATE	CONTRACT NUMBER	PIECE MARK	ACTUAL MILS 3 READING MIN.	REQUIRED MILS	COAT NUMBER	TEST BY	NOTES

MRP, LLC. RANDOM AUDIT CHECK LIST

Shop Inspector Random Audit					
PARAGRAPH NUMBER	CONTRACT NUMBER	DATE	INITIALS	RESULTS	NOTES
5.3.3					
5.3.9					
5.3.16					
5.3.17					
5.3.18					
5.3.30					
5.3.35					

Office Random Audit					
PARAGRAPH NUMBER	CONTRACT NUMBER	DATE	INITIALS	RESULTS	NOTES
5.3.1					
5.3.2					
5.3.4					
5.3.5					
5.3.6					
5.3.7					
5.3.11					

EXHIBIT 5-7

Section 6.0 CALIBRATION & LIST OF INSPECTION EQUIPMENT

Purpose

To establish procedures in the calibration and handling of measurement and test equipment used in verifying conformance of products to the established quality requirements and specifications, to establish a system by which gages and measuring equipment are controlled, calibrated, and maintained, to establish an administrative system that assures conformance of all tooling to specified requirements.

Scope

This procedure governs all special tools, gages, instruments, fixtures, and testing devices used for manufacturing, assembly, inspection and testing, as well as tooling used as a measure of acceptance criteria including: mechanical tools and gages used to measure physical dimensional parameters and includes, but is not limited to, jigs, fixtures, mechanical hand tools, tape measures, squares, rules, weld gages.
Each Standard Calibrated Tape is to be considered as valuated as long as it shows no wear or damage. It is imperative that calibration tapes never to be used for any purpose except checking other tapes. It must be kept in a locked location to protect it's integrity.

Responsibility

This function rests with Quality Assurance Department.

Skidmore-Wilhelm Calibrator

The Quality Control Manager shall arrange to have the "Skidmore" sent to an appropriate service facility that can certify its performance accuracy in accordance with appropriate National Institute of Science and Technology standards. This certification shall be performed annually unless the equipment has been damaged or it is otherwise felt that it is not providing accurate information. A suitable tag or sticker shall be affixed to the "Skidmore" stating the date of the certification, certification due date, and the name of the certifying agency.

List of MRP, LLC. Testing Equipment

6" Millwright Rule 32nd 64th 10th-100th
C. A. L. V-WAC Gauge
NASCO Fillet Gauge #NFG-7
MAGNA Lite
6" LED Lite
12" 4 Cell Mag Lite
PLAMGREN Weld Gauge
General Depth/Angle Gauge
Starrett Micrometer Digital
Scherr-Tumico Micrometer
G. A. L. Skew - T Gauge
G. A. L. HiLo Gauge
Pearson Cam-Type Weld Gauge
Pratt & Lambert Wet Film Gauge
Nordson Film Thickness Gauge
Parker DA 200 Mag Yolk AC/DC
Kraut Kramer US-K7 UT Machine
II W Calibration Block

For building plants welding equipment meters are calibrated and verified in house or out of house on a yearly basis.

Amperage shall be within +/- 10 amps.
Voltage shall be within +/- 1 volt.

Paint gage calibration is done at time of each use.

If any instruments are dropped or damaged they are to be sent out for service immediately.

Non-destructive testing equipment such as ultrasonic, magnetic particle, etc. will be calibrated and maintained in accordance with ASNT TC-1A.

Shop and inspector tapes are to be checked yearly to the plants master tape. These tapes are also to be checked when there is a consistent sign of fabrication errors. Tapes are to have a consistent pull as they lay side by side. The calibration tape is not to be used for any purpose except checking other tapes.

Acceptance Criteria: A variation of +/- 1/16" from the calibrated tape is acceptable.

Unacceptable equipment is to be withdrawn from use.

All instruments must have their accuracy traced to a national standard

Section 7.0 OWNER INSPECTION

Purpose

To ascertain compliance with customers inspectors.
This also covers those people whose duty is expediting.

Scope

The section covers all contracts with any customer.

Responsibility

The responsibility for this function rests with Quality Assurance Manager.

When and if the owner or owner's delegated Inspector (Authorized Inspector) is at MRP, LLC they shall be given suitable desk space during the stay.

On contracts requiring special conditions, such as air-condition, phones etc., and the requirements will be readily met.

Section 8.0 OUTSIDE INSPECTION CONTRACTED BY MRP, LLC

Purpose
To ascertain that the necessary resources are available for inspection activies.

Scope
This section covers all contracts.

Responsibility
The responsibility for this function rests with the Quality Control Manager.

If it becomes necessary, MRP, LLC will employ third party inspection agencies to conduct:

1 Welder And Procedure Qualification Test
2 Ultrasonic Testing
3 Radiographic Testing
4. Magnetic Particle Testing
5. Dye Penetration Testing
6 AWS – CWI (Certified Weld Inspector) Inspection.

See section 12. (Technical Assistance)

Certification papers from Inspection agencies shall include the following:

A letter stating that the inspection agency will supply services.
All certification papers shall be in accordance with ASNT-TC-1A
Copies of certification for each person that may be sent and the papers of the person issuing each certification shall be presented.

Section 9.0 RECORD RETENTION

Purpose

To retain quality records for a period specified.
Quality records include at least the following:

- Inspection records
- NDT Reports
- Drawing logs
- MTRs (Material test reports)
- CoCs (certificates of compliance/conformances)
- Design changes
- RFIs (Request for information)
- Mill and consumable purchase orders
- Records or summaries of non-conformances reports
- Internal and external quality management system audits.

To identify the storage of quality records that protects them from damage. Facilitates retrieval through identification collection, indexing, and disposition. To ensure that records are legible, dated (including revision dates), clean, identifiable, and maintained in an orderly manner.

Scope

This procedure applies to all records affecting quality.

Responsibilities

The Quality Assurance Manager is responsible for maintaining quality records as defined in this procedure for day-to-day activities

The Executive Management Representative (President) has responsibilities and record retention as shown in 1.1.8 and 1.1.9

Quality Control Records will be retained for a one (1) year minimum time period after the contract has been shipped unless informed to the contrary.

Section 10.0 MAINTENANCE PROGRAM

Purpose
To establish a procedure for a program to assure that production equipment will operate properly. To provide material of acceptable quality that meets project specifications.

Scope
Proper care of operations major plant production equipment.

Responsibility
The Plant Manager and the Maintenance Supervisor are responsible for the safe and efficient operation of plant production equipment.

If a problem is found that requires a shut down of the equipment it shall be LOCKED OUT and RED TAGGED and taken out of service.

Preventative maintenance is done by constant visual checks by the plant employees and feedback to the Maintenance Department (Exhibit Nos. 10-1, 10-2, 10-3).

Repair items beyond the training and capabilities of the plant maintenance department are sublet to specialty shops.

Crane maintenance is performed by an outside service and a record is kept.

Welding equipment has their amperage and voltmeters checked on a yearly basis for building work. A record is kept on the Amperage and voltage Checklist (Exhibit 10-3)

In addition to the yearly check, the meters are checked if there are welding problems or if additional checks are required by contract documents.

A log of cleaning of welding machines is kept on the Welding Machine Cleaning Log (Exhibit 10-2).

A visual inspection of chains (no chokers are used) is done twice a year.

Fluids in all equipment are to be done as per manufacturers recommendations by the Maintenance Supervisor or, Machine Operator.

PROCEDURE FOR USE OF PREVENTATIVE MAINTENANCE LOG

For the months indicated on the preventative maintenance log, the following items are to be visually checked and date and initial of the person performing this function put in the respective block.

1. GUARDS
2. CONDITION OF ELECTRIC WIRING AND SWITCHES
3. BLADES
4. FLUID LEVELS AND CLEANLINESS OF FLUIDS
5. GENERAL CONDITION OF WORK AREAS
6. HOUSEKEEPING
7. QUESTION OPERATOR (S) AS TO GENERAL PERFORMANCE OF THEIR EQUIPMENT

MRP PREVENTATIVE MAINTENANCE-SCHEDULE LOG

EQUIPMENT NAME	ASSIGN #	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC

EXHIBIT 10-1

MRP WELDING MACHINE CLEANING LOG

MACHINE NUMBER	DATE	REMARKS	BY

COMPANY BACKGROUND

Since its inception 25 years ago, Lovett Silverman has established itself as a leading firm in the areas of CPM scheduling, claims resolution, Surety consulting, project management, and construction litigation support.

Lovett Silverman is staffed with 40 construction experts selectively matched to meet the distinct needs of any project. Our proven ability to effectively evaluate and satisfy these needs is largely responsible for our continued success in servicing a wide variety of clients. We consider Lovett Silverman's size to be an advantage to our clients, since close teamwork and responsiveness are essential in providing a quality work product.

SERVICES

Regardless of the size, scope, or phase of the assignment, Lovett Silverman is committed to providing the most professional, efficient, and cost-effective services possible. The commitment to excellence of Lovett Silverman's diversified staff of professionals has earned the unqualified trust and respect of some of America's leading corporations, law firms, financial institutions and government agencies. By combining these qualities into a collective team effort, the firm has developed a large portfolio of services resulting in a proven record of success.

The following is a brief summary of the firm's present capabilities:

- **Project Planning and CPM Scheduling**
- **Construction Claims, Expert Testimony and Litigation Support**
- **Contract Administration, Construction/Project Management**
- **Surety Claims Consulting**
- **Construction Financing Control and Monitoring**

PLANNING & SCHEDULING PHILOSOPHY

An accurate and well thought out CPM Schedule is a tool for the use of all parties to plan projects, monitor progress and assure timely completion. By contrast, a poorly prepared and monitored schedule fails to provide the proper early warning to make adjustments to meet milestones or completion dates. It is Lovett Silverman=s proven philosophy that delays and claims on any construction project can be effectively minimized and/or avoided by applying the following fundamental principles:

I. Develop a schedule in a team effort with all parties
II. Pro-actively use the schedule to monitor progress
III. Document issues contemporaneously
IV. Resolve disputes in a timely manner

Lovett Silverman uses the latest version of Primavera Project Planner for Windows exclusively for all of our consulting assignments. Our staff attends user seminars when upgrades are being introduced to keep abreast of software innovations to help us maintain our competitive edge.

CPM SCHEDULING SERVICES

Lovett Silverman provides CPM Scheduling consulting services on a wide variety of projects. Generally, our services for Owners, Developers, Construction Managers and Contractors fall into one of the following categories:

- Third Party CPM Planning and Scheduling
- CPM Schedule Review

Third Party CPM Scheduling

What is it?

It is scheduling using an ***independent*** consultant whose exclusive focus is to develop, monitor and administer the Master Project Schedule. The schedule is developed using a ***Team Effort*** with representatives from the Owner, Developer, Construction Managers/General Contractors and Design Consultants. Once this plan is developed, all team members must accept the plan, and the CPM Consultant becomes the administrator of the Master Schedule.

What are the Benefits?

A Single Point of Administration

By integrating each project team members work plan into one Master Project Schedule, an Owner need only reference one document to check the status of any component of the project. Secondly, by integrating all schedules into one Master Schedule and defining interrelationships between schedules, conflicts can be identified and remedied to ensure the overall project goals are not compromised. Additionally, by consolidating and linking all team members' schedules into a Master Project Schedule, the effect on the overall project can be easily demonstrated, should a team member deviate from their work plan.

Better Control

A single administrator of the schedule will ensure that there is a consistent level of detail in all team members work plans. It will also help to ensure that changes in schedule logic are minimal and warranted.

Accurate Schedule Projections

By utilizing an independent consultant whose exclusive focus is to administer the Project Schedule, more accurate projections on progress are obtained. Furthermore, because all the schedules are linked together in the master schedule, the "real time" impact to the overall schedule can be determined should any team member fall behind schedule.

A Management Tool

Lovett Silverman can design and produce progress reports tailored to meet each project=s unique information requirements. This may involve typical monthly update reports; summary level reports for management boards; or detailed reports to monitor the progress of a specific portion of work which may be causing concern.

Delay Mitigation/Avoidance Tool

Through close monitoring of progress, the Master Project Schedule can identify work that is slipping, and provide an early warning of potential problems to allow prompt action to mitigate delays.

Third Party CPM Scheduling

Typical Services

Lovett Silverman's services typically fall into three phases; Pre-Construction/Planning, Construction, and Testing/Migration.

Pre-Construction/Planning

- Develop preliminary summary schedule with key project milestones
- Incorporate agency approvals, project financing and lease development.
- Develop and monitor design schedules, including: schematic design, design development, value engineering, and construction documents.
- Prepare or comment on schedule specifications for construction phase
- Define bid and award dates for Construction Managers, Contractors and other consultants.
- Review schedule portion of bidder responses

Construction

- Develop a detailed CPM construction schedule with input from Owner/Developer, CMs, Contractors and other necessary team members.
- Attend construction progress meetings, walk job site, and maintain a dialogue with all team members to keep a pulse on the project.
- Chair monthly schedule update meeting at the job site with all team members in attendance.
- Produce a monthly update report and present results to the Owner and team members.
- Document any schedule variances and recommend a course of action to maintain project milestones.
- Evaluate potential impact of change orders on the project schedule.
- Provide an objective review of delay disputes and assist in resolution.

Testing/Migration

- Develop a detailed integrated testing schedule for all building systems.
- Plan the migration of Owner furnished equipment and furniture.

CPM Schedule Review

In many situations, Owners, especially Public Agencies prefer to have the Contractor develop and administer the project schedule. In these cases Lovett Silverman provides consulting services to review and comment on the submitted schedules. Our typical services provided include:

Pre-Construction/Planning Phase

- Prepare schedule specification to be incorporated into Contractor bid documents
- Identify key project milestones and prepare summary schedule for information to bidders
- Identify any sensitive areas which may need more detailed planning (ie. Site access, environmental remediation, long lead equipment, utility tie-ins)
- Review schedule portion of bidder responses

Construction Phase - Schedule Development

- Review and comment on preliminary CPM (typically 90 or 120 day schedule).
- Review and comment on detailed baseline schedule, including: major submittals and procurement, cost and resource loading (if required). Special attention will be paid to sequencing of critical paths, crew flow, project manpower, cash flow curves.

Construction Phase - Schedule Updating

- Chair schedule update meetings on a monthly basis at job site; walk job site with contractor to agree on status.
- Analyze the Contractor update submittal and provide comments to the Owner on progress.
- Prepare a response, if necessary, to Contractor monthly narrative.
- Advise Owner of current and potential problem areas and suggest possible corrective action.
- Provide a what-if scenario for change order impact.
- Assist Owner in analyzing and negotiating time extensions, if necessary.

PROJECT PROFILES

Lovett Silverman' s staff has experience in providing CPM Scheduling and schedule related services on a wide array of project types, including:

High Rise Office Buildings
Bank Headquarters
Securities/Commodities Exchanges
Data Centers
Mixed use

Commercial Buildings
Retail space
Casinos
Arenas
Stadiums
Museums

Educational Facilities
Schools
Universities

Transportation/Infrastructure
Bus maintenance facilities
Airports
Hospitals/Prisons
Water/Wastewater
Tunnels and Bridges
Rail interchanges
Subway/Railroad car maintenance facility
Parking facilities

Federal Facilities
Military bases
Courts
Post Offices

Environmental
Asbestos removal
Soil remediation

Industrial
Chemical manufacturing
Oil refineries
Pharmaceutical
Aircraft manufacturing

Power Generation
Cogeneration
Fossil fuel
Trash to Energy
Nuclear
Emission control

On the following pages is a table of current/recent relevant CPM projects and detailed profiles of several sample projects.

Lovett Silverman
CPM Scheduling Project Experience

Project Name	Project Type	Owner Name	Construction Value	Description of Services
Stockton College Campus Center Pomona, NJ	Education	Richard Stockton College of NJ	$46 million	Schedule development and monthly schedule updates for the construction of a new campus center
Freedom Tower Podium Wall NYC	Commercial	PANYNJ	$82 million	Baseline schedule development and schedule updates for the complete glazed enclosure system at grade level to 6th floor of the Freedom Tower
Ridgewood Train Station Ridgewood, NJ	Rail Station	NJ Transit	$24 million	Schedule development and updates for accessibility improvements to platforms, a bridge, tunnel and elevator for the train station
Yale Morse & Stiles Renovation & Addition New Haven, CT	Education	Yale University	$105 million	Clean up the existing construction schedule and provide monthly updates for the renovation of existing dorms and common areas and the new addition to activity areas
Front Street District Hartford, CT	Commercial	Nitkin	$30 million	Finalize the existing schedule and submit monthly schedule updates for the conversion of the Hartford Times building to offices and the construction of a new building and parking garage
Yale University Biology Bldg New Haven, CT	Education	Yale University	$185 million	Baseline schedule development and updates for the additon of a 315,000 sf, 4 story molecular, cellular and developmental biology building on campus
Morgan Stanley Data Center Newark, NJ	Data Center	Morgan Stanley	$21 million	Schedule development and updates for a new data center in Newark, NJ
Morgan Stanley Data Center NYC	Data Center	Morgan Stanley	$21 million	Schedule development and updates for a new data center in New York City
Greater Egg Harbor Regional High School Egg Harbor, NJ	School	District of Greater Egg Harbor/NJSDA	$65 million	Schedule development and monthly schedule updates for the construction of a new high school for Greater Egg Harbor
Kean Science Center Union, NJ	School	Kean University	$44 million	Schedule development and monthly schedule updates for a new 6 story building for science, technology and math for Kean University
Epstein's Rehabilitation Plan Morristown, NJ	Residential/mixed use	Roseland Properties	$65 million	Review and add detail to the schedule to accurately monitor construction progress for the development of luxury apartments, condos, lofts, a parking garage, retail and office space Monitor and update the schedule
270 Park Ave NYC	Residential/High rise	JP Morgan Chase	$300 million	Convert and produce master schedule for the renovation of a hi-rise residential building
Highlands at Morristown Station Morristown Transit Village, NJ	Residential/mixed use	Roseland Properties	$75 million	Schedule development and updates for 217 apartments, an 8,000 sf parking garage, and retail space
Kean University New Residence Halls Union, NJ	Residential/dormitory	Kean University	$80 million	Schedule development and updates for the addition of 2 new residence halls for Kean University
Red Bull Arena Harrison, NJ	Sports Complex	Red Bulls	$150 million	Schedule development and updates for the construction of the new Red Bulls soccer stadium
Red Bulls Practice Facility Hanover, NJ	Sports Complex	Red Bulls	$50 million	Schedule development and updates for the construction of the new Red Bulls 23 acre Practice Facility
Shangri-La Hotel (610 Lexington) NYC	Hotel	Shangri La Hotel	$250 million	Schedule development and updates for a new 206 room luxury hotel in mid-town Manhattan
North Ward Park Elementary School Newark, NJ	School	NJ School Construction Authority	$33 million	Schedule development for a new Elementary school
Hudson Yards NYC	Commercial	The Related Companies	TBD	Schedule development for RFP for developer of the commercial/residential development over the LIRR Hudson Yard
NY Jets New Training Facility New Jersey	Entertainment/mixed use	NY Jets LLC	$40 million	Schedule development and updates
Horizen's Vu Hotel New York, NY	Residential	Horizen	$35 million	Schedule development and updating of a 17 story hotel renovation
Hudson County Plaza Reconstruction NY	Municipal facility	Hudson County	$32 million	Scheduling of a 7 story building renovation
BMW Headquarters Expansion Montvale, NJ	Building/Commercial	BMW	$45 million	Schedule development and updates

Lovett Silverman
CPM Scheduling Project Experience

Project Name	Project Type	Owner Name	Construction Value	Description of Services
Union County College - Elizabeth Campus Expansion Bldg Elizabeth, NJ	School	Union County College	$35 million	Baseline schedule development, schedule updates
77 Hudson Condo & Apartment Towers Jersey City, NJ	Residential	K Hovnanian	$120 million	Peer review of schedule Monitor monthly site progress updates and reports
Hammarskjold Middle School East Brunswick, NJ	School	Town of East Brunswick	$45 million	Baseline schedule development, schedule updates
John Jay College of Criminal Justice New York, NY	School	DASNEY/John J College	$250 million	Baseline schedule development, schedule updates
International High School Paterson, NJ	School	NJSDA	$38 million	Baseline schedule development, schedule updates
NJ Transit - Mount Arlington Station Mt Arlington, NJ	Rail Station	NJ Transit	$22 million	Baseline schedule development, schedule updates
PepsiCo Mountain Top, PA	Building/Commercial	PepsiCo	$30 million	Baseline schedule development, schedule updates
Bank of America New York, NY	Bank	Bank of America	$1 billion	Baseline schedule development, schedule updates
Neptune Community School Neptune, NJ	School	NJSCC	$40 million	Prepare request for equitable adjustment, including delay analysis and damages review
Ridge Hill Village Yonkers, NY	Residential/mixed use, 5 parking garages	Forest City Ratner Companies	$630 million	Baseline schedule development, schedule updates
Mount Vernon Elementary School Irvington, NJ	School	NJSCC	$28 million	Prepare delay analysis, provide schedule updates
Xanadu - Structure/shell East Rutherford, NJ	Entertainment/mixed use	ERC 16W Limited Partnership	$1 billion	Baseline schedule development, schedule updates, delay claim mitigation
E Decks at Xanadu East Rutherford, NJ	Parking garage	Meadowlands Xanadu	$32 million	Schedule development and updates for two new parking garages located at the Xanadu entertainment facility
Xanadu Deck BCD East Rutherford, NJ	Parking garage	Mills Corp	$35 million	Baseline schedule development, schedule updates Attend update meetings
Goldman Sachs Site 26 - 200 West New York, NY	Building/Commercial	Goldman Sachs	$2 billion	Baseline schedule development, schedule updates, CM Schedule review and tracking Coordinate master schedule, quantity and progress tracking
Yankee Stadium Bronx, NY	Stadium	New York Yankees	$1 billion	Baseline schedule development, schedule updates Peer review of CM schedule
Gilligan Student Union/NJCU Jersey City, NJ	School	NJ City University	$14 million	Baseline schedule development, schedule updates
Grandview D West New York, NJ	Residential	K Hovnanian	$45 million	Baseline schedule development, schedule updates Monitor site progress
Harrison High School Harrison, NJ	School	NJ School Construction Corp	$65 million	Baseline schedule development, schedule updates Prepare delay analysis for time extensions
Riverwalk/Grandview Bldg B West New York, NJ	Residential	K Hovnanian	$60 million	Baseline schedule development, schedule updates Monitor site progress
East River Plaza Manhattan, NY	Building/Commercial	FCRC/Blumenfeld	$110 million	Baseline schedule development for foundations Schedule updates and attend update meetings Impact analysis
Riverwalk at Port Imperial, Bldg A West New York, NJ	Residential	Roseland Properties	$60 million	Baseline schedule development, schedule updates Peer review of CM schedule Monitor site progress
Beekman New York, NY	Residential/mixed use	Forest City Ratner Companies	$400 million	Front end development, including, lease, permitting, agency approvals, design, procurement and Construction Schedule development
NJ City University Arts & Science Bldg Jersey City, NJ	School	NJ City University	$25 million	Baseline schedule development, schedule updates

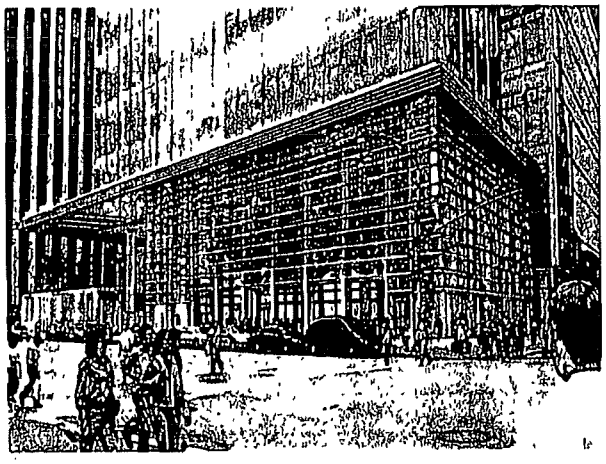
Lovett Silverman
CPM Scheduling Project Experience

Project Name	Project Type	Owner Name	Construction Value	Description of Services
Montclair State University Academic Bldg Little Falls, NJ	School	Montclair State University	$50 million	Baseline schedule development, schedule updates
Babbio Center at Stevens Institute Hoboken, NJ	School	Stevens Institute	$25 million	Baseline schedule development, schedule updates
Jersey City Schools PS3, MS4 Jersey City, NJ	School	NJ School Construction Corp	$63 million	Baseline schedule development, schedule updates
Brooklyn Arena Brooklyn, NY	Sports Complex	Forest City Ratner Companies	$1+ billion	Front end development, including, lease, permitting, agency approvals, design, procurement and Construction Schedule development, schedule updates and claims avoidance
Towers at Merritt River	Building/Commercial	Building & Land Technology	$60 million	Baseline schedule development, schedule updates Claims avoidance
80 Dekalb Brooklyn, NY	Residential/High rise	Forest City Ratner Companies	$80 million	Front end development, including, lease, permitting, agency approvals, design, procurement and Construction Schedule development
Princeton Public Library Princeton, NJ	Library	Public Library of Princeton	$11 million	Baseline schedule development, schedule updates
Museum of Modern Art New York, NY	Museum	Museum of Modern Art	$250 million	Peer review of CM schedule, monitor progress
Montclair University Theater Montclair, NJ	Theater	Montclair State University	$21 million	Baseline schedule development, schedule updates
Bank of New York/Atlantic Terminal Tower Brooklyn, NY	Building/Commercial	Forest City Ratner Companies	$65 million	Baseline schedule development, schedule updates
Montclair State University Student Residences Little Falls, NJ	Residential/dormitory	Montclair State University	$38 million	Baseline schedule development, schedule updates
9 Metrotech South Brooklyn, NY	Building/Commercial	Forest City Ratner Construction Services	$90 million	Schedule development, schedule updates, accelerated schedule, cost load schedule
Hoboken Rail Rehabilitation Hoboken, NJ	Rail Yard	NJ Transit	$26 million	Schedule development, schedule updates, accelerated schedule, cost load schedule
Goldman Sachs - 30 Hudson Jersey City, NJ	Building/Commercial	Goldman Sachs	$1+ billion	Baseline schedule development, schedule updates, CM Schedule review and tracking Coordinate master schedule, quantity and progress tracking
Sotheby's Headquarters NY City	Building/Commercial	Sotheby's	$91 million	Review and formal critique of construction schedule, weekly monitoring of schedule, document review, claim analysis, walk through inspections & reports
New York Times Headquarters NY City	Building/Commercial	New York Times Company	$400 million	Schedule development/design, summary construction schedule, monthly schedule updates
330 Jay Street - NY Supreme/Family Court Brooklyn, NY	Courthouse/commercial	Forest City Ratner	$700 million	Baseline schedule development, CM schedules review, CM/master schedules merger, monthly master schedule updates
AOL Time Warner Center NY City	Building/Mixed use	Related Companies	$1 7 billion	Pre-construction schedule development, construction schedule review, monthly report on Bovis Lend Lease schedule, construction schedule development, monthly updates, restaurant schedule development
Secaucus Transfer Station Secaucus, NJ	Rail station/bridge	NJ Transit	$90 million	Baseline schedule development, monthly schedule updates, delay analysis, concrete delay analysis, time extension request, delay graphics, cost load schedule, recovery schedule, acceleration schedule
Rail Operations Center Kearny, NJ	Building/Rail	NJ Transit	$16 million	Baseline schedule development, monthly schedule updates
Magic Rte 80 Northern New Jersey	Highway information system	NJ State DOT	$13 million	Baseline schedule preparation and updates
McGuire AF Base Ambulatory Care Center Wrightstown, NJ	Health care facility	US Army Corps of Engineers	$32 million	Baseline schedule development, monthly schedule updates
Hilton Time Square NY City	Hotel	Forest City Ratner/Hilton	$140 million	Baseline schedule development, schedule updates, walk through inspections

Lovett Silverman
CPM Scheduling Project Experience

Project Name	Project Type	Owner Name	Construction Value	Description of Services
Newark-NEC/Monorail Connection Newark, NJ	Rail Station	NJ Transit	$28 million	Baseline schedule development, schedule updates
Atlantic Terminal Brooklyn, NY	Retail	Forest City Ratner Corporation	$65 million	Baseline schedule development, schedule updates
Embassy Suites at Battery Park City NY City	Hotel	Forest City Ratner Corporation	$110 million	Baseline schedule development, schedule updates, walk through inspections
Renovation of 27 Subway Stations NY City	subway station	NYCTA	$11 million	Time extension request, schedule updates, completion schedule, settlement negotiation
Fire Department Headquarters Brooklyn, NY	Building/Commercial	Forest City Ratner Corporation	$60 million	CPM schedules preparation and updates
180th Street Subway Car Maintenance Facilities Bronx, NY	Rail maintenance	NY City Transit Authority	$44 million	CPM baseline, updates, delay claim submittal, fragnets
NJ Transit - Wayne Bus Garage Wayne, NJ	Bus Garage	NJ Transit	$28 million	CPM schedule review, claims avoidance
60 Wall Street NY City	Building/Commercial	JP Morgan	$500 million	Delay analysis, issue analysis, expert report, settlement assistance and litigation support
New York Mercantile Exchange NY City	Building/Commercial	NYMEX	$240 million	Baseline schedule development, CM schedule review, CM/master schedules merger, monthly master schedule updates
11 Metrotech Ctr/DOITT, E911 Brooklyn, NY	Building/Commercial	Forest City Ratner	$65 million	Lease and Construction Schedule development, updates, MEP testing/turnover,

One Bryant Park/Bank of America
Manhattan, NY City



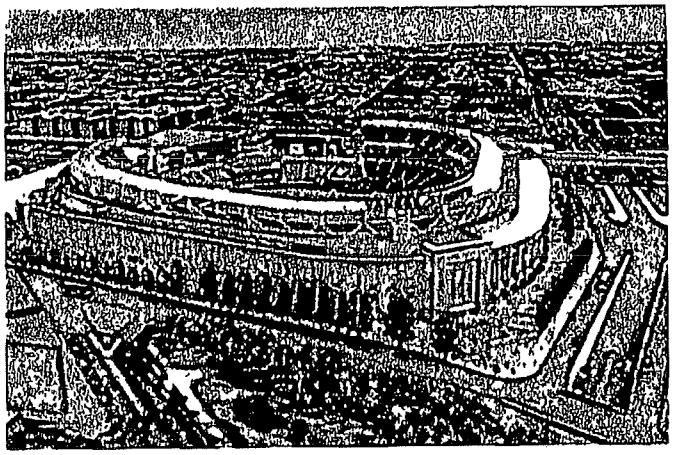
The Durst Organization is in a Joint Venture with Bank of America to build the project known as 1 Bryant Park in mid-town Manhattan. This building is a 54 story, 2.1 million square foot skyscraper that will serve as the headquarters for Bank of America's operations in New York City, and house its global corporate and investment banking, wealth and investment management and consumer and commercial banking businesses. The Bank of America building will be the second tallest building in Manhattan.

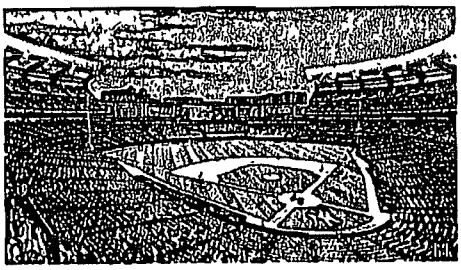
Tishman Construction is the project Construction Manager for the core/shell portion of the project. The Joint Venture selected Lovett Silverman to provide a professional review and comment on Tishman's baseline schedule. Then, perform monthly reviews of Tishman's schedule updates.

Lovett Silverman provided the following schedule consulting services:

- Review and Validation of GC/CM Construction Schedules
- Monthly Schedule Peer Review

New York Yankees Stadium
Bronx, NY





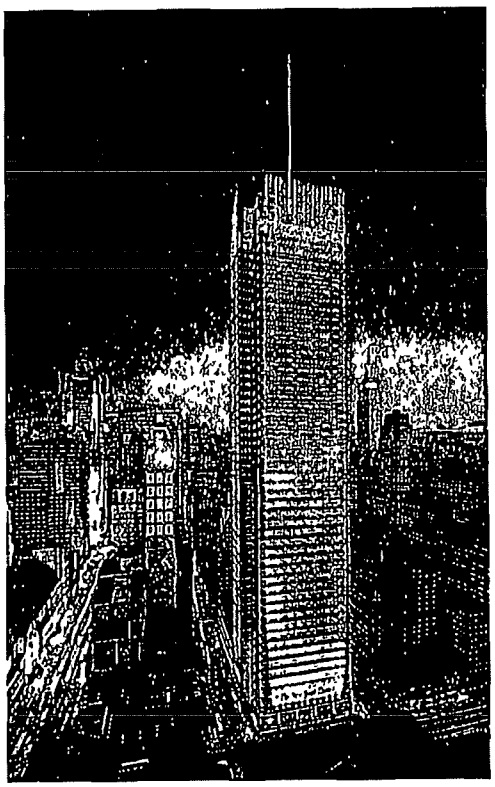
This project is the development of the new $800 million New York Yankee Stadium located next to the existing Yankee Stadium. The new stadium will house 51,800 fans and is part of a larger prospective $1.2 billion redevelopment that includes a hotel, conference center, a high school for sports management and medicine, offices and a museum, as well as recreational parks along the waterfront and other facilities around the ballpark. Within the stadium there will be entertainment areas that include many restaurants in addition to 60 luxury suites.

Tishman Speyer has a development agreement with the New York Yankees for the construction of this new stadium, where Tishman Speyer Properties will act as an agent to the Owner. Tishman Speyer Properties retained Lovett Silverman to develop and maintain a Master Project Schedule, and to provide oversight on Turner's construction schedule.

Lovett Silverman is providing the following schedule consulting services:

- Develop Baseline Schedule in conjunction with CM and sub-contractors
- Third party review of CM Construction Schedule
- Monitor project status on monthly basis, including a peer review of the Turner's schedule with a narrative report

New York Times Headquarters
New York, NY

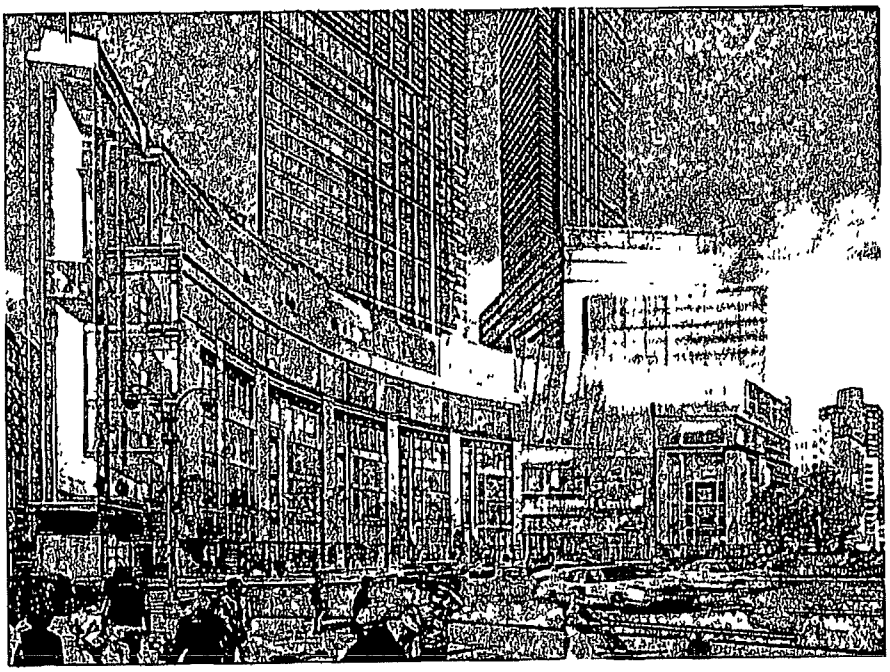


This $850 million, 52 story building is the product of a series of joint ventures between the New York Times and Forest City Ratner Company. The tower has 1.6 million square feet of office space, a 350 seat auditorium on the ground level overlooking a garden area, a rooftop conference center, a glass enclosed retail complex on the ground floor.

Lovett Silverman provided the following schedule consulting services to Ownership:

- Development of original master schedule; updates of master until CM was retained.
- Review of CM's proposed schedules; Detailed review of baseline schedules and development of incentive milestones.
- Monitoring project status on monthly basis, including a peer review of AMEC's schedule updates, with a narrative report
- Analysis and negotiation of sub-contractor delay claims.

AOL/Time Warner Center
Columbus Circle, NY City

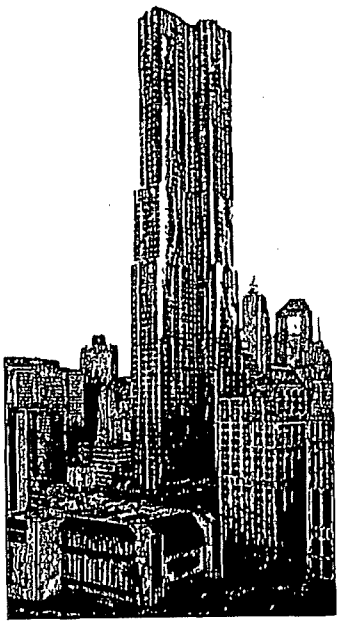


This project is a $1.7 billion development on the site of the old New York Coliseum at Columbus Circle. The 2.7 million square foot multi-use project is the home of AOL/Time Warner's new world headquarters, Jazz at Lincoln Center, Mandarin Hotel, residential condominiums, office space, a retail mall and a parking garage.

Lovett Silverman provided the following schedule consulting services:

- Coordinated design schedules of multiple design teams for each building component.
- Developed summary level milestone schedule for planning.
- Developed full baseline schedule in conjunction with CM and sub-contractors.
- Scheduled phased occupancy by tenants.
- Monitoring project status on monthly basis, including a peer review of the CM's schedule, including a narrative report.
- Provided Claims assistance on fire insurance claim

Beekman Place
New York, NY



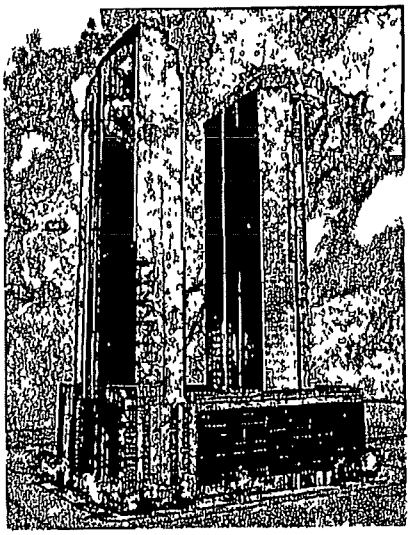
Beekman Place is a 76 story, 1.1 million sq ft, multi-use high-rise designed by the renowned architect Frank Gehry. This building will consist of rental apartments, a public school for 630 pre-K thru third grade students, an ambulatory care facility for NY Downtown Hospital, 1,300 sq ft of ground floor retail space, one level of below-ground hospital parking, and two plazas surrounding the building.

Lovett Silverman has developed a master schedule incorporating all required approvals and design activities for the developer, Forest City Ratner Companies. In addition, a summary level construction schedule was developed and refined.

Lovett Silverman is providing the following schedule consulting services:

- Master Schedule Development
- Monthly Schedule Updates and Peer Reviews with narratives
- Initial Verification of GC/CM Construction Schedules
- Attend monthly site visit and meeting to assess schedule status

77 Hudson
Jersey City, NJ

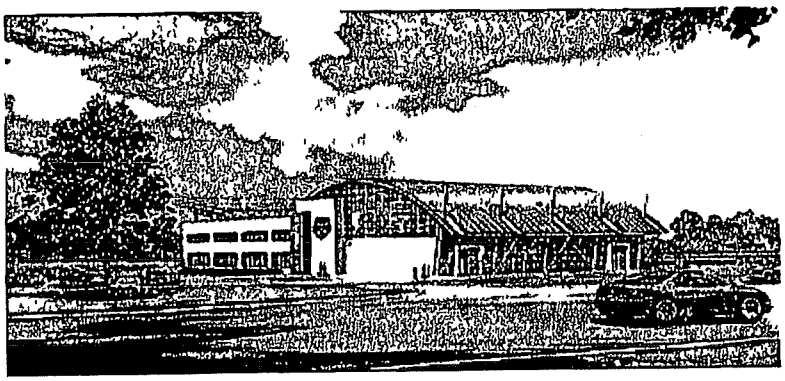


K. Hovnanian and its business partner EQR are developing a property at 77 Hudson Street in Jersey City, New Jersey. 77 Hudson is a luxury residential hi-rise that consists of a nine story parking structure with a retail component at the ground floor level. Atop of this structure will stand two residential towers, one containing 420 condos and the other with 481 rentals. Joint amenity spaces will sit between the towers at the top of the parking structure that include concierge service, a community lounge, game room, fully-equipped business center, fitness area and studios, sauna rooms, massage room, children's playroom, 30,000 square foot manicured roof top park, swimming pool, dog park, jogging path and views of the Hudson River.

Lovett Silverman is providing the following schedule consulting services:

- Review and validation of CM/GC Construction Schedule
- Monthly Schedule Peer Review
- Attend monthly site visits to discuss and review the schedule

Red Bull Practice Facility
Hanover, NJ



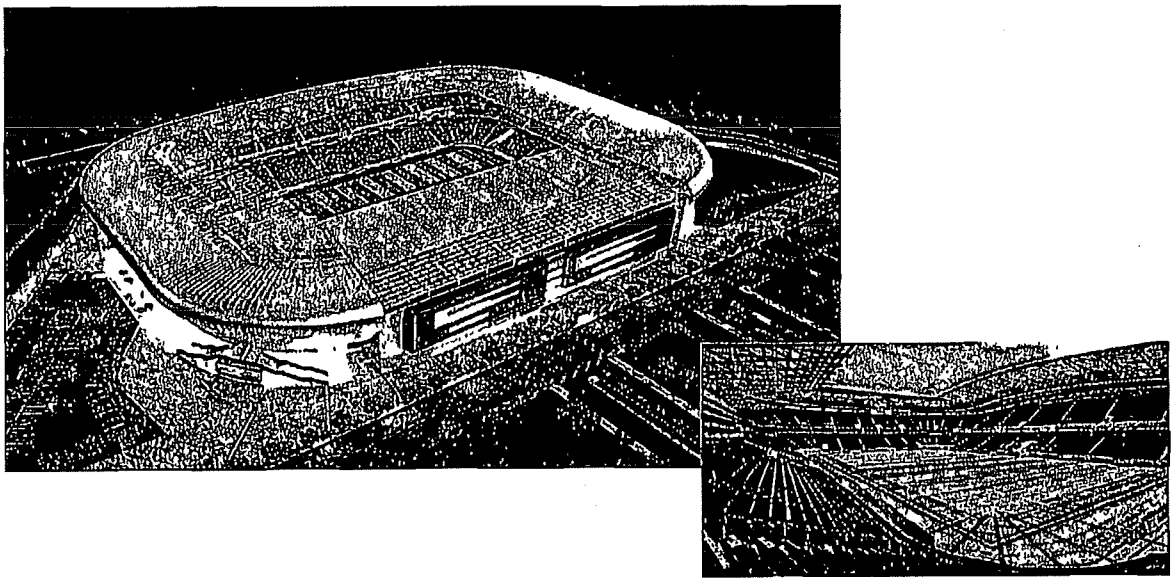
The Red Bulls are constructing a new Headquarters and practice facility in Hanover, NJ that includes six soccer fields, a 50,000 square foot, two-story office building and a one-story, 3,700 square foot field house. Amenities include multiple locker rooms, player's lounge, weight room, and trainer's room.

Of the six soccer fields, five will be outdoors while one will be covered by a tension fabric frame structure for use during inclement weather or at night. Four of the fields will be equipped with lights for evening and night activities.

Lovett Silverman is providing the following schedule consulting services:

- Develop a detailed CPM Schedule
- Review and Modification of the Construction Schedule
- Monthly Schedule Updates
- Attend Monthly site walk through to assess schedule status
- Advise on any recommended actions to recover lost time

Red Bull Arena
Harrison, NJ

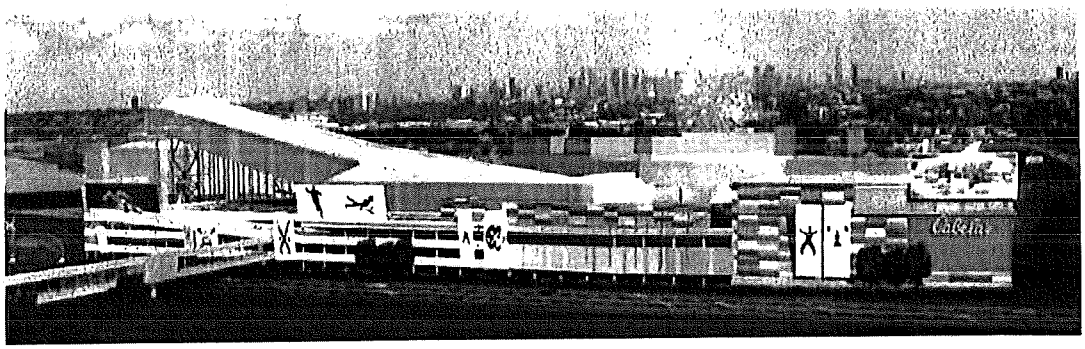


The Red Bulls are constructing a new 25,189 seat stadium for their soccer team. A key feature is the dynamic foam roof that wraps around the entire stadium in a metal shell, blocking fans from the weather. The design includes 30 luxury suites, 1,116 club seats and a first row of seats that will be only 21 feet from the touchlines.

Lovett Silverman is providing the following schedule consulting services:

- Develop a detailed CPM Schedule
- Review and Modification of the Construction Schedule
- Monthly Schedule Updates
- Attend Monthly site walk through to assess schedule status
- Advise on any recommended actions to recover lost time

Meadowlands Xanadu
East Rutherford, NJ



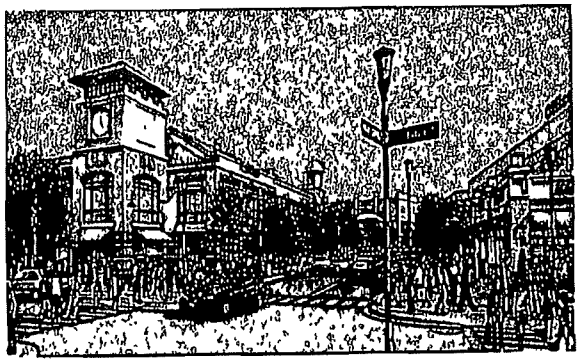
This 4.8 million square foot entertainment facility will offer visitors interactive entertainment venues, fine dining, outdoor amusements, runway fashion shows and America's first Snow Dome for indoor skiing. Meadowlands Xanadu will also offer a luxury hotel and office buildings.

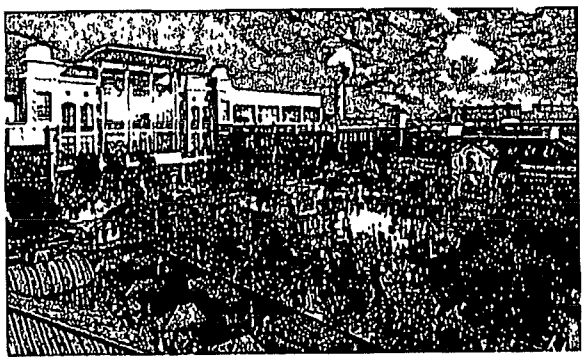
Lovett Silverman was initially retained by Terminal Construction for the construction of the first parking garage. Subsequently, we were retained by Turner Construction for the Superstructure/Shell construction of all areas. In addition, we have been retained by the Owner to provide oversight of the whole project schedule.

Lovett Silverman is providing the following schedule consulting services :

- Develop detailed Baseline Schedule
- Monthly Schedule Updates with narratives
- Delay claim mitigation

Ridge Hill Village
Yonkers, NY



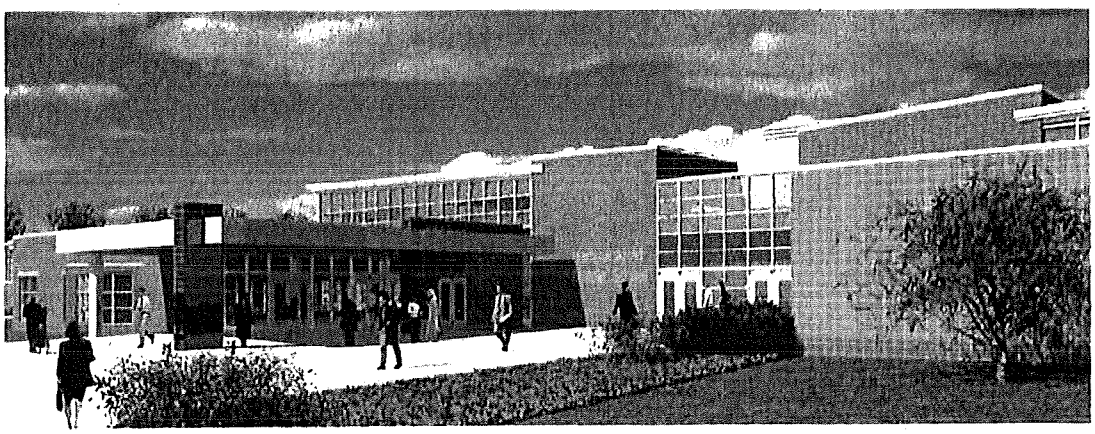


Developed by Forest City Ratner Companies, Ridge Hill Village in Westchester County, New York will feature approximately 1.3 million square feet of retail development including shopping, restaurants, and a multi-screen cinema, in addition to 160,000 square feet of office and research facilities, up to 1,000 residential apartments, and a 175 room hotel with convention center, as well as a 1,248 space parking facility.

Lovett Silverman is providing the following services:

- Oversight review/commentary of the sitework contractor schedule.
- Maintain Master Schedule in conjunction with PM and CM's
- Monitoring project status on monthly basis

Hammarskjold Middle School
East Brunswick, NJ

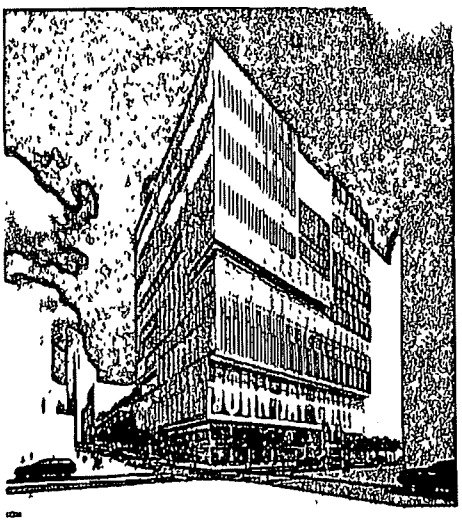


This project is the addition of a new building that includes classrooms, offices, gymnasiums, media center, and a new 1000 seat auditorium and cafeteria. The General Contractor, Terminal Construction, has appointed Lovett Silverman to produce and maintain the Construction Schedule on a monthly basis.

Lovett Silverman provided the following schedule consulting services:

- Prepare Detailed Baseline Schedule
- Monthly Schedule Updates with narratives

John Jay College of Criminal Justice
New York, NY



This major expansion project for Manhattan's City University of New York's John Jay College of Criminal Justice will join the college's buildings into a one-block campus, adding an all-glass-facade mid-rise building and a landscaped public space to integrate the school into the surrounding neighborhood. The plan is to occupy the entire block over a two-phase construction schedule and add the new 620,000 square foot building. The $457 million project will expand campus space by 36%. The new 14 story building will house classrooms, forensic labs, lecture halls, offices, conference spaces, student lounges, a café, and a black box theater when it is ready for occupancy in 2010.

The project's Construction Manager, Turner Construction, retained Lovett Silverman to develop the project's Master Schedule, perform cost-loading analysis and monthly schedule updates in coordination with site walk-thru's and project meetings.

Lovett Silverman is providing the following schedule consulting services:

- Develop Baseline Schedule and perform cost-loading
- Monitoring project status on a monthly basis, including a peer review of the CM's schedule and monthly site visits
- Monthly schedule updates with narratives

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ANDREW F. BORGLUM, P.E.
Principal

PROFESSIONAL AFFILIATIONS:

Registered Professional Engineer, Pennsylvania
Member - American Society of Civil Engineers

EDUCATION:

Lehigh University - BS Civil Engineering

AREAS OF KNOWLEDGE AND EXPERTISE:

Twenty three years of professional experience in civil/structural design, project management oversight, CPM scheduling, the preparation and evaluation of construction claims, and surety evaluations. Project types include: modern high-rise buildings, transportation; school renovations, multi-use single story office buildings, hotels, retail/entertainment, arenas, water/waste water treatment plants, health care facilities, hospitals and prisons, nuclear and coal power plants, resource recovery facilities, airports and residential developments. Qualified as an expert and has provided expert testimony on schedule impact analysis and damages including delays, disruption, differing site conditions, extra work, termination and productivity at mediation, and in the United States District Court and State of New York Court of Claims.

Mr. Borglum has written several papers and lectured on such topics as: CPM in Litigation, Documenting Impact Claims, and Documentation and Claims Avoidance. He has also provided expert testimony on schedule impact analysis at mediation, arbitration and trial.

PROFESSIONAL EXPERIENCE:

Presently, Equity Owner with shared responsibility for business development and management of the Northeast Region. Responsibilities include management of office and staff, fiscal responsibility of revenues/profits, coordination of sales and marketing efforts, preparation of proposals, monitoring of project budgets, and production and presentation of preliminary and final work products to clients.

Currently providing analysis and resolution of construction claims. Services include: schedule delay analysis, cost overrun analysis, productivity analysis, preliminary estimate of claim value, determination of liability and damages, expert report preparation, settlement negotiations, and expert testimony at deposition and trial, litigation support including interrogatories, document inspections

and depositions.

Additionally involved in providing CPM scheduling consulting services for Owners, Developers, Construction Managers and Contractors, including: developing milestone schedules, detailed lease, design, construction, testing/commissioning and migration schedules which are integrated into a master schedule; attendance at progress meetings and schedule update meetings; produce monthly reports and present to the project team; document schedule slippages and recommend recovery action; evaluate schedule impact of change orders; provide objective review of claim issues to assist in dispute resolution.

Previously, as a Senior Engineer with a national engineering and construction management consulting firm specializing in Construction disputes and CPM scheduling. Responsibilities included: CPM Schedule development and updating, evaluation of delay and acceleration claims, preparation and evaluation of lost productivity, extra work, professional liability, defective workmanship and escalation damage claims. Also provided general litigation support including interrogatories, document discovery inspections, and depositions.

As a Project Engineer on a twenty-story residential tower, was responsible for inspection of in-place work and evaluating compliance to plans and specifications, as well as providing estimates of percent complete, and calculating a cost-to-cost complete. Also served as a Project Engineer in charge of completing and closing out approximately 20 contracts in New Jersey, New York and Pennsylvania of a major commercial window manufacturer/installer.

As a Project Controls Engineer on a Project Management Team for planning stage of $200 million residential development project on the northern N.J. coastline, assisted in the development of a master project schedule and long term cost projections.

RECENT CPM PROJECT EXPERIENCE

Goldman Sachs - *Battery Park City, NY*	$ TBD
Museum of Modern Art - *New York, NY*	$250 million
Goldman Sachs - *Jersey City, NJ*	$1.5 Billion
AOL/Time Warner Centre - *New York, NY*	$1.7 Billion
New York Times New Headquarters - *New York, NY*	$300 million
Towers at Merritt River - *Norwalk, CT*	$60 million
Supreme & Family Court - State of New York - *Brooklyn, NY*	$700 million
Atlantic Terminal Retail/Tower - *Brooklyn, NY*	$125 million
Riverwalk/Bldg A - *West New York, NJ*	$55 million
NJ City University Arts & Science Bldg - *Jersey City, NJ*	$30 million
NJSCC Schools PS3/MS4 - *Jersey City, NJ*	$65 million
9 Metrotech South - *Brooklyn, NY*	$90 million
Hilton Times Square - *New York, NY*	$140 million
NJ Transit Secaucus Transfer Rail Station - *Secaucus, NJ*	$100 million
Ritz Carleton Golf Lodge - *Naples, FL*	$60 million
Sotheby's Headquarters Phase II - *New York, NY*	$22 million
NJ Transit Rail Operations Center - *Kearny, NJ*	$15million
Embassy Suites Hotel - *New York, NY*	$130 million
NYCTA 180th street Maintenance Facility - *Bronx, NY*	$40 million
New York Mercantile Exchange Headquarters - *New York, NY*	$240 million
New Headquarters for Fire Dept. of New York - *Brooklyn, NY*	$60 million
New York Hospital Center for Aging - *New York, NY*	$3 million
NY City Data Center/E911 facility - *Brooklyn, NY*	$65 million
Charlotte Airport Terminal Expansion - *Charlotte, NC*	$25 million

RECENT CLAIMS PROJECT EXPERIENCE

Islip Landfills, *Long Island, NY*
Defense of two $8 million claims on landfill remediation projects. Issues include additional quantities, idle equipment, delays, and lost productivity. One project included a trial.

Jackson Towers Condominiums at Las Olas, *Fort Lauderdale, FL*
Defense of $5 million claim for delays and extra work on a residential condominium high-rise project. This project was arbitrated.

Macomb's Dam Bridge, *Bronx, NY*
Preparation of delay, disruption and acceleration claim for this bridge rehabilitation project.

Sotheby's Auction House, *New York, NY*
Litigation support for $12 million in claims/counterclaims for Sotheby's auction house headquarters in NY City. Issues include delay, poor management, and termination.

Healthcare Facility, Greenhaven Correctional Facility
Expert testimony on delay analysis and litigation support for $3 million claim, where issues included underground interferences, design changes, and lost productivity.

Westhampton Nursing Home, *Westhampton, NY*
Expert report and testimony in defense of a $1.4 million 3rd party errors/omissions claim for a nursing home. Issues include design errors and concurrent delays.

Madison Square Garden, *New York, NY*
$12 million asbestos abatement claim for sports arena. Issues include extra work and design omissions.

Sun Oil, *Philadelphia, PA*
$5 million claim for Mechanical contractor on Oil refinery. Issues include restricted access, delays/acceleration, excessive design changes.

JP Morgan Bank World Headquarters, *New York, NY*
Litigation support for $70 million in claims/counterclaims relating to HVAC and granite curtainwall on a 48 story JP Morgan Bank World Headquarters. Issues included design errors, poor workmanship, fabrication delays.

Babylon Resource Recovery Facility, *Babylon, NY*
$21 million claim on a resource recovery plant. Issues include: disputed extra work late/inadequate design; delayed site access.

Merck Headquarters, *Whitehouse Station, NJ*
$6 million changed subsurface conditions claim by foundations contractor on a 1 million sq. ft. office facility.

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DOUGLAS E. PETERSON, P.E.
Principal

PROFESSIONAL AFFILIATIONS:

Professional Engineer: New Jersey, New York, Florida, California, Georgia
Certified General Contractor: Florida
General Building Contractor: California
American Society of Civil Engineers
National Society of Professional Engineers
American Arbitration Association – Former Construction & NJ Public Sector Panelist

EDUCATION:

University of North Florida, M.B.A. (1983)
Rensselaer Polytechnic Institute, B.S., Civil Engineering (1976)

AREAS OF KNOWLEDGE AND EXPERTISE:

Mr. Peterson has 33 years of professional experience in the fields of engineering and construction, including construction management, construction claims and litigation support, CPM scheduling, civil/ structural design and surety consulting. Project experience includes fossil fuel power generation facilities, cogeneration, resource recovery, water and wastewater, mass transit, medical, defense, commercial, industrial, educational and high-rise. Qualified as an expert and has provided expert testimony on schedule impact analysis and damages including delays, inefficiency, disruption, excessive changes, differing site conditions, extra work, termination and productivity at mediation, arbitration and in state court. Served as arbitrator in several construction disputes, with the key issues being incomplete design, change orders, delay, and damages. Lecture subjects have included constructability, value engineering, construction claims analysis, claims avoidance, documentation, and scheduling.

PROFESSIONAL EXPERIENCE:

Principal with shared technical and business responsibility for the New Jersey office, providing claims and scheduling services to the New York/New Jersey Metro area. Responsibilities include office administration, management of office staff, fiscal responsibility of

revenues/profits, coordination of sales and marketing efforts, preparation of proposals, monitoring of project budgets, and production and presentation of preliminary and final reports to clients.

Responsible for litigation support and construction claims consulting services, including schedule delay and damage analysis, and settlement negotiations. Prepared as-planned and as-built schedules, time impact analysis, lost productivity analysis, expert reports and counterclaim in support of the Owner for two disputes, totaling $70 million, related to a newly constructed 50 story, $750 million bank headquarters building in New York City, a $23 million dispute related to an $85 million trash-to-energy resource recovery facility on Long Island, a $15 million asbestos abatement claim related to a major sports arena, and a $13 million claim related to a water treatment plant in Georgia. Provided claims consulting services related to nursing/assisted living facilities, electrical substations, colleges, schools, municipal facilities, highway & bridge, landfill, airport hangars, airtrain monorail project, pharmaceutical projects, a research laboratory, retail centers, E-911 facilities, a visitors center, automated security systems, and a refinery piping and environmental abatement project.

Major construction CPM scheduling assignments have included an $11 million public library, a $50 million college academic building, a $38 million college residence hall complex, a $20 million college performing arts theater, a $32 million USAF hospital, a $25 million railroad and monorail station serving a major airport, a $28 million rail maintenance facility, a $60 million high security 24-hour computer data center in Brooklyn, NY, a pharmaceutical process piping project, a Asmart highway@ traffic monitoring and notification systems.

Recent surety completion assignments include two water treatment facilities, two sewage treatment plant controls upgrades, sewer systems in several towns, landscaping at a $100 million IRS facility, housing developments, a fire training center, a golf course and plumbing at a $100 million Federal prison.

Previously, provided claims prevention consultation, dispute analysis and resolution during the construction phase of a $41 million wastewater treatment facility expansion and a $30 million bus maintenance facility.

Previous Construction Management Assignments include:
Resident Construction Manager responsible for all project construction activity including quality, schedule, and budget compliance for a $70 million cogeneration project and a $10 million railroad yard improvement project.

Resident Engineer responsible for jobsite engineering, scheduling, document control, constructability/value engineering reviews and workshops, claims avoidance and resolution, and quality surveillance on the following projects:

- $1.1 billion power plant project in Florida. This facility was completed on time and under budget.
- $180 million high security one million square foot aircraft manufacturing facility in California. This facility contained 250,000 sq ft of office area including raised computer

flooring and security features such as magnetic card reader access, balanced magnetic switches and motion detectors.

Construction Engineer on a $500 million power plant project included field engineering, inspection, progress certification, change order resolution, contract administration and schedule maintenance. Also responsible for layout of site laydown/storage/staging areas and temporary facility design.

Civil/Structural Engineer on several power plant projects valued between $250 million and $500 million. Responsible for structural steel and reinforced concrete design and site layout.

REPRESENTATIVE CPM PROJECT EXPERIENCE

Hammarskjold Middle School, *East Brunswick, NJ*	$55 million
Princeton Public Library, *Princeton, NJ*	$11 million
Montclair State University - Lab & Classroom, *Upper Montclair, NJ*	$50 million
Montclair State University - Theater, *Upper Montclair, NJ*	$21 million
Montclair State University - Dorms, *Upper Montclair, NJ*	$38 million
NJ Transit Hoboken Rail Maintenance Facility, *Hoboken, NJ*	$26 million
Brooklyn Federal Post Office & Courthouse, *Brooklyn, NY*	$130 million
Smart Highway Project, *Northern NJ*	$13 million
NJ Transit AirTrain Monorail Station, *Newark, NJ*	$28 million
NJ Transit Wayne Bus Garage, *Wayne, NJ*	$28 million
McGuire AFB Ambulatory Care Center, *Wrightstown, NJ*	$32 million
NY City Data Center/E911 facility, *Brooklyn, NY*	$65 million

REPRESENTATIVE CLAIMS PROJECT EXPERIENCE

PS-178 School, *Manhattan, NY*
Prepared schedule analysis and testified in Queens Supreme Court in defense of the general contractor regarding delays relating to this $25 million school.

Watchung Square, *Watchung, NJ*
Prepared expert report and schedule analysis for this retail complex in defense of general contractor claims. Provided expert testimony at arbitration in support of claims.

Route 7 Lift Bridge, *Belleville, NJ*
Prepared expert report in support of electrical subcontractor regarding delays and damages. Provided testimony in depositions and mediation proceedings.

International Trade Center South, *Mt. Olive, NJ*
Prepared expert report detailing $18 million of delays and damages incurred by the earthwork contractor related to a retail project.

Middlesex County Landfill, *East Brunswick, NJ*
Prepared expert report regarding schedule analysis in support of the general contractor's claim. Provided testimony in depositions and mediation.

Atlanta/Fulton County Water Treatment Plant, *Buford, GA*
Provided expert report regarding delays and damages in support of general contractor's claim related to delays on this $23 million facility.

Pharmaceutical Facilities, *NY & NJ*
Expert reports provided related to claims in support of several electrical and mechanical contractors related to projects at Merck, Bristol Myers Squibb and Wyeth. Issues included delay, disputed change orders and lost productivity.

County Courthouse Expansion and Renovation, *New City, NY*
Prepared expert report regarding design errors in support of the County.

Newark Airport AirTrain Monorail Station, *Newark, NJ*
Prepared expert report in support of the electrical contractor. Issues included delay, acceleration, disputed change orders and lost productivity.

911 Communications Center, *Warren, NJ*
Prepared expert report in defense of general contractor against subcontractor claims.

Morristown Town Hall Renovation, *Morristown, NJ*
Claims analysis and negotiation assistance in support of Owner. Defense of contractor claims.

Flagler Beach Bridge, *Flagler Beach, FL*
Prepared delay analysis related to new FLDOT bridge across intercoastal waterway.

Madison Square Garden, *New York, NY*
Prepared $12 million asbestos abatement claim for this sports arena. Issues included extra work and design omissions.

Sun Oil Refinery, *Philadelphia, PA*
$5 million claim for mechanical contractor on oil refinery. Issues include restricted access, delays/acceleration, and excessive design changes.

JP Morgan Bank World Headquarters, *New York, NY*
Schedule and damages analysis and litigation support for $70 million in claims/counterclaims relating to HVAC and granite curtainwall on a 48 story JP Morgan Bank World Headquarters. Issues included design errors, poor workmanship, and fabrication delays.

Babylon Resource Recovery Facility, *Babylon, NY*
Schedule and damages analysis related to $21 million claim on a resource recovery plant. Issues included disputed extra work, late/inadequate design and delayed site access.

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MICHAEL J. DiPRIMO JR.

Senior Consultant

EDUCATION

New Jersey Institute of Technology - BS, Civil Engineering

Previously attended Penn State University emphasizing studies in the Architectural Engineering, Construction Management division.

GENERAL EXPERIENCE

Mr. DiPrimo has 21 years of experience in the areas of construction coordination, planning and CPM scheduling, field inspection and testing, cost estimating, and construction claims avoidance/analysis. He has been involved in the construction of several hi-rise office and residential buildings, federal courthouses, powerplants, wastewater treatment facilities, airports, university campuses, sports facilities, retail and entertainment facilities, and mass transit centers. Extensive experience with project scheduling and cost control software including the use of Primavera scheduling software, Means Cost Estimating software, AutoCAD, Lotus, WordPerfect, Microsoft Windows and Office.

PROJECT EXPERIENCE

Currently providing CPM scheduling consulting services on several major construction projects in NY City and Northern New Jersey. Tasks include developing milestone schedules, design, construction, testing/commissioning and migration schedules which are integrated into a master schedule, progress and schedule update meeting attendance, monthly report production for the project team, document schedule slippages and recommend recovery action, evaluate schedule impact of change orders, and provide objective review of claim issues to assist in dispute resolution.

Mike is currently providing schedule analysis and monthly schedule updates to a major contractor on a $1 billion baseball stadium being constructed in New York City. Responsibilities include field visits, attendance at project update meetings, and analysis of the contractor's progress schedule for potential claim issues. Mike is also involved in the development of a $2 billion retail and entertainment complex located in East Rutherford, NJ. He is providing scheduling services that include schedule development and review, schedule updates and attendance at project meetings. Other current projects include the development and maintenance of the project schedule for a new soccer stadium in Harrison, NJ, several high density residential projects along the NJ side of the Hudson River, and two high rise residential towers.

Prior to these assignments, Mike was involved full time with the coordination of scheduling on a $1.2 billion development project in downtown Jersey City, NJ. Responsibilities included milestone planning and development and monitoring of an integrated schedule based on information from dozens of consultants, construction managers, the owner and developer.

In addition, Mike was the Scheduling Manager for a major construction manager at the Merck Rahway campus in Rahway, NJ where he was responsible for the coordination and implementation of the scheduling and cost control program for approximately $750 million of construction. In collaboration with a team of four schedulers, he was responsible for the planning and accurate reporting of design, procurement and construction progress for various projects, which included a powerplant, chiller building, super rack for utility distribution, an eight-story office building, and a chemical sewer replacement program. Tasks include updates, and attending various project and owner meetings.

Mike has performed detailed investigative studies of construction delays and disruptions to help resolve engineering and construction disputes. Responsibilities included schedule delay analysis, preparation of as-planned and as-built schedules, manpower studies, analysis of weather conditions, productivity analysis, material quantity takeoffs and project records maintenance. Assignments included:

- $1.25 million delay and disruption claim for work at a northern New Jersey airport.
- Defense of a subcontractor claim to the prime contractor at a County 911 facility.
- $34 million in delay claims surrounding slab and owner furnished equipment on a Rail Maintenance Facility.
- $70 million in claims/counterclaims relating to HVAC and granite curtainwall on major bank's 48 story world headquarters in New York City.
- $48 million in owner claims relating to the design and erection of the space frame structure at a convention center in New York City.
- $6 million in claims involving earthwork, utilities and differing site conditions at an International Airport in New York City.

Mike was previously the Schedule Engineer in charge of developing and updating the preconstruction master schedule for a new U.S. Courthouse in New York City. This work included the coordination of the architect's demolition and construction drawing preparation, GSA/CM and judicial reviews, GSA lease acquisition, tenant relocation and fit-out of new work spaces. He also participated in value engineering workshops focusing on the superstructure and phasing of the work.

RECENT CPM PROJECT EXPERIENCE

Red Bull Stadium - *Harrison, NJ*	$150 million
Red Bull Practice Facility - *Hanover, NJ*	$50 million
Goldman Sachs - *Battery Park, NY*	$ 2+ Billion
Grandview at Riverwalk Port Imperial - *West New York, NJ*	$60 million
Goldman Sachs - *Jersey City, NJ*	$1.5 Billion
Meadowlands Xanadu - *East Rutherford, NJ*	$2 Billion
Disney New Amsterdam Theater Offices - *New York*	$34 million
Henley on Hudson - *Weehawken, NJ*	TBD
NY Jets Training Facility - *Florham Park, NJ*	$40 million
77 Hudson Condo & Apartment Towers - *Jersey City, NJ*	TBD
The Lofts at Riverwalk, Bldg. C - *West New York, NJ*	TBD
Vista Pointe, Bldg. F - *Edgewater, NJ*	TBD
New Yankee Stadium - *Bronx, NY*	$1 Billion
Hudson Pointe - *Edgewater, NJ*	TBD
Livingston Town Center - *Livingston, NJ*	$15 million
Paulus Hook - *Jersey City, NJ*	$32 million
East River Plaza - *Manhattan, NY*	TBD
NJ Transit Secaucus Transfer Rail Station - *Secaucus, NJ*	$100 million
Sotheby's Headquarters Phase II - *New York, NY*	$22 million
NJ Transit Rail Operations Center - *Kearny, NJ*	$15 million
Embassy Suites Hotel - *New York, NY*	$130 million
NYCTA 180th Street Maintenance Facility - *Bronx, NY*	$40 million
New York Mercantile Exchange Headquarters - *New York, NY*	$240 million
New Headquarters for Fire Dept. of New York - *Brooklyn, NY*	$60 million
NY City Data Center/E911 facility - *Brooklyn, NY*	$65 million

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JESSE RATCLIFFE
Senior Consultant

EDUCATION

University of California, Berkeley - BS Nuclear Engineering, BS Industrial Engineering and Operations Research (Double Major), 1981

Seton Hall University - MBA, Finance, Certificate in International Business, 1990

MILITARY

U.S. ARMY – 25th Infantry Division, 2/11 Field Artillery, 1974-1977
Battalion Maintenance Specialist

Military Active Tour of Duty. Responsible for the overall maintenance of power generation equipment and parts supply in a Combat Artillery unit. Supervised 1-7 military personnel on assigned tasks.

AREAS OF KNOWLEDGE AND EXPERTISE

Mr. Ratcliffe has 27 years of experience in CPM scheduling, cost control and analysis, estimating, project management, as well as claims avoidance and resolution. His responsibilities include the setup, maintenance and analysis of cost and schedule control systems in the monitoring and evaluation of EPC tasks. Project types include institutional, government and industrial facilities, process plants, power generation, transportation, schools, office buildings and hi-rise hotel projects involving both new construction and modifications.

PROFESSIONAL EXPERIENCE

Project experience includes all aspects of CPM scheduling including baseline schedule development, monthly progress and update meeting attendance, perform walk-thrus to determine job progress, monthly schedule updates, and cost and delay analysis for Owners, Developers, Construction Managers and Contractors.

Current projects include the schedule development & monthly schedule updates for the John Jay College of Criminal Justice (new 13-story college building in New York City), 80 Dekalb Avenue (new 34-story apartment building in New York City), Egg Harbor Regional High School in southern NJ, and Shangri-La Hotel (a new 63-story hi-rise building in New York City).

Recently, Jesse was involved in the CPM schedule preparation and update for a CO_2 process plant in Fulton, NY. He was involved in the development of a CPM construction schedule for a $71 million Hotel and Resort Complex, as well a 300,000 square foot commercial office and retail complex. Other responsibilities included the review and analysis of as-built conditions against plans in support of construction claims litigation.

Previously, as a Chief Project Controls Engineer, Jesse managed and directed the preparation and maintenance of an integrated EPC program schedule and the overall cost development and control towards the construction of a $250 million processing facility to downblend U233 into a more stable form of isotope for safe handling and disposal.

As a Chief Project Controls Engineer, he managed and reviewed the preparation and update of CPM EPC schedules for a combined gas-fired power plant and Nitrogen plant in Mexico, a Plutonium Reprocessing Facility in Idaho, and other radioactive waste handling/processing facilities for the Department of Energy.

Prior to above, Jesse was the Project Control Manager for a 600 MW combined cycle power plant in Pennsylvania. His responsibilities included CPM baseline schedule development and update from Engineering and Procurement through Construction and Commissioning, cost monitoring and forecasting, evaluation of delay and acceleration claims, daily review of site changed conditions and the subsequent preparation of field change requests, and the weekly progress measurement and reporting. He worked closely with project personnel during the Engineering and Design, Procurement, Construction and Startup phases. Coordinated site functions relating to cost, schedule and change control involving subcontractors and direct hire craft labor. Monitored and analyzed site progress, productivity and financial performance on a weekly and monthly basis. The $500 million EPC project was commissioned and turned over to the client on schedule and within final cost objectives.

CURRENT AND RECENT CPM PROJECT EXPERIENCE

Shangri-La Hotel, *New York, NY*
Develop the baseline construction schedule, provide monthly updates and attend progress meetings for a new up-scale hi-rise hotel building .

CO_2 Process Plant, *Fulton, NY*
Develop the baseline construction schedule and provide monthly updates for a CO_2 plant, which processes raw feed gas into liquid CO_2 for transport by rail or truck.

80 Dekalb Avenue, *Brooklyn, NY*
Develop the baseline construction schedule, provide monthly updates and attend progress meetings for a new hi-rise apartment building .

Vu Hotel, *New York, NY*
Develop the baseline construction schedule, provide monthly updates and attend progress meetings for the conversion of an existing mid-rise building into an up-scale hotel utilizing and expanding the existing structure.

Hammarskjold Middle School, *East Brunswick, NJ*
Develop the baseline construction schedule and provide monthly progress updates for a new addition and alterations to existing building.

John Jay College of Criminal Justice, *NY, NY*
Baseline schedule development, preparation of monthly progress updates, cost loading analysis, multi-contractor schedule coordination and attendance at monthly site meetings for the 612,000 square foot campus expansion.

New York City School Construction Authority, *New York, NY*
Lead Scheduler for the Coal Boiler Condition Assessment and Construction Management for 150 NYC Public Schools in Brooklyn and the Bronx.

New York City School Construction Authority, *New York, NY*
Lead scheduler on a construction management team for a new $32 million prototype primary school in Queens consisting of three multistory, concrete and steel structures with construction duration of 26 months.

City University of New York – Lehman College, *New York, NY*
Prepared schedules on the master plan, design and construction for the rehabilitation of heating and cooling systems for the Lehman College campus.

Queensborough Community College, *New York, NY*
Prepared schedules for the boiler plant rehabilitation project. Project scope included the design of plant modifications for replacement of three 25 million Btu/hr high temperature hot water boilers and auxiliary equipment.

New York City Transit, West Side Bus Maintenance Facility, *New York, NY*
Lead Project Controls engineer for the design and construction support for the rehabilitation of the existing Greyhound Bus Facility entailing 600,000 SF conversion to a NYCT bus maintenance and storage facility for 260 buses.

Merck & Co., Inc. – Rahway Powerhouse Expansion, *Rahway, NJ*
Lead Project Controls engineer on the engineering, procurement and construction of a new boiler and steam distribution system. Responsible for the development and monthly update of the EPC schedule. Monitored and analyzed cost performance. Prepared monthly project progress reports.

ALZO, Inc., *Sayreville, NJ*
Lead Project Controls engineer responsible for the planning and scheduling and cost control of the Engineering, Procurement & Construction of a cosmetic processing & manufacturing facility in Sayreville, NJ.

BOC Gases, *Murray Hill, NJ*
Planning and scheduling support for process systems and packaged plant projects. Developed and updated CPM schedules for a variety of equipment configurations in the production of assorted gases applications.

AMTRAK / NJ Transit, *New York, NY*
Lead Project Controls engineer on the Construction Management of the Sunnyside Yard (Long Island City, NY) Static Frequency Converter Station. Reviewed and analyzed CPM construction schedules.

LORAL/UNISYS Defense Systems, *Various Locations*
Lead Project Controls engineer on the Engineering, Design, Procurement and Construction Management of NEXRAD Weather Radar Facilities for 150 sites within and outside the Continental United States.

Lear Siegler, Inc. / Grumman Aerospace Co., *Florham Park, NJ*
Project Administration Supervisor responsible for the cost and schedule control on the design and manufacture of Stores Management Systems for the F-14 and A-6 Navy aircraft.

Westinghouse Electric Corp., *Sunnyvale, CA*
Planner/Scheduler. Responsible for the cost and schedule control activities of a $500 million Defense Aerospace contract in compliance with DoD requirements (C/SCS). Established and developed Work Breakdown Structures and budget baselines. Developed, monitored and coordinated integrated program schedules Analyzed and reported cost and schedule performance (BCWS, BCWP, ACWP, CPR) conforming to DoD regulations. Conducted studies, meetings and presentations as required.

Bechtel Power Corp., San Francisco, CA / Public Service Electric & Gas
Planning and Scheduling engineer on the $2.3 billion Engineering, Procurement and Construction of the Hope Creek Nuclear Generating Station. Responsible for the Cost and Schedule development and statusing of design and construction schedules.

JESSE RATCLIFFE, Senior Consultant

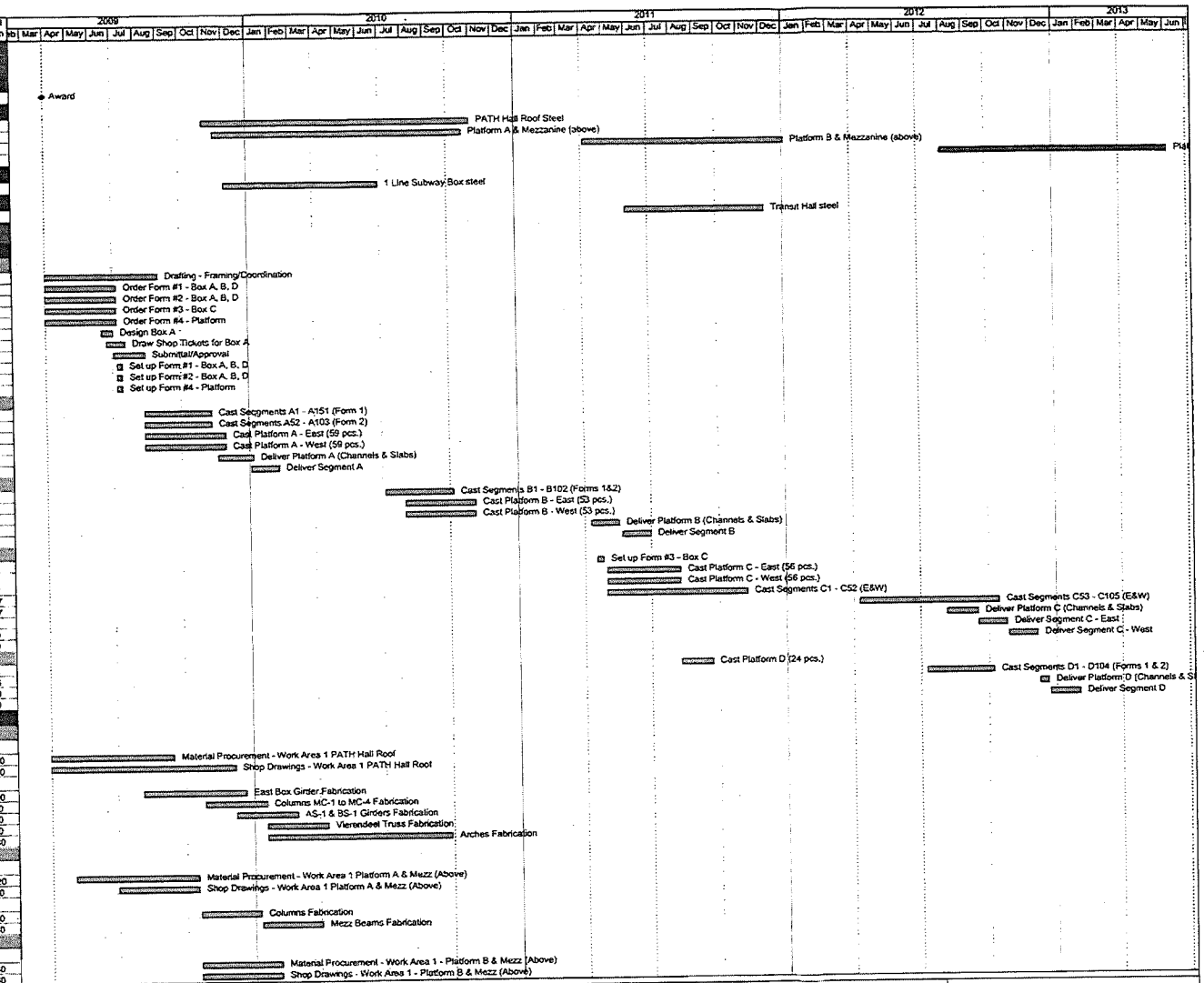
DCM ERECTORS INC.

110 East 42nd Street
Suite 1704
New York, NY 10017
Tel. (212) 599-1603 Fax (212) 599-1615

Technical Proposal Items No.: ***5.2 Schedule & 5.3 Cost/Schedule Controls***
RFP/Contract No.: W0TC-GC1-2-KN0186-020
Station Construction and Transit Hall Structure to Grade
Structural Steel, Intumescent Coating, Metal Deck & Precast Work
New York, NY
February 22, 2009

DCM Erectors, Inc proposes to retain Lovett & Silverman of Mahwah, NJ as Primavera Scheduling Consultants. Lovett & Silverman have assisted us in the preparation of our proposed contract schedule and if successful would prepare a cost loaded CPM schedule and two/four week look aheads to enable us and Phoenix Constructors, JV to forecast and assess the adherence to project milestones and the effect of changes in scope/conditions upon same. We attach our schedule.

Activity ID	Activity Name	Start	Finish	Original Duration
Milestones				
Award				
A100	Award		03-31-09*	0
Work Area 1				
A410	PATH Hall Roof Steel	11-02-09	11-01-10	261
A430	Platform A & Mezzanine (above)	11-17-09	10-21-10	243
A450	Platform B & Mezzanine (above)	04-05-11	01-02-12	195
A470	Platform C/D & Mezzanine (above)	08-02-12	06-05-13	220
Work Area 2				
A490	1 Line Subway Box steel	12-01-09	06-30-10	157
Work Area 3				
A510	Transit Hall steel	06-01-11	12-06-11	135
Submittals, Shop Drawings & Fabrication				
Precast				
Engineer/order/set-up				
A1490	Drafting - Framing/Coordination	03-31-09	08-31-09	110
A1530	Order Form #1 - Box A, B, D	04-01-09	07-06-09	69
A1540	Order Form #2 - Box A, B, D	04-01-09	07-06-09	69
A1550	Order Form #3 - Box C	04-01-09	07-06-09	69
A1560	Order Form #4 - Platform	04-01-09	07-06-09	69
A1500	Design Box A	06-16-09*	07-01-09	12
A1510	Draw Shop Tickets for Box A	06-23-09	07-17-09	18
A1520	Submittal/Approval	07-02-09	08-13-09	31
A1570	Set up Form #1 - Box A, B, D	07-07-09	07-13-09	5
A1580	Set up Form #2 - Box A, B, D	07-07-09	07-13-09	5
A1600	Set up Form #4 - Platform	07-07-09	07-13-09	5
A platform/segment				
A1610	Cast Segments A1 - A151 (Form 1)	08-13-09	11-11-09	65
A1620	Cast Segments A52 - A103 (Form 2)	08-13-09	11-11-09	65
A1670	Cast Platform A - East (59 pcs.)	08-13-09	11-30-09	78
A1680	Cast Platform A - West (59 pcs.)	08-13-09	11-30-09	78
A1740	Deliver Platform A (Channels & Slabs)	11-20-09	01-06-10	34
A1780	Deliver Segment A	01-04-10	02-10-10	28
B platform/segments				
A1630	Cast Segments B1 - B102 (Forms 1&2)	07-06-10*	10-05-10	66
A1690	Cast Platform B - East (53 pcs.)	08-02-10*	11-04-10	69
A1700	Cast Platform B - West (53 pcs.)	08-02-10*	11-04-10	69
A1750	Deliver Platform B (Channels & Slabs)	04-11-11*	05-18-11	28
A1790	Deliver Segment B	05-23-11*	06-30-11	29
C platform/segments				
A1590	Set up Form #3 - Box C	04-18-11*	04-27-11	6
A1710	Cast Platform C - East (56 pcs.)	05-02-11*	08-09-11	72
A1720	Cast Platform C - West (56 pcs.)	05-02-11*	08-09-11	72
A1640	Cast Segments C1 - C52 (E&W)	05-02-11*	11-08-11	137
A1650	Cast Segments C53 - C105 (E&W)	04-09-12*	10-16-12	137
A1760	Deliver Platform C (Channels & Slabs)	08-06-12*	09-17-12	31
A1800	Deliver Segment C - East	09-18-12	10-26-12	29
A1810	Deliver Segment C - West	10-29-12	12-07-12	30
D platform/segments				
A1730	Cast Platform D (24 pcs.)	08-10-11	09-21-11	31
A1660	Cast Segments D1 - D104 (Forms 1 & 2)	07-09-12*	10-08-12	86
A1770	Deliver Platform D (Channels & Slabs)	12-10-12	12-21-12	10
A1820	Deliver Segment D	12-24-12	02-01-13	30
Structural Steel				
Work Area 1 - PATH Hall Roof				
Material & Shop Drawings				
A1830	Material Procurement - Work Area 1 PATH Hall Roof	03-31-09	09-14-09	120
A1840	Shop Drawings - Work Area 1 PATH Hall Roof	03-31-09	12-07-09	180
Fabrication				
A1970	East Box Girder Fabrication	08-04-09	12-21-09	100
A1980	Columns MC-1 to MC-4 Fabrication	10-27-09	01-15-10	60
A1990	AS-1 & BS-1 Girders Fabrication	12-08-09	03-01-10	60
A2000	Vierendeel Truss Fabrication	01-19-10	04-12-10	60
A2010	Arches Fabrication	01-19-10	09-27-10	180
Work Area 1 - Platform A & Mezz (Above)				
Material & Shop Drawings				
A1890	Material Procurement - Work Area 1 Platform A & Mezz (Above)	05-04-09*	10-16-09	120
A1900	Shop Drawings - Work Area 1 Platform A & Mezz (Above)	06-29-09	10-16-09	80
Fabrication				
A2200	Columns Fabrication	10-19-09	01-08-10	60
A2210	Mezz Beams Fabrication	01-11-10	04-02-10	60
Work Area 1 - Platform B & Mezz (Above)				
Material & Shop Drawings				
A1910	Material Procurement - Work Area 1 - Platform B & Mezz (Above)	10-19-09*	02-05-10	80
A1920	Shop Drawings - Work Area 1 - Platform B & Mezz (Above)	10-19-09	02-05-10	80



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Remaining Work
Milestone
Completed Work
Actual Milestone
Critical Remaining Work
Critical Milestones

WTC1

WTC Transportation Hub

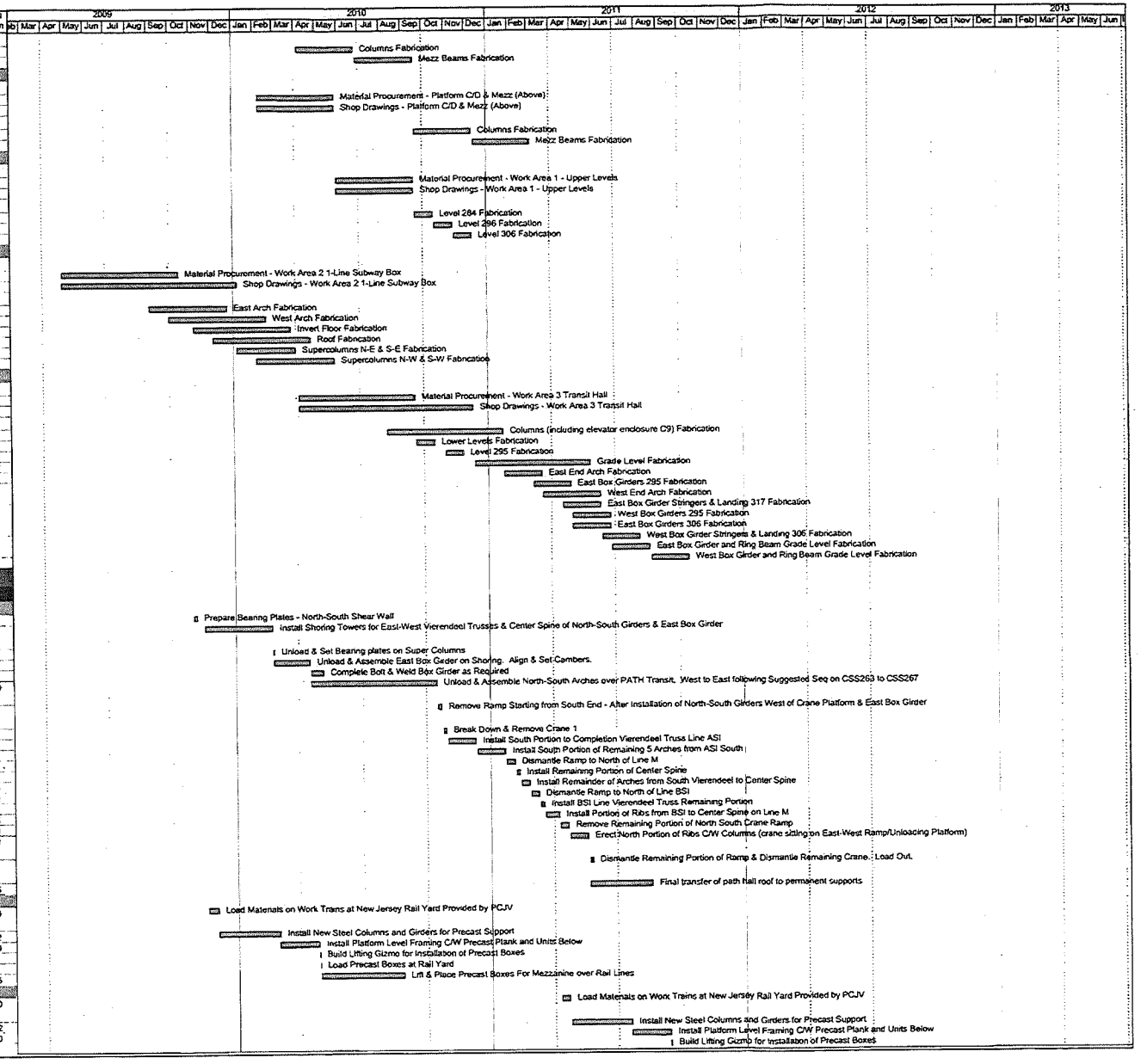
Technical Proposal Schedule

ORIGINAL

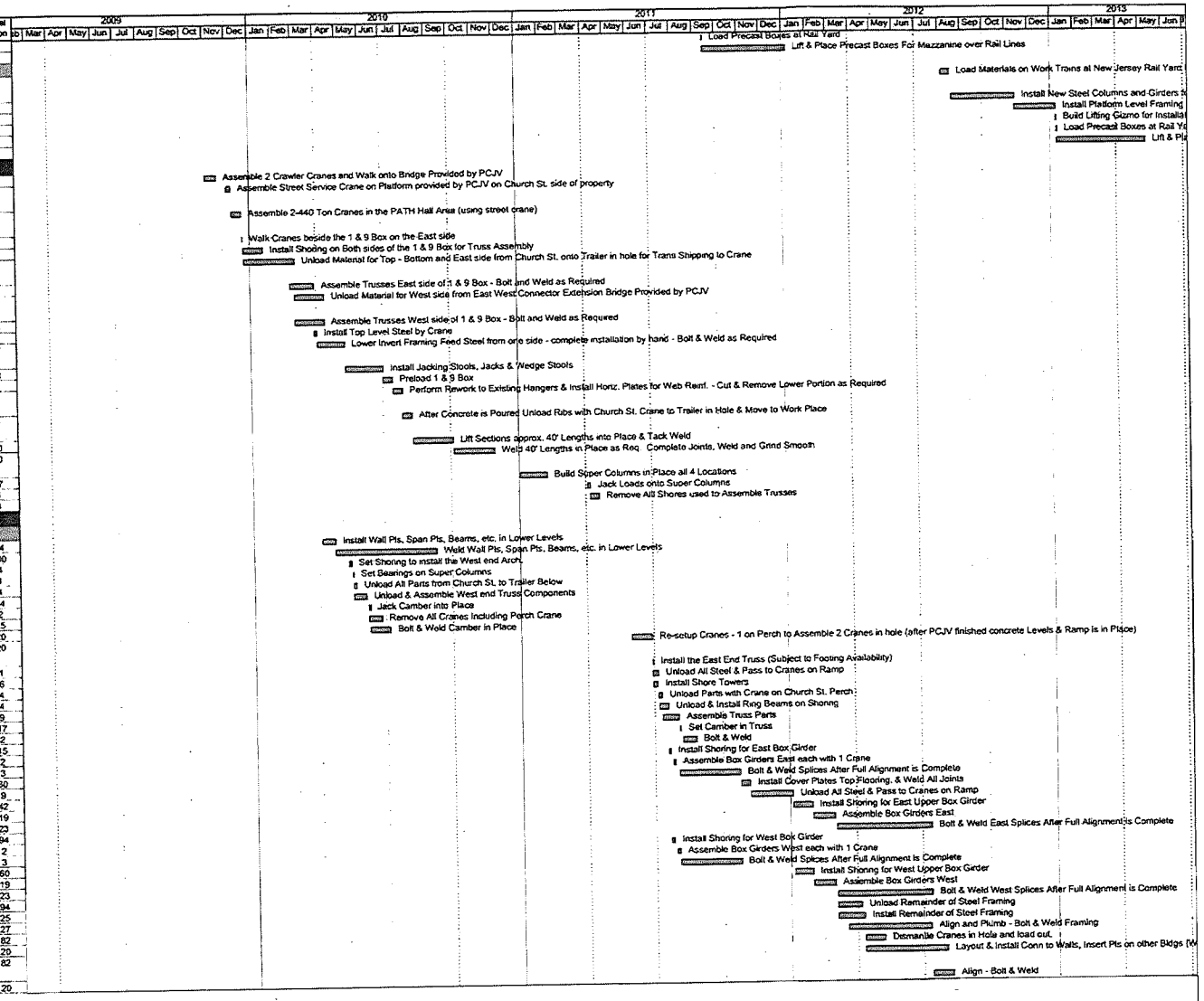
DCM ERECTORS INC.

LOVETT SILVERMAN
1200 MacArthur Blvd.
Mahwah, NJ
201.327.3100

Activity ID	Activity Name	Start	Finish	Original Duration
Fabrication				
A2220	Columns Fabrication	04-05-10	06-25-10	60
A2230	Mezz Beams Fabrication	06-28-10	09-17-10	60
Work Area 1 - Platform C/D & Mezz (Above)				
Material & Shop Drawings				
A1930	Material Procurement - Platform C/D & Mezz (Above)	02-08-10*	05-28-10	80
A1940	Shop Drawings - Platform C/D & Mezz (Above)	02-08-10	05-28-10	80
Fabrication				
A2240	Columns Fabrication	09-20-10	12-10-10	60
A2250	Mezz Beams Fabrication	12-13-10	03-04-11	60
Work Area 1 - Upper Levels				
Material & Shop Drawings				
A1950	Material Procurement - Work Area 1 - Upper Levels	05-31-10*	09-17-10	80
A1960	Shop Drawings - Work Area 1 - Upper Levels	05-31-10	09-17-10	80
Fabrication				
A2260	Level 284 Fabrication	09-20-10	10-15-10	20
A2270	Level 296 Fabrication	10-18-10	11-12-10	20
A2280	Level 306 Fabrication	11-15-10	12-10-10	20
Work Area 2 - 1-Line Subway Box				
Material & Shop Drawings				
A1850	Material Procurement - Work Area 2 1-Line Subway Box	04-30-09*	10-14-09	120
A1860	Shop Drawings - Work Area 2 1-Line Subway Box	04-30-09	01-06-10	180
Fabrication				
A2020	East Arch Fabrication	09-03-09	12-23-09	80
A2030	West Arch Fabrication	10-01-09	02-17-10	100
A2040	Invert Floor Fabrication	11-05-09	03-24-10	100
A2050	Roof Fabrication	12-03-09	04-21-10	100
A2060	Supercolumns N-E & S-E Fabrication	01-07-10	03-31-10	60
A2070	Supercolumns N-W & S-W Fabrication	02-04-10	05-26-10	80
Work Area 3 - Transit Hall				
Material & Shop Drawings				
A1870	Material Procurement - Work Area 3 Transit Hall	04-05-10*	09-17-10	120
A1880	Shop Drawings - Work Area 3 Transit Hall	04-05-10	12-10-10	180
Fabrication				
A2080	Columns (including elevator enclosure C9) Fabrication	08-09-10	01-21-11	120
A2090	Lower Levels Fabrication	09-20-10	10-15-10	20
A2100	Level 295 Fabrication	11-01-10	11-26-10	20
A2110	Grade Level Fabrication	12-13-10	05-27-11	120
A2120	East End Arch Fabrication	01-24-11	03-18-11	40
A2130	East Box Girders 295 Fabrication	03-07-11	04-29-11	40
A2160	West End Arch Fabrication	03-21-11	06-10-11	60
A2140	East Box Girder Stringers & Landing 317 Fabrication	04-18-11	06-10-11	40
A2170	West Box Girders 295 Fabrication	05-02-11	06-24-11	40
A2135	East Box Girders 306 Fabrication	05-02-11	06-24-11	40
A2180	West Box Girder Stringers & Landing 306 Fabrication	06-13-11	08-05-11	40
A2150	East Box Girder and Ring Beam Grade Level Fabrication	06-27-11	08-19-11	40
A2190	West Box Girder and Ring Beam Grade Level Fabrication	08-22-11	10-14-11	40
Construction				
Work Area 1				
PATH Hall roof				
A1220	Prepare Bearing Plates - North-South Shear Wall	11-02-09	11-06-09	5
A1230	Install Shoring Towers for East-West Vierendeel Trusses & Center Spine of North-South Girders & East Box Girder	11-18-09	02-23-10	70
A1240	Unload & Set Bearing plates on Super Columns	02-24-10	02-24-10	1
A1250	Unload & Assemble East Box Girder on Shoring. Align & Set Cam...	02-25-10	04-16-10	37
A1260	Complete Bolt & Weld Box Girder as Required	04-19-10	05-06-10	14
A1270	Unload & Assemble North-South Arches over PATH Transit. West to East following Suggested Seq on CSS263 to CSS267	04-19-10	10-15-10	130
A1280	Remove Ramp Starting from South End - After Installation of North-South Girders West of Crane Platform & East Box Girder	10-18-10	10-22-10	5
A1290	Break Down & Remove Crane 1	10-25-10	10-29-10	5
A1300	Install South Portion to Completion Vierendeel Truss Line ASI	11-01-10	12-10-10	30
A1310	Install South Portion of Remaining 5 Arches from ASI South	12-13-10	01-21-11	30
A1320	Dismantle Ramp to North of Line M	01-24-11	02-04-11	10
A1330	Install Remaining Portion of Center Spine	02-07-11	02-11-11	5
A1340	Install Remainder of Arches from South Vierendeel to Center Spine	02-14-11	02-25-11	10
A1350	Dismantle Ramp to North of Line BSI	02-28-11	03-11-11	10
A1360	Install BSI Line Vierendeel Truss Remaining Portion	03-14-11	03-18-11	5
A1370	Install Portion of Ribs from BSI to Center Spine on Line M	03-21-11	04-08-11	15
A1380	Remove Remaining Portion of North South Crane Ramp	04-11-11	04-22-11	10
A1390	Erect North Portion of Ribs C/W Columns (crane sitting on East-West Ramp/Unloading Platform)	04-25-11	05-20-11	20
A1400	Dismantle Remaining Portion of Ramp & Dismantle Remaining Crane. Load Out.	05-23-11	05-27-11	5
A2410	Final transfer of path hall roof to permanent supports	05-23-11	08-19-11	65
Platform A & Mezz				
A1420	Load Materials on Work Trains at New Jersey Rail Yard Provided by PCJV	11-20-09	12-03-09	10
A1430	Install New Steel Columns and Girders for Precast Support	12-04-09	03-01-10	62
A1440	Install Platform Level Framing C/W Precast Plank and Units Below	03-02-10	04-26-10	40
A1450	Build Lifting Gizmo for Installation of Precast Boxes	04-27-10	04-27-10	1
A1460	Load Precast Boxes at Rail Yard	04-28-10	04-28-10	1
A1470	Lift & Place Precast Boxes For Mezzanine over Rail Lines	04-29-10	08-25-10	86
Platform B & Mezz				
A2290	Load Materials on Work Trains at New Jersey Rail Yard Provided by PCJV	04-11-11	04-22-11	10
A2300	Install New Steel Columns and Girders for Precast Support	04-25-11	07-19-11	62
A2310	Install Platform Level Framing C/W Precast Plank and Units Below	07-20-11	09-13-11	40
A2320	Build Lifting Gizmo for Installation of Precast Boxes	09-14-11	09-14-11	1



Activity ID	Activity Name	Start	Finish	Original Duration
A2330	Load Precast Boxes at Rail Yard	09-15-11	09-15-11	1
A2340	Lift & Place Precast Boxes For Mezzanine over Rail Lines	09-16-11	01-06-12	81
Platform C/D & Mezz-1				
A2350	Load Materials on Work Trains at New Jersey Rail Yard Provided by PCJV	08-06-12	08-17-12	10
A2360	Install New Steel Columns and Girders for Precast Support	08-20-12	11-13-12	62
A2370	Install Platform Level Framing C/W Precast Plank and Units Below	11-14-12	01-08-13	40
A2380	Build Lifting Gizmo for Installation of Precast Boxes	01-09-13	01-09-13	1
A2390	Load Precast Boxes at Rail Yard	01-10-13	01-10-13	1
A2400	Lift & Place Precast Boxes For Mezzanine over Rail Lines	01-11-13	05-10-13	86
Work Area 2 - 1 Line Subway Box				
A760	Assemble 2 Crawler Cranes and Walk onto Bridge Provided by P...	11-02-09	11-17-09	12
A540	Assemble Street Service Crane on Platform provided by PCJV on Church St. side of property	12-01-09	12-07-09	5
A740	Assemble 2-440 Ton Cranes in the PATH Hall Area (using street crane)	12-08-09	12-21-09	10
A750	Walk Cranes beside the 1 & 9 Box on the East side	12-22-09	12-22-09	1
A790	Install Shoring on Both sides of the 1 & 9 Box for Truss Assembly	12-23-09	01-19-10	20
A770	Unload Material for Top - Bottom and East side from Church St. onto Trailer in hole for Trans Shipping to Crane	12-24-09	03-03-10	50
A810	Assemble Trusses East side of 1 & 9 Box - Bolt and Weld as Requ...	02-25-10	03-29-10	23
A780	Unload Material for West side from East West Connector Extension Bridge Provided by PCJV	03-04-10	04-12-10	28
A815	Assemble Trusses West side of 1 & 9 Box - Bolt and Weld as Req...	03-04-10	04-12-10	28
A820	Install Top Level Steel by Crane	03-30-10	04-01-10	3
A830	Lower Invert Framing Feed Steel from one side - complete installation by hand - Bolt & Weld as Required	04-02-10	05-10-10	27
A840	Install Jacking Stools, Jacks & Wedge Stools	05-11-10	07-01-10	38
A850	Preload 1 & 9 Box	07-02-10	07-14-10	9
A860	Perform Rework to Existing Hangers & Install Horiz. Plates for Web Reinf. - Cut & Remove Lower Portion as Required	07-15-10	07-27-10	9
A870	After Concrete is Poured Unload Ribs with Church St. Crane to Trailer in Hole & Move to Work Place	07-28-10	08-09-10	9
A880	Lift Sections approx. 40' Lengths into Place & Tack Weld	08-10-10	10-04-10	40
A885	Weld 40' Lengths in Place as Req. Complete Joints, Weld and Grind Smooth	10-05-10	11-29-10	40
A800	Build Super Columns in Place all 4 Locations	01-03-11*	02-08-11	27
A890	Jack Loads onto Super Columns	04-04-11*	04-07-11	4
A900	Remove All Shores used to Assemble Trusses	04-08-11	04-19-11	8
Work Area 3 - Transit Hall				
Transit Hall Steel				
A1020	Install Wall Pts, Span Pts, Beams, etc. in Lower Levels	04-05-10*	04-22-10	14
A1025	Weld Wall Pts, Span Pts, Beams, etc. in Lower Levels	04-23-10	09-09-10	100
A0910	Set Shoring to install the West end Arch.	05-11-10	05-14-10	4
A0920	Set Bearings on Super Columns	05-17-10	05-17-10	1
A0930	Unload All Parts from Church St. to Trailer Below	05-18-10	05-21-10	4
A0940	Unload & Assemble West end Truss Components	05-18-10	06-04-10	14
A0950	Jack Camber into Place	06-07-10	06-08-10	2
A1030	Remove All Cranes Including Perch Crane	06-07-10	06-25-10	15
A0955	Bolt & Weld Camber in Place	06-09-10	07-06-10	20
A1040	Re-setup Cranes - 1 on Perch to Assemble 2 Cranes in hole (after PCJV finished concrete Levels & Ramp is in Place)	06-01-11	06-28-11	20
A0960	Install the East End Truss (Subject to Footing Availability)	06-29-11	06-29-11	1
A1050	Unload All Steel & Pass to Cranes on Ramp	06-29-11	07-06-11	6
A0970	Install Shore Towers	06-30-11	07-05-11	4
A0980	Unload Parts with Crane on Church St. Perch	07-06-11	07-11-11	4
A1060	Unload & Install Ring Beams on Shoring	07-07-11	07-19-11	9
A0990	Assemble Truss Parts	07-12-11	08-03-11	17
A1000	Set Camber in Truss	08-04-11	08-05-11	2
A1010	Bolt & Weld	08-08-11	08-26-11	15
A1070	Install Shoring for East Box Girder	07-20-11	07-21-11	2
A1080	Assemble Box Girders East each with 1 Crane	07-26-11	07-28-11	3
A1090	Bolt & Weld Splices After Full Alignment is Complete	08-03-11	10-25-11	80
A1100	Install Cover Plates Top Flooring. & Weld All Joints	10-26-11	11-07-11	9
A1110	Unload All Steel & Pass to Cranes on Ramp	11-08-11	01-04-12	42
A1120	Install Shoring for East Upper Box Girder	01-05-12	01-31-12	19
A1130	Assemble Box Girders East	02-01-12	03-02-12	23
A1140	Bolt & Weld East Splices After Full Alignment is Complete	03-05-12	07-12-12	94
A1075	Install Shoring for West Box Girder	07-22-11	07-25-11	2
A1085	Assemble Box Girders West each with 1 Crane	07-29-11	08-02-11	3
A2420	Bolt & Weld Splices After Full Alignment is Complete	08-03-11	10-25-11	60
A1125	Install Shoring for West Upper Box Girder	01-05-12	01-31-12	19
A1135	Assemble Box Girders West	02-01-12	03-02-12	23
A1145	Bolt & Weld West Splices After Full Alignment is Complete	03-05-12	07-12-12	94
A1180	Unload Remainder of Steel Framing	03-05-12	04-06-12	25
A1185	Install Remainder of Steel Framing	03-05-12	04-10-12	27
A1200	Align and Plumb - Bolt & Weld Framing	03-19-12	07-10-12	82
A1210	Dismantle Cranes in Hole and load out.	04-11-12	05-08-12	20
A1190	Layout & Install Conn to Walls, Insert Pts on other Bldgs (WTC2 & WTC3)	04-11-12	08-02-12	82
A1170	Align - Bolt & Weld	07-13-12	08-09-12	20



DCM ERECTORS INC.

110 East 42nd Street
Suite 1704
New York, NY 10017
Tel. (212) 599-1603 Fax (212) 599-1615

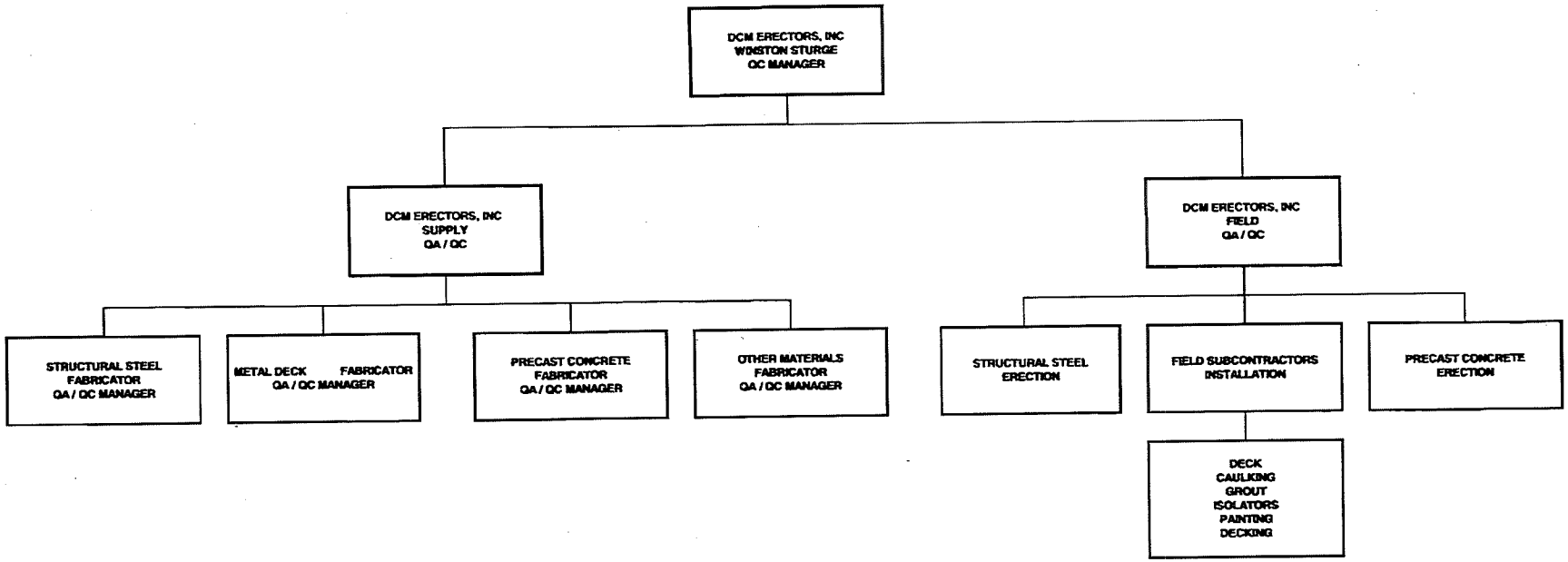
Technical Proposal Item No.: ***5.4 Quality Assurance, Quality Control and Quality Management***
RFP/Contract No.: W0TC-GC1-2-KN0186-020
Station Construction and Transit Hall Structure to Grade
Structural Steel, Intumescent Coating, Metal Deck & Precast Work
New York, NY
February 22, 2009

DCM Erectors, Inc will strive to provide materials and services of the utmost quality and state of the art. DCM Erectors, Inc policy toward Quality Management will be a systematic approach to achieving organized activities occurring in the manner that they are intended. DCM Erectors, Inc Senior Management will insure that this Quality Policy is understood and implemented throughout all levels of our organization including subcontractors. The DCM Quality Control Manager will be responsible to manage the implementation of this Quality Plan and make sure that it is understood, disseminated to appropriate parties and maintained throughout the life of the project.

With this in mind, we attach quality manuals from WTC # 1 Freedom Tower and Work Package 8A which have been accepted and approved by the Port Authority of New York and New Jersey. We realize that we will have to produce a Work Package 20 specific Quality Program for approval which encompasses the expertise of Steel Bridge Fabrication/ Fracture Critical Material, AWS D 1.5, Intumescent Coating Application and Precast Concrete Quality Assurance if we are chosen as the successful prime contractor.

DCM ERECTORS, INC. - TRANSPORTATION HUB - WORK PACKAGE 20

QUALITY CONTROL ORGANIZATIONAL CHART



American Institute of Steel Construction

is proud to recognize

MRP, LLC.

South Plainfield, NJ

for successfully meeting the quality certification requirements for

Standard for Steel Building Structures

Roger E. Ferch

Certification valid through November 2009

American Institute of Steel Construction

is proud to recognize

Owen Steel Company, Inc.

Columbia, SC

for successfully meeting the quality certification requirements for

Standard for Steel Building Structures, Simple Steel Bridges and Major Steel Bridges

Fracture Critical Endorsement

Sophisticated Paint Coating Endorsement-
Enclosed

Roger E. Ferch

Roger E. Ferch

Certification valid through May 2009

ATTACHMENT- 7

American Institute of Steel Construction, Inc.

is proud to recognize

URSSA, S. Coop

Vitoria - Gasteiz,

for successfully meeting the quality certification requirements for

Standard for Steel Building Structures, Simple Steel Bridges and Major Steel Bridges

Sophisticated Paint Coating Endorsement-Enclosed

Roger E Ferch

Bobbi Marstellar

Certification valid through May 2009

American Institute of Steel Construction

is proud to recognize

Cives Steel Co. Northern Div.

Gouverneur, NY

for successfully meeting the quality certification requirements for

Standard for Steel Building Structures

Sophisticated Paint Coating Endorsement-
Enclosed

Roger E. Ferch

Certification valid through October 2009

American Institute of Steel Construction

is proud to recognize

High Steel Structures, Inc.

Lancaster, PA

for successfully meeting the quality certification requirements for

Standard for Steel Building Structures, Simple Steel Bridges and Major Steel Bridges

Fracture Critical Endorsement

Sophisticated Paint Coating Endorsement-
Enclosed

Roger E. Ferch

Certification valid through August 2009

American Institute of Steel Construction

is proud to recognize

High Steel Structures, Inc.

Williamsport, PA

for successfully meeting the quality certification requirements for

Standard for Steel Building Structures, Simple Steel Bridges and Major Steel Bridges

Fracture Critical Endorsement

Sophisticated Paint Coating Endorsement-Enclosed

Roger E. Ferch

Certification valid through August 2009

CERTIFICATE OF REGISTRATION

This is to certify that

HIGH STEEL STRUCTURES, INC.

1911 Old Philadelphia Pike P.O. Box 10008, Lancaster, Pennsylvania 17605-0008 USA

operates a

Quality Management System

which complies with the requirements of

ISO 9001:2000

for the following scope of registration

The registration covers the Quality Management System for the fabrication of Steel Buildings, Steel Bridge Girders, and other Steel Components.

Certificate No:	CERT-0016121	Original Certification Date:	June 17, 2003
File No:	014023	Current Certification Date:	May 31, 2006
Issue Date:	August 12, 2008	Certificate Expiry Date:	June 16, 2009

Wendy Tilford
President,
QMI-SAI Canada Limited

Alex Ezrakhovich
General Manager,
SAI Global Certification Services Pty Ltd

Certified System ISO 9001

ANAB ACCREDITED

Registered by:

SAI Global Certification Services Pty Ltd, 286 Sussex Street, Sydney NSW 2000 Australia with QMI-SAI Global and subject to the SAI Global Certification Services Pty Ltd Terms and Conditions for Certification. While all due care and skill was exercised in carrying out this assessment, SAI Global Certification Services Pty Ltd accepts responsibility only for proven negligence. This certificate remains the property of SAI Global Certification Services Pty Ltd and must be returned to SAI Global Certification Services Pty Ltd upon its request.
To verify that this certificate is current, please refer to the QMI-SAI Global On-Line Certification Register www.qmi-saiglobal.com/qmi_companies/

QMI Management Systems

Certificate of Registration

High Steel Structures, Inc.

3501 W 4th Street
Williamsport, Pennsylvania
17701-4106 USA

has demonstrated that its Quality Management System is in compliance with:

ISO 9001:2000

The following scope of registration applies:

Fabrication of Steel Girders and other Steel Bridge Components.

Certificate Number:	CERT-0020837
QMI File Number:	025615
SIC Number / NACE Code:	3441 / DJ28.1
Original Registration Date:	April 13, 2004
Current Registration Date:	April 13, 2007
Registration Expiry Date:	April 12, 2010

QMI REGISTERED

Wendy J. Tilford
President of QMI

ANAB ACCREDITED

IQNet

American Institute of Steel Construction

is proud to recognize

ADF Group, Inc.

Terrebonne, QC

for successfully meeting the quality certification requirements for

Standard for Steel Building Structures, Simple Steel Bridges and Major Steel Bridges

Fracture Critical Endorsement

Roger E. Ferch

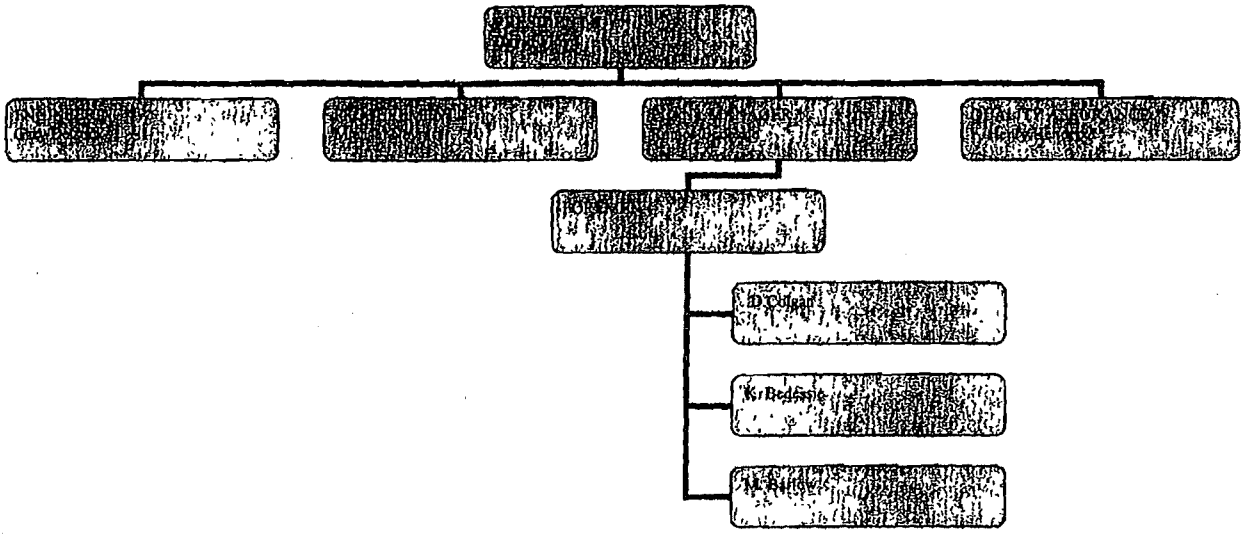
Certification valid through June 2009

QUALITY CONTROL MANUAL
MRP, LLC.

Organizational chart

MRP, LLC.

*** Denotes Member of "Executive Management Team"**
**** Denotes the "Quality Representative" of the Executive Management Team & the AISC Contact Representative.**



MRP, LLC. LOG OF MANUAL HOLDERS

Manual #	Holder	Initial Date	Rev. #1	Rev. #2	Rev. #3
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					

EXHIBIT #1

MRP, LLC

CONTROL AND MANAGEMENT OF THE QUALITY MANUAL

GENERAL
This quality manual includes or references the methods and documentation required for the fabrication of steel in accordance with AISC and the AWS D 1.1 specifications.

PURPOSE
The purpose of this manual and its attachments is to document in writing the control and the implementation and maintenance of this manual. The responsibility for completion of this manual, is the Quality Management Representative designated by the president. See Section 11 of this manual.

This manual provides information about how to perform activities and processes consistently. It contains written procedures or instructions in various forms for the actives that management feels are of concern.

ISSUANCE AND CONTROL
The person designated by the president, the Quality Management Representative, will provide controlled copies of this manual to those parties as shown on Exhibit No. 1. Should the holder's requirement for a manual cease due to any reason; they shall return their copy.

REVISIONS TO THE MANUAL.
Accepted revisions to this manual will be issued to all holders of controlled copies. At the time of issuance a transmittal letter will be attached. As proof of receipt, a copy of the transmittal letter must be signed, dated and returned. Exhibit #2

The latest changes are in italic letters.

The manual revision is to be in the upper right hand corner of pages, which have changes on them. This could be as small a change as a page number change due to inserted material.

This manual is to be reviewed yearly by the person designated by the president and prior to the designated time for the AISC audit.

GENERAL PROCEDURE FOR PREPARATION AND CONTROL OF PROCEDURES

Documentation must contain the purpose of the procedure. Assign responsibilities for completion, responsibility for review of the procedure and identify records that are generated. The term "Documented Procedure" where it applies within this standard, indicates that the procedure is established, documented, implemented, and maintained.

INDEX

Statement of Policy
Table of Contents
List of Exhibits
Quality Control Manual, Management of
Log of Manual Holders
Transmittal Letter
Abbreviations
Section 1: Organization
Section 2: Drawing & Specification Control
Section 3: Material Control
Section 4: Fabrication Control
Section 5: Inspection
Section 6: Calibration & list of Inspection Equipment
Section 7: Owner
Section 8: Independent Party Inspection
Section 9: Records
Section 10: Maintenance Program
Section 11: Audits
Section 12: Technical Assistance
Section 13: Training

Weld procedures are in a separate brochure.
Bolting procedures are in a separate brochure.
Clean and Paint procedures are in a separate brochure.
Painter training is in the Clean and Paint brochure.

LIST OF EXHIBITS

EXHIBITS	Exhibit #
Log of manual holders.	1
Revisions to manual	2
Contract Information Sheet	1-1
Field Problem Summary List	1-2
Non-Conformance Log	1-3
Request for Information (RFI) Log	1-4
Welder Continuity Log	4-1
Rod Oven Temperature Log	4-2
Daily Inspection Report	5-1
Tape Verification Log	5-2
Red Tag Log	5-3
Dew Point Check Log	5-4
Surface Preparation Methods	5-5
Paint Record Log	5-6
Random Audit Check List	5-8
Preventative Maintenance Schedule Log	10-1
Welding Machine Cleaning Log	10-2
Amperage and Volt Meter Check list	10-3
Documented training form	13-1

Section 1.0 ORGANIZATION

1.1 Direction and Leadership

The purpose of this section is to shown the general management system.
The scope is general in nature and is shown in more detail though out this manual and applies to all projects.

MRP, LLC has formed an *Executive Management Team.*

1.1.1 General Management Policy Statement.

1.1.2 As shown by the signatures in the previous section, MRP, LLC has been organized with an Executive Management team, which includes the position Quality Assurance which has been designated as the Quality Management Representative. This latter position is the AISC contact position.

1.1.3 Executive management has directed the development of systems necessary to achieve the goals of the fabricator's policies

1.1.4 The policy of MRP, LLC. is to furnish and fabricate a quality product that is consistent with AISC and AWS specifications and requirements contained in the contract documents. A portion of control is by the use of a "Contract Information Document" (Exhibit 1-1)

.5 Management will direct all activities of the company to meet this specific requirement.

1.1.6 Management will, as shown in the Policy Statement, supply sufficient recourses and communication channels to address and resolve customer complaints. When RFIs are needed they shall be recorded on the RFI Log. (Exhibit 1-4)

1.1.7 Management acknowledges the need for and supports the separation between quality control responsibilities and production responsibilities. Production Manager and Quality Control will report independently to the President and Quality Assurance Manager.

1.1.8 Process performance and product conformance at is tracked by back charge charges reports, internal error trends and their cause and correction in fitting, welding, bolting and coating application processes; detailing errors; shipping delays; or equipment failures.

These reports are filed in the contract folder.

Letters of recommendation are filed both in the contact folder and posted both in the office and shop areas.

1.1.9 Management will insure that procedures needed for the quality management system are established implemented and maintained in accordance with the Standard.

Implementation is by as a minimum, a semi-annual self-audit. This self- audit is by an internal self-audit six month after the yearly AISC required self-audit
Conditions affecting quality may trigger another self-audit of either the complete system or just the department(s) involved.

These records are to be supplied to the designated Executive Committee person, who will be responsible to maintain them. - (Refer to section 9 of this manual). This is accomplished by reviewing and documenting the results of internal and AISC audits, customer feedback, back charges relating to internal error trends with fitting, welding, bolting and coating applications, detailing errors, shipping delays or equipment failures. See FIELD PROBLEM SUMMARY LIST (exhibit 1-2), NON-CONFORMANCE LOG (exhibit 1-3) and RFI log (exhibit1-4).
This could also be by review of the Red Tag Log, Corrective Action Reports [(exhibit 1-5) when generated in house] or from any source and customer feed back etc. This data is the basis to assess the program as reaching the quality and production goals of the company
These are submitted to the designated Executive Committee person via a transmittal letter (exhibit # 2 of this QC/QA manual) which requires a signature to insure receipt.

1.1.10 Quality meetings are in conjunction with production meetings as well as separate meeting as deemed necessary by upper management. Reports to the executive management team on the performance of the quality management system and any need for improvement are discussed. The meeting will cover and summaries of red tags logs and non-conformance reports, sample of which are shown in this section of this manual. These records are retained as shown in Section 9. Reports of the quality meetings are retained by the Quality Management Representative and copies supplied to all concerned.

1.1.11 Management will ensure the promotion of and awareness of customer requirements throughout the organization. Portions of this responsibility are fulfilled by use of the Contract Information Sheet.

1.1.12 Management will promote liaisons with external parties on matters relating to the quality management systems.

1.1 13 Particular duties and resumes of the Executive Management Team are shown in the AISC submittal manual and are not shown in this manual.

1.1.14 The Quality Assurance Manager functions as a separate authority responsible to the President of MRP, LLC. The President will appoint employees from outside the company as Auditors or Advisors as deemed necessary.

1.1.15 The Quality Assurance Manager is responsible for implementing and supervising the Quality Control Program. The responsibility encompasses all activities including plate and shape ordering, storage, production, inspection and loading. This person shall also revise and distribute the Quality Control Manual, develop training programs and review purchase orders.

1.1 16 In addition to the above, the Quality Assurance Manager and the Detailing Manager reviews incoming contracts for special requirements such as material traceability, special weld tests, qualification or re-qualification of welders and tackers, special cleaning or painting and any exceptions to the AISC or AWS codes. The special requirements shall be shown on the Contract Information Sheet.

1.1.17 Management will be responsible for the qualification of personnel. In addition to the training as shown in Section 13, it may be attending AISC training sessions and visits to the AISC web page for updates on Frequently Asked Questions.

1.1.18 Special information is made part of the detailing job folder and is also brought to the attention of purchasing, shop supervision and Quality Assurance.

1.1.19 When changes are made to a contract that will have major impact on either products, quality, costs and delivery a new Contract Information Sheet will be issued. This issue will be by the original originator.

1.2 Quality Assurance Manager

1.2.1 Quality control has the authority to stop and inform supervision of non-conforming work.

1.2.2 Quality Assurance Manager or their designated representative shall:
Random audit that material is ordered to ASTM Specifications and that certified material test reports are received and properly filed.
Random audits of the purchasing of weld materials and review typical filler metal certifications.
See that inspectors have proper training and certification. See section 13.
Conduct or have conducted yearly & semi-yearly audits of the Quality Control Program.
When Nondestructive Examination (NDE), other than visual is required by contract specifications, the Quality Assurance Manager will contact an outside agency to have properly certified inspectors assigned to the portion of work affected. Records of such inspections and corrective action taken shall be kept in the Quality Assurance Manager contract files.
See the material is properly received.
Resolve non-conforming material.
Maintain records regarding job quality
Schedule, oversee and maintain records of welders and tackers test.
Audit that welder's use each process they are certified for every 6 months
Audit electrode control and rod oven temperature
Audit that void prints are out of the system.
Oversee Material Inspector

1.3 Evaluation of the program.

1.3.1 To help ascertain the effectiveness of this program, field problems are recorded on the Field Problem Summary List (Exhibit 1-2). Shop problems by use of the Red Tag Log and NCR files. (Exhibit 1-3). Copies of the above are to be retained in the Executive Management files. A copy of customer complaints and commendations are retained in the executive management files. It is expected, that information from this data will be useful in improving the Quality Systems.

1.4 Management meetings.

In addition to kick off meetings, management will have a weekly meeting and more often if deemed necessary by upper management. Discussions will cover safety, quality problems if any, drawing and production schedules and any maintenance problems if any. See 1.1.10 Minutes may be by informal notes by each person.

CONTRACT INFORMATION SHEET

DOMESTIC ONLY: YES NO
Minority Participation *YES* *NO* JOB NO._____

DELIVERY DATE_____

JOB NAME_____

JOB ADDRESS_____

STRUCTURAL STEEL TONS_____

CONTRACT MANAGER_____

DESCRIPITION_____

ARCH/ENGR _____TELEPHONE NUMBER_____

DETAILER_____ TELEPHONE NUMBER_____

ERECTOR_____TELEPHONE NUMBER_____

GALVANIZING_____

ASTM A123 REFERENCED_____

IS THERE A NEED TO CONTACT THIRD PARTY INSPECTION?

_____

ARE THERE SPECIAL ERECTION RESPONSIBILITIES? _____

SPECIAL JOB NOTES (IF ON ADDITION SHEET INDICATE THE SHEET)

_____

SHOP CONNECTIONS BOLTED OR WELDED.

_____

IF BOLTED IS TENSIONING REQUIRED? _____

PAGE 1 OF 2

EXHIBIT 1-1

SPECIAL WELD NOTES (IF ON ADDITION SHEET INDICATE THE SHEET)

_____

_____

_____

WELDERS PAPERS TO BE SUBMITTED? _____

WELD PROCEDURES TO BE SUBMITTED? _____

IS COATING SUBLET? _____

IF SO NAME AND TELEPHONE NUMBER _____

SSPC CLEANING REQUIREMENT _____

PAINT FIRST COAT TYPE _____ DRY MILS

PAINT SECOND COAT TYPE _____ DRY MILS

PAINT THIRD COAT TYPE _____ DRY MILS

EXCEPTIONS _____

_____

_____

_____

_____

_____

_____

_____

EXHIBIT 1-1 (Continued)

MRP, LLC. FIELD PROBLEM SUMMARY LIST

CONTRACT NUMBER	PROJECT NAME	REPORTED BY	NATURE OF PROBLEM	NATURE OF FIX	RED TAG OR NCR #	DATE

EXHIBIT 1-2

MRP, LLC. - NCR - NON-CONFORMANCE LOG

CONTRACT NUMBER	NCR #	NATURE OF PROBLEM	DATE OF ISSUE	REPLY DATE	RESOLVED DATE	IS DATA IN THE CONTRACT FILES?

EXHIBIT 1-3

MRP, LLC. REQUEST FOR INFORMATION (RFI) LOG

RFI #	Date	Contract #	Person Contacted	Reason	Disposition

EXHIBIT 1- 4

Section 2.0 DRAWING AND SPECIFICATION CONTROL

Purpose

The purpose of this section is to shown the methods and procedures and controls of handling drawing (both design and details) specifications and items of a special nature. It is of utmost importance to ensure: that only the most recent revision of documents for manufacturing and assemblies are available to appropriate personnel, to maintain contract review records, provide contract authorization, and document the review of contract activities, to define the distribution of project requirements, to provide for customer confirmation, ensure company capability in terms of schedule, manufacturing equipment, materials, and personnel.

Scope

The scope applies to all projects. A review is completed on all projects. The depth of the review may be altered depending on the project scope which the Project Manager evaluates using cost, tonnage, specific complexity, customer history with the facility, or shipping requirements. After the Project Manager reviews contract information and identified deviations to standard contracts, the review decision will be documented.

The Project Manager provides technical advice to customers on the most appropriate choices in product features related to ease of fabrication to reduce cost and/or effect delivery.

2.1 Department "POLICY STATEMENT & RESPONSIBILITY"

It is the policy of MPR, LLC personnel performing detailing functions to provide shop detail drawings and instructions, which adequately interpret the owner's designs and specifications, which are then approved by the Owner.

Signed _____ _____ Date _____
David Floyd, President

2.2 JOB BINDERS

IMPLEMENTATION PROCEDURES FOR CONTRACT ORDERS

Object of the following is to have every new job given immediate attention. Orders placed, Schedules set, and decisions made and delivery as required by contract.

2.2.1 When a contract or purchase order to proceed is received by the President, the department must immediately retrieve data from the estimating file along with the bid package which describes the scope of work and has attached notes describing all post bid communications with the contractor on schedule, access, staging, phasing, etc. A comparison of bid data vs. the final contract must be made. If a verbal order is received and no written conformation is received within 5 working days, estimating follows up with the contractor.

2.2.2 The drawings, bid and specifications are turned over to the President who will put a new job number on it and assure that the proper file folders and proper forms are attached The Production Department and Detailing Department are then informed that a new job has been received.

2.2.3 The job and all necessary information are then entered into the computer.

2.2.3 (Cont'd)

The job folder and drawings are then turned over to the Detailing Department. The Detailing Department establishes the schedule.

2.2.4 Detailing coordinates, clarifiers, resolves and tracks information with the customer by way of RFI's. RFI's are tracked on the RFI Log. (Exhibit 1-4)

The President. initiates a new project by presenting the President with a Sales Estimate, a Shop Order, a Data Input Sheet and a Bid File. After the President has reviewed the package, the President:

1) Forwards the White copy of the Shop Order, Input Data Sheets and Estimating File to the Administrative Assistant for input and creating of a main file.
2) Forwards the Pink copy of the Shop Order to the Plant Manager for the creation of a shop file.
3) The Yellow copy of the Shop Order is forwarded to Procurement for their log.

2.3 CONTRACT DRAWINGS - ORIGINAL

Once being informed that the company has been the successful low bidder and recipient of a new job, the Detailing Manager shall make certain that the Detailing Department has the latest set of design drawings, specifications and addenda.

The company's detailing standards shall be followed. These standards are the AISC's Detailing Standards. The Detailing Department enters the bid document and current document drawing numbers, revision, specification, and addenda is the Project Design Drawing Log. This log is used to record any and all revisions issued by the architect.

2.3.1 CONTRACT DRAWINGS- REVISIONS

Upon receiving the drawings, specifications and addenda they are to be compared to the bid set of drawings, specifications and addendum as identified in the Final Confirmation Proposal, for any revisions. Should there be revisions they are immediately reviewed for impact.

2.3.2 CUSTOMER SUPPLIED DRAWINGS

The customer-supplied drawings must be received with a transmittal letter. These drawings are logged and tracked the same as normal shop drawings developed by the fabricator. I.e.: date received, date to shop, revisions etc.

2.4 SHOP DRAWINGS - GENERAL

Regardless of preparation or origin, the Detailing Department shall be responsible for all drawing maintenance and the issuance of all documents including the revisions that are required to perform the work.
All shop drawing released for fabrication shall be stamped "*Approved for Fabrication*" by the issuing department. All drawings going to the shop which are not approved for fabrication shall be stamped " *Preliminary*".

2.4.1 SHOP DRAWINGS - SUBMITTALS

The Detailing Department maintains records on all submittals and re-submittals through the use of the Letter of Transmittal and the shop-drawing log.

2.4.2 SHOP DRAWINGS - REQUESTS FOR INFORMATION

When the Contract drawings do not provide all the necessary information or dimensions then the Detailing Department will send a Request for Information-RFI-Transmittal.

2.4.3 SHOP DRAWINGS - REVISIONS

If revisions to shop drawings are extensive they are resubmitted for approval prior to being released for fabrication. The resubmission and return are properly documented in the shop drawing submittal log. Whether the drawing has been resubmitted for approval or modified in-house, it is marked with an appropriate revision number and proper logged. If the revision requires additional work the drawings are sent to the President for costing, a change order request form is sent to the Contractor/Owner identifying the change and the Add or Credit Amount.

2.4.4 SHOP DRAWINGS - PRODUCTION DISTRIBUTION AND CONTROL

The release of drawings to the plant is recorded on the Shop Drawing Log, which lists each drawing, and its revision that has been released to production. Drawings are given to the Quality Assurance Manager who reviews them with the Plant Manager prior to distributing them to production personnel.

Before the Plant Manager makes a drawing distribution. he checks the drawing against the Production Drawing Log to be assured he is distributing the latest version.

The Plant Manager shall distribute all drawings and their revisions to production personnel. When distributing a revised drawing, all previous revision shall be destroyed.

If production personnel need to retain previous revisions to the drawings, they will mark such drawings, "VOID" and initial and date the drawing using RED ink, pencil or crayon. Drawings so marked shall indicate that the drawings are for reference only.

If an item that is revised is already in production or has been fabricated it is immediately Red Tagged.

All detail drawings are the responsibility of the Plant Manager so he/she must personally mark or destroy the drawing and must Red Tag any piece in production.

Only prints stamped "Approved for Fabrication" may be used for production or inspection.

2.5 SHOP DRAWINGS - IN HOUSE

Shop drawings are prepared in house whenever practical If workload is too great, shop drawings are sublet

2.6 SHOP DRAWINGS - SUBLET

When Shop drawings are sublet, contract information is transmitted with a Sub-Contract Agreement for Drafting Services. Sublet detailing is performed by concerns that are approved by the Detailing Manager. The corporation is responsible for work performed by the sublet detailer, also MRP, LLC furnishes the sublet detailer with a set of the Corporation Shop Standards, (Connection Sizes, weld Sizes, etc.) Coordinating outside drawings is by the Detailing Manager. The Detailing Manager reviews the shop drawing from the sublet detailer to the contract.

2.7 SHOP DRAWINGS / ERECTION DRAWINGS - RESPONSIBILITY

The detailer making the drawing shall initial all shop drawings. All shop drawings shall be initialed by a checker and stamped prior to going out for approval. All distributions are entered in the Production Drawing Log. Any errors found to exist can be traced to the drawing and checking source.

2.8 ADVANCE BILLS OF MATERIAL (MILL ORDER)

The Advance Bills of Material, used for ordering steel, are prepared by the detailer for purchasing department to either obtain from stock, mill or warehouse. When changes are made, the original document is copied and the changes noted on the duplicate This list is used for ordering material.

2.9 MATERIAL RECEIVED - IDENTIFICATION AND VERIFICATION

he Purchasing Department issues to the Receiving Department a reconciled order list, which identifies each item, size, and grade for the project The Receiving Department verifies each item as it is received and marks it for the designated project.

2.10 FINAL BILLS OF MATERIAL (SHOP BILL MATERIAL)

Final Bills of Material are indicated on the detailed drawings and the detailer issues a Cutting List Final Bill. They contain the ordered size for each mark number.

2.11 FIELD BOLTS

At the completing of the detailing, the detailer summarizes the field bolts and totals them on the Field Bolt List.

2.12 DISTRIBUTION OF DRAWINGS TO ERECTOR ALONG WITH SPECIAL INSTRUCTIONS.

Two prints of Erection Drawings are sent to the Erector and so noted in the Shop Drawings Submittal Log. Any special requirements called for in the specifications will be shown on the drawings along with any special instructions.

2.13 CHECKING OF CAD PROGRAM DATA

For each sublet detailer per major software change the CAD program will be checked as follows:
One column and one beam.

- Grade of material
- Section size
- Length
- One connection

When drawings are sublet, the detailer must be notified in writing of the above and supply all data to the above to the fabricator.

Section 3.0 MATERIAL CONTROL

Purpose

To ensure that purchased product, subcontractors, materials and services conform to the specified requirements, to ensure that purchase orders clearly define the product ordered, to select suppliers and subcontractors based on their ability to meet the company's requirements, to keep records of acceptable suppliers and subcontractors and ensure that quality system controls are effective for both suppliers and subcontractors. to incorporate purchased product into the supplies.

Scope

This procedure applies to all materials and parts ordered for incorporation into the products, consumed during the production process, or used to operate the business.

3.0 Department "POLICY STATEMENT & RESPONSIBILITY"

It is the policy of MRP, LLC. Procurement is to purchase all material and services to conform to AWS specifications and in accordance with the contract document requirements. Where a level of certification is required by contract documents, sublet fabrication is only awarded to fabricators holding the required certification.

Signed _____ Date_____
Michael Neyra, Procurement

3.1 MATERIAL PURCHASED

3.2.1 STRUCTURAL STEEL

The purchasing department orders structural steel. Basic ordering is from Advance Bills of Material. A Purchase Order specifying requirements and requiring mill test reports is completed displaying material type and grade (stating year of specification), number of pieces, shape, length, special requirements, etc. Certified Material Test Reports (CMTR'S) are specified to be supplied on all material. All material must meet ASTM A6. These certifications are to be available to authorized personnel.
All material is to be ordered in accordance with paragraph 4 of ASTM A6. Delivery instructions will be each case basis.

When heat numbers and/or material test reports are required for special application, the following shall be followed.

a. Detailing will, in writing, inform the shop to be certain that heat number are circled on the material and also written on the piece. Test reports must be on hand prior to use. The above is both for stock and ordered material.
b. Material preparation shall ascertain that, if the identity is on crop end, that mark is transferred to the useable material.
c. The fitter shall, on sketch sheets furnished by detailing, show the heat number used per piece mark.
d. These sketch sheets are to be returned to detailing for the job file and/or submittal to the customer. The sketch sheets serve as the "AS BUILT" prints, unless otherwise in the contract documents.

3.2.1 STRUCTURAL STEEL (Cont'd)

All material returned to stock must be marked as to material designation and grade, size including length and the heat number. Where practical the purchase order number is also put on the returned material. Company policy is that material not marked as to type or grade is ASTM A36.

3.2.2 WELDING MATERIALS

Welding material orders are called in by the shop to suppliers as a release to Purchase Orders set up by the Plant Manager. The Purchase Orders shall designate the AWS specification desired as well as trade name. Low hydrogen shielded metal and electrodes shall be ordered in hermetically sealed containers. Typical filler metal certifications are to be supplied. Standing Purchase Orders stating the above are permissible.

When and if actual certificates are required, it shall be shown on the Purchase Order as well as any required special tests such as diffusible hydrogen, etc. These filler metal certifications are to be available to authorized personnel.

3.2.3 BOLTS AND NUTS

Bolts and nuts are ordered by the Plant Manager, Procurement or President. If required by a contract, the Purchase Order will specify the grade, length and required certificates of conformance. When and if special test are required, it shall so state on the Purchase Order. These certifications are to be available to authorized personnel.

3.2.4 PAINTING

Paint is ordered by the Plant Manager. If required by a contract, the purchase order shall require test reports be furnished. Copies of such shall be forwarded to Quality Assurance for audit and file. Test reports are received only when required by contract specifications. Application and Material Safety Data Sheets must be supplied. These certifications are to be available to authorized personnel.

3.2.5 MISCELLANEOUS MATERIAL AND SERVICE

Purchase orders of miscellaneous material as shown on Bills of Material and all those items and services necessary for daily business.
When the service is for NDT, the PO shall state that all reports are to go to the fabricator.

3.2.6 FILES

Manufacturers' test reports of Weld Wire, Bolts, Paint, etc. and Mill Test Reports, are kept on when required in the Job Folder.

3.3 RECEIVING AND INSPECTION OF PURCHASED MATERIAL

3.3.1 MILL AND WAREHOUSE MATERIAL

3.3.1.1 Certified Material Test Reports are received by Procurement, which randomly checks them for compliance to the ASTM Code. They are then initialed and dated. These CMTR's are maintained in the job file for a Quality Assurance or customer audit. All sheets checked will be signed and dated by the auditor.

3.3.1.2 Material is checked by the receiving department against Bill of Lading and the Purchase Order for type, quantity, size, heat number when possible and general appearance sheets are to initialed and dated Material is at this time spot checked against ASTM. Specifications as to straightness and surface condition. When any discrepancy is found, it shall be noted on the receiving statement. That material which appears to not meet ASTM A-6 is referred to purchasing for resolution. Material received for contracts is identified as such.

3.3.1.3 When customer supplied material is received, paragraph 3.3.1.2 applies and any lost or damaged material shall be promptly reported to the customer.

3.3.1.4 Material to stock which is left over from contract work shall be individually marked as to material type A36, A572 gr. 50 etc. All material shall be marked with the job and heat number (all cut pieces and all individual pieces from open bundles must be traceable to the job and heat number). In addition, the job and heat number of all cut material must be turned in to the foreman for record keeping purposes

3.3.2 WELD MATERIAL

3.3.2.1 Weld Material shall meet AWS Specifications and Classification Standards.

3.3.2.2 The receiving group in the yard receives welding material. They are checked to assure proper quantity, type and size They are stored in a dry area. Discrepancies, if any, are brought to the attention of the Plant Manager. When and if required, they are marked as to the contract they are to be used on

3.3.3 BOLTS AND NUTS

3.3.3.1 Test reports of bolts and nuts are received and checked by purchasing and audited by Quality Assurance. They are randomly reviewed for compliance to contract requirements. Review sheets will be initialed and dated.

3.3.3.2 The receiving group, which checks for quantity size, diameter and type, receives bolts and nuts. If there are discrepancies, they are brought to the attention of Purchasing. If ordered for a specific contract, the contract is to be marked on each container. Certifications are randomly reviewed for compliance to contract requirements. Reviewed sheets will be initialed and dated.

3.3.4 PAINTING

3.3.4.1 Test reports of paint are received and randomly checked by Procurement and audited by Quality Assurance to review for compliance to contract documents. Reviewed sheets will be initialed and dated

3.3.4.2 Paint is received by the Plant Manager and is checked against the shipping statement as to type and quantity. The bill of Lading is to be signed and dated.

3.3.4.3 Paint is stored in a covered building away from the main plant. For safety reasons the drums are brought into the paint area on an as needed basis

3.3.5 MISCELLANEOUS MATERIAL

3.3 5.1 When and if certified material test reports or material certificates are required, they are received by Procurement. These sheets reviewed by Procurement are initialed and dated.

For those purchased items, which require inspection by MRP, LLC. Purchasing will notify the Quality Assurance Department. This could be at the producer's plant. Quality Assurance will inspect per the contract and maintain records of such in the Quality Assurance Office. Evaluation is per each new supplier, exception supplier or problems with a supplier.

3.4 IDENTIFICATION

Identification means the ability to determine that the specified material grade and size is being used. An identification system is required in the 1999 AISC LRFD Specification Section M5.5. "The fabricator shall be able to demonstrate by a written procedure and by actual practice a method of material application and identification, visible at least through the "fit-up" operation, of the main structural elements of a shipping piece.

The identification method shall be capable of verifying proper material application as it relates to:

(1) Material specification designation

(2) Heat number, if required

(3) [CMTR] for special requirements [if required]

3.5 MATERIAL SUBSTITUTION

If proper grade or material size is not available Detailing will advise the customer and request permission for a substitution.

3.6 SUBCONTRACTED FABRICATION

3.6.1 The customer or Engineer of Record must approve (in writing) any subcontracting to a fabricator that is not an AISC Certified Fabricator on projects requiring AISC certification.

Section 4.0 FABRICATION CONTROL

Purpose
The purpose of this section is to assure all production is in accordance with this manual.

Scope
The scope covers all pertinent plant operations except those shown in separate binders. See index.

4.1 Department "POLICY STATEMENT & RESPONSIBILITY"

It is the policy of MRP, LLC Production Department to furnish a quality product in accordance with approved shop details, the AISC and AWS codes, and contract specifications. Inspectors work separate from Production and report to the President.

Signed_____ Date_____
Ramos Bedessie, Plant Manager

4.2 PROCESSING CONTROL

4.2.1 Upon receipt of approved shop drawings from detailing a fabrication plan is finalized.

2.2 The following is furnished to Procurement by Detailing along with a letter of transmittal: Bill of material and a Cut List for parts. (angle, plate etc.)

4.2.3 From the fit up package purchasing will explain to production what each piece cuts from then marks up each cut list.

4.2 4 From the parts package each piece of material is reviewed. What ever is not in stock is ordered from warehouse for immediate delivery.

4.2 5 Procurement then logs the Cutting list Summary sheet into FABTROL 4.2.5 Program.

4.2.6 Procurement then turns the job over to production. Production then reviews the job requirements and finalizes a fabrication plan.

4.2.7 Any special tests, inspections or unusual requirements that have not been covered in pre-fabrication meeting *or on the Contract Information Sheet* will be brought to the attention of Quality Assurance.

4.2.8 MRP, LLC uses FCAW Flux Core Arc welding, GMAW, and SMAW Shielded Metal Arc welding.

4.3 REQUISITIONS MATERIAL OR ITEMS

4.3.1 Welding material received as shown in Para. 3.2.2 shall be used as specified on the shop drawings. A review will be made that welding procedures are available and issued for the consumable to be used.

..2 The person who takes structural material from storage will be responsible for the particular shape. Material cutting lists are used. Unless material has been specifically designed for a particular contract it is used as long as it is designated as to the proper ASTM number.

4.3.3 Material being returned to inventory is marked per type of steel if other than ASTM A-36. The number of Pieces, size and type are recorded on the Inventory Management Report. This data is given to the inventory Control Office who adjusts the inventory on the Inventory Control Card.

4.4 WELDERS AND TACKERS

The Plant Manager assigns only certified welders and tackers.

4.5 WELDER INFORMATION

Welder continuity is tracked by use of the Welder Continuity Log (Exhibit 4-1).
Welders shall follow the approved weld procedures. These weld procedures are in a separate binder and are available to the welders. Weld procedures may be developed by third parties but must be signed by a member of this organization and released by Quality Assurance department.
Rod oven temperature control is by the use of Exhibit 4-2.
Welder assigned mark is placed near the piece .

4.6 BOLTING

Bolts and Nuts of proper grade and size as shown on detail drawings may be used from stock unless the contract specifies special documentation. When such is required, the shop foremen will release for use those bolts and nuts received as per paragraph 3.3.2.
Bolt tightening shall be made be the "turn of the nut" method as described in AISC's Specification for Structural Joints Using ASTM A325 or A490 Bolts.
Proprietary fastener systems, if used, will be per the manufacturers fastening procedures.
A490 bolts and galvanized A325 bolts shall not be reused. Other A325 bolts may be reused if approved by the responsible Engineer.
Touching up of retightening previously tightened bolts, which may have been loosened by tightening of adjacent bolts, shall not be considered reused.
The actual bolting procedures are in the plant's Bolting Procedures. See separate brochure

4.7 INSPECTION

Before the painter paints each piece, it will be inspected to assure that the piece is fabricated in accordance with the drawing.
Shop assembled material as a pre-fit for field assembly is to be submitted to Quality Assurance for verification of assembly dimensions and reaming prior to disassembly. This Procedure would apply to certain cases of Truss and Column Splicing.
See section #5.

4.8 PAINTING

The Contract Information Sheet (Exhibit 1-1) identifies the paint specified for the project. The painter and Plant Manager match the specified paint in the paint storage area and the Plant Manager releases it for consumption.
The painting procedures are in the plant's painting procedures. See separate brochure

4.9 SHIPPING

Material is stored in the shipping yard until required at the site. Material is loaded and secured on trucks and the Plant Manager generates a shipping list.

Shop assembled material as a prefit for field assembly is to be submitted to Quality Assurance for verification of assembly dimensions and reaming prior to dis-assembly. This Procedure would apply to certain cases of Truss and Column Splicing.

MRP, L.L.C.
Welder Continuity Log

Welder Name	Process	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.

MRP, LLC ROD OVEN TEMPERATURE CONTROL LOG

AM			PM			AM			PM		
DATE	TEMP	BY	DATE	TEMP	BY	DATE	TEMP	BY	DATE	TEMP	BY

Section 5.0 INSPECTION

Purpose

To assure, through a series of specific actions of inspection and testing, that materials fabricated are in accordance with approved plans and specifications. In the event the customer's requirements for inspection are more stringent that the company's standard, the customer's requirements will govern.

Scope

The scope covers pertinent quality control issues except those shown in separate binders. See index.

5.1 Department "INSPECTION POLICY & RESPONSIBILITY"

It is the policy of MRP, LLC Inspection Department to inspect and insure the materials and workmanship conform to approved shop prints, AISC and AWS codes and contract specifications while working independent of other departments.

Signed_____ Date_____

F. Henry Hendrix, Quality Assurance

5.2 DOCUMENT REVIEW

5.2.1 The Quality Assurance Manager, Operations and the Plant Manager reviews contracts for special requirements.

5.2.2 Current Library for review includes, but is not limited to, that shown in paragraph 5.7 of this Manual.

5.3 IMPLEMENTATION OF PROGRAM

The term "audit" as used in this section denotes randomness. These items must be performed at least quarterly. This record keeping is as shown in exhibit 5-7

5.3.1 Audit that contract specifications are in the job folder.

5.3.2 Audit shop detail prints for such as base material, weld consumable, cleaning and painting requirements vs. Contract

5.3.3 Audit that void prints are removed from the system.

5.3.4 Audit Purchase Orders of steel as to:

1. ASTM number vs. Contract requirements.
2. Special requirements such as notch toughness, material traceability and origin of manufacture.
3. That CMTR's are sent to MRP, LLC

5.3.5 Audit Purchase Orders of Welding Rods (when contract specifications require) as to:

1. Trade name and AWS designation.

2. Special requirements such as notch roughness.
3. SMAW electrodes are to be supplied in hermetically sealed containers
4 Weld material certificates are to be sent to MRP, LLC.

5.3.6 Audit Purchase Orders of Paint, as to contract requirements

5.3.7 Audit Purchase Orders of nuts and bolts, as to contract requirements

5.3.8 Develop Weld Procedures and post same in welding area. When required, weld procedures are submitted for customer approval through Engineering or the President.

5.3.9 Audit Quality Control inspection records.

5.3.10 Develop training papers and conduct classes. Refer to 5.9, 5.10 & Section 13

5.3.11 Audit that the latest codes and specifications are available.

5.3.12 Intercede in quality conflicts between any parties. If the subject cannot be resolved, the President and the Quality Assurance Manager will make the final decision.

5.3.13 Arrange for independent third party inspection when required. Check qualifications of inspectors for radiography, ultrasonic, magnetic particle or dye penetrant

5.3.14 Work with Owner's inspectors on all pertinent

5.3.15 Maintain contract files on quality related matters. Recording is done on the Inspector's Report

5.3.16 Ascertain that welders know the correct preheat and interpass temperature for the material type, thickness and type electrode if using the SMAW process. Preheat and interpass requirements, unless stated differently in contract documents, as per table 3.2 of AWS D1.1.

5.3.17 Ascertain that steel is free of grease, paint, oil, and heavy rust or heavy scale.

5.3.18 Ascertain weld procedures are in the weld area and followed.

5.3.19 When and if MRP, LLC chooses to use the SMAW process, the inspector will audit rod oven temperature log.

5.3.20 Visually inspect welds to section 6 (Inspection) and table 6.1 of AWS D1.1 in its entirety. The codes years are the date shown in the contract documents.

5.3.21 When other than visual is required, assist the outside technician when required.

5 3 22 Inspect surface preparation is done in-house prior to painting or prior to shipping. Unless specified, the standards are per SSPC-SPI (Exhibit 5-5). Dew Point calculations when required by contract specifications are recorded on Exhibit 5-4.

5.3 23 Inspect paint for specified mills using paint gages. Coating thickness calibration standards are used to check the paint gage. This is in addition to millage checks by the paint crews. This is recorded on the "Painting Record Log" (Exhibit 5-6).

5.3.24 Inspect that paint is applied in accordance with the paint supplier's recommendations.

5.3.25 Ascertain that on contracts requiring special order paints, bolts, nuts, etc. that stock items are not used and applicable items are. Quality Assurance is to verify the bolt sketch (when one is required) sign and date it.

5.3.26 Make arrangements for certifications of welders, tackers or weld procedure qualification, as required.

5.3.27 Assist, when necessary, with inspection of incoming steel by Receiving Department.

5.3.28 When Inspection is required off plant property to investigate an item needing correction. This requires an Inspection Trip.

5.3.29 The first production operator ascertains material size and specification. Item is so designated on the cutting list.

5.3.30 Audits that material are sawed to length - No Records Kept-Cutting list marked.

5.3.31 Assures random inspection is on going of welds, holes, copes, etc. by shop supervision.

5.3.32 Ascertain that welders are certified for process, position and thickness of material.

5.3.33 Arrange to have amperage and voltmeters checked.

5.3.34 Fitter's tapes are checked by Quality Control once a year, using the plant's master tape as follows:

Tape is to have its number and initials or holder inscribed on the case

The tapes are to be checked by Plant Manager using the master tape and the results posted on the Tape Verification Log (Exhibit 5-2). A constant tape pull, same person on master tape and production tape, is to be utilized.

5.3.35 Monitor inspection by production line employees.

5.3.36 Final inspection after the fitting, welding and coating operations will be QC inspectors. It is desirable to do a final inspection of welding prior to coating.

5.4 Non-Conformances

5.4.1 It is the responsibility of the shop inspector in particular and any other employee to identify deficiencies that require a non-conformance report. This responsibility includes incoming material to ASTM A6, bought out items, drawings, cutting sheets, fabrication and all related operations.

5.4.2.1 Where materials are non-conforming to the applicable code, the inspector will "Red Tag" it. The tag will show contract, mark, reason for rejection, and inspector's initials. Removal of the Red Tag occurs once the corrective action is taken and piece is re-inspected. Only an Inspector may remove a red tag. The tags are then filed numerically in the office of the Quality Assurance Department. Red Tag Log (Exhibit 5-3) is utilized as part of the procedure. This material is to be segregated whenever possible or well marked as to the problem sufficient to prevent further fabrication in the area of the non-conformance.

5.4.3 The responsibility for review and authority for disposition of non-conforming product is by interfacing with QA, Operations, Engineering and Plant Management all depending on the seriousness of the problem. When necessary the customer will be notified as to possible shipping delays.

5.4.4 The deposition of non-conforming work may be by being reworked, repaired, used as is, customer approved non-conforming or scrapped.

5.4.5 All reworked material must be re-inspected and released by the Quality Assurance Department. When customer approval is required it shall be documented.

5.4.6 The non-conformance log (Exhibit 1-3) must be completed and a copy given to the concerned parties and to designated person of the Executive Management Team.

5.4.7 The person or persons causing the non-conformance will be made aware of the problem and advised as to methods or procedures to assure the error does not occur again.

5.5 Record keeping.

Quality Assurance will keep records using Daily Inspection Reports pertaining to Job, Welder, Fitter and Paint. Per exhibit 5-1

5.6 Hold points

If an item does not pass inspection at any of the above points, it is held there (Inspection Point) for immediate corrective action. If there will be an assumed long time for the deposition, the piece may be moved to a special area and be duly noted as being on hold.
Hold points may also be required by the contract. All such hold points must be either shown in the contract information sheet or on the print.
Hold points may be established in house.

5.7 CURRENT LIBRARY

AISC Selected Standards for Structural Steel Buildings
Manual of Steel Construction, LRFD and ASD, which includes the following specifications and codes:
Specification for Structural Steel Buildings

- LRFD Specification for the Design of Steel Hollow Structural Sections
- Specification for Single-Angle Members
- Specifications for Structural Joints Using ASTM A325 or A490 Bolts
- AISC Code of standard practice for steel Buildings and Bridges
- AISC, A Guide to Engineering and Quality Criteria for Steel Structures: Common Question's Answered.

ANSI/AWS A2 4 Welding Symbols
ANSI/AWS A3.0 Terms and definitions
ANSI/AWS B1.10-86R Guide for the Nondestructive Inspection of Welds
ANSI/AWS D1.1 Structural Welding Code –Steel
ANSI Z49 1:1999 Safety in Welding, Cutting, and Allied Processes
AWS QC 1:96 Standard for AWS Certification of Welding Inspectors
AWS Inspection 2nd Edition 1980
Steel Structures Painting Manual, Volume 1, Good Painting Practices.
Steel Structures Painting Manual, Volume II, Systems and specifications
AISC Detailing for Steel Construction
AISC Seismic Provisions for Structural Steel Buildings
ASTM VOLUME 03.03

5.8 SUBLET WORK

5.8.1 Sublet work when done, is to be done by shops holding the proper certification for the type work to be performed. The Quality Control Manager or their designated people, will spot check.

5.9 PROCEDURE FOR SHOP INSPECTOR QUALIFICATION

5.9.1 Shop inspectors shall be chosen on their ability to interpret shop prints, measure, and gage and communicate their findings with both management and shop employees.
Training is to be by senior employees and/or the Quality Assurance Officer.
The training guide shall be the AWS "Visual Inspection Workshop Reference Manual".
Additional training shall be by use of AWS-CWI training program.

5.10 PROCEDURES FOR CERTIFYING AND UPDATING OF NDT PERSONNEL

5.10.1 The training for certification on NDT personnel (other then VT shall be per ASNT-TC1A.)
5.10.2 VT training shall be per paragraph 5.9 of this manual.
5.10.3 When inspection is by line employees, they are to have had an eye screening within 3 years and be trained for the inspection function they are performing. Example: fitters checking material from the saw.

5.11 TOLERANCES

Tolerances can be very complex as shown below for information and training:

5.11.1 The AISC *Manual of Steel Construction, Load and Resistance Factor Design* Manual, Third Edition (page 3-34) basically references the AISC *Code of Standard Practice.*
5.11.2 The AISC *Code of Standard Practice* (March 7,2000) basically references *ASTM A6/A6M.* This *Code of Standard Practice* (Page 34, paragraphs 6.4.1 through 6.4.6) addresses fabrication tolerances. These paragraphs make reference to AWS D1.1 and the AASHTO specifications.
5.11.3 The AISC *Code of Standard Practice* (March 7,2000) references Architecturally Exposed Structural Steel (AESS). NOTE: AESS must be reference in the contract specifications and are in general more restrictive.
5.11.4 The AWS D1.1/D1.1M:2002 *Structural Welding Code Steel* references the tolerances in the index on page 499.
5.11.5 The AISC *Engineering and Quality Criteria for Steel Structures* (Fourth Edition) references tolerances in the index on page 94. Note: NOTE: The above noted *Code of Standard Practice* (March 7,2000) may be more restrictive in areas and must be investigated on a case-by-case basis.

Contract specifications override all of the above.

MRP, LLC.
1640 New Market Ave.
S. Plainfield, NJ 07080
Phone (732) 968-6061 Fax (732) 968-5675

Daily Inspection Report

JOB #_____ **Date**_____

PIECE/Mark	Block #	QTY	Fitter	Welder	REV. #	Completion/Date

MRP, LLC.
1640 New Market Ave.
S. Plainfield, NJ 07080
Phone (732) 968-6061 Fax (732) 968-5675

TAPE VERIFICATION LOG

Date	By	Tape #	HELD BY	5'	10'	20'	45'	MISC	NOTES

MRP AMPERAGE & VOLTMETER LOG

WELDER #	AMPERAGE MACHINE	AMPERAGE CHECK METER	VOLTAGE MACHINE	VOLT CHECK METER	NOTES

Section 11.0 AUDITS

Purpose
To assure that the company's quality system is in place and steps are taken to improve it.

Scope
The entire quality system.

Responsibility
The management representative will perform an internal audit of this program during the 11th and 23rd months after initial certification, using the standard AISC checklist.

NOTE: The management representative or a qualified individual, independent of the function being audited, shall perform the audit.

The audit team will also consist of the President and the Quality Assurance Manager. The audit team may also consist of persons from outside MRP, LLC.

Management will insure that procedures needed for the quality management system are established, implemented and maintained in accordance with the Standard. Implementation is by as minimum, a semi-annual self- audit. This special semi-annual self- audit is an internal self-audit six-month after the yearly AISC required self-audit. Conditions affecting quality may trigger another self –audit of either the complete system or just the department(s) involved. These records are to be supplied to the designated Executive Committee person, who will be responsible to maintain them.

In Case of significant conditions adverse to Quality, a re-audit shall be made to assure that the cause of the condition had been correctly determined and corrective action taken to prevent a reoccurrence.

Special audits shall be performed when required to check some particular function.

Unannounced audits by AISC will be performed early in the second and third year period.

Section 12.0 TECHNICAL ASSISTANCE

Purpose

To assure that the best possible technical assistance is available.

Scope

Everyone does not know everything. Therefore it is important to know someone, who although they do not know everything has technical resources.

Responsibility

For assistance relating to Engineering, Architects, Steel, Detailing, Shop production, Welding, Painting, and Finishing, Steel Erecting and other related areas, the following individuals or concerns may be contacted:

Contact Listing

Engineering:	Jack Jeramie – PE	Phone· 416.429.9780 Fax: 416-429-9781
	Gus Patel-PE	Phone 201 945.9434 Fax: 201-945-9438
Architects:	Riki Swede / Floyd – AIA	Phone: 732-683-9924
Steel Detailers	Gary DeCock Frank Sacco	Phone 416.241.6967 Phone. 416-431-0953
Shop Production:	John Kazrino	Phone: 416-995-7031
Painting:	Mercer Coating	Phone: 908.925.5000
Galvanizing:	U. S. Amboy Galvanizing	Phone: 732.442.7555
Machining:	Pabst	Phone: 908.353.2880
Fab Machinery	Rockhill	Phone: 732.545.1283

Section 13.0 DOCUMENTED TRAINING PROGRAMS

Purpose
To make every step so that all employees have proper training for their present duties and upgrading.

Scope
All positions in the company.

Responsibility
This responsibility rests with the President.

The course curricula must relate to the subject and cover the key issues of the subject.
Training is to be given by personnel with training or experience in the subject.
An evaluation of the student's comprehension of the material at the end of the course is desirable.
Training is documented when the instructor, attendees, course outline and date are recorded.

The sample form is shown as Exhibit 13-1.

MRP, LLC.
1640 New Market Ave.
S. Plainfield, NJ 07080
Phone (732) 968-6061 Fax (732) 968-5675

MRP DOCUMENTED TRAINING FORM

SUBJECT_____ **Date**_____

INSTRUCTOR_____**INSTRUCTOR RESUME ON FILE? YES**_____ **NO** _____

CURRICULUM ATTACHED? YES_____ **NO** _____

ATTENDEES

SIGNATURE	PRINTED NAME	EVALUATED AS UNDERSTANDING	EVALUATED AS NOT FULLY UNDERSTANDING - NOTE THE REASON

Inspection and Testing

INSPECTION & TEST PLAN

Contract No.: 724	Project:	**Date: 5/15/08**
Client: TISHMAN CONSTRUCTION CORP OF NY	**WTC1 – ABOVE GRADE STEEL**	**Revision No.: 1 7/10/08**
Contract Mgr.: David Floyd		

Subcontractors: **Cleaning and Painting: Mercer Coating and Lining Co., Inc.**
1410 East Linden Avenue
P.O. Box 1656
Linden, NJ 07036

E. = Engineer **P.M.= Project Manager**	**S. = Supervisor** **QCM = Quality Control Manager** **S.Y.F = Shipping Yard Foreman**	**Proc.= Procurement** **R.Y.S.= Receiving Yard Supervisor** **S.C.= Store Clerk**

INSPECTION & TEST PLAN	ACTION BY AND FREQUENCY	HOLD POINTS	
		HOLD BY	RELEASE BY
1: Subcontractors Quality Program Requirements			
A): Cleaning and Painting – Review and submit Subcontractors own In-house Quality Control Plan for acceptance.	P.M. Prior to start of coating.		
MRP to monitor on an ongoing basis Subcontractor's QC Plan, as per section 8.0 of the MRP QC Manual.	QCM		
2: Incoming Inspection:			
A): Plate and structural sections shall be checked as per Section 3.3.1 of the MRP QC Manual.	R.Y.S. As received		
Mill Test Reports shall be checked by Procurement for compliance to the pertinent ASTM code, prior to shop fabrication.	Proc.		
Copies of the Mill Test Reports (MTR) shall be submitted to the Customer's Quality Assurance Representative.			
B): Consumables – All welding consumables will be purchase to the contract specifications meeting the requirements of **AWS D1.1 (2006) and AWS D1.8 (2005)** and shall undergo the required consumables verification per section 3.3.2 of the MRP QC Manual,	R.Y.S. As received.		
Low hydrogen electrodes and fluxes shall be stored, conditioned and dispensed as per code / specification per section 3.3 2 of the MRP QC Manual.	S.C.		

INSPECTION & TEST PLAN	ACTION BY AND FREQUENCY	HOLD POINTS	
		HOLD BY	RELEASE BY
3: In-Process Inspection: A): Items shall be inspected as per the relevant items on the **"Standard Inspection Checklist"**, stamped on the back of the Inspectors drawings, to indicate compliance the inspector shall date and initial the respective column of the stamp. Non-Conformances shall be handled per MRP QC Manual section 5.4, for corrective action. 1. Material Preparation: Verify that the proper piece mark has been marked as per drawing or other requirement. Check that the correct size of rolled sections and plates are being used. Verify that the material conforms to dimensional requirements of the drawings and or cutting sheets. Verify that cut edges meet roughness tolerance of code or specifications. Verify weld preparation grooves, weld access holes, as call for on drawings etc., conform to **D1.1** section 5.17 or **D1.8** section 6.9, with a finish surface roughness not exceeding 500µin. Check for proper finish of bearing surface where required.	MRP Inspector. Ongoing.		
2. Dimensional Accuracy After Fitting: Typical dimensional inspection will included, but is not limited to, the following: Check all detail material for correct size and dimension after tack welding. Check that tack welds in the **CJP** are made within the joint. No welding should be made inside the **Protected Zone** unless made within the weld joint. Check holes for size and location. Verify that fitted material or attachments are in correct location within required tolerance. Verify that all joints to be welded are within required dimensional tolerance, e.g. root opening, etc. Verify that weld symbols marked on pieces are correct per the drawings. Verify pieces are marked **Demand Critical** or **SLRS**.	MRP Inspector. Ongoing.		

INSPECTION & TEST PLAN	ACTION BY AND FREQUENCY	HOLD POINTS	
		HOLD BY	RELEASE BY
Check sub-assemblies prior to incorporation into final assembly. Check all cambers and sweep 3. <u>Welding Conformance:</u> Inspection of all welding shall be performed prior to painting. Welds shall be inspected in accordance with WTC Tower 1 Structural Steel Specification 05100, Clause 1.5 Quality Control item F Per specifications, perform NDT as required. Welders and Tack welders shall be certified in accordance with the AWS D1 1 Section 4 requirements. All welders shall die stamp their welds using a low compression stamp with an individual number to identify their welds. Welders shall verify they have the appropriate joint WPS in their possession prior to welding operations. Monitor minimum preheat and interpass temperature as per AWS D1.1, Table 3 2. Weld sizes shall be as shown on the drawings. All welds shall be examined visually. Acceptance criteria as per **AWS D1.1, Table 6.1**. UT acceptance criteria as per AWS D1.1. Magnetic particle testing shall meet the requirements of ASTM E709, acceptance criteria as per AWS D1.1.	MRP Inspector. Ongoing.		
4. <u>Coatings:</u> Check for: Surface preparation as per manufactures and or Contract Specification. The correct paint is being used. That the paint is being applied as per the manufactures recommendations. Dry film thickness measurements shall be as per manufacturer recommendations. Freedom from voids, sags, blisters, and other visible defects. Verify and check Subcontractor's Quality Control Records.	**Q.C.M.**		

INSPECTION & TEST PLAN	ACTION BY AND FREQUENCY	HOLD POINTS	
		HOLD BY	RELEASE BY
5. Final Inspection: Each shipping piece shall receive a final inspection that shall consist of: Check drawing stamp to verify that the piece has been inspected as required by this Inspection and Test Plan.	Q.C.M.		
6. Storage and Shipping: Check for proper storage of materials. Check for correct handling and blocking during loading and shipping. Shipping shall be performed in accordance with 4.9 of the MRP QC Manual.	S.Y.F.		
7. Quality Records: Inspection drawings, mill test reports, N.D.T. test reports, etc., shall be kept for **1 (one)** year after the date of completion of erection.	Q.C.M. P.M.		

Prepare by: (MRP, LLC.)	Manager of Quality Control	F. Henry Hendrix Name (Print)	Signature	7/10/08 Date
Approved by: (MRP, LLC.)	Project Manager	David Floyd Name (Print)	Signature	7/10/08 Date
Customer Approval by:	Title	Name (Print)	Signature	Date

MRP LLC 1640 NEW MARKET AVE., SOUTH PLAINFIELD, NJ 07080, PHONE: (732) 968-6061, FAX: (732) 968-5675

PROCEDURE FOR STRAIGHT-BEAM ULTRASONIC EXAMIMATION OF STEEL PLATE 4" AND UP

Personnel performing this examination shall be certified in accordance with the latest edition of ASNT-SNT-TC-1A.

Specification: ASTM A 435

EQUIPMENT: KRAUT KRAMER USK7
W/ 2.25 MHZ TRANSDUCER: STRAIGHT BEAM 1''DIAMETER

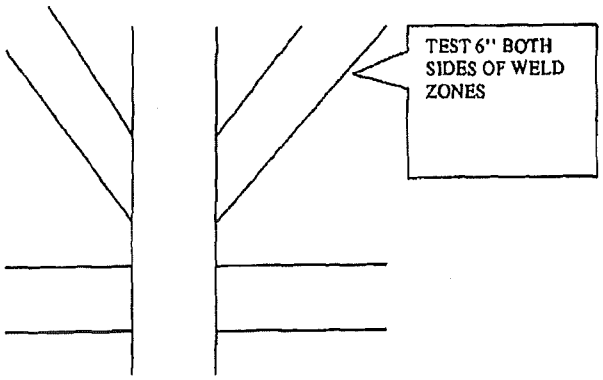
COUPLANT: WATER

CALIBRATION: SWEEP THE CRYSTAL ALONG THE PLATE SURFACE FOR A DISTANCE OF AT LEAST 1T OR SIX INCHES WICHEVER IS THE GREATER, AND NOTE THE POSITION OF THE BACK WALL REFLECTION. A SHIFT IN LOCATION OF BACK REFLECTION DURING CALIBRATION SHALL BE CAUSE FOR RECALIBRATION OF THE INSTRUMENT.

MATERIAL CONDITION:
THE SURFACE OF THE PLATE SHALL BE FREE OF LOOSE SCALE, DIRT, AND OIL. SURFACE SHALL BE SMOOTH ENOUGH TO MAINTAIN A LEAST 50% BACK WALL REFLECTION.

SCANNING PATTERN:
SHALL BE DONE IN A CONTINUOUS SWEEP ALONG THE AXIS OF THE WELD ZONES, A PATH 3 INCHES WIDE, WHICH CENTERS ON THE INTENDED WELD, SHALL BE SCANNED.

ACCEPTANCE:
ANY DISCONTINNUITY OR INDICATION CAUSING TOTAL LOSS OF BACK WALL REFLECTION WICH CANNOT BE CONTAINED WITHIN A CIRCLE, THE DIAMETER OF WICH IS 3'' ONE HALF TIME T1 OR WICHEVER IS GREATER SHALL BE UNACCEPTABLE


TEST 6" BOTH
SIDES OF WELD
ZONES

MRP LLC 1640 NEW MARKET AVE., SOUTH PLAINFIELD, NJ 07080, PHONE: (732) 968-6061, FAX: (732) 968-5675

APPENDIX A

SUPPLEMENTAL NONDESTRUCTIVE TESTING PROCEDURES

TABLE OF CONTENTS

1.0 WRITTEN PRACTICE

2.0 ULTRASONIC TESTING SHEARWAVE

3.0 MAGNETIC PARTICLE TESTING

4.0 VISIBLE DYE PENETRANT TESTING

5.0 VISUAL INSPECTION

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QUALITY CONTROL PROCEDURE

APPENDIX A

1.0

SUPPLEMENTAL NONDESTRUCTIVE TESTING WRITTEN PRACTICE

No.: Appendix A 1.0

Revision: 0

Page: 1 of 14

PREPARED BY:_____ DATE:

APPROVED BY:_____ DATE:
NDT Level III

APPROVED BY:_____ DATE:
President

REVISION HISTORY

Rev. No.	Effective Date	Description of Revision
0	5/1/2008	Initial Issue

APPROVED BY: _____ DATE:
NDT Level III

APPROVED BY: _____ DATE:
President

1.0 SCOPE

1.1 This written practice establishes the minimum requirements for education, training, experience, examination and certification of personnel responsible for conducting nondestructive tests while in the employment of MRP, INC. It applies to all persons conducting nondestructive tests that are required to be certified to the provisions of *Recommended Practice No. SNT-TC-1A, 2006.* The methods of nondestructive testing covered by this written practice are MT, PT, UT, and RT as used in accordance with the applicable codes, standards, specifications and regulations referenced below.

2.0 REFERENCES

2.1 AMERICAN SOCIETY OF NON-DESTRUCTIVE TESTING

Recommended Practice No. SNT-TC-1A, Personnel Qualification and Certification in Nondestructive Testing, 2006 edition
ANSI/ASNT CP-189
ANSI/ASNT CP-105

2.2 AMERICAN WELDING SOCIETY

ANSI/AWS D1.1/D1.1M STRUCTURAL WELDING CODE, 2006 Edition
ANSI/AWS D1.8/D1.8M STRUCTURAL WELDING CODE – SEIMIC SUPPLEMENT, 2005

2.3 AMERICAN INSTITUTE OF STEEL CONSTRUCTION

2.3 EMPLOYER PROCEDURES – MRP, INC "Quality Assurance Procedures, Appendix A and Appendix B"

3.0 DEFINITIONS

1. **Certification:** written testimony of qualification.
2. **Certifying authority:** the person or persons properly designated in the written practice to sign certifications on behalf of the employer.
3. **Certifying agency:** the employer of the personnel being certified; specifically, MRP, INC.
4. **Closed book examinations:** an examination administered without access to reference material except for materials supplied with or on the examination.
5. **Comparable:** being at an equivalent or similar level of NDT responsibility and difficulty as determined by the employer.
6. **Documented:** the condition of being in written form.
7. **Employer:** the corporate, private, or public entity which employs personnel for wages, salary, fees or other considerations; specifically, MRP, INC.
8. **Experience:** work activities accomplished in a specific NDT method under the direction of qualified supervision, including the performance of NDT method and related activities, but not including time spent in organized training programs.

9. **Nondestructive testing:** a process that involves the inspection, testing, or evaluation of materials, components, and assemblies for materials' discontinuities, properties and machine problems without further impairing or destroying the parts' serviceability. Throughout this document the term NDT applies equally to the NDT inspection methods used for material inspection, flaw detection or predictive maintenance (PdM) applications.
10. **Outside Agency:** a company or individual who provides Level III services and whose qualifications to provide these services have been reviewed and approved by the employer engaging the company or individual.
11. **Qualification:** demonstrated skill and knowledge, along with documented training and experience required for personnel to properly perform the duties of a specific job.
12. **Recommended practice:** a set of guidelines to assist the employer in developing uniform procedures for the qualification and certification of NDT personnel to satisfy the employer's specific requirements.
13. **Training:** an organized program developed to impart the knowledge and skills necessary for qualification.
14. **Written Practice:** a written procedure developed by the employer that details the requirements for qualification and certification of their employees.

4.0 LEVELS OF QUALIFICATION

4.1 There are three basic levels of qualification applied o NDT personnel employed by DCM ERECTORS, Inc: Level I, Level II, and Level III.

4.2 An individual in the process of becoming qualified and/or certified Level I is considered a trainee. A trainee shall not independently conduct tests or interpret, evaluate, or report test results of any NDT. A trainee shall work under the direct guidance of certified individuals.

4.3 Qualification Requirements for Level I:

4.3.1 Level I personnel shall be qualified and/or required to:

1. Perform specific calibrations, specific nondestructive tests and specific evaluations for determining the acceptance or rejection of tested items in accordance with written instructions.
2. Record test results. Normally the Level I does not have the authority to sign-off on the acceptance and completion of the nondestructive tests unless specifically trained to do so per clearly written instructions.
3. Perform NDT job activities in accordance with written instructions or direct supervision from a Level II or Level III individually.

4.4 Qualification Requirements for Level II:

4.4.1 Level II Personnel shall be qualified and/or required to:

1. Be thoroughly familiar with the scope and limitations of each method for which the individual is certified.
2. Set up and calibrate equipment.
3. Interpret and evaluate results with respect to applicable codes, standards and specifications.
4. Organize and report the results of nondestructive tests.

5. Exercise assigned responsibility for on-the-job training and guidance of Level I and trainee personnel.

4.5 **Qualification Requirements for Level III:**

4.5.1 Level III personnel shall be qualified and/or required to:

1. Be responsible for NDT operations to which assigned and for which certified
2. Develop, qualify, and approve procedures; establish and approve NDT methods and test techniques to be used by the Level I and Level II personnel.
3. Interpret and evaluate test results in terms of applicable codes, standards, specifications and procedures.
4. Assist in establishing acceptance criteria where none are available, based on practical background in applicable materials, fabrication and product technology.
5. Be generally familiar with appropriate NDT methods other than those for which specifically certified, as demonstrated by passing an ASNT Level III Basic Examination or by in house testing.
6. In the methods for which certified, be responsible for, and capable of, training and examination of Level I and Level II personnel for certification in those methods.

5.0 EDUCATION, TRAINING, AND EXPERIENCE REQUIREMENTS

5.1 Level I and II personnel initially certified to conduct NDT covered by this written practice shall have received at least the minimum classroom training hours shown in Table I, depending upon each candidate's formal educational background. The training program shall include sufficient examinations to ensure that the course material has been understood. Educational attainment, completed training and experience shall be document on the "Nondestructive Testing Personnel Qualification Record Form."

5.2 Documented prior certification is considered by MRP, INC in determining evidence of qualification for comparable levels of certification.

5.3 Documented training and/or experience in positions and activities comparable to those of Levels I, II, III prior to the establishment of this written practice is considered to satisfy the requirements of training and/or experience.

5.4 Organized NDT training shall be conducted either by employer-certified Level III individuals or by an outside agency or other certified individual designated and approved by a responsible Level III or other authorized official of MRP, INC.

5.5 Procedures and test techniques that individuals will encounter in their specific assignments, and the applicable instructions, specifications, and codes used shall be part of each candidate's informal on-the-job training under the coordination of the Level III individuals.

5.6 The training program shall follow the "Recommended Training Course" for each test method as shown in the SNT-TC-1A, 2006 edition, unless otherwise modified to meet specific needs.

6.0 EXAMINATIONS

6.1 Vision Examinations

6.1.1 All Level I, II, and III personnel shall be given an annual vision examination to ensure natural or corrected near-distance acuity exists in at least one eye. The individual shall be capable of reading a Jaeger Number 2 or equivalent type and size letters at a distance of not less than 12 in.

6.1.2 Where differentiation of colors is critical to job performance, the capability to distinguish and differentiate contrast among colors or shades of gray used in the method shall be demonstrated. This examination shall be administered upon initial certification and every three years thereafter.

6.2 Written Examination Requirements

6.2.1 All Level I, II, and III written examinations shall be closed book except that necessary data such as graphs, tables, specifications, procedures, codes, etc., may be provided with or in the examination. Questions utilizing such reference materials shall require an understanding of the information rather than merely locating the appropriate answer. All questions used for Level I and Level II examinations shall be approved by the responsible Level III.

6.3 General Examination for Level I and Level II

6.3.1 Each Level I and II candidate shall be given a general, objective type (for example, multiple choice) written examination addressed to the basic principles of each method and appropriate to the level for which certification is sought.

6.3.2 This examination shall be administered as follows:

1. as part of an organized training program when feasible;
2. given separately when experienced personnel a re being examined for recertification, or;
3. given separately for initial certification of personnel coming from a former employer and otherwise complying with this written practice.

6.3.3 The general examination questions shall be approved by the Level III. The qualification level, content and format of the examination questions shall be similar to the example questions in the applicable SNT-TC-1A supplement. The supplement questions are intended only as examples. They shall not be used verbatim for qualification examinations.

6.3.4 Candidates shall have access to questions only at the time of the examination.

6.3.5 A valid endorsement on an ACCP Level I or Level II certificate fulfills the criteria for Level I or Level II general examinations for each applicable NDT method.

6.4 Specific Examination for Level I and Level II

6.4.1 Each Level I and II candidate shall be given a specific, objective type (for example, multiple choice) written examination addressing the equipment, operating procedures, test techniques and product forms that the personnel may encounter in the specific job assignments.

6.4.2 This examination shall be administered as follows:
1. as part of an organized training program when feasible;
2. given separately when experienced personnel are being examined for recertification, or;
3. given separately for initial certification of personnel coming from a former employer and otherwise completing with this written practice.

6.4.3 The examination shall be approved by the Level II and shall address the specifications, codes and acceptance criteria as listed in the references, to the extent they are in routine use and apply to the particular methods for which the candidate is being examined. The content of the specific examination shall be constructed to evaluate the ability of the candidate to effectively use the applicable specifications, codes, etc,. to perform the required tests and/or evaluate the results to the degree necessitated by the anticipated qualification level.

6.4.4 A valid endorsement on an ACCP Level I or Level II certificate fulfills the criteria for Level I or Level II specific examinations for each applicable NDT method, provided documented experience exists to fulfill the MRP, INC specific examination criteria.

6.5 Practical Examination

6.5.1 **Level I** - Each Level I candidate shall be given a practical "hands-on" examination that demonstrates the candidates' proficiency to perform specific calibrations, specific tests using the equipment normally available on the job, and specific evaluations for acceptance or rejection determinations in accordance with detailed instructions and procedures as listed in the references. At least one flawed specimen shall be tested and the results analyzed by the person being considered for certification. Selection of the specimens shall be made by the Level III and performance shall be measured based on at least 10 performance checkpoints selected to demonstrate understanding of test variables and procedural requirements.

6.5.2 **Level II** – Each Level II candidate shall be given a practical "hands-on" examination that demonstrates the candidate's ability to select and perform the applicable NDT technique, set up and perform calibrations using equipment normally available on the job, interpret and evaluate results in accordance with applicable specifications, codes, standards, etc., as listed in the references, and organize and report the results of the test. At least one flawed specimen shall be tested, and the results analyzed by the person being considered for certifications. Selection of the specimens shall be made by the Level II, and performance shall be measured based on at least 10 performance checkpoints selected to demonstrate understanding of test variables and procedural requirements.

6.5.3 A valid endorsement on an ACCP Level I or Level II certificate fulfills the criteria for Level I or Level II practical examinations for each applicable NDT method.

6.6 Number of Questions for Level I and II Examinations

6.6.1 Table II summarizes the minimum number of examination questions to be included in each Level I and II written examination.

6.7 Administration and grading of Written and Practical Examinations for Levels I and II

6.7.1 The security, grading and administration of the examinations shall be the responsibility of the designated Level III, certified in the methods for which the examinations are to be administered. The Level III shall approve the use of all Level I and II questions, the selection of practical test samples, and the performance checkpoints. However, administration, monitoring, and scoring of the examinations may be delegated to a suitably qualified representative of the Level III.

6.7.2 The results of each Level I and Level II candidate's three examinations (general, specific, and practical) are to be combined into a composite score for which a score of 80 percent is the minimum required for qualification. The composite score is obtained by simple averaging of the scores achieve in each of the three examinations. In addition, the score for each of the individual examinations shall be 70 percent or higher.

6.8 **Reexamination for Level I and Level II**

6.8.1 Level I or Level II candidate failing to attain a composite score of 80% or higher, or a score of 70 percent or higher on any individual examination, shall be prohibited from being reexamined for 30 calendar days from the time of the failed examination, unless evidence of having received suitable additional training is presented, as determined by the Level III.

7.0 REQUIREMENTS FOR LEVEL III QUALIFICATION AND EXAMINATION

7.1 **Level III Qualification Requirements**

7.1.1 Provided the Level III examination requirements are fulfilled, as set forth in the following section, and individual can qualify as a Level III by satisfying one of the following criteria:

1. Have obtained a degree in engineering or science from a college or university (four-year curriculum, minimum), plus one additional year of experience beyond the Level II requirements in the methods for which being certified, or;
2. Have satisfactorily completed at least two years of technical training (engineering or science at a university, college or technical school), plus two additional years of experience beyond the Level II requirements in an assignment at least comparable to that of a Level II in methods for which being certified, or;
3. Have four years of NDT experience beyond the Level II requirements in assignments at least comparable to that of a Level II in the methods for which certification is being sought.
4. For Level III qualification, required experience shall consist of the sum of the times required for Level I and Level II, and the required formal training shall also consist of the training required for Level I and Level II plus any additional formal training as defined in this written practice.

7.2 **Level III Examination Requirements**

7.2.1 There shall be three separate examinations administered to Level III candidates:

1. Basic Examination (required only once when more than one method examination is taken). The minimum number of questions shall be as follows:
    A. 15 questions related to understanding SNT-TC-1A, 2006 edition;

B. 20 questions relating to applicable materials, fabrication, and product technology, and;
C. 20 questions similar to those used for Level II examinations relating to applicable NDT methods.

2. Method Examination (required for each different method). The minimum number of questions shall be as follows:
   A. 30 questions relating to fundamentals and principles that are similar to published ASNT NDT Level III questions for each method;
   B. 15 questions relating to application and establishment of techniques that are similar to published ASNT NDT Level III questions for each method, and;
   C. 20 questions relating to capability for interpreting codes, standards and specifications relating to the method.
3. Specific Examination (required for each different method). The minimum number of questions shall be as follows:
   A. 20 questions relating to specifications, equipment, techniques and procedures applicable to MRP, INC products and NDT methods used, and to the administration of this written practice.
4. Except as provided in 6 and 7 of this section, a Level III candidate must pass a Basic, Method and Specific Level III examination, to be administered and score by the President of MRP, INC.
5. The results of each Level II candidate's three examinations (Basic, Method, and Specific) are to be combined into a composite score for which a score of 80 percent is the minimum required for qualification. The composite score is obtained by simple averaging of the scores achieved in each of the three examinations. In addition, the score for each individual examination shall be 70 percent or higher.
6. The Level III Basic and Method Examinations are not required of the candidate has a current, valid ASNT NDT Level III certificate and endorsements in the methods for which certifications is sought. A valid endorsement on an ACCP Professional Level III certificate fulfills the criteria for Level III Basic and Methods Examinations.
7. The Level III Specific Examination is not required if the candidate has a current valid ASNT NDT Level III certificate or a valid endorsement on an ACCP Professional Level III certificate in the methods for which certification is sought. However, the candidate must also produce documented evidence of experience, including the preparation of NDT procedures related to codes, standards, and/or specifications, and evidence of evaluation of test results in accordance with codes, standards and/or specifications.

7.3 Reexamination for Level III

7.3.1 Level II candidates failing to attain a composite score of 80 percent or higher, or a score of 70 percent or higher in any individual examination, shall be prohibited from being reexamined for 30 calendar days from the time of the failed examination, unless evidence of having received suitable additional training is presented as determined by NDT Level III.

8.0 CERTIFICATION

8.1 Level III individuals employed by MRP, INC. are certified by the President of MRP, INC. upon satisfactory presentation of documentation showing evidence of qualification in accordance with the written practice, in the methods for which certification is being sought.

8.2 When outside agencies supply Level III services, the responsibility for ensuring that these organizations or individuals satisfy the requirements of the written practice on a continuing basis remains with the designated staff employee of MRP, INC.

8.3 If outside agencies are used, the responsibility for certification shall be retained by MRP, INC.

8.4 The "Designated Level III" shall certify Level I and Level II individuals, upon satisfactory completion of the training, experience, and examinations required by this written practice.

8.5 Personnel certifications records shall be maintained in active files by MRP, INC during the employment of certified individuals. Following separation of the employment, the affected personnel certifications records shall be removed from active records, but maintained for at least 12 months following separation. Active records shall include:

A. This written practice;
B. Names and certification records of NDT personnel, including;
   1. applicable NDT experience, status of current and past levels of certification and methods which certified, results of examinations (including vision), and training received, during employment at MRP, INC.
   2. documentary evidence of training and experience in NDT during prior employment, as applicable;
   3. documentary evidence of educational attainment, as applicable;
   4. documentary evidence of satisfactory qualifications when such qualifications are used in lieu of any specific examinations;
   5. copies of current examinations;
   6. authorizations for designating and certifying Level III individuals;
   7. authorizations for certifying Level I and II individuals;
   8. authorizations designating outside agencies providing Level III services.

8.6 For the case where a new employee who held an equivalent certification with a previous employer is a candidate for certification in any NDT method by MRP, INC, such certification shall be granted:

A. upon presentation to, and acceptance by, the Level III of documentation verifying the scope of the prior certification:
B. upon presentation of evidence that the candidate was working in capacity to which certified, prior the separation, within six months of separation; and'
C. provided the candidate is being recertified within six months of separation.

8.6 If a new employee does not meet the above requirements, additional training, experience and examinations shall be required as deemed appropriate by the Level III.

9.0 TECHNICAL PERFORMACE EVALUATION

9.1 At the discretion of NDT Level III, any NDT personnel may be reexamined at any time during the stated period of certification in any or all of the examination parts and have their certifications extended or revoked. Supplemental training may also be required.

9.2 At least annually, the technical performance of Level I and II personnel shall be evaluated and documented by the appropriate Level III. This evaluation shall be conducted using the procedures for the practical examinations for Level I and Level II

10.0 RECERTIFICATION

10.1 Level I and Level II NDT personnel shall be recertified every THREE YEARS based upon one of the following:

A. evidence of continuing satisfactory technical performance as judged and documented by the Level III;
B. or by reexamination in any or all parts of the examinations for the applicable methods as deemed necessary by the applicable Level III.

10.2 Level III personnel shall be recertified every FIVE YEARS based upon one of the following:

A. evidence of continuing satisfactory technical performance as judged by the President of MRP, INC; or,
B. by reexamination in any or all parts of the examinations for the applicable methods as deemed necessary by the President of MRP, INC.

10.3 Unless otherwise required by contract or governing provisions of applicable codes, standards, specifications, or regulations, reexamination and recertification of certified NDT personnel shall be required if a certified individual has not performed job duties in the methods for which certified:

A. during a contiguous period of six months or more, or;
B. for a total of six months or more during any period of one year or more.

11.0 TERMINATION OF CERTICATION

11.1 All NDT certifications of personnel leaving the employment of MRP, INC are revoked at the time of the employee's separation.

11.2 Certifications shall be revoked if a certified individual fails to qualify for recertification.

MRP LLC 1640 NEW MARKET AVE., SOUTH PLAINFIELD, NJ 07080, PHONE: (732) 968-6061, FAX: (732) 968-5675

QUALITY CONTROL PROCEDURE

APPENDIX A

2.0

ULTRASONIC TESTING SHEAR WAVE METHOD

No.: Appendix A 2.0

Revision: 0

Page: 1 of 12

PREPARED BY:_____ DATE:

APPROVED BY:_____ DATE:
NDT Level III

APPROVED BY:_____ DATE:
President

9.0 TECHNICAL PERFORMACE EVALUATION

9.1 At the discretion of NDT Level III, any NDT personnel may be reexamined at any time during the stated period of certification in any or all of the examination parts and have their certifications extended or revoked. Supplemental training may also be required.

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B. by reexamination in any or all parts of the examinations for the applicable methods as deemed necessary by the President of MRP, INC.

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B. for a total of six months or more during any period of one year or more.

11.0 TERMINATION OF CERTICATION

11.1 All NDT certifications of personnel leaving the employment of MRP, INC are revoked at the time of the employee's separation.

11.2 Certifications shall be revoked if a certified individual fails to qualify for recertification.

12.0 REINSTATEMENT OF CERTIFCATION

12.1 A previously certified individual whose certification has been terminated may be reinstated to the former level without further examinations provided:

A. the certification records have been maintained in accordance with the written practice; and'
B. the employee's certification did not expire during the period of termination; and'
C. the employee's certification is reinstated within six months of certification termination.

13.0 SAMPLE FORMS

13.1 The SAMPLE FORMS attached to this written practice are used by MRP, INC in the control and administration of the NDT personnel qualification and certification program.

Record of Authorizations and Designations
MRP, INC.

Training

Outside Agency or Individual Used: Kevin A. Laster, Jr.

Courses: MT, UT, PT, VT

Designated/Approved by: _____
President, MRP, INC.

Effective Date: _____

Examinations

Vision Examinations

Performed By: A Licensed Optometrist

Designated/Approved by: _____
President, MRP, INC.

Effective Date: _____

Written and Practical Examinations

☐ General Written Exams (Levels I/II): MT, UT, PT, VT

Delegated To: F. Henry Hendrix

Designated/Approved by: _____
President, MRP, INC.

Effective Date: _____

☐ Basic Written Exams (Level III): MT, UT, PT, VT

Delegated To: American Society of Non-Destructive Testing

Designated/Approved by: _____
President, MRP, INC.

Effective Date: _____

☐ Specific Written Examination (Levels I/II/III): MT, UT, PT, VT

Delegated To: F. Henry Hendrix

Designated/Approved by: _____
President, MRP, INC.

Effective Date: _____

☐ Practical Examination (Levels I/II/III): MT, UT, PT, VT

Delegated To: F. Henry Hendrix

Designated/Approved by: _____
President, MRP, INC.

Effective Date: _____

Certifications

☐ Level I and Level II Certifications Authorized By: Kevin A. Laster, Jr.

Designated/Approved by: _____
President, MRP, INC.

Effective Date: _____

☐ Level III Certifications Authorized By: President, MRP, INC

Designated/Approved by: _____
President, MRP, INC.

Effective Date: _____

REVISION HISTORY

Rev. No.	Effective Date	Description of Revision
0	5/1/2008	Initial Issue

APPROVED BY:_____ DATE:
NDT Level III

APPROVED BY:_____ DATE:
President

1.0 Principle

This Ultrasonic Angle Beam Testing Procedure provides directions to locate and evaluate ultrasonic reflectors using angle beam Ultrasonic Testing.

2.0 Scope

This procedure applies to equipment made of non-porous ferrous and non-ferrous materials. This procedure applies to specific CJP welds made, in field erection and fabrication shops. It applies to all inspectors while in the employment of MRP, INC as used in accordance with applicable codes, standards, specifications, and regulations referenced below. This procedure contains all of the requirements for the Inspector's qualifications and responsibilities.

3.0 References

American Society for Nondestructive Testing, Bulletin SNT-TC-1A

American Society for Nondestructive Testing, Bulletin CP-189

American Welding Society, Structural Welding Code, Steel D1.1

American Institute for Steel Construction, AISC, LRFD

4.0 Responsibilities

4.1 The NDT/NDE Level III has the primary responsibility for ensuring Ultrasonic Angle Beam Testing is performed and documented according to this procedure.

4.2 The NDT/NDE Level III has the primary responsibility to evaluate test results, ensure documentation is complete for the examination/client file, and issue Examination Reports as necessary.

5.0 Safety

5.1 All safety regulations shall be followed while performing this activity. The tools required for completing this activity, including those needed for personnel safety, must be scheduled for availability and checked for proper working condition before use.

5.2 Additional site specific safety requirements are found in the "MRP SAFTEY MANUAL."

6.0 Personnel

6.1 Personnel performing ultrasonic examination shall be certified to the current edition of SNT-TC-1A. Contract personnel shall furnish copies of their certification. Only Level II or Level III personnel shall perform interpretation or evaluation of results or indications.

7.1 Equipment and Supplies

7.1.1 Acquisition Instrument

7.1.1.1 A pulse-echo type of ultrasonic flaw detector shall be utilized for this examination. The instrument shall be capable of generating and receiving frequencies over the nominal range of 1MHz to 5MHz. Other frequencies may be used if equal or better sensitivity can be demonstrated.

7.1.1.2 The ultrasonic instrument shall be equipped with a stepped gain control calibrated in units of 2 dB or less, accurate over the useful range to 20% of the nominal amplitude ratio, to allow measurement of indication beyond the linear range of the vertical display on the screen. The ultrasonic instrument shall provide linear vertical presentation within ± 5% of the full screen height.

7.1.2 Transducer

7.1.2.1 The transducer nominal frequency shall be 1 or 10 MHZ, unless variables such as production material grain structure necessitates the use of other frequencies to obtain adequate penetration and/or resolution. Transducers may utilize either single or dual transducer elements; size shall be in the range of 1/4 inch to 1 inch, with the shape being round, square, or rectangular. For angle beam examination, wedges shall be provided to select an angle deemed appropriate for the configuration being examined.

7.1.3 Couplant

7.1.3.1 Commercially available couplants such as Ultragel II shall be used for calibration and examination. Other couplants may be used, as approved by the NDT/NDE Level III.

7.1.4 Calibration Block

7.1.4.1 Calibration blocks shall be of the same product form, material specification or equivalent Group Number as the tested material.

7.1.4.2 Calibration shall be performed on a certified IIW block for the purposes of this procedure. Alternative calibration methods may be used in accordance with 7.1.4.3.

7.1.4.3 The alternative to basic calibration reflectors for shear wave inspection shall be 1.5mm side drilled holes in accordance with AWS D1.1 Annex S.

7.2 Preparation

7.2.1 Calibration shall include the complete ultrasonic examination system. The original calibration shall be performed on the basic calibration block. Checks shall be made to verify the sweep range calibration and distance amplitude correction. Checks shall include the entire examination system.

7.2.2 Instrument Calibration

7.2.2.1 **Calibration Times:** Calibrations shall be performed in the following:

A. Every 40 hours of use.
B. Every time the batteries are changed or allowed to go dead.
C. Every time the coaxial cable is replaced
D. Every time the transducer is replaced.

7.2.2.2 **Screen Height Linearity:** The ultrasonic instrument shall provide screen height linearity within 5% of full range for at least 80% of the full screen height (FSH) (base line to maximum calibrated screen point).

7.2.1.3 **Amplitude Control Linearity:** The ultrasonic instrument shall utilize an amplitude control, accurate over its useful range to 20% of the nominal amplitude ratio to allow measurements of indications beyond the linear range of the vertical CRT display.

7.2.3 Transducer Calibration

7.2.3.1 The maximum indications shall be obtained with the sound beam oriented perpendicular to the axis of the side-drilled holes. The centerline of the search unit shall be at least 1-1/2 inches from the nearest side of the block.

7.2.3.2 For contact examination, the temperature of the examination and basic calibration block surfaces shall be within 25 degrees F. (14 degrees C).

7.2.3.3 Calibration shall be performed from the surface of the calibration block, which corresponds to the surface of the component from which the examination will be performed.

7.2.4 Angle Beam Calibration

7.2.4.1 The nominal frequency shall be 1 or 10 MHz, unless attenuation or the need for greater resolution makes another frequency more suitable.

7.2.4.2 The beam angle for refracted shear waves shall be 45, 60 or 70 degrees.

7.2.5 Distance Amplitude Correction (DAC) Calibration

7.2.5.1 The distance-amplitude-correction (DAC) curve (primary reference level) shall be constructed by positioning the search unit for maximum response from the SDH which gives the highest amplitude, then adjusting the sensitivity control to provide an 80% ± 5%

FSH indication from the SDH. Mark the peak of indication on the screen. Position the search unit for maximum amplitude from the calibration reflectors and mark peaks on the screen, and then connects screen marks for SDH indication peaks to construct the DAC curve. Record gain settings on the calibration record, as applicable.

7.2.6 AWS D1.1 (IIW Block) Calibration

7.2.6.1 The calibration for AWS Structural Steel Welding Examination shall be as defined in AWS D1.1, Section 6. Calibration shall be performed for Longitudinal and Transverse Modes. Record gain settings on the calibration record, as applicable.

7.2.7 Surface Preparation

7.2.7.1 The base metal on each side of the weld shall be free of weld spatter, surface irregularities or foreign matters that might interfere with the examination. Where the weld surface interferes with the examination, the weld shall be prepared as needed to permit examination.

7.2.7.2 Prior to examination, all grease, paint, dirt, rust, weld splatter or other foreign material shall be removed from the areas to be inspected. The cleaning may be performed by hand scraping, wire brushing, vapor degreasing, chemical cleaning, or by mechanical means. It is not recommended to perform surface preparation by grit or shot blasting because it may have the ability to peen over indications.

8.0 Procedure

8.1 Prior to UT, the weld shall be visually inspected for imperfections and discontinuities per MRP, INC "Quality Assurance Procedure – Visual Inspection Appendix A 5.0, Rev. 0"

8.2 Scanning Speed

8.2.1 The scanning speed shall not exceed 6 inches per second. Slower scanning speeds may be necessary.

8.3 Coverage

8.3.1 To ensure complete scanning of the required examination volume, each pass of the search unit shall overlap a minimum of 25% of the transducer dimension perpendicular to the scan.

8.4 Scanning Level

8.4.1 Scanning shall be performed at a gain setting at least twice (+6 dB) above the primary reference level. Adjustments to controls other than the gain or attenuator controls during scanning shall require re-calibration.

8.4.2 Supplemental scanning levels are attached in Table 6.2 and Table 6.3 for statically loaded and cyclically loaded structures in accordance with the AWS D1.1.

8.5 Scanning Techniques

8.5.1 **Scanning Speed:** scanning speed shall be no more than 6 inches per second.

8.5.2 **Straight Beam:** The scanning of the adjacent base metal shall be performed to detect reflectors that might affect angle beam inspection result. Any base metal discontinuities found within T/4 of the steel surfaces adjacent to the fusion line shall be accepted or rejected on the basis of the criteria of AWS D1.1 Table 6.2. Locations and areas of such reflectors shall be recorded. Straight beam scanning may also be used to establish general conditions and thickness profiling of weld areas or other base metal locations.

8.5.3 **Reflectors Oriented Parallel to the Weld:** To detect reflectors oriented parallel to the weld seam, the angle beam shall be directed at approximate right angles to the weld axis from two directions, where possible. The search unit shall be manipulated such that ultrasonic energy passes through the entire weld metal volume, as well as the heat affected zones and the adjacent base metal.

8.5.4 **Reflectors Oriented Transverse to the Weld:** To detect reflectors oriented transverse to the weld, the angle beam shall be directed essentially parallel to the weld axis. The search unit shall be manipulated such that ultrasonic energy passes through the entire weld metal volume, as well as the heat affected zones and adjacent base metal.

9.0 Definition of Recordable Indication

9.1 All reflectors that produce a response greater than 20% DAC shall be investigated to the extent that they can be evaluated in terms of the acceptance standards.

A. Length - The length of an indication shall be the dimension at which the indication exceeds 50% of the reference level, or by using the 6 dB drop method from the peak amplitude of the indication, whichever is longer. The length shall be located to an operator selected and reported coordinate system. If the length is not parallel to the weld, the orientation shall be reported.

B. Depth - For shear wave inspection, the depth of the flaw from the examination surface at its maximum amplitude shall be reported.

C. Location - Location of reportable reflectors relative to the weld centerline shall be documented.

D. Amplitude - For shear wave inspection the maximum amplitude of the signal relative to the reference level shall be recorded.

E. TWD - The through wall size of a flaw shall be determined and reported, when required. Sizing shall be performed using tip diffraction techniques and/or high angle longitudinal techniques.

F. Special Conditions - Any condition that is not normally reportable, but in the operator's judgment would aid in evaluation, shall be recorded.

9.2 Recordable indications are also found in Table 6.2 and Table 6.3 AWS D1.1 for statically loaded and cyclically loaded structural steel.

10.0 Documentation

10.1 All ultrasonic angle beam examinations shall be documented. The documentation shall include at a minimum:

10.1.1 Calibration Data Record

* Calibration sheet identification and calibration date
* Client, site or project designation
* Names of examination personnel and level of certification
* Examination procedure number and revision
* Calibration block identification
* Test instrument identification and serial number
* Search unit identification, serial number, frequency and size
* Beam angle and mode of propagation in the material
* Couplant
* Instrument settings sufficiently identified to permit repetition of the examination at a later date

10.1.2 Examination Data Record

* Data sheet identification and applicable calibration sheet identification
* Date and time period of examination
* Names of examination personnel and level of certification
* Examination procedure and revision
* Identification and location of the component and/or the volume scanned (marked drawings of sketches will satisfy this requirement)
* Surface from which the examination is conducted
* A record of indications and indication-free areas

ULTRASONIC ANGLE BEAM CALIBRATION FORM

Report No: ____
Equipment No: _____
Unit: _____
P&ID: _____
UT Cal Sheet No: _____

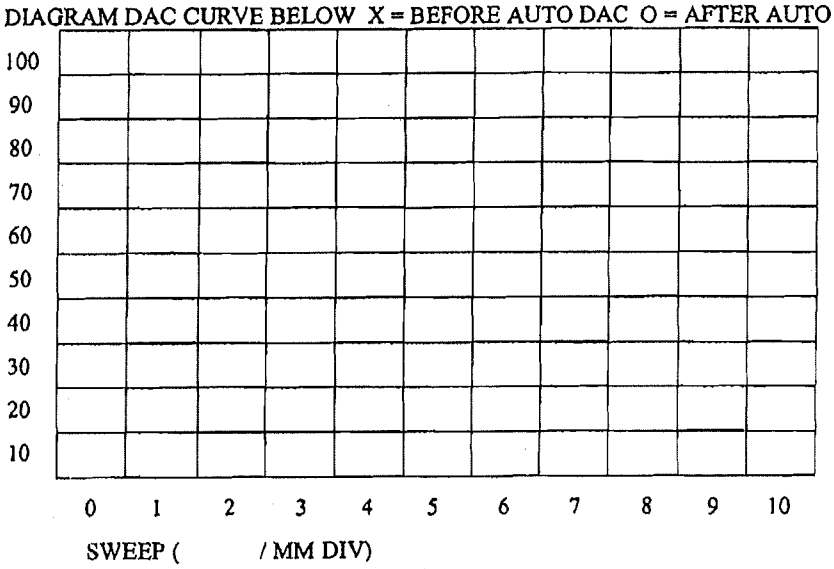
Description: _____
Inspector (print): _____ (sign): _____
Company: _____
Date: _____

UT MACHINE _____ S/N _____
PROBE MFGR _____ MODEL _____
PROBE FREQUENCY _____ SIZE _____ S/N _____
PROBE ANGLE NOMINAL/ACTUAL _____ / _____
CAL BLOCK _____ S/N _____
REF BLOCK _____ S/N _____
MATERIAL _____ VEL _____
DELAY COARSE _____
SWEEP COARSE _____
PROCEDURE _____ REV _____
CALIBRATION REFLECTOR _____

COUPLANT
TEMPERATURE
CABLE
SURFACE
DAMPING
REJECT _____
ZERO OFFSET _____ Usec
ENERGY
MODE T/R THRU
PROCEDURE DATE
REFERENCE dB

	INITIAL	CHECK	CHECK	FINAL
DATE				
TIME				
REF dB				

DIAGRAM DAC CURVE BELOW X = BEFORE AUTO DAC O = AFTER AUTO DAC



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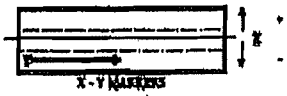
REPORT OF ULTRASONIC EXAMINATION

Project:	Project / Job No.:
Client:	Location:
Contact:	Date:

TESTING PARAMETERS

Equipment Identification	Transducer	Material
Manufacturer:	Angle:	Type: Thickness:
Model:	Size:	Weld Joint AWS:
Serial No.:	Min:	Welding Procedure:
Quality Requirements Sec.:		

WELD LOCATION AND IDENTIFICATION SKETCH



X - Y MARKERS
Use Leg I, II, & III

Comments:

Piece Mark Identification No.	Weld Location	Frame Plane	Angle	Depth: Indication Level a	Depth: Reference Level b	Depth: Attenuation Power c	Depth: Indication Rating d	Discontinuity: Length	Discontinuity: Angular Distance (Round Pos. b)	Discontinuity: Depth Factor "A" Reflection	Discontinuity: Distance Form X	Discontinuity: Distance Form Y	Acceptable	Rejectable

We the undersigned certify that the statements in this report are correct and that the welds were prepared and tested in accordance with the requirements of Section 4 AWS/AWS D1.1 (2006) Structural Welding Code.

Inspector: _____
Level: _____
CWI No. _____

Table 6.2
UT Acceptance-Rejection Criteria (Statically Loaded Nontubular Connections) (see 6.13.1)

Discontinuity Severity Class	Weld Thickness[1] in in. [mm] and Search Unit Angle										
	5/16 through 3/4 [8–20]	> 3/4 through 1-1/2 [20–38]	> 1-1/2 through 2-1/2 [38–65]			> 2-1/2 through 4 [65–100]			> 4 through 8 [100–200]		
	70°	70°	70°	60°	45°	70°	60°	45°	70°	60°	45°
Class A	+5 & lower	+2 & lower	–2 & lower	+1 & lower	+3 & lower	–5 & lower	–2 & lower	0 & lower	–7 & lower	–4 & lower	–1 & lower
Class B	+6	+3	–1 0	+2 +3	+4 +5	–4 –3	–1 0	+1 +2	–6 –5	–3 –2	0 +1
Class C	+7	+4	+1 +2	+4 +5	+6 +7	–2 to +2	+1 +2	+3 +4	–4 to +2	–1 to +2	+2 +3
Class D	+8 & up	+5 & up	+3 & up	+6 & up	+8 & up	+3 & up	+3 & up	+5 & up	+3 & up	+3 & up	+4 & up

General Notes:

- Class B and C discontinuities shall be separated by at least 2L, L being the length of the longer discontinuity, except that when two or more such discontinuities are not separated by at least 2L, but the combined length of discontinuities and their separation distance is equal to or less than the maximum allowable length under the provisions of Class B or C, the discontinuity shall be considered a single acceptable discontinuity
- Class B and C discontinuities shall not begin at a distance less than 2L from weld ends carrying primary tensile stress, L being the discontinuity length.
- Discontinuities detected at "scanning level" in the root face area of CJP double groove weld joints shall be evaluated using an indicating rating 4 dB more sensitive than described in 6 26 6 5 when such welds are designated as "tension welds" on the drawing (subtract 4 dB from the indication rating "d") This shall not apply if the weld joint is backgouged to sound metal to remove the root face and MT used to verify that the root face has been removed.
- ESW or EGW: discontinuities detected at "scanning level" which exceed 2 in. [50 mm] in length shall be suspected as being piping porosity and shall be further evaluated with radiography
- For indications that remain on the display as the search unit is moved, refer to 6 13 1

Note
1 Weld thickness shall be defined as the nominal thickness of the thinner of the two parts being joined.

Class A (large discontinuities)
Any indication in this category shall be rejected (regardless of length)

Class B (medium discontinuities)
Any indication in this category having a length greater than 3/4 in [20 mm] shall be rejected

Class C (small discontinuities)
Any indication in this category having a length greater than 2 in [50 mm] shall be rejected.

Class D (minor discontinuities)
Any indication in this category shall be accepted regardless of length or location in the weld.

Scanning Levels	
Sound path[2] in in. [mm]	Above Zero Reference, dB
through 2-1/2 [65 mm]	14
> 2-1/2 through 5 [65–125 mm]	19
> 5 through 10 [125–250 mm]	29
> 10 through 15 [250–380 mm]	39

Note
2 This column refers to sound path distance, NOT material thickness

Table 6.3
UT Acceptance-Rejection Criteria (Cyclically Loaded Nontubular Connections) (see 6.13.2)

Discontinuity Severity Class	Weld Thickness[1] in in. [mm] and Search Unit Angle										
	5/16 through 3/4 [8–20]	> 3/4 through 1-1/2 [20–38]	> 1-1/2 through 2-1/2 [38–65]			> 2-1/2 through 4 [65–100]			> 4 through 8 [100–200]		
	70°	70°	70°	60°	45°	70°	60°	45°	70°	60°	45°
Class A	+10 & lower	+8 & lower	+4 & lower	+7 & lower	+9 & lower	+1 & lower	+4 & lower	+6 & lower	–2 & lower	+1 & lower	+3 & lower
Class B	+11	+9	+5 +6	+8 +9	+10 +11	+2 +3	+5 +6	+7 +8	–1 0	+2 +3	+4 +5
Class C	+12	+10	+7 +8	+10 +11	+12 +13	+4 +5	+7 +8	+9 +10	+1 +2	+4 +5	+6 +7
Class D	+13 & up	+11 & up	+9 & up	+12 & up	+14 & up	+6 & up	+9 & up	+11 & up	+3 & up	+6 & up	+8 & up

General Notes
- Class B and C discontinuities shall be separated by at least 2L, L being the length of the longer discontinuity, except that when two or more such discontinuities are not separated by at least 2L, but the combined length of discontinuities and their separation distance is equal to or less than the maximum allowable length under the provisions of Class B or C, the discontinuity shall be considered a single acceptable discontinuity
- Class B and C discontinuities shall not begin at a distance less than 2L from weld ends carrying primary tensile stress, L being the discontinuity length.
- Discontinuities detected at "scanning level" in the root face area of CJP double groove weld joints shall be evaluated using an indicating rating 4 dB more sensitive than described in 6 26 6 5 when such welds are designated as "tension welds" on the drawing (subtract 4 dB from the indication rating "d"). This shall not apply if the weld joint is backgouged to sound metal to remove the root face and MT used to verify that the root face has been removed.
- For indications that remain on the display as the search unit is moved, refer to 6.13 2 1

Note:
1 Weld thickness shall be defined as the nominal thickness of the thinner of the two parts being joined.

Class A (large discontinuities)
Any indication in this category shall be rejected (regardless of length)

Class B (medium discontinuities)
Any indication in this category having a length greater than 3/4 in. [20 mm] shall be rejected

Class C (small discontinuities)
Any indication in this category having a length greater than 2 in [50 mm] in the middle half or 3/4 in [20 mm] length in the top or bottom quarter of weld thickness shall be rejected.

Class D (minor discontinuities)
Any indication in this category shall be accepted regardless of length or location in the weld.

Scanning Levels	
Sound path[2] in in. [mm]	Above Zero Reference, dB
through 2-1/2 [65 mm]	20
> 2-1/2 through 5 [65–125 mm]	25
> 5 through 10 [125–250 mm]	35
> 10 through 15 [250–380 mm]	45

Note
2 This column refers to sound path distance, NOT material thickness.

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QUALITY CONTROL PROCEDURE

APPENDIX A

3.0

MAGNETIC PARTICLE TESTING

No.: Appendix A 3.0

Revision: 0

Page: 1 of 8

PREPARED BY:_____ DATE:

APPROVED BY:_____ DATE:
NDT Level III

APPROVED BY:_____ DATE:
President

REVISION HISTORY

Rev. No.	Effective Date	Description of Revision
0	5/1/2008	Initial Issue

APPROVED BY:_____ DATE:
NDT Level III

APPROVED BY:_____ DATE:
President

1.0 Principle

This Magnetic Particle Testing Procedure provides directions to perform Magnetic Particle Testing of ferromagnetic equipment items.

2.0 Scope

2.1 This procedure applies to examination of ferromagnetic materials. Three types of Magnetic Particle Testing are discussed in this procedure:

* Visible Contrast Magnetic Particle Testing (VCMPT)
* Wet Fluorescent Magnetic Particle Testing (WFMPT)
* White Contrast Magnetic Particle Testing (WCMPT)

Note: In general, Magnetic Particle Testing is only capable of detecting surface discontinuities.

2.2 This procedure applies to Magnetic Particle tests made, in field erection and fabrication shops. It applies to all inspectors while in the employment of MRP, INC as used in accordance with applicable codes, standards, specifications, and regulations referenced below. This procedure contains all of the requirements for the Inspector's qualifications and responsibilities

3.0 References

ASME Boiler and Pressure Vessel Code, Section V, Article 7

ASME Boiler and Pressure Vessel Code, Section V, Article 25, SE-709

American Society for Nondestructive Testing, Bulletin SNT-TC-1A

American Welding Society, Structural Welding Code, Steel D 1.1

American Society for Nondestructive Testing, Bulletin CP-189

4.0 Responsibilities

4.1 The NDT/NDE Level III has the primary responsibility for ensuring Magnetic Particle Testing is performed and documented according to this procedure.

4.2 The NDT/NDE Level III has the primary responsibility to evaluate test results, ensure documentation is complete for the examination/client file, and issue Examination Reports as necessary.

5.0 Safety

5.1 Before starting the inspection, the MSDS Sheets for the materials to be used should be reviewed for safe handling instructions.

5.2 All safety regulations shall be followed while performing this activity. The tools required for completing this activity, including those needed for personnel safety, must be scheduled for availability and checked for proper working condition before use.

5.3 Additional site specific safety requirements are found in the "MRP SAFTEY MANUAL."

5.4 **Using Ultraviolet Lights (WFMPT):** Filters on black lights will filter out most of the harmful ultraviolet rays as well as the visible light rays. Missing, cracked or broken filters are to be replaced before use. Even with undamaged filters, skin can be "sunburned" by too much exposure to ultraviolet light.

6.0 Personnel

6.1 Personnel performing magnetic particle inspection shall have adequate vision, with correction if necessary, to be able to read a Jaeger Type 2 Standard Chart at a distance of not less than 12 inches, and shall be capable of distinguishing and differentiating contrast between colors used. These requirements shall be checked annually.

6.2 Personnel qualified to Level I while being supervised by personnel qualified to Level II or Level III may perform application of the testing media. Only Level II or Level III examiners shall make interpretations and evaluations of indications.

7.0 Work Instructions

7.1 Equipment and Supplies

7.1.1 Magnetizing equipment shall be the Parker Probe Type 200 or 400 or a similar type magnetic examination yoke.

7.2 Visible Contrast MPT

7.2.1 Magnetic particles of a suitable visible contrast such as Parker RP6 Red (or equivalent medium) shall be used as the examination medium.

7.2.2 Examination shall be performed under lighted conditions, or with the assistance of auxiliary lighting as necessary to sufficiently light the examination surface.

7.3 Wet Fluorescent MPT

7.3.1 Wet fluorescent magnetic particles supplied in aerosol cans such as Magnaflux Magnaglo 14AM (or equivalent medium) shall be used as the examination medium.

7.3.2 An ultraviolet light, usually called a blacklight, will be used with the fluorescent particles.

7.4 White Contrast MPT

7.4.1 Wet black magnetic particles supplied in aerosol cans, such as Magnaflux 7CS-Black, shall be used as the examination medium. White contrast paint, such as Magnaflux MX-WCP, shall be used to provide background contrast.

7.4.2 A white light source shall be utilized with this technique.

7.5 Surface Preparation

7.5.1 Prior to examination, all grease, paint, dirt, rust, weld splatter or other foreign material shall be removed from the areas to be inspected. The cleaning may be performed by hand scraping, wire brushing, vapor degreasing, chemical cleaning, or by mechanical means. It is not recommended to perform surface preparation by grit or shot blasting because it may have the ability to peen over indications.

7.5.2 For White Contrast MPT, spray the contrast paint over the inspection surface to provide good contrast for the particles without causing excessive buildup or runs in the inspection area.

7.6 Calibration

7.6.1 Calibration shall be performed each day prior to performing a Magnetic Particle Test. Calibrations shall be performed at maximum yoke spacing. Maximum yoke spacing is 12 inches.

7.6.2 AC calibration requires to be performed on a certified 10lb lift block.

7.6.3 DC calibration requires to be performed on a certified 40lb lift block.

8.0 Procedure

8.1 Prior to MT, the weld shall be visually inspected for imperfections and discontinuities per MRP, INC "Quality Assurance Procedure – Visual Inspection Appendix A 5.0, Rev. 0"

8.2 The examination shall be performed by the continuous method; that is, the magnetizing current shall remain on during the period the magnetic particles are being applied and while the excess magnetic particles are being removed.

8.3 Longitudinal magnetization shall be induced by passing alternate current through the material under examination by means of an alternating current electromagnetic yoke. The yoke legs shall be placed from ½" to 1" approximately from the toe of the weld.

REVISION HISTORY

Rev. No.	Effective Date	Description of Revision
0	5/1/2008	Initial Issue

APPROVED BY:_____ DATE:
NDT Level III

APPROVED BY:_____ DATE:
President

1.0 Principle

This Visual Inspection Testing (VT) procedure provides directions to locate and evaluate visual discontinuities in welds.

2.0 Scope

This procedure applies to fillet and the visible parts of CJP and PJP welds made in field erection and fabrication shops. It applies to all Certified Welding Inspectors performing Visual Inspection Testing (VT) while in the employment of MRP, INC as used in accordance with applicable codes, standards, specifications, and regulations referenced below. This procedure contains all of the requirements for the Inspector's qualifications and responsibilities and the acceptance criteria for discontinuities

3.0 References

ANSI/AWS D1.1/D1.1M STRUCTURAL WELDING CODE, 2006 Edition

ANSI/AWS QC1-96 Standard for AWS CERTIFICATION of Welding Inspectors, 1996

ANSI/AWS A2.4 *Symbols for Welding and Nondestructive Testing,* 1998 Edition

ANSI/AWS A3.0 *Standard Welding Terms and Definitions*, 2001 Edition

American Institute of Steel Construction (A.I.S.C.), Latest Edition

4.0 Definitions

4.1 **acceptance criteria.** Specified limits placed on characteristics of an item or process defined in codes, specifications, or other documents.
4.2 **certificate.** The document issued to the applicant on successful completion of the requirements for certification.
4.3 **certification.** The act of determining, verifying and attesting in writing to the qualification of personnel in conformance to specified requirements.
4.4 **code.** A standard suitable for adoption by a governmental authority.
4.5 **CWI.** Certified Welding Inspector.
4.6 **NDE.** Nondestructive Examination. The act of determining the suitability of some material or component for its intended purpose using techniques that do not affect its serviceability.
4.7 **QA.** Quality Assurance. Specification of quality assurance methods, procedures, or criteria for employer or client. Review quality assurance programs of vendors, subcontractors, or other organizations. Conduct or supervise quality audits of vendors, subcontractors, or other organizations.
4.8 **qualification.** Demonstrated training, skill, knowledge and experience required for personnel to perform the duties of a specific job.
4.9 **qualified.** Having complied with specific requirements.

4.10 **QC.** Quality Control. Detection and measurement of weld discontinuities or the supervision of individuals so involved. Specification of quality control methods, procedures, and acceptance criteria. Review of quality control programs of vendors, subcontractors, or other organizations.

4.11 **specification.** A standard suitable for adoption in procurement documents.

4.12 **standard.** A generic term incorporating codes, specifications, recommended practices, classifications, methods, and guides that have been prepared by a sponsoring committee, and approved and adopted in accordance with established procedures.

4.13 **verb usage.** As used in this standard, the word **shall** denotes a requirement, the word **should** denotes a guideline and the word **may** denotes a choice.

5.0 Basis for Qualification

5.1 Inspectors responsible for acceptance or rejection of material and workmanship shall be qualified. The bases of Inspector qualification shall be documented. If the Engineer elects to specify the bases of inspector qualification, it shall be so specified in contract documents. The acceptable qualification basis shall be the following:

(1) Current or previous certification as an AWS Certified Welding Inspector (CWI) in conformance with the provisions of AWS QC1, *Standard and Guide for Qualification and Certification of Welding Inspectors*, or

(2) Current or previous qualification by the Canadian Welding Bureau (CWB) in conformance with the requirements of the Canadian Standard Association (CSA) Standard W178.2, *Certification of Welding Inspectors*, or

5.2 The qualification of an Inspector shall remain in effect indefinitely, provided the Inspector remains active in inspection of welded steel fabrication, unless there is specific reason to question the Inspector's ability.

5.3 Inspectors and Assistant Inspectors shall have passed an eye examination with or without corrective lenses to prove: (1) near vision acuity of Snellen English, or equivalent, at no less than 12 in. [300 mm]; and (2) far vision acuity of 20/40, or better. Eye examination of all inspection personnel shall be required every three years or less if necessary to demonstrate adequacy.

6.0 Responsibilities

6.1 The Inspector shall ascertain that all fabrication and erection by welding is performed in conformance with the requirements of the contract documents.

6.2 Verify that the base materials and consumable welding materials conform to the specifications and that welding filler metals used are as specified for each base material or combination of base materials.

6.3 Verify that the welding equipment to be used for the work is appropriate for use with the welding procedure and has the capability to meet the applicable requirements of the welding procedure

6.4 Verify that the welding procedures are as specified and are qualified, and that the welding is performed in conformance to the applicable procedure.

6.5 Witness performance and testing of procedure qualification test assemblies, or supervise these activities when performed by outside agencies

6.6 Verify that welders, welding operators, and tack welders have been qualified in conformance to the applicable standards, and that they are qualified to use the welding procedures specified for the work.

6.7 Witness testing of the welder test assemblies and/or welding operator qualification test assemblies, or supervise these activities when performed by outside agencies.

6.8 Verify documentation of performance qualification test results

6.9 Verify documentation of procedure qualification test results

6.10 Require requalification if there is evidence the welder's or welding operator's work does not conform to the requirements of the applicable standard.

6.11 Require requalification if the welder's or welding operator's qualification is not current.

7.0 Work Instructions

7.1 Verify that only approved or qualified welding procedures are used for the work

7.2 Verify that the edge preparation or joint geometry meet the requirements of the welding procedure and drawings.

7.3 Verify that the specified filler metals are used and that filler metals are maintained in proper condition, per requirements, or as recommended by the manufacturer

7.4 Verify that the technique and performance of each welder, welding operator, and tack welder are as specified

7.5 Verify that the work conforms to requirements of the applicable standards, drawings, or other documents.

7.6 Verify that the work inspected is identified and documented in accordance with specified requirements.

7.7 Perform the required visual Examinations

7.8 Verify that the required visual and other nondestructive examinations have been performed by qualified personnel in the specified manner. Review the resulting information to ensure that the results are complete.

7.9 Perform any further nondestructive examinations that are required, provided qualifications are in conformance to the specified requirements.

7.10 Surface Preparation

7.10.1 Prior to examination, all grease, paint, dirt, rust, weld splatter or other foreign material shall be removed from the areas to be inspected. The cleaning may be performed by hand scraping, wire brushing, vapor degreasing, chemical cleaning, or by mechanical means. It is not recommended to perform surface preparation by grit or shot blasting because it may have the ability to peen over indications.

8.0 Procedure

8.1 This type of inspection and test shall be performed as necessary prior to assembly, during assembly, during welding, and after welding to ensure that materials and workmanship meet the requirements of the contract documents. Fabrication/erection inspection and testing shall be the responsibilities of the Contractor unless otherwise provided in the contract documents.

9.0 Definition of Recordable Indications

9.1 Any cracks, incomplete fusion, or overlap are rejectable regardless of length.

9.2 All fillet weld profiles should follow Attachment I

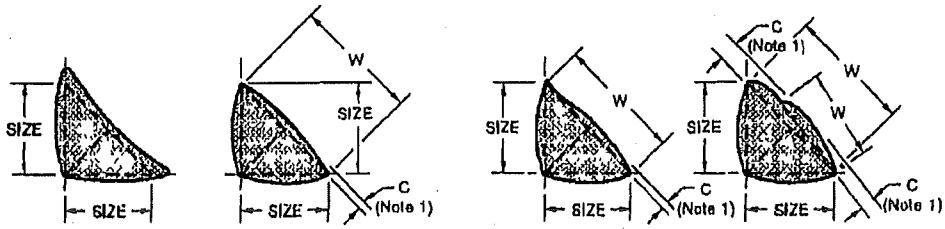
9.3 Maximum reinforcement of a butt grove weld is 1/8"

9.4 All other weld profiles shall comply with acceptance criteria in Attachment II, AWS D1.1 Table 6.1 Visual Acceptance Criteria.

10.0 Documentation

10.1 Prepare clear and concise reports and verify that records of the welding procedure, the welding procedure qualification, the welder's, welding operator's and tack welder's qualifications, the control of welding materials, and the results of examinations are maintained. A sample Visual Inspection form is attached.

ATTACHMENT I

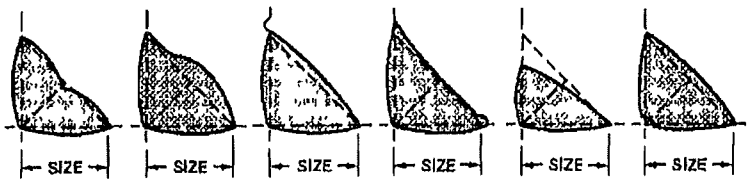


(A) DESIRABLE FILLET WELD PROFILES

(B) ACCEPTABLE FILLET WELD PROFILES

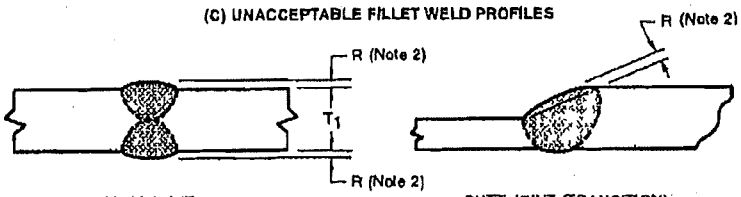
Note 1. Convexity, C, of a weld or individual surface bead with dimension W shall not exceed the value of the following table

WIDTH OF WELD FACE OR INDIVIDUAL SURFACE BEAD, W	MAX CONVEXITY, C
W ≤ 5/16 in. [8 mm]	1/16 in. [2 mm]
W > 5/16 in. [8 mm] TO W < 1 in. [25 mm]	1/8 in. [3 mm]
W ≥ 1 in. [25 mm]	3/16 in. [5 mm]



UNDERSIZE WELD | EXCESSIVE CONVEXITY | EXCESSIVE UNDERCUT | OVERLAP | UNDERSIZE WELD | INCOMPLETE FUSION

(C) UNACCEPTABLE FILLET WELD PROFILES

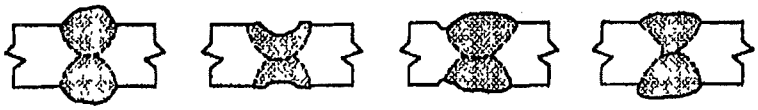


BUTT JOINT— EQUAL THICKNESS PLATE

BUTT JOINT (TRANSITION)— UNEQUAL THICKNESS PLATE

Note 2. Reinforcement R shall not exceed 1/8 in. [3 mm] (see 5.24.4).

(D) ACCEPTABLE GROOVE WELD PROFILE IN BUTT JOINT



EXCESSIVE WELD REINFORCEMENT | UNDERFILL | EXCESSIVE UNDERCUT | OVERLAP

(E) UNACCEPTABLE GROOVE WELD PROFILES IN BUTT JOINTS

Figure 5.4—Acceptable and Unacceptable Weld Profiles (see 5.24)

ATTACHMENT II

Table 6.1
Visual Inspection Acceptance Criteria (see 6.9)

Discontinuity Category and Inspection Criteria	Statically Loaded Nontubular Connections	Cyclically Loaded Nontubular Connections	Tubular Connections (All Loads)
(1) Crack Prohibition Any crack shall be unacceptable, regardless of size or location.	X	X	X
(2) Weld/Base-Metal Fusion Thorough fusion shall exist between adjacent layers of weld metal and between weld metal and base metal.	X	X	X
(3) Crater Cross Section All craters shall be filled to provide the specified weld size, except for the ends of intermittent fillet welds outside of their effective length.	X	X	X
(4) Weld Profiles Weld profiles shall be in conformance with 5.24.	X	X	X
(5) Time of Inspection Visual inspection of welds in all steels may begin immediately after the completed welds have cooled to ambient temperature. Acceptance criteria for ASTM A 514, A 517, and A 709 Grade 100 and 100 W steels shall be based on visual inspection performed not less than 48 hours after completion of the weld.	X	X	X
(6) Undersized Welds The size of a fillet weld in any continuous weld may be less than the specified nominal size (L) without correction by the following amounts (U): L, specified nominal weld size, in. [mm] — U, allowable decrease from L, in. [mm] ≤ 3/16 [5] — ≤ 1/16 [2] 1/4 [6] — ≤ 3/32 [2.5] ≥ 5/16 [8] — ≤ 1/8 [3] In all cases, the undersize portion of the weld shall not exceed 10% of the weld length. On web-to-flange welds on girders, underrun shall be prohibited at the ends for a length equal to twice the width of the flange.	X	X	X
(7) Undercut (A) For material less than 1 in. [25 mm] thick, undercut shall not exceed 1/32 in. [1 mm], with the following exception: undercut shall not exceed 1/16 in. [2 mm] for any accumulated length up to 2 in. [50 mm] in any 12 in. [300 mm]. For material equal to or greater than 1 in. thick, undercut shall not exceed 1/16 in. [2 mm] for any length of weld.	X		
(B) In primary members, undercut shall be no more than 0.01 in. [0.25 mm] deep when the weld is transverse to tensile stress under any design loading condition. Undercut shall be no more than 1/32 in. [1 mm] deep for all other cases		X	X
(8) Porosity (A) CJP groove welds in butt joints transverse to the direction of computed tensile stress shall have no visible piping porosity. For all other groove welds and for fillet welds, the sum of the visible piping porosity 1/32 in. [1 mm] or greater in diameter shall not exceed 3/8 in. [10 mm] in any linear inch of weld and shall not exceed 3/4 in. [20 mm] in any 12 in. [300 mm] length of weld.	X		
(B) The frequency of piping porosity in fillet welds shall not exceed one in each 4 in. [100 mm] of weld length and the maximum diameter shall not exceed 3/32 in. [2.5 mm]. Exception: for fillet welds connecting stiffeners to web, the sum of the diameters of piping porosity shall not exceed 3/8 in. [10 mm] in any linear inch of weld and shall not exceed 3/4 in. [20 mm] in any 12 in. [300 mm] length of weld.		X	X
(C) CJP groove welds in butt joints transverse to the direction of computed tensile stress shall have no piping porosity. For all other groove welds, the frequency of piping porosity shall not exceed one in 4 in. [100 mm] of length and the maximum diameter shall not exceed 3/32 in. [2.5 mm].		X	X

General Note. An "X" indicates applicability for the connection type, a shaded area indicates non-applicability

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REPORT OF VISUAL WELD EXAMINATION

Project:	Project / Job No.:
Client:	Location:
Contact:	Date:

WELDING INFORMATION

WELDING PROCESS:	ELECTRODE:
ELECTRODE MANUFACTURER:	SIZE:
ANY JOINT TYPE:	BRAND:
	TYPE:
MOTE USED:	

TEST PARAMETERS

Test Method Standard:	Production Stage:	For Welds:
	In Process ☐	Root Pass ☐
Acceptance Standard:	Final ☐	Intermediate ☐
	Other ☐	Final Pass ☐
Product Form:	Material Type:	Drawing No.:

TERMS AND ABBREVIATIONS

C - Crack	S - Slag	IP - Incomplete Penetration
IF - Incomplete Fusion	U - Undercut	IL - Insufficient Leg Size (Fillet Welds Only)
E - Excessive Convexity	P - Porosity	O - Other (Specify)

INSPECTION

Piece / Weld Identification	Comments

Additional Remarks:

Technician: _____ NDT Level: _____
CWI No.: _____

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APPENDIX B

SIESMIC STRUCTURE QUALITY CONTROL PROCEDURES

TABLE OF CONTENTS

1.0 QAP SEISMIC STRUCTURE SUPPLMENTAL ADD.

2.0 ULTRASONIC TESTING SHEARWAVE

3.0 MAGNETIC PARTICLE TESTING

MRP LLC 1640 NEW MARKET AVE., SOUTH PLAINFIELD, NJ 07080, PHONE: (732) 968-6061, FAX: (732) 968-5675

QUALITY CONTROL PROCEDURE

APPENDIX B

1.0

QUALITY CONTROL PLAN SIESMIC STRUCTURE SUPPLEMENTAL ADDENDUM

No.: Appendix B 1.0

Revision: 0

Page: 1 of 11

PREPARED BY:_____ DATE:

APPROVED BY:_____ DATE:
NDT Level III

APPROVED BY:_____ DATE:
President

REVISION HISTORY

Rev. No.	Effective Date	Description of Revision
0	5/1/2008	Initial Issue

APPROVED BY:_____ DATE:
NDT Level III

APPROVED BY:_____ DATE:
President

1.0 PRINCIPLE

This Seismic Welding Supplemental Addendum provides a Quality Assurance Plan for compliance with the AWS D1.8 Structural Welding Code – Seismic Supplement, Edition 2005, the AISC Seismic Provisions for Structural Steel Buildings, Edition 2005, and applicable specifications and contract documents.

2.0 SCOPE

This procedure applies to all welds made, in field erection and fabrication shops, on Seismic Load Resisting Systems (SLRS). It applies to all welders and inspectors while in the employment of MRP, INC as used in accordance with applicable codes, standards, specifications, and regulations referenced below. This procedure contains all of the requirements for the welder's and Inspector's qualifications and responsibilities.

3.0 LIMITATIONS

The procedure is intended to apply to the following:

A. Structures made of steels with minimum specified yield strengths of 70 ksi or less.
B. Structures that contain beams or braces in which inelastic behavior is expected, and that use a steel with a minimum specified yield strength that does not exceed 50 ksi.

4.0 REFERENCES

AWS D1.1/D1.1M Structural Welding Code – Steel, Latest Edition

AWS A5.20/A5.20M:2005, *Specification for Carbon Steel Electrodes for Fluxed Core Arc Welding*

AWS D1.8/D1.8M:2005 Structural Welding Code- Seismic Supplement

AWS A5.01, *Filler Metal Procurement Guidelines*

AWS A5.1, *Specification for Carbon Steel Electrodes for Shielded Metal Arc Welding*

AWS B4.0, *Standard Methods for Mechanical Testing of Welds*

AWS QC1, *Standard for AWS Certification of Welding Inspectors*

AISC Seismic Provisions for Structural Steel Buildings, Edition 2005

ASNT SNT-TC-1A, Recommended Practice for the Qualification and Certification of Nondestructive Testing Personnel, edition 2006

ASNT CP-189

FEMA-353, Recommended Specifications and Quality Assurance Guidelines for Steel Moment Frame Construction for Seismic Application

5.0 DEFININTIONS

Contract Documents: Specific documents created as guidelines for the design and construction of the project. This includes plans, drawings, details, and specifications.

Demand Critical Welds: welds designated by the Engineer in the Contract Documents, and required to meet specific requirements of the AWS D1.8 Structural Welding Code – Seismic Supplement.

Engineer of Record: referred to hereon as the "Engineer".

k-Area: The region of the web that extends from the tangent point of the web and the flange-web fillet a distance of 1-1/2 in. into the web beyond the *k* dimension.

Lowest Anticipated Service Temperature (LAST): The lowest one (1) hour average temperature with a 100-year mean recurrence interval

Protected Zone: That portion of a member of the SLRS, designated by the Engineer in Contract Documents in which inelastic straining is anticipated to occur and to which special limitations in these provisions apply with regard to attachments and fabrication.

Quality Assurance Plan (QAP): The written description of qualifications, procedures, quality inspections, resources, and records to be used to provide assurance that the structure complies with the Engineer's quality requirements, specifications, jurisdictional requirements, and Contract Documents.

Seismic Load Resisting System (SLRS): The assembly of structural elements in the building that resists the seismic loads and events, as indicated by the Engineer in the Contract Documents.

6.0 SAFETEY

6.1 All safety regulations shall be followed while performing this activity. The tools required for completing this activity, including those needed for personnel safety, must be scheduled for availability and checked for proper working condition before use.

6.2 Additional site specific safety requirements are found in the "MRP SAFTEY MANUAL."

7.0 BASIS FOR PERSONNEL QUALIFICATIONS

7.1 Supplemental Welder Qualification Testing – Required Welder Tests

7.1.1 Welders shall be tested and Certified for the welding activities they are to perform. Welders SHALL NOT weld in positions, on material, with filler metals, or with welding processes they are not currently Certified to weld in.

7.1.2 Welders shall be tested and qualified in accordance with the AWS D1.1/D1.1M Clause 4 "Qualification." Tack Welders shall also be tested and qualified in accordance with the AWS D1.1/D1.1M Clause 4 "Qualification."

7.1.3 In addition to the requirements of the AWS D1.1/D1.1M Clause 4 "Qualification", the welders shall pass the Supplemental Welding Qualification for Restricted Access Welding as prescribed in Annex C of the AWS D1.8/D1.8M when making welds meeting **ALL** the following requirements:

A. The weld is **DEMAND CRITICAL**
B. The weld joins the bottom beam flange to the column flange
C. The weld must be made by welding through a beam web weld access hole.

7.1.4 Welders shall be qualified using backing that is the type of material to be used on the project, unless the welding test is performed without backing. If the test is performed without backing, the welder shall be qualified to weld with or without backing. A welder that welds with backing SHALL NOT be qualified to weld without backing. If a welder uses a backing other that steel, the test shall be performed with the largest allowable root opening that will be permitted in production.

7.1.5 Welders that have passed the Supplemental Welding Qualification for Restricted Access Welding, in accordance with Annex C of the AWS D1.8/D1.8M, shall have a certification valid for 36 months provided the rules of continuity for process use of AWS D1.1/D1.1M are met. If the welder qualification lapses while on the project, the welder's qualification shall remain valid unless there is a specific reason to question the welder's ability.

7.2 INSPECTOR QUALIFICATIONS

7.2.1 For the purposes of this procedure, Certified Welding Inspectors shall be qualified as:

A. Certified Welding Inspectors (CWI) or Senior Certified Welding Inspectors (SCWI) in accordance with AWS QC1.
B. Level 2 Welding Inspectors or Level 3 Welding Inspectors, certified in accordance with the Canadian Welding Bureau (CWB) in conformance with the Canadian Standard Association (CSA) W178.2.

7.2.2 Personnel performing Non-Destructive Testing shall be certified to the current edition of SNT-TC-1A. Contract personnel shall furnish copies of their certification. Only Level II or Level III personnel shall perform interpretation or evaluation of results or indications.

7.2.3 Personnel performing Ultrasonic Testing on seismic structures shall be certified to MRP, INC "Quality Assurance Procedure – Appendix B 2.0 Ultrasonic Testing, Shearwave Method, Rev. 0"

7.2.4 Personnel performing Magnetic Particle Testing on seismic structures shall be certified to MRP, INC "Quality Assurance Procedure – Appendix B 3.0 Magnetic Particle Testing, Continuous Method, Rev. 0"

8.0 RESPONSIBILITIES

8.1 NON-CONFORMANCE REPORTS (NCR)

8.1.1 All employees under the employment of MRP, Inc, have the responsibility to perform their job in accordance with quality standards and report any work that is contrary to quality as a deficiency. Any and All deficiencies found outside of Quality Control shall be reported to the Project Quality Control Manager. If a deficiency is not immediately fixed, a Non-Conformance Report (NCR) shall be issued. The NCR shall have the following:

A. Date and Time
B. Location
C. Description of the Non-conformance
D. Method of discovery
E. Corrective Action to be taken
F. The person whom identified the Non-conformance

A sample NCR report is attached in Attachment I.

8.1.2 Non-conformance reports that are issued shall be logged on a NCR Log Report. The NCR Log Report shall allow for the proper tracking of the status of specific NCR's and allows for determination of further action in order to resolve documented deficiencies. A sample NCR Log Report is attached in Attachment II.

8.1.3 Documents reporting nonconformance should be distributed to the Owner, Engineer, Contractor and the Building Official.

8.2 WELDER AND INSPECTOR RESPONSIBILITIES

8.2.1 The welder, QC Welding Inspector, and QA Welding Inspector, as appropriate, shall perform the QC and QA tasks indicated in the following list:

8.2.1.1 Review and understand the applicable portions of the specifications, the Contract Documents and the shop drawings for the project.

8.2.1.2 Verify that all applicable welder qualifications, welding operator qualifications and tack welder qualifications are available, current and accurate.

8.2.1.3 Require requalification of any welder, welding operator or tack welder who has, for a period of six months, not used the process for which the person was qualified.

8.2.1.4 Verify welder identification and qualification. Verify that any required supplemental welder qualification testing, if required for the joint, has been executed and that the welder has passed.

8.2.1.5 Verify that each welder has a unique identification mark or die stamp to identify welds.

8.2.1.6 Verify that all applicable Welding Procedure Specifications (WPSs), with Procedure Qualification Records (PQRs) as needed, are available, current and accurate.

8.2.1.7 Verify that an approved Welding Procedure Specification (WPS) has been provided and that each welder performing the weld has reviewed the WPS. A copy of the appropriate WPSs shall be available for each joint, although need not be present at each joint location.

8.2.1.8 Review mill test reports for all main member and designated connection base material for compliance with the project requirements.

8.2.1.9 Verify base material identification with the approved shop drawings and specifications.

8.2.1.10 Verify the electrode, flux and shielding gas certifications for compliance with the Contract Documents.

8.2.1.11 Verify welding consumables with the approved shop drawings and approved WPS's.

8.2.1.12 Verify that electrodes are used only in the permitted positions and within the welding parameters specified in the WPS.

8.2.1.13 Verify that electrodes and fluxes are properly stored, and that exposure limits for the welding materials are satisfied.

8.2.1.14 At suitable intervals, observe joint preparation, assembly practice, preheat temperatures, interpass temperatures, welding techniques, welder performance and any postweld controlled cooling or heat treatment to ensure that the applicable requirements of the WPS and Code are satisfied.

8.2.1.15 At suitable intervals, verify proper current and voltage of the welding equipment in application of the WPS, if needed, by using a hand held calibrated amp and volt meter. Current and voltage shall be measured near the arc with this equipment.

8.2.1.16 Inspect the work to ensure compliance with AWS D1.1 and AWS D1.8 or additional specified weld acceptance criteria. Size and contour of welds shall be measured with suitable gauges. A strong light, magnifiers, or other devices as needed may be used to aid visual inspection.

8.2.1.17 Schedule NDT technicians in a timely manner, after the visual inspection is complete and the assembly has cooled. The final NDT on a specific weld shall not be performed sooner than 24 hours after the welding has been completed.

8.2.1.18 Mark the welds, parts, and joints that have been inspected, and accepted, with a distinguishing mark or die stamp, or maintain records indicating the specific welds inspected by each inspector.

8.2.1.19 Document the accepted and rejected items in a written report. Transmit the report to the designated recipients in a timely manner.

9.0 FILLER MATERIAL CERTIFICATION REQUIREMENTS

9.1 All welding electrodes shall conform to E70xx electrodes. E80xx electrodes shall be used only in CJP welds were both connecting components have steel yield strength of 65ksi.

9.2 WPS shall have the Manufacturer to be listed with manufactures' Essential Variable ranges. Manufactures' Certificate of Conformance shall meet AWS D1.8 6.3.1 and 6.3.2.

9.3 Filler metal minimum mechanical properties per AWS D1.8 Table 6.1. For non demand critical weld 20 ft lbs @ 0 degrees F.

9.4 Diffusible hydrogen level: 16ml max.

9.5 For Demand Critical Welds; Electrodes shall be provided in protective packaging that limits the ability of the electrode to absorb moisture. When removed from the packaging, the electrode shall be capable of depositing weld metal with a maximum diffusible hydrogen content not to exceed the limits of 8.4. Exposure shall not exceed the electrode manufacturer's guidelines, when the guidelines are based upon electrode exposure test conducted in accordance with D1.8 Annex D.

9.6 Demand Critical Welds LAST CVN Testing: In accordance with AWS D1.8, testing shall be 40 ft lbs @ 0 degrees F.

9.7 Maximum Preheat and Interpass Temperature: 550 degrees interpass

9.8 Filler Metals shall acceptable pass Section 6 standards and tests of the AWS D1.8 prior to use.

10.0 NON-DESTRUCTIVE TESTING OF WELDS

10.1 Personnel performing Visual Inspection shall be certified to section 6.2.1. Visual Inspection shall be performed in accordance with MRP, INC "Quality Assurance Procedure – Visual Inspection Appendix A 5.0, Rev. 0"

10.2 Personnel performing Ultrasonic Testing on seismic structures shall be certified to 6.2.3. Ultrasonic Testing shall be performed in accordance with MRP, INC "Quality Assurance Procedure – Appendix B 2.0 Ultrasonic Testing, Shearwave Method, Rev. 0"

10.3 Personnel performing Magnetic Particle Testing on seismic structures shall be certified to 6.2.4. Magnetic Particle Testing Shall be performed in accordance with MRP, INC "Quality Assurance Procedure – Appendix B 3.0 Magnetic Particle Testing, Continuous Method, Rev. 0"

11.0 DOCUMENTATION

11.1 The following shall be documented and kept current by the MRP, INC Quality Assurance Manager:

A. Procedure Qualification Records (PQR's)
B. Welding Procedure Specifications (WPS's)
C. Welder Performance Qualification Records (WPQR)
D. Welder Certification Continuance Logs
E. Quality Control Documentation
F. Non-Conformance Reports and Logs (NCR's)
G. Inspector certifications
H. Inspection reports (Visual, MT, UT, Daily, Paint, etc.)
I. Inspection Procedures
J. Equipment Calibrations
K. Latest Edition Specifications, drawings, contract documents, latest editions.
L. All relevant codes applicable to the project.

ATTACHMENT I
NCR REPORT

MRD LLC 1640 NEW MARKET AVE., SOUTH PLAINFIELD, NJ 07080, PHONE: (732) 968-6061, FAX: (732) 968-5675

NON-CONFORMANCE REPORT

Project: _____ Project / Job No.: _____
Client: _____ Location: _____
Contact: _____ Date: _____
Report No: _____

DEFICIENT RELATIVE TO:

Drawing/Plan No.: _____ Specification(s): _____
Location of Piece: _____ Title: _____

DEFICIENCY

Description of Nonconformance: _____

Method of Discovery: _____

Corrective Action: _____

Issued By: _____
Delivered To: _____
Date: _____ Time: _____

ATTACHMENT II
NCR LOG

MRP Inc. 1640 NEW MARKET AVE., SOUTH PLAINFIELD, NJ 07080, PHONE: (732) 968-6061, FAX: (732) 968-5675

NONCONFORMANCE REPORT LOG

Project Name:
Project No.:

Piecemark	NCR Report #	Date	Description	Corrective Action	Initials	REPAIR Date

Page 1 of 1

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QUALITY CONTROL PROCEDURE

APPENDIX B

2.0

ULTRASONIC TESTING SHEAR WAVE METHOD

No.: Appendix B 2.0

Revision: 0

Page: 1 of 13

PREPARED BY:_____ DATE:

APPROVED BY:_____ DATE:
NDT Level III

APPROVED BY:_____ DATE:
President

REVISION HISTORY

Rev. No.	Effective Date	Description of Revision
0	5/1/2008	Initial Issue

APPROVED BY:_____ DATE:
NDT Level III

APPROVED BY:_____ DATE:
President

1.0 Principle

This Ultrasonic Angle Beam Testing Procedure provides directions to locate and evaluate ultrasonic reflectors using angle beam Ultrasonic Testing on Seismic Structures. This procedure provides for compliance with the AWS D1.8 Structural Welding Code – Seismic Supplement, Edition 2005, the AISC Seismic Provisions for Structural Steel Buildings, Edition 2005, and applicable specifications and contract documents.

2.0 Scope

This procedure applies to testing on materials made of non-porous ferrous and non-ferrous materials. This procedure applies to specific CJP welds made, in field erection and fabrication shops, on Seismic Load Resisting Systems (SLRS). It applies to all inspectors while in the employment of MRP, INC as used in accordance with applicable codes, standards, specifications, and regulations referenced below. This procedure contains all of the requirements for the Inspector's qualifications and responsibilities

3.0 References

American Society for Nondestructive Testing, Bulletin SNT-TC-1A

American Society for Nondestructive Testing, Bulletin CP-189

American Welding Society, Structural Welding Code, Steel D1.1

American Welding Society, Structural Welding Code, Seismic Supplement, Steel D1.8

FEMA-353 Recommended Specifications and Quality Assurance Guidelines for Steel Moment-Frame Construction for Seismic Applications, June 2000

American Institute of Steel Construction, Seismic Provisions for Structural Steel Buildings, Edition 2005

4.0 Responsibilities

4.1 The NDT/NDE Level III has the primary responsibility for ensuring Ultrasonic Angle Beam Testing is performed and documented according to this procedure.

4.2 The NDT/NDE Level III has the primary responsibility to evaluate test results, ensure documentation is complete for the examination/client file, and issue Examination Reports as necessary.

5.0 Safety

5.1 All safety regulations shall be followed while performing this activity. The tools required for completing this activity, including those needed for personnel safety, must be scheduled for availability and checked for proper working condition before use.

5.2 Additional site specific safety requirements are found in the "MRP SAFTEY MANUAL."

6.0 Personnel

6.1 Personnel performing ultrasonic examination shall be certified to the current edition of SNT-TC-1A. Contract personnel shall furnish copies of their certification. Only Level II or Level III personnel shall perform interpretation or evaluation of results or indications.

6.2 Additionally, all UT technicians shall be certified MRP, INC as required in Annex E of the AWS D1.8 Structural Welding Code Seismic Welding Supplement. Annex E is attached.

7.0 Work Instructions

7.1 Equipment and Supplies

7.1.1 Acquisition Instrument

7.1.1.1 A pulse-echo type of ultrasonic flaw detector shall be utilized for this examination. The instrument shall be capable of generating and receiving frequencies over the nominal range of 1MHz to 5MHz. Other frequencies may be used if equal or better sensitivity can be demonstrated.

7.1.1.2 The ultrasonic instrument shall be equipped with a stepped gain control calibrated in units of 2 dB or less, accurate over the useful range to 20% of the nominal amplitude ratio, to allow measurement of indication beyond the linear range of the vertical display on the screen. The ultrasonic instrument shall provide linear vertical presentation within ± 5% of the full screen height.

7.1.2 Transducer

7.1.2.1 The transducer nominal frequency shall be 1 or 10 MHZ, unless variables such as production material grain structure necessitates the use of other frequencies to obtain adequate penetration and/or resolution. Transducers may utilize either single or dual transducer elements; size shall be in the range of 1/4 inch to 1 inch, with the shape being round, square, or rectangular. For angle beam examination, wedges shall be provided to select an angle deemed appropriate for the configuration being examined.

7.1.3 Couplant

7.1.3.1 Commercially available couplants such as Ultragel II shall be used for calibration and examination. Other couplants may be used, as approved by the NDT/NDE Level III.

7.1.4 Calibration Block

7.1.4.1 Calibration blocks shall be of the same product form, material specification or equivalent Group Number as the tested material.

7.1.4.2 Calibration shall be performed on a certified IIW block for the purposes of this procedure. Alternative calibration methods may be used in accordance with 7.1.4.3.

7.1.4.3 The alternative to basic calibration reflectors for shear wave inspection shall be 1.5mm side drilled holes in accordance with AWS D1.1 Annex S.

7.2 Preparation

7.2.1 Calibration shall include the complete ultrasonic examination system. The original calibration shall be performed on the basic calibration block. Checks shall be made to verify the sweep range calibration and distance amplitude correction. Checks shall include the entire examination system.

7.2.2 Instrument Calibration

7.2.2.1 **Calibration Times:** Calibrations shall be performed in the following manner:

A. Every 40 hours of use.
B. Every time the batteries are changed or allowed to go dead.
C. Every time the coaxial cable is replaced
D. Every time the transducer is replaced.

7.2.2.2 **Screen Height Linearity:** The ultrasonic instrument shall provide screen height linearity within 5% of full range for at least 80% of the full screen height (FSH) (base line to maximum calibrated screen point).

7.2.1.3 **Amplitude Control Linearity:** The ultrasonic instrument shall utilize an amplitude control, accurate over its useful range to 20% of the nominal amplitude ratio to allow measurements of indications beyond the linear range of the vertical CRT display.

7.2.3 Transducer Calibration

7.2.3.1 The maximum indications shall be obtained with the sound beam oriented perpendicular to the axis of the side-drilled holes. The centerline of the search unit shall be at least 1-1/2 inches from the nearest side of the block.

7.2.3.2 For contact examination, the temperature of the examination and basic calibration block

surfaces shall be within 25 degrees F. (14 degrees C).

7.2.3.3 Calibration shall be performed from the surface of the calibration block, which corresponds to the surface of the component from which the examination will be performed.

7.2.4 Angle Beam Calibration

7.2.4.1 The nominal frequency shall be 1 or 10 MHz, unless attenuation or the need for greater resolution makes another frequency more suitable.

7.2.4.2 The beam angle for refracted shear waves shall be 45, 60 or 70 degrees.

7.2.5 Distance Amplitude Correction (DAC) Calibration

7.2.5.1 The distance-amplitude-correction (DAC) curve (primary reference level) shall be constructed by positioning the search unit for maximum response from the SDH which gives the highest amplitude, then adjusting the sensitivity control to provide an 80% ± 5% FSH indication from the SDH. Mark the peak of indication on the screen. Position the search unit for maximum amplitude from the calibration reflectors and mark peaks on the screen, and then connects screen marks for SDH indication peaks to construct the DAC curve. Record gain settings on the calibration record, as applicable.

7.2.6 AWS D1.1 (IIW Block) Calibration

7.2.6.1 The calibration for AWS Structural Steel Welding Examination shall be as defined in AWS D1.1, Section 6. Calibration shall be performed for Longitudinal and Transverse Modes. Record gain settings on the calibration record, as applicable.

7.2.7 Surface Preparation

7.2.7.1 The base metal on each side of the weld shall be free of weld spatter, surface irregularities or foreign matters that might interfere with the examination. Where the weld surface interferes with the examination, the weld shall be prepared as needed to permit examination.

7.2.7.2 Prior to examination, all grease, paint, dirt, rust, weld splatter or other foreign material shall be removed from the areas to be inspected. The cleaning may be performed by hand scraping, wire brushing, vapor degreasing, chemical cleaning, or by mechanical means. It is not recommended to perform surface preparation by grit or shot blasting because it may have the ability to peen over indications

8.0 Procedure

8.1 Prior to UT, the weld shall be visually inspected for imperfections and discontinuities per MRP, INC "Quality Assurance Procedure – Visual Inspection Appendix A 5.0, Rev. 0"

8.2 Scanning Speed

8.2.1 The scanning speed shall not exceed 6 inches per second. Slower scanning speeds may be necessary.

8.3 Coverage

8.3.1 To ensure complete scanning of the required examination volume, each pass of the search unit shall overlap a minimum of 25% of the transducer dimension perpendicular to the scan.

8.4 Scanning Level

8.4.1 Scanning shall be performed at a gain setting at least twice (+6 dB) above the primary reference level. Adjustments to controls other than the gain or attenuator controls during scanning shall require re-calibration.

8.4.2 Supplemental scanning levels are attached in Table 6.2 and Table 6.3 for statically loaded and cyclically loaded structures in accordance with the AWS D1.1.

8.5 Scanning Techniques

8.5.1 **Scanning Speed:** scanning speed shall be no more than 6 inches per second.

8.5.2 **Straight Beam:** The scanning of the adjacent base metal shall be performed to detect reflectors that might affect angle beam inspection result. Any base metal discontinuities found within T/4 of the steel surfaces adjacent to the fusion line shall be accepted or rejected on the basis of the criteria of AWS D1.1 Table 6.2. Locations and areas of such reflectors shall be recorded. Straight beam scanning may also be used to establish general conditions and thickness profiling of weld areas or other base metal locations.

8.5.3 **Reflectors Oriented Parallel to the Weld:** To detect reflectors oriented parallel to the weld seam, the angle beam shall be directed at approximate right angles to the weld axis from two directions, where possible. The search unit shall be manipulated such that ultrasonic energy passes through the entire weld metal volume, as well as the heat affected zones and the adjacent base metal.

8.5.4 **Reflectors Oriented Transverse to the Weld:** To detect reflectors oriented transverse to the weld, the angle beam shall be directed essentially parallel to the weld axis. The search unit shall be manipulated such that ultrasonic energy passes through the entire weld metal volume, as well as the heat affected zones and adjacent base metal.

8.6 Flaw Sizing Technique

8.6.1 The Flaw Sizing Technique shall be used to evaluate the approximate dimensions of a located reflector inside a weld. The reflector's size shall be documented and reported to the Engineer of Record. Flaw Sizing Technique shall only be used **WRITTEN** permission of the Engineer of Record.

8.6.2 Flaw Sizing shall be performed in accordance with Annex S of the AWS D1.1 and Annex G of the AWS D1.8.

9.0 Definition of Recordable Indication

9.1 All reflectors that produce a response greater than 20% DAC shall be investigated to the extent that they can be evaluated in terms of the acceptance standards.

A. Length - The length of an indication shall be the dimension at which the indication exceeds 50% of the reference level, or by using the 6 dB drop method from the peak amplitude of the indication, whichever is longer. The length shall be located to an operator selected and reported coordinate system. If the length is not parallel to the weld, the orientation shall be reported.

B. Depth - For shear wave inspection, the depth of the flaw from the examination surface at its maximum amplitude shall be reported.

C. Location - Location of reportable reflectors relative to the weld centerline shall be documented.

D. Amplitude - For shear wave inspection the maximum amplitude of the signal relative to the reference level shall be recorded.

E. TWD - The through wall size of a flaw shall be determined and reported, when required. Sizing shall be performed using tip diffraction techniques and/or high angle longitudinal techniques.

F. Special Conditions - Any condition that is not normally reportable, but in the operator's judgment would aid in evaluation, shall be recorded.

9.2 Recordable indications are also found in Table 6.2 and Table 6.3 AWS D1.1 for statically loaded and cyclically loaded structural steel.

10.0 Documentation

10.1 All ultrasonic angle beam examinations shall be documented. The documentation shall include at a minimum:

10.1.1 **Calibration Data Record**

* Calibration sheet identification and calibration date
* Client, site or project designation
* Names of examination personnel and level of certification
* Examination procedure number and revision
* Calibration block identification
* Test instrument identification and serial number
* Search unit identification, serial number, frequency and size

* Beam angle and mode of propagation in the material
* Couplant
* Instrument settings sufficiently identified to permit repetition of the examination at a later date

10.1.2 **Examination Data Record**

* Data sheet identification and applicable calibration sheet identification
* Date and time period of examination
* Names of examination personnel and level of certification
* Examination procedure and revision
* Identification and location of the component and/or the volume scanned (marked drawings of sketches will satisfy this requirement)
* Surface from which the examination is conducted
* A record of indications and indication-free areas

ULTRASONIC ANGLE BEAM CALIBRATION FORM

Report No: ____
Equipment No: _____
Unit: _____
P&ID: _____
UT Cal Sheet No: _____

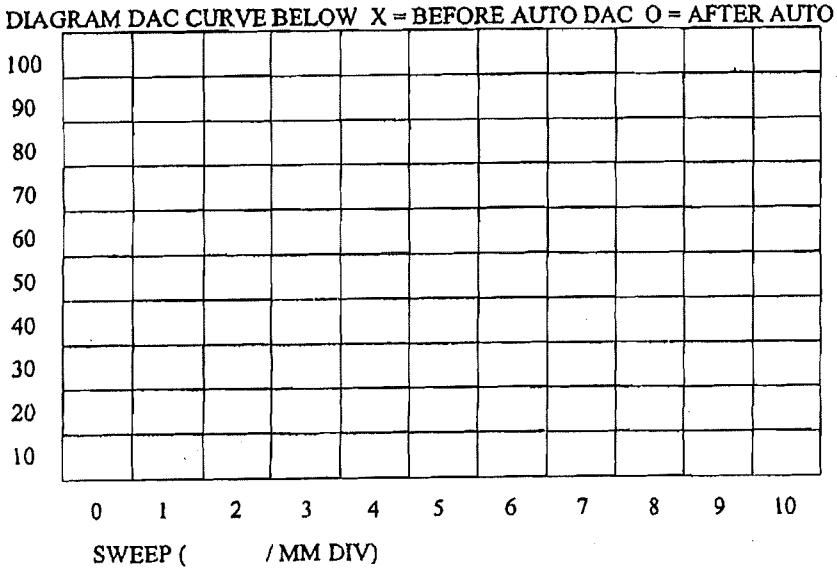
Description: _____
Inspector (print): _____ (sign): _____
Company: _____
Date: _____

UT MACHINE _____ S/N _____
PROBE MFGR _____ MODEL _____
PROBE FREQUENCY _____ SIZE _____ S/N _____
PROBE ANGLE NOMINAL/ACTUAL _____ / _____
CAL BLOCK _____ S/N _____
REF BLOCK _____ S/N _____
MATERIAL _____ VEL _____
DELAY COARSE _____
SWEEP COARSE _____
PROCEDURE _____ REV _____
CALIBRATION REFLECTOR _____

COUPLANT
TEMPERATURE
CABLE
SURFACE
DAMPING
REJECT _____
ZERO OFFSET _____ Usec
ENERGY
MODE T/R THRU
PROCEDURE DATE
REFERENCE dB

	INITIAL	CHECK	CHECK	FINAL
DATE				
TIME				
REF dB				

DIAGRAM DAC CURVE BELOW X = BEFORE AUTO DAC O = AFTER AUTO DAC



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REPORT OF ULTRASONIC EXAMINATION

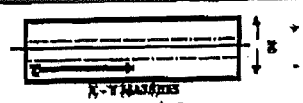
Project: _____ Project / Job No.: _____
Client: _____ Location: _____
Contact: _____ Date: _____

TESTING PARAMETERS

Equipment/Identification	Transducer	Material	
Manufacturer: _____	Angle: _____	Type: _____	Thickness: _____
Model: _____	Size: _____	Weld Joint AWS: _____	
Serial No.: _____	Mfr: _____	Welding Procedure: _____	

Quality Requirements Sec.: _____

WELD LOCATION AND IDENTIFICATION SKETCH



Comments: _____

Flaw Mark Identification No.	Weld Location	Flaw Size	Leg(s)	Defects: Indication Level a	Defects: Reference Level b	Defects: Acceptance Factor c	Defects: Indication Rating d	Discontinuity: Length	Discontinuity: Angular Distance (Round Path)	Discontinuity: Depth From "A" Surface	Distance: From X	Distance: From Y	Acceptable	Reject Cut

We the undersigned certify that the statements in this record are correct and that the welds were prepared and tested in accordance with the requirements of Section 6 AWS/AWS D1.1 (2004) Structural Welding Code.

Inspector: _____
Level: _____
(SW) No.: _____

Table 6.2
UT Acceptance-Rejection Criteria (Statically Loaded Nontubular Connections) (see 6.13.1)

Discontinuity Severity Class	Weld Thickness[1] in in. [mm] and Search Unit Angle										
	5/16 through 3/4 [8–20]	> 3/4 through 1-1/2 [20–38]	> 1-1/2 through 2-1/2 [38–65]			> 2-1/2 through 4 [65–100]			> 4 through 8 [100–200]		
	70°	70°	70°	60°	45°	70°	60°	45°	70°	60°	45°
Class A	+5 & lower	+2 & lower	–2 & lower	+1 & lower	+3 & lower	–5 & lower	–2 & lower	0 & lower	–7 & lower	–4 & lower	–1 & lower
Class B	+6	+3	–1 0	+2 +3	+4 +5	–4 –3	–1 0	+1 +2	–6 –5	–3 –2	0 +1
Class C	+7	+4	+1 +2	+4 +5	+6 +7	–2 to +2	+1 +2	+3 +4	–4 to +2	–1 to +2	+2 +3
Class D	+8 & up	+5 & up	+3 & up	+6 & up	+8 & up	+3 & up	+3 & up	+5 & up	+3 & up	+3 & up	+4 & up

General Notes
- Class B and C discontinuities shall be separated by at least 2L, L being the length of the longer discontinuity, except that when two or more such discontinuities are not separated by at least 2L, but the combined length of discontinuities and their separation distance is equal to or less than the maximum allowable length under the provisions of Class B or C, the discontinuity shall be considered a single acceptable discontinuity
- Class B and C discontinuities shall not begin at a distance less than 2L from weld ends carrying primary tensile stress, L being the discontinuity length.
- Discontinuities detected at "scanning level" in the root face area of CJP double groove weld joints shall be evaluated using an indicating rating 4 dB more sensitive than described in 6 26 6.5 when such welds are designated as "tension welds" on the drawing (subtract 4 dB from the indication rating "d") This shall not apply if the weld joint is backgouged to sound metal to remove the root face and MT used to verify that the root face has been removed.
- ESW or EGWs: discontinuities detected at "scanning level" which exceed 2 in. [50 mm] in length shall be suspected as being piping porosity and shall be further evaluated with radiography
- For indications that remain on the display as the search unit is moved, refer to 6 13 1

Note:
1 Weld thickness shall be defined as the nominal thickness of the thinner of the two parts being joined.

Class A (large discontinuities)
Any indication in this category shall be rejected (regardless of length)

Class B (medium discontinuities)
Any indication in this category having a length greater than 3/4 in. [20 mm] shall be rejected

Class C (small discontinuities)
Any indication in this category having a length greater than 2 in. [50 mm] shall be rejected.

Class D (minor discontinuities)
Any indication in this category shall be accepted regardless of length or location in the weld.

Scanning Levels	
Sound path[2] in in. [mm]	Above Zero Reference, dB
through 2-1/2 [65 mm]	14
> 2-1/2 through 5 [65–125 mm]	19
> 5 through 10 [125–250 mm]	29
> 10 through 15 [250–380 mm]	39

Note
2 This column refers to sound path distance, NOT material thickness

Table 6.3
UT Acceptance-Rejection Criteria (Cyclically Loaded Nontubular Connections) (see 6.13.2)

Discontinuity Severity Class	Weld Thickness[1] in in. [mm] and Search Unit Angle										
	5/16 through 3/4 [8–20]	> 3/4 through 1-1/2 [20–38]	> 1-1/2 through 2-1/2 [38–65]			> 2-1/2 through 4 [65–100]			> 4 through 8 [100–200]		
	70°	70°	70°	60°	45°	70°	60°	45°	70°	60°	45°
Class A	+10 & lower	+8 & lower	+4 & lower	+7 & lower	+9 & lower	+1 & lower	+4 & lower	+6 & lower	–2 & lower	+1 & lower	+3 & lower
Class B	+11	+9	+5 +6	+8 +9	+10 +11	+2 +3	+5 +6	+7 +8	–1 0	+2 +3	+4 +5
Class C	+12	+10	+7 +8	+10 +11	+12 +13	+4 +5	+7 +8	+9 +10	+1 +2	+4 +5	+6 +7
Class D	+13 & up	+11 & up	+9 & up	+12 & up	+14 & up	+6 & up	+9 & up	+11 & up	+3 & up	+6 & up	+8 & up

General Notes
- Class B and C discontinuities shall be separated by at least 2L, L being the length of the longer discontinuity, except that when two or more such discontinuities are not separated by at least 2L, but the combined length of discontinuities and their separation distance is equal to or less than the maximum allowable length under the provisions of Class B or C, the discontinuity shall be considered a single acceptable discontinuity
- Class B and C discontinuities shall not begin at a distance less than 2L from weld ends carrying primary tensile stress, L being the discontinuity length.
- Discontinuities detected at "scanning level" in the root face area of CJP double groove weld joints shall be evaluated using an indicating rating 4 dB more sensitive than described in 6 26 6.5 when such welds are designated as "tension welds" on the drawing (subtract 4 dB from the indication rating "d") This shall not apply if the weld joint is backgouged to sound metal to remove the root face and MT used to verify that the root face has been removed.
- For indications that remain on the display as the search unit is moved, refer to 6.13.2 1

Note
1 Weld thickness shall be defined as the nominal thickness of the thinner of the two parts being joined.

Class A (large discontinuities)
Any indication in this category shall be rejected (regardless of length).

Class B (medium discontinuities)
Any indication in this category having a length greater than 3/4 in [20 mm] shall be rejected.

Class C (small discontinuities)
Any indication in this category having a length greater than 2 in. [50 mm] in the middle half or 3/4 in. [20 mm] length in the top or bottom quarter of weld thickness shall be rejected.

Class D (minor discontinuities)
Any indication in this category shall be accepted regardless of length or location in the weld.

Scanning Levels	
Sound path[2] in in. [mm]	Above Zero Reference, dB
through 2-1/2 [65 mm]	20
> 2-1/2 through 5 [65–125 mm]	25
> 5 through 10 [125–250 mm]	35
> 10 through 15 [250–380 mm]	45

Note
2 This column refers to sound path distance; NOT material thickness.

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QUALITY CONTROL PROCEDURE

APPENDIX B

3.0

MAGNETIC PARTICLE TESTING CONTINUOUS METHOD

No.: Appendix B 3.0

Revision: 0

Page: 1 of 7

PREPARED BY:_____ DATE:

APPROVED BY:_____ DATE:
NDT Level III

APPROVED BY:_____ DATE:
President

REVISION HISTORY

Rev. No.	Effective Date	Description of Revision
0	5/1/2008	Initial Issue

APPROVED BY:_____ DATE:
NDT Level III

APPROVED BY:_____ DATE:
President

1.0 Principle

This Magnetic Particle Testing Procedure provides directions to perform Magnetic Particle Testing of ferromagnetic equipment items. This procedure provides for compliance with the AWS D1.8 Structural Welding Code – Seismic Supplement, Edition 2005, the AISC Seismic Provisions for Structural Steel Buildings, Edition 2005, and applicable specifications and contract documents.

2.0 Scope

This procedure applies to examination of ferromagnetic materials. One type of Magnetic Particle Testing is discussed in this procedure:

* Visible Contrast Magnetic Particle Testing (VCMPT)

Note· In general, Magnetic Particle Testing is only capable of detecting surface discontinuities.

This procedure applies to specific VCMPT tests made, in field erection and fabrication shops, on Seismic Load Resisting Systems (SLRS). It applies to all inspectors while in the employment of MRP, INC as used in accordance with applicable codes, standards, specifications, and regulations referenced below. This procedure contains all of the requirements for the Inspector's qualifications and responsibilities

3.0 References

American Society for Nondestructive Testing, Bulletin SNT-TC-1A

American Society for Nondestructive Testing, Bulletin CP-189

American Welding Society, Structural Welding Code, Steel D1.1

American Welding Society, Structural Welding Code, Seismic Supplement, Steel D1.8

FEMA-353 Recommended Specifications and Quality Assurance Guidelines for Steel Moment-Frame Construction for Seismic Applications, June 2000

American Institute of Steel Construction, Seismic Provisions for Structural Steel Buildings, Edition 2005

4.0 Responsibilities

4.1 The NDT/NDE Level III has the primary responsibility for ensuring Magnetic Particle Testing is performed and documented according to this procedure.

4.2 The NDT/NDE Level III has the primary responsibility to evaluate test results, ensure documentation is complete for the examination/client file, and issue Examination Reports as necessary.

5.0 Safety

5.1 Before starting the inspection, the MSDS Sheets for the materials to be used should be reviewed for safe handling instructions.

5.2 All safety regulations shall be followed while performing this activity. The tools required for completing this activity, including those needed for personnel safety, must be scheduled for availability and checked for proper working condition before use.

5.3 Additional site specific safety requirements are found in the "MRP SAFTEY MANUAL."

6.0 Personnel

6.1 Personnel performing magnetic particle inspection shall have adequate vision, with correction if necessary, to be able to read a Jaeger Type 2 Standard Chart at a distance of not less than 12 inches, and shall be capable of distinguishing and differentiating contrast between colors used. These requirements shall be checked annually.

6.2 Personnel qualified to Level I while being supervised by personnel qualified to Level II or Level III may perform application of the testing media. Only Level II or Level III examiners shall make interpretations and evaluations of indications.

6.3 Supplemental certification of NDT personnel shall be performed in accordance with Annex F of the AWS D1.8.

7.0 Work Instructions

7.1 <u>Equipment and Supplies</u>

7.1.1 Magnetizing equipment shall be the Parker Probe Type 200 or 400 or an similar type continuous method magnetic examination yoke.

7.2 <u>Visible Contrast MPT</u>

7.2.1 Magnetic particles of a suitable visible contrast such as Parker RP6 Red (or equivalent medium) shall be used as the examination medium. Particles shall be dry, finely divided high-permeability ferromagnetic material with low retentivity and suitable size range.

7.2.2 Examination shall be performed under lighted conditions, or with the assistance of auxiliary lighting as necessary to sufficiently light the examination surface.

7.3 Calibration

7.3.1 Calibration shall be performed each day prior to performing a Magnetic Particle Test. Calibrations shall be performed at maximum yoke spacing. Maximum yoke spacing is 12 inches.

7.3.2 AC calibration requires to be performed on a certified 10lb lift block.

7.3.3 DC calibration requires to be performed on a certified 40lb lift block.

7.4 Surface Preparation

7.4.1 Prior to examination, all grease, paint, dirt, rust, weld splatter or other foreign material shall be removed from the areas to be inspected. The cleaning may be performed by hand scraping, wire brushing, vapor degreasing, chemical cleaning, or by mechanical means. It is not recommended to perform surface preparation by grit or shot blasting because it may have the ability to peen over indications.

8.0 Procedure

8.1 Prior to MT, the weld shall be visually inspected for imperfections and discontinuities per MRP, INC "Quality Assurance Procedure – Visual Inspection Appendix A 5.0, Rev. 0"

8.2 The examination shall be performed by the continuous method; that is, the magnetizing current shall remain on during the period the magnetic particles are being applied and while the excess magnetic particles are being removed.

8.3 Longitudinal magnetization shall be induced by passing alternate current through the material under examination by means of an alternating current electromagnetic yoke. The yoke legs shall be placed from ½" to 1" approximately from the toe of the weld.

8.4 Each area to be examined shall be checked with the poles of the yoke in two positions each at 45 degrees to the line being examined and 90 degrees to the line. The yoke should then be moved down the line so that the magnetic fields overlap halfway each time the sequence is repeated.

8.5 Magnetic particles shall be applied during the excitation with sufficient time (about 5 seconds) being allowed for the migration of particles to regions of flux leakage.

8.6 Examination coverage shall allow for 100% overlap in the inspection. If the geometry of the piece does not allow 100%, then that shall be stated on the report.

8.7 Visible Contrast MPT

8.7.1 The examination shall be performed in a lighted area and the examiner shall perform the examination within 7 to 30 inches from the examination surface and at an angle of no greater than 15 degrees from parallel to the examination surface. Magnetizing field intensity should be verified by use of a "pie gauge" type field indicator.

8.7.2 Dry particles shall be applied in such a manner that a light, uniform, dust-like coating of particles settles on the part while it is being magnetized. The particles shall be observed while entering the flux leakage field for the shaping of discontinuities.

8.7.3 Sufficient air flow to the remove the excess particles shall be directed at the area of inspection. The velocity of the air shall allow for particles to be removed from the weld areas such as undercut but shall not be so strong that it removes particles from the flux leakage field.

9.0 Definition of Recordable Indication

9.1 Normally only indications with a major dimension greater than 1/16 inch shall be considered relevant.

9.2 All Relevant indications, determined by MT to be cracks or incomplete fusion, shall be rejected regardless of length.

10.0 Documentation

10.1 The size and type of all recordable indications should be noted and mapped. The mapping should reference a zero point in both the (X),(Y) coordinate directions, for example, weld centerlines. The model number or type of equipment used, the type of current used and the type of particles used should be recorded. A sample results report format is attached.

10.2 Calibration Records shall be written into every report.

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REPORT OF MAGNETIC PARTICLE EXAMINATION

Project:	Project / Job No.:
Client:	Location:
Contact:	Date:

TESTING PARAMETERS

Test Method Standard:	Production Stage:	For Welds:	Equipment Identification:
	In Process ☐	Root Pass ☐	Model No.
Acceptance Standard:	Final ☐	Intermediate ☐	
	Other ☐	Final Pass ☐	Serial No.
Product Form:	Material Type:	Drawing No.	UV Meter No.

Product / Weld Identification Qty / Piece / Seq.	Motor Code	Fails Code	Repair	Linear	Rounded	Cracks	Surface	Undercut	Other	Test Quantity	Defect Location or Other Remarks

*The UV Intensity was verified at the prescribed intervals: Yes ☐ No ☐ Not Applicable ☒

TECHNIQUE

Particle Type	Particle Examination:	Magnetization Technique:		Current: AC ☐ DC ☒
Dry ☒	Fluorescent ☐	Prod ☐	Coil Cables ☐	
Wet ☐	Visible ☒	Yoke ☒	Head Shot ☐	Amperage:

Remarks: Set-Up / Location Sketch; as detailed on individual drawing(s)

Technician: _____ NDT Level: _____

NDT Level: _____

Personnel Certifications

ASNT Central Certification Program

Be it known that

Forrest H Hendrix

has met the established and published Requirements for Certification by ASNT as

ACCP Level II

in the following Nondestructive Testing Methods:

Method	Sector	Technique	Issue Date	Expiration Date
Magnetic Particle Testing	GI	B;Y	01/04	01/09
Liquid Penetrant Testing	GI;PE	P;S;W	01/04	01/09
Radiographic Testing	GI	G	01/04	01/09
Ultrasonic Testing	GI	CF;W	01/04	01/09
Visual and Optical Testing	GI	D	01/04	01/09

141340

Certificate Number

ASNT President

Certification Management Council Chair

This certificate is the property of ASNT and is not official without ASNT's raised gold seal.

The American Society for Nondestructive Testing

Forrest H Hendrix

has met the heretofore published ASNT requirements for certification as

ACCP Level II

in the methods indicated:

Method	Sector	Technique	Exp Date
MT	GI	D,Y	01/09
PT	GI,PE	P,S,W	01/09
RT	GI	G	01/09
UT	GI	CF,W	01/09
VT	GI	D	01/09

(See reverse side for method descriptions)

ASNT Technical Services Manager

01/04
Issue Date

141340
Certificate Number

Certificate Holder

American Welding Society

Certifies That
WELDING INSPECTOR

F Henry Hendrix

Has complied with the requirements of AWS QC1,
Standard for AWS Certification of Welding Inspectors.

with X without _____ eye correction, _____ color blind

AWS President

AWS Certification Chair

99080021
Certificate Number

August 1 2011
Expiration Date

MRP L.L.C.
1640 NEW MARKET AVE.
S. PLAINFIELD N.J.
Phone: (732) 968-6061 Fax (732) 968-5675

REPORT OF WELDER AND WELDING OPERATOR QUALIFICATION TEST REPORT

TESTED FOR: SHOP

PROJECT: AWS-D1.1 (2006) WELDER QUALIFICATION

Welder/Welder Operator's Name	Welding Code (ID & year)	Date	Specimen	Test Number
A. UTROBIN	AWS-D1.1 (2006)	2/9/2005	Plate (X) Pipe ( )	MRP-2-1
Welder Identification No.	**Base Material Specification**	**Diameter & Wall Thickness**	**Joint**	**Plate Thickness**
XXX-XX-6220	A572 GR50	N/A	Groove (X) Fillet ( )	1"
Process	**Position**	**Specimen Furnished By:**	**Specimen Machined By:**	**Thickness Range Qualified**
FCAW	3-G	MRP (X) Others ( )	MRP (X) Others ( )	UNLIMITED
Weld Progression	**Welding Procedure No.**	**Rev. No.**	**Current**	**Polarity**
UP (X) CW ( ) L to R (X) Down ( ) CCW ( ) R to L ( )	MRP-064		AC ( ) DC (X) AMPS: 140-200	Direct ( ) Reverse (X)
	Welding Procedure Data by: MRP, Inc. Witnesses (Tech):			Other:

FILLER METAL		VISUAL INSPECTION (AWS ONLY)	
	Classification: E71T1	Appearance:	ACCEPTABLE
75-25%	Diameter/ F No.: 1/16" F4	Undercut:	NONE PRESENT
Shielding: Gas (X) Flux ( )	Trade Name: TRIPLE 7	Piping Porosity:	NONE PRESENT

GUIDED BEND TEST RESULTS

TYPE	RESULTS	TYPE	RESULTS
SIDE BEND 1	PASS		
SIDE BEND 2	PASS		

FILLET TEST RESULTS

Weld Appearance	Fillet Size
Pass ( ) Fail ( )	Leg: in in. Concavity ( ) in. Convexity ( ) in.
Macro Etch Test Results Pass ( ) Fail ( )	Fracture Test Results (Describe location, nature, & size of any cracks or shearing of the specimen)

RADIOGRAPHIC TEST RESULTS

FILM IDENTIFICATION	RESULTS	REMARKS	FILM IDENTIFICATION	RESULTS	REMARKS

QUALIFICATION RESULTS

WE THE UNDERSIGNED, CERTIFY THAT THE STATEMENTS IN THIS RECORD ARE CORRECT AND THAT THE TEST WELDS WERE PREPARED, WELDED AND TESTED TO THE REQUIREMENTS OF SECTION 4 OF THE ASW D1.1 (2006)

REMARKS:

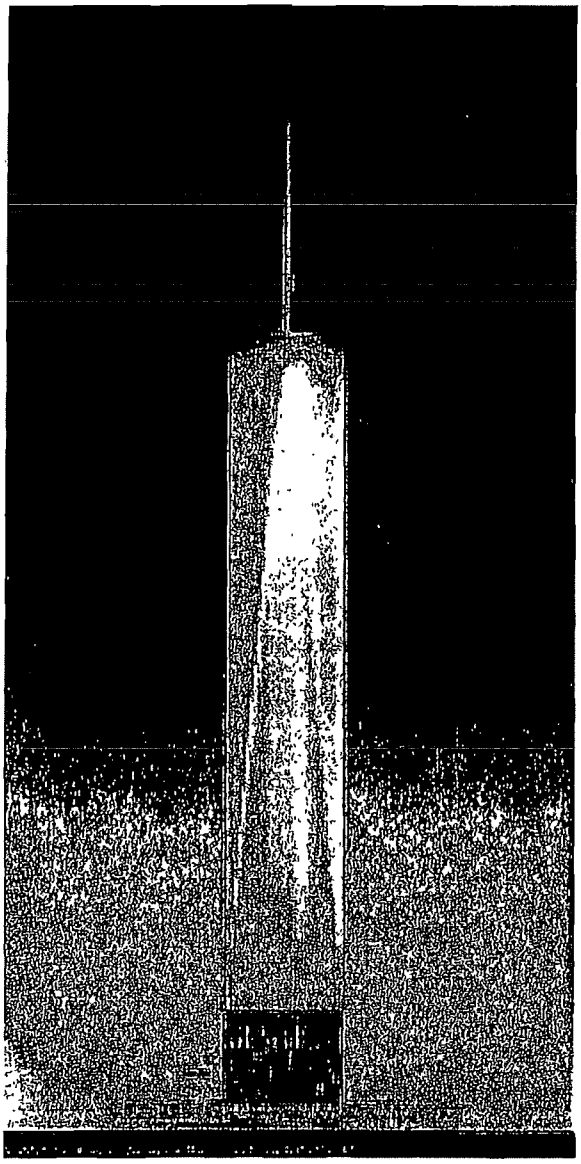
updated 9-22-07

APPROVED BY: D. Floyd, President, MRP LLC

TESTED BY: F. Henry Hendrix, CWI-99080021

DCM

ERECTORS, INC.



WTC – TOWER ONE

Field Quality Control Plan

(Oct 8th, 2008)

DCM ERECTORS INC.
110 East 42nd St. New York, NY 10017 Phone: (212) 599-1603 Fax: (212) 599-1615

FREEDOM TOWER INDEX

Section 1: Bolting Specifications; Bolting Procedures, and Bolt Pre-Installation Testing

Section 2: Bolting Inspection Procedures, and Records

Section 3: Minimum Preheat Temperature, and Interpass Temperatures

Section 4: Field Weld Provisions and Procedures; Codes and Standards,

Section 5: Welding Inspection Procedures, and Records

Section 6: Standard Drawings and Illustrations

Section 7: Miscellaneous Files

Section 8: Welding Consumables Product Data; Product Conformances

Section 9: Non Conformance Reports (NCR) (FPN)

Section 10: Specifications

Section 11: AWS D1.8

Section 12: Welder Qualifications, Welder Licenses, Welder Restrictive Access Test, and Welder Logs.

Section 13: Weld Procedures (WPS and PQR)

Section 14: Deck and Stud Data and Procedures

Section 15: Reserved

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Section 1

Bolting Specifications
Bolting Procedures
Bolt Pre-Installation Testing

DCM FIELD BOLTING

Bolts shall comply with requirements of the following specification: 1.) High Strength Bolts- ASTM A325, ASTM A490. 2.) All ASTM A325 and A490 bolts shall be preferably cold-forged and with rolled threads (Type 2 A325 and Type A490's are not to be used. 3.) All heavy hex nuts for high strength bolts must be ASTM A194 @h or ASTM A563 DH for use with plain (uncoated) bolts or nuts under ASTM A194 or A536 that have a minimum proof stress not below 175,000 psi. No other nuts are acceptable, and nuts must show both the manufacturer's mark and the relevant symbol.

Washers shall conform to the American Standard B27, Type B. Washers in contact with high strength bolt heads and nuts shall be hardened in accordance with ASTM Designation A325. Hardened round washers in contact with high strength bolt heads and nuts must be manufactured to ASTM F436 which requires a hardness of 38 to 45 HRC and must show manufacture's mark. Washers for use with short slotted or oversized holes on over 1 inch A490 bolts must also be 5/16" thick washer.

Manufactured bolts will be delivered, tested, and stored at the Weinstock Brothers warehouse located on Long Island (140 E Mineola Ave., Valley Stream)

The bolt received by supplier (Weinstock Brothers) shall identify the manufactures Lot Number, and its corresponding mill test reports and certificates. (See page 3)

Manufactures' certificates shall be are reviewed for adequacy and compliance with project requirements. Manufactures' certificates will be kept on file at the Weinstock Brothers warehouse.

Sampling at the Weinstock warehouse shall be performed using the "shipping lot method". The Owners (Verification, QA, Special Inspectors) notified, for verification of Bolt Testing and Inspection.

Bolts may be sampled by the Engineer on site and tested by the Owner for wedge tensile and Rockwell hardness requirements in accordance with the appropriate American Society for Testing and Materials (ASTM) specifications.

All galvanized bolts shall meet the requirements for rotational capacity testing as specified in the appropriate ASTM specification (e.g. ASTM A325, ASTM A490).

Pre-installation testing and inspections at the Weinstock Brothers warehouse shall be conducted in accordance with RCSC Specifications and recorded on the accompanying "Bolt Pre – Installation Assembly Test" form.

A bolt calibration device, calibrated within the past year, is available. (See pages 4-8)

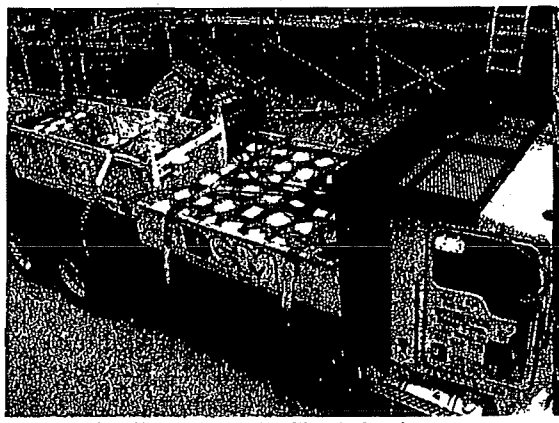
DCM FIELD BOLTING

Prior to site delivery bolts will be categorized per the Field Bolt List. This list establishes the number and sizes of bolts, nuts, and washers for a specific Tier area of erection known as Block Number.

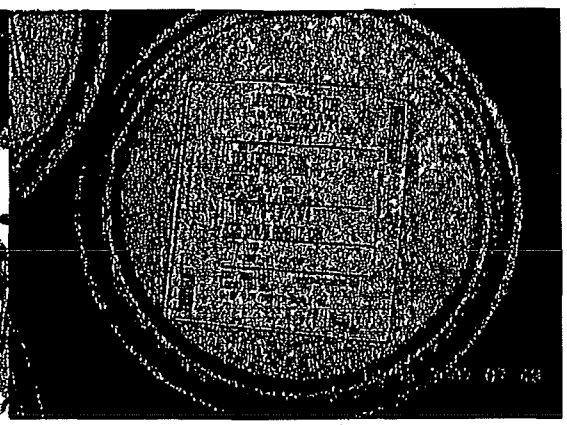
The Certified Mill test reports for bolts are placed In an envelope and given to the driver for delivery to the Erection Superintendent.

A list of all bolts used in the connection in terms of diameter, grade (A325 or A490), Slip Critical (S.C.), Slip Critical in an Oversize Hole (S.C.-O.V.S.,) Bearing (N), or Bearing (X). Note: The new RCSC specification similarly requires the joint type be specified as snug-tightened, pre-tensioned, or slip critical. This list will be delivered to the Erection Superintendent.

Example of delivery:



Delivery Per DCM Blocks



Controlled Bolt Kegs

Bolt installations shall be in accordance with the RCSC specifications, and the accompanying DCM Bolting Installation Procedure. (See pages 9 & 10)

Bolts diameters 1-1/8 inches and less than will be installed by the Twist-Off- Method and or Turn-of-Nut Method.

Bolts diameters greater than 1-1/8 will be installed by the Turn-of-Nut method.

Inspections shall be in accordance with the RCSC specifications, and the accompanying Inspection Forms.

DCM
BOLT MATERIAL INSPECTION RECORD

Project_____
Inspector_____
Date of Inspection _____
Complete this inspection log for each type of fastener product, diameter, length, grade and production lot for the fasteners to be used on the project.

Bolt
____A325 ____A490 ____Other

Twist-Off Bolt
____F1852 ____Marked A325 ____Marked A490

Nut
____ A563 grade( ) ____A194 grade( )

Washer
____F436

Direct Tension Indicator (DTI)

____F959 ____Type A325 ____Type A490

Manufacturers mark and name_____

Diameter 3/4 7/8 1 1-1/8 1-1/4 1-3/8 1-1/2
Length_____

Finish
____Black ____Hot dipped galvanized ____Mechanically Galvanized ____Other

Lot Number_____

DCM Bolt Pre-Installation Assembly Tests

Project_____ Inspector_____
Date_____

Bolt tension Calibrator Model_____ Number_____
Date of test_____ Performed by_____
Bolt lot number_____ Nut lot number_____
Assembly lot number_____ Direct tension Indicator lot number_____
Lubrication condition _____oily _____dry ____rusty _____re-lubricated using _____mixed

For short bolt testing, with installation method other than turn-of-nut method: DTI lot number_____
Measured average gap at required pretension_____

Bolt grade ____A325 ____A490 _____Bolt Diameter _____ Bolt Length
Minimum Required pretension (RCSC Specification, Table 4, following) _____kips
Required Pre-Installation Test tension _____kips

Installation method selected
____Turn of Nut ____Calibrated Wrench ____Twist- Off Type Tension Control Bolt ____Direct Tension Indicator

Turn-of-Nut Method
(Performed on each lot of bolt/nut assembly at the start of the work)
_____Required turns ____1/3 ____1/2 ____2/3 _____Measured pretension

Calibrated Wrench Method
(Performed daily for each diameter, grade and lot)
____ Achieved tension for wrench _____kips
____ Actual rotation _____turn (not to exceed RCSC Specification, Table rotation following)

Twist – Off Bolt Method
(Performed on each lot of bolt/nut/washer assembly at the start of the work)
____ Achieved tension at twist-off _____kips

Direct Tension Indicator Method
(Performed on each lot of bolt/nut assembly with DTI at the start of work)
Feeler gage thickness .005 in .015 in.
Pre-Installation Test Tension required _____kips (See RCSC Specification, Table 4, following)
Actual pretension_____ kips (should equal or slightly exceed above value)
Number of feeler gape refusals_____

Number of DTI gaps	4	5	6	7	8	9
Number of refusals permitted in Pre- Installation Test	1	2	2	3	3	4
Number of refusals required for installation acceptance	2	3	3	4	4	5

DCM Bolt Pre-Installation Assembly Tests

RCSC Specification, Table 4.
Fastener Tension Required for Pretension and Slip-Critical Connections

Minimum Tension[a] in 1000s of Pounds (kips)

Bolt Diameter, d_b	A325 Bolts		A490 Bolts	
	Required Pretension	Pre- Installation Test Tension Required	Required Pretension	Pre-Installation Test Tension Required
3/4	28	29	35	37
7/8	39	41	49	51
1	51	54	64	67
1-1/8	56	59	80	84
1-1/4	71	75	102	107
1-3/8	85	89	121	127
1-1/2	103	108	148	155

RCSC Specification, Table 5.
Nut Rotation from Snug Tight Condition [a, b]

Disposition of Outer Face of Bolted Parts

Bolt Length [c] (underside of head to end of bolt)	Both faces normal to bolt axis	One face normal to bolt axis, other sloped not more than 1:20	Both faces more than 1:20 from normal to bolt axis
Not more than $4d_b$	1/3 turn	1/2 turn	2/3 turn
More than 4db but not more than $8d_b$	1/3 turn	2/3 turn	5/6 turn
~~More than 8db~~ but not More than $12d_b$	2/3 turn	5/6 turn	1 turn

[a] ~~Nut~~ Rotational is relative to bolt regardless of the element (nut or bolt) being turned. For required nut rotations of 1/2 turn and less, the tolerance is plus or minus 30 degrees; for required nut rotations of 2/3 turn and more, the tolerance is plus or minus 45 degrees.

[b] Applicable only to joints in which all material within the grip is steel.

[c] When the bolt length exceeds $12d_b$ the required nut rotation shall be determined by actual testing in a suitable tension calibrator that simulates the conditions of solidly fitting steel.

DCM Conversion Chart for Turn of the Nut Method
Required Turns for Tightening
Flat Surfaces under Bolt Head and Nut

7/8" Bolt	through 3-1/2"	1/3 turn
	over 3-1/2" through	1/2 turn
	over 7" through 10-1/2"	2/3 turn
1" Bolt	through 4"	1/3 turn
	over 4" through 8"	1/2 turn
	over 8" through 12"	2/3 turn
1-1/8" Bolt	through 4- 1/2"	1/3 turn
	over 4-1/2" through 9"	1/2 turn
	over 9" through 13-1/2"	2/3 turn
1-1/4" Bolt	through 5"	1/3 turn
	over 5" through 10"	1/2 turn
	over 10" through 15"	2/3 turn
1-3/8" Bolt	through 5-1/2"	1/3 turn
	over 5-1/2" through 11"	1/2 turn
	over 10" through 16-1/2"	2/3 turn
1-1/2" Bolt	through 6"	1/3 turn
	over 6" through 12"	1/2 turn
	over 12" through 18"	2/3 turn

Application tolerances:

1/3 turn +/- 30 degrees
~~1/2 turn~~ +/- 30 degrees
2/3 turn +/- ~~30~~ degrees 45°

DCM Pre-Installation Testing Turn-of-the-Nut Method

1. Take three bolts of each diameter, length, grade, and production lot, with three nuts of each diameter, grade, and production lot, as they will be assembled in the field. If washers are to be used, include the washers that will be used in the assembly. Each set is called a "test assembly."
2. Place the bolt in the Skidmore-Wihelm. If the nut will be turned on the structure, place the head in the back of the Skidmore. If the bolt head is to be turned, use a flat bushing in the back of the Skidmore or place the nut in the bushing slot.
3. Add the plate shims and washers as necessary to have approximately two to three threads of stick-out beyond the face of the nut when the nut is finger tight. Stick out can range between five threads and a flush end condition (no stick out). If the bolt is too short to have the end of the bolt flush with the nut, perform this test in a steel plate and skip Step 7 and 8 below.
4. Snug the bolt using the technique (spud wrench or impact wrench) to be used on the structure. Use approximately the same effort or impact time anticipated after the joint has been drawn to the snug condition, no gap condition
5. Match mark the nut, bolt and Skidmore face-plate as would be done on the structure.
6. Apply the required turns. Verify that the achieved tension as read on the Skidmore dial gage is at least 5% more than the required bolt pretension.
7. Record the achieved tension.
8. Remove the test assembly and repeat steps 2 through 7 above for the remaining bolts in the pre-installation testing set of three bolts.

DCM
Pre-Installation Testing F1852 "Twist-Off" Bolt Method

1. Take three F1852 "twist-off" bolts of each diameter, length, grade, and production lot, with three nuts of each diameter, grade and production lot, and three washers of each diameter and production lot, as provided as a complete set by the manufacturer or supplier. Each set is called a "test assembly".
2. Place the bolts in the Skidmore-Wilhelm. Use a flat bushing on the back of the Skidmore.
3. Add flat plate shims and washers as necessary to have approximately two to three threads of stick out beyond the face of the nut when the nut is finger tight. Place the washer from the test assembly on the last so that it will be adjacent to the nut. Final stick out may range between five threads and a flush end condition (no stick out).
4. Snug the bolt using the technique (spud wrench, impact wrench or installation wrench) to be used on the structure. Use approximately the same effort or wrench time anticipated after the joint has been drawn to the snug, no gap condition.
5. Further tighten the bolt by turning the nut with the special installation wrench until the spline shears off.
6. Verify that the achieved tension as read on the Skidmore dial gage is at least 5% more than the required bolt pretension.
7. Record the achieved tension.
8. Remove the test assembly and repeat steps 2 through 7 above so that a total of three consecutive test assemblies have been completed and all satisfy the requirements for pre-tension.

DCM Bolting Installation Procedures

Fastener components shall be protected from dirt and moisture in closed containers at the site of installation. Only as many fastener components as are anticipated to be installed during the work shift shall be taken from protected storage. Fastener components that are not incorporated in the work shall be returned to protective storage at the end of the shift. Fasteners components shall not be cleaned or modified from the as-delivered condition. Fastener components that accumulate rust and dirt shall not be incorporated into the work unless they are re-qualified in accordance with RCSC. Note: Twist-of f-type bolts cannot be re-qualified.

The Field Bolt List categorizes four types of joints: 1.) N – shear bearing, threads included in the shear plane. 2.) X – shear bearing, threads excluded in the shear plane. 3.) S.C.-Slip Critical. 4.) S.C.-OVS - Slip Critical in an oversize hole.

N- Bolts and X - Bolt (shear bearing joints); most need to be tightened only to the "snug-tighten" condition. This is defined as the tightness attained by either a few hits of an impact wrench or the full effort of a worker with an ordinary spud wrench that brings the connection plies into firm contact. If joints have been designated as "N" or "X", determine if "The Field Bolt" has designated the joints as "snug tight" or pre-tensioned".

S.C. - Bolts must be completely pretension.

S.C.-OVS-Bolts must be completely pre-tensioned. When an oversize hole or short slotted hole occurs in the outer ply on bolt diameters greater than 1 inch a 5/16 hardened washer will be installed.

Bolt diameters 1-1/8 inch and greater will be install by the "Turn-of-the-Nut" Method or the "Twist-Off Bolt" Method.

Bolt diameters greater than1-1/8 will be installed by the "Turn-of-the-Nut" Method.

DCM will qualify individual bolt installer skills. (See accompanying Bolt Installer Qualification log) (See page 11)

Turn-of-the-Nut Method: 1.) Snug the joint so that the gaps exist between the layers of steel at the bolts holes. Apply a few hits with an impact wrench (until solid sound) or apply full effort on a spud wrench (Snugging the Joint). 2.) Inspect the joint to verify the snug condition has been achieved. 3.) Match-mark each nut, bolt and steel surface in a straight line, going across a corner of the nut. 4.) Matchmark the head side to assuring non rotation. 5.) Apply the proper turns in accordance with RCSC Specification Table 5, and/or the "Conversion Chart for Turn-of-the-Nut Method".

Twist-Off-Bolt Method: 1.) Snug the joint so that no gapes exist between the layers of steel at the bolt holes . This may be done applying the special installation wrench until

full resistance is indicated by the sound of the wrench, or applying a few hits with an impact wrench (until solid sound), or applying the full effort on a spud wrench. 2.) Inspect the joint to verify that the snug condition has been achieved. 3.) Using a systematic approach tighten each bolt using the special installation wrench until the bolt spline shears. 4.) Eject spline in a safe manner.

DCM Bolt Installer Qualification

Bolt Installer Name_____

	Bolt Installation Method			
	Turn of Nut	Calibrated Wrench	Twist Off Bolt	Direct Tension Indicator
Verification Of Knowledge And Skills	_____	_____	_____	_____

DCM Forman and or Inspector_____ Date_____

Personnel responsible for installing bolts should possess, as a minimum the following knowledge: bolt and nut grade identification, bolt length measurement, required lubrication conditions, the use of field bolt list, the assessment of the snug tight condition, and the proper techniques for performing the selected pre-tensioning method.

For the turn of the nut method, required knowledge includes determining the required rotation beyond the snug condition, proper match marking techniques, and wrench observation techniques. For the calibrated wrench method, required knowledge includes the methods of wrench calibration, requirements for recalibration of wrenches, and the proper use of the calibrated wrench calibrated wrench. For twist off bolts, the required knowledge includes the use of the electric wrench for snugging, and the use of the wrench for pre-tensioning. For the direct tension indicator (DTI) method, required knowledge includes the placement of the DTI in the assembly, the use of feeler gages to check the snug condition, and the use of feeler gages to verify the pre-tensioned condition.

DCM ERECTORS INC.
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Section 2

Bolting Inspection Procedures and Records

SLRS Frame Bolt Inspection Points and Frequencies

Inspection points and frequencies of quality control (QC) and quality assurance (QA) tasks and documentation for the seismic load resisting system (SLRS) shall be as provided in the following tables.

The following entries are used in the tables:

Observe (O) – The inspector shall observe these functions on a random, daily basis. Welding operations need not be delayed pending observations.

Perform (P) – These inspections shall be performed prior to the final acceptance of the item. Where a task is noted to be performed by both QC and QA, it shall be permitted to coordinate the inspection function between QC and QA so that the inspection functions need be performed by only one party.

Document (D) – the inspector shall prepare reports indicating that the work has been performed in accordance with the contract documents. The report need not provide detailed measurements for joint fit-up, WPS settings, completed welds, or other individual items listed in the Tables. For shop fabrication, the report shall indicate the piece mark of the piece inspected. For field work, the report shall indicate the reference grid lines and floor or elevation inspected. Work not in compliance with the contract documents and whether the noncompliance has been satisfactorily repaired shall be noted in the inspection report.

SLRS Frame Inspection Of Bolting

Observation of bolting operations shall be the primary method used to confirm that the procedures, materials and workmanship incorporated in construction are those that have been specified and approved for the project. The inspection task shall be as follows:

Inspection Task Prior to Bolting	QC		QA	
	Task	Doc.	Task	Doc.
Proper bolts selected for the joint detail	O	-	O	-
Proper bolting procedure selected for joint detail	O	-	O	-
Connecting elements are fabricated properly, including the appropriate faying surface condition and hole preparation, if specified, meets applicable requirements.	O	-	O	-
Pre-installation verification testing conducted for fastener assemblies and methods used	P	D	P	D
Proper storage for bolts, nuts, washers, and other fasteners components	O	-	O	-

Inspection Task During Bolting	QC		QA	
	Task	Doc.	Task	Doc.
Fastener assemblies placed in all holes and washers (if required) are properly positioned	O	-	O	-
Joint brought to snug condition prior to the pretension operation	O		O	
Fastener component not turned by the wrench prevented from rotating	O	-	O	-
Bolts are pretensioned progressing systematically from most rigid point toward free edges.	O	-	O	-

Inspection Task After Bolting	QC		QA	
	Task	Doc.	Task	Doc.
Document accepted and rejected connections	P	D	P	D

DCM ERECTORS INC.

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New York, NY 10017
United States of America

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Fax: (212) 599-1615

SLRS FRAMING BOLTING INSPECTION REPORT

PROJECT: World Trade Center Tower One	**INSPECTOR:**
PROJECT ADDRESS: World Trade Center Tower One, N.Y., N.Y.	**DATE:**

ACCEPTANCE STANDARDS:	**REF.**	**REF.**
ACCEPTANCE CRITERIA:	**SPEC:**	**DWG:**

LOCATION		BOLT GRADE & TYPE	MANUFACTURER / MARKINGS	DIAMETER (INCHES)	NON-CONFORMANCE CODE #
FRAMING	GRID LOCATION				

FASTENER ASSEMBLY NON-CONFORMANCE CODE NUMBERS

1) Improper Storage
2) Improper Joint Snugging
3) Improper Stickout
4) Unsuitable Washers
5) Unsuitable Hole Dia.
6) Unsuitable Nuts
7) Splined End Not Broken (TC Only)
8) Cleanliness

TIGHTENING PROCEDURE	Turn of the Nut: ☐	Calibrated Wrench: ☐	Twist-Off Bolts: ☐	Snug Tight: ☐	
TYPE OF CONNECTION(S)	Beam to Beam: ☐	Beam to Column ☐	Bracing: ☐	Splice: ☐	

INSPECTION NOTES:

***100% of fastner assemblies inspected have been found acceptable unless noted otherwise**

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Section 3

Minimum Preheat Temperature and Interpass Temperatures

AWS D1.1 Table 3.2
Prequalified Minimum Preheat Temperature and Interpass Temperature

(Based on category and thickness; the highest minimum preheat shall apply)

Category B

A500(Grade A,B,C); A572(Grade 42,50,52); A992(Grade 50); A913[b](Grade 50)

Up to 3/4 inch.....32[1] degrees F
Over 3/4" thru 1-1/2".....50 degrees F
Over 1-1/2" thru 2-1/2".....150 degrees F
Over 2-1/2" .....225 degrees F

Category C

A572(Grade 60,65); A913[b] (Grade 60,65)

Up to 3/4 inch.....50 degrees F
Over 3/4" thru 1-1/2" .....150 degrees F
Over 1-1/2" thru 2-1/2".....225 degrees F
Over 2-1/2" .....300 degrees F

Category D

A913 to A913(Grade 50, 60,65) (electrode with maximum diffusible hydrogen of 8ml)

Greater than 1/8 Inch.....32 degrees F

[1]When the base metal temperature is below 32degrees F, the base metal shall be preheated to a minimum of 70degrees F and the minimum interpass temperature shall be maintained during welding.

[b]The heat input limitations of 5.7 shall not apply to ASTM A913

Preheat and Interpass Temperature
Per AWS D1.1

All Preheat and Interpass Temperatures at weld joints shall be measured at the minimum distance equal to the thickness of the thickest part under consideration, but no less than 3 inches in all directions from point of welding.

Maximum Interpass Temperature
Per AWS D1.8

Section 6.5: Maximum Interpass Temperature is 550 degrees F.
Section 6.16: Preheat of tack welds shall be as required by the WPS.

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Section 4

Field Weld Provisions
And
Procedures
Codes and Standards

DCM FIELD WELDING PROVISIONS AND PROCEDURES For FREEDOM TOWER

(Structural Design Drawing) S-6.20

Codes and Test: (Note E.1 on S-6.20)
AISC 13th edition, AISC341S1-05, AISC358-05, AISC360-05, AWS D1.1, AWS D1.8

Frame: (Note D. on S-6.20)
The Seismic Load Resisting System (SLRS) are all members around the perimeter of the building shown on S-300 Series, and the outrigger members floors 91-100. The HSS 18 x 12 flat shown on S-3.10, S-3.11, and S-3.12 do not need to meet the SLRS requirements. Weld Procedures for the SLRS follow the provisions o ANSI/AISC 341s1-05, ANSI/AISC 358- 05 and AWS D1.8.

L.A.S.T.: (Note D.4.G on S-6.20)
Lowest Anticipated service temperature (LAST) of the steel structure is minus (-) 20 degrees F on floors ground through 20th and 91st to the top of the building inclusive. In other parts of the building the LAST is higher than 50F. Follow ANS/AISC 341s-1 and AWS D1.8 Provisions.

Electrodes/Filler Metals: (Note A.16 on S-6.2O)
All welding electrodes shall conform to E70xx electrodes. E80xx electrodes shall be used only in CJP welds were both connecting components have steel yield strength of 65ksi.

AWS D1.8 Code on the SLRS Frame and LAST designated areas

Section 5: Welder Qualification: In addition to the requirements of D1.1 Code Restrictive Access qualifications test are required when ; the weld is demand critical, the weld joins bottom beam flange to column flange, the weld must be made welding through a beam web access hole. (See attached D1.8 figure C.3 for illustration)

Section 6: Fabrication.
6.1 WPS: Manufacturer to be listed with manufactures' variable ranges
6.3 Filler and Weld Metals: All welds governed by this code shall comply with all the requirements of 6.3, except that the requirements of 6.3.5, 6.3.6, 6.3.7, and 6.3.8 shall apply only to Demand Critical Welds.
6.3.1 AWS A5 Properties: Filler metal minimum mechanical properties per Table 6.1 For non demand critical weld 20 ft lbs @ 0 degrees F.

6.3.2 Diffusible hydrogen level: 16ml max.
6.3.3 Manufactures' Certificate of Conformance meets 6.3.1, and 6.3.2
6.3.4 Intermix testing requirements for FCAW-S
6.3.6 LAST CVN Testing: for Demand Critical *Welds (In accordance with above listed S-6.20 note D.4.G with a last of minus 20 degrees F; testing shall be 40 ft lbs @ 0 degrees F.)*
6.3.7 Testing Source 6.3.5 may be tested by the Manufacture
6.3.8.1 Lot testing of Manufactures Filler Metals
6.4. For Demand Critical Welds; Electrodes shall be provided in protective packaging that limits the ability of the electrode to absorb moisture. When removed from the packaging, the electrode shall be capable of depositing weld metal with a maximum diffusible hydrogen content not to exceed the limits of 6.3.2. Exposure shall not exceed the electrode manufacturer's guidelines, when the guidelines are based upon electrode exposure test conducted in accordance with Annex D.
6.5 Maximum Preheat and Interpass Temperature: 550 degrees interpass (See attached AWS D1.1 Table 3.2 Prequalified Minimum Preheat and Interpass Temperature excerpts)
6.6 Tack weld to steel backing must be in the weld joint.
6.7 Removal of backing bars (See attached D1.8 Table C-1.1 for locations) *(Bottom flange beam to column)*
6.8 Reinforced 5/16 fillet at removed backing bars (See attached D1.8 Figure 6.1 for illustration, and Table C-1.1 for locations.) *(Bottom flange beam to column)*
6.9 For Demand Critical Welds: Weld Access Holes geometry per D1.1/D1.1M, surface roughness 500. Repair by grinding or welding *(Shop performed)*
6.10 Weld tabs: minimum 1 inch; to be tack welded in the joint; removal surface roughness of 500. (See attached D1.8 Figure 6.3 for illustrations, and Table C-1.1for locations) *(Beam to columns and column splices)*
6.11 End Dams shall not be placed at the end of the weld. (See attached D1.8 figure 6.4)
6.12 When a fillet weld is required between the left-in-place steel backing and the column, the minimum size shall be 5/16.Steel backing at beam flange to column flange joints shall not be welded to the underneath of the beam flange. (See attached C-6.2 for illustration and table C-1.1 for locations) *(Bottom of top flange to column)*
6.13 Each welder shall be assigned an identification symbol or mark. Each welder shall mark or stamp his or hers identification mark.
6.14 CJP welds of beam bottom flanges, or continuity plates using weld access holes shall be sequenced as follows: As far as practical starts and stops shall not be directly under the beam web. Each layer shall be completed across the full width of the flange before beginning the next layer. For each layer, the weld starts and stops shall be on the opposite side of the beam, as compared to the previous layer.
6.15 Weld attachment, including stud welds and fasteners for the connection of other materials shall be prohibited within the Protection Zone. Arc spot welds, (puddle welds) for the attachment of metal deck shall be permitted in the Protection Zone. (See attached D1.8 Figure C-1.1 for illustration.)

6.16 Preheat of tack welds shall be as required by the WPS. Tack weld in the protective zone shall be prohibited outside the weld joint.

Section 5

Welding Inspection Procedures And Records

Structural Steel Specification Section 5100 as it pertains to QA/QC Testing and Inspection

Section 1.4 Quality Assurance

B. Testing and Inspection

3. Quality Assurance Testing and inspection of structural steel will be Performed by an independent testing agency retained and paid for by the Owner.
7. All weld inspection for shop and field, will in general consist of complete visual inspection, and the following:
   a. Magnetic Particle Inspection- as per ASTM E709.
      (1) Manual fillet weld and partial joint penetration welds-random testing approximately 10% linear inches of weld made.
      (2) Automatic fillet welds and partial joint penetration welds-one foot of each end of all welds. (Applies to web-to flange of plate girders. Elsewhere 10% linear inches of weld made.)
      (3) Tension welds- Magnetic particle inspection 100% of all welds.
   b. Ultrasonic inspection-as per AWS Section 6, Part C and as amended below.
      (1) Manual groove welds- ultrasonic testing 100% of all welds
      (2) Automatic groove welds-ultrasonic testing, 100% of all welds
      (3) Liquid penetration as per ASTM E165, if required.

Section 1.5 Quality Control

C. The Contractor shall maintain a Quality Control Program for both fabrication and erection of structural steel to assure that all installations conform to the requirements of the contract Drawings and Specifications. The Quality Control Program shall conform to the AISC Code of Standard Practice for Steel Buildings and Bridges, as well as the requirements in this Section for both shop and field inspection and testing. The Contractor shall employ non-destructive testing personnel that meet ASNT SNT-TC-1A Level II qualifications and an AWS certified Welding Inspector (CWI).

H. The Owner will perform Quality Assurance testing and Inspection to ensure quality workmanship, Inspection and testing will include, but not limited to, visual inspections, ultrasonic, radiographic, magnetic partial or dye penetrate testing of the welding and cutting performed in the fabrication shop and in the field. The percentage and extent of testing will be no less than 25% of that required of the Contractor.

SLRS Frame Nondestructive Testing (NDT) of Welds

Nondestructive testing shall be performed by quality assurance personnel.

(1) Procedures

Ultrasonic testing shall be performed by QA according to the procedures prescribed in Appendix W. Section W4.2.

Magnetic particle testing shall be performed by QA according to the procedures prescribed in Appendix W. Section W4.2.

(2) Required NDT

(a) k-Area NDT: When welding of doubler plates, continuity plates, or stiffeners has been performed in the k area, the web shall be tested for cracks using magnetic particle (MT). The MT inspection area shall include the k-area base metal within 3 inches of the weld.

(b) CJP Groove Weld (NDT): Ultrasonic testing shall be performed on 100 percent of CJP groove welds in materials 5/16 in. thick or greater. Ultrasonic testing in materials less than 5/16 in thick is not required. Magnetic particle testing shall be performed on 25 percent of all beam to column CJP groove welds.

(c) Base Metal NDT for Lamellar Testing and Laminations
After joint completion, base metal thicker than 1-1/2 in. loaded in tension in the through thickness direction in tee or corner joints, where the connected material is greater than ¾ inch and contains CJP groove welds, shall be ultrasonically tested for discontinuities behind and adjacent to the fusion line of such welds. Any base metal discontinuities found within t/4 of the steel surface shall be acceptable or rejected on the basis of criteria of AWS D1.1 Table 6.2, where t is the thickness of the part subjected to the through-thickness strain.

(d) Beam Cope and Access Hole NDT: At welded splices and connections, thermally cut surfaces of beam copes and access holes shall be tested using magnetic particle testing or penetrant testing, when the flange thickness exceeds 1- ½ in. for rolled shapes, or when the web thickness exceeds 1-1/2 in. for built up members.

(e) Reduced Beam Section Repair (NDT): Magnetic particle testing shall be performed on any weld and adjacent area of the reduced beam section (RBS) plastic hinge region that has been repaired by welding, or on the base metal of the RBS plastic hinge region. if a sharp notch has been removed by grinding.

(f) Weld tab Removal Sites: Magnetic particle testing shall be performed on the end of welds from which the weld tabs have been removed, except continuity plate weld tabs.

(g) Reduction of Percentage of Ultrasonic Testing: The amount of ultrasonic testing is permitted to be reduced if approved by the engineer of record and the authority having jurisdiction. The nondestructive testing rate for an individual welder or welding operator may be reduced to 25 percent, provided the reject rate is demonstrated to be 5 percent or less of the welds tested for the welder or welding operator. A sampling of at least 40 completed welds for a job shall be made for such reduction evaluation. Reject rate is the number of welds containing rejectable defects divided by the number of welds completed. For evaluating the reject rate of continue welds over 3 ft in length where the effective throat thickness is 1 in. or less, each 12 in. increment or fraction thereof shall be considered as one weld. For evaluating the reject rate on continuous welds over 3 ft. in length where the effective throat thickness is greater than 1 inch, each 6 inch of length or fraction of fraction thereof shall be considered one weld.

(h) Reduction of Percentage of Magnetic Particle: The amount of MT on CJP groove welds is permitted to be reduced if approved by the engineer of record and the authority having jurisdiction. The MT rate for an individual welder or welding operator may be reduced to 10 percent, provided the reject rate is demonstrated to be 5 percent or less of the welds tested for the welder or welding operator. A sampling of at least 20 completed welds for a job shall be made for such reduction evaluation. Reject rate is the number of welds containing rejectable defects divided by the number of welds completed. This reduction is not permitted on welds in the k-area, at repair sites, weld tab and backing removal sites and access holes.

(3) Documentation

All NDT performed shall be documented. For shop fabrication, the NDT report shall identify the tested weld by piece mark and location in the piece. For field work, the NDT report shall identify the tested weld by location in the structure, piece mark, and location in the piece.

SLRS Frame Inspection Points and Frequencies

Inspection points and frequencies of quality control (QC) and quality assurance (QA) tasks and documentation for the seismic load resisting system (SLRS) shall be as provided in the following tables.

The following entries are used in the tables:

Observe (O) – The inspector shall observe these functions on a random, daily basis. Welding operations need not be delayed pending observations.

Perform (P) – These inspections shall be performed prior to the final acceptance of the item. Where a task is noted to be performed by both QC and QA, it shall be permitted to coordinate the inspection function between QC and QA so that the inspection functions need be performed by only one party.

Document (D) – the inspector shall prepare reports indicating that the work has been performed in accordance with the contract documents. The report need not provide detailed measurements for joint fit-up, WPS settings, completed welds, or other individual items listed in the Tables. For shop fabrication, the report shall indicate the piece mark of the piece inspected. For field work, the report shall indicate the reference grid lines and floor or elevation inspected. Work not in compliance with the contract documents and whether the noncompliance has been satisfactorily repaired shall be noted in the inspection report.

Visual Welding Inspection

Visual inspection of welding shall be the primary method used to confirm that the procedures, materials, and workmanship incorporated in construction are those that have been specified and approved for the project. See attached task provided in the following tables:

SLRS FRAME INSPECTION OF WELDING

Visual Inspection Tasks Before Welding	QC		QA	
	Task	Doc	Task	Doc
Material identification ((Type/Grade)	O	-	O	-
Fit up of Groove Welds (including joint geometry) - Joint preparation - Dimension (alignment, root opening, root face, bevel) -Cleanliness (condition of steel s surfaces) -Tacking ((tack weld quality and location) -Backing type and fit (if applicable)	P/O**	-	O	-
Configuration and finish of access hole	O	-	O	-
Fit up of Fillet Welds -Dimensions (alignment, gaps at root) -Cleanliness (condition of steel surfaces -Tacking (tack weld quality and location)	P/O**	-	O	-

** Following performance of this inspection task for ten welds to be made by a given welder, with the welder demonstrating adequate understanding of requirements and possesion of skills and tools to verify these items, the performed designation of this task shall be reduced to Observe, and the welder shall perform this task. Should the inspector determine that the welder has discontinued adequate performance of this task, the task shall be returned to Perform until such time as the inspector has reestablished adequate assurance that the welder will perform the inspection task listed.

Visual Inspection During Welding	QC		QA	
	Task	Doc.	Task	Doc.
WPS followed -Settings on welding equipment -Travel speed -Selected welding materials -Shielding gas type/flow -Preheat applied -Interpass temperature maintained (min./max.) -Intermix of filler metals avoided unless approved	O	-	O	-
Use of qualified welders	O	-	O	-
Control and handling of welding consumables -Packaging -Exposure control	O	-	O	-
Environmental conditions -Wind speed within limits -Precipitation and temperature	O	-	O	-
Welding techniques -Interpass and final cleaning -Each pass within profile limitations -Each pass meets quality requirements	O	-	O	-
No welding over cracked tacks	O	-	O	-

Visual Inspection Tasks After Welding	QC		QA	
	Task	Doc.	Task	Doc.
Welds cleaned	O	-	O	-
Welder identification legible	O	-	O	-
Verify size, length, and location of weld	O	-	O	-
Visual Inspect welds to acceptable criteria -Crack prohibition - Weld/base-metal fusion -Crater cross section -Weld profiles -Weld size -Undercut -Porosity Placement of reinforcement fillets	P	D	P	D
Backing bars removed and weld tabs removed and finished (if required)	P	D	P	D
Repair activities	P	-	P	D

Other Inspection Task	QC		QA	
	Task	Doc.	Task	Doc.
Reduced beams section (RBS) requirements				
-Contour and finish -Dimensional tolerances				
Protective zone - no holes and unapproved attachments				

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SLRS FRAMING WELDING INSPECTION REPORT

PROJECT: World Trade Center Tower One	**INSPECTOR:**
PROJECT ADDRESS: World Trade Center Tower One, N.Y., N.Y.	**DATE:**
ACCEPTANCE STANDARDS:	**REF. SPEC:**
ACCEPTANCE CRITERIA:	**REF. DWG:**

FRAMING / GRID LOCATIONS:

STAGES AT WHICH INSPECTED:	Base Metal Preparation ☐	Fit-up & Alignment ☐	Root Pass ☐
	Intermediate Passes: ☐	Final Inspection: ☐	Re-Inspection: ☐

MACHINE TYPE:	**AMPS:**	**POLARITY:**
MAKE:	**PROCESS:**	**POSITION:**
AWS JOINT DESIGN:	**THICKNESS:**	**WELD SIZE:**
Groove / Fillet / Plug / Spot / Slot / Other:	**ELECTRODE:**	
BASE MATERIALS:	**DIAMETER (IF PIPE):**	

WELDER	LICENSE #

SUMMARY OF INSPECTION:

INSPECTION RESULTS:	Accepted: ☐	Rejected: ☐	Work in Progress: ☐

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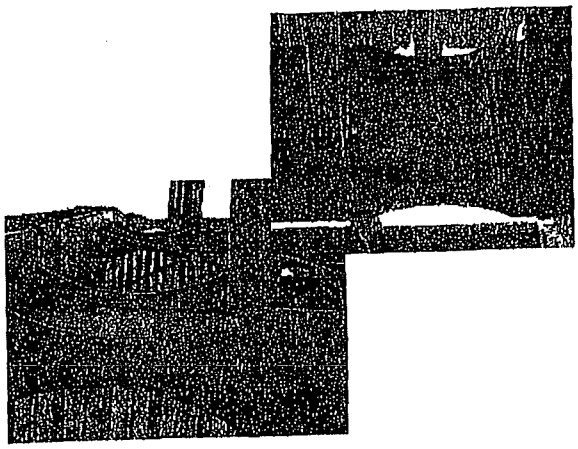
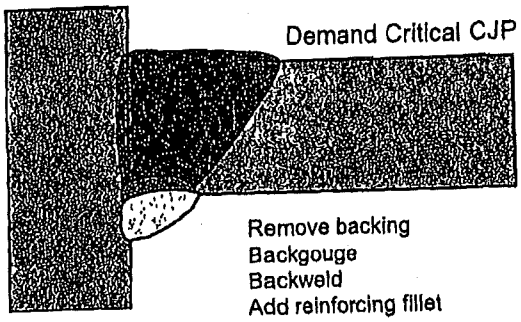
Section 6

Standard Drawings And Illustrations

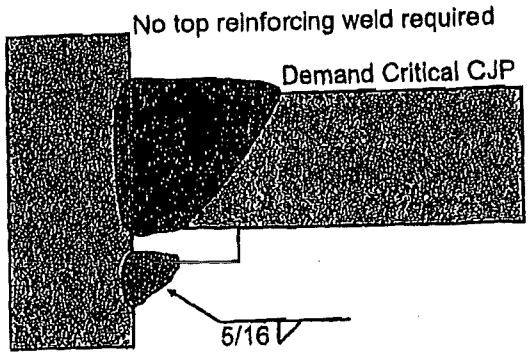


Reduced Beam Section **Bottom Flange**



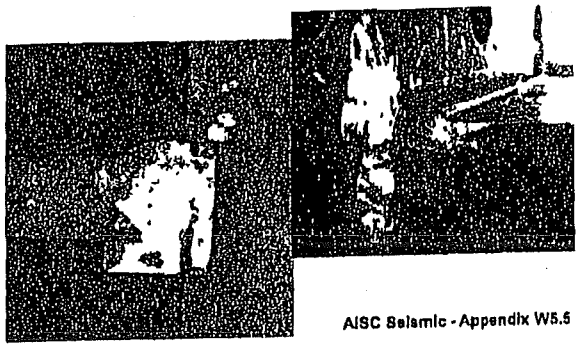
AISC 358 - 3.3.2

Reduced Beam Section **Top Flange**



AISC 358 - 3.3.3

Weld Tab Removal and Finish



AISC Seismic - Appendix W5.5

Weld Tab Removal and Finish

Cut to within 1/8" (1/4" for continuity plates)

Max surface roughness 500 microinches

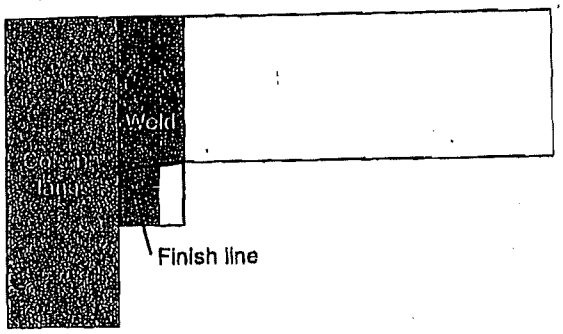
Flush finish not required

No gouges or notches

Contoured transition, but no minimum radius

AISC Seismic - Appendix W5.5

Weld Tab Removal and Finish



AISC Seismic - Appendix W5.5

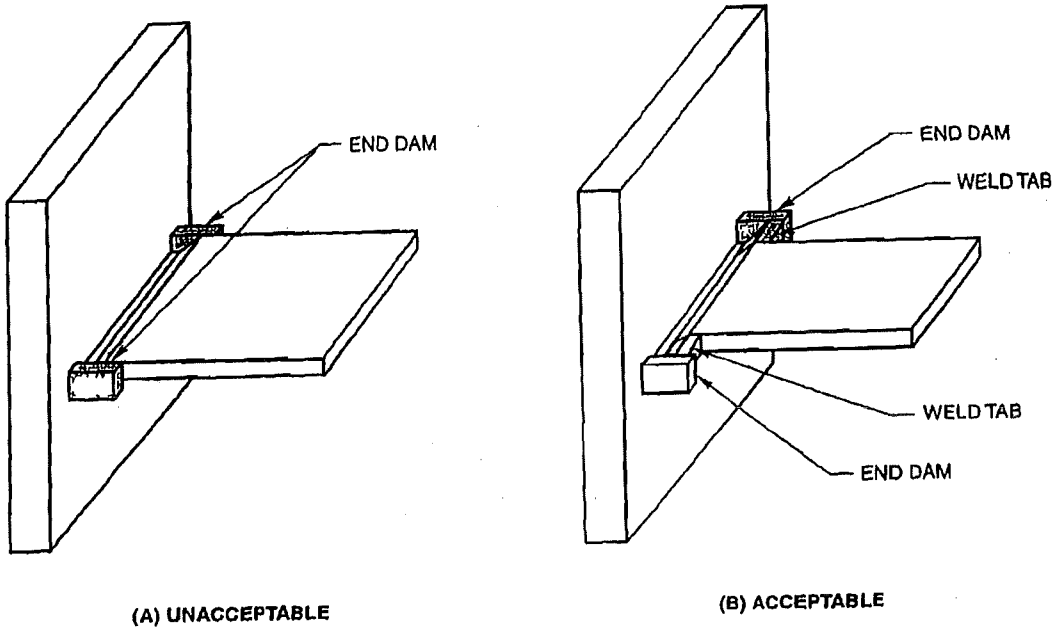
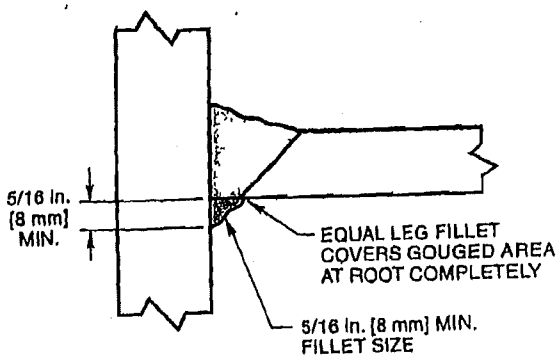
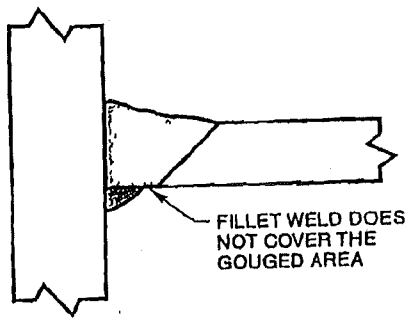


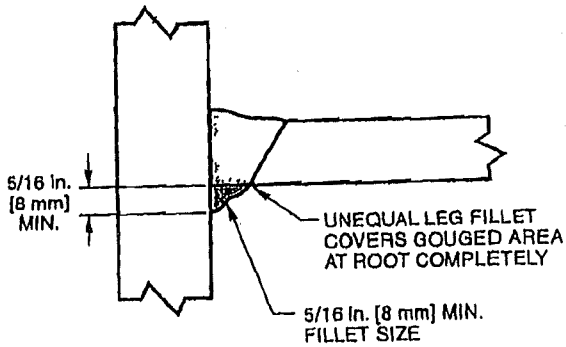
Figure 6.4—Acceptable and Unacceptable Use of End Dams (see 6.11.2)



(A) ACCEPTABLE



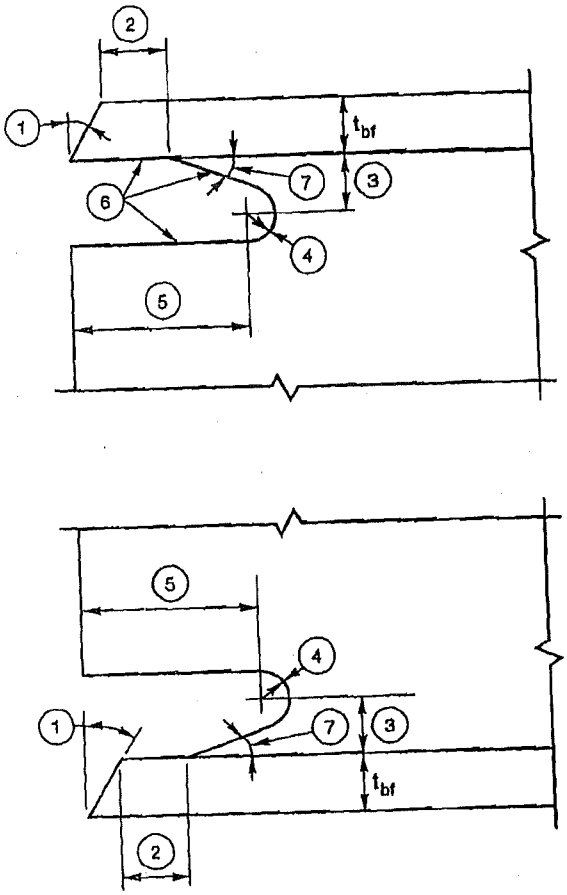
(B) UNACCEPTABLE[a]



(C) ACCEPTABLE

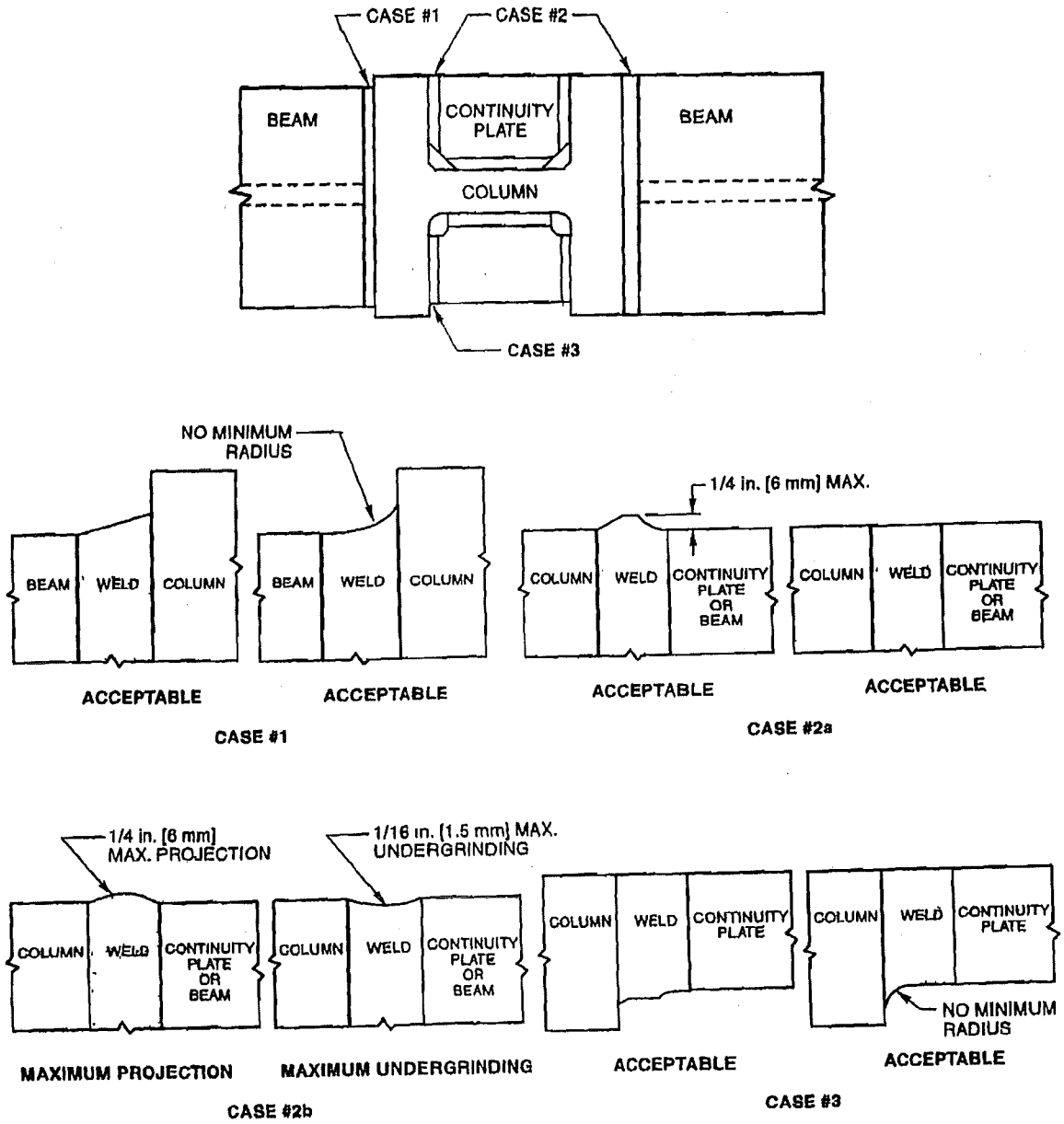
[a] Condition B is acceptable provided that all gouges and cavities have been filled and any root area has been ground smooth.

Figure 6.1—Reinforcing Fillet Requirements (see 6.8)



Notes.
1. Bevel as required by for the WPS.
2. t_{bf} or 1/2 in. [12 mm], whichever is larger (plus 1/2 t_{bf}, or minus 1/4 t_{bf}).
3. The minimum dimension shall be 3/4 t_{bf}, or 3/4 in. [20 mm], whichever is greater. The maximum dimension shall be t_{bf} or 3/4 in. [20 mm], whichever is greater (+1/4 in. [6 mm]).
4. 3/8 in. [10 mm] minimum radius (–0, +unlimited).
5. 3 t_{bf} (±1/2 in [12 mm]).
6. See 6.9.2.1 for surface roughness requirements.
7. Tolerances shall not accumulate to the extent that the angle of the access hole cut to the flange surface exceeds 25°.

Figure 6.2—Alternate Geometry—Beam Flange Weld Access Hole Detail (see 6.9.1.2)



Note: All contours, thermal cuts exceeding 500 μin. [13 μm] roughness shall be ground to 500 μin. [13 μm] finish or smoother.

Figure 6.3—Acceptable Tab Removal Conditions (see 6.10.3)

Table C-1.1
Removal of Tabs and Backing

	Tabs	Backing
Prequalified Moment Connection (see AISC Connection Prequalification)		
Qualified Moment Connections (see AISC Qualification Tests)		
Moment Frames		
Top Flange—Column Flange	Remove	Remain with fillet weld to column (not to beam)
Bottom Flange—Column Flange	Remove	Remove
Continuity Plates	—	Remain with fillet weld to column
	At column fillet (e.g., near the k-area) Not recommended (see 4.10.4)	—
	Near column flange tip Remove	—
Concentrically Braced Frames (CBF)		
All Brace Connection Joints	Remain	Remain
Eccentrically Braced Frames (EBF)		
Links to Columns	Remove	Same as Moment Frame
Braces to Links	Remove	Remove
All Other Brace Connection Joints	Remain	Remain
Column Splices (for Moment Frames, CBF, EBF)		
Column Splices	Remove	Remain

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Section 7

Miscellaneous Files

5.22.4.3 Correction. Root openings greater than those allowed in 5.22.4.1, but not greater than twice the thickness of the thinner part or 3/4 in. [20 mm], whichever is less, may be corrected by welding to acceptable dimensions prior to joining the parts by welding.

5.22.4.4 Engineer's Approval. Root openings greater than allowed by 5.22.4.3 may be corrected by welding only with the approval of the Engineer.

5.22.5 Gouged Grooves. Grooves produced by gouging shall be in substantial conformance with groove profile dimensions as specified in Figure 3.3 and 3.4 and provisions of 3.12.3 and 3.13.1. Suitable access to the root shall be maintained.

5.22.6 Alignment Methods. Members to be welded shall be brought into correct alignment and held in position by bolts, clamps, wedges, guy lines, struts, and other suitable devices, or by tack welds until welding has been completed. The use of jigs and fixtures is recommended where practicable. Suitable allowances shall be made for warpage and shrinkage.

5.23 Dimensional Tolerance of Welded Structural Members

The dimensions of welded structural members shall conform to the tolerances of (1) the general specifications governing the work, and (2) the special dimensional tolerances in 5.23.1 to 5.23.11.3. (Note that a tubular column is interpreted as a compression tubular member.)

5.23.1 Straightness of Columns and Trusses. For welded columns and primary truss members, regardless of cross section, the maximum variation in straightness shall be

Lengths of less than 30 ft [9 m]:

$$1/8 \text{ in.} \times \frac{\text{No. of ft of total length}}{10}$$

$$1 \text{ mm} \times \text{No. of meters of total length}$$

Lengths of 30 ft [10 m] to 45 ft [15 m] = 3/8 in. [10 mm]

Lengths over 45 ft [15 m]:

$$3/8 \text{ in.} + 1/8 \text{ in.} \times \frac{\text{No. of ft of total length} - 45}{10}$$

$$10 \text{ mm} + 3 \text{ mm} \times \frac{\text{No. of meters of total length} - 15}{3}$$

5.23.2 Beam and Girder Straightness (No Camber Specified). For welded beams or girders, regardless of cross section, where there is no specified camber, the maximum variation in straightness shall be

$$1/8 \text{ in.} \times \frac{\text{No. of ft of total length}}{10}$$

$$1 \text{ mm} \times \text{No. of meters of total length}$$

5.23.3 Beam and Girder Camber (Typical Girder). For welded beams or girders, other than those whose top flange is embedded in concrete without a designed concrete haunch, regardless of cross section, the maximum variation from required camber at shop assembly (for drilling holes for field splices or preparing field welded splices) shall be

at midspan, –0, +1-1/2 in. [40 mm] for spans ≥ 100 ft [30 m]
–0, + 3/4 in. [20 mm] for spans < 100 ft [30 m]

at supports, 0 for end supports
± 1/8 [3 mm] for interior supports

at intermediate points, $-0, + \frac{4(a)b(1 - a/S)}{S}$

where
a = distance in feet (meters) from inspection point to nearest support
S = span length in feet (meters)
b = 1-1/2 in. [40 mm] for spans ≥ 100 ft [30 m]
b = 3/4 in. [20 mm] for spans < 100 ft [30 m]

See Table 5.6 for tabulated values.

5.23.4 Beam and Girder Camber (without Designed Concrete Haunch). For members whose top flange is embedded in concrete without a designed concrete haunch, the maximum variation from required camber at shop assembly (for drilling holes for field splices or preparing field welded splices) shall be

at midspan, ± 3/4 in. [20 mm] for spans ≥ 100 ft [30 m]
± 3/8 in. [10 mm] for spans < 100 ft [30 m]

at supports, 0 for end supports
± 1/8 in. [3 mm] for interior supports

at intermediate points, $\pm \frac{4(a)b(1 - a/S)}{S}$

where a and S are as defined above

b = 3/4 in. [20 mm] for spans ≥ 100 ft [30 m]
b = 3/8 in. [10 mm] for spans < 100 ft [30 m]

See Table 5.7 for tabulated values.

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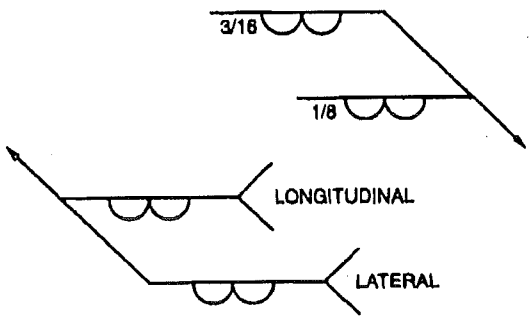
12.2.2 Multiple Layer. Multiple-layer surfacing welds may be specified by using multiple reference lines with the required size (thickness) of each layer placed to the left of the weld symbols. The direction of welding may be specified by an appropriate note in the tail of the welding symbol or indicated on the drawing [see Figure 48(C)].



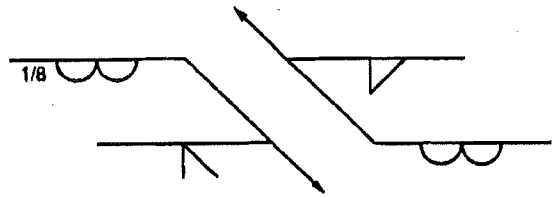
12.2.3 Unspecified Size (Thickness). When no specific thickness of a surfacing weld is required, the size dimension need not be included in the welding symbol [see Figure 48(B)].

12.3 Extent, Location, and Orientation of Surfacing Welds

12.3.1 Entire Area. No dimension other than size (thickness) is necessary to specify surfacing of the entire area of a plane or curved surface [see Figure 48(A)].

12.3.2 Portion of Area. When only a portion of a surface is to receive a surfacing weld, the extent, location, and orientation shall be shown on the drawing [see Figure 48(B) and (C)].

12.4 Surfacing a Previous Weld. Multiple reference lines may be used to specify a surfacing weld on the surface of a previously made weld (see 3.7).



12.5 Surfacing to Adjust Dimensions. The surfacing weld symbol may be used to specify a surfacing weld to correct assembly problems such as reducing excessive root openings [see Figure 48(D)].

Part B
Brazing Symbols

13. Brazed Joints

If no special preparation other than cleaning is required, only the arrow and reference line need be used with the brazing process indicated in the tail [see Figure 49(A)]. Applications of conventional welding symbols to brazed joints are illustrated in Figure 49(B) through (H). Figure 49(C), (D), (E), (G), and (H) show how joint clearances can be indicated. All symbols used for welding may also be used for brazing, where suitable.

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September 10, 1999 06:07:26

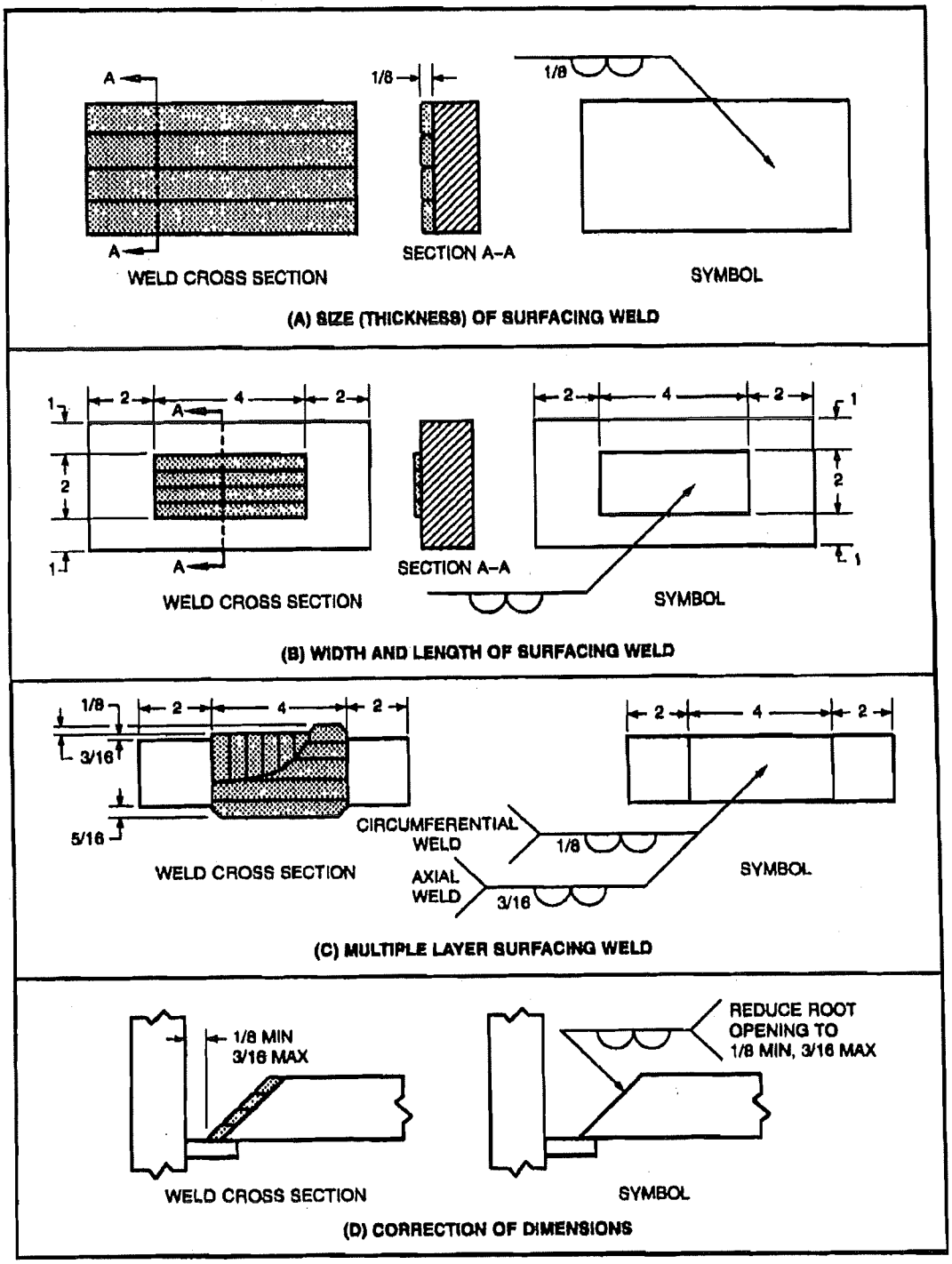

Figure 48—Applications of Surfacing Weld Symbol

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Information Handling Services,

Bridges. Temporary bracing shall be provided, in accordance with the requirements of the *Code of Standard Practice for Steel Buildings and Bridges*, wherever necessary to support the loads to which the structure may be subjected, including equipment and the operation of same. Such bracing shall be left in place as long as required for safety.

3. Alignment

No permanent bolting or welding shall be performed until the adjacent affected portions of the structure have been properly aligned.

4. Fit of Column Compression Joints and Base Plates

Lack of contact bearing not exceeding a gap of 1/16 in. (2 mm), regardless of the type of *splice* used (*partial-joint-penetration groove welded* or bolted), is permitted. If the gap exceeds 1/16 in. (2 mm), but is less than 1/4 in. (6 mm), and if an engineering investigation shows that sufficient contact area does not exist, the gap shall be packed out with nontapered steel *shims*. Shims need not be other than mild steel, regardless of the grade of the main material.

5. Field Welding

Shop paint on surfaces adjacent to *joints* to be field welded shall be wire brushed if necessary to assure weld quality.

Field welding of attachments to installed embedments in contact with concrete shall be done in such a manner as to avoid excessive thermal expansion of the embedment which could result in spalling or cracking of the concrete or excessive *stress* in the embedment anchors.

6. Field Painting

Responsibility for touch-up painting, cleaning and field painting shall be allocated in accordance with accepted local practices, and this allocation shall be set forth explicitly in the design documents.

7. Field Connections

As erection progresses, the structure shall be securely bolted or welded to support the dead, wind and erection *loads*.

M5. QUALITY CONTROL

The fabricator shall provide *quality control* procedures to the extent that the fabricator deems necessary to assure that the work is performed in accordance with this specification. In addition to the fabricator's quality control procedures, material and workmanship at all times may be subject to inspection by qualified inspectors representing the purchaser. If such inspection by representatives of the purchaser will be required, it shall be so stated in the design documents.

Q11: Where do I find the procedures for performing the Rotational Capacity (RC) tests in tension calibrators and steel plates?

A: The procedures for the RC tests are in Appendix A1 of the FHWA Report No. FHWA-SA-91-031 "High Strength Bolts for Bridges". There are two procedures, one for bolts that are long enough to be tested in a tension calibrator and a second for bolts too short to fit in the tension calibrator. **All bolts, that are long enough to fit in tension calibrators, shall be tested in the tension calibrator.**

Q12: What can be learned from the bolt stick-out?

A: Traditionally the bolt stick-out through the nut has been an indicator that the correct length of bolt has been selected for a connection and to verify that the nut will not bottom out at the end of the threads during tensioning. The stick-out can be used as an inspection tool. We look for a uniform stick-out of all bolts with in a connection. Prior to tensioning, this indicates that all the bolts used are the same length. I have seen connections with bolts of different lengths used together and other connections where washers were added under the bolt head when they were not needed, both causing non-uniform stick-out. After tensioning the stick-out should still be uniform. We occasionally will see a bolt in a connection with excess stick-out. Excess stick-out after tensioning typically indicates over tensioning. The bolts with excess stick-out after tensioning will typically neck down in the threads within the grip length of the bolt. The bolts, with excess stick-out, may be providing the required minimum tension, however the standard installation procedure has not been followed. My recommendation is that any bolt with excess stick-out after tensioning be removed and replaced.

Q13: When relubrication is required in the field what lubricant should be used?

A: When relubricating fasteners, we have found through experience that wax based lubricants provide lower torque values than oils and grease products. There are a number of wax based lubricants that work well for lubricating fasteners. They include water/wax emulsions such as Johnson Wax "JON-COTE 639" and MacDermid "TORQUE'N TENSION CONTROL FLUID". There are stick waxes, bees wax and even toilet bowl ring wax that work well. To provide best results the nuts are dipped in the water/wax emulsions and then laid out on a clean surface to dry. When dry they are placed in protected storage until they're used. When using the firmer waxes, best results are obtained by melting the wax and dipping the nuts, allowing them to warm to the wax temperature then removing them allowing excess wax to drain and cooling on a clean surface. These should also be placed in protected storage until used.

Q14: What is the recommended cleaning method for removing lubricant for installed bolts?

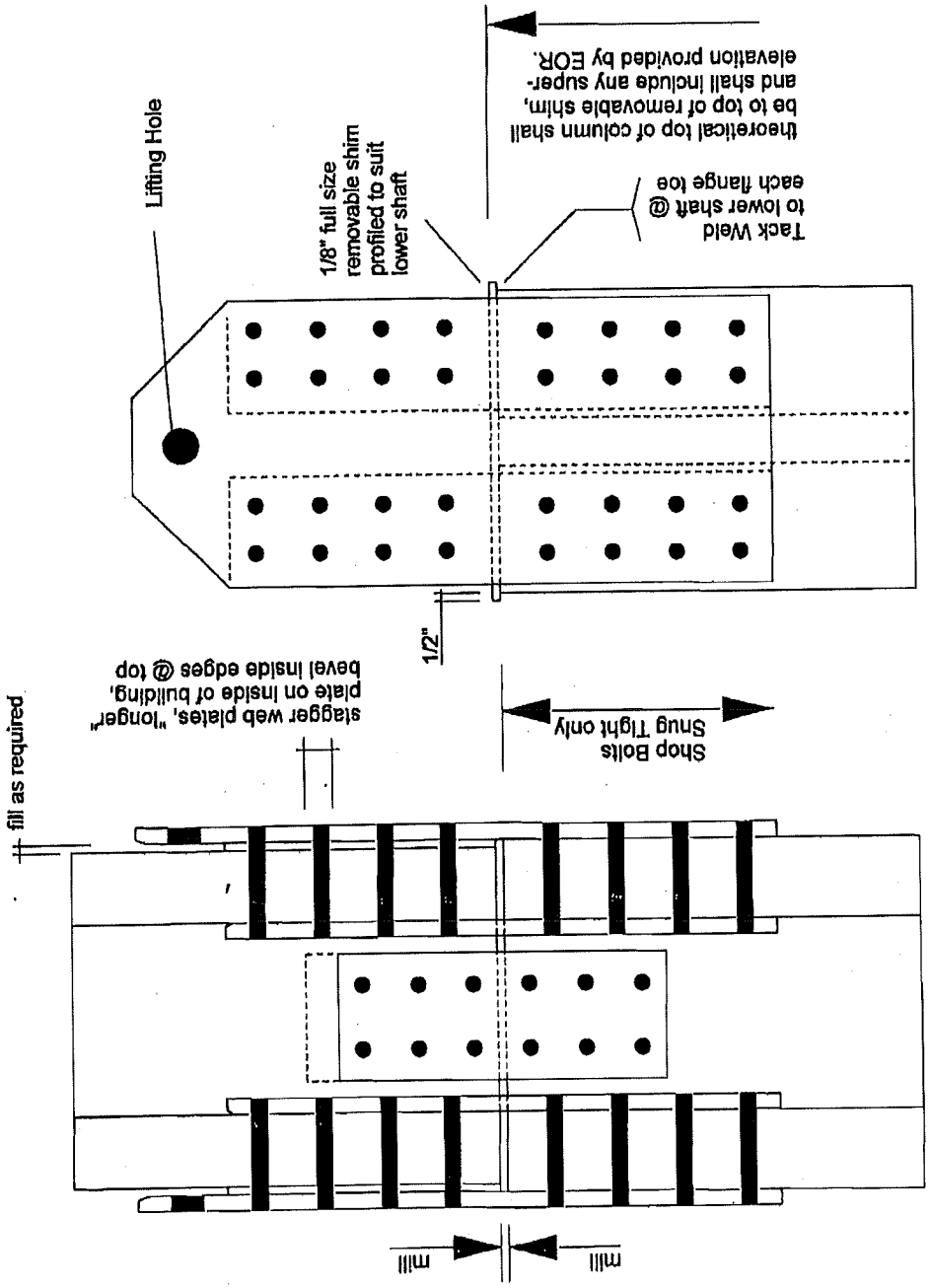
A: The wax on the nuts will weather after installation of the fasteners, however all of the wax may not be removed by weathering. A number of States require pressure washing of the steel prior to completion of steel bridge projects for both painted and weathering steel. Soaps such as TSP used with the pressure washing should remove all or most of the lubricants from the fastener assemblies. There are several cautions. The more wax or lubricant used, the more effort that will be needed to remove it. Observe environmental regulations when cleaning the steel.

Q15: What is the proper procedure to remove excess galvanizing from anchor bolt? How can this problem be minimized or eliminated?

Automated Steel Detailing Associates	WTC - Freedom Tower	Prepared by :	jw	ENG003
		Checked by :		
		Revision #	0	oct/07

Typical Bolted Perimeter Column Splice (Number of Bolts will vary)

The compression and creep of the concrete core on this project may be difficult to quantify. To permit easier on-site column length adjustment, DCM will introduce "removable" shims at the column splices. As conditions warrant, these shims may be removed or increased in number in order to maintain an as yet unspecified differential between the elevations of the perimeter columns and the composite steel/concrete core. To provide a reasonable amount of potential adjustment, OVS holes would be provided in both the splice plates and the columns. Please approve in concept. (Plate thickness and bolt quantities will vary.)



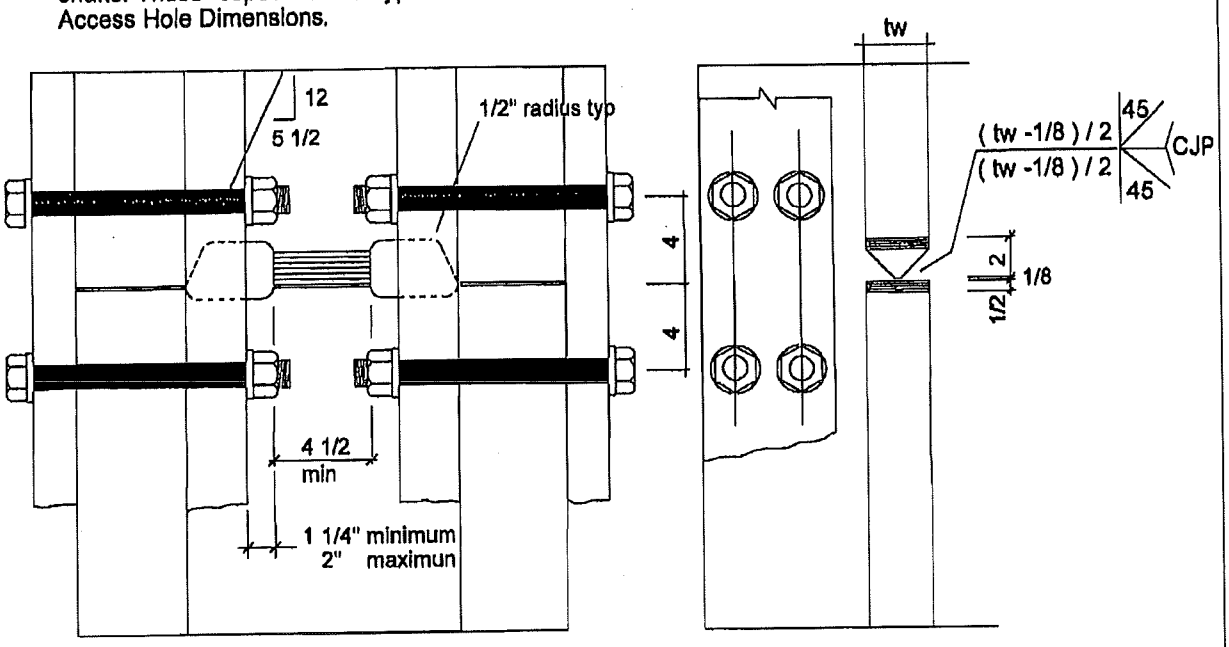
All holes in plates and column to be OVS.
All faying surfaces to be blast cleaned to SP6.
(this includes any flange or web fill plates but not the 1/8" removable shim)
All bolts to be Regular Hex Head Bolts, 1 1/8A490 (tightened by "turn of the nut")
All bolts to be supplied with two 5/16" thick hardened washers

Automated Steel Detailing Associates 77 Belfield Rd, Suite 100 Toronto ON M9W 1G6	World Trade Center - Tower 1 Project Contract # 724	Engineering Design Sheet		Page ENG037c Pg 1 of 1
		Prepared by:	jw	
		Checked by:		
		Revision #	3	Date may/08

Schematic Column Splice for Non-Covered Plated Wide Flange Columns above the 20th Floor - SLRS

The Flanges will be bolted for axial tension forces and moments, (and weak axis moments and shears.) using 1 1/8"A490SCB bolts assuming Strength as the Limit State, 1 5/16 holes in plates and flanges. Provide 2 - 5/16 hardened washer for each bolt.
The Webs will be CJP welded for strong axis shears using E80 electrodes, AWS D1.8, Demand Critical
The webs will be coped locally only to allow temination of the CJP web weld without "end dams".

The 1/8" removable shims will be supplied as 2 individual shims, one at each flange. There will be a 1/8" gap at the web which must be bridged by welding, or no gap if the flange shims are removed, or a larger gap if additional flange shimming is required.
The length of the steel column, exclusive of the 1/8 shim, shall be based on theoretical contract floor heights
The local web coping to allow for the finishing of the Web CJP welds will be in both the upper and lower shafts. These "copes" are not typical weld access holes and therefore do not need to meet AISC Seismic Access Hole Dimensions.



The Length of the Remaining Web shall fall within the limitations above but in no case shall it be less than that required by calculation below:

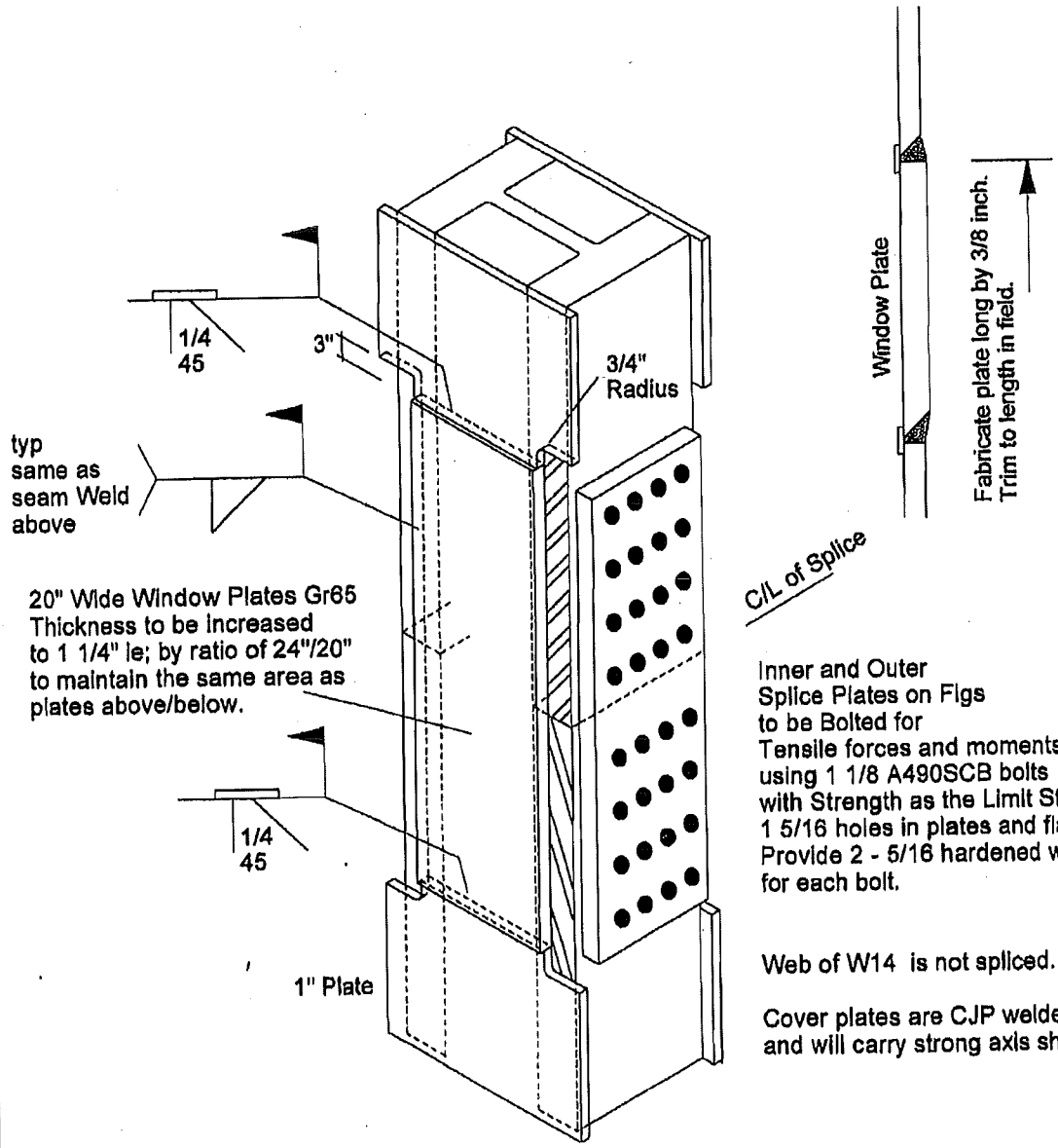
The shear stress, fvg, must be less than .6Fy or 39 ksi.
The flexural tensile stress must be less than Fcr where
Fcr = ((.9Fy)^2 - 3 (fvg^2)) ^.5
and the tensile stress, ftg, shall be calculated as Vy kips x (2 1/2 + 1/8 + 1/8) / 2 inches / Zx of remaining web

Ie for a W14x455, tw = 2.015, Fy = 65, where Vy = 300 kips at Floors 45 to 55, Grids C / 5 E / 7
For a remaining length of web = 5 1/4 inches
Zx = 2.015 x 5.25 ^2 / 4 = 13.88
fvg = 300 / (5.25 x tw) = 28.4 ksi < 39 ksi OK
ftg = 300 x (2 3/4 / 2) / 13.88 = 29.72 ksi
Fcr = ((.9 x 65)^2 - 3 x (28.4 ^2)) ^ .5
= 31.66 ksi > 29.72 OK

The 5 1/4 inch remaining web thickness plus twice the horizontal clearance of 1 1/4 inch will limit the thickness of the inner flange plates to a maximum of (12 5/8 in-to-in of flanges - 5.25 + 2 x 1.25) / 2 or 2 7/16ths. Currently on sketch 022D001A the inner flange plates are 2 1/2 at this location. (This is believed to be the "worst" condition to the 61st floor.)

Automated Steel Detailing Associates 77 Belfield Rd, Suite 100 Toronto ON M9W 1G6	World Trade Center - Tower 1 Project Contract # 724	Engineering Design Sheet		Page ENG037 Page 1 of 1
		Prepared by :	jw	
		Checked by :		
		Revision #	1	Date may/08

Schematic Column Splice for
Boxed WF Column above 20th floor - SLRS
Approximately 40 in number to the 30th floor.
E80 Electrodes - AWS D1.8, Demand Critical Weld



Inner and Outer
Splice Plates on Figs
to be Bolted for
Tensile forces and moments
using 1 1/8 A490SCB bolts
with Strength as the Limit State.
1 5/16 holes in plates and flanges.
Provide 2 - 5/16 hardened washer
for each bolt.

Web of W14 is not spliced.

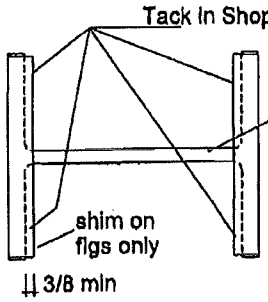
Cover plates are CJP welded
and will carry strong axis shears.

1/8 removable shims will be provided shop tacked to the lower WF column only.
The length of the steel column, exclusive of the 1/8 shim, shall be based on theoretical contract floor heights.
The CJP weld at the top and bottom edges of the window cover plates will be made on shop installed backing bars inplace on the existing cover plates. The "window" plates will be fabricated long and trimmed to length in the field to suit based on the removal or addition of shims to accomodate column shortening.

Automated Steel Detailing Associates 77 Belfield Rd, Suite 100 Toronto ON M9W 1G6	World Trade Center - Tower 1 Project Contract # 724	Engineering Design Sheet		Page JS034 pg 1 of 8
		Prepared by :	jw	
		Checked by :		
		Revision #		Date Apr 10/08

Erection Column Splices
(within Core only)
W14x233 Columns down to
W14x90 Columns minimum

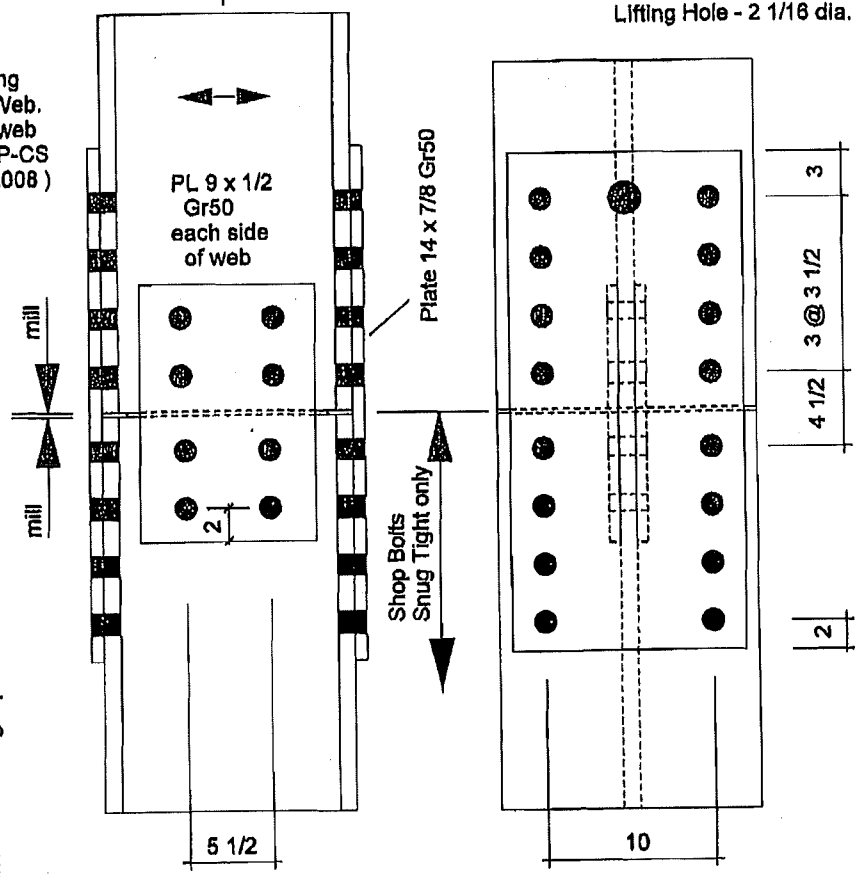
(See next page for connection capacities)



Tension Capacity varies based on bolt capacity and/or column capacity.

Lifting Hole - 2 1/16 dia.

Shear not Specified.
Capacity varies depending on thickness of column Web.
(4 bolts double shear in web conn. as per Y.E. of WSP-CS to J.W. ASDA, April 10/2008)



Above the 20th floor, supply a 1/8 removable shim at each flange of the column. Theoretical top of column shall be to top of removable shim, and shall include the super-elevation of the column. Below the 20th floor, no shim is required but top of column shall be to theoretical height of column with super-elevation included.
The superelevation of the erection core columns shall be as follows.
Up to the 20th floor, add 1/8 inch to the length of the column per tier.
Above the 20th floor, add 1/16 to the length of the column per tier, ie; the length of the column measured to the top of the 1/8 removable shim, shall be 1/16 more than the theoretical contract column height per tier.

All holes in plates and column to be 1 5/16 diameter.
All faying surfaces to be blast cleaned to SP6.
(this includes any flange or web fill plates but not the 1/8" removable shim)
All bolts to be Regular Hex Head Bolts, 1 1/8A490X-SCB
(tightened by "turn of the nut")
All bolts to be supplied with two 5/16" thick hardened washers

Coreshield 8 Ni-2

Seismic Certified

AWS E81T8-Ni2

Coreshield 8 Ni-2* is a self-shielded flux cored wire designed to produce welds with outstanding impact toughness at temperatures as low as -40°F (-40°C). It is suitable for all position welding and is especially suited for making root passes. It should be run on straight polarity (electrode negative)

Size (in.)	5/64*	
Shielding Gas	N/A	
Heat Input Range (kJ/in)	High 78-85	Low 25-32
Position	3G	1G
Heat Input (kJ/in)	84.19	31.7
Current (amps)	178	285
WFS (in/min)	88	185
Voltage (volts)	21.6	24.5
Travel Speed (in/min)	2.74	13.2
Pass / Layer	2F, 3S	1F,1S,1T,1Qd,1Qt,H
Tensile Strength (ksi)	89.8	95.6
Yield Strength (ksi)	73.1	87.0
Elongation (%)	27	24
Impact Temperature (°F)	70	70
Impact Results (ft-lbs)	114,97,96,107,107	105,111,116,116,96
Minimum Required (ft-lbs)	40	40
Average Impact (ft-lbs)	104	109
Additional Impact Results (ft-lbs) @ 0°F **	48,32,68,63,73	93,82,63,55,105
Average Impacts (ft-lbs) @ 0°F	51	80

*Testing was done on 5/64 Coreshield 8 Ni-2: Lot Number 86167 TR 3117
** Anticipated Service Temperature of -20°F

Diffusible Hydrogen Results: 5/64 Diameter Coreshield 8 Ni-2 lot number 86167 TR 3117

Condition	Hydrogen Coupon #1 (ml/100g)	Hydrogen Coupon #2 (ml/100g)	Hydrogen Coupon #3 (ml/100g)	Hydrogen Coupon #4 (ml/100g)	Avg: (ml/100g)
Prior	6.1	6.2	5.4	4.7	5.6
After 72 hrs @ 80°F/ 80%RH	8.0	7.8	7.4	8.5	7.9

Chemistry

Condition	C	Mn	Si	P	S	Ni	Mo	Al
High HI *	0.06	1.35	0.22	0.006	0.004	2.39	0.016	1.0
Low HI *	0.06	1.31	0.18	0.006	0.004	2.34	0.014	1.09
Chem Pad	0.05	1.37	0.17	0.0058	0.004	2.45	0.02	0.98

* Results Taken From Plates' Tensile Bolt:

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(Fax) 800-444-8911
www.esabna.com

Coreshield 8 Ni-2

AWS E81T8-Ni2

Seismic Certified

Typical Mechanical Properties

Shielding Gas : N/A	As Welded
Yield Strength, ksi (MPa) *	73.4 (506)
Tensile Strength, ksi (MPa) *	87 (600)
Elongation % in 2" *	30
Typical Charpy V-Notch Impact Properties	
Testing Temperature	Ft.-lbs (J)
-20F (-30°C) *	53 (71)
-40°F (-29°C) *	56 (76)

* HI was 57.6 kJ/in Tested to AWS A5.29

Typical Undiluted Weld Metal Analysis

Shielding Gas	N/A
Carbon (C)	0.06
Manganese (Mn)	1 27
Silicon (Si)	0.18
Phosphorus (P)	0.005
Sulfur (S)	0.004
Nickel (Ni)	2.1
Molybdenum (Mo)	0.02
Aluminum	1.0

Typical Welding Parameters

Diameter	Amperage (amps)	Voltage (volts)	WFS (ipm)	Dep. Rate (lbs/hr)	Efficiency Rate %	ESO
5/64"	170	20	65	2.8	71	3/4 in.
	190	22	80	3 4	72	3/4 in.
	230	24	100	4.7	73	3/4 in.

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DCM ERECTORS INC.
110 East 42nd St. New York, NY 10017 Phone: (212) 599-1603 Fax: (212) 599-1615

Section 8

Welding Consumable Product Data and Product Conformance

CORESHIELD® 8

AWS A5.20; E71T-8D

Seismic Certified

Coreshield 8 is an all-position self-shielded flux cored wire designed to weld critical demand structural applications while maintaining excellent arc characteristics and high welder appeal. With its fast-freezing slag that supports the molten metal during welding, Coreshield 8 is ideal for out-of-position welding in structural fabrication and other heavy duty applications. Applications include bridge and building fabrication, plate and tubular welding, hull and stiffener welding in ship construction.

Coreshield 8 is tested and certified to meet the new AWS A5.20 'D' designation requirements, making this self-shielded wire an excellent choice for demand critical welds when FEMA 353, D1.1 or D1.8 Seismic Supplement is utilized.

Maximize Your Productivity & Minimize Your Cost

Certified Performance

- ✓ Meets demand critical requirements
- ✓ Meets most lowest anticipated surface temperature applications
- ✓ Improved performance over existing products
- ✓ 7 Day Extended Exposure Limit
- ✓ Crack resistant in critical applications

Improved Productivity

- ✓ Higher deposition rate
- ✓ Wider operating range
- ✓ Faster travel speeds
- ✓ Meet construction time-tables
- ✓ Better Cost Efficiency

Improved Welder Appeal

- ✓ More forgiving than traditional wires
- ✓ Simplifies training and qualification
- ✓ Better Arc Control
- ✓ Self-releasing slag
- ✓ Limited clean-up

Outstanding Inspection Results

- ✓ Minimal Post Weld Work
- ✓ Lowers reject & repair rates

AWS 5.20 "D" Designator Testing Results

Size (in)	5/64"	
Shielding Gas	Self-shielded	
Heat Input Range (kJ/in)	High 78-85	Low 25-32
Position	3G	1G
Heat Input (kJ/in)	84.8	31.1
Current (amps)	250	305
WFS (in/min)	145	190
Voltage (volts)	21.9	23.5
Travel Speed (in/min)	3.9	13.8
Pass / Layer	2F, 3S	1F,1S,1T,3Q
Tensile (ksi)	82.8	87.7
Yield (ksi)	68.1	73.5
Elongation (%)	22	27
Impact Temperature (°F)	70	70
Impact Results (ft-lbs)	73,76,73,71,72	68,65,59,69,68
Minimum Required (ft-lbs)	40	40
Average Impact (ft-lbs)	73	66

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CORESHIELD® 8

AWS A5.20; E71T-8D

Seismic Certified

AWS 5.20 D1.8 Testing Results

Size (in.)	5/64"	
Shielding Gas	Self-shielded	
Heat Input Range (kJ/in)	High 64-96	Low 24-36
Position	3G	1G
Heat Input (kJ/in)	70 5	34.7
Current (amps)	275	250
WFS (in/min)	145	190
Voltage (volts)	22	22
Travel Speed (in/min)	5 2	9.5
Pass / Layer	2F,3½ S	1F,3S,3T
Tensile (ksi)	82 0	85.9
Yield (ksi)	65 2	74 0
Elongation (%)	29	24
Impact Temperature (°F)	70	70
Impact Results (ft-lbs)	72,72,70,69,68	71,75,71,67,68
Minimum Required (ft-lbs)	40	40
Average Impact (ft-lbs)	70	70
Impact Temperature (°F)	0	0
Impact Results (ft-lbs)	48,43,38,38,44	46,39,37,38,44
Minimum Required (ft-lbs)	40	40
Average Impact (ft-lbs)	42	41

Typical Mechanical Properties

Shielding Gas · Self-shielded	As Welded
Yield Strength, ksi (MPa)	67 (465)
Tensile Strength, ksi (MPa)	82 (565)
Elongation % in 2"	24
Typical Charpy V-Notch Impact Properties	
Testing Temperature	Ft.-lbs (J)
40°F (4°C)	65 (85)
-20°F (-29°C)	30 (41)

Typical Undiluted Weld Metal Analysis

	%
Carbon	0.17
Manganese	0 5
Silicon	0 1
Phosphorus	0.010
Sulfur	0.003
Aluminum	0 5

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CORESHIELD® 8

AWS A5.20; E71T-8D

Seismic Certified

Typical Welding Parameters

Diameter	Amperage (amps)	Voltage (volts)	WFS (ipm)	Dep. Rate (lbs/hr)	Efficiency Rate %	ESO
1/16"	150	21	120	3.1	75 8	3/4 inches
	175	22	150	4.1	75.9	3/4 inches
	200	23	190	5 2	75 9	3/4 inches
	240	24	230	5.8	74 7	3/4 inches
	275	25	300	7.6	74.9	3/4 inches
	300	26	340	9.7	77 4	3/4 inches
0.072"	150	21	75	2.6	74 5	3/4 inches
	180	22	95	3.5	78.5	3/4 inches
	225	23	125	4 5.	77 9	3/4 inches
	275	24	170	6 1	77.6	3/4 inches
	325	25	220	8.0	77 8	3/4 inches
	370	26	300	11.2	80.0	3/4 inches
5/64"	150	21	70	2 8	77 1	3/4 inches
	200	22	105	4.4	79.1	3/4 inches
	250	23	135	5.6	78 2	3/4 inches
	300	24	175	7 2	78 8	3/4 inches
	350	25	230	9 5	78 9	3/4 inches
	375	25	270	11 3	79.9	3/4 inches
	400	26	300	12.5	80.7	3/4 inches

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ESAB Welding & Cutting Products

Certificate of Conformance AWS A5.20 D1.8 / FEMA 353

Seismic Certified

Product:	**Coreshield 8**		
AWS Classification.	AWS 5.20, E71T-8 (TESTED TO A5 20 "D")	Order Number:	
Specifications:	AWS D1.8/D1.8M.2005	Customer PO:	
Diameter:	5/64 in (2 0 mm)	Test Number.	B12826082410 B12540072900
Heat:		Test Completed:	12/15/2007
Lot.	82775/83290	Date Generated:	8/22/2008

This document certifies that the produced named above and supplied on the referenced order is of the same classification, manufacturing process and material requirements as the material which was used for the test that was concluded on the date shown, the results of which are shown below. All tests required by the specifications shown for classification were performed at the time and the material tested met all requirements It was manufactured and supplied by the Quality System Program of The Esab Group Inc., which is certified to ISO9001 and meets the requirements of ANSI/AWS A5.01, and other specification and military requirements, as applicable.

Test Settings	**Low Heat Input**	**High Heat Input**
Heat Input · kJ/in	31.14	84.83
Shielding Gas	Self-Shielded	Self-Shielded
Current (amps)	305	250
WFS : in (cm) per min.	190 (482.6)	145 (368.3)
Polarity	DCEN	DCEN
Voltage (volts)	23 5	21.9
ESO : in. (cm)	7/8 (2.2) -1 (2.5)	5/8 (1.6) -3/4 (1.9)
Weld Position	1G	3G
Pass / Layer Sequence	1F,1S,1T,3Q	2F,3S
PH/IPT . ºF (ºC)	70 (20) / 225 (107)	300 (277) / 450 (3)
TS : in./min. (cm/min.)	13.8 (35)	3.9 (9.9)
Mechanical Properties		
Testing Conditions	As Welded	As Welded
Tensile Strength : ksi (MPa)	87.7 (605)	82.8 (571)
Yield Strength . ksi (MPa)	73.5 (507)	68.0 (470)
Elongation % in 2 inches	27	22
Charpy-V-Notch Impacts		
Testing Conditions	As Welded	As Welded
Temperature : ºF (ºC)	70 (21)	70 (21)
Individual Results : Ft -lbs. (J)	68,65,59,69,68 (92,88,80,94,92)	73,76,73,71,72 (99,103,99,96,98)
Average · Ft.-lbs. (J)	65 (89)	73 (99)
Temperature : ºF (ºC)	0 (-17)	0 (-17)
Individual Results : Ft -lbs. (J)	45,43,35 (65,58,47)	43,37,37 (58,50,50)
Average : Ft -lbs (J)	41 (56)	39 (53)

Diffusible Hydrogen

Average · ml/100 gr. Prior	9.2
Average : ml/100 gr Exposed	13 1 (72 Hrs @ 80°F/80%RH)

This product satisfies the requirements of AWS D1.8/D1.8M:2005, Annex D after exposure for 7 days at 80ºF, 80% humidity.

The Esab Group Inc quality system is audited and certified by ABS, ASME, LR and the U S. Department of Defense.

QMI REGISTERED ISO 9001

By: K Wildasin

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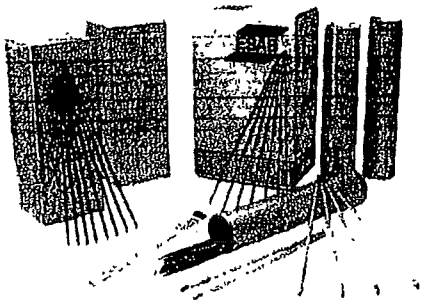
ESAB

The ESAB Group Inc.
801 Wilson Avenue
Hanover, Pennsylvania 17331

ATOM ARC 7018-M

Industry
Shipbuilding
Civil Construction
Mobile Machinery
General Fabrication



Welding Process
SMAW (Stick)

Classifications/Approvals
AWS A5.1; E7018M
A.B.S.- 3,3Y(H5)
QPL-22200/10; MIL-7018-M
ASME SFA 5.1

Filler Metal Type
Mild Steel

AWS Classifications
AWS A5.1; E7018M

Atom Arc 7018-M is an all-position low hydrogen electrode specially formulated to meet the more stringent requirements of Military Specification MIL-E-0022200/10 for mechanical properties, coating moisture and diffusible hydrogen content. Atom Arc 7018-M was intended for welding carbon steels, as well as high tensile steels, such as Grade HT of MIL-S-16113 and MIL-S-22698. It is also used for attachment welds to HY-80 and HY-100.

Available Parts

Part No.	Size	Length	Weight	Package
255017501	3/32	12 in.	40	Hermetically Sealed Can
255118051	3/32	12 in.	40	
255014102	3/32	14 in.	10	Hermetically Sealed Can
255014102-03	3/32	14 in.	10	
255014003	3/32	14 in.	50	Hermetically Sealed Can
255014003-03	3/32	14 in.	50	Hermetically Sealed Can
255014003-25	3/32	14 in.	50	Hermetically Sealed Can
255014003-34	3/32	14 in.	50	Hermetically Sealed Can
255014110	1/8	14 in.	10	Hermetically Sealed Can
255014110-05	1/8	14 in.	10	Hermetically Sealed Can
255014011	1/8	14 in.	50	Hermetically Sealed Can
255014011-03	1/8	14 in.	50	Hermetically Sealed Can
255014011-25	1/8	14 in	50	Hermetically Sealed Can
255014011-34	1/8	14 in.	50	Hermetically Sealed Can
255014128	5/32	14 in.	10	Hermetically Sealed Can
255014029	5/32	14 in.	50	Hermetically Sealed Can
255014029-03	5/32	14 in.	50	Hermetically Sealed Can
255014136	3/16	14 in.	10	Hermetically Sealed Can
255014037	3/16	14 in.	50	Hermetically Sealed Can
255014037-03	3/16	14 in.	50	Hermetically Sealed Can
255118101	3/16	14 in.	50	
255014045	7/32	18 in.	50	Hermetically Sealed Can
255014045-03	7/32	18 in.	50	Hermetically Sealed Can
255014151	1/4	18 in.	10	Hermetically Sealed Can
255014052	1/4	18 in.	50	Hermetically Sealed Can

ATOM ARC 7018-M

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Deposition Table				
Diameter	Optimal Amperage	Range Amperage	Deposition Rate	Efficiency
3/32 in	90 A	70 - 100	1.7 lbs./hr.	66.3 %
1/8 in	120 A	90 - 160	2.6 lbs./hr.	71.6 %
1/8 in	140 A	90 - 160	2 7 lbs./hr.	70.9 %
5/32 in	140 A	130 - 220	3.1 lbs./hr.	75 %
5/32 in	170 A	130 - 220	3.8 lbs./hr.	73.5 %
3/16 in	200 A	200 - 300	4.9 lbs./hr.	76.4 %
3/16 in	250 A	200 - 300	5.4 lbs./hr.	74.6 %
7/32 in	250 A	250 - 350	6.5 lbs./hr.	75 %
7/32 in	300 A	250 - 350	7.2 lbs./hr.	74 %
1/4 in	300 A	300 - 400	7.7 lbs./hr.	78 %
1/4 in	350 A	300 - 400	8.7 lbs./hr.	77 %

Typical Mechanical Properties	
As Welded	
Yield Strength	69 ksi (475 MPa)
Tensile Strength	80 ksi (550 MPa)
Elongation in 2"	30 %
Reduction in Area	72 %
Stress Relieved 1 hr. @ 1150°F (621°C)	
Yield Strength	57 ksi (395 MPa)
Tensile Strength	71 ksi (490 MPa)
Reduction in Area	76 %
Elongation in 2"	36 %

Typical Charpy V-Notch Impact Properties	
Testing Temperature -20°F (-29°C)	
As Welded	114 ft.-lbs. (155 J)
Stress Relieved 1 hr. @ 1150°F (621°C)	166 ft.-lbs. (225 J)

Typical Undiluted Weld Metal Analysis	
C	0.04 %
Mn	1.0 %
Si	0.3 %
P	0.013 %
S	0.013 %
Mo	0.1 %

AWS E7018-1 H4R (E4818*)

Hobart® 418

DESCRIPTION:

Hobart 418 is a general purpose electrode that allows you to tackle a wide variety of welding projects with ease. You will get superior weldability from this low hydrogen, mild steel electrode that provides you with excellent start and restart capabilities in addition to a smooth and virtually spatter free arc. Hobart 418 has a very flat bead shape with a fine ripple appearance. The weld puddle smoothly washes into the sidewalls with no undercut. Slag removal is one of the best and in many cases is self-peeling. Hobart 418 also has the ability to operate smoothly even when the welding surface is somewhat dirty or rusty. Hobart 418 is designated as a low moisture absorbing product and can be exposed to higher temperatures and humidity for over 8 hours and meet AWS requirements. Extremely high impact levels are available with Hobart 418 even at -50°F giving the 418 its AWS E7018-1 designation.

APPLICATIONS:

Low alloy structurals; alloy and high carbon castings, and enameling steels requiring low hydrogen and weld metals with tensile strength of 70,000 psi; power and petrochemical plants (pressure vessels, fittings, piping and tie-ins); steel structures or field erections (building and bridges); mining equipment (buggies, conveyors, bucket repair, general maintenance, and build-up of idler rolls on dozers); piping and some pipelines; rail car and locomotive construction; heavy equipment fabrication and repair (earthmoving and construction equipment, etc.); shipbuilding, barge offshore drilling rigs; boiler code applications; some truck chassis; infrastructure repair and rebuilding to State and Federal Transportation Codes; general maintenance work, nuclear work, farm machine (manufacture and repair); general fabrication.

FEATURES:	BENEFITS:
• Superior weld appeal	• Promotes arc time for increased productivity; weld easily, reducing welder fatigue
• Effortless starts and restarts	• No starting porosity, ideal for tacking; increases welding productivity
• Low moisture absorption rate	• Reduces worry of moisture pick-up resulting in low hydrogen cracking; required less trips to the oven for dry electrodes; increase quality and reliability of weld
• Low spatter	• Ideal for all positions, produces good looking welds, reduces clean-up time
• Good wetting action	• Produces a nice flat bead contour; prevents cold laps; eliminates undercutting
• Very stable arc	• Easy to control, runs smooth in all positions with excellent vertical-up capability
• Easy slag removal	• When used for tacking with Fabshield wires, Fabshield slag over tacks is easy to remove
• Compatible with Fabshield tubular wires	
• Flat bead	

TYPICAL WELD METAL PROPERTIES**(Chem Pad):

Weld Metal Analysis		AWS Spec: (max)
Carbon (C)	0.02	0.15
Manganese (Mn)	1.06	1.60
Phosphorus (P)	0.011	0.035
Sulphur (S)	0.014	0.035
Silicon (Si)	0 50	0 75
Chromium (Cr)	0.01	0 08
Nickel (Ni)	0.07	0.30
Molybdenum (Mo)	0 01	0.30
Mn + Ni + Cr + Mo + V	1.28	1.75

TYPICAL MECHANICAL PROPERTIES**(AW):

		AWS Spec: (min)
Tensile Strength:	78,500 psi (541 MPa)	70,000 psi
Yield Strength:	65,500 psi (452 MPa)	58,000 psi
Elongation % in 2"	28%	22%
Reduction of Area	72%	not required

* Metric AWS classification

**The information contained or otherwise referenced herein is presented only as "typical" without guarantee or warranty, and Hobart Brothers Company expressly disclaims any liability incurred from any reliance thereon. Typical data are those obtained when welded and tested in accordance with AWS A5 1 specification. Other tests and procedures may produce different results No data is to be construed as a recommendation for any welding condition or technique not controlled by Hobart Brothers Company

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HOBART BROTHERS HOBART® Performance Welding.

Hobart® 418

Typical Charpy-V-Notch Impact Values** (AW):

		AWS Spec: (min)
Avg. at -20°F (-29°C)	94 ft•lbs (127 Joules)	20 ft•lbs
Avg at -50°F (-46°C)	74 ft•lbs (100 Joules)	20 ft•lbs

Conformances and Approvals:

• AWS A5 1-2004, Class E7018-1 H4R • ASME SFA5 1 F-1, A-1, Class E7018-1 H4R • ABS Grade 3

Recommended Welding Procedures:

GENERAL:	Electrode positive, work negative, (DCEP) or AC
ARC:	Very short (less than half the diameter of the electrode)
FLAT:	Angle electrode 10° - 15° from 90°
VERTICAL-UP:	Use weaving technique
VERTICAL-DOWN:	Not recommended
OVERHEAD:	Use slight weaving motion within puddle
STORAGE:	220°F to 350°F, (to ensure a low hydrogen weld deposit, storage in oven is recommended)
RECONDITIONING:	If exposed to atmosphere for extended periods, the electrode should be reconditioned for one hour at 575°F

Recommended Operating Parameters:

Diameter Inches	Diameter mm	Type of Power	Minimum Amps	Optimum* Amps	Maximum Amps
3/32	2.4	DCEP or AC	80	90	100
1/8	3.2	DCEP or AC	90	130	150
5/32	4.0	DCEP or AC	110	170	230
3/16	4 8	DCEP or AC	150	220	300
1/4	6.4	DCEP or AC	270	340	380

*For out of position welding, reduce amperages shown by 15%

Typical Deposition Data (at optimum):

Diameter Inches	Diameter mm	Type of Power	Amps	Volts	Deposition Rate lbs/hr	Deposition Efficiency*%
3/32	2.4	DCEP	90	22	1.80	62.7
1/8	3.2	DCEP	130	26 5	2 60	73.1
5/32	4.0	DCEP	170	28	3.90	62.5
3/16	4.8	DCEP	220	28 5	5.20	69.2
1/4	6.4	DCEP	340	32	8.00	70.6

*Allowance made for 2" stub loss included

Available Diameters and Packages:

Diameter Inches	Diameter mm	Length Inches	Length mm	5-Lb. Plastic Pak	10-Lb. Plastic Pak	50-Lb. Can
3/32	2.4	14"	355	S119932-045	S119932-089	S119932-035
1/8	3 2	14"	355	S119944-045	S119944-089	S119944-035
5/32	4.0	14"	355	S119951-045	S119951-089	S119951-035
3/16	4.8	14"	355	--	--	S119958-035
7/32	5.6	18"	457	--	--	S119970-035
1/4	6.4	18"	457	--	--	S119981-035

Material Safety Data Sheets on any Hobart Brothers Company product may be obtained from Hobart Customer Service.

Because Hobart Brothers Company is constantly improving products, Hobart reserves the right to change design and/or specifications without notice.

Hobart is a registered trademark of Hobart Brothers Company, Troy, Ohio

HOBART BROTHERS HOBART —Performance Welding.

ESAB Welding & Cutting Products

Annex B: Intermix CVN Testing of Filler Metal Combinations
AWS D1.8/D1.8M:2005, Structural Welding Code – Seismic Supplement

Seismic Certified

	Root	Fill	Root	Fill	Root	Fill
Electrode	**Coreshield 6**	**Coreshield 8**	**Dual Shield 710X**	**Coreshield 8**	**Dual Shield R-70 Ultra**	**Coreshield 6**
Lot No.	83407	83414	82898	83414	82875	83407
Diameter In	3/32	5/64	1/16	5/64	3/32	3/32
Shielding Gas	N/A	N/A	100% CO2	N/A	N/A	N/A
Polarity	DCEP	DCEN	DCEP	DCEN	DCEP	DCEP
Current (amps)	365	285	280	300	350	375
Voltage (volts)	26.2	22.4	28	21.5	27	25.2
WFS (in/min)	160	200	260	170	140	160
ESO (in)	3/4 to 1	1	5/8	3/4 to 1	1	1
TS (in /min)		9 2				9.4
Pass/Layer	1 Split	5 Split	2 Split	5 Split	1 Full	4 Split
Mechanical Properties						
Tensile Strength (ksi)	85.9		86 2		82.4	
Yield Strength (ksi)	69.0		70 8		66.9	
Elongation (%)	31.5		27 0		28.0	
% Reduction of Area	66 1		59.4		64.0	
Charpy V-Notch (ft.-lbs.)						
Testing Temp. 70°F	79, 76, 73, 74, 69		82, 78, 78, 81, 82		59, 58, 57, 56, 57	
Avg ft.-lbs	74		80		57	
Testing Temp 0°F	50, 44, 39, 47, 45		55, 57, 47, 56, 54		40, 31, 32, 37, 34	
Avg ft -lbs	45		54		35	
Testing Conditions						
Test No	B1-2604-08-2952		B1-2605-08-2952		B1-2606-08-2952	
Joint	20 Deg / 5/8 RO		20 Deg / 5/8 RO		45 Deg / 1/2 RO	
Welding Position	1G (Flat)		1G (Flat)		1G (Flat)	
Steel Plate (in)	3/4 x 15 x 17 ASTM A131		3/4 x 15 x 12 ASTM A285		3/4 x 15 x 14 ASTM A131	
Steel Backer (in)	3/8 x 1 x 17 ASTM A36		3/8 x 1 x 17 ASTM A36		3/8 x 1 x 17 ASTM A36	
Preheat (°F)	70		70		70	
Interpass (°F)	300		300		300	

Acceptance Criteria – All Welds: For all welds governed by code B7, the required CVN toughness average value shall be at least 20 ft.-lbs at 0°F.

Acceptance Criteria – Demand Critical Welds: For Demand Critical welds the required notch toughness average value shall be at least 40 ft.-lbs at 70°F.

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ESAB Welding & Cutting Products

Annex B: Intermix CVN Testing of Filler Metal Combinations
AWS D1.8/D1.8M:2005, Structural Welding Code – Seismic Supplement

Seismic Certified

	Root	Fill	Root	Fill	Root	Fill
Electrode	**Atom Arc 7018**	**Dual Shield 710X**	**Atom Arc 7018**	**Coreshield 6**	**Atom Arc 7018**	**Coreshield 8**
Lot No.	4A307B02	82875	4A307B02	83407	4A307B02	83414
Diameter In.	1/8	3/32	1/8	3/32	1/8	5/64
Shielding Gas	N/A	100 % CO2	N/A	N/A	N/A	N/A
Polarity	DCEP	DCEP	DCEP	DCEP	DCEP	DCEN
Current (amps)	140	368	140	365	140	290
Voltage (volts)	23	30	23.5	26 2	23.5	22 4
WFS (in/min)	N/A	255	N/A	160	N/A	200
ESO (in.)	½	¾ to 1	½	1	½	¾
TS (in /min)				11		10
Pass/Layer	2 Split	5 Split	2 Split	4 Split	2 Split	5 Split
Mechanical Properties						
Tensile Strength (ksi)	89.3		81 0		88 7	
Yield Strength (ksi)	79 2		67 0		73 4	
Elongation (%)	27 5		27 0		30.0	
% Reduction of Area	66 3		64.7		63 9	
Charpy V-Notch (ft.-lbs.)						
Testing Temp. 70°F	91, 89, 75, 66, 82		60, 60, 62, 62, 61		73, 80, 75, 75, 70	
Avg ft -lbs	81		61		75	
Testing Temp. 0°F	43, 30, 47, 43, 45		44, 45, 54, 45, 43		39, 46, 49, 44, 51	
Avg ft.-lbs	42		46		76	
Testing Conditions						
Test No.	B1-2603-08-2952		B1-2601-08-2952		B1-2600-08-2952	
Joint	20 Deg / 5/8 RO		20 Deg / 5/8 RO		20 Deg / 5/8 RO	
Welding Position	1G (Flat)		1G (Flat)		1G (Flat)	
Steel Plate (in)	3/4 x 15 x 12 ASTM A285		3/4 x 15 x 10 5 ASTM A131		3/4 x 15 x 13 5 ASTM A131	
Steel Backer (in)	3/8 x 1 x 17 ASTM A36		3/8 x 1 x 17 ASTM A36		3/8 x 1 x 17 ASTM A36	
Preheat (°F)	70		70		70	
Interpass (°F)	300		300		300	

Acceptance Criteria – All Welds. For all welds governed by code B7, the required CVN toughness average value shall be at least 20 ft.-lbs at 0°F.

Acceptance Criteria – Demand Critical Welds: For Demand Critical welds the required notch toughness average value shall be at least 40 ft.-lbs at 70°F

ESAB

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"D" Classification Product Data

Testing for "D" classification															
5/6/2008													Travel		
Test Number	Diameter	Product	Lot	Gas Shielding	Position	Heat Input	Heat Input	Date	ESO	Current	WFS	Voltage	Speed	PH / IPT	Shielding
	(in)		Number		Range / (kJ/in)			Tested	(in)	(amps)	(in/min)	(volts)	(in/min)	(°F) / (°F)	Gas
Requirements							As Shown								
B1-2542-07-2952	1/16	Dual Shield 710X	82672	100% CO2	Flat	Low 25-32	31.6	12/17/2007	5/8	300	260	27	15.38	70 / 225	100 % CO2
B1-2541-07-2952	1/16	Dual Shield 710X	82672	100 % CO2	Vertical	High 78-85	83.5	12/17/2007	5/8	220	165	25.5	4.03	300 / 450	100 % CO2
B1-2540-07-2900	5/64	Coreshield 8	82775	N/A	Flat	Low 25-32	31 14	12/7/2007	7/8 - 1	305	190	23.5	13.81	70 / 225	N/A
B1-2576-07-2410	5/64	Coreshield 8	83290	N/A	Vertical	High 78-85	84 83	1/2/2008	5/8 - 3/4	250	145	21.9	3 9	300 / 450	N/A
B1-2826-08-2410 *	5/64	Coreshield 8	84011	N/A	Flat	24-36 *	34 7	5/5/2008	3/4	250	190	22	9.51	70/250	N/A
B1-2827-08-2410 *	5/64	Coreshield 8	84011	N/A	Vertical	64-96 *	70.49	5/5/2008	5/8 - 3/4	275	145	22	5.15	300 / 450	N/A
B1-2599-08-2952	1/16	Dual Shield II 80Ni1H4	81628	75Ar/25CO2	Vertical	High 78-85	79	1/22/2008	5/8 - 3/4	210	160	25.3	4	250 / 488	75/25
B1-2598-08-2952	1/16	Dual Shield II 80Ni1H4	81628	75Ar/25CO2	Flat	Low 25-32	31	1/22/2008	5/8 - 3/4	292	230	27	14.9	70 / 250	75/25
B1-2637-08-2410	5/64	Coreshield 8 Ni2 (lab)	NX 4584	N/A	Flat	Low 25-32	40.1	2/14/2008	3/4	301	170	22.2	9 99	70/225	N/A
B1-2793-08-2410	5/64	Coreshield 8 Ni2 (lab)	NX 4584	N/A	Vertical	High 78-85	79 89	4/28/2008	3/4	188	83.5	21 2	2.99	300 /450	N/A
J1-2415-07-HRD07-8	5/64	Coreshield 8 Ni2 (lab)	NX 4584	N/A	Flat	**	57 63 **	10/9/2007	5/8 - 3/4	335	165	24 2	8 44	70 /325	N/A

N/A = Not Applicable

N/R = Not Required

* Tested to AWS D1 8 Spec 30kJ/in ±20% and 80kJ/in ±20%

** Tested to standard AWS A5 29 Spec. (no buttering of plate)

"D" Classification Product Data

Testing for "D" classification														
5/6/2008														
Test Number	Diameter	Product	Pass/	Tensile			Impacts		Avg			Avg		
	(in)		Layer	UTS (psi)	YS (psi)	Elong (%)	Temp (F)	Results (ft-lbs)	(ft-lbs)	Temp	Results (ft-lbs)	(ft-lbs)		
Requirements				70,000 min	58,000 min	22 min	+70 F	40 min	40 min	N/R	N/R	N/R	N/R	N/R
B1-2542-07-2952	1/16	Dual Shield 710X	9S	90,704	81,776	26 5	70	106,101,108,112,116	109	0	56,69,80,44,54	61		
B1-2541-07-2952	1/16	Dual Shield 710X	1F/4S	76,566	65,358	32	70	134,153,137,141,143	142	0	39,64,18,67,26	43		
B1-2540-07-2900	5/64	Coreshield 8	1F,1S,1T,3Q	87,660	73,548	27	70	68,65,59,69,68	66	0	45,43,35	41		
B1-2576-07-2410	5/64	Coreshield 8	2F,3S	82,755	68,072	22	70	73,76,73,71,72	73	0	43,37,37	39		
B1-2826-08-2410 *	5/64	Coreshield 8	1f,3S,3T	85,877	74,053	24	70	71,75,71,67,68	70	0	46,39,37,38,44	41		
B1-2827-08-2410 *	5/64	Coreshield 8	2F,3 1/2 S	82,019	65,246	29	70	72,72,70,69,68	70	0	48,43,38,38,44	42		
B1-2599-08-2952	1/16	Dual Shield II 80Ni1H4	2F,3S	84,628	72,915	30.5	70	166,153,176,161,158	163				-20	117,86,119,123,104
B1-2598-08-2952	1/16	Dual Shield II 80Ni1H4	1F,3S,5T	91,273	87,215	29	70	115,116,119,117,121	118				-20	90,102,90,83,85
B1-2637-08-2410	5/64	Coreshield 8 Ni2 (lab)	3S,3T	95,050	84,905	20	70	124,122,132,123,124	125					
B1-2793-08-2410	5/64	Coreshield 8 Ni2 (lab)	2S,1 2/3 T	84,567	67,251	28	70	76,41,28,58	50					
J1-2415-07-HRD07-8	5/64	Coreshield 8 Ni2 (lab)		87,001	73,432	30	-20	28,65,76,28,70	53	-40	50,64,51,59,55	56		
N/A = Not Applicable														
N/R = Not Required														
* Tested to AWS D1 8 Spec 30kJ/in ±20%														
** Tested to standard AWS A5.29 Spec. (no														

"D" Classification Product Data

Testing for "D" classification												
5/6/2008												
Test Number	Diameter	Product	Chemistry									
	(in)		C	Mn	Si	P	S	Cr	Ni	Mo	Al	N2
Requirements												
B1-2542-07-2952	1/16	Dual Shield 710X	0.025	1 6	0.73	0.008	0 009	0 047	0.469	0.011	0.009	0.0038
B1-2541-07-2952	1/16	Dual Shield 710X	0 033	1.13	0.5	0.008	0 009	0 046	0 389	0 011	0.008	0 0067
B1-2540-07-2900	5/64	Coreshield 8	0.19	0 46	0.11	0 005	0.004	0.04	0 02	0.01	0.46	0.0293
B1-2576-07-2410	5/64	Coreshield 8	0.22	0 53	0.17	0.007	0 003	0 04	0.03	0 01	0 56	0.0254
B1-2826-08-2410 *	5/64	Coreshield 8		Not Finished								
B1-2827-08-2410 *	5/64	Coreshield 8		Not Finished								
B1-2599-08-2952	1/16	Dual Shield II 80Ni1H4	0.055	1.21	0 3	0 01	0.009	0 04	0 91	0.008	0 005	0 0021
B1-2598-08-2952	1/16	Dual Shield II 80Ni1H4	0 048	1 31	0.36	0.008	0.008	0.04	0 91	0.009	0.0038	<0.0008
B1-2637-08-2410	5/64	Coreshield 8 Ni2 (lab)	0.066	1.384	0.18	0.005	0.005	0 045	2.34	0 017	1 2	0.021
B1-2793-08-2410	5/64	Coreshield 8 Ni2 (lab)										
J1-2415-07-HRD07-8	5/64	Coreshield 8 Ni2 (lab)										
N/A = Not Applicable												
N/R = Not Required												
* Tested to AWS D1.8 Spec. 30kJ/in ±20%												
** Tested to standard AWS A5.29 Spec. (no												

DCM ERECTORS INC.
110 East 42nd St. New York, NY 10017 Phone: (212) 599-1603 Fax: (212) 599-1615

Section 9

Non Conformance Reports (NCRs) & (FPNs)

DCM ERECTORS INC.

110 East 42nd Street Suite 1710
New York, NY 10017
United States of America

Phone:(212) 599 – 1603
Fax: (212) 599 – 1615

Addressing and Correcting of Field Non-Conformances

1.0 Policy & Scope

1.1 It is Company policy to establish and maintain documented procedures to ensure that product that does not conform to specified requirements is reworked to meet either the original contractual requirements, the requirements of approved erection and/or shop drawings, or otherwise engineered and approved specified conditions.

2.0 Responsibilities

2.1 The Project Team is responsible for:

A) The investigation into and the recording of all non-conformances and their resolution.
B) Developing a disposition method with responsible parties with consideration taken to economic rationality and reason.
C) Implementing the appropriate disposition.
D) Identifying and defining the responsibilities and authority of those personnel assigned to the disposition of non-conformances.

3.0 Procedures

3.1 Competent personnel assigned the task of handling the disposition of non-conformances are to address and investigate all non-conformance concerns as presented within customer complaints and correspondences, within outside non-conformance reports, and by fellow DCM field staff.

3.2 If upon investigation of any of the aforementioned concerns the existence of a non-conformance is verified, then the said discovered non-conformance will enter the DCM Erectors, Inc. Field Problem Notification system, be documented utilizing an FPN form (see attached item 9-1), and logged into the FPN Field Log (see attached Item 9-2).

3.3 Upon verification of the existence of any non-conformance it will be ascertained as to whether the field condition can be reconciled with the currently approved condition.

A) In the event that a non-conformance can be reworked to meet the currently approved conditions within economic rationality and reason while being in accordance with accepted AISC and pertinent AWS standards the non-conformance will be designated a number from the 1000 series of the FPN log and be entered into the FPN Field Log for completion tracking purposes only.

DCM ERECTORS INC.

110 East 42nd Street Suite 1710
New York, NY 10017
United States of America

Phone:(212) 599 – 1603
Fax: (212) 599 – 1615

B) In the event that a non-conformance cannot be reworked to meet the currently approved conditions within economic rationality and reason while being in accordance with accepted AISC and pertinent AWS standards the non-conformance will be designated a number from the 100 FPN series, a proposed fix shall be engineered by a member of our engineering staff, the proposed fix shall be submitted to the customer for approval, and the non-conformance shall be entered into the FPN Field Log for completion and re-inspection purposes.

3.4) An FPN shall be designated as complete on the FPN Field Log once an FPN's field condition meets its either its currently approved condition as per contractual requirements, approved erection and/or shop drawings, or approved engineering sketches.

3.5 Upon obtaining the status of "completed" the FPN will be considered ready for inspection and all 100 series FPNs will be inspected for conformance to the corresponding approved engineering sketch. Approval upon inspection shall be evidenced by an inspectors sign-off on the FPN Field Log under the appropriate FPN number.

(Field Procedure Work Book Form 9-1)

DCM ERECTORS INC.

FIELD PROBLEM NOTIFICATION

110 EAST 42ND STREET 1704
NEW YORK, NY 10017
PHONE: (212) 599 - 1603
FAX: (212) 599 - 1615

FPN# _____

TO: _____
CO: _____
TEL. NO.: _____
FAX NO.: _____

DATE: _____
CONTRACT NO.: _____
PROJECT NAME: _____
NO. of PAGES: _____

LOCATION IN BUILDING: _____

PROBLEM / QUESTION:

By DCM Erectors

ANSWER:

ANSWER FROM:

FPN

(Field Procedure Work Book Form 9-2)

DCM ERECTORS FIELD PROBLEM NOTIFICATION LOG

____ Series

FPN Number	Revision Number	Location		Notes	Material On Site	DCM Verified Completed	Re-inspection Sign-Off
		Floor	Grid				

DCM ERECTORS INC.
110 East 42nd St. New York, NY 10017 Phone: (212) 599-1603 Fax: (212) 599-1615

Section 10

Specifications

DCM ERECTORS INC.
110 East 42nd St. New York, NY 10017 Phone: (212) 599-1603 Fax: (212) 599-1615

Section 12

Welder Qualifications, Welder Licenses, Welder Restrictive Access Test and Welder Logs.

Job Name: _____

Date: _____

DCM CERTIFIED WELDER LOG

Welder Name	Welding Certification Granted By	Welder ID #	Process Qualified For	Positions	Expiration Date

SAMPLE

DCM ERECTORS Inc.

110 East 42nd Street
New York, NY 10017
Phone: (212) 599-1603 Fax (212) 599-1615

WELDER AND WELDING OPERATOR QUALIFICATION TEST REPORT

TESTED FOR:
Restricted Access Weld Test

PROJECT:
WTC-1 Freedom Tower

Welder/Welder Operator's Name	Welding Code (ID & year) AWS-D1.8 (2005)	Date	Specimen Plate ( ) Pipe ( )	Test Number
Welder Identification No	Base Material Specification	Diameter & Wall Thickness	Joint Groove ( ) Fillet ( )	Plate Thickness
Process	Position	Specimen Furnished By Others ( )	Specimen Machined By ( ) Others ( )	Thickness Range Qualified
Weld Progression UP ( ) CW ( ) L to R ( ) Down ( ) CCW ( ) R to L ( )	Welding Procedure No Rev No		Current AMPS AC ( ) DC ( )	Polarity Direct ( ) Reverse ( )
	Welding Procedure Date by MRP, Inc Witnessed (Ts			Other

FILLER METAL		VISUAL INSPECTION (AWS ONLY)
	Classification	Appearance
	Diameter/ F No	Undercut
Shielding Gas ( ) Flux ( )	Trade Name	Piping Porosity

GUIDED BEND TEST RESULTS

TYPE	RESULTS	TYPE	RESULTS

FILLET TEST RESULTS

Weld Appearance Pass ( ) Fail ( )	Fillet Size Leg In	In	Concavity ( ) In	Convexity ( ) In
Macro Etch Test Results Pass ( ) Fail ( )	Fracture Test Results (Describe location, nature, & size of any cracks or shearing of the specimen)			

RADIOGRAPHIC TEST RESULTS

FILM IDENTIFICATION	RESULTS	REMARKS	FILM IDENTIFICATION	RESULTS	REMARKS

QUALIFICATION RESULTS

WE THE UNDERSIGNED, CERTIFY THAT THE STATEMENTS IN THIS RECORD ARE CORRECT AND THAT THE TEST WELDS WERE PREPARED, WELDED AND TESTED TO THE REQUIREMENTS OF SECTION 4 OF THE AWS D1.8 (2005).

REMARKS:

APPROVED BY: Robert J. Mahoney, Jr., General Superintendent

TESTED BY: F. Henry Hendrix, CWI-99080021

SAMPLE

DCM ERECTORS Inc.

110 East 42nd Street
New York, NY 10017
Phone: (212) 599-1603 Fax (212) 599-1615

WELDER AND WELDING OPERATOR QUALIFICATION TEST REPORT

TESTED FOR: **PROJECT:** WTC-1 Freedom Tower

Welder/Welder Operator's Name	Welding Code (ID & year) AWS-D1.1 (2006)	Date	Specimen Plate ( ) Pipe ( )	Test Number
Welder Identification No	Base Material Specification	Diameter & Wall Thickness	Joint Groove ( ) Fillet ( )	Plate Thickness
Process	Position	Specimen Furnished By Others ( )	Specimen Machined By ( ) Others ( )	Thickness Range Qualified
Weld Progression UP ( ) CW ( ) L to R ( ) Down ( ) CCW ( ) R to L ( )	Welding Procedure No Rev No		Current AC ( ) DC ( ) AMPS	Polarity Direct ( ) Reverse ( )
	Welding Procedure Date by: MRP, Inc Witnesses (Tech)		Other	

FILLER METAL		VISUAL INSPECTION (AWS ONLY)
	Classification	Porosity
	Diameter/ F No	Undercut
Shielding Gas ( ) Flux ( )	Trade Name	Piping Porosity

GUIDED BEND TEST RESULTS

TYPE	RESULTS	TYPE	RESULTS

FILLET TEST RESULTS

Weld Appearance Pass ( ) Fail ( )	Fillet Size Leg In In Concavity ( ) In Convexity ( ) In
Macro Etch Test Results Pass ( ) Fail ( )	Fracture Test Results (Describe location, nature, & size of any cracks or shearing of the specimen)

RADIOGRAPHIC TEST RESULTS

FILM IDENTIFICATION	RESULTS	REMARKS	FILM IDENTIFICATION	RESULTS	REMARKS

QUALIFICATION RESULTS

WE THE UNDERSIGNED, CERTIFY THAT THE STATEMENTS IN THIS RECORD ARE CORRECT AND THAT THE TEST WELDS WERE PREPARED, WELDED AND TESTED TO THE REQUIREMENTS OF SECTION 4 OF THE AWS D1.1 (2006).

REMARKS:

APPROVED BY: **TESTED BY:**

Robert J. Mahoney, Jr., General Superintendent

F. Henry Hendrix, CWI-99080021

SAMPLE

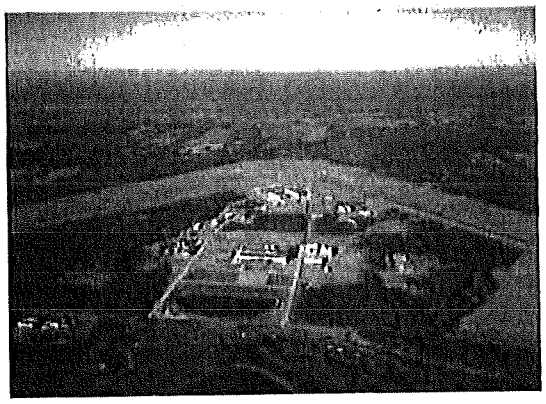
COMPOSITE TECHNOLOGIES / FCS GROUP
4062 Grumman Boulevard – Building 81, Calverton, New York 11933
(631) 680-0662 Fax (631) 727-5085

TECHNICAL PROPOSAL & QUALIFICATIONS

QUALIFICATIONS OF CONTRACTOR'S EPOXY INTUMESCENT COATING SYSTEM (ICS) INSTALLER AND TEAM MEMBER

Project: WOTC-GC1-2-KNO186-020-STATION HALL STRUCTURE TO GRADE

Specification section: 07816



Composite Technologies, Calverton, NY (CT) and FCS Group LLC, Lynbrook, NY (FCS) have teamed to be the specialty subcontractor that will furnish and install the Epoxy Intumescent Coating System for the World Trade Center Path Station.

CT is one of the nation's leading fire proofing, composite materials & construction companies, specializing in research, development, design, fabrication, and delivery of fire protective and composite materials for commercial, industrial, and government customers. CT's base of operations is a 40-acre parcel of the former naval weapons testing center in Calverton, NY with a 300,000-square-feet production facility that can be configured to meet nearly any demand for fire resistant shop coatings. If you wish to know more about CT please visit www.composite-technologies.com

FCS is one of the regions leading field applied coatings firms specializing in new structures, public infrastructure rehabilitation, fire protection and corrosion mitigation. Both CT and FCS are certified applicators of Epoxy Intumescent Coating Systems.

The firms own four plural component pumps dedicated to spraying Epoxy Intumescent Coating Systems.
In addition the firms customers include amongst others: Silverite Construction, WDF, Structuretone, Tully, Turner, Frontier-Kemper, Picone/McCullagh, Carlin Contracting, Jett Industries, Citnalta Construction, , Gilbane, O&G Industries, Schiavone, E.E. Cruz

APPROACH

CT can shop install the Epoxy Intumescent Coating System at the steel fabricators plants North America, through out the world, at staging and shake out yards in the NY/NJ METRO area and at their facility on Long Island or in the field.

MANAGEMENT TEAM RESUMES (see attached exhibit "A")

William G. Higbie
Gerald Hallissy
Neil Singh
Raj Pipada

QUALITY CONTROL PLAN

CT has retained Debra Ingram, AIA of Works in Progress Associates to manage the quality control plan – see attached exhibit "B" project specific quality control plan

SAFETY PLAN

CT will retain American Safety or other industry recognized consultant to manage the safety plan

MBE/WBE

CT will obtain minority participation by sub-contracting work to:
MBE - FCS Group
WBE – Works in Progress Associates

MATERIAL DATA AND MSDS SHEETS

See attachment exhibit "C"

SUSTAINABLE DESIGN REQUIREMENTS

See attachment exhibit "D"

TOP COAT NOT REQUIRED

See attachment exhibit "E"

EPOXY INTUMESCENT COATING SYSTEM THICKNESS & TESTING

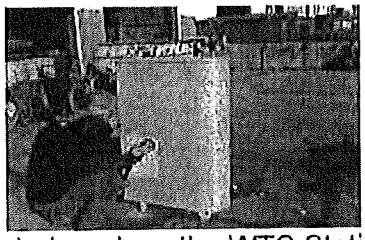
See attachment exhibit "F"

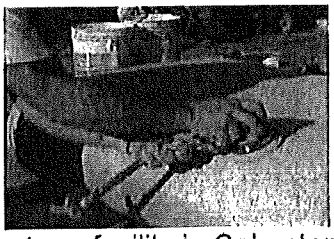
PROJECT SPECIFIC APPLICATION MANUAL

See attachment exhibit "G"

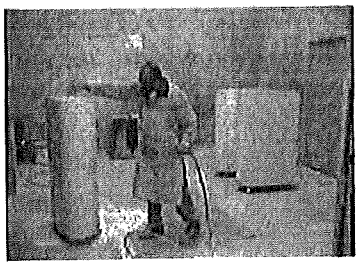
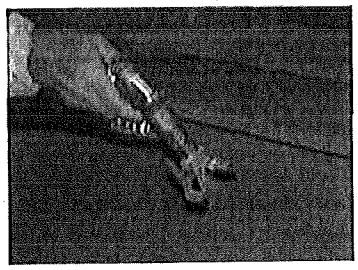
EXPERIENCE AND SIMILAR TYPES OF WORK COMPLETED

We have worked on the Fire resistant coating of the New York Times building and have prepared mock ups for the World Trade Center Path Station columns. The photos

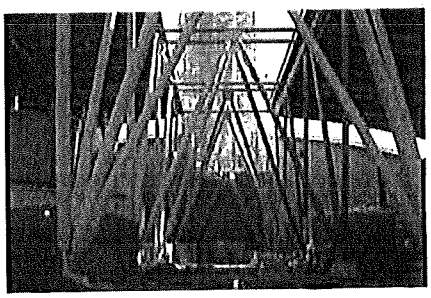




below show the WTC Station columns under construction at our facility in Calverton, Long Island, New York as well as the Frog Eye connection at the New York Times building.

The photos below show the prior fire proofing experience of CT & FCS and its suppliers.



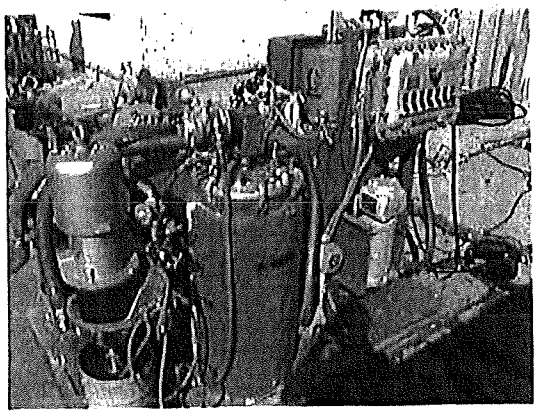
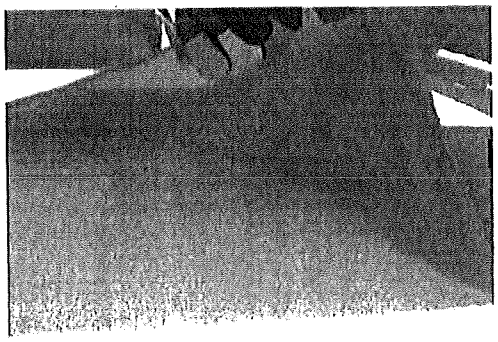



EXHIBIT "A"

MANAGEMENT TEAM RESUMES

COMPOSITE TECHNOLOGIES
4062 Grumman Boulevard – Building 81, Calverton, New York 11933
(631) 680-0662 F (631) 727-5085

Gerald Hallissy FAIA

Composite Technologies, LLC, Calverton NY

- Gerald Hallissy's 41 year career has spanned several sectors of the architecture and construction industry. including involvement with fireproofing of institutional, civic, Jerry's services to industry combines traditional and new fireproofing and composite materials for fire protection, blast mitigation, composite strengthening, panelized facades, concrete rehabilitation, seismic upgrades, ceramic insulation and reactive powder concrete for buildings, structures, highways, public works and mass transit projects.
- Mr. Hallissy also participates in the firm's strategic alliances with other firms, development of new business markets, and management of design/build projects. In addition he synthesizes positions towards facilitating resolutions, partnering diverse business cultures and focusing team members towards the goal of executing the architects high quality design and construction.

Prior experience

RailWorks Transit, Inc. East Farmingdale, NY
Stephen B. Jacobs & Associates, Architects, New York, NY
Hoberman & Wasserman Architects New York, NY
Davis, Brody & Associates, Architects,
William F. Pederson & Associates, Architects,
Gwathmey & Henderson, Architects,

Organizations and Affiliations

Registered Architect: New York, New Jersey, Florida
National Council of Architectural Registration Boards

- Jerry was advanced to the College of Fellows of the American Institute of Architects in 1991 for the excellence in collaborative work in designing affordable inner-city housing and training a predominately minority work force to self-perform restoration of landmark structures and new construction.

Lectures

- AIA 2003 Convention, San Diego CA – Presentation Opportunities with Performance based Fire Design
- Construction Super Conference, December 2006 San Francisco, CA ,Design Considerations for a Post 9/11 World

Education

1964-1968 Pratt Institute Brooklyn, NY, Bach Architecture

COMPOSITE TECHNOLOGIES
4062 Grumman Boulevard – Building 81, Calverton, New York 11933
(631) 680-0662 F (631) 727-5085

William G Higbie

Composite Technologies, LLC, Calverton, NY

William Higbie's 43 year career has spanned sectors of the construction industry, including involvement with fireproofing of institutional, civic, educational, hotel, mass transit, infrastructure, and historic restoration projects. Bill also has 30 years of fire fighting experience and was chief of one of the largest fire departments in the state of New York from 1974-1985.

His particular emphasis is on strategic collaboration between diverse cultures (owners, design professionals, and contractors) in the construction industry to focus on high quality design and construction.

Many projects have required non-prescriptive solutions when prescriptive codes have not been applicable. Installations have incorporated both traditional materials and emerging composite technologies for fire protection, blast mitigation, ballistic defeat, seismic upgrades, and life safety systems.

Bill's current role as managing principal Composite Technologies LLC has included installation of fireproofing on prominent high-rise buildings, and development of blast and ballistic solutions for buildings and mass transit. Through this experience, Bill brings wide knowledge of defeat mechanisms applicable to today's real world vulnerabilities.

These aspects of asset protection and the collaboration between all stakeholders in the project delivery process are what lead to his passion for protecting human and physical assets.

- **Experience** William Higbie offers services to industry that combines traditional and new composite materials for blast mitigation, composite strengthening, panelized facades, concrete rehabilitation, seismic upgrades, fireproofing, ceramic insulation and reactive powder concrete for fire protection, armor systems, buildings, structures, highways, public works and mass transit projects.

  - Bill Higbie in his roles as principal, director of field operations is responsible for managing large and complex design-build projects, creating new markets and strategic alliances with other firms.

FCS GROUP, LLC.
25 Hutcheson Place, Lynbrook, New York 11563
(516) 599-4100 F (516) 599-0828

Neil Singh

FCS Group, LLC, Lynbrook, NY

- Ambition, drive, motivation and hard work have led Neil Singh to expand operations from the New York area all the way to Portland, Oregon. He is focused on maintaining and expanding the specialty services that FCS has to offer – Industrial coatings, Intumescent Fireproofing and Environmental services.
- As the managing principal of FCS he is involved in all facets of the business- from estimating, to sales, to operations to emerging opportunities. A highly qualified team of engineers make sure that the office runs smoothly, allowing Neil the flexibility to devote time to what he truly enjoys – field operations and project execution. He is passionate about employee-training and having a highly-skilled workforce. Neil is very hands-on and intimately familiar with all Fireproofing and Coatings. High quality and customer satisfaction are ingrained in the FCS culture.

Union / Management Cooperation

- Starting with his internship with the Painters International in Washington D.C., Neil has been actively involved with union-management cooperation. He is a board member of District Council 9's apprentice training fund. He is an active participant in union-management seminars such as improving market share, creating a highly-trained union workforce, etc.

Organizations and Affiliations

Member, BCA- Building Contractors Association, NY
Board of Directors, Association of Master Painters and Decorators, NY
Board Member, IUPAT DC-9 Joint Apprentice and Training Fund, NY

Certifications

NACE (National Association of Corrosion Engineers)
- Certified Coating Technician

SSPC (The Society for Protective Coatings)
- C3 Lead Certification
- Level 1 Coatings Inspector

Education

Bachelor of Arts and Business Administration
University of Richmond, Virginia
Double Major: ∘ Business Administration ∘ Leadership Studies
Masters in Construction Management (in progress)
New York University, New York

FCS GROUP, LLC.
25 Hutcheson Place, Lynbrook, New York 11563
(516) 599-4100 F (516) 599-0828

Raj Pipada

FCS Group, LLC, Lynbrook, NY

- Raj Pipada has over ten years of experience in managing Industrial coatings and Intumescent Fireproofing projects throughout the New York area. His background in Environmental Engineering has helped FCS in forming a complete division that offers environmental services to general contractors and owners.
- In his current role as Senior Project Manager, Raj is involved in bidding and executing some of the largest and most complex coating and Intumescent fireproofing projects in the New York area. He oversees projects that use state-of-the-art technologies and products such as Sponge-Jet Blasting, Vacuum Blasting, Plural Component Spraying and Polyurea.
- Having worked on diverse and complex structures such as transportation centers, fossil and nuclear power plants, water and waste-water treatment plants, Raj has a unique understanding of coating, fireproofing and environmental requirements of any project. Over the years, he has advised owners, architects, engineers and general contractors in selecting project-specific coating and fireproofing products.

Recent Intumescent Fireproofing Projects

- University of Massachusetts Central Heating Plant, Amherst, MA
  Product Used- Carboline's Thermolag 3000 (3 Hour Rating)
- New Campus East Facilities, Ft. Belvoir, VA
  Product Used- International's Interchar 212

Organizations and Affiliations

Member, NACE (National Association of Corrosion Engineers)
Member, SSPC (The Society for Protective Coatings)

Certifications

NACE (National Association of Corrosion Engineers)
- Level 2 Coating Inepctor

SSPC (The Society for Protective Coatings)
- C3 Lead Certification
- Level 1 Coatings Inspector

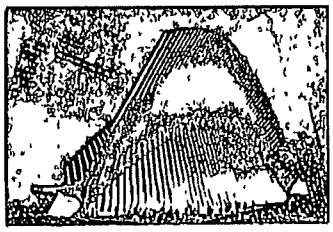
Education

B.S., Civil Engineering

M.S., Environmental Engineering
New Jersey Institute of Technology, Newark, NJ

EXHIBIT "B"

QUALITY CONTROL PLAN



Composite Technologies
4062-81 Grumman Boulevard
Calverton, New York 11933

Quality Control Plan for Composite Technologies

Project: WOTC-GC1-2-KNO186-020-STATION HALL STRUCTURE TO GRADE
Specification section: 07816 – Epoxy Intumescent Coating System

Works-In-Progress Associates (WPA) will provide Quality Control (QC) Services for Composite Technologies for both the shop and field applied intumescent coating system for the structural steel for the PATH WTC Transportation Hub Package 20 project. WPA understands the integral importance of quality control on the successful project completion which balances equally on the aesthetics and conformity to the visual quality of the finish and upon the critical technical requirements of the application for code compliance. WPA will provide the Quality Control oversight for all aspects for the intumescent steel coating system as directed by Composite Technologies, from design and performance testing and inspection; delivery storage and handling of the product; project conditions; sequencing of the work and remedial work; through finish appearance for final sign off.

WPA Firm Profile

Works-in-Progress Associates was founded in 1994 by Debra Inwald AIA, founder and principal. WPA services include project team assembly, contract negotiation and administration, procurement, facilities management, construction supervision, design and technical review. WPA has been instrumental in bringing projects to completion on over 156 projects in the last 14 years, two thirds of which involved working with city and state agencies. ***WPA is a certified Woman Owned Business with The Port Authority of New York,*** New York State Department of Economic Development, & New Jersey, Dormitory Authority State of New York, New York City School Construction Authority, and NYC Department of Small Business Services with approval pending from the Commonwealth of Massachusetts. A1 Works-In-Progress Associates LLC is a Limited Liability S Corporation.

The Works-in-Progress Associates staff is a diverse group of talented professionals with years of experience in project management and the construction industry. Our project managers include registered architects, experienced project and construction managers, sustainable design experts, and office engineers. Many staff members have worked for and with New York State agencies such as DASNY, DDC, DGS, DOT, MTA, and the NYC Department of Parks. We currently have on-going contracts and projects with PANYNJ, MTA, LMCCC and the SCA.

WPA knows New York City agencies, methodologies, participants and we are well versed in the required processes, and we have successfully managed projects for government and public agencies, community organizations, universities and corporations. WPA's staff continues to productive working relationship with city agencies and civic

organizations. Listed below are some of the agencies and projects that WPA's staff has worked with: Alliance for Downtown New York, Community Boards 1, 9, 10, 11, Property Owners and Area Construction, Federal Transit Agency, City and State of New York, Port Authority New York/ New Jersey, Department of Transport, Department of Housing and Urban Development, Department of General Services, Hudson River Park Trust, Department of Design and Construction- Structures and Infrastructures, Battery Park City Authority, Economic Development Corporation, Manhattan Borough Presidents Office, Metropolitan Transportation Authority, NYC Department of Small Business Services, NYC Economic Development Corporation; New York Dormitory Authority of the State of New York, Metropolitan Transportation Authority, Division of Housing and Community Renewal; Department of Cultural Affairs, New York Council on the Arts.

GENERAL RESPONSIBILITIES

1.01 QUALITY CONTROL SERVICES FOR COMPOSITE TECHNOLOGIES

Works-in-Progress Associates (WPA) will be responsible for ensuring the Quality Control on the completion of all work in conformance with contractual requirements. Because of the integral importance of the application to the aesthetics of the project and regardless of the configuration for the application of the product, we understand that our roles and responsibilities regarding Quality Control includes the aesthetics of the finish and protection of the surrounding areas for the applied Product contributes to the success of the project from both an aesthetic and technical point of view. WPA will provide quality control oversight for the accurate completion and final sign off of all required QC forms and reports. Additional responsibilities include ensuring that the Product field service audit requirements are completed, documented and available for consultation. This is particularly important with regard to corrective actions agreed by the contractual parties on non-conformances. The Site QC Inspector will have the necessary expertise to correctly evaluate the quality of the work and will be responsible for bringing any non-conformances to the immediate attention of the appropriate Project Manager.

Importance will be placed on Quality Control oversight and monitoring for: Monitor Surface Finish Application; record keeping; reporting and team coordination; sample preparation; environmental condition oversight; substrate preparation; priming procedures; attending trade field meetings; pin installation: procedures for masking surroundings; product storage conditions; monitoring coating thickness; final conditions; substrate temperature monitoring; repairs and corrective actions; etc.

1.02 QUALITY CONTROL/ ASSURANCE PERSONNEL

A. **Site Quality Control Inspector** will be provided by WPA to implement on a daily basis all the QC checks described in this manual and the project QC plan, where applicable. The Site Quality Control Inspector will have successfully completed Product Training School and be in possession of both the Training School certificate and the relevant Product Application Manual at the work site. The Site QC Inspector will also be responsible for the accurate completion and final sign off of all required QC forms and reports. Additional responsibilities include ensuring Product (Fire & Insulation Products) field service audit requirements are completed, documented and available for consultation. This is particularly important with regard to corrective actions agreed by the contractual parties on non-conformances. The Site QC Inspector will evaluate the quality of the work and be responsible for bringing any non-conformances to the immediate attention of the Project Manager.

   1. Records shall be produced and maintained covering the progress of a project. With good records a reference is available if documentation review is required for any reason at a later date. Such documentation can help to demonstrate that the work was carried out in accordance

with the specifications. Generally three types of records are used. The first is a quality control form in which details of work carried out in a given area are recorded according to when each step was completed and accepted. The second and third are daily logs to record personnel, weather conditions, material consumption, surface areas completed and equipment details. Documented quality records are a requirement of the quality system standard and International Paint's Field Service Audit Programme.

2. WPA will coordinate the project samples prior to the commencement of the specified intumescent coating system application. WPA will coordinate and get sign-off on the size and configuration of the sample to be made accordance with the project requirements. Samples to be located in the structural steel fabricator's shop- if shop applied, unless otherwise directed. Sample shall employ the materials, preparatory requirements and other such conditions as those specified; and as required to represent the actual materials and methods proposed in the actual work including proposed "hold-back" conditions which emulate the actual field welded conditions requiring field touch-up/coating application.. Coordinate samples for members, connections and surface preparation, including primers and top finish coats. Obtain acceptance of visual quality and workmanship of sample prior to the commencement of work. Accepted samples to be retained as a standard for judging the work which may be incorporated into the finished work.
3. Minutes of the meeting shall be recorded, typed and printed by the Contractor and distributed by him to all parties concerned within five days of the meeting.

B. **Site Supervisor** will organize the practical work operations including daily planning, materials supply and storage and checking on progress. The Site Supervisor has direct responsibility for the quality of the work carried out and must therefore have successfully completed a Product Training School. Both the Training School certificate and the relevant Product Application Manual should be in the Site Supervisor's possession at the work site.

1.03 DESIGN AND PREFORMANCE REQUIREMENTS

A. **OPERATING PROCEDURES** WPA's Scope of work will be to confirm that the process of product fireproofing application is consistent with manuals and agreed upon quality control standards: including but not limited to: surface preparation; priming with an approved product; installation reinforcement; masking where necessary; approved application techniques: and topcoat if required and damasking. The recommended and approved application processes appropriate for the job and in all cases, the approved equipment must be utilized in the shop and field application.

1.04 SUBMITTALS

A. WPA will coordinate and Obtain Test Reports including submittal of certified test results from an independent and accepted testing laboratory acceptable to the Authority indicating compliance of products with performance requirements indicated.

1.05 DELIVERY STORAGE AND HANDLING

A. WPA will monitor product storage conditions as specified, including instructions for long-term storage and preparation storage for applications. The storage requirements are to be maintained to optimize material performance and ease of application. Daily temperature recordings to be documented for each applicable storage site and will include both ambient and actual core sample temperatures.

1.05 PROJECT CONDITIONS

WPA will monitor the Environmental Conditions for the intumescent coating system both in the shop and where work is deferred to the field, the specified criteria for the "shop applied" quality control and installation requirements shall apply. We will monitor that the environmental conditions are maintained

as per the manufacturer's published recommendations for ambient and substrate temperatures as approved by the Client. We will monitor that proper temporary protection and heat can be provided to maintain temperatures of both at or above this temperature level for the specified time frame before, during and for a specified period after application. Surface temperature must be a maintained at the appropriate temperature above the dew point and relative humidity will also be observed during the curing process. Monitoring of appropriate ventilation requirements are met by means of natural or, where this is inadequate, of forced air circulation during and after application until it dries thoroughly as specified and agreed to. Ventilate areas required to receive intumescent fireproofing system during Application, and for not less than specified period following application.

1. WPA will monitor environmental conditions as they are important for every aspect of the application system and are required to obtain optimum performance and application conditions. WPA will monitor quality controls for blasting and priming in accordance with the manufacturer's written instructions and Client's requirements and as outlined in the product system application Manuals for each process. These conditions will be recorded on the agreed upon periodic based as conditions can vary considerably depending on location.

1.07 SEQUENCING

A. WPA will coordinate work to avoid unnecessary exposure of fireproofing to abrasion, damage, and defects resulting from storage, handling and erection likely to occur during construction operations.
   1. Ensure it is installed with sufficient time allowed for inspection, testing and correction of defective work including remedial work resulting from defects, damages, and non-compliant applications and confirm that conditions and requirements are replicated. However, this does not prohibit complete field application of intumescent fireproofing system. Where work is deferred to the field, the specified criteria for the "shop applied" quality control and installation requirements shall apply.
   2. The Project Manager and Supervisor will obtain a release document from the owner's representative (Client/Architect/Engineer) for a given area of the structure to start work on.

2.01 PRODUCT QUALITY CONTROL OVERSIGHT

A. A. testing & inspection oversight will be provided by WPA, which entails the daily inspection of all work including substrate primer Intumescent Coating-Type Fireproofing System. The Client's Architect/ Engineer will perform Quality Assurance inspections to ensure that WPA's Quality Control program is being followed.
   1. WPA will oversee the remedial work required to comply with the specified requirements as well as the re-testing of such remedial work until the system installations meet the required performance criteria.
   2. We will also supervise the repair or replacement of coating system components within areas where test results indicate assemblies do not comply with code, performance or visual finish requirements.

2.02 EXAMINATION

A. Examination oversight will be carried out by WPA and will require applicator/installer to examine primed structural steel substrates to determine if they are in satisfactory condition prior to receiving intumescent coatings.
   1. Verify that primed surfaces have been properly prepared and coated, and that they are ready to receive specified coatings.

2. Verify that hold-back areas and other such surfaces have been clearly identified so that field grinding of coatings will not be required; and field welding can be properly performed.
3. Verify holes, slots and other such penetrations are properly protected so that applied intumescent coating system components will not interfere with subsequent work.
4. Commencement of intumescent coating application will imply the Contractor's acceptance of existing conditions.

2.03 SURFACE PREPARATION OVERSIGHT

A. WPA will examine the steel substrates and conditions that may affect the intumescent coatings, and determine when to proceed with work after unsatisfactory conditions have been corrected.

B. WPA will oversee the cleaning of substances which might be incompatible with or interfere with bond of intumescent fireproofing, and ensure removal of ill-timed work which might interfere with installation of intumescent coating/treatment.

1. WPA will oversee compliance with manufacturer's published instructions for preparation of surfaces, preparation of materials, and application process, including oil, dirt, scale, rust and non-compatible shop primer.
2. Oversee the Coatings Applications
   a. Hold-back shop applied intumescent coating system components at bolted connections and as specified for welded connections; to allow for steel erection in the field.
   b. Oversee that temporary protection is in place to confine spray operations, protect the environment, and ensure adequate ambient environmental conditions.
   c. Monitor OSHA approved ventilation to prevent unsafe build-up of fumes and vapors.

2.04 APPLICATION QUALITY CONTROL

A. WPA will provide Quality Control oversight for the application of intumescent coating system materials as required for quality level indicated by approved samples and in accordance with manufacturer's calculations for each structural steel member, as follows below:

1. Oversight of conformity to the visual quality of the control sample and the required thicknesses to achieve Code required fire resistance ratings for the applied intumescent coating system in stipulated number of passes and see that the manufacturer's recommended thickness allowed for a single coat are maintained.
2. Monitor that the intumescent fireproofing is cured thoroughly between coats and test applied coats as recommended for cure and dryness prior to apply next coat.
3. Monitor that there is control of the applications to ensure smooth even surfaces capable of receiving tap finish coat(s) application without telegraphing surface irregularities.
   a. Monitor that each succeeding coat is sanded/prepared as recommended by manufacturer for optimal surface smoothness and proper tooth for succeeding coats.
4. In monitoring application, give special attention to ensure edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces without pillowing or hollows.
5. Monitor that minimum thickness of coating is maintained that leaves no evidence of application technique, paints laps, irregularity in texture and other surface imperfections deemed defective by the Engineer/Architect.

EXECUTION

3.01 FIELD EXAMINATION

A. WPA to monitor for quality control to examine and document field conditions before finished members are protected, delivered and off-loaded to the Project site in preparation of erection. Determine if said

site conditions are acceptable, and in accordance with the necessary requirements to oversee work in order to prevent damage to coated members. Verify that substrates are ready for erection and meet requirements.

3.02 FIELD PREPARATION

A. After erection of the intumescent coated structural steel, WPA will examine the structure for coating damages resulting from handling, erection, bolted- and welded-connections, insufficient protections and construction. Identify areas and conditions in need of remedial work and proceed with repairs in accordance with the manufacturer's written instructions and recommendations, as well as the Contract Documents.

1. WPA will monitor work progress for quality control of the substrate preparation to be carried out in accordance with the Product Application Manual procedures. The cleaning grade and blast profile will be documented and deemed acceptable prior to the specified priming. If the Product applicator does not actually perform the blasting and priming, the applicator is responsible for verifying the conformance of surface preparation and primer with the Product Application Manual requirements by means of either suitable QC documentation or first hand testing and inspection.

3.03 OVERSIGHT OF FIELD INSTALLATION AND QUALITY CONTROL

A. WPA will monitor and document the substrate priming repair procedure for field block outs which is to be carried out in accordance with the Product Application Manual procedures, using only primers name, type and applied thickness on a daily basis from the "Product Fireproofing Approved Primer Systems" list, unless written authorization is obtained for another primer system.

B. WPA will monitor that surfaces or equipment in the spraying areas that do not require fireproofing is to be masked off and overspray is to be closely watched for. WPA will manage all quality control issues which include the aesthetics of the finish and protection of areas outside the termination points of the applied Product.

C. WPA will monitor that applications, either solvent or solvent less applications will be carried out in accordance with the procedures outlined in the Product Application Manual. WPA will provide the documentation which will include but not be limited to: environmental conditions; equipment type; material temperatures; tank temperatures; heater temperatures; line temperature; gun exit temperature; spray pressures for each component; coating thickness; location of area sprayed; material batch numbers.

D. WPA will provide the documentation which will include but not be limited to: environmental conditions; equipment type; material temperature; solvent type and amount; coating thickness; location of area sprayed; material batch numbers.

E. WPA will monitor the correct measurement of the fireproofing system thickness which is critical to guaranteeing conformance with the project specification and the following criteria should be strictly adhered to. Method for measuring wet product thickness, to be confirmed by the product manuals, engineers/architects and that all appropriate members of the application team from the sprayer to the troweller to the roller are trained, to assure reaching the design thickness over the whole surface. Method of measuring dry Product thickness to be measured by approved methods to be provided which may include: drilling of small hole and checking the Product thickness with a depth gauge with care taken not to damage the substrate and to refill the holes with Product as soon as possible; using an electromagnetic or ultrasound thickness gauge with care taken to calibrate the gauge immediately prior to taking readings, and may be used where in areas without reinforced wire mesh. Thickness readings will be recorded.

F. INSPECTION EQUIPMENT may include but not be limited to

a. FILM THICKNESS: Wet film thickness (bridge gauge) the gauge should be used by all members of the application team (sprayer, troweller and roller).Dry film thickness (mechanical depth micrometer) a mechanical depth micrometer is required to inspect cured Product for thickness measurements. Dry film thickness (electronic or ultrasound thickness gauge) This type of gauge is used to measure the thickness of dry coatings on steel substrates and can be used to measure both the primer and Product dry film thickness, without metal mesh used as the reinforcement system. Care should be taken to calibrate the instrument before each use.

b. SUBSTRATE TEMPERATURE (surface thermometer) a thermometer should be used to measure the surface temperature of the substrate immediately before Product is applied. It should be calibrated to the manufacturer's specification and range.

c. AMBIENT CONDITIONS (sling psychrometer, hygrometer, and air thermometer) Reliable instrumentation should be used to record air temperature and relative humidity. We recommend the use of a sling psychrometer as it is a simple but reliable and robust instrument consisting of two thermometers in a frame one of which has a wet bulb and the other a dry bulb. The dew point temperature can then be calculated in relation to air temperature and relative humidity.

d. PRODUCT TEMPERATURE Digital thermometer/bi-metal thermometer is used to record Product temperatures during storage and application. They should be calibrated to the manufacturer's specification as detailed in the Application Manual.

3.04 CLEANING, REPAIR AND PROTECTION

A. WPA will oversee that, immediately upon completion of fireproofing operations in each containable area of project applied, spatters are removed and fall-out of materials from surfaces of other work and clean exposed surfaces to remove evidence of soiling. QC oversight to include that the exposed fireproofing materials are cured in compliance with fireproofing manufacturer's recommendations.

B. WPA will oversee that intumescent fireproofing system, is protected from damage resulting from construction operations and will be without damage or deterioration at time of Final Acceptance.

C. WPA will monitor and coordinate installation of fireproofing with other work in order to minimize the need for other trades to cut or remove fireproofing. As other trades successively complete installation of their work, WPA will monitor the protection of structure afforded by fireproofing by patching any areas which have been removed or damaged.

D. WPA will monitor and coordinate the repair or replacement of work which has not been successfully protected.

E. **OPERATING PROCEDURES** WPA's Scope of work will be to confirm that the process of product fireproofing application is consistent with manuals and agreed upon quality control standards: including but is not limited to: surface preparation; priming with an approved product; installation reinforcement; masking where necessary; approved application techniques: and topcoat if required and damasking. The recommended and approved application processes appropriate for the job and in all cases, the approved equipment must be utilized.

F. **Sample preparation** Prior to the start up of actual production work an approved sample or a sample area will be coated with Product in accordance with the project specifications. This sample should be representative of the work to be carried out throughout the project. The sample or sample area will then be approved and signed off by the owner's representative, applicator's representative, fabricator's representative, International Paint's Field Service Engineer and any other party as required by the contract for the quality of surface finish and conformance with the relevant procedures and specifications.

G. **Substrate preparation** shall be carried out in accordance with the procedures described in the Product Application Manual. The cleaning grade and blast profile shall be documented and accepted prior to priming as specified in the Appendices. If the Product applicator does not actually perform the blasting and priming, the applicator is responsible for verifying the conformance of surface preparation and primer with the Product Application Manual requirements by means of either suitable QC documentation or first hand testing and inspection.

H. **Priming procedure** of the substrate shall be carried out in accordance with the procedures described in the Product Application Manual. Only primers on the "Product Fireproofing Approved Primer Systems" list may be used, unless written authorization is obtained for another primer system. Documentation for the primer system shall consist of primer name, type and applied thickness on a daily basis as indicated in the Appendices.

I. **Mesh Reinforcement** is to be installed in accordance with the procedures described in the relevant Product Application Manual. Documentation of the mesh system used shall include mesh type, size, attachment means and standoffs).

3.05 FINAL INSPECTION

After all QC documentation is submitted, final inspection will be carried out by the owner's representative, applicator's representative, fabricator's representative, Engineer/Architect and any other party as required by the contract. Areas will then be signed off for acceptance or repairs noted and carried. A 100% visual inspection should be performed to ensure there is no exposed mesh, debonding at terminations or bubbles below the surface layer of Product. Physical inspection consists of measurement of dry film thickness of the Product system and tapping to detect possible hollow areas or delamination between sprayed layers of Product not easily visible.

6.0 FIELD SERVICE AUDITS

In addition to the forms and records produced by the qualified applicator, copies of the Audit Report and Non-Conformance Report (if raised) shall also be maintained. These reports supplied by Engineer will include: Area Quality Control Reports, Daily Logs, Equipment Quality Control Reports, and Field Service Audits which are to be signed. Copies of reports will be QA/QC representative on site and the owner's representative at the end of each Engineer's visit. Additional copies will be distributed to respective agencies as required by the project specifications. The maintenance of these records is important in that a history of audits is documented for each project. Follow-up audits may require reference to verify that requested remedial action has been successfully completed, or situations may arise where past audit history requires review.

STAFFING STRUCTURE

Structure

A. WPA's team approach to project management ensures that back-up personnel are available and current on relevant project issues, and see that deadlines are met The Principal of the firm or the Project Executive will be involved for critical issues while the Quality Control Inspectors will have detailed oversight of the project management supported by other personnel as required. The Principal and the Senior Project Manager will be involved during the project's duration and will have significant involvement during the project mobilization and for project meetings as requested. The Senior Project Manager and Quality Control Inspectors will handle all the day-to-day issues of the project and be on-site as required. WPA services shall include advice, opinions or recommendations as appropriate. WPA's staff assigned to the project will conduct activities related - but not limited to - onsite Quality

Control Inspectors, coordinating, supervision, verification of compliance with design and construction practices and reporting. All decisions in connection with the implementation of such recommendations are the responsibility of Composite Technologies.

MATERIAL DATA AND MSDS SHEETS

See attachment exhibit "C"

Interchar® 212

Epoxy Intumescent Coating

International Protective Coatings

WORLD WIDE PRODUCT RANGE

PRODUCT DESCRIPTION

A high performance, high build, solvent free, two pack modified epoxy intumescent fireproofing coating designed to be used on steelwork requiring protection from cellulosic fires.

Independently fire tested. Approved to UL 263 (exterior listed), BS 476 part 20-22, and GOST (Russia).

Applied off site by specialist applicators Interchar 212 will achieve the required protection (e.g. 2 hours) in only one or two coats. The product has excellent corrosion performance and mechanical properties. Unlike many other products on the market Interchar 212 can provide fully fire proofed steelwork without the need to topcoat.

Interchar 212 is a spray applied material, and performs without the requirement for any reinforcement.

INTENDED USES

To assist in preserving the structural integrity of steelwork in a cellulosic fire. Typical structures requiring this protection include a number of public access buildings e.g Airport Terminals, Leisure Facilities, Convention Centres, Educational Facilities, Shopping Malls, Industrial Complexes, and Hotels.

Interchar 212 utilizes tough durable epoxy technology to provide a material that allows for steelwork to be fabricated and fire protected away from the construction site which helps in both improving quality control and reducing construction schedules.

PRACTICAL INFORMATION FOR INTERCHAR 212

Color	Medium Gray
Gloss Level	Matte Textured Finish
Volume Solids	100%
Typical Thickness	2 mm - 8 mm (Dependent on protection required). Typical thickness per coat 3.5 mm
Theoretical Coverage	1 kg of Interchar 212 will provide 1 mm of fire protection to 1 m^2**
Practical Coverage	Allow appropriate loss factors
Method of Application	Hot twin feed airless spray (Plural Component) or modified single component machine

** based on plural component application

Drying Time

Temperature	Touch Dry#	Hard Dry#	Overcoating Interval with recommended topcoats *Minimum*	*Maximum*
50°F (10°C)	16 hours	24 hours	24 hours	Extended*
59°F (15°C)	8 hours	16 hours	24 hours	Extended*
77°F (25°C)	5 hours	12 hours	12 hours	Extended*
104°F (40°C)	2 hours	8 hours	8 hours	Extended*

* See International Protective Coatings Definitions & Abbreviations

\# All drying time data has been quoted a typical thickness of 3.5 mm

REGULATORY DATA

Flash Point	Base (Part A) >223°F (106°C)	C/A (Part B) >223°F (106°C)	Mixed >223°F (106°C)
Applied Density (plural component)	62.4 lbs/ft^3 (1000 kg/m^3)		
VOC	0 lb/gal (0 g/l)	(Calculated)	

ECOTECH

See Product Characteristics section for further details

Ecotech is an initiative by International Protective Coatings, a world leader in coating technology, to promote the use of environmentally sensitive products across the globe.

Interchar® 212

Epoxy Intumescent Coating

SURFACE PREPARATION

All surfaces to be coated should be clean, dry and free from contamination. Prior to paint application all surfaces should be assessed and treated in accordance with ISO 8504:2000.

Abrasive Blast Cleaning

This product must only be applied to surfaces prepared by abrasive blast cleaning to SSPC-SP10 or Sa2.5 (ISO 8501-1:1998).

Primed Surfaces

If applied within 4 hours of blasting in shop, a primer may not be required. Consult with International Paint.

APPLICATION

Mixing	If applying Interchar 212 by modified airless spray, pump or trowel, it will first be necessary to thoroughly power mix a kit of Interchar 212. Individual components must have been stored for 24 hours at 73°F (23°C) and fully power agitated before mixing. 70°-80°F (21°-67°C)	
Mix Ratio	Always mix full units.	
Working Pot Life	59°F (15°C) 120 minutes	77°F (25°C) 90 minutes
Plural Component	Highly Recommended	Heated plural equipment approved by International Paint
Modified Airless Spray	Suitable	Higher applied densities may lead to lower transfer efficiencies
Trowel	Suitable - Small areas only	
Thinner	International GTA123 International GTA822 International GTA853	Only for pre-mix and hand application - consult Working Procedures.
Cleaner	International GTA822	
Work Stoppages	Do not allow mixed material to remain in hoses, gun or spray equipment. Thoroughly flush all equipment with International GTA822.	
Clean Up	Clean all equipment immediately after use with International GTA822. It is good working practice to periodically flush out spray equipment during the course of the working day. Frequency of cleaning will depend upon amount sprayed, temperature and elapsed time, including any delays. All surplus materials and empty containers should be disposed of in accordance with appropriate regional regulations/legislation.	

Interchar® 212

Epoxy Intumescent Coating

PRODUCT CHARACTERISTICS

The detailed Recommended Working Procedures for Interchar epoxy coatings must be consulted prior to use. In addition it is mandatory that you make contact with International Paint to ensure that, if required, a training programme can be initiated in the application and use of this material.

International Paint highly recommends the use of plural component equipment for Interchar 212. Other application methods can lead to increased usage rates due to the unique product characteristic and increased wastage associated with other application methods.

Only equipment approved by International Paint shall be used, as detailed in the Working Procedures or by the International Paint Field Service Engineer.

Surface temperature must always be a minimum of 5°F (3°C) above dew point.

When applying Interchar 212 in confined spaces ensure adequate ventilation.

The final surface finish is dependent on application method. Avoid using a mixture of application methods whenever possible.

Do not apply at steel temperatures below 41°F (5°C). This product will not cure adequately below 41°F (5°C). For maximum performance ambient curing temperatures should be above 50°F (10°C).

In common with all epoxies Intergard 212 will chalk and discolour on exterior exposure. These phenomena are not detrimental to fire proofing performance. Where a durable cosmetic finish with good gloss and colour retention is required overcoat with recommended topcoats.

Where multicoat systems are being used optimum inter coat adhesion is best achieved by keeping the overcoating interval as short as possible.

Due to the high build nature of this material it may be necessary to roller areas requiring a cosmetic finish.

International Paint can supply field service, however it is the responsibility of the Application Contractor to provide reasonable notice to International Paint of the planned application dates. Where field service is supplied quality control remains the responsibility of the applicator but as a minimum must conform to the procedures laid down by the client and International Paint.

Note: VOC values are typical and are provided for guidance purposes only. These may be subject to variation depending on factors such as differences in color and normal manufacturing tolerances.

Low molecular weight reactive additives, which will form part of the film during normal ambient cure conditions, will also affect VOC values determined using EPA Method 24.

SYSTEMS COMPATIBILITY

Interchar 212 has been tested as part of a coating system for use in fire situations in combination with a wide range of primers and topcoats.

The following primers are approved for use with Interchar 212:

Intergard 251
Intergard 269
Intercure 200
Intercure 200HS

The following topcoats are approved for use with Interchar 212 :

Interthane 870
Interthane 990
Interfine 878
Interfine 979

Interchar® 212

Epoxy Intumescent Coating

ADDITIONAL INFORMATION

Further information regarding industry standards, terms and abbreviations used in this data sheet can be found in the following documents available at www.international-pc.com:

- Definitions & Abbreviations
- Surface Preparation
- Paint Application
- Theoretical & Practical Coverage
- Interchar epoxy Working Procedures

Individual copies of these information sections are available upon request.

SAFETY PRECAUTIONS

This product is intended for use only by professional applicators in industrial situations in accordance with the advice given on this sheet, the Material Safety Data Sheet and the container(s), and should not be used without reference to the Material Safety Data Sheet (MSDS) which International Protective Coatings has provided to its customers.

All work involving the application and use of this product should be performed in compliance with all relevant national, Health, Safety & Environmental standards and regulations.

In the event welding or flame cutting is performed on metal coated with this product, dust and fumes will be emitted which will require the use of appropriate personal protective equipment and adequate local exhaust ventilation.

If in doubt regarding the suitability of use of this product, consult International Paint for further advice.

PACK SIZE	44.2 lb (20.0 kg) Unit	
	110.3 lb (50.0 kg) Unit	
	For availability of other pack sizes contact International Protective Coatings	
SHIPPING WEIGHT	U.N. Shipping No.	Non Hazardous
		31.33 lbs (14.2 kg)
		12.78 lbs (5.8 kg)
STORAGE	Shelf Life	12 months minimum at 25°C (77°F). Subject to re-inspection thereafter. Store in dry, shaded conditions away from sources of heat and ignition.

Important Note

The information given in this sheet is not intended to be exhaustive and any person using the product for any purpose other than that specifically recommended in this sheet without first obtaining written confirmation from us as to the suitability of the product for the intended purpose does so at his own risk. Any warranty, if given, or specific Terms & Conditions of Sale are contained in International's Terms & Conditions of Sale, a copy of which can be obtained on request. While we endeavor to ensure that all advice we give about the product (whether in this sheet or otherwise) is correct we have no control over either the quality or condition of the substrate or the many factors affecting the use and application of the product. Therefore, unless we specifically agree in writing to do so, we do not accept any liability whatsoever or howsoever arising for the performance of the product or for any loss or damage (other than death or personal injury resulting from our negligence) arising out of the use of the product. The information contained in this sheet is liable to modification from time to time in the light of experience and our policy of continuous product development.

It is the user's responsibility to check that this sheet is current prior to using the product Issue date 01/10/2005

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AKZO NOBEL

Interzinc® 52

Epoxy Zinc-Rich

International. Protective Coatings

WORLD WIDE PRODUCT RANGE

PRODUCT DESCRIPTION

A two component, metallic zinc rich epoxy primer which complies with the composition and performance requirements of SSPC Paint 20.

INTENDED USES

As a high performance primer to give maximum protection as part of any anti-corrosive coating system for aggressive environments including those found on offshore structures, petrochemical facilities, pulp and paper plants, bridges and power plants.
Interzinc 52 has been designed to provide excellent corrosion resistance in both maintenance and new construction situations.

PRACTICAL INFORMATION FOR INTERZINC 52

Color	Blue, Gray, Green
Gloss Level	Matte
Volume Solids	59%
Typical Thickness	2-3 mils (50-75 microns) dry equivalent to 3.4-5.1 mils (85-127 microns) wet
Theoretical Coverage	315 sq.ft/US gallon at 3 mils d.f.t and stated volume solids 7.90 m²/litre at 75 microns d.f.t and stated volume solids
Practical Coverage	Allow appropriate loss factors
Method of Application	Airless Spray, Air Spray, Brush

Drying Time

Temperature	Touch Dry	Hard Dry	Overcoating Interval with recommended topcoats: Minimum	Maximum
41°F (5°C)	2 hours	10 hours	8 hours	Extended[1]
59°F (15°C)	90 minutes	6 hours	4 hours	Extended[1]
77°F (25°C)	75 minutes	4 hours	3 hours	Extended[1]
104°F (40°C)	45 minutes	2 hours	2 hours	Extended[1]

[1] See International Protective Coatings Definitions & Abbreviations

For curing at low temperatures an alternative curing agent is available. See Product Characteristics for details.
Maximum overcoating intervals are shorter when using polysiloxane topcoats. Consult International Protective Coatings for further details.

REGULATORY DATA

Flash Point	Base (Part A) 84°F (29°C)	Curing Agent (Part B) 86°F (30°C)	Mixed 84°F (29°C)
Product Weight	21.0 lb/gal (2.5 kg/l)		
VOC	2.80 lb/gal (336 g/l)	USA - EPA Method 24	
	156 g/kg	EU Solvent Emissions Directive (Council Directive 1999/13/EC)	

See Product Characteristics section for further details

Interzinc® 52

Epoxy Zinc-Rich

SURFACE PREPARATION

All surfaces to be coated should be clean, dry and free from contamination. Prior to paint application all surfaces should be assessed and treated in accordance with ISO 8504:2000.

Oil or grease should be removed in accordance with SSPC-SP1 solvent cleaning.

Abrasive Blast Cleaning

Abrasive blast clean to a minimum of SSPC-SP6 or Sa2½ (ISO 8501-1:1988). If oxidation has occurred between blasting and application of Interzinc 52, the surface should be reblasted to the specified visual standard.

Surface defects revealed by the blast cleaning process, should be ground, filled, or treated in the appropriate manner.

A surface profile of 1.6-3.0 mils (40-75 microns) is recommended.

Shop Primed Steelwork

Interzinc 52 is suitable for application to unweathered steelwork freshly coated with zinc silicate shop primers.

If the zinc shop primer shows extensive or widely scattered breakdown, or excessive zinc corrosion products, overall sweep blasting will be necessary. Other types of shop primer are not suitable for overcoating and will require complete removal by abrasive blast cleaning.

Weld seams and damaged areas should be cleaned to a minimum St3 (ISO 8501:1988) or SSPC-SP3. Optimum performance will be achieved with blasting to Sa2½ (ISO 8501-1:1988) or SSPC-SP6; where this is not practical, hand preparation to SSPC-SP11 is recommended.

APPLICATION

Mixing

Material is supplied in two containers as a unit. Always mix a complete unit in the proportions supplied. Once the unit has been mixed it must be used within the working pot life specified.

(1) Agitate Base (Part A) with a power agitator.
(2) Combine entire contents of Curing Agent (Part B) with Base (Part A) and mix thoroughly with power agitator.

Mix Ratio

4 part(s) : 1 part(s) by volume

Working Pot Life

41°F (5°C)	59°F (15°C)	77°F (25°C)	104°F (40°C)
24 hours	12 hours	5 hours	2 hours

Airless Spray

Recommended

Tip Range 17-21 thou (0.43-0.53 mm)
Total output fluid pressure at spray tip not less than 2503 psi (176 kg/cm²)

Air Spray (Pressure Pot)

Recommended

Gun DeVilbiss MBC or JGA
Air Cap 704 or 765
Fluid Tip E

Brush

Suitable - Small areas only

Typically 2 0-3 0 mils (50-75 microns) can be achieved

Roller

Not recommended

Thinner

International GTA220 (or International GTA415)

Do not thin more than allowed by local environmental legislation.

Cleaner

International GTA822 (or International GTA415)

Work Stoppages

Do not allow material to remain in hoses, gun or spray equipment. Thoroughly flush all equipment with International GTA415 or GTA220. Once units of paint have been mixed they should not be resealed and it is advised that after prolonged stoppages work recommences with freshly mixed units.

Clean Up

Clean all equipment immediately after use with International GTA415 or GTA220. It is good working practice to periodically flush out spray equipment during the course of the working day. Frequency of cleaning will depend upon amount sprayed, temperature and elapsed time, including any delays.

All surplus materials and empty containers should be disposed of in accordance with appropriate regional regulations/legislation

Interzinc® 52

Epoxy Zinc-Rich

PRODUCT CHARACTERISTICS

In order to ensure good anti-corrosive performance, it is important to achieve a minimum dry film thickness of Interzinc 52 of 1.5 mils (40 microns). To achieve a uniform, coalesced, closed film at this dry film thickness, it will be necessary to thin Interzinc 52 with 10% with International thinners. The film thickness of Interzinc 52 applied must be compatible with the blast profile achieved during surface preparation. Low film thickness should not be applied over coarse blast profiles.

Care should be exercized to avoid the application of dry film thicknesses in excess of 6 mils (150 microns).

Care should be exercised to avoid over-application which may result in cohesive film failure with subsequent high builds, and to avoid dry spray which can lead to pinholing of subsequent coats. Over-application will also result in slower curing and extended handling and overcoating times.

Over-application of Interzinc 52 will extend both the minimum overcoating periods and handling times, and may be detrimental to long term overcoating properties.

When Interzinc 52 is allowed to weather before topcoating ensure all zinc salts are removed prior to paint application and only topcoat with recommended materials.

Surface temperature must always be a minimum of 5°F (3°C) above dew point.

Interzinc 52 is not normally recommended for underwater use. Please consult International Protective Coatings for further details in this situation.

Interzinc 52 is suitable for the localized repair of damaged inorganic zinc primer - consult International Protective Coatings for specific advice.

Low Temperature Curing

An alternative curing agent is available for applications at temperatures less than 41°F (5°C). When using this alternative cunng agent it should be noted that the VOC will increase to 3 lb/gal (360 g/l).

Interzinc 52 is capable of curing at temperatures below 32°F (0°C). However, this product should not be applied at temperatures below 32°F(0°C) where there is a possibility of ice formation on the substrate.

			Minimum overcoating interval with recommended topcoats	
Temperature	Touch Dry	Hard Dry	Minimum	Maximum
-5°C (23°F)	6 hours	32 hours	36 hours	Extended*
0°C (32°F)	3 hours	16 hours	18 hours	Extended*
5°C (41°F)	2 hours	6 hours	6 hours	Extended*

Touch dry times shown above are actual drying times due to chemical cure, rather than physical set due to solidification of the coating film at temperatures below 32°F (0°C)

*See International Protective Coatings Definitions & Abbreviations

For further details regarding cure times and overcoatability, please contact International Protective Coatings.

This product has the following specification approvals:

Steel Structures Painting Council - SSPC Paint 20

On consultation with International Protective Coatings this product is compatible with alternative application methods such as flow coating.

Note: VOC values quoted are based on maximum possible for the product taking into account variations due to color differences and normal manufacturing tolerances.

Low molecular weight reactive additives, which will form part of the film during normal ambient cure conditions, will also affect VOC values determined using EPA Method 24.

SYSTEMS COMPATIBILITY

Interzinc 52 is designed for application to correctly prepared steel It is possible to apply over approved prefabrication primers Details of these can be obtained from International Protective Coatings

Recommended topcoats are:

Intercure 200	Intergard 740
Intercure 420	Interseal 670HS
Interfine 629HS	Interthane 990
Intergard 251	Interzone 1000
Intergard 269	Interzone 505
Intergard 401	Interzone 954
Intergard 475HS	

For other suitable topcoats, consult International Protective Coatings

Interzinc® 52

Epoxy Zinc-Rich

ADDITIONAL INFORMATION

Further information regarding industry standards, terms and abbreviations used in this data sheet can be found in the following documents available at www.international-pc.com:

- Definitions & Abbreviations
- Surface Preparation
- Paint Application
- Theoretical & Practical Coverage

Individual copies of these information sections are available upon request.

SAFETY PRECAUTIONS

This product is intended for use only by professional applicators in industrial situations in accordance with the advice given on this sheet, the Material Safety Data Sheet and the container(s), and should not be used without reference to the Material Safety Data Sheet (MSDS) which International Protective Coatings has provided to its customers.

All work involving the application and use of this product should be performed in compliance with all relevant national, Health, Safety & Environmental standards and regulations.

In the event welding or flame cutting is performed on metal coated with this product, dust and fumes will be emitted which will require the use of appropriate personal protective equipment and adequate local exhaust ventilation.

If in doubt regarding the suitability of use of this product, consult International Protective Coatings for further advice.

PACK SIZE

10 liter unit	Interzinc 52 Base	8 liters in a 10 liter container
	Interzinc 52 C/A	2 liters in a 2.5 liter container
3 gallon unit	Interzinc 52 Base	2.4 gallons in a 3.5 gallon container
	Interzinc 52 C/A	0.6 gallons in a 1 gallon container

For availability of other pack sizes contact International Protective Coatings

SHIPPING WEIGHT

U.N. Shipping No. 1263

10 liter unit	54 lb (24.5 kg) Base (Part A)
	4.6 lb (2.1 kg) Curing Agent (Part B)
3 gallon unit	63.3 lb (28.7 kg) Base (Part A)
	5.3 lb (2.4 kg) Curing Agent (Part B)

STORAGE

Shelf Life: 12 months minimum at 77°F (25°C). Subject to re-inspection thereafter. Store in dry, shaded conditions away from sources of heat and ignition

Important Note

The information given in this sheet is not intended to be exhaustive and any person using the product for any purpose other than that specifically recommended in this sheet without first obtaining written confirmation from us as to the suitability of the product for the intended purpose does so at his own risk. Any warranty, if given, or specific Terms & Conditions of Sale are contained in International's Terms & Conditions of Sale, a copy of which can be obtained on request. While we endeavor to ensure that all advice we give about the product (whether in this sheet or otherwise) is correct we have no control over either the quality or condition of the substrate or the many factors effecting the use and application of the product. Therefore, unless we specifically agree in writing to do so, we do not accept any liability whatsoever or howsoever arising for the performance of the product or for any loss or damage (other than death or personal injury resulting from our negligence) arising out of the use of the product. The information contained in this sheet is liable to modification from time to time in the light of experience and our policy of continuous product development.

It is the user's responsibility to check that this sheet is current prior to using the product. Issue date 3/20/2007

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www.international-pc.com

AKZO NOBEL

hca212_A1

MATERIAL SAFETY DATA SHEET
INTERCHAR 212

Sales Order. (SalesOrd)

MSDS Revision No: A1 -18
MSDS Revision Date. 01/18/2007

EMERGENCY NUMBERS:

(800) 424-9300	CHEMTREC (USA)
(703) 527-3887	CHEMTREC (Int)
(800) 854-6813	Poison Control Center
CUSTOMER SERVICE.	(Non-Emergency)
(800) 569-1267	International Paint
(800) 631-7481	Interlux

International.

International Paint LLC
6001 Antoine Drive
Houston, Texas 77091

1. GENERAL INFORMATION

Product Identity: INTERCHAR 212

Bulk Sales Reference No: hca212

IMPORTANT: Read this MSDS before handling or disposing of this product, and provide this information to the employee, customers, and users of this product. PLEASE NOTE THE MSDS REVISION NUMBER AT THE TOP OF THIS PAGE. If the MSDS Revision Number posted at the top of this page does not match the MSDS Revision Number on the product label, please contact Customer Service at the phone number included above for the correct MSDS. This product is covered by the OSHA Hazard Communication Standard and this document has been prepared in accordance with requirements of this standard.

NOTICE: OSHA hazardous chemicals are listed in Section 2 if present at 1% or more. Carcinogens and extraordinarily/special hazardous chemicals are listed in Section 2 if present at .1% or more. Additional regulatory information for specific chemical categories is included in Section 15.

2. HAZARDOUS INGREDIENT INFORMATION

CAS No.	Ingredient Name & %	Source	Exposure Data
000108-78-1	Melamine 1.0 - 10% by Weight	OSHA:	No Established Limit
		ACGIH:	No Established Limit
		NIOSH:	No Established Limit
		Supplier:	No Established Limit
		OHSA, CAN:	No Established Limit
		Mexico:	No Established Limit
		Brazil:	No Established Limit
		Source	Health Data
		NIOSH:	No Established Limit
		Source	Carcinogen Data
		OSHA:	Select Carcinogen: No
		NTP:	Known Carcinogen: No; Suspected Carcinogen: No
		IARC:	Group 1: No; Group 2A: No; Group 2b: No; Group 3: Yes; Group 4: No

CAS No.	Ingredient Name & %	Source	Exposure Data
000115-86-6	Triphenyl phosphate 1.0 - 10% by Weight	OSHA:	No Established Limit
		ACGIH:	3 mg/m3 TWA
		NIOSH:	3 mg/m3 TWA1000 mg/m3 IDLH
		Supplier:	No Established Limit
		OHSA, CAN:	3 mg/m3 TWAEV
		Mexico:	3 mg/m3 TWA6 mg/m3 STEL
		Brazil:	No Established Limit
		Source	Health Data
		NIOSH:	Neurotoxicity in animals
		Source	Carcinogen Data
		OSHA:	Select Carcinogen: No
		NTP:	Known Carcinogen: No; Suspected Carcinogen: No
		IARC.	Group 1: No; Group 2A: No; Group 2b: No; Group 3: No; Group 4: No

CAS No.	Ingredient Name & %	Source	Exposure Data
		OSHA:	No Established Limit
		ACGIH:	No Established Limit
		NIOSH:	No Established Limit
		Supplier:	No Established Limit
		OHSA, CAN:	No Established Limit
007440-44-0	Carbon 1.0 – 10% by Weight	Mexico:	No Established Limit
		Brazil:	No Established Limit
		Source	Health Data
		NIOSH:	No Established Limit
		Source	Carcinogen Data
		OSHA:	Select Carcinogen: No
		NTP:	Known Carcinogen: No; Suspected Carcinogen: No
		IARC:	Group 1: No; Group 2A: No; Group 2b: No; Group 3: No; Group 4: No

CAS No.	Ingredient Name & %	Source	Exposure Data
		OSHA:	No Established Limit
		ACGIH:	No Established Limit
		NIOSH:	No Established Limit
		Supplier:	No Established Limit
		OHSA, CAN:	No Established Limit
015625-89-5	Trimethylolpropane triacrylate 1.0 – 10% by Weight	Mexico:	No Established Limit
		Brazil:	No Established Limit
		Source	Health Data
		NIOSH:	No Established Limit
		Source	Carcinogen Data
		OSHA:	Select Carcinogen: No
		NTP:	Known Carcinogen: No; Suspected Carcinogen: No
		IARC:	Group 1: No; Group 2A: No; Group 2b: No; Group 3: No; Group 4: No

CAS No.	Ingredient Name & %	Source	Exposure Data
		OSHA:	No Established Limit
		ACGIH:	No Established Limit
		NIOSH:	No Established Limit
		Supplier:	No Established Limit
		OHSA, CAN:	No Established Limit
025085-99-8	OXIRANE, 2,2'-4-BUTYLIDENEBISPHENYLENEOXYMETHYLENE 25 – 50% by Weight	Mexico:	No Established Limit
		Brazil:	No Established Limit
		Source	Health Data
		NIOSH:	No Established Limit
		Source	Carcinogen Data
		OSHA:	Select Carcinogen: No
		NTP:	Known Carcinogen: No; Suspected Carcinogen: No
		IARC:	Group 1: No; Group 2A: No; Group 2b: No; Group 3: No; Group 4: No

CAS No.	Ingredient Name & %	Source	Exposure Data
		OSHA:	No Established Limit
		ACGIH:	No Established Limit
		NIOSH:	No Established Limit
		Supplier:	No Established Limit
		OHSA, CAN:	No Established Limit
068333-79-9	Polyphosphoric acids, ammonium salts 25 – 50% by Weight	Mexico:	No Established Limit

		Brazil:	No Established Limit
		Source	Health Data
		NIOSH:	No Established Limit
		Source	Carcinogen Data
		OSHA:	Select Carcinogen: No
		NTP:	Known Carcinogen: No; Suspected Carcinogen: No
		IARC:	Group 1: No; Group 2A: No; Group 2b: No; Group 3: No; Group 4: No

CAS No.	Ingredient Name & %	Source	Exposure Data
		OSHA:	No Established Limit
		ACGIH:	No Established Limit
		NIOSH:	No Established Limit
		Supplier:	No Established Limit
068937-41-7	Propylated triphenyl phosphate mixture 10 - 25% by Weight	OHSA, CAN:	No Established Limit
		Mexico:	No Established Limit
		Brazil:	No Established Limit
		Source	Health Data
		NIOSH:	No Established Limit
		Source	Carcinogen Data
		OSHA:	Select Carcinogen: No
		NTP:	Known Carcinogen: No; Suspected Carcinogen: No
		IARC:	Group 1: No; Group 2A: No; Group 2b: No; Group 3: No; Group 4: No

3 HAZARD IDENTIFICATION

Overview:	NOTICE: Reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage. Intentional misuse by deliberately concentrating and inhaling the contents may be harmful or fatal. Avoid contact with eyes, skin and clothing.
Inhalation:	Harmful if inhaled. Causes nose and throat irritation. Vapors may affect the brain or nervous system causing dizziness, headache or nausea.
Eyes:	Causes severe eye irritation. Do not get in eyes.
Skin:	Causes skin irritation. May be harmful if absorbed through the skin.
Ingestion:	Harmful if swallowed. May cause abdominal pain, nausea, vomiting, diarrhea, or drowsiness.
Chronic Effects:	Contains an ingredient which can cause organ damage (See Section 2 and Section 15 for each ingredient).
HMIS Rating:	Health: 1 Flammability: 2 Reactivity: 0

4. FIRST AID MEASURES

General:	Remove contaminated clothing and shoes Get medical attention immediately. Wash clothing before reuse. Thoroughly clean or destroy contaminated shoes.
Inhalation:	If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.
Eyes:	In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention immediately.
Skin:	In case of contact, immediately flush skin with soap and plenty of water. Get medical attention immediately.
Ingestion:	If swallowed, immediately contact Poison Control Center at 1-800-854-6813. DO NOT induce vomiting unless instructed to do so by medical personnel. Never give anything by mouth to an unconscious person.

5. PROTECTIVE EQUIPMENT AND CONTROL MEASURES

Respiratory:	Select equipment to provide protection from the ingredients listed in Section 2 of this document. Ensure fresh air entry during application and drying. If you experience eye watering, headache or dizziness or if air monitoring demonstrates dust, vapor, or mist levels are above applicable limits, wear an appropriate, properly fitted respirator (NIOSH approved) during and after application. Follow respirator manufacturer's directions for respirator use. FOR USERS OF 3M RESPIRATORY PROTECTION ONLY: For information and assistance on 3M occupational health and safety products,

	call OH&ESD Technical Service toll free in U.S.A. 1-800-243-4630, in Canada call 1-800-267-4414. Please do not contact these numbers regarding other manufacturer's respiratory protection products. 3M does not endorse the accuracy of the information contained in this Material Safety Data Sheet.
Eyes:	Do not get in eyes. Protective equipment should be selected to provide protection from exposure to the chemicals listed in Section 2 of this document. Depending on the site-specific conditions of use, safety glasses, chemical goggles, and/or head and face protection may be required to prevent contact. The equipment must be thoroughly cleaned, or discarded after each use.
Skin/Hand:	Protective equipment should be selected to provide protection from exposure to the chemicals listed in Section 2 of this document. Depending on the site-specific conditions of use, protective gloves, apron, boots, head and face protection may be required to prevent contact. The equipment must be thoroughly cleaned, or discarded after each use.
Engineering Controls:	Prevent build-up of vapors by opening all windows and doors to achieve cross-ventilation.
Other Work Practices:	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Use good personal hygiene practices. Wash hands before eating, drinking, using toilet facilities, etc. Promptly remove soiled clothing and wash clothing thoroughly before reuse. Shower after work using plenty of soap and water.

6. FIRE AND EXPLOSION INFORMATION

Flash Point:	F: 392
	C: 200
Lower Explosive Limit (LEL):	1 (%vol in air) at Normal Atmospheric Temp and Pressure
Fire and Explosion Hazards:	Material may burn but does not ignite readily. Fire may produce irritating, corrosive and/or toxic gases. Containers may explode when heated.
Fire Fighting Procedures:	SMALL FIRES: Use dry chemical, CO_2, water spray or foam. LARGE FIRES: Use water spray, fog, or foam. Move containers from fire area if you can do so without risk. Runoff from fire control may cause pollution. Dike fire control water for later disposal. Do not scatter the material. Also Reference Emergency Response Guide Number: 159

7. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Liquid
pH:	No Established Limit
Specific Gravity:	1.401164
Boiling Point (F):	275
Vapor Density:	Heavier than air
VOC Content (lbs):	Refer to the Technical Data Sheet for this product.
Evaporation Rate:	Slower than ether

8. STABILITY AND REACTIVITY DATA

General:	This product is stable and hazardous polymerization will not occur.
Incompatible Materials:	Strong oxidizing agents.
Hazardous Decomposition:	May produce hazardous fumes when heated to decomposition as in welding. Fumes may produce Carbon Dioxide and Carbon Monoxide.

9. HANDLING AND STORAGE

Storage Temperature:	Store between 40-100°F (4-38°C).
Handling and Storage Precautions:	Keep away from heat, sparks and flame. Do not smoke. Extinguish all flames and pilot lights, and turn off stoves, heaters, electric motors and other sources of ignition during use and until all vapors are gone. Vapors may cause flash fire or ignite explosively. Prevent build-up of vapors by opening all windows and doors to achieve cross-ventilation. Do not get in eyes, on skin or clothing. Close container after each use. Wash thoroughly after handling

10. TOXICOLOGICAL DATA

General:	NOTICE: Reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage. Intentional misuse by deliberately concentrating and inhaling the contents may be harmful or fatal. No additional information provided for this product. See Section 2 for chemical specific data.

11. ECOLOGICAL DATA

General:	No additional information provided for this product. See Section 2 for chemical specific data.

12. ACCIDENTAL RELEASE MEASURES

Spill Response Procedures:	ELIMINATE ALL IGNITION SOURCES (no smoking, flares, sparks or flames in immediate area). Do not touch or walk through spilled material. Stop leak if you can do so without risk. Prevent entry into waterways, sewers, basements or confined areas. Absorb or cover with dry earth, sand, or other non-combustible material and transfer to containers. LARGE SPILLS: Dike far ahead of liquid spill to contain released material and runoff from fire control.
Public Safety:	CALL CHEMTREC at (800)-424-9300 for emergency response. Isolate spill or leak area immediately for at least 25 to 50 meters (80 to 160 feet) in all directions. Keep unauthorized personnel away. Stay upwind. Keep out of low areas. Ventilate closed spaces before entering. Also, Reference Emergency Response Guide Number: 159

13. DISPOSAL CONSIDERATION

Waste Disposal:	Dispose of in accordance with local, state and federal regulations. (Also reference RCRA information in Section 15 if listed).

14. TRANSPORTATION INFORMATION

DOT (Domestic Surface Transportation)		IMO / IMDG (Ocean Transportation)	
DOT Proper Shipping Name: PAINT OR PAINT RELATED MATERIAL, NMFC 149980		IMDG Proper Shipping Name: PAINT OR PAINT RELATED MATERIAL, NMFC 149980	
DOT Hazard Class:	NR	IMDG Hazard Class:	Not Regulated
UN / NA Number:	Not Regulated	UN Number:	Not Regulated
DOT Packing Group:	Not Regulated	IMDG Packing Group:	Not Regulated
CERCLA/DOT RQ:	Not Applicable gal. / Not Applicable lbs.	System Reference Code:	9

15. REGULATORY INFORMATION

Regulatory Overview:	The regulatory data in Section 15 is not intended to be all-inclusive, only selected regulations are represented All ingredients of this product are listed on the TSCA (Toxic Substance Control Act) inventory or are not required to be listed on the TSCA inventory. **Note:** Any chemical ingredients listed in Section 15, that do not also appear in Section 2, are contained in the product at a concentration below the applicable OSHA threshold level of 1% or 0.1%.
WHMIS Classification:	D2B
Regulatory List	Product Ingredients on List
DOT Marine Pollutants (10%):	
(No Product Ingredients Listed)	
DOT Severe Marine Pollutants (1%):	
(No Product Ingredients Listed)	
EPCRA 311/312 Chemicals and RQs (>.1%) :	
(No Product Ingredients Listed)	

EPCRA 302 Extremely Hazardous (>.1%) :
(No Product Ingredients Listed)
EPCRA 313 Toxic Chemicals (>.1%) :
(No Product Ingredients Listed)
Mass RTK Substances (>1%) :

000108-78-1	Melamine
000115-86-6	Triphenyl phosphate

Mass Extraordinarily Haz Sub (>.01%) :
(No Product Ingredients Listed)
Penn RTK Substances (>1%) :

000108-78-1	Melamine
000115-86-6	Triphenyl phosphate

Penn Special Hazardous Substances (>.01%) :

026125-61-1	1,4-Benzenedicarbonyl dichloride, polymer with 1,4-benzenediamine
001333-86-4	Carbon black

Rhode Island Hazardous Substances (>.1%) :
(No Product Ingredients Listed)
RCRA Status (>.01%) :
(No Product Ingredients Listed)
N.J. RTK Substances (>1%) :
(No Product Ingredients Listed)
N.J. Special Hazardous Substances (>.01%) :
(No Product Ingredients Listed)

001330-20-7	Xylenes (o-, m-, p- isomers)

N.J. Env. Hazardous Substances (>.1%) :
(No Product Ingredients Listed)
Proposition 65 - Carcinogens (>0%):
(No Product Ingredients Listed)
Proposition 65 - Female Repro Toxins (>0%):
(No Product Ingredients Listed)
Proposition 65 - Male Repro Toxins (>0%):
(No Product Ingredients Listed)
Proposition 65 - Developmental Toxins (>0%):
(No Product Ingredients Listed)

16. OTHER INFORMATION

The information and recommendations contained herein are based upon data believed to be correct. However, no guarantee or warranty of any kind, expressed or implied, is made with respect to the information contained herein. We accept no responsibility and disclaim all liability for any harmful effects which may be caused by exposure to our products. Customers/users of this product must comply with all applicable health and safety laws, regulations, and orders.

End Of Document

HCA213_A1

MATERIAL SAFETY DATA SHEET
INTERCHAR 212

International

International Paint LLC
6001 Antoine Drive
Houston, Texas 77091

Sales Order (SalesOrd)
MSDS Revision No: A1 - 13
MSDS Revision Date: 01/24/2007

EMERGENCY NUMBERS
(800) 424-9300 CHEMTREC (USA)
(703) 527-3887 CHEMTREC (Int'l)
(800) 854-6813 Poison Control Center
CUSTOMER SERVICE: (Non-Emergency)
(800) 599-1267 International Paint
(800) 631-7451 Interlux

1. GENERAL INFORMATION

Product Identity: INTERCHAR 212

Bulk Sales Reference No: HCA213

IMPORTANT: Read this MSDS before handling or disposing of this product, and provide this information to the employee, customers, and users of this product. PLEASE NOTE THE MSDS REVISION NUMBER AT THE TOP OF THIS PAGE. If the MSDS Revision Number posted at the top of this page does not match the MSDS Revision Number on the product label, please contact Customer Service at the phone number included above for the correct MSDS. This product is covered by the OSHA Hazard Communication Standard and this document has been prepared in accordance with requirements of this standard.

NOTICE: OSHA hazardous chemicals are listed in Section 2 if present at 1% or more. Carcinogens and extraordinarily/special hazardous chemicals are listed in Section 2 if present at .1% or more. Additional regulatory information for specific chemical categories is included in Section 15.

2. HAZARDOUS INGREDIENT INFORMATION

CAS No.	Ingredient Name & %	Source	Exposure Data
000090-72-2	TRI(DIMETHYLAMINOMETHYL)PHENOL 1.0 - 10% by Weight	OSHA:	No Established Limit
		ACGIH:	No Established Limit
		NIOSH:	No Established Limit
		Supplier:	No Established Limit
		OHSA, CAN:	No Established Limit
		Mexico:	No Established Limit
		Brazil:	No Established Limit
		Source	Health Data
		NIOSH:	No Established Limit
		Source	Carcinogen Data
		OSHA:	Select Carcinogen: No
		NTP:	Known Carcinogen: No; Suspected Carcinogen: No
		IARC:	Group 1: No; Group 2A: No; Group 2b: No; Group 3: No; Group 4: No

CAS No	Ingredient Name & %	Source	Exposure Data
000108-78-1	Melamine 10 - 25% by Weight	OSHA:	No Established Limit
		ACGIH:	No Established Limit
		NIOSH:	No Established Limit
		Supplier:	No Established Limit
		OHSA, CAN:	No Established Limit
		Mexico:	No Established Limit
		Brazil:	No Established Limit
		Source	Health Data
		NIOSH:	No Established Limit
		Source	Carcinogen Data
		OSHA:	Select Carcinogen: No
		NTP:	Known Carcinogen: No; Suspected Carcinogen: No
		IARC:	Group 1: No; Group 2A: No; Group 2b: No; Group 3: Yes; Group 4: No

CAS No.	Ingredient Name & %	Source	Exposure Data
000112-57-2	Tetraethylenepentamine 1.0 - 10% by Weight	OSHA:	No Established Limit
		ACGIH:	No Established Limit
		NIOSH:	No Established Limit
		Supplier:	No Established Limit
		OHSA, CAN:	No Established Limit
		Mexico:	No Established Limit
		Brazil:	No Established Limit
		Source	Health Data
		NIOSH:	No Established Limit
		Source	Carcinogen Data
		OSHA:	Select Carcinogen: No
		NTP:	Known Carcinogen: No; Suspected Carcinogen: No
		IARC:	Group 1: No; Group 2A: No; Group 2b: No; Group 3: No; Group 4: No

CAS No.	Ingredient Name & %	Source	Exposure Data
013463-67-7	Titanium dioxide 10 - 25% by Weight	OSHA:	No Established Limit
		ACGIH:	10 mg/m3 TWA
		NIOSH:	5000 mg/m3 IDLH
		Supplier:	No Established Limit
		OHSA, CAN:	10 mg/m3 TWAEV (total dust)
		Mexico:	10 mg/m3 TWA (nuisance particulate)20 mg/m3 STEL
		Brazil:	No Established Limit
		Source	Health Data
		NIOSH:	Lung tumors in animals
		Source	Carcinogen Data
		OSHA:	Select Carcinogen: No
		NTP:	Known Carcinogen: No; Suspected Carcinogen: No
		IARC:	Group 1: No; Group 2A: No; Group 2b: No; Group 3: Yes; Group 4: No

CAS No.	Ingredient Name & %	Source	Exposure Data
014808-60-7	Quartz 0.10 - 1.0% by Weight	OSHA:	No Established Limit
		ACGIH:	0.05 mg/m3 TWA (respirable fraction)
		NIOSH:	0.05 mg/m3 TWA (respirable dust)50 mg/m3 IDLH (respirable dust)
		Supplier:	No Established Limit
		OHSA, CAN:	0.10 mg/m3 TWAEV0.10 mg/m3 TWEAV; (See Ontario Reg. 845 for full information)
		Mexico:	10 mg/m3 TWA
		Brazil:	No Established Limit
		Source	Health Data
		NIOSH:	Chronic lung disease (silicosis)
		Source	Carcinogen Data
		OSHA:	Select Carcinogen: Yes
		NTP:	Known Carcinogen: Yes; Suspected Carcinogen: No
		IARC:	Group 1: Yes; Group 2A: No; Group 2b: No; Group 3: No; Group 4: No

CAS No	Ingredient Name & %	Source	Exposure Data
TS-FS0385	Magnesium Silicate Mixture 1.0 - 10% by Weight	OSHA:	No Established Limit
		ACGIH:	No Established Limit
		NIOSH:	No Established Limit
		Supplier:	No Established Limit
		OHSA, CAN:	No Established Limit

Mexico:	No Established Limit
Brazil:	No Established Limit
Source	Health Data
NIOSH:	No Established Limit
Source	Carcinogen Data
OSHA:	Select Carcinogen: No
NTP:	Known Carcinogen: No; Suspected Carcinogen: No
IARC:	Group 1: No; Group 2A: No; Group 2b: No; Group 3: No; Group 4: No

3. HAZARD IDENTIFICATION

Overview:	NOTICE: Reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage. Intentional misuse by deliberately concentrating and inhaling the contents may be harmful or fatal. Avoid contact with eyes, skin and clothing.
Inhalation:	Harmful if inhaled. Causes nose and throat irritation. Vapors may affect the brain or nervous system causing dizziness, headache or nausea.
Eyes:	Causes eye burns. Do not get in eyes.
Skin:	Causes skin burns. May be harmful if absorbed through the skin.
Ingestion:	Harmful if swallowed May cause abdominal pain, nausea, vomiting, diarrhea, or drowsiness.
Chronic Effects:	Contains an ingredient which can cause organ damage (See Section 2 and Section 15 for each ingredient). Cancer hazard. Contains an ingredient which can cause cancer (See Section 2 and Section 15 for each ingredient). Risk of cancer depends on duration and level of exposure.
HMIS Rating:	Health: 3 Flammability: 1 Reactivity: 0

4. FIRST AID MEASURES

General:	Remove contaminated clothing and shoes. Get medical attention immediately. Wash clothing before reuse Thoroughly clean or destroy contaminated shoes.
Inhalation:	If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.
Eyes:	In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention immediately.
Skin:	In case of contact, immediately flush skin with soap and plenty of water. Get medical attention immediately.
Ingestion:	If swallowed, immediately contact Poison Control Center at 1-800-854-6813. DO NOT induce vomiting unless instructed to do so by medical personnel. Never give anything by mouth to an unconscious person.

5. PROTECTIVE EQUIPMENT AND CONTROL MEASURES

Respiratory.	Select equipment to provide protection from the ingredients listed in Section 2 of this document. Ensure fresh air entry during application and drying. If you experience eye watering, headache or dizziness or if air monitoring demonstrates dust, vapor, or mist levels are above applicable limits, wear an appropriate, properly fitted respirator (NIOSH approved) during and after application. Follow respirator manufacturer's directions for respirator use. FOR USERS OF 3M RESPIRATORY PROTECTION ONLY: For information and assistance on 3M occupational health and safety products, call OH&ESD Technical Service toll free in U.S.A. 1-800-243-4630, in Canada call 1-800-267-4414. Please do not contact these numbers regarding other manufacturer's respiratory protection products. 3M does not endorse the accuracy of the information contained in this Material Safety Data Sheet.
Eyes:	Do not get in eyes. Protective equipment should be selected to provide protection from exposure to the chemicals listed in Section 2 of this document. Depending on the site-specific conditions of use, safety glasses, chemical goggles, and/or head and face protection may be required to prevent contact. The equipment must be thoroughly cleaned, or discarded after each use.
Skin/Hand:	Protective equipment should be selected to provide protection from exposure to the chemicals listed in Section 2 of this document. Depending on the site-specific conditions of use, protective gloves, apron, boots, head and face protection may be required to prevent contact. The equipment must be thoroughly cleaned, or discarded after each use.
Engineering Controls:	Prevent build-up of vapors by opening all windows and doors to achieve cross-ventilation.
Other Work Practices:	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Use good personal hygiene practices. Wash hands before eating, drinking, using toilet facilities, etc. Promptly remove soiled clothing and wash clothing thoroughly before reuse. Shower after work using plenty of soap and water.

6. FIRE AND EXPLOSION INFORMATION

Flash Point:	F: 392 C: 200
Lower Explosive Limit (LEL):	1 (%vol in air) at Normal Atmospheric Temp and Pressure
Fire and Explosion Hazards:	COMBUSTIBLE MATERIAL: May burn but does not ignite readily. When heated, vapors may form explosive mixtures with air. Indoors, outdoors, and low or confined areas (sewers, basements, tanks) creating a vapor explosion hazard. Contact with metals may evolve flammable hydrogen gas. Containers may explode when heated.
Fire Fighting Procedures:	SMALL FIRES: Use dry chemical, CO_2, water spray or foam LARGE FIRES: Use dry chemical, CO_2, water spray, or alcohol-resistant foam. Move containers from fire area if you can do so without risk. Runoff from fire control may cause pollution. Dike fire control water for later disposal. Do not scatter the material. Also Reference Emergency Response Guide Number: 153

7. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Liquid
pH:	No Established Limit
Specific Gravity:	1.321706
Boiling Point (F):	275
Vapor Density:	Heavier than air
VOC Content (lbs):	Refer to the Technical Data Sheet for this product.
Evaporation Rate:	Slower than ether

8. STABILITY AND REACTIVITY DATA

General:	This product is stable and hazardous polymerization will not occur.
Incompatible Materials:	Strong oxidizing agents.
Hazardous Decompostion:	May produce hazardous fumes when heated to decomposition as in welding. Fumes may produce Carbon Dioxide and Carbon Monoxide.

9. HANDLING AND STORAGE

Storage Temperature:	Store between 40-100°F (4-38°C).
Handling and Storage Precautions:	Keep away from heat, sparks and flame. Do not smoke. Extinguish all flames and pilot lights, and turn off stoves, heaters, electric motors and other sources of ignition during use and until all vapors are gone. Vapors may cause flash fire or ignite explosively. Prevent build-up of vapors by opening all windows and doors to achieve cross-ventilation. Do not get in eyes, on skin or clothing. Close container after each use. Wash thoroughly after handling.

10. TOXICOLOGICAL DATA

General:	NOTICE: Reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage. Intentional misuse by deliberately concentrating and inhaling the contents may be harmful or fatal. No additional information provided for this product. See Section 2 for chemical specific data.

11. ECOLOGICAL DATA

General:	No additional information provided for this product. See Section 2 for chemical specific data.

12. ACCIDENTAL RELEASE MEASURES

Spill Response Procedures:	ELIMINATE ALL IGNITION SOURCES (no smoking, flares, sparks or flames in immediate area). Do not touch or walk through spilled material. Stop leak if you can do so without risk. Prevent entry into waterways, sewers, basements or confined areas. Absorb or cover with dry earth, sand, or other non-combustible material and transfer to containers. LARGE SPILLS: Dike far ahead of liquid spill to contain released material and runoff from fire control. DO NOT GET WATER INSIDE CONTAINERS.
Public Safety:	CALL CHEMTREC at (800)-424-9300 for emergency response. Isolate spill or leak area immediately for at least 25 to 50 meters (80 to 160 feet) in all directions. Keep unauthorized personnel away. Stay upwind. Keep out of low areas. Ventilate closed spaces before entering. LARGE SPILLS: Consider initial downwind evacuation for at least 300 meters (1000 feet). Also, Reference Emergency Response Guide Number: 153

13. DISPOSAL CONSIDERATION

Waste Disposal:	Dispose of in accordance with local, state and federal regulations. (Also reference RCRA information in Section 15 if listed).

14. TRANSPORTATION INFORMATION

DOT (Domestic Surface Transportation)		IMO / IMDG (Ocean Transportation)	
DOT Proper Shipping Name: PAINT		IMDG Proper Shipping Name: CORROSIVE LIQUID, TOXIC, N.O.S.	
DOT Hazard Class:	8	IMDG Hazard Class:	Class 8, No division Corrosive materials
UN / NA Number:	UN 3066	UN Number:	UN 2922
DOT Packing Group:	III	IMDG Packing Group:	III
CERCLA/DOT RQ:	Not Applicable gal. / Not Applicable lbs.	System Reference Code:	95

15. REGULATORY INFORMATION

Regulatory Overview:	The regulatory data in Section 15 is not intended to be all-inclusive, only selected regulations are represented. All ingredients of this product are listed on the TSCA (Toxic Substance Control Act) inventory or are not required to be listed on the TSCA inventory. **Note:** Any chemical ingredients listed in Section 15, that do not also appear in Section 2, are contained in the product at a concentration below the applicable OSHA threshold level of 1% or 0.1%
WHMIS Classification:	D2B:E
Regulatory List	Product Ingredients on List
DOT Marine Pollutants (10%): (No Product Ingredients Listed)	
DOT Severe Marine Pollutants (1%): (No Product Ingredients Listed)	
EPCRA 311/312 Chemicals and RQs (>.1%) : (No Product Ingredients Listed)	
EPCRA 302 Extremely Hazardous (>.1%) : (No Product Ingredients Listed)	
EPCRA 313 Toxic Chemicals (>.1%) : (No Product Ingredients Listed)	
Mass RTK Substances (>1%) :	
000108-78-1	Melamine
000112-57-2	Tetraethylenepentamine
013463-67-7	Titanium dioxide

Mass Extraordinarily Haz Sub (>.01%) :	
014808-60-7	Quartz
Penn RTK Substances (>1%) :	
000108-78-1	Melamine
000112-57-2	Tetraethylenepentamine
013463-67-7	Titanium dioxide
Penn Special Hazardous Substances (>.01%) :	
026125-61-1	1,4-Benzenedicarbonyl dichloride, polymer with 1,4-benzenediamine
Rhode Island Hazardous Substances (>.1%) :	
(No Product Ingredients Listed)	
RCRA Status (>.01%) :	
(No Product Ingredients Listed)	
N.J. RTK Substances (>1%) :	
(No Product Ingredients Listed)	
N.J. Special Hazardous Substances (>.01%) :	
000112-57-2	Tetraethylenepentamine
001330-20-7	Xylenes (o-, m-, p- isomers)
N.J. Env. Hazardous Substances (>.1%) :	
(No Product Ingredients Listed)	
Proposition 65 - Carcinogens (>0%):	
014808-60-7	Quartz
Proposition 65 - Female Repro Toxins (>0%):	
(No Product Ingredients Listed)	
Proposition 65 - Male Repro Toxins (>0%):	
(No Product Ingredients Listed)	
Proposition 65 - Developmental Toxins (>0%):	
(No Product Ingredients Listed)	

16. OTHER INFORMATION

The information and recommendations contained herein are based upon data believed to be correct. However, no guarantee or warranty of any kind, expressed or implied, is made with respect to the information contained herein. We accept no responsibility and disclaim all liability for any harmful effects which may be caused by exposure to our products. Customers/users of this product must comply with all applicable health and safety laws, regulations, and orders.

End Of Document

SUSTAINABLE DESIGN REQUIREMENTS

See attachment exhibit "D"

International
Protective Coatings

1.07 Submittals, Section G, Certificates

This is to certify that Interchar 212 complies with the following Sustainable Design material requirements as detailed in Section 01351, Sustainable Design requirements:

1. Interchar 212 fire protection material is manufactured in Houston, TX and >20% of the raw materials are extracted within a 500 mile radius of the Houston manufacturing facility. If this location falls within a 500 mile radius of the project site, then Interchar 212 can contribute to earning Materials and Resources Credit 5.2.
2. Interchar 212 fire protection materials is zero VOC as measured in accordance with the Green Seal Standard GS-11 requirements.

Interchar 212 MSDS, Interchar 212 product cut sheet and Interchar 212 LEED certification letter are attached with project submittal.

William A. Dempster III, CSI
HVI Market Director – North America
International Paint, LLC
6001 Antoine Drive
Houston, TX 77091

TOP COAT NOT REQUIRED

See attachment exhibit "E"

International
Protective Coatings

2.03 Auxillary Fireproofing Materials. Section C - Topcoats
Interchar 212 epoxy intumescent fire protection material is a UL Classified product listed in the UL Fire Resistant Directory. Interchar 212 material was tested without a topcoat layer for applications in interior and exterior environments and is not required to maintain the fire rating. A topcoat layer is optional to meet the project specific aesthetic requirements and has no effect on maintaining the fire performance of the Interchar 212.

William A. Dempster III, CSI
HVI Market Director – North America
International Paint, LLC
6001 Antoine Drive
Houston, TX 77091

EPOXY INTUMESCENT COATING SYSTEM

THICKNESS & TESTING

EXHIBIT "F"

certifire

CERTIFICATE OF APPROVAL
No CF 468

This is to certify that, in accordance with
CERTIFIRE's Rules for Certification
The undermentioned products of

INTERNATIONAL PAINT LIMITED

Stoneygate Lane, Felling, Gateshead, NE10 0JY
Tel: 0191 469 6111 Fax: 0191 438 3711

Have been assessed against the requirements of the Technical Schedule(s) denoted below and are approved for use subject to the conditions appended hereto:

CERTIFIED PRODUCT	TECHNICAL SCHEDULE
Interchar 212	TS15 Intumescent Coatings for Steelwork

Signed and sealed for and on behalf of CERTIFIRE

Sir Ken Knight
Chairman - Management Council
Page 1 of 19

Issued: 3rd April 2007
Valid to: 2nd April 2012

Warrington certifire certification

UKAS PRODUCT CERTIFICATION 087

Only valid when authenticCERTIFIRE Seal is in place

CERTIFICATE No CF 468
INTERNATIONAL PAINT LIMITED

Interchar 212

1. This approval relates to the use of Interchar 212 for the fire protection of I-shaped steel sections. The precise scope is given in Tables 1 to 12 which show the total dry film thickness of Interchar 212 (excluding primer and top sealer) required to provide fire resistance periods in accordance with BS476: Part 21: 1987 of 30 minutes up to 120 minutes for differing sections and section factors (Hp/A).

2. This certification is designed to demonstrate compliance of the product or system specifically with Approved Document B (England and Wales), Section D of the Technical Standards (Scotland), Technical Booklet E (N. Ireland). If compliance is required to other regulatory or guidance documents there may be additional considerations or conflict to be taken into account.'

3. The products are approved on the basis of.

   i) Initial type testing.
   ii) A design appraisal against TS15.
   iii) Certification of quality management system to ISO 9001: 2000.
   iv) Inspection and surveillance of factory production control
   v) Audit testing

4. The data referring to three-sided fire exposure of beams relate to beams supporting concrete floor slabs. Separate consideration is required where this is not the case.

5. The data shown are applicable to steel sections blast cleaned to Swedish Standard SA2.5 or equivalent and primed with a suitable and compatible primer. Specifications of surface preparations, primers and top sealers is available from International Paint Limited whose responsibility is to ensure that Interchar 212 is compatible for use in respect of both ambient and fire conditions. The total dry film thickness of primer should not exceed that tested.

6. The data shown is applicable to Interchar 212 applied by spray to horizontal, vertical, flexural and compression members supporting loads up to the maximum design loads specified in BS449: Part 2 as indicated in Tables 2 and 10. For other design temperatures it should be confirmed it is acceptable to utilise these temperatures prior to using the data for approval purposes.

7. The approval relates to on going production. Product and/or its immediate packaging is identified with the manufacturers' name, the product name or number, the CERTIFIRE name or name and mark, together with the CERTIFIRE certificate number and application where appropriate.

8. The data shown in the tables are based on assessments which comply with the criteria for acceptability now incorporated within the Certifire scheme.

9. The assessment considered steel design temperatures in the range 350°C to 700°C with respect to I-section beams and 400°C, 550°C and 620°C with respect to I-section columns.

Issued: 3rd April 2007
Valid to: 2nd April 2012

CERTIFICATE No CF 468
INTERNATIONAL PAINT LIMITED

Interchar 212

Table 1: Column Protection: 400°C				
Section factor up to m^{-1}	Thickness (mm) for Fire Resistance Period			
	30 minutes	60 minutes	90 minutes	120 minutes
10	2.00	2.00	2.00	2.00
20	2.00	2.00	2.03	2.57
30	2.00	2.00	2.77	3.50
40	2.00	2.00	3.38	4.27
50	2.00	2.28	3.90	4.92
60	2.00	2.54	4.34	5.48
70	2.00	2.76	4.72	5.96
80	2.00	2.95	5.05	6.38
90	2.00	3.13	5.35	6.75
100	2.00	3.28	5.61	7.08
110	2.00	3.42	5.84	7.38
120	2.00	3.54	6.05	7.64
130	2.00	3.65	6.24	7.88
140	2.00	3.75	6.41	8.10
150	2.00	3.84	6.57	8.30
160	2.00	3.93	6.72	8.48
170	2.00	4.00	6.85	8.65
180	2.00	4.08	6.97	8.80
190	2.00	4.14	7.08	8.95
200	2.00	4.20	7.19	9.08
210	2.00	4.26	7.29	9.20
220	2.00	4.31	7.38	9.32
230	2.00	4.36	7.46	9.43
240	2.00	4.41	7.54	9.53
250	2.00	4.46	7.62	9.62
260	2.00	4.50	7.69	9.71
270	2.00	4.54	7.76	9.80
280	2.00	4.57	7.82	9.87
290	2.00	4.61	7.88	9.95
300	2.00	4.64	7.93	10.02

Thickness is intumescent only.

Issued: 3rd April 2007
Valid to: 2nd April 2012

CERTIFICATE No CF 468
INTERNATIONAL PAINT LIMITED

Interchar 212

Table 2: Column Protection: 550°C				
Section factor up to m^{-1}	Thickness (mm) for Fire Resistance Period			
	30 minutes	60 minutes	90 minutes	120 minutes
10	2.00	2.00	2.00	2.00
20	2.00	2.00	2.00	2.00
30	2.00	2.00	2.00	2.56
40	2.00	2.00	2.38	3.14
50	2.00	2.00	2.76	3.64
60	2.00	2.00	3.09	4.08
70	2.00	2.00	3.37	4.46
80	2.00	2.00	3.63	4.79
90	2.00	2.00	3.85	5.08
100	2.00	2.04	4.05	5.35
110	2.00	2.13	4.23	5.59
120	2.00	2.21	4.39	5.80
130	2.00	2.28	4.54	5.99
140	2.00	2.35	4.67	6.17
150	2.00	2.41	4.80	6.34
160	2.00	2.47	4.91	6.48
170	2.00	2.52	5.02	6.62
180	2.00	2.57	5.11	6.75
190	2.00	2.61	5.20	6.87
200	2.00	2.66	5.29	6.98
210	2.00	2.70	5.36	7.08
220	2.00	2.73	5.44	7.18
230	2.00	2.77	5.51	7.27
240	2.00	2.80	5.57	7.35
250	2.00	2.83	5.63	7.43
260	2.00	2.86	5.69	7.51
270	2.00	2.89	5.74	7.58
280	2.00	2.91	5.79	7.65
290	2.00	2.93	5.84	7.71
300	2.00	2.96	5.88	7.77

Thickness is intumescent only.

Issued: 3rd April 2007
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INTERNATIONAL PAINT LIMITED

Interchar 212

Table 3: Column Protection: 620°C				
Section factor up to m^{-1}	Thickness (mm) for Fire Resistance Period			
	30 minutes	60 minutes	90 minutes	120 minutes
10	2.00	2.00	2.00	2.00
20	2.00	2.00	2.00	2.38
30	2.00	2.00	2.00	3.15
40	2.00	2.00	2.34	3.77
50	2.00	2.00	2.65	4.26
60	2.00	2.00	2.90	4.67
70	2.00	2.00	3.12	5.02
80	2.00	2.00	3.30	5.32
90	2.00	2.00	3.46	5.57
100	2.00	2.00	3.60	5.79
110	2.00	2.00	3.72	5.99
120	2.00	2.00	3.83	6.16
130	2.00	2.00	3.93	6.32
140	2.00	2.00	4.01	6.45
150	2.00	2.00	4.09	6.58
160	2.00	2.00	4.16	6.69
170	2.00	2.02	4.22	6.80
180	2.00	2.04	4.28	6.89
190	2.00	2.07	4.34	6.98
200	2.00	2.09	4.39	7.06
210	2.00	2.12	4.43	7.13
220	2.00	2.14	4.48	7.20
230	2.00	2.16	4.52	7.27
240	2.00	2.17	4.55	7.33
250	2.00	2.19	4.59	7.38
260	2.00	2.21	4.62	7.43
270	2.00	2.22	4.65	7.48
280	2.00	2.23	4.68	7.53
290	2.00	2.25	4.71	7.57
300	2.00	2.26	4.73	7.61

Thickness is intumescent only.

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INTERNATIONAL PAINT LIMITED

Interchar 212

Table 4: I-Section Beams at 350°C					
30 minutes		60 minutes		90 minutes	
Section factor up to	Thickness mm	Section factor up to	Thickness mm	Section factor up to	Thickness mm
150	1.215	150	3.609	75	4.162
155	1.243	155	3.695	80	4.490
160	1.272	160	3.780	85	4.817
165	1.300	165	3.866	90	5.145
170	1.329	170	3.951	95	5.472
175	1.357	175	4.037	100	5.800
180	1.386	180	4.123	105	5.980
185	1.414	185	4.208	110	6.161
190	1.443	190	4.294	115	6.341
195	1.471	195	4.379	120	6.521
200	1.499	200	4.465	125	6.702
205	1.528	205	4.550	130	6.882
210	1.556	210	4.636	135	7.062
215	1.585	215	4.722	140	7.243
220	1.613	220	4.807	145	7.423
225	1.642	225	4.893	150	7.603
230	1.670	230	4.978		
235	1.699	235	5.064		
240	1.727	240	5.150		
245	1.756	245	5.235		
250	1.784	250	5.321		
255	1.813	255	5.406		
260	1.841	260	5.492		
265	1.870	265	5.577		
270	1.898	270	5.663		
275	1.927	275	5.749		
280	1.955	280	5.931		
285	1.984	285	6.260		
290	2.012	290	6.588		
295	2.041	295	6.916		
300	2.069	300	7.245		
305	2.097	305	7.573		
310	2.126				
315	2.154				
320	2.183				
325	2.211				
330	2.240				

Thickness is intumescent only. Three sided beams with a concrete slab.

Issued: 3rd April 2007
Valid to: 2nd April 2012

CERTIFICATE No CF 468
INTERNATIONAL PAINT LIMITED

Interchar 212

Table 5: I-Section Beams at 400°C

30 minutes		60 minutes				90 minutes			
Section factor up to m^{-1}	Thickness mm	Section factor up to m^{-1}	Thickness mm	Section factor up to m^{-1}	Thickness mm	Section factor up to m^{-1}	Thickness mm	Section factor up to m^{-1}	Thickness mm
230	1.213	90	2.073	215	4.285	75	3.863	180	5.819
235	1.244	95	2.136	220	4.349	80	3.956	185	5.912
240	1.276	100	2.200	225	4.414	85	4.049	190	6.005
245	1.308	105	2.264	230	4.478	90	4.142	195	6.098
250	1.340	110	2.327	235	4.542	95	4.235	200	6.191
255	1.372	115	2.391	240	4.606	100	4.328	205	6.284
260	1.404	120	2.455	245	4.670	105	4.422	210	6.377
265	1.436	125	2.518	250	4.734	110	4.515	215	6.471
270	1.467	130	2.582	255	4.799	115	4.608	220	6.564
275	1.499	135	2.645	260	4.863	120	4.701	225	6.657
280	1.531	140	2.709	265	4.927	125	4.794	230	6.750
285	1.563	145	2.773	270	4.991	130	4.887	235	6.843
290	1.595	150	2.836	275	5.055	135	4.980	240	6.936
295	1.627	155	2.900	280	5.120	140	5.074	245	7.029
300	1.659	160	3.067	285	5.184	145	5.167	250	7.123
305	1.690	165	3.233	290	5.248	150	5.260	255	7.216
310	1.722	170	3.400	295	5.312	155	5.353	260	7.309
315	1.754	175	3.567	300	5.376	160	5.446	265	7.402
320	1.786	180	3.733	305	5.441	165	5.539	270	7.495
325	1.818	185	3.900	310	5.505	170	5.632	275	7.588
330	1.850	190	3.964	315	5.569	175	5.725	280	7.681
		195	4.028	320	5.633				
		200	4.093	325	5.697				
		205	4.157	330	5.761				
		210	4.221						

Thickness is intumescent only. Three sided beams with a concrete slab.

Issued: 3rd April 2007
Valid to: 2nd April 2012

CERTIFICATE No CF 468
INTERNATIONAL PAINT LIMITED

Interchar 212

Table 6: I-Section Beams at 450°C

30 minutes		60 minutes		90 minutes			
Section factor up to m^{-1}	Thickness mm	Section factor up to m^{-1}	Thickness mm	Section factor up to m^{-1}	Thickness mm	Section factor up to m^{-1}	Thickness mm
260	1.208	160	1.439	75	3.511	205	5.535
265	1.233	165	1.591	80	3.589	210	5.613
270	1.259	170	1.743	85	3.666	215	5.691
275	1.284	175	1.896	90	3.744	220	5.769
280	1.309	180	2.048	95	3.822	225	5.847
285	1.335	185	2.200	100	3.900	230	5.925
290	1.360	190	2.352	105	3.978	235	6.002
295	1.386	195	2.504	110	4.056	240	6.080
300	1.411	200	2.657	115	4.134	245	6.158
305	1.437	205	2.809	120	4.211	250	6.236
310	1.462	210	2.932	125	4.289	255	6.314
315	1.488	215	3.013	130	4.367	260	6.392
320	1.513	220	3.094	135	4.445	265	6.470
325	1.538	225	3.174	140	4.523	270	6.548
330	1.564	230	3.255	145	4.601	275	6.625
		235	3.335	150	4.679	280	6.703
		240	3.416	155	4.757	285	6.781
		245	3.497	160	4.834	290	6.859
		250	3.577	165	4.912	295	6.937
		255	3.658	170	4.990	300	7.015
		260	3.739	175	5.068	305	7.093
		265	3.819	180	5.146	310	7.170
		270	3.900	185	5.224	315	7.248
		275	3.973	190	5.302	320	7.326
		280	4.046	195	5.380	325	7.404
		285	4.119	200	5.457	330	7.482
		290	4.192				
		295	4.265				
		300	4.338				
		305	4.412				
		310	4.485				
		315	4.558				
		320	4.631				
		325	4.704				
		330	4.777				

Thickness is intumescent only. Three sided beams with a concrete slab.

Issued: 3rd April 2007
Valid to: 2nd April 2012

CERTIFICATE No CF 468
INTERNATIONAL PAINT LIMITED

Interchar 212

Table 7: I-Section Beams at 500°C

30 minutes		60 minutes		90 minutes				120minutes	
Section factor up to m^{-1}	Thickness mm	Section factor up to m^{-11}	Thickness mm	Section factor up to m^{-11}	Thickness mm	Section factor up to m^{-1}	Thickness mm	Section factor up to m^{-1}	Thickness mm
330	1.200	180	1.920	75	2.133	205	4.984	155	5.482
		185	1.990	80	2.300	210	5.054	160	5.659
		190	2.060	85	2.467	215	5.124	165	5.835
		195	2.130	90	2.633	220	5.195	170	6.012
		200	2.200	95	2.800	225	5.265	175	6.189
		205	2.270	100	2.967	230	5.336	180	6.366
		210	2.340	105	3.133	235	5.406		
		215	2.410	110	3.300	240	5.476		
		220	2.480	115	3.467	245	5.547		
		225	2.550	120	3.633	250	5.617		
		230	2.620	125	3.800	255	5.687		
		235	2.690	130	3.928	260	5.758		
		240	2.760	135	3.999	265	5.828		
		245	2.830	140	4.069	270	5.899		
		250	2.900	145	4.139	275	5.969		
		255	2.978	150	4.210	280	6.039		
		260	3.057	155	4.280	285	6.110		
		265	3.135	160	4.350	290	6.180		
		270	3.214	165	4.421	295	6.250		
		275	3.292	170	4.491	300	6.321		
		280	3.370	175	4.561	305	6.391		
		285	3.449	180	4.632	310	6.461		
		290	3.527	185	4.702	315	6.532		
		295	3.605	190	4.773	320	6.602		
		300	3.684	195	4.843	325	6.673		
		305	3.762	200	4.913	330	6.743		
		310	3.841						
		315	3.919						
		320	3.997						
		325	4.076						
		330	4.154						

Thickness is intumescent only.
Three sided beams with a concrete slab.

Issued: 3rd April 2007
Valid to: 2nd April 2012

CERTIFICATE No CF 468
INTERNATIONAL PAINT LIMITED

Interchar 212

Table 8: I-Section Beams at 550°C			
30 minutes		60 minutes	
Section factor up to m^{-1}	Thickness mm	Section factor up to m^{-1}	Thickness mm
330	1.200	155	1.255
		160	1.326
		165	1.396
		170	1.467
		175	1.537
		180	1.608
		185	1.678
		190	1.749
		195	1.819
		200	1.890
		205	1.960
		210	2.031
		215	2.101
		220	2.172
		225	2.223
		230	2.262
		235	2.300
		240	2.338
		245	2.377
		250	2.415
		255	2.454
		260	2.492
		265	2.531
		270	2.569
		275	2.608
		280	2.646
		285	2.685
		290	2.723
		295	2.762
		300	2.800
		305	2.838
		310	2.877
		315	2.931
		320	3.009
		325	3.086
		330	3.164

Thickness is intumescent only. Three sided beams with a concrete slab.

Issued: 3rd April 2007
Valid to: 2nd April 2012

CERTIFICATE No CF 468
INTERNATIONAL PAINT LIMITED

Interchar 212

Table 8 continued: I-Section Beams at 550°C							
90 minutes				120 minutes			
Section factor up to m^{-1}	Thickness mm	Section factor up to m^{-1}	Thickness mm	Section factor up to m^{-1}	Thickness mm	Section factor up to m^{-1}	Thickness mm
75	1.333	205	4.592	75	3.716	205	5.559
80	1.500	210	4.660	80	3.787	210	5.630
85	1.667	215	4.728	85	3.857	215	5.701
90	1.833	220	4.796	90	3.928	220	5.772
95	2.000	225	4.864	95	3.999	225	5.843
100	2.167	230	4.931	100	4.070	230	5.913
105	2.333	235	4.999	105	4.141	235	5.984
110	2.500	240	5.067	110	4.212	240	6.055
115	2.667	245	5.135	115	4.283	245	6.126
120	2.833	250	5.203	120	4.354	250	6.197
125	2.994	255	5.271	125	4.425	255	6.268
130	3.150	260	5.339	130	4.496	260	6.339
135	3.306	265	5.406	135	4.566	265	6.410
140	3.463	270	5.474	140	4.637	270	6.481
145	3.619	275	5.542	145	4.708	275	6.551
150	3.775	280	5.610	150	4.779	280	6.622
155	3.914	285	5.678	155	4.850	285	6.693
160	3.981	290	5.746	160	4.921	290	6.764
165	4.049	295	5.814	165	4.992	295	6.835
170	4.117	300	5.881	170	5.063	300	6.906
175	4.185	305	5.949	175	5.134	305	6.977
180	4.253	310	6.017	180	5.204	310	7.048
185	4.321	315	6.085	185	5.275	315	7.119
190	4.389	320	6.153	190	5.346	320	7.190
195	4.456	325	6.221	195	5.417	325	7.260
200	4.524	330	6.289	200	5.488	330	7.331

Thickness is intumescent only.
Three sided beams with a concrete slab.

Issued: 3rd April 2007
Valid to: 2nd April 2012

CERTIFICATE No CF 468
INTERNATIONAL PAINT LIMITED

Interchar 212

Table 9: I-Section Beams at 600°C			
30 minutes		60 minutes	
Section factor up to m^{-1}	Thickness mm	Section factor up to m^{-1}	Thickness mm
330	1.200	180	1.259
		185	1.340
		190	1.421
		195	1.502
		200	1.583
		205	1.665
		210	1.746
		215	1.827
		220	1.908
		225	1.989
		230	2.070
		235	2.151
		240	2.213
		245	2.246
		250	2.279
		255	2.311
		260	2.344
		265	2.377
		270	2.409
		275	2.442
		280	2.475
		285	2.507
		290	2.540
		295	2.573
		300	2.606
		305	2.638
		310	2.671
		315	2.704
		320	2.736
		325	2.769
		330	2.802

Thickness is intumescent only.
Three sided beams with a concrete slab.

Issued: 3rd April 2007
Valid to: 2nd April 2012

CERTIFICATE No CF 468
INTERNATIONAL PAINT LIMITED

Interchar 212

Table 9 continued: I-Section Beams at 600°C							
90 minutes				120 minutes			
Section factor up to m^{-1}	Thickness mm	Section factor up to m^{-1}	Thickness mm	Section factor up to m^{-1}	Thickness mm	Section factor up to m^{-1}	Thickness mm
90	1.226	215	3.932	70	3.190	190	5.465
95	1.378	220	4.011	75	3.323	195	5.558
100	1.530	225	4.090	80	3.416	200	5.651
105	1.683	230	4.169	85	3.509	205	5.744
110	1.835	235	4.248	90	3.602	210	5.837
115	1.987	240	4.328	95	3.695	215	5.930
120	2.139	245	4.407	100	3.788	220	6.024
125	2.291	250	4.486	105	3.881	225	6.117
130	2.443	255	4.565	110	3.975	230	6.210
135	2.596	260	4.644	115	4.068	235	6.303
140	2.748	265	4.723	120	4.161	240	6.396
145	2.900	270	4.803	125	4.254	245	6.489
150	2.974	275	4.882	130	4.347	250	6.582
155	3.047	280	4.961	135	4.440	255	6.675
160	3.121	285	5.040	140	4.533	260	6.769
165	3.194	290	5.119	145	4.626	265	6.862
170	3.268	295	5.198	150	4.720	270	6.955
175	3.341	300	5.278	155	4.813	275	7.048
180	3.415	305	5.357	160	4.906	280	7.141
185	3.488	310	5.436	165	4.999	285	7.234
190	3.562	315	5.515	170	5.092	290	7.327
195	3.635	320	5.594	175	5.185	295	7.421
200	3.709	325	5.673	180	5.278	300	7.514
205	3.782	330	5.753	185	5.372	305	7.607
210	3.856						

Thickness is intumescent only.
Three sided beams with a concrete slab.

Issued: 3rd April 2007
Valid to: 2nd April 2012

CERTIFICATE No CF 468
INTERNATIONAL PAINT LIMITED

Interchar 212

Table 10: I-Section Beams at 620°C			
30 minutes		60 minutes	
Section factor up to m^{-1}	Thickness mm	Section factor up to m^{-1}	Thickness mm
330	1.200	180	1.197
		185	1.268
		190	1.340
		195	1.412
		200	1.483
		205	1.555
		210	1.627
		215	1.698
		220	1.770
		225	1.842
		230	1.913
		235	1.985
		240	2.057
		245	2.128
		250	2.200
		255	2.226
		260	2.252
		265	2.278
		270	2.304
		275	2.330
		280	2.356
		285	2 381
		290	2.407
		295	2.433
		300	2.459
		305	2.485
		310	2.511
		315	2.537
		320	2.563
		325	2.589
		330	2.615

Thickness is intumescent only.
Three sided beams with a concrete slab.

Issued: 3rd April 2007
Valid to: 2nd April 2012

CERTIFICATE No CF 468
INTERNATIONAL PAINT LIMITED

Interchar 212

Table 10 continued: I-Section Beams at 620°C							
90 minutes				120 minutes			
Section factor up to m^{-1}	Thickness mm	Section factor up to m^{-1}	Thickness mm	Section factor up to m^{-1}	Thickness mm	Section factor up to m^{-1}	Thickness mm
90	1.200	215	3.525	60	1.633	200	5.348
95	1.267	220	3.588	65	1.822	205	5.438
100	1.383	225	3.650	70	2.011	210	5.529
105	1.500	230	3.713	75	2.200	215	5.619
110	1.617	235	3.775	80	2.389	220	5.710
115	1.733	240	3.838	85	2.578	225	5.800
120	1.850	245	3.900	90	2.767	230	5.890
125	1.967	250	3.995	95	2.956	235	5.981
130	2.083	255	4.090	100	3 144	240	6.071
135	2.200	260	4.185	105	3.333	245	6.162
140	2.317	265	4.280	110	3.522	250	6.252
145	2.433	270	4.375	115	3.711	255	6.343
150	2.550	275	4.470	120	3.900	260	6.433
155	2.667	280	4.565	125	3.990	265	6.524
160	2.783	285	4.660	130	4.081	270	6.614
165	2.900	290	4.755	135	4.171	275	6.705
170	2.963	295	4.850	140	4.262	280	6.795
175	3.025	300	4.945	145	4.352	285	6.886
180	3.088	305	5.040	150	4.443	290	6.976
185	3.150	310	5.135	155	4.533	295	7.067
190	3.213	315	5.230	160	4.624	300	7.157
195	3.275	320	5.325	165	4.714	305	7.248
200	3.338	325	5.420	170	4.805	310	7.338
205	3.400	330	5.515	175	4.895	315	7.429
210	3.463			180	4.986	320	7.519
				185	5.076	325	7.610
				190	5.167	330	7.700
				195	5.257		

Thickness is intumescent only. Three sided beams with a concrete slab.

Issued: 3rd April 2007
Valid to: 2nd April 2012

CERTIFICATE No CF 468
INTERNATIONAL PAINT LIMITED

Interchar 212

Table 11: I-Section Beams at 650°C			
30 minutes		60 minutes	
Section factor up to m^{-1}	Thickness mm	Section factor up to m^{-1}	Thickness mm
330	1.200	200	1.215
		205	1.293
		210	1.371
		215	1.449
		220	1.528
		225	1.606
		230	1.684
		235	1.762
		240	1.840
		245	1.919
		250	1.997
		255	2.075
		260	2.153
		265	2.210
		270	2.236
		275	2.261
		280	2.287
		285	2.312
		290	2.338
		295	2.364
		300	2.389
		305	2.415
		310	2.440
		315	2.466
		320	2.491
		325	2.517
		330	2.542

Thickness is intumescent only.
Three sided beams with a concrete slab.

Issued: 3rd April 2007
Valid to: 2nd April 2012

CERTIFICATE No CF 468
INTERNATIONAL PAINT LIMITED

Interchar 212

Table 11 continued: I-Section Beams at 650°C

90 minutes				120 minutes			
Section factor up to m^{-1}	Thickness mm	Section factor up to m^{-1}	Thickness mm	Section factor up to m^{-1}	Thickness mm	Section factor up to m^{-1}	Thickness mm
130	2.072	235	3.248	75	1.852	205	5.099
135	2.115	240	3.465	80	2.045	210	5.177
140	2.157	245	3.683	85	2.239	215	5.255
145	2.200	250	3.900	90	2.432	220	5.333
150	2.243	255	3.979	95	2.625	225	5.411
155	2.285	260	4.058	100	2.818	230	5.489
160	2.328	265	4.138	105	3.011	235	5.566
165	2.371	270	4.217	110	3.205	240	5.644
170	2.413	275	4.296	115	3.398	245	5.722
175	2.456	280	4.375	120	3.591	250	5.800
180	2.499	285	4.454	125	3.784	255	5.878
185	2.541	290	4.533	130	3.931	260	5.956
190	2.584	295	4.613	135	4.009	265	6.034
195	2.627	300	4.692	140	4.087	270	6.111
200	2.670	305	4.771	145	4.165	275	6.189
205	2.712	310	4.850	150	4.243	280	6.267
210	2.755	315	4.929	155	4.320	285	6.345
215	2.798	320	5.008	160	4.398	290	6.423
220	2.840	325	5.088	165	4.476	295	6.501
225	2.883	330	5.167	170	4.554	300	6.579
230	3.030			175	4.632	305	6.657
				180	4.710	310	6.734
				185	4.788	315	6.812
				190	4.866	320	6.890
				195	4.943	325	6.968
				200	5.021	330	7.046

Thickness is intumescent only.
Three sided beams with a concrete slab.

Issued: 3rd April 2007
Valid to: 2nd April 2012

CERTIFICATE No CF 468
INTERNATIONAL PAINT LIMITED

Interchar 212

Table 12: I-Section Beams at 700°C			
30 minutes		60 minutes	
Section factor up to m^{-1}	Thickness mm	Section factor up to m^{-1}	Thickness mm
330	1.200	215	1.246
		220	1.313
		225	1.380
		230	1.448
		235	1.515
		240	1.582
		245	1.649
		250	1.716
		255	1.783
		260	1.851
		265	1.918
		270	1.985
		275	2.052
		280	2.119
		285	2.187
		290	2.217
		295	2.237
		300	2.258
		305	2.279
		310	2.299
		315	2.320
		320	2.341
		325	2.362
		330	2.382

Thickness is intumescent only.
Three sided beams with a concrete slab.

Issued: 3rd April 2007
Valid to: 2nd April 2012

CERTIFICATE No CF 468
INTERNATIONAL PAINT LIMITED

Interchar 212

Table 12 continued: I-Section Beams at 700°C					
90 minutes		90 minutes			
Section factor up to m^{-1}	Thickness mm	Section factor up to m^{-1}	Thickness mm	Section factor up to m^{-1}	Thickness mm
175	2.128	75	1.546	205	4.693
180	2.179	80	1.710	210	4.761
185	2.231	85	1.873	215	4.829
190	2.282	90	2.037	220	4.898
195	2.334	95	2.200	225	4.966
200	2.385	100	2.363	230	5.035
205	2.437	105	2.527	235	5.103
210	2.488	110	2.690	240	5.171
215	2.540	115	2.854	245	5.240
220	2.591	120	3.017	250	5.308
225	2.643	125	3.181	255	5.376
230	2.694	130	3.344	260	5.445
235	2.746	135	3.508	265	5.513
240	2.797	140	3.671	270	5.581
245	2.849	145	3.835	275	5.650
250	2.900	150	3.941	280	5.718
255	2.968	155	4.009	285	5.786
260	3.037	160	4.078	290	5.855
265	3.105	165	4.146	295	5.923
270	3.174	170	4.214	300	5.991
275	3.242	175	4.283	305	6.060
280	3.311	180	4.351	310	6.128
285	3.379	185	4.419	315	6.196
290	3.448	190	4.488	320	6.265
295	3.516	195	4.556	325	6.333
300	3.585	200	4.624	330	6.401
305	3.653				
310	3.722				
315	3.790				
320	3.859				
325	3.949				
330	4.073				

Thickness is intumescent only.
Three sided beams with a concrete slab.

Issued: 3rd April 2007
Valid to: 2nd April 2012

UL Online Certifications Directory

BXUV.X664
Fire Resistance Ratings - ANSI/UL 263

Page Bottom

Design/System/Construction/Assembly Usage Disclaimer

- Authorities Having Jurisdiction should be consulted in all cases as to the particular requirements covering the installation and use of UL Listed or Classified products, equipment, system, devices, and materials.
- Authorities Having Jurisdiction should be consulted before construction.
- Fire resistance assemblies and products are developed by the design submitter and have been investigated by UL for compliance with applicable requirements. The published information cannot always address every construction nuance encountered in the field.
- When field issues arise, it is recommended the first contact for assistance be the technical service staff provided by the product manufacturer noted for the design. Users of fire resistance assemblies are advised to consult the general Guide Information for each product category and each group of assemblies. The Guide Information includes specifics concerning alternate materials and alternate methods of construction.
- Only products which bear UL's Mark are considered as Classified, Listed, or Recognized.

Fire Resistance Ratings - ANSI/UL 263

See General Information for Fire Resistance Ratings - ANSI/UL 263

Design No. X664

July 11, 2007

Ratings — 1, 1-1/2, 2 and 3 Hr. (See Item 2)

1. **Steel Column** — Wide flange steel columns with the minimum sizes shown in the table below. The column surfaces shall be free of dirt, loose scale and oil and then primed with epoxy based primers to an approximate dry film thickness of 50 microns.

2. **Mastic and Intumescent Coatings*** — Two component spray materials applied in one or more coats as described in the application instructions to the thicknesses shown below. Thicknesses below include the 50 microns of primer.

Steel		1 Hour Rating	1-1/2 Hour Rating	2 Hour Rating	3 Hour Rating
Size	W/D	Min Thkns (in.)	Min Thkns (in.)	Min Thkns (in.)	Min Thkns (in.)
W6x16	0.58	0.132	0.288	0.422	NR
W8x24	0.59	0.132	0.286	0.418	NR
W10x26	0.61	0.132	0.281	0.412	NR
W14x34	0.63	0.132	0.277	0.405	NR
W10x33	0.66	0.132	0.270	0.396	NR
W8x31	0.66	0.132	0.270	0.396	NR
W21x44	0.67	0.132	0.268	0.393	NR
W16x40	0.68	0.132	0.266	0.390	NR
W18x40	0.68	0.132	0.266	0.390	NR
W8x28	0.68	0.132	0.266	0.390	NR
W6x25	0.69	0.132	0.264	0.387	NR
W10x30	0.70	0.132	0.262	0.384	NR
W12x35	0.70	0.132	0.262	0.384	NR
W14x38	0.70	0.132	0.262	0.384	NR
W12x40	0.74	0.132	0.254	0.372	NR
W8x35	0.74	0.132	0.254	0.372	NR
W14x43	0.75	0.132	0.253	0.370	NR
W24x55	0.75	0.132	0.253	0.370	NR
W16x45	0.76	0.132	0.251	0.367	NR
W21x50	0.76	0.132	0.251	0.367	NR
W18x50	0.77	0.132	0.249	0.364	NR
W10x39	0.78	0.132	0.247	0.362	NR
W18x46	0.78	0.132	0.247	0.362	NR
W12x45	0.82	0.129	0.240	0.352	NR
W14x48	0.83	0.128	0.239	0.349	NR

W24x68	0.83	0.128	0.239	0.349	NR
W10x49	0.84	0.095	0.224	0.347	NR
W16x50	0.84	0.095	0.224	0.347	NR
W24x62	0.84	0.095	0.224	0.347	NR
W8x40	0.84	0.095	0.224	0.347	0.567
W12x53	0.85	0.095	0.224	0.345	0.563
W18x55	0.85	0.095	0.224	0.345	0.563
W21x57	0.85	0.095	0.224	0.345	0.563
W21x62	0.85	0.095	0.224	0.345	0.563
W10x45	0.89	0.095	0.224	0.336	0.549
W12x50	0.91	0.095	0.224	0.331	0.541
W14x53	0.91	0.095	0.224	0.331	0.541
W10x54	0.92	0.095	0.224	0.329	0.538
W12x65	0.92	0.095	0.224	0.329	0.538
W14x61	0.92	0.095	0.224	0.329	0.538
W18x60	0.92	0.095	0.224	0.329	0.538
W21x68	0.92	0.095	0.224	0.329	0.538
W27x84	0.92	0.095	0.224	0.329	0.538
W12x58	0.93	0.095	0.224	0.327	0.534
W16x67	0.93	0.095	0.224	0.327	0.534
W24x76	0.93	0.095	0.224	0.327	0.534
W16x57	0.95	0.095	0.224	0.323	0.528
W18x76	0.96	0.095	0.224	0.321	0.524
W18x65	0.99	0.095	0.224	0.315	0.515
W21x73	0.99	0.095	0.224	0.315	0.515
W30x99	1.00	0.095	0.224	0.313	0.511
W8x48	1.00	0.095	0.224	0.313	0.511
W10x60	1.02	0.095	0.224	0.309	0.505
W12x72	1.02	0.095	0.224	0.309	0.505
W24x84	1.02	0.095	0.224	0.309	0.505

W27x94	1.02	0.095	0.224	0.309	0.505
W14x68	1.03	0.095	0.224	0.307	0.502
W16x77	1.06	0.095	0.224	0.302	0.493
W14x90	1.07	0.095	0.224	0.300	0.490
W24x104	1.07	0.095	0.224	0.300	0.490
W18x71	1.08	0.095	0.224	0.298	0.488
W18x86	1.08	0.095	0.224	0.298	0.488
W33x118	1.08	0.095	0.224	0.298	0.488
W30x108	1.09	0.095	0.224	0.297	0.485
W12x79	1.11	0.095	0.224	0.293	0.479
W14x74	1.11	0.095	0.224	0.293	0.479
W27x102	1.11	0.095	0.224	0.293	0.479
W21x101	1.12	0.095	0.224	0.291	0.476
W21x83	1.12	0.095	0.224	0.291	0.476
W24x94	1.13	0.095	0.224	0.290	0.474
W10x68	1.14	0.095	0.224	0.288	0.471
W30x116	1.16	0.095	0.224	0.285	0.466
W36x135	1.16	0.095	0.224	0.285	0.466
W14x99	1.17	0.095	0.224	0.283	0.463
W33x130	1.18	0.095	0.224	0.282	0.461
W8x58	1.19	0.095	0.224	0.280	0.458
W24x117	1.20	0.095	0.224	0.279	0.456
W18x97	1.21	0.095	0.224	0.277	0.453
W12x87	1.22	0.095	0.224	0.276	0.451
W14x82	1.22	0.095	0.224	0.276	0.451
W16x89	1.22	0.095	0.224	0.276	0.451
W21x111	1.23	0.095	0.224	0.274	0.448
W27x114	1.23	0.095	0.224	0.274	0.448
W21x93	1.24	0.095	0.224	0.273	0.446
W30X124	1.24	0.095	0.224	0.273	0.446

W24x162	1.63	0.095	0.224	0.226	0.369
W27x178	1.63	0.095	0.224	0.226	0.369
W36x194	1.63	0.095	0.224	0.226	0.369
W12x120	1.64	0.095	0.224	0.225	0.367
W36x230	1.71	0.095	0.218	0.218	0.356
W33x221	1.72	0.095	0.217	0.217	0.355
W30x211	1.76	0.095	0.213	0.213	0.349
W36x210	1.76	0.095	0.213	0.213	0.349
W14x159	1.77	0.095	0.174	0.174	0.347
W10x112	1.81	0.095	0.174	0.174	0.347
W36x245	1.82	0.095	0.174	0.174	0.347
W12x136	1.84	0.095	0.174	0.174	0.347
W33x241	1.88	0.095	0.174	0.174	0.347
W36x260	1.92	0.095	0.174	0.174	0.347
W14x176	1.95	0.095	0.174	0.174	0.347
W12x152	2.04	0.095	0.174	0.174	0.347
W36x280	2.06	0.095	0.174	0.174	0.347
W14x193	2.12	0.095	0.174	0.174	0.347
W36x300	2.19	0.095	0.174	0.174	0.347
W12x170	2.26	0.095	0.174	0.174	0.347
W14x211	2.30	0.095	0.174	0.174	0.347
W12x190	2.49	0.095	0.174	0.174	0.347
W14x233	2.52	0.095	0.174	0.174	0.347

NR = No Rating

Steel		1 Hour Rating	1-1/2 Hour Rating	2 Hou r Rating	3 Hour Rating
Size	Hp/A	Min. Thkns (micron)	Min. Thkns (micron)	Min. Thkns (micron)	Min. Thkns (micron)
W6x16	231	3353	7317	10715	NR
W8x24	227	3353	7257	10627	NR

W10x26	220	3353	7139	10455	NR
W14x34	213	3353	7026	10289	NR
W10x33	203	3353	6862	10049	NR
W8x31	203	3353	6862	10049	NR
W21x44	200	3353	6809	9972	NR
W16x40	197	3353	6757	9895	NR
W18x40	197	3353	6757	9895	NR
W8x28	197	3353	6757	9895	NR
W6x25	194	3353	6706	9820	NR
W10x30	191	3353	6655	9746	NR
W12x35	191	3353	6655	9746	NR
W14x38	191	3353	6655	9746	NR
W12x40	181	3353	6461	9461	NR
W8x35	181	3353	6461	9461	NR
W14x43	179	3353	6414	9392	NR
W24x55	179	3353	6414	9392	NR
W16x45	176	3353	6368	9325	NR
W21x50	176	3353	6368	9325	NR
W18x50	174	3353	6322	9258	NR
W10x39	172	3353	6277	9192	NR
W18x46	172	3362	6277	9192	NR
W12x45	163	3269	6104	8938	NR
W14x48	161	3247	6062	8877	NR
W24x68	161	3247	6062	8877	NR
W10x49	160	2413	5690	8817	NR
W16x50	160	2413	5690	8817	NR
W24x62	160	2413	5690	8817	NR
W8x40	160	2413	5690	8817	14408
W12x53	158	2413	5690	8757	14311
W18x55	158	2413	5690	8757	14311

W21x57	158	2413	5690	8757	14311
W21x62	158	2413	5690	8757	14311
W10x45	151	2413	5690	8526	13934
W12x50	147	2413	5690	8415	13752
W14x53	147	2413	5690	8415	13752
W10x54	146	2413	5690	8361	13664
W12x65	146	2413	5690	8361	13664
W14x61	146	2413	5690	8361	13664
W18x60	146	2413	5690	8361	13664
W21x68	146	2413	5690	8361	13664
W27x84	146	2413	5690	8361	13664
W12x58	144	2413	5690	8307	13576
W16x67	144	2413	5690	8307	13576
W24x76	144	2413	5690	8307	13576
W16x57	141	2413	5690	8202	13404
W18x76	140	2413	5690	8150	13319
W18x65	135	2413	5690	7999	13072
W21x73	135	2413	5690	7999	13072
W30x99	134	2413	5690	7950	12992
W8x48	134	2413	5690	7950	12992
W10x60	131	2413	5690	7853	12834
W12x72	131	2413	5690	7853	12834
W24x84	131	2413	5690	7853	12834
W27x94	131	2413	5690	7853	12834
W14x68	130	2413	5690	7806	12757
W16x77	126	2413	5690	7667	12530
W14x90	125	2413	5690	7622	12456
W24x104	125	2413	5690	7622	12456
W18x71	124	2413	5690	7577	12383
W18x86	124	2413	5690	7577	12383

W33x118	124	2413	5690	7577	12383
W30x108	123	2413	5690	7533	12311
W12x79	121	2413	5690	7447	12170
W14x74	121	2413	5690	7447	12170
W27x102	121	2413	5690	7447	12170
W21x101	120	2413	5690	7404	12100
W21x83	120	2413	5690	7404	12100
W24x94	119	2413	5690	7362	12031
W10x68	118	2413	5690	7320	11963
W30x116	116	2413	5690	7238	11829
W36x135	116	2413	5690	7238	11829
W14x99	115	2413	5690	7198	11763
W33x130	114	2413	5690	7158	11698
W8x58	113	2413	5690	7119	11634
W24x117	112	2413	5690	7080	11570
W18x97	111	2413	5690	7041	11507
W12x87	110	2413	5690	7003	11445
W14x82	110	2413	5690	7003	11445
W16x89	110	2413	5690	7003	11445
W21x111	109	2413	5690	6966	11383
W27x114	109	2413	5690	6966	11383
W21x93	108	2413	5690	6928	11322
W30X124	108	2413	5690	6928	11322
W10x77	105	2413	5690	6783	11085
W14x109	105	2413	5690	6783	11085
W33x141	105	2413	5690	6783	11085
W36x150	105	2413	5690	6783	11085
W30x132	102	2413	5690	6678	10913
W18x106	102	2413	5690	6644	10857
W24x131	101	2413	5690	6610	10802

W12x96	100	2413	5690	6576	10747
W21x122	100	2413	5690	6576	10747
W27x146	99	2413	5690	6543	10693
W16x100	99	2413	5690	6510	10639
W36x160	99	2413	5690	6510	10639
W8x67	99	2413	5690	6510	10639
W33x152	98	2413	5690	6477	10586
W14x120	96	2413	5690	6382	10429
W36x170	93	2413	5690	6258	10227
W10x88	92	2413	5690	6228	10178
W21x132	92	2413	5690	6228	10178
W12x106	92	2413	5690	6198	10129
W30x173	92	2413	5690	6198	10129
W18x119	91	2413	5690	6169	10081
W24x146	91	2413	5690	6139	10033
W27x161	91	2413	5690	6139	10033
W14x132	87	2413	5690	5969	9755
W36x182	87	2413	5690	5969	9755
W33x201	85	2413	5690	5861	9579
W21x147	84	2413	5690	5809	9493
W30x191	84	2413	5690	5809	9493
W10x100	82	2413	5690	5731	9367
W14x145	82	2413	5690	5731	9367
W24x162	82	2413	5690	5731	9367
W27x178	82	2413	5690	5731	9367
W36x194	82	2413	5690	5731	9367
W12x120	82	2413	5690	5706	9325
W36x230	78	2413	5535	5535	9046
W33x221	78	2413	5512	5512	9007
W30x211	76	2413	5419	5419	8857

W36x210	76	2413	5419	5419	8857
W14x159	76	2413	4420	4420	8820
W10x112	74	2413	4420	4420	8820
W36x245	74	2413	4420	4420	8820
W12x136	73	2413	4420	4420	8820
W33x241	71	2413	4420	4420	8820
W36x260	70	2413	4420	4420	8820
W14x176	69	2413	4420	4420	8820
W12x152	66	2413	4420	4420	8820
W36x280	65	2413	4420	4420	8820
W14x193	63	2413	4420	4420	8820
W36x300	61	2413	4420	4420	8820
W12x170	59	2413	4420	4420	8820
W14x211	58	2413	4420	4420	8820
W12x190	54	2413	4420	4420	8820
W14x233	53	2413	4420	4420	8820

NR = No Rating

INTERNATIONAL PAINT LTD — Type Interchar 212. Investigated for Conditioned Interior Space Purpose, Interior General Purpose and Exterior Use.

*Bearing the UL Classification Mark

Last Updated on 2007-07-11

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Fire Resistance Ratings - ANSI/UL 263

Page Bottom

Fire Resistance Ratings - ANSI/UL 263

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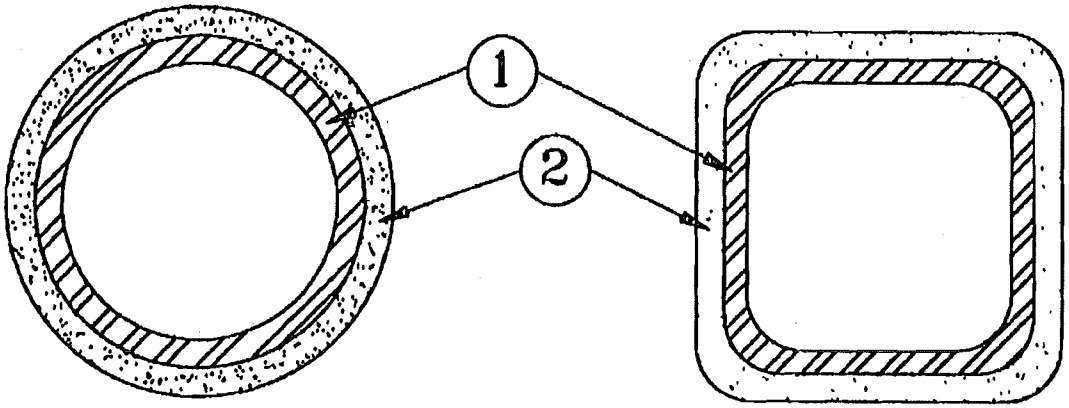
Design No. X674

July 11, 2007

Rating - 2 Hr. (See Item 2)



1. **Steel Column** — Steel tube or steel pipe columns with A/P values shown in the table below. The minimum wall thickness shall be 5/16 in. The column surfaces shall be free of dirt, loose scale and oil and then primed with epoxy based primers to an approximate dry film thickness of 50 microns.

2. **Mastic and Intumescent Coatings*** — Two component spray materials applied in one or more coats as described in the application instructions to the thicknesses shown below. Thicknesses below include the 50 microns of primer.

		Thkns.	Thkns.	Thkns.	Thkns.	Thkns.	Thkns.	Thkns.	Thkns.
		mm	in.	mm	in.	mm	in.	mm	in.
Size	A/P	1 hr	1 hr	1-1/2 hr	1-1/2 hr	2 hr	2 hr	2-1/2 hr	2-1/2 hr
ST 6X6X5/16	0.30	3.089	0.122	6.242	0.246	9.396	0.370	NR	NR
ST 7X5X5/16	0.30	3.089	0.122	6.242	0.246	9.396	0.370	NR	NR
ST 7X7X5/16	0.30	3.089	0.122	6.242	0.246	9.396	0.370	NR	NR
ST 8X4X5/16	0.30	3.089	0.122	6.242	0.246	9.396	0.370	NR	NR
ST 8X6X5/16	0.30	3.089	0.122	6.242	0.246	9.396	0.370	NR	NR
ST 8X8X5/16	0.30	3.089	0.122	6.242	0.246	9.396	0.370	NR	NR
ST 10X2X5/16	0.30	3.089	0.122	6.242	0.246	9.396	0.370	NR	NR
ST 10X4X5/16	0.30	3.089	0.122	6.242	0.246	9.396	0.370	NR	NR
ST 10X6X5/16	0.30	3.089	0.122	6.242	0.246	9.396	0.370	NR	NR

ST 10X10X5/16	0.30	3.089	0.122	6.242	0.246	9.396	0.370	NR	NR
ST 12X4X5/16	0.30	3.089	0.122	6.242	0.246	9.396	0.370	NR	NR
ST 12X6X5/16	0.30	3.089	0.122	6.242	0.246	9.396	0.370	NR	NR
ST 12X8X5/16	0.30	3.089	0.122	6.242	0.246	9.396	0.370	NR	NR
ST 12X12X5/16	0.30	3.089	0.122	6.242	0.246	9.396	0.370	NR	NR
ST 14X4X5/16	0.30	3.089	0.122	6.242	0.246	9.396	0.370	NR	NR
ST 14X6X5/16	0.30	3.089	0.122	6.242	0.246	9.396	0.370	NR	NR
ST 14X10X5/16	0.30	3.089	0.122	6.242	0.246	9.396	0.370	NR	NR
ST 14X14X5/16	0.31	3.005	0.118	6.145	0.242	9.284	0.366	NR	NR
ST 4X4X3/8	0.34	2.754	0.108	5.851	0.230	8.948	0.352	NR	NR
ST 5X3X3/8	0.34	2.754	0.108	5.851	0.230	8.948	0.352	NR	NR
ST 5X4X3/8	0.34	2.754	0.108	5.851	0.230	8.948	0.352	NR	NR
ST 6X2X3/8	0.34	2.754	0.108	5.851	0.230	8.948	0.352	NR	NR
ST 6X3X3/8	0.34	2.754	0.108	5.851	0.230	8.948	0.352	NR	NR
ST 5X5X3/8	0.35	2.670	0.105	5.753	0.227	8.837	0.348	NR	NR
ST 6X4X3/8	0.35	2.670	0.105	5.753	0.227	8.837	0.348	NR	NR
ST 6X6X3/8	0.35	2.670	0.105	5.753	0.227	8.837	0.348	NR	NR
ST 7X3X3/8	0.35	2.670	0.105	5.753	0.227	8.837	0.348	NR	NR
ST 7X4X3/8	0.35	2.670	0.105	5.753	0.227	8.837	0.348	NR	NR
ST 7X5X3/8	0.35	2.670	0.105	5.753	0.227	8.837	0.348	NR	NR
ST 7X7X3/8	0.35	2.670	0.105	5.753	0.227	8.837	0.348	NR	NR
ST 8X2X3/8	0.35	2.670	0.105	5.753	0.227	8.837	0.348	NR	NR
ST 8X3X3/8	0.35	2.670	0.105	5.753	0.227	8.837	0.348	NR	NR
ST 8X4X3/8	0.35	2.670	0.105	5.753	0.227	8.837	0.348	NR	NR
ST 8X6X3/8	0.35	2.670	0.105	5.753	0.227	8.837	0.348	NR	NR
ST 10X4X3/8	0.35	2.670	0.105	5.753	0.227	8.837	0.348	NR	NR
ST 8X8X3/8	0.36	2.586	0.102	5.655	0.223	8.725	0.344	NR	NR
ST 10X6X3/8	0.36	2.586	0.102	5.655	0.223	8.725	0.344	NR	NR
ST 10X10X3/8	0.36	2.586	0.102	5.655	0.223	8.725	0.344	NR	NR
ST 12X4X3/8	0.36	2.586	0.102	5.655	0.223	8.725	0.344	NR	NR
ST 12X6X3/8	0.36	2.586	0.102	5.655	0.223	8.725	0.344	NR	NR
ST 12X8X3/8	0.36	2.586	0.102	5.655	0.223	8.725	0.344	NR	NR
ST 12X12X3/8	0.36	2.586	0.102	5.655	0.223	8.725	0.344	NR	NR
ST 14X4X3/8	0.36	2.586	0.102	5.655	0.223	8.725	0.344	NR	NR
ST 14X6X3/8	0.36	2.586	0.102	5.655	0.223	8.725	0.344	NR	NR
ST 14X10X3/8	0.36	2.586	0.102	5.655	0.223	8.725	0.344	NR	NR
ST 14X14X3/8	0.36	2.586	0.102	5.655	0.223	8.725	0.344	NR	NR
ST 4X4X1/2	0.44	1.940	0.076	4.873	0.192	7.831	0.308	NR	NR
ST 5X3X1/2	0.44	1.940	0.076	4.873	0.192	7.831	0.308	NR	NR
ST 5X5X1/2	0.45	1.940	0.076	4.775	0.188	7.719	0.304	NR	NR
ST 6X4X1/2	0.45	1.940	0.076	4.775	0.188	7.719	0.304	NR	NR

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ST 6X6X1/2	0.46	1.940	0.076	4.677	0.184	7.607	0.299	NR	NR
ST 7X5X1/2	0.46	1.940	0.076	4.677	0.184	7.607	0.299	NR	NR
ST 7X7X1/2	0.46	1.940	0.076	4.677	0.184	7.607	0.299	NR	NR
ST 8X4X1/2	0.46	1.940	0.076	4.677	0.184	7.607	0.299	NR	NR
ST 8X6X1/2	0.46	1.940	0.076	4.677	0.184	7.607	0.299	NR	NR
ST 10X4X1/2	0.46	1.940	0.076	4.677	0.184	7.607	0.299	NR	NR
ST 8X8X1/2	0.47	1.940	0.076	4.579	0.180	7.495	0.295	NR	NR
ST 10X6X1/2	0.47	1.940	0.076	4.579	0.180	7.495	0.295	NR	NR
ST 12X4X1/2	0.47	1.940	0.076	4.579	0.180	7.495	0.295	NR	NR
ST 12X6X1/2	0.47	1.940	0.076	4.579	0.180	7.495	0.295	NR	NR
ST 14X4X1/2	0.47	1.940	0.076	4.579	0.180	7.495	0.295	NR	NR
ST 10X10X1/2	0.48	1.940	0.076	4.481	0.176	7.384	0.291	NR	NR
ST 12X8X1/2	0.48	1.940	0.076	4.481	0.176	7.384	0.291	NR	NR
ST 12X12X1/2	0.48	1.940	0.076	4.481	0.176	7.384	0.291	NR	NR
ST 14X6X1/2	0.48	1.940	0.076	4.481	0.176	7.384	0.291	NR	NR
ST 14X10X1/2	0.48	1.940	0.076	4.481	0.176	7.384	0.291	NR	NR
ST 14X14X1/2	0.48	1.940	0.076	4.481	0.176	7.384	0.291	NR	NR
ST 8X8X5/8	0.58	1.940	0.076	3.503	0.138	6.060	0.239	9.029	0.355
ST 10X10X5/8	0.59	1.940	0.076	3.503	0.138	6.060	0.239	8.914	0.351
ST 12X8X5/8	0.59	1.940	0.076	3.503	0.138	6.060	0.239	8.914	0.351
ST 16X16X1	0.95	NR	NR	NR	NR	4.090	0.161	5.970	0.235
ST 12X12X2	1.67	1.940	0.076	3.503	0.138	6.060	0.239	4.790	0.189
		Thkns.	Thkns.	Thkns.	Thkns.	Thkns.	Thkns.	Thkns.	Thkns.
		mm	in.	mm	in.	mm	in.	mm	in.
Size	A/P	1 hr	1 hr	1-1/2 hr	1-1/2 hr	2 hr	2 hr	2-1/2 hr	2-1/2 hr
SP 14X0.312	0.31	3.047	0.120	6.193	0.244	9.339	0.368	NR	NR
SP 4X0.337	0.31	3.005	0.118	6.145	0.242	9.284	0.366	NR	NR
SP 8X0.322	0.31	3.005	0.118	6.145	0.242	9.284	0.366	NR	NR
SP 5X0.375	0.35	2.670	0.105	5.753	0.227	8.837	0.348	NR	NR
SP 10X0.365	0.35	2.670	0.105	5.753	0.227	8.837	0.348	NR	NR
SP 2 X 0.436	0.36	2.586	0.102	5.655	0.223	8.725	0.344	NR	NR
SP 12X0.375	0.36	2.586	0.102	5.655	0.223	8.725	0.344	NR	NR
SP 14X0.375	0.36	2.544	0.100	5.607	0.221	8.670	0.341	NR	NR
SP 8X0.406	0.39	2.360	0.093	5.392	0.212	8.424	0.332	NR	NR
SP 12X0.406	0.39	2.308	0.091	5.332	0.210	8.355	0.329	NR	NR
SP 6X0.432	0.40	2.250	0.089	5.264	0.207	8.278	0.326	NR	NR
SP 14X0.438	0.42	2.046	0.081	5.026	0.198	8.006	0.315	NR	NR
SP 2.5 X 0.552	0.45	1.940	0.076	4.775	0.188	7.719	0.304	NR	NR
SP 8X0.5	0.47	1.940	0.076	4.579	0.180	7.495	0.295	NR	NR
SP 10X0.5	0.48	1.940	0.076	4.513	0.178	7.420	0.292	NR	NR
SP 12X0.5	0.48	1.940	0.076	4.481	0.176	7.384	0.291	NR	NR

SP 14X0.5	0.48	1.940	0.076	4.460	0.176	7.360	0.290	NR	NR
SP 3X0.6	0.50	1.940	0.076	4.285	0.169	7.160	0.282	NR	NR
SP 6X0.562	0.51	1.940	0.076	4.145	0.163	7.000	0.276	NR	NR
SP 12X0.562	0.54	1.940	0.076	3.921	0.154	6.744	0.266	NR	NR
SP 8X0.594	0.55	1.940	0.076	3.766	0.148	6.567	0.259	NR	NR
SP 10X0.594	0.56	1.940	0.076	3.687	0.145	6.476	0.255	NR	NR
SP 14X0.594	0.57	1.940	0.076	3.612	0.142	6.391	0.252	NR	NR
SP 4X0.674	0.57	1.940	0.076	3.600	0.142	6.378	0.251	NR	NR
SP 4X0.674	0.57	1.940	0.076	3.571	0.141	6.343	0.250	NR	NR
SP 6X0.719	0.64	1.940	0.076	3.571	0.141	6.060	0.239	8.330	0.328
SP 5X0.75	0.65	1.940	0.076	3.571	0.141	6.060	0.239	8.239	0.324
SP 12X0.688	0.65	1.940	0.076	3.571	0.141	6.060	0.239	8.217	0.323
SP 8X 0.719	0.66	1.940	0.076	3.571	0.141	6.060	0.239	8.123	0.320
SP 10X0.719	0.67	1.940	0.076	3.571	0.141	6.060	0.239	7.987	0.314
SP 14X0.75	0.71	1.940	0.076	3.571	0.141	6.060	0.239	7.541	0.297
SP 8X0.812	0.74	1.940	0.076	3.571	0.141	6.060	0.239	7.246	0.285
SP 6 X 0.864	0.75	1.940	0.076	3.571	0.141	6.060	0.239	7.081	0.279
SP 10X0.844	0.78	1.940	0.076	3.571	0.141	6.060	0.239	6.763	0.266
SP 12X0.844	0.79	1.940	0.076	3.571	0.141	6.060	0.239	6.644	0.262
SP 8 X 0.875	0.79	1.940	0.076	3.571	0.141	6.060	0.239	6.623	0.261
SP 10X1.0	0.91	1.940	0.076	3.571	0.141	6.060	0.239	5.283	0.208
SP 12X1.0	0.92	1.940	0.076	3.571	0.141	6.060	0.239	5.116	0.201
SP 14X 1.094	1.01	1.940	0.076	3.571	0.141	6.060	0.239	4.790	0.189
SP 14X 1.25	1.14	1.940	0.076	3.571	0.141	6.060	0.239	4.790	0.189
SP 14X1.406	1.26	1.940	0.076	3.571	0.141	6.060	0.239	4.790	0.189
SP 16X1.594	1.44	NR	NR	NR	NR	4.090	0.161	5.970	0.235

INTERNATIONAL PAINT LTD — Type Interchar 212. Investigated for Conditioned Interior Space Purpose, Interior General Purpose and Exterior Use.

*Bearing the UL Classification Mark

Last Updated on 2007-07-11

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Sent: Wednesday, August 22, 2007 8:32 AM
To: Dempster, Bill
Subject: Emailing: showpage

ONLINE CERTIFICATIONS DIRECTORY

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Fire Resistance Ratings - ANSI/UL 263

Page Bottom

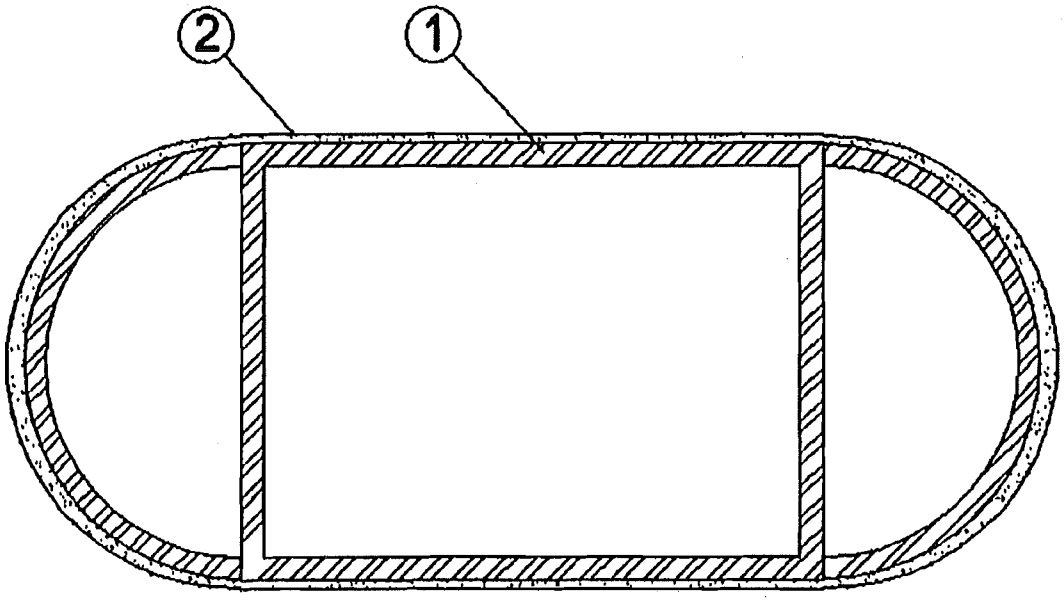
Fire Resistance Ratings - ANSI/UL 263

See General Information for Fire Resistance Ratings - ANSI/UL 263

Design No. X678

July 30, 2007

Rating - 2 Hr.



1. **Steel Column** — Minimum 12 x 8-5/8 steel tube column having a 5/8 in. thickness. Column also provided with rounded ends consisting of minimum Schedule 40, 8-5/8 in. diameter pipe. Pipe cut in half, edges chamfered and continuously welded to narrow face of the tube column. Column surfaces shall be free of dirt, loose scale and oil and then primed with epoxy based primers to an approximate dry film thickness of 85 microns.

Formula for Calculation of Shape Factor

Combined A/P = A/P Pipe Section + A/P Exposed Faces of Tube

2. **Mastic and Intumescent Coatings*** — Two component spray materials applied in one or more coats as described in the application instructions to a thickness a specified in the table below. Thickness includes the 85 microns of primer.

Combined (A/P)	Thickness (in.)	Thickness (mm)
0.46	0.238	6.05
0.8	0.161	4.09

INTERNATIONAL PAINT LTD — Type Interchar 212. Investigated for Conditioned Interior Space Purpose, Interior General Purpose and Exterior Use.

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PROJECT SPECIFIC APPLICATION MANUAL

EXHIBIT "G"

Interchar 212
Application Guidance Notes

Fire protection performance and pre-fire durability are critically dependent on the correct application of the system. These guidance notes are intended to assist applicators and are for guidance only; Akzo Nobel accepts no liability for the acts or omissions of any applicators.

Applicators must make direct contact with International Protective Coatings to discuss training requirements for the application of Interchar 212 PRIOR to any commencement of a project.

TECHNICAL AND APPLICATION DATA herein is for the purpose of establishing a general guideline of the coating and proper coating application procedure. Test performance results were obtained in a controlled laboratory environment and International makes no representation that the exhibited published test results, or any other tests, accurately represent results actually found in all field environments. As application, environmental and design factors can vary significantly, due care should be exercised in the selection, verification of performance, and use of the coating(s).

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INTRODUCTION

These Application Guidance Notes contain advice on application of Interchar 212 intumescent systems.

Passive fireproofing materials prevent potentially catastrophic structural failures from occurring by providing an insulating shield against the intense heat of a fire. The Interchar 212 fireproofing system is the result of over 30 years of research and development and possesses extensive certification for a wide range of fire protection ratings.

This document is subject to the following;

1. Compliance with individual country standards concerning fire resistance,
2. All equipment being suitable and fully serviced prior to use for Interchar applications.
3. All applicators being competent in the application of non-standard high performance coatings.
4. All Health & Safety recommendations of the equipment manufacturer being followed.

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SYSTEM DESCRIPTION

Interchar 212 passive fireproofing system consists of a two pack epoxy intumescent mastic.

Interchar 212 can provide effective fire protection to a very wide range of steel structures in cellulosic fire scenarios, whilst also providing protection against corrosion. In a fire, Interchar 212 fireproofing will intumesce (expand) to a thickness much greater than that of the applied coating to form an insulating blanket of char. It is this char and its formation that protects the substrate from fire damage.

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SURFACE PREPARATION

Degreasing

The presence of surface oil or grease prevents a coating from properly adhering to the substrate and can lead to rapid failure of the whole system. For this reason, all visible oil, grease and other soluble contaminants must be removed before the application of both primer and Interchar 212. Degreasing is also important before blast cleaning activities.

Cleaning and degreasing should be carried out to SSPS-SP1 standard.

Methods of degreasing include:

- wiping or scrubbing the surface with rags or brushes wetted with solvent (*NB: use clean solvent for the final wiping*)
- steam cleaning using detergents or emulsion/alkaline cleaners followed by steam or fresh water wash to remove detrimental residues.

The applicator should select the method most appropriate to the situation, giving due consideration to relevant health and environmental regulations. Heavy oil or grease deposits should be removed first by scraper, followed by detergent washing (or solvent cleaning) and a thorough fresh water rinse.

Blast cleaning

Blast cleaning is widely accepted as being the best way of preparing a metallic substrate (usually steel) before application of a protective coating and it is a very important part of the whole application process. When a primer is used, blast cleaning should be carried out in accordance with the requirements on the primer technical data sheet.

The general requirement is near-white blast cleaning, to Sa2½ (ISO 8501-1:2007), SSPC-SP10 or NACE No. 2, with a sharp angular profile being obtained. The blast profile should be between 50 and 75 microns (2-3 mils) for steel substrates and the recommended method for measuring the blast profile is with replica tape.

Galvanised substrates should be prepared using Interprime 160 Etch Primer; ensure that this product is not over-applied. Any powdery deposits which may form on the surface will need to be rinsed off with clean water prior to overcoating. Sweep abrasive blasting may also be used to provide a roughened surface, to a standard similar to Sa 1 (ISO 8501-1), SSPC-SP7 or NACE No. 4.

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Power tool cleaning

See Table 1 Note 1. Power tool cleaning may be used on small areas, typically for touch up and repair areas and should be carried out to SSPC-SP11 standard. Ensure that the surface of the steel does not become polished.

Table 1: Interchar 212 Surface Preparation Chart

OPERATION REQUIRED	*STEEL*	*GALVANISED STEEL*
Degreasing	✓	✓
Etch Priming	X	✓ using Interprime 160
Power Tool Cleaning	See Note 1	
Near White Blast Cleaning	✓	
Sweep (Brush-off) Blast Cleaning		✓
Blow down	✓	✓
Primer	✓	✓

Note 1: Small areas (not exceeding $1m^2$ ($1550in^2$), for example welds and local repair areas, should be prepared by power tool methods to achieve a clean, roughened surface in accordance with SSPC-SP11, power tool cleaning. Power tool cleaning is not an acceptable primary surface preparation method for steel.

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PRIMERS

It is possible to apply Interchar 212 directly to blast cleaned steel, if the relevant country approval allows this but environmental factors (temperature, time, humidity etc), may make it necessary to prime the substrate to prevent deterioration of the blast.

To ensure optimal bonding between the Interchar 212 and substrate, correct primer type and thickness are required.

Primer Thickness

Optimal bonding is achieved when the primer's dry film thickness (dft) is sufficient to just cover the peaks of the blast profile and maintain a rust free condition prior to application of Interchar 212. Maximum primer thickness is dependent on individual primers and careful monitoring and measurement of primer thickness is required. Dft measurement should be carried out in accordance with ISO 2808.

The **maximum** allowable primer system dft's are summarized in the following table:

Table 2: Primer System Maximum Dft's

Primer System	Dry Film Thickness	
	Normal Areas	*Overlap Areas*
Epoxy primer (e.g Intergard 251)	50-75 microns (2-3 mils)	150 microns (6 mils)
Epoxy zinc primer (e.g Interzinc 52)	50-75 microns (2-3 mils)	150 microns (6 mils)
Epoxy zinc primer plus tie coat	75-110 microns (3-4.4 mils)	150 microns (6 mils)

Contact International Paint for further advice on specific primers.

NOTE: In areas of difficult access, such as internal angles, etc, where multiple spray passes are unavoidable, thickness should be carefully monitored and controlled.

Reduction of Excessive Primer Thickness

Excessive primer thickness should be reduced to the dft's indicated in Table 2. The preferred method to be used is abrasive sweep blasting. Sanding with P80-P100 grade aluminium oxide abrasive paper may be suitable for small areas; however, care should be taken to prevent polishing of the surface which would lead to inadequate adhesion of the Interchar 212. Polishing must be avoided and frequent changes of the abrasive paper should be made.

After primer reduction surfaces should be cleaned of dust and contaminants and thoroughly dry prior to the application of Interchar 212.

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Primer Type

Please consult with International Protective Coatings for recommended primers. Care should be taken to ensure that systems have reached sufficient levels of cure prior to overcoating with Interchar 212. Generally this will not be less than three days.

It is the applicator's responsibility to ensure that the primed surface and the primer itself are in an acceptable condition for overcoating with Interchar 212. Such factors as ageing of the primer (degradation and surface chalking), contamination, rust, bloom, etc. shall be considered when determining a surface's suitability before overcoating with Interchar 212. Where there is any doubt as to a primer's acceptance, consult International Protective Coatings. Dry film thickness checks should be made to ensure that they don't exceed the tolerance set out in Table 2.

If epoxy zinc primers are exposed to humid or outdoor conditions prior to application of Interchar 212, zinc salts may be formed on the surface which is detrimental to adhesion of the Interchar 212. These will need to be removed by sweep blasting or abrading; alternatively, an epoxy tie coat may be applied over the primer prior to external exposure to prevent salts forming.

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PACKAGING

For plural component equipment, Interchar 212 is supplied in a 50kg (110lb) kit comprising 35.48kg (78.2lb) grey coloured resin (Part A) in 2 x 20 litre (2 x 5.3 US gallon) pails and 14.52kg (32lb) of light coloured hardener (Part B) in a 20 litre (5.3 US gallon) pail.

For single component pumps and trowel application, Interchar 212 is supplied in a 20kg (44.1lb) kit, comprising 14.2kg (31.3lb) of grey coloured resin (Part A) in a 22.7 litre (6 US gallon) short-filled pail and 5.8kg (12.8lb) of light coloured hardener (Part B) in a 7.6 litre (2 US gallon) pail.

AMBIENT CONDITIONS

Suitable application conditions are of critical importance for the successful application of Interchar 212. Consequently, it should only be applied when the ambient conditions are within the following parameters:

- *Air temperature: minimum 10°C*
- *Relative humidity: maximum 85%*
- *Surface temperature: at least 3°C above dew point temperature*

There is a higher propensity for amine bloom formation at lower application temperatures which would affect overcoating with further layers of Interchar 212 where required and may affect overcoating with topcoats. For low air temperature applications, plural equipment is the recommended dispensing method.

STORAGE CONDITIONS

Interchar 212 should be stored indoors and out of direct sunlight.

The following storage temperature ranges must be maintained:

1. General storage: Minimum 5°C (41°F), maximum 30°C (86°F)
2. Material temperature for plural component spray application: 30–34°C (86–93°F) for 24 hours (maximum 48 hours) prior to use

Accelerated methods of heating the Interchar 212 containers prior to use, such as electrical heaters in direct contact with the containers or hot water baths, are not permitted. Such methods can cause overheating of the outer layers of material in the container, which may produce undesirable changes to its properties (including shorter pot life).

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SURFACE FINISH

Discontinuities, pinholes, voids or isolated deposits of excess thickness in the coating are not acceptable.

Where there is the risk of water ponding on horizontal surfaces, the Interchar 212 should be sloped sufficiently to avoid ponding.

Samples of the surface finish acceptable to the client, a reference area, should be prepared by the applicator prior to job start-up. See the Quality Control Guidance notes for Interchar 212 Fireproofing Systems Application for further details.

Please see Appendix 2 Guidelines for Achieving an Improved Finish Quality for more details regarding surface finish.

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INTERCHAR 212 APPLICATION WITH PLURAL SPRAY EQUIPMENT INCLUDING EQUIPMENT REQUIREMENTS

Plural Component Spray Equipment

As Interchar 212 is a thixotropic material, it is most efficiently applied with purpose built hot spray plural component pumps, which have the advantage of not requiring any premixing of the two parts.

For Interchar 212 the application parameters possible depend on a number of factors (e.g. environmental conditions, equipment type, etc) and are as follows:

1.	Storage tank temperatures	Part A: 35°-60°C (95°-140°F) Part B: 35°-50°C (95°-122°F)
2.	Hose heater temperature	45-65°C (113°-149°F)
3.	Gun exit temperature	40-55°C (104°-131°F)
4.	Storage tank pressures (see Note 2)	Part A: 4.10 – 6.90 bar (60-100 psi) Part B: 2.00 – 4.10 bar (30-60 psi)
5.	Tank stirrer speed	10-30rpm
6.	Displacement pump pressure	175-276 bar (2500-4000 psi)

Fluid lines and spray tips:
¾" – ½" I.D. fluid lines
Suggested tip size: 0.035" to 0.041"

Note 2: Ability to vary tank pressures is critical to achieve the correct weight mix ratios.

It is necessary to provide controlled heated storage for the Interchar 212 and advisable to place the machine in a modified insulated container for work at low air temperatures.

The importance of keeping all spray equipment clean and efficient cannot be overstated, as down time is very costly. For this reason a skilled and experienced machine operator is a vital component of the team, together with a regular maintenance or service programme for the equipment.

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Machines built to spray Interchar 212 are supplied by a number of companies. Each supplier provides instructions on machine operation and maintenance and should be able to advise on the individual set up required to achieve best application qualities.

Ratio Checks

It is important that the delivery ratio of plural spray pumps is regularly checked. As a minimum, a ratio check by weight should be performed at the start up of each day's production and again if the machine is shut down and restarted for any reason. Use the following procedure for ratio checks by weight:

1. *Weigh clean empty Parts A and B containers and note the respective weights.*
2. *Place the containers under the ratio check valves located on the mixing block and open the valves at exactly the same time.*
3. *Close the valves when the containers are at least half full at exactly the same time.*
4. *Find the net weight of each part by subtracting the weight of the containers.*
5. *Calculate the ratio of Part A to Part B.*

Example:
Part A empty container weight – 2.3kg (5.0lb)
Part B empty container weight – 1.2kg (2.6lb)

Part A full container weight – 9.4kg (20.7lb)
Part B full container weight – 4.1kg (9.0lb)

Part A net weight – 7.1kg (15.7lb)
Part B net weight – 2.9kg (6.4lb)

As a minimum a ratio check should be carried out at the start of each shift and after each machine shutdown and restart. In addition to the ratio checks, constant checking of the displacement pump pressure gauges and the colour of the mixed Interchar should be carried out by the machine operator and sprayer respectively.

Parts A:B as a ratio of total weight = **2.45:1**

The **weight ratio** for Interchar 212 is 2.49:1.

The acceptable ratio range of Part A:Part B is:

2.37:1 Minimum
2.61:1 Maximum

Where values are found to be outside the range, please contact International Protective Coatings for further advice.

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Spray Application

Frequently shutting down spray machines causes wasted time and material spent cleaning and causes pressure build up in the material lines and spray gun, which may represent a safety hazard.

Interchar 212 can be rolled to achieve a uniform thickness of the coat, which allows uniform build up of subsequent coats and ultimately the correct final thickness. Rolling also serves to produce a smoother surface finish, when required. Rolling can be carried out using a short nap roller dampened with International Protective Coatings thinner GTA123 (or GTA822) . Refer to Appendix 2 Guidelines for Achieving an Improved Finish Quality.

Two considerations to bear in mind with rolling are that if the Interchar 212 has not gelled (started to cure) sufficiently, it can sag or slump and that too much solvent on the roller can reduce the cure rate if it is forced into the wet Interchar 212.

For subsequent coats, sufficient time must pass for the applied Interchar 212 to gel ("set up" or partially cure) in order to support the weight of the additional material.

Preferably, subsequent coats should be applied when the previous coat is still tacky. Where practicalities prevent "wet on wet" application, overcoating time should be reduced to a minimum.

When the overcoating time is longer than 24 hours, a sprayed holding coat should be applied to leave the Interchar 212 with a good key to improve the adhesion of the next coat. The holding coat is produced by boosting the Interchar 212 temperature (in the plural component spray equipment) and/or raising the pump output pressure to give a wide fan and increased atomisation. The spray pass is much faster than normal and the result is a coarse finish that promotes good bonding with subsequent coats.

The final coat of Interchar 212, when applied to a 'wet' surface, should be sufficiently thick to allow good 'flowing out' and to minimise surface roughness and to achieve the specified final thickness.

In applying the final Interchar 212 coat to a hardened surface the thickness should be no less than 2mm to ensure adequate adhesion to the hardened surface.

In hot conditions, i.e. air temperature above 40°C, the spray unit and Interchar 212 should be located in an air-conditioned environment. Hoses should be insulated and wrapped with heat reflecting tape. It may also be necessary to raise hoses above the ground in extremely hot environments. High substrate temperatures should be avoided by providing suitable shade cover and air-conditioning of the area immediately surrounding the workface may also be necessary.

***CAUTION*: During application and curing, the surface should be protected from moisture (e.g. rain, high humidity, etc) as required. These conditions could affect intercoat adhesion.**

If water contamination occurs, cured material can be dried and solvent wiped. Uncured material should be removed and replaced.

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Thickness Measurement

As the fire protection rating is determined by the Interchar 212 thickness, it is imperative that applicators constantly measure and record thicknesses during application.

Interchar 212 is a 100% volume solids product, so wet and dry film thicknesses are the same.

The following procedure for thickness measurement must be followed:

A. Method for measuring wet thickness:
The recommended method of measuring wet thickness is to use a pre-cut bridge gauge having a width of approximately 25mm (1"), typically made from a putty knife. Notch or pin gauges are not acceptable because they limit the measurement to one point. The gauge should just touch the rolled surface. International Protective Coatings strongly recommends the continuous use of the bridge gauge by all members of the application team (sprayer, trowellers and rollers). This is the only way of ensuring the design thickness will be applied to the whole surface

B. Method of measuring dry thickness:
Dry film thickness can be measured by either of the following methods:

- drilling a small hole approximately 2mm ($^1/_{12}$") in diameter and checking the Interchar 212 thickness with a depth gauge (care must be taken not to damage the substrate and to refill the holes with Interchar 212 as soon as possible);
- using an electromagnetic or ultrasound thickness gauge (care must be taken to correctly calibrate on a smooth calibration plate the gauge immediately before taking any readings).

It is recognized that the applied Interchar 212 layer will never be perfectly even and that areas of lower than specified design thickness ("valleys") are compensated by areas of higher than design thickness ("peaks").

Unless specifically stated otherwise in the project documentation, the minimum acceptable thickness at any point shall not be less than 85% of the design thickness up to a maximum of 1.5mm ($^1/_{16}$") less than the design thickness. In other words, for thicknesses up to and including 10mm ($^3/_8$") the minimum allowable thickness is 85% of the design thickness. For thicknesses above 10mm ($^3/_8$") the minimum allowable thickness is the design thickness less 1.5mm ($^1/_{16}$").

In all cases, the average thickness must be at least the specified passive fireproofing design thickness.

The number of thickness readings to be taken should be decided by all parties before commencing application, and ideally be made with reference to local standards for the measurement of fire protection thicknesses.

Thickness readings should be accurately recorded.

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APPLICATION WITH MODIFIED SINGLE LEG AIRLESS SPRAY EQUIPMENT INCLUDING EQUIPMENT REQUIREMENTS

Application with single leg equipment is not as efficient as with plural component. More product wastage will occur and guidance notes labour requirements are likely to be higher. Usage rates up to 10% higher than those stated on the data sheet are likely to occur.

International Protective Coatings recommends the use of the plural component equipment whenever possible.

Mixing

A small amount of International Protective Coatings thinner GTA123 (or GTA822) may be added to reduce viscosity for mixing and spraying. The amount required varies with initial material temperature but up to maximum 1.0 litre (0.25 US gallons) may be used per full kit of Interchar 212 and is added into Part A.

When Part A has reached a smooth consistency, Part B is then poured into the Part A container, scraping the sides of the Part B container to empty it completely. The two parts are thoroughly mixed together with a high torque, variable speed, paddle mixer of minimum 5 HP air motors (or 1000W/110V electric motor minimum) equipped with 250mm (10") diameter paddle.

For best results, the mixer should be mounted on a power ram base to ease the effort required and to allow vertical movement of the paddle blade. The mixing should begin slowly and speed built up gradually.

Mix carefully until a smooth texture and uniform colour are achieved, which should take approximately 4 minutes. Consideration should always be given to the relevant pot life and kits should not be mixed until they are ready to be used.

Modified Single Leg Airless Spray Equipment

Pump compression ratio: *from 68:1 to 74:1 fitted with check valve to eliminate spray fan fluctuation.*

Air Motor: *Graco Premier (or equivalent) mounted on a power ram with a follower or induction material feed plate.*

- ¾" I.D. fluid line 15 to 20 metres (50 to 65 feet) long, rated to meet the required high pressures of the pump.
- ½" I.D. whip line 4.5 metres (15 feet) long, rated to meet the required high pressures of the pump.
- High pressure airless spray gun fitted with swivel.
- 0.035" to 0.041" I.D. "reverse-a-clean" airless spray tips.
- ¾" I.D x 300 mm (12") long in-line static mixer.

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HAND/TROWEL APPLICATION

Interchar 212 may also be applied manually using plasterer's trowels. This has the advantage of very little waste and virtually eliminates the need for masking. Special care must be taken during hand trowel applications when coating connection joints that a uniform thickness and required surface finish is achieved (See Appendix 2 Guidance on Surface Finish....)

Mixing should be carried out as described for single leg airless spray application. Extreme care should be taken when mixing to scrape the walls of the container into the central material to avoid applying any unmixed material that might remain on the sides.

After a kit has been mixed, it may be spread out on flat clean boards or surfaces for each applicator to work with. This prevents the material from curing too quickly and allows sufficient working time. Alternatively the material may be applied directly from the pail.

Often trowel application will require less than a full kit of Interchar 212. In these cases, the required amounts of Parts A and B should be accurately weighed out into a clean container and thoroughly mixed. The correct ratio by weight for Interchar 212 is detailed previously in this document.

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TOPCOATS

Interchar 212 has been extensively tested to industry recognised standards to demonstrate its ability to withstand weather and environmental exposure, both with and without topcoats.

Generally Interchar 212 will be topcoated to meet owners' colour schemes and finish requirements. However, there are specific situations where the use of a topcoat is recommended, these include:

- *To comply with ENV13381 requirements*
- *Area of high UV exposure: like all epoxy products, Interchar 212 may chalk when exposed to high levels of UV for prolonged periods. This can result in fading of the original colour*

It is recommended that Interchar 212 is topcoated when it is sufficiently cured and the surfaces are clean and dry, and prior to any possible contamination.

For recommended minimum overcoating intervals, please refer to the Technical Data sheet.

Temperature °C	(°F)	Minimum (hours)
15	(59)	12
25	(77)	6
40	(104)	4

Maximum overcoating times are dependent upon environmental exposure, type of topcoat system used and other factors. The topcoat datasheet, the specification and working procedures must also be consulted especially when utilising Interfine polysiloxanes as the maximum overcoat intervals are likely to be shorter than the general ones quoted on the datasheet.

Excessive rollering with solvent can, in extreme cases, cause amine bloom on the surface of the Interchar 212. This is not acceptable for application of topcoats. If amine bloom occurs, surfaces must be washed down with a mild detergent solution and rinsed with fresh water, prior to application of any topcoat.

Interchar 212 can be overcoated with a wide range of suitable topcoats to meet specific requirements. For example, International Protective Coatings' Interthane 990 and Interfine 878 are recommended topcoats.

For heavy duty protection and to prevent shading on stippled finishes, International Protective Coatings recommends one of the following topcoat systems:

1. Two coats of Interthane 990 or Interfine 878 at 50 microns (2 mils) dft per coat.
2. One coat of epoxy polyamide primer at 75 microns (3 mils) dft plus one coat of Interthane 990 or Interfine 878 at 50 microns (2 mils) dft.

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REMOVAL AND REPAIR, ADDITIONAL WORK, WELD CUTBACK AND REPAIR OF DAMAGED AREAS

Removal

Interchar 212 can be removed after application for additional work, e.g. welding of attachment, by the use of handheld air driven pistol chisel using a sharp chisel bit of the appropriate width, usually 25 or 50mm. The tool should be used to split the bond between Interchar 212 and the steel, taking care not to gouge or damage the steel substrate.

N.B.: Operators should wear suitable personal protection including dust masks and eye protection.

Weld Cutback

For small weld operations, such as addition of clips and hangers, a cutback of 50mm from weld area should be made. For large welds of heavy angle or other members, a cutback of 75mm should be made. Interchar 212 can be removed with a fair degree of accuracy on an identified cut line without damage to surrounding material. After welding has taken place, the surrounding Interchar 212 should show no sign of discolouration or damage. If discolouration, change of applied colour or *'browning'* is seen, then discoloured material should be removed back to sound material.

In the case of allowance of cutback for welding of structural members and structural members themselves which are to be pre-coated with Interchar 212 prior to assembly, the following recommendation is made:

No weld preheat: 300mm either side of weld
Weld preheat: See following table

Preheat (°C)	Duration (hours)	Free Distance (m)
100	4-8	0.75
100	9-12	1.00
150	4-8	0.75-1.00
150	9-12	1.00-1.25

The above figures are expected to be conservative, actual distance is a combination of factors, including mass of steel at weld junction and method of preheat.

As previously noted, discolouration of surrounding material will indicate insufficient cutback or overheating of an area. Interchar 212 will have to be removed and reapplied.

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REPAIR OF DAMAGED AREAS

Repair of damaged areas, in the fabrication yard or during service life, and cutback areas should follow the procedure below. Application conditions must conform with specified conditions for primer topcoat and Interchar 212 application.

1. Check the **'border'** area of surrounding Interchar 212 for soundness and adhesion in the joint area.

2. Mark out the area to be repaired. Masking should be done around the area to be repaired in a square or rectangular shape. This will give the patch a clean appearance once completed

3. Using a disc grinder, cut through the Interchar 212 (take care not to damage substrate).

4. Using chosen tools (hammer and chisel or pneumatic chisel), cut into patch to remove damaged Interchar 212. Make sure all uncured material is removed.

5. Small areas, for example, welds and local repair areas, may be prepared by power discing with a carborundum disc or by needle gun to achieve a clean, roughened surface in accordance with SSPC-SP11. Power brushing should not be used as a **primary** surface preparation method for large areas.

6. Abrade adjacent surfaces for a distance of 150mm (6") from edge of repair area. After roughening, a suitable International Protective Coatings thinner GTA123 (or GTA822) solvent should be used to ensure that the area is clean.

7. Reinstate primer to specification. For repairs, Interchar 212 may also be applied directly to blast cleaned steel.

8. Reinstate Interchar 212 to specification, taking care to smooth over the repair area edges. Trowel application of Interchar 212 is acceptable for repair areas.

9. Topcoat replacement and repair should follow International Protective Coatings' guidelines and topcoat manufacturer's instructions.

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SAFETY AND ENVIRONMENT

Appropriate Material Safety Data Sheets and local Health & Safety personnel protection requirements must be observed for all materials used

Refer to local legislation and the manufacturer's specific instructions with regard to equipment safety.

For instruction on the disposal of Interchar 212 refer to International Protective Coatings.

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APPENDIX 2
INTERCHAR 212 - GUIDELINES FOR IMPROVED FINISH QUALITY

Interchar® 212 is used in many infrastructure projects where the quality of finish achieved is important. These guidelines should be used to assist when discussing the surface finish.

As referenced in the Interchar 212 Application Guidance Notes, a standard of finish should be agreed by all parties prior to job start up and a reference sample produced.

As with any application, the aesthetic finish will depend upon many factors including, but not limited to, the following;

- The skill of the applicator
- Equipment used
- Application method used
- Temperature of substrate and location
- Size and shape of steel member (it is more difficult to obtain a good finish standard on smaller steel members, complex designs and circular sections)
- Access to steel members during application

It is recommended that

1) Project specifications, together with the Application Guideline Notes are followed,
2) Only applicators that are trained in applying epoxy intumescent products by International Protective Coatings should apply Interchar 212.

FINISH STANDARD

It is critical that the spray applied material is of the best achievable finish before any secondary surface finishing is started (i.e. roller, sanding etc).
An approved mock-up of the final aesthetic finish shall be part of the project standard and quality check.

International Protective Coatings has categorized the finish standards into 4 bands. It should however be understood that these are guidelines only and do not in any way mean that International Protective Coatings is responsible for ensuring the finish is acceptable.

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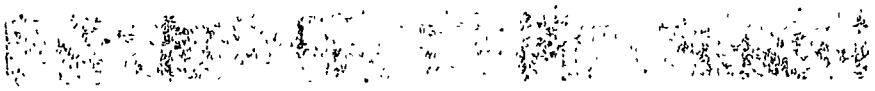
FINISH STANDARD NO.1

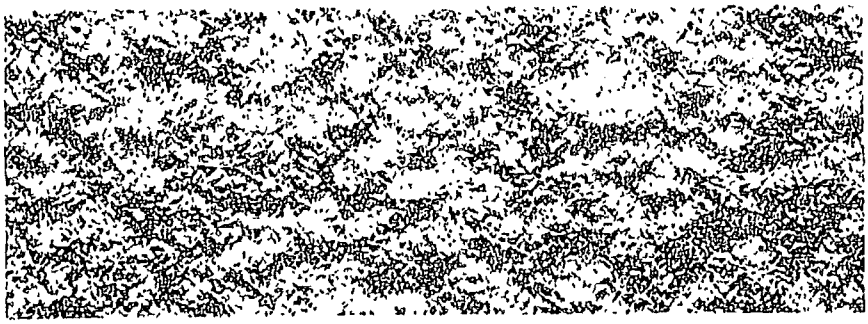
Standard Finish
Spray Applied

Description: A standard finish is appropriate for non-visible areas, or where surface finish is less important (e.g. elevator shafts, parking garages, etc.). Correct minimum DFT applied, but surface is highly textured (± 5mm (0.2 inches) variation in DFT) and includes pinholes and a generally porous appearance. Fibres may be standing up.

Application highlights: This has been applied at a high DFT and has not been rolled correctly to a uniform surface to lay down fibres and peaks. Poor fan pattern and continuous over application will lead to air pockets in the cured film and pinholes on the surface giving a porous appearance.

Comments: Although this standard is acceptable for many epoxy intumescent projects, where the performance of the coating is the important factor, this finish would not normally be up to the standard expected for prominent structures where Interchar 212 is utilised.





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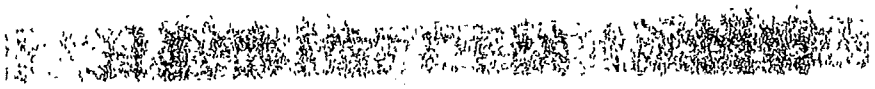
FINISH STANDARD NO.2

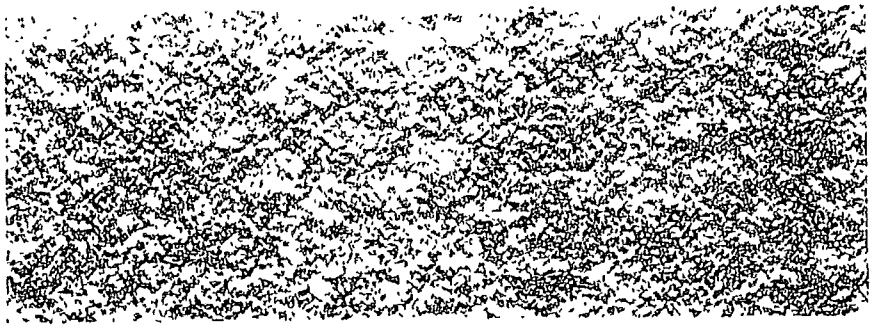
Normal Decorative Finish
Spray Applied/Back Rolled

Description: Correct minimum DFT applied with a good general standard of cosmetic finish when viewed from a distance of 5m (16' 3") or more. Reasonably uniform texture with orange peel and similar minor defects.

Application highlights: Apply a maximum of 3mm (75 mils) per coat of Interchar 212 as per application manual *(Note: the WFT should be continually checked to ensure the coating is even and the correct thickness).* Immediately after spraying, use a damp 3" short nap roller to achieve a rolled uniform surface by lightly removing peaks and build up with special attention for areas including flange areas, toes, box stiffeners etc. *(Note: The correct solvent must be used to dampen the roller)*
Allow the Interchar 212 to 'gel up' and then apply the next coat as above removing peaks and build up using roller method. 'Gel up' means 'there is no movement of material when touched'. Time to 'gel up' should be 2-3 hours at 15°C (air / substrate temperature).
'Waviness' resulting from uneven thickness should be avoided. Waviness is often caused by trying to apply too much Interchar 212 per coat (>3 mm).

Comments: This standard should be readily achievable, but the finish may vary depending on the factors mentioned in the background notes





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FINISH STANDARD NO.3

High Decorative Finish
Spray Applied/Back Rolled/Sanded

Description: Correct minimum DFT applied with a good general standard of cosmetic finish when viewed from a distance of 2m (6' 6") or more. Minor orange peel, some slight textures and other similar minor defects are apparent.

Application highlights: Apply as per standard No.2, but add an extra 2mm of Interchar 212 to allow for sanding. It is important that a skilled refinishing crew is used to ensure both quality and speed (i.e. a yacht refinishing crew). Once the Interchar 212 is fully cured, sand the surface using orbital sanders initially with 80 grit paper reducing to 120 and finally 220 grit for the final finish.

Comments: The better the sprayed finish the faster the sanded finish will be achieved.
Any pinholes or **minor** defects can be filled using a filling compound as specified by International Protective Coatings. The percentage of defects must be less than 1.0% and must only be surface imperfections, otherwise the fire protection properties could be compromised

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FINISH STANDARD NO.4

Ultra Decorative Finish
Spray Applied/Back Rolled/Sanded Smooth

Description: Correct minimum DFT applied with an excellent standard of cosmetic finish when viewed from a distance of 0.9 feet (30cm) or more. No orange peel giving a very smooth finish

Application highlights: Apply as per standard No.2, but add an extra 2mm of Interchar 212 to allow for sanding. It is important that a skilled refinishing crew is used to ensure both quality and speed (i.e. a yacht refinishing crew). Once the Interchar 212 is fully cured, sand the surface using orbital sanders initially with 80 grit paper reducing to 120 and finally 220 grit for the final smooth finish.

(Please note: This finish can also be achieved by casting Interchar 212. Joints and seams for castings must be an equivalent finish to the casting so they are not visible when top coated.
Please contact International Protective Coatings to find out about this specialised method)

Comments: Apply as per standard No.3.

(Please note: If castings are the chosen option then additional third party fire testing should be carried out on any casting to test adhesion of the casting to the substrate in a fire.
International MUST be contacted and the castings guidelines discussed prior to tendering for any projects using castings).

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Masking tape must be removed prior to Interchar 212 curing. Apply secondary masking tape at termination/free edge area to prevent need for a hammer and chisel to remove masking and save time.

SUMMARY

The appearance of Interchar 212 can be greatly enhanced by using various application techniques; however, the labour costs should be taken into account prior to quoting for a project. International Protective Coatings advises all applicators to conduct their own application trials, so they have a more accurate estimate of costs using their applicators and equipment.

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ERECTORS INC.

110 East 42nd Street
Suite 1704
New York, NY 10017
Tel. (212) 599-1603 Fax (212) 599-1615

Technical Proposal Item No.: ***5.5 Safety***
RFP/Contract No.: W0TC-GC1-2-KN0186-020
Station Construction and Transit Hall Structure to Grade
Structural Steel, Intumescent Coating, Metal Deck & Precast Work
New York, NY
February 22, 2009

DCM Erectors, Inc is proud of its safety record and seeks to have every job site accident free. We constantly train our employees in the latest safety practices. We provide our employees with means and methods to adhere to OCIP safety standards. We strictly enforce OSHA Subpart R. We attach a sample site specific safety program. We would prepare a site specific safety program for approval should we be selected as the successful contractor for this project.

DCM ERECTORS INC.
110 East 42nd St.- 1704, New York, NY 10017, Phone: (212) 599-1603, Fax: (212) 599-1615
25 Belfield Road, Etobicoke, Ontario M9W 1E8, Phone: (416) 241 - 6967, Fax: (416) 241 - 3239

February 22, 2009

Phoenix Constructors JV
115 Broadway, 18th Floor
New York, NY 10006

Attention: **Mr. Javed Qureshi**

Reference: **Transportation Hub – Work Package 20**
Site Specific Safety Plan

Dear Javed;

In the bid documents, addendum 12, item 10 – Means and Methods Statement – Planned Engineering controls to meet 6' – 0" Fall Requirements.

We will provide our work force with the following equipment:
- Full Body Harness,
- Double Lanyards equipped with a Shock Absorber or
- Self Retractable Lanyards

The market offers also the following additional equipment:
- Beam walkers 9beam clamp that can be dragged as walking on the top flange of a beam)
- Steel Chokers (to wrap around structural steel member if there are no tie points available)
- Web straps
- Builders grip

We will also provide the following:
- Pre attached steel cables to the top surface of steel members.
- Pre engineered temporary safety stanchions that clamps to W shapes (see attached information).
- Engineered temporary work platforms.
- Logistic drawings for erecting large members (see attached 722X202 CEP_04-03-Rev.00)
- Etc...

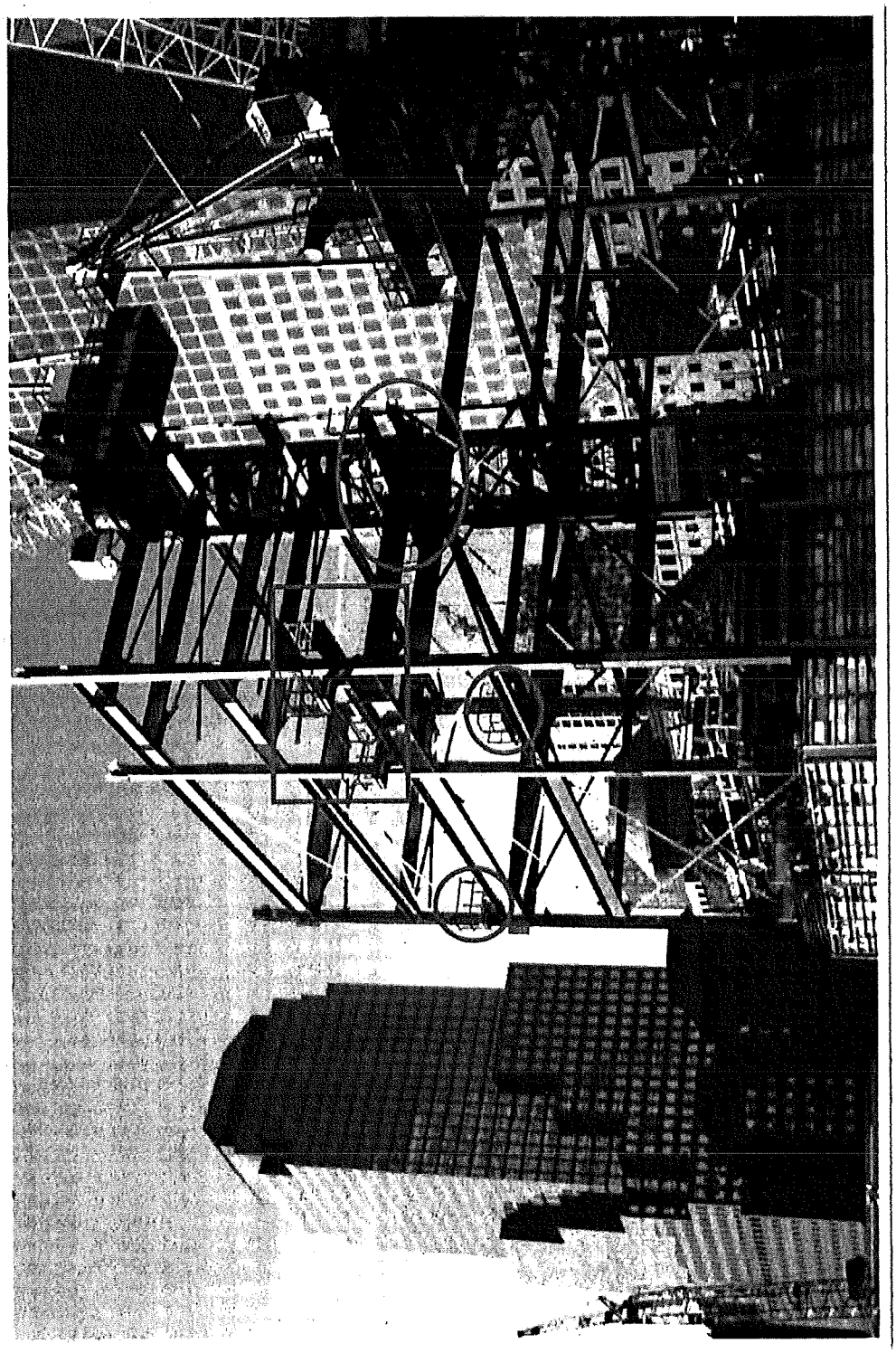
We hope the above and attachments will meet the requirements stated in addendum #12 – section 10. Means and methods.

Respectfully yours

DCM Erectors, Inc.

Richard Gilbert
Project Manager
Cc: Larry Davis, Jeff Gannett – DCM Erectors

ENGINEERED TEMPORARY PLATFORMS



BEAM WALKER – TIEOFF POINT TO BE DRAGED ALONG

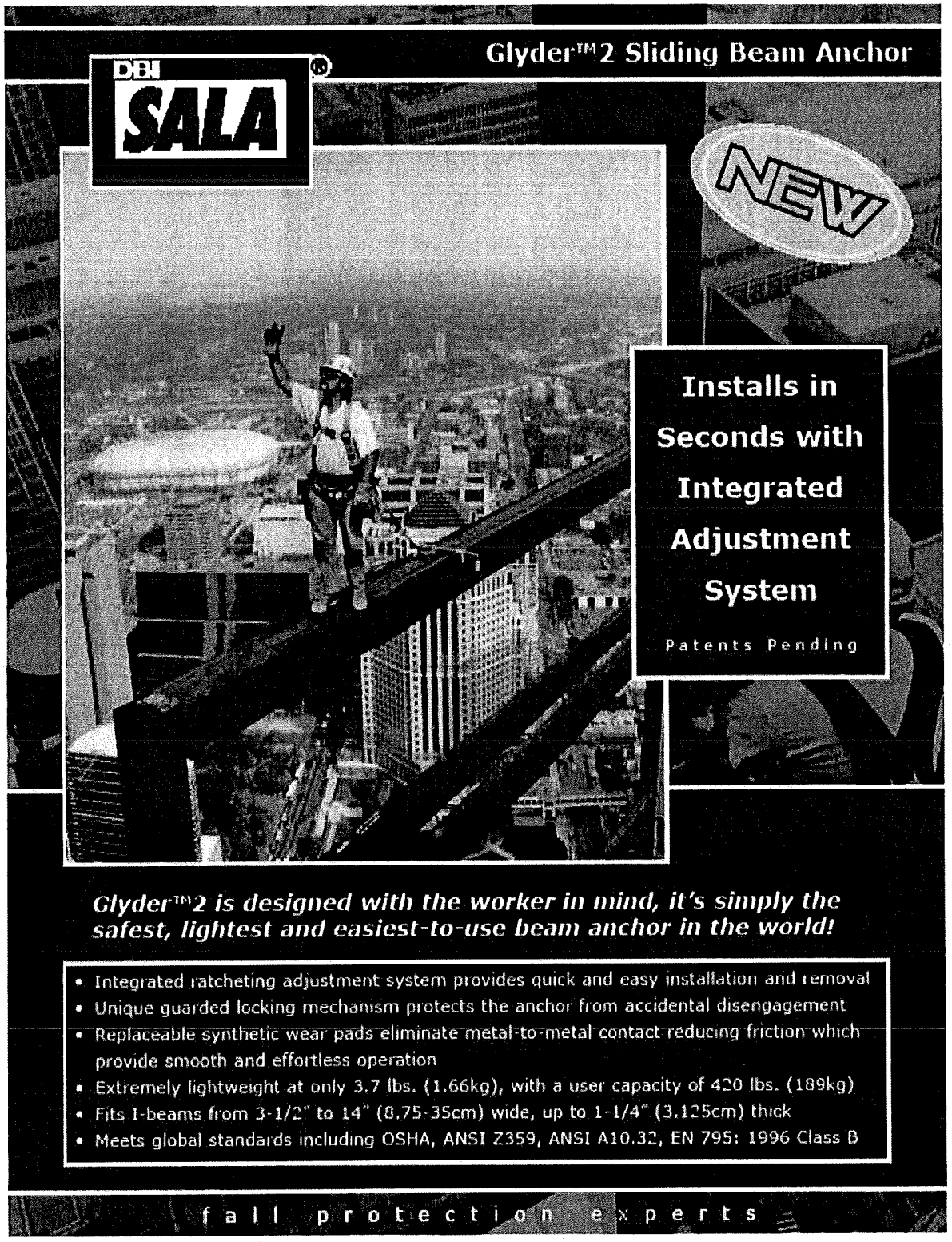


PLATE ANCHORS – CAN BE USED ON BEAMS, ANGLES, ETC.

NEW FROM DBI/SALA

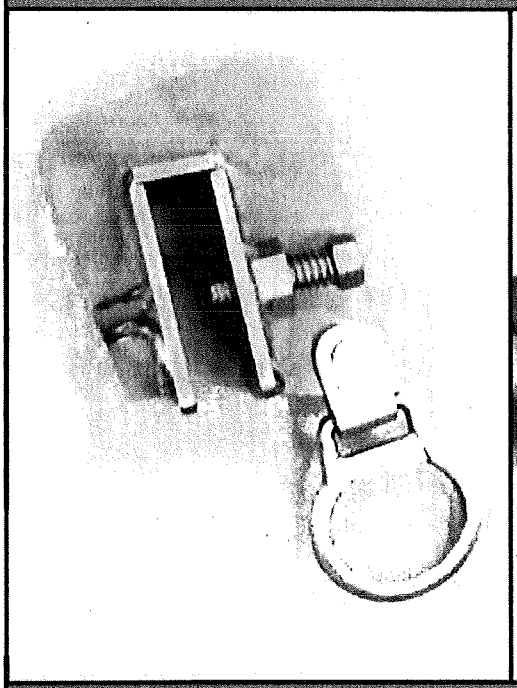
ISO 9001

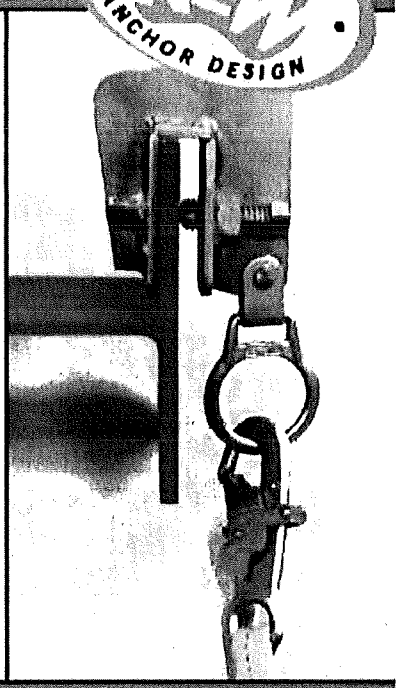
DBI SALA

Plate Anchor

Provides Anchor Point on Steel Plating

REVOLUTIONARY NEW ANCHOR DESIGN





An easy-to-use and compatible anchor specifically designed to attach to plate steel!

- Designed for attachment to 3/8" to 1" thick plate steel - ideal for ship building and maintenance.
- Easy to use set-screw design ensures a positive and safe connection.
- Integral D-ring provides a compatible connection point.
- 5,000 lb. strength, fall arrest rated.
- Accomodates a lanyard or self retracting lifeline for versatility.
- Durable, corrosion resistant zinc plated steel construction.

- *Model: 2104550 - Plate anchor for steel, fits 3/8" to 1" thick.*

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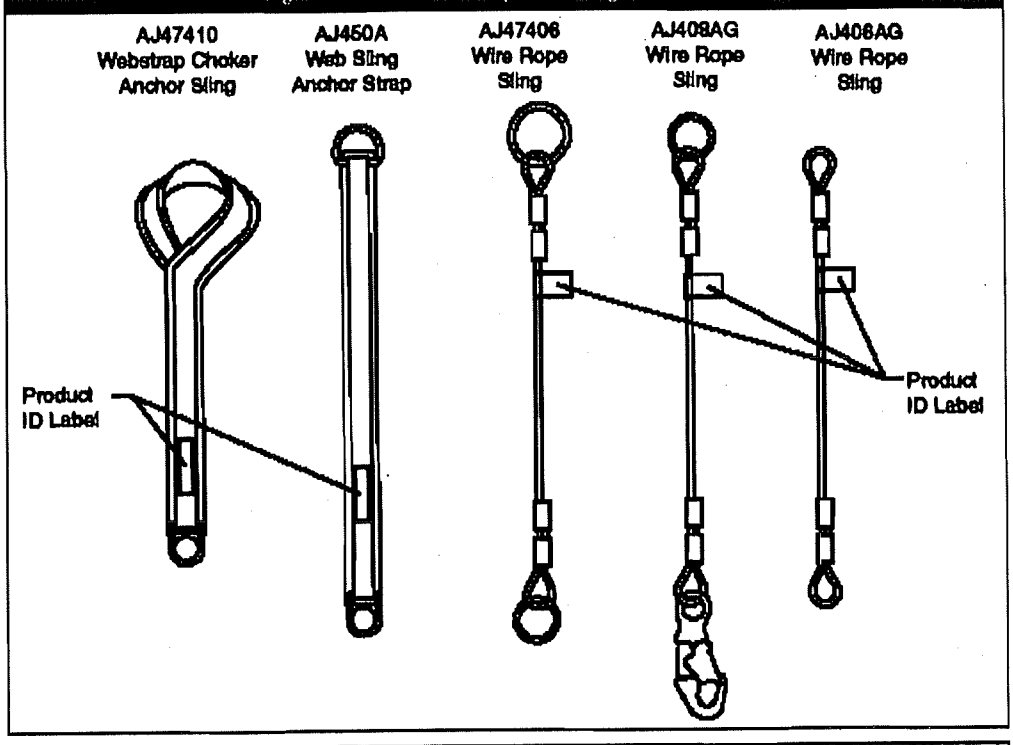
Fax: 651-388-5065 • www.dbisala.com • E-mail: solutions@dbisala.com

SLINGS OR STRAPS TO WRAP AROUND BEAMS OR GIRDERS

User Instruction Manual
Anchorage Connectors

This manual is intended to meet the Manufacturer's instructions as required by ANSI-Z359.1 and ANSI-A10.14, and should be used as part of an employee training program as required by OSHA.

Figure 1 - Web and Wire Rope Anchorage Connectors



***WARNING:** This product is part of a personal fall arrest, restraint, work positioning, suspension, or rescue system. The user must follow the manufacturer's instructions for each component of the system. These instructions must be provided to the user of this equipment. The user must read and understand these instructions before using this equipment. Manufacturer's instructions must be followed for proper use and maintenance of this equipment. Alterations or misuse of this product, or failure to follow instructions, may result in serious injury or death.*

***IMPORTANT:** If you have questions on the use, care, or suitability of this equipment for your application, contact Protecta.*

***IMPORTANT:** Record the product identification information from the ID label in the inspection and maintenance log in section 9.0 of this manual.*

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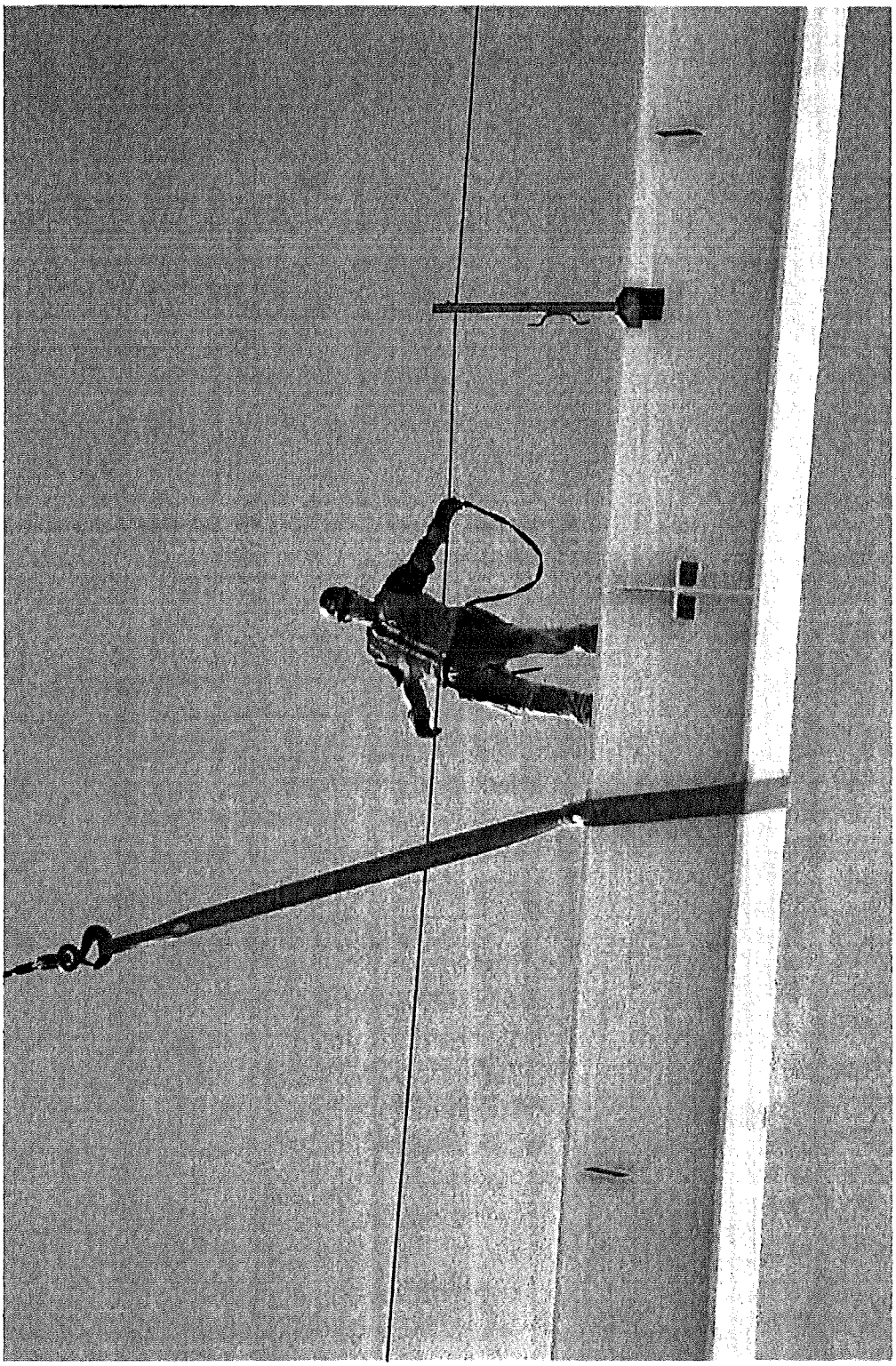
DCM's TEMPORARY SAFETY STANCHION



Form **W-9**
(Rev November 2005)
Department of the Treasury
Internal Revenue Service

Request for Taxpayer Identification Number and Certification

Give form to the requester. Do not send to the IRS.

Print or type
See Specific Instructions on page 2.

Name (as shown on your income tax return)
DCM Erectors, Inc

Business name, if different from above

Check appropriate box: ☐ Individual/ Sole proprietor ☒ Corporation ☐ Partnership ☐ Other ▶ ☐ Exempt from backup withholding

Address (number, street, and apt. or suite no.)
110 E 42nd Street, Room 1704, NY, NY 10017

Requester's name and address (optional)

City, state, and ZIP code

List account number(s) here (optional)

Part I Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. The TIN provided must match the name given on Line 1 to avoid backup withholding. For individuals, this is your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the Part I instructions on page 3. For other entities, it is your employer identification number (EIN). If you do not have a number, see *How to get a TIN* on page 3.

Note. If the account is in more than one name, see the chart on page 4 for guidelines on whose number to enter.

Social security number
| | | | | | | | | |

or

Employer identification number

Part II Certification

Under penalties of perjury, I certify that:

1. The number shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me), and
2. I am not subject to backup withholding because: (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (IRS) that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding, and
3. I am a U.S. person (including a U.S. resident alien).

Certification instructions. You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and generally, payments other than interest and dividends, you are not required to sign the Certification, but you must provide your correct TIN. (See the instructions on page 4.)

Sign Here Signature of U.S. person ▶ [signature] Date ▶ 12/3/2008

Purpose of Form

A person who is required to file an information return with the IRS, must obtain your correct taxpayer identification number (TIN) to report, for example, income paid to you, real estate transactions, mortgage interest you paid, acquisition or abandonment of secured property, cancellation of debt, or contributions you made to an IRA.

U.S. person. Use Form W-9 only if you are a U.S. person (including a resident alien), to provide your correct TIN to the person requesting it (the requester) and, when applicable, to:

1. Certify that the TIN you are giving is correct (or you are waiting for a number to be issued),
2. Certify that you are not subject to backup withholding, or
3. Claim exemption from backup withholding if you are a U.S. exempt payee.

In 3 above, if applicable, you are also certifying that as a U.S. person, your allocable share of any partnership income from a U.S. trade or business is not subject to the withholding tax on foreign partners' share of effectively connected income.

Note. If a requester gives you a form other than Form W-9 to request your TIN, you must use the requester's form if it is substantially similar to this Form W-9.

For federal tax purposes, you are considered a person if you are:

- An individual who is a citizen or resident of the United States,
- A partnership, corporation, company, or association created or organized in the United States or under the laws of the United States, or
- Any estate (other than a foreign estate) or trust. See Regulations sections 301.7701-6(a) and 7(a) for additional information.

Special rules for partnerships. Partnerships that conduct a trade or business in the United States are generally required to pay a withholding tax on any foreign partners' share of income from such business. Further, in certain cases where a Form W-9 has not been received, a partnership is required to presume that a partner is a foreign person, and pay the withholding tax. Therefore, if you are a U.S. person that is a partner in a partnership conducting a trade or business in the United States, provide Form W-9 to the partnership to establish your U.S. status and avoid withholding on your share of partnership income.

The person who gives Form W-9 to the partnership for purposes of establishing its U.S. status and avoiding withholding on its allocable share of net income from the partnership conducting a trade or business in the United States is in the following cases.

- The U.S. owner of a disregarded entity and not the entity,

SITE SPECIFIC SAFETY PLAN

PROJECT:

TRANSPORTATION HUB

Work Package 20

New York, NY

GENERAL CONTRACTOR:

PHOENIX CONSTRUCTORS J V

115 Broadway, 18th Floor
New York, NY 10007

CONTRACTOR:

DCM ERECTORS INC.
110 East 42ND Street
New York, NY 10017

SAMPLE
TO BE REVISED
SITE SPECIFIC

REVISION: SAMPLE
DATE: February 2009

COPY NUMBER:

4 of 4

COPY ISSUED TO:

DCM ERECTORS, INC.

(FIELD OFFICE)

DCM ERECTORS INC.

110 East 42nd Street Suite 1710
New York, NY 10017
United States of America

Phone: (212) 599 – 1603
Fax: (212) 599 – 1615

COPIES ISSUED TO

1 ..... PHOENIX CONSTRUCTORS JV

2 ..... PHOENIX CONSTRUCTORS JV

3 ..... DCM ERECTORS, INC. (Main Office)

4 ..... DCM ERECTORS, INC. (Field Office)

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TABLE of CONTENTS

Description **Page**

Section 1

NOTE 1
INTRODUCTION 2
HEALTH & SAFETY POLICY 3
REFERENCES 4
EMERGENCY PROCEDURES 5
ACCIDENT INVESTIGATION 10
DESCRIPTION OF WORK AREAS 12
POTENTIAL HAZARDS 13
TRAINING OF PERSONNEL 14
WEEKLY SAFETY MEETING 15
PERSONAL PROTECTIVE EQUIPMENT 16
PERSONAL HYGIENE 17
SITE ACCESS AND EGRESS 18

Section 2

HOISTING MATERIAL or EQUIPMENT 1
CONVENTIONAL CRANE 3
FALL PROTECTION 4
SITE SPECIFIC FALL PROTECTION 6
PERSONNEL PROTECTIVE EQUIPMENT 7
LADDERS & STEPLADDERS 8
HOT WORK 9
BOLTING WITH TC BOLTS 10
WORKING FROM A MAN-BASKET 11
PROPANE USE 13
WORKING FROM POWER ELEVATED WORK PLATFORM 15
SUBPART "R" (from OSHA web site) ..... **Attachment "A"**
CHAPTER 33 – NYC BUILDING DEPARTMENT ..... **Attachment "B"**
STUDY MATERIAL (NYFD certificate of fitness) ..... **Attachment "C"**
MAN-BASKET INFORMATION ..... **Attachment "D"**
TEMPORARY FALL ARREST SYSTEM ..... **Attachment "E"**

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TABLE of CONTENTS

Description **Page**

Section 3

OSHA POSTER 1
EMERGENCY PHONE NUMBERS 2
INFORMATION TO GIVE EMERGENCY SERVICES 3

Section 4

SITE LAYOUT 1
PARTIAL CITY MAP 2

Section 5

PROJECT TELEPHONE DIRECTORY

Section 6

SUGGESTED SAFETY TOPICS

Section 7

FORMS TO BE USED ON SITE

Section 8

HAZCOM PROGRAM Including MSDS Sheets

Section 9

INFORMATION FROM GENERAL CONTRACTOR

a. PROJECT SITE SAFETY PROGRAM
b. SITE LOGISTIC PLAN
c. Emergency Response Map

Section 10

USED TO PROVIDE BLANK FORMS IN SITE MANUAL ONLY

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A COPY OF THIS SAFETY PLAN

MUST BE KEPT

AT THE NEW YORK OFFICE

and

AT THE FIELD OFFICE OF

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Transportation Hub – Package 20

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INTRODUCTION

The following is the safety plan that was developed specifically for the

TRANPORTATION HUB
PACKAGE 20
New York, NY

Our goal is to inform and limit the exposure of our workforce to hazards that may be present while performing the required tasks to bring this project to completion.

This safety plan was based on visits to the site prior and after the bid stage and with the project manager, assistant project manager, operations manager, superintendent and general foreman in order to assess the various hazards that may be present at any time during the project. The site-specific safety plan will be reviewed and modified as required due to new hazards or to the changes in scope of work.

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REFERENCES

The following sources of references were used to develop this plan:

Code of Federal Regulations – Labor 29 (part 1926) as posted on WEB

New York City Building Code – Chapter 33 as posted on WEB

Cranes and Derricks Third Edition - Shapiro

Hoisting and Rigging - C. S. A. O. Publications

Customer's Architectural and Structural Drawings

Bid Documents Provided by Phoenix Constructors JV

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EMERGENCY PROCEDURES

There is always the possibility that an unplanned event could occur on a site and procedures have to be in place in order to help the supervisors and workers to be able to react and stay in control of the events.

The procedures included in this section are:

- Critical Injury
- Major Accident
- Power Failure
- Emergency Evacuation
- Fire

We also have included in this section the company's "Accident Investigation Procedure". An investigation is always required after any type of accident in an effort to avert any reoccurrence of the events.

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CRITICAL INJURY

1. Provide first aid to injured worker(s).

2. Have someone notify the following:

1st. PAPD

2nd. Phoenix Constructors JV on site safety Mr. John Kane at (845) 494- 29760.

3rd. New York office immediately at (212) 599 - 1603 and

3. **CONTACT:**

PAPD – 212 – 608 – 5111

PAPD – 212 – 608 – 5115

The caller must be able to give precise directions on how to get to the nearest access to the location of the accident or injured party and what type of emergency it is.

4. Secure area to prevent other workers or public from getting injured, turn off all equipment/machinery and their source of power. Rope off area in order to protect the accident scene for the rescue and the investigation.

5. Dispatch a worker to the entrance of the project and others at various locations (man hoist, stairs, doorway, etc...) to guide the emergency personnel to the exact location of the accident or injured worker as fast as possible.

6. After the injured worker(s) have been taken care of, the superintendent/foreman will start the accident investigation (with **Phoenix Constructors JV** representative present if available) and keep the New York office and **Phoenix Constructors JV** updated on his findings.

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POWER FAILURE

1. When a power failure occurs in a building, all the workers should stop working and listen to their environment to determine if other dangers other than the power failure are present.

2. Turn off all power sources to all the equipment in the area (if possible).

3. Workers are to remain at their workstations until their foreman comes and tells them to go to the designated regrouping area. Everyone is to use the nearest exit if safe and regroup at **the location shown on the current I. R. Map posted in man shanties and offices.**

4. Everyone is to stay calm and remain at the regroup location and wait until told by the site superintendent to either go back to work or go home for the rest of the day.

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EMERGENCY EVACUATION

If an employee believes an emergency evacuation is necessary, he must notify his foreman immediately so a decision can be taken. If an evacuation is required the foreman should notify **Phoenix Constructors JV** or utilizing a two-way radio to advise them of the type of emergency and have a decision taken by them.

If an evacuation is required that workers should proceed as follows:

1. Turn off all sources of power to the equipment in your area (if possible).
2. Look around to determine which way is the safest and nearest exit.
3. Walk; do not run towards the nearest exit.
4. Regroup **the location shown on the current I. R. Map posted in man shanties and offices** and let your foreman know that you have exited the building/site and are safe.
5. Let your foreman know if you think someone else is still inside the building and at what location.
6. DCM's foreman to advise **Phoenix Constructors JV** that all of our personnel are out.

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ACCIDENT INVESTIGATION

1. The site **Phoenix Constructors JV** and **DCM's** superintendent and **PAPD** are to get to the accident scene as soon as possible.

2. Provide immediate Medical Aid where needed.

3. Secure the area. Ensure any machinery or power sources involved or in the immediate area are turned-off. Do not remove anything from the scene unless authorized by proper authorities. Keep non-essential personnel and public out of area.

4. Look over accident area for any immediate danger still present.

5. If possible, get picture(s) and sketches of accident scene.

6. Conduct Interviews. **1-With those directly involved (co-workers).**
   2-With those indirectly involved (witnesses).

7. If any member(s) of the Media (Newspaper, T.V., etc.) are in attendance, decline answering any questions. Do not make a statement on behalf of the company. Have them contact the office of **DCM Erectors, Inc.** and/or **Mr. ########### of Phoenix Constructors JV at (212) 616 – 5800**.

8. Identify causes. Avoid making snap decisions and fixed opinions.

9. Complete accident report and forward to the **New York Office** and **Phoenix Constructors JV site fax (212) 566 - 2356**

11. Follow-up your investigation. It is not over until preventative actions are taken.

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DESCRIPTION of WORK AREAS

LOCATION:

This project is located at the World Trade Center, New York, NY. The site is located at the corners of Church Street and Fulton Street. When the entire will completed, the transportation hub will be located between Tower 2 and Tower 3. Our scope of work includes the installation of the structural steel, deck and precast components that will make this structure.

DESCRIPTION OF THE PROJECT:

Our scope of work includes erecting in place approximately 23,000 tons of steel that will make the structure from the foundations to the street level of the new Transportation Hub.

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CRANE:

To be updated

TEMPORARY SHORING

To be updated

STEEL ERECTION:

To be updated

DECK INSTALLATION

To be updated.

DECK INSTALLATION

To be updated

All work will be performed in strict conformance to

OSHA Standards including Subpart "R" for erection of structural steel.

PROPOSED LIST OF MAJOR EQUIPMENT:

? - Crawler crane(s)
? - Generator(s)
? - Compressor(s)
? - Welding machine(s)
? - Hand tools

PERMITS TO BE ACQUIRED AT VARIOUS PHASES OF THE PROJECT:

- Hot work permit
- Compress gases storage
- Diesel fuel storage
- Sidewalk closure
- Street lane closure

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POTENTIAL HAZARDS

The following list is hazards our workers could be exposed to while working on this project. The erection phase of the project will be approximately 60 weeks. The list bellow should not be taken as the only hazards that could be present on site:

HAZARD TASK ANALYSIS

TASK	HAZARD	PROTECTION
Unloading Trucks	Struck by Truck	When guiding truck into position, make sure the driver can see you at all times. Do not position yourself between the trailer and a hard surface such as loading dock or barriers. Wear you traffic vest at all times.
	Struck by load	When unbinding straps or chains, stand clear of load as it may shift.
	Struck by vehicular traffic	Always stay within the protection of the loading lane barricades. If you have to use the adjacent lane have a traffic control person wearing a vest and flag stop the traffic.
	Struck by falling objects	Before hoisting load, check it for small pieces or loose pieces that may fall. Remove them and hoist them separately in skip box or other means.
Steel, Deck and Precast Erection	Struck by steel members	All steel members that could swing and hit a worker or the underside of the boom must be controlled by 2 tag lines. Stay clear of the load path.
	Fall from above	When exposed to fall as per OSHA subpart R, a full body harness and lanyard must be worn and used.

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TASK	HAZARD	PROTECTION
	Fall on same level (tripping)	Make certain your area is free of tripping hazards such as discarded material, electrical cords, etc…
	Overhead hazard	The area directly below where the erection is going on must be cleared of all other trades and roped off.
Hot Work	Burns to eyes (flash)	Wear proper eye protection including proper shade number.
	Burns to face and neck	Wear face shield.
	Burns to rest of body	Wear long sleeve shirt, gloves, welding sleeves or jacket. Lace your boots to the top and have your pant legs over the top of your boots.
	Injuries to the eyes	When chipping or grinding (cleaning weld) wear clear face shield and safety glasses.
	Fumes	Keep your face away from fumes. Work in a well ventilated area or wear the proper fume mask or respirator. Check NIOSH for proper type of mask and cartridges. Have worker fit tested for that type of mask.
	Fires	Have a fire extinguisher within reach of the worker performing the hot work at all times. Have a fire watch patrol the area. Move away (20' in all direction) all combustible material. If not able to meve material, cover it with fire retardant blankets

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TASK	HAZARD	PROTECTION
Bolting	Pinched fingers	Always use tools for what they are intended for.
	Injuries to wrist	Use TC Guns or impact wrench as per the manufacturer instruction manual.
Working from scaffold	Falls	The level from which the work is performed must be fully planked.
	Collapse	All vertical or horizontal bracing and pins must be used as per manufacturer assembly manual.
	Stability	Scaffold must be erected plumb and on a firm surface. When erecting on deck, planks under the legs should be used.
Working with a ladder	Ladder not stable.	As per OSHA; install the ladder with the top extending at least 3' above landing and with as a minimum the top tied to the structure to prevent movement.
	Slip and falls	Ladder should be installed with a 4 to 1 ratio (4'up 1' away from wall). When climbing the 3 contact point method should be used. Clean your boots of mudd or snow before starting to climb.
Carrying loads	Back injury	Use proper technique. Have 2 workers carry heavy load (75lbs) or loads that can get caught in the wind like sheet of deck
Slip and Falls from same level	Straining ankles, knees or back	House keeping, keep clear access path with screen or planks over deck. Clean your feet of mud or snow. Elevate extension cords or move them against wall out of walkway

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TASK	HAZARD	PROTECTION
Using power tools	Noise	Wear ear protection when required when using power tools or working in a noisy environment. If you have to shout to be heard, hearing protection is required.
Working Outside	Sun stroke or Sun Burns	Wear long sleeve shirt at all times (no thank top). Wear sun screen.
	Frost Bites	Wear proper dry clothing for winter.

The way we can reduce the potential exposures of our workers to the above-mentioned hazards is through training. A description of procedures and what type of personnel protective equipment required will be part of our workers indoctrination before they start to work in that environment.

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- Fire protection.
- Noise.
- Protection to existing building.
- Traffic control while unloading trucks.

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PERSONAL PROTECTIVE EQUIPMENT

Each worker must use the proper personnel protective equipment as required for the task they are performing.

The only PPE the worker has to supply himself is his own work boots. All other PPE such as hardhat, safety glasses, face shield, welding shield, welding jackets, respirators, earplugs, full body harness with lanyard and other safety equipment will be supplied to the worker free issue when required.

One of the site **supervisor responsibilities** is to ensure that all workers wear and use the proper PPE when required and that it is replaced when necessary.

The workers will be trained at the indoctrination time on how to wear, adjust and maintain their Full Body Harness with lanyard.

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PERSONAL HYGIENE

Personal hygiene is not something we can force on our worker, but it is something we can remind them of and will help in reducing their exposure to some hazards due to ingestion or absorption of chemical products.

Our worker will not be permitted to eat at their work area.

When leaving at the end of the shift, our workforce should take the time to wash their face and hands and change to street clothes before traveling home. This will prevent them from contaminating their family when they arrive home or other persons while traveling by public transportation.

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SITE ACCESS AND EGRESS

The following will be discussed at the orientation stage of the new employees or employees transferred from other sites starting at the **Transportation Hub – Work Package 20.**

EMPLOYEES: There will be personnel gates **4, 3F, 3G and 3G.** These gates may not be in use at all the times.

MATERIAL: The trucks will enter via the gate on Church Street.

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PROJECT SPECIFIC REQUIREMENTS

- **HIGH VISIBILITY VEST WITH REFLECTOR STRIPES TO BE WORN AT ALL TIMES**
- **SAFETY GLASSES TO BE WORN AT ALL TIMES ON SITE**
  (EXCEPT WHEN WALKING ON STEEL THAT HAS NOT BEEN DECKED OVER)
- **NO SMOKING ON SITE AT ALL TIMES**
- **HAVE YOUR ID BADGE VISBLE ON YOU AT ALL TIMES**
- **COMPRESSED GAS BOTLES TO BE CAPPED EVERY NIGHT AND STORED IN CAGES**

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HOISTING MATERIAL or EQUIPMENT

When undoing the load's binding chains or straps; great care must be taken, as the load may shift upon becoming loose or hooking onto it.

No hoisting to be performed above any workers on the job site except workers receiving the load. All workers not involved in the actual erection of the structural steel must be kept away from the erection area or crane swing path.

No shaking-out hooks to be used for erection. Only hooks equipped with safety latches that are in good working condition.

All loads must be controlled by 2 tag lines when being hoisted from the trucks or landed.

The following procedure has been revised on December 14, 2007

NOTE:
If using someone else's rigging; written certification must be provided by the supplier of the rigging that the rigging is adequate to perform the required task safely.

The rigging must also be approved by our engineering department and site competent persons.
On site competent persons are:

- **Arnold VanHess**
- **Richard Schuler**

Beginning of Shift:
All rigging equipment must be visually inspected by a qualified person.
Wire Rope Slings to be checked for:

- Kinks and Birds nest
- Corrosion
- Abrasions
- Broken strands
- Socket connections or cable clamps.
- Tag or other means showing rated capacity

Synthetic Web Slings to be checked for:

- Abnormal wear,
- Broken or cut fibers
- Discoloration or rotting
- Distortion of hardware
- Information tag showing name of manufacturer, capacity, etc…

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CONVENTIONAL CRANE

When working with a conventional crane the same care as listed above in HOISTING MATERIAL or EQUIPMENT section must be taken.

However due to the nature of the equipment following extra care must be taken

- When positioning the crane, the tail swing (counterweight) radius must be clear of any obstruction.
- Pinch point must be marked and roped off to prevent injuries.
- When moving the crane to reposition it, a signalman must walk the crane after the travel path has been inspected and cleared.
- The crane operator must stop any movement of the crane if eye contact is lost with the flagman.
- When workers have to perform maintenance to the equipment by accessing the cab roof, a ladder must be provided.
- The installation of the crane must match the approved drawings that were submitted at the time of the permit request. (see PANYNJ lift plan in this section)
- Care must be taken to protect the properties surrounding our work area including sidewalks and street surfaces.

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FALL PROTECTION FOR THIS PROJECT

PERIMETER PROTECTION:

Temporary safety post will be welded on top of the arches at every two arches. After the post have been fully welded at the base, the ¼" aircraft steel cables will be passed through the two ½" holes to provide protection for the workers on the perimeter. The holes spacing is to be as per OSHA standard, 42" for the top hole and 21" for the bottom one. Both dimensions to be taken from top of deck.

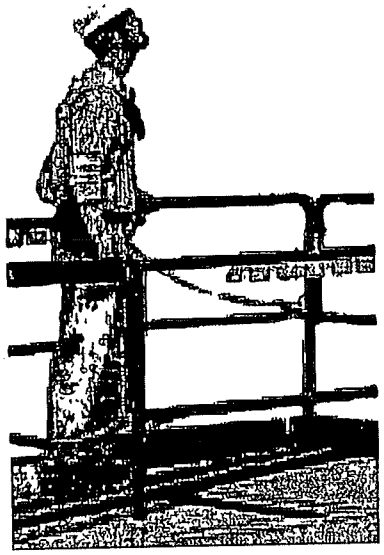
To provide adjustment to the cables, turnbuckles will be installed every four posts on the top and middle cable.

The perimeter post for cables will be welded to slice 3 prior it is erected in place. To provide protection to the workers installing the posts and the cables, power aerial lifts will be used while installing the cables.

LEADING EDGE WORK:

The deck installers must wear a full body harness equipped with lanyards with shock absorber while installing the deck on top of the arches. The working height is 33' – 9". Tie points will be incorporated in every safety post installed on the perimeter of the arches.

There will be no decking zone on this project due to the constant height of fall the workers will be exposed at all times.



ERECTION and WELDING of SLICES:

Installing or welding of slices 2, 3, 4 and 5 will be performed from aerial lifts. While working from the lift, the workers must wear their full body harness equipped with lanyard and shock absorbers at all times and tie-off to the anchor points provided by the manufacturer.

SAMPLE
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PERSONNAL PROTECTIVE EQUIPMENT

Hart Hats: Head protection in good condition must be worn at all time when on site.

Work Boots: Work boots must be worn at all times while on site. The work boots will be in good repairs with no stitching missing, no steel showing if with steel caps and laced to the top at all times.

Work Gloves: Gloves will be worn when handling rough material and ropes to protect hands against injuries/abrasions.

Safety Glasses: **Eye protection (clear or colored) will be worn at all times when exposed to eye injuries**

Note: *Eye protection must be worn when performing the following tasks:*

- *Grinding (face shield + safety glasses)*
- *Chipping (face shield + safety glasses)*
- *Painting*
- *Driving pins*
- *Welding, gouging (face shield with proper lens shade)*
- *Burning, cutting (burning goggles or safety glasses with the proper lens shade)*
- *Removing loose scale from steel members*
- *Handling chemicals in the liquid or powder form*
- *All task generating dust, sparks, fumes*
- *Walking near other trades performing tasks listed above*

Note: *Safety glasses can be removed while moving from point to point on structural steel members where there is no temporary or permanent floor or deck.*

Clothing: Tank tops, shorts or other clothing that does not protect against sparks, paint or other types of injury are not allowed. Also loose clothing is not accepted.

Hearing Protection: Hearing protection must be worn when exposed to noise level that may damage the hearing.

Full Body Harness: **A full body harness and lanyard with shock absorber must be worn at all times when working above concrete slab at elevation 265' so it is readily available when required.**

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LADDERS & STEPLADDERS

WHEN USING A LADDER OR STEP-LADDER, THEY MUST BE:

- On a firm and level surface.
- In good repair.
- Away from traffic areas or doors.
- Away from overhead power lines.

WHEN USING A LADDER OR STEP-LADDER, YOU MUST:

- Always face ladder or stepladder when climbing.
- Keep your center of gravity between side rails.
- Never use a ladder or stepladder on top of a box, cart, scaffold or scissors lift.

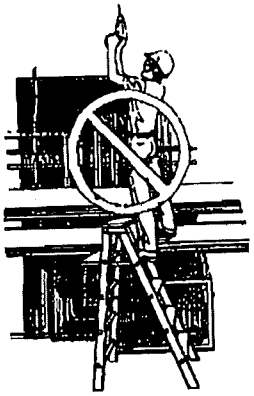
LADDERS:

- Must be tied at the top to prevent lateral movements.
- Rails of ladder extend at least three feet above landing point.
- Follow the rule of 4 feet high for 1 foot of inclination.

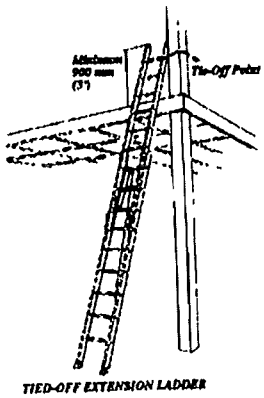
STEPLADDER:

- Do not split your weight between the step-ladder and something else.
- Never work from the top step or the pail shelf.

SAMPLE
SITE SPECIFIC



NEVER STRADDLE THE SPACE BETWEEN A LADDER AND AN OTHER OBJECT



TIED-OFF EXTENSION LADDER

KEEP THREE POINT CONTACT WHILE CLIMBING

DO NOT CARRY THINGS WHILE CLIMBING

DO NOT USE ALUMINUM OR WOOD LADDERS OR STEPLADDERS

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BOLTING WITH TC BOLTS

BOLTERS

- ALL BOLTER-UPS ARE TO CARRY CANVAS BOLT BAGS.
- ALL TC TIPS WILL BE RELEASED FROM THE GUN INTO THE CANVAS BAG ONLY (socket of gun should be as close as possible to mouth of bag).
- BAGS WILL BE EMPTIED AT LUNCH AND QUITING TIME OR AS OFTEN AS REQUIRED.

APPRENTICES

TO CHECK FLOORS TWICE PER DAY FOR TIPS WHERE BOLTING OPERATION IS IN PROGRESS.

- ON THE EDGE OF THE BUILDING.
- ON THE EDGE OF FLOOR OPENINGS.
- ON TOP OF SCREENS.
- ON TOP OF SAFETY DECK.
- ON TOP OF PLANKS.

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The following is a list of things **NOT TO DO** when working from a MANBASKET:

- DO NOT lift the MANBASKET with any equipment other than a crane or derrick.
- DO NOT use the MANBASKET without first having the crane inspected by a qualified person.
- DO NOT use a defective or damaged crane.
- DO NOT use a defective or damaged MANBASKET.
- DO NOT breach the required clearance of a live electrical line.
- DO NOT permit unauthorized personnel to use the MANBASKET.
- DO NOT allow personnel in the MANBASKET with its test weight attached.
- DO NOT allow persons to use the MANBASKET who are not trained or familiar with the applicable OSHA or ASME regulations concerning MANBASKET and Cranes or Derrick.
- DO NOT attach test weight by any means other than that supplied by the basket manufacturer.
- DO NOT attach your BODY HARNESS LANYARD to an ADJACENT STRUCTURE when occupying the MANBASKET.
- DO NOT sit, stand or climb on the MANBASKET guardrail.
- DO NOT use planks, ladders, other devices or extensions in the MANBASKET as a work position.
- DO NOT use the MANBASKET a convenience. (use stairways when available)
- DO NOT use the MANBASKET if the data plate is missing, defaced or not legible.
- DO NOT use a MANBASKET that has not been subjected to the required trial lift and proof test.

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PROPANE USE ON SITE

USAGE:

- Propane Gas can be use for multiple types of operations such as:
- Heating of shanties,
- Powering fork-lift, zoom-boom or scissor lift and
- Pre-heating of structural members prior to welding

PLANNING:

- Before bringing any amount of propane gas (LPG) on site you have a cage for storage its location at least 25' from any combustible material. Cage must be kept away from access or egress to the site or stairways.
- One worker that has a certificate of fitness for handling propane issued by the NYFD and current
- One worker that has a certificate of fitness for fire guard both issued by the NYFD and current.
- We will require approximately 8 bottles of 100lbs capacity on site at all times.
- 20 lbs fire extinguisher will be required for each worker pre-heating or welding. A few extra extinguishers should be spread around the concrete slab and on top of the deck portion that has been installed. (20 to 25 extinguisher should suffice)

PREHEATING:

- To handling of bottles, 100lbs bottles will be used in conjunction with a rose-bud to preheat the steel members to be welded together.
- The rose-bud will be used only by a worker that has a certificate of fitness for torch handling and there will be a **fire guard** patrolling the area at all times while the rose-bud(s) are being used. A fire extinguisher will be place within 10' of the area were the pre-heating operations are being conducted.
- The propane will be used to bring the steel members to the required temperature as specified in the welding procedure. The rose-buds can be kept on if the welding procedure requires it to keep a constant temperature if required.
- While pre-heating; the propane bottle must be kept at a minimum of 10' from the heating area.
- When not pre-heating; the bottles must be capped and put back in the storage cage with no hose attached to it.
-

SAMPLE
SITE SPECIFIC

POWER SOURCE FOR EQUIPMENT:

- When using propane for equipment power source the following must happen:
- Un-used bottles must be kept in the storage cage on site.
- Bottles must be changed only by a worker who has a certificate of fitness for propane handling issued by NYFD and is current.
- No smoking while changing the bottle, **(no smoking on site at all times)**
- Engine must be turned off while changing the bottle,
- Only the proper type of bottle can be used on equipment (designed to be used with the bottle lying on its side).
- Bottles cannot be changed inside an enclosed area.

POWER SOURCE FOR HEATING SHANTY:

- When using propane for heating occupied areas such as shanty or tool crib:
- Heating equipment used is the proper type for that use,
- Vented to the outside of the shanty or tool crib,
- Equipped with a working thermostat,
- A fire extinguisher must be kept at all times in the shanty while heater is on,
- Propane bottle used as a power source is to be kept outside the shanty or tool crib and secured in an upright position.

SAMPLE
TO BE REVIEWED TO BE SITE SPECIFIC

DO YOU HAVE A FIRE EXTINGUISHER NEAR YOU?

IS YOUR FIREGUARD AVAILABLE?

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POWERED ELEVATED PLATFORM

When working with or from powered elevated platform also known as zoom-boom the following safety rules apply:

Selection

The equipment must be selected in function of where it will work, concrete slab or uneven terrain and for the intended height of reach.

Upon Reception

- Have the rental outfit demonstrate the use of this particular piece of equipment.
- Make sure the operating manual and maintenance log are with the piece of equipment.
- Inspect the equipment for the following:
  1. Platform and guardrail (loose or missing pieces)
  2. Hoses and cable guards (no damages to hoses, cables or guards)
  3. Drive motor and brake shields (no leaks or missing hardware)
  4. Drive hub for no visible damages or leakage
  5. Tires and wheels (properly inflated, rim damages or missing lug nuts)
  6. Frame for bends or other damages.
  7. Fuel (is tank leaking, filler cap in place)
  8. Power track (damages to hydraulic or electrical lines)
  9. Boom pivot shaft (properly secured and lubricated)
  10. Lift cylinder (rod end shaft properly secured)
  11. Tie rods and linkage (no visual damages)
  12. Engine oil (full and filler cap on)
  13. Ground control panel (switches operable, labels legible)
  14. Counterweight (properly secured)
  15. Exhaust system (no leaks or damages)
  16. Battery (cables tight and no corrosion at poles)
  17. Hydraulic oil level (proper)
  18. Turntable and pinion (should show signs of lubrication)
  19. Boom (no visible damages)
  20. Platform control console (switch and levers, labels)
  21. All placards should be legible.

SAMPLE
TO BE EDITED TO BE SITE SPECIFIC

Beginning of each Shift

1. Check fuel
2. Check oil
3. Check for any leakage.
4. Check for any structural damage to the platform or boom

While working from platform

1. Always wear a full body harness and lanyard.
2. Always tie-off to the anchor point on the platform.
3. If no anchor points are provided, tie-off using the middle handrail.
4. Make sure the gate is fully closed.
5. Always work with both feet on the platform
6. Never use step ladder or plank to reach a point.
7. Do not step on mid or top rail.
8. Do not drive move the equipment with the boom extended
9. Do not drive near trenches (keep away from edge as far as the depth of the trench).
10. If the equipment has outriggers, use them.
11. Check ground conditions (level, holes, covers, etc…).
12. While traveling, have worker walk your travel path.

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LIST OF ATTACHMENTS

SUBPART "R" (from OSHA web site) ..... **Attachment "A"**

CHAPTER 33 – NYC BUILDING DEPARTMENT ..... **Attachment "B"**

STUDY MATERIAL (NYFD certificate of fitness) ..... **Attachment "C"**

MAN-BASKET CERTIFICATION from MANUFACTURER ..... **Attachment "D"**

MAN-BASKET DAILY CHECK LIST ..... **Attachment "E"**

MAN-BASKET USE AND SAFETY BOOKLET ..... **Attachment "F"**

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You Have a Right to a Safe and Healthful Workplace.

IT'S THE LAW!

- [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]

The Occupational Safety and Health Act of 1970 (OSH Act) (P.L. 91-596) assures safe and healthful working conditions for working men and women throughout the Nation. The Occupational Safety and Health Administration in the U.S. Department of Labor has the primary responsibility for administering the OSH Act. The rights listed here may vary depending on the particular circumstances. To file a complaint, report an emergency or seek OSHA advice, assistance, or products, call 1-800-321-OSHA or your nearest OSHA office: • Atlanta (404) 562-2300 • Boston (617) 565-9860 • Chicago (312) 353-2220 • Dallas (214) 767-4731 • Denver (303) 844-1600 • Kansas City (816) 426-5861 • New York (212) 337-2378 • Philadelphia (215) 861-4900 • San Francisco (415) 975-4310 • Seattle (206) 553-5930. Teletypewriter (TTY) number is 1-877-889-5627. To file a complaint online or obtain more information on OSHA federal and state programs, visit OSHA's website at www.osha.gov. If your workplace is in a state operating under an OSHA-approved plan, your employer must post the required state equivalent of this poster.

1-800-321-OSHA
www.osha.gov

U.S. Department of Labor • Occupational Safety and Health Administration • OSHA 3165

SITE SPECIFIC SAFETY PLAN

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PAPD EMERGENCY PHONE NUMBER:

212- 608- 5111

OR

212- 608- 5115

PHOENIX CONSTRUCTORS JV

(845) 494 - 2976

DCM SITE PHONE NUMBER:

(###) ### -

The above number is for the cell phone of the site superintendent

SITE ADDRESS:

TRANSPORTATION HUB – Work Package 20

New York, NY

TO BE POSTED NEAR EACH TELEPHONES IN SITE OFFICE

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INFORMATION FOR EMERGENCY

Stay calm and give the following information.

1. What type of emergency

Personnel Injury
- Description of injury
- Still conscious or not
- Breathing or not

Fire
- Wood
- Electrical
- Chemical

Equipment failure
- Describe

Other

2. Address

TRANSPORTATION HUB – East West Connector

Use entrance on **FULTON AND CHURCH STREETS**

Someone will be waiting to guide you to the exact location of the emergency on site.

Which **floor/grid line?**

TO BE POSTED NEAR EACH TELEPHONES IN SITE OFFICE

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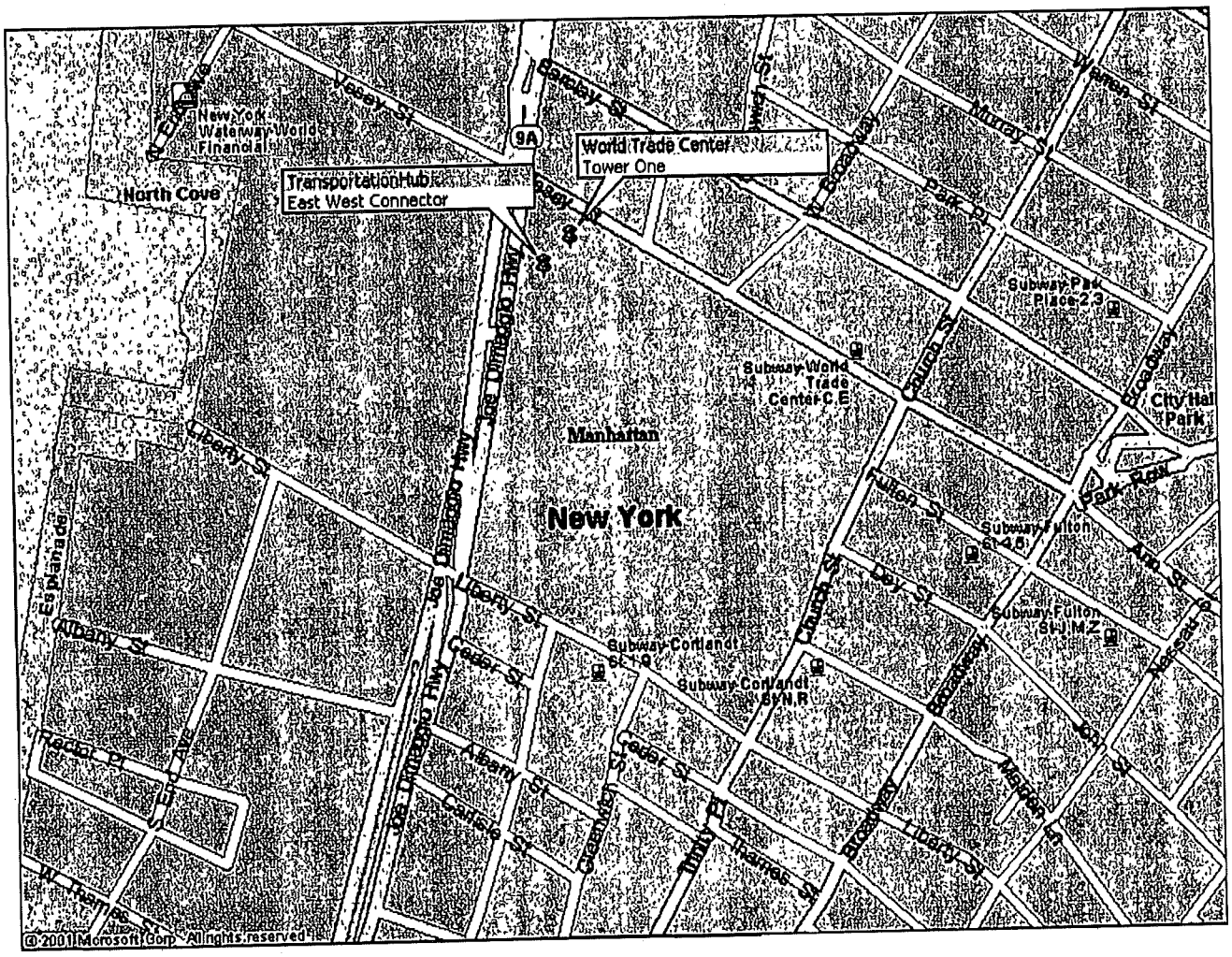
SITE LOCATION



Partial Manhattan map showing location of site.

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CRANE LOGISTIC DRAWINGS
BY
DCM ERECTORS, INC.

DCM ERECTORS INC.

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EMERGENCY PHONE DIRECTORY

DCM Erectors, Inc.

NEW YORK OFFICE:	110 East 42nd Street Suite 1710 New York, NY 10017	(212) 599 - 1603 Phone (212) 599 - 1615 Fax
TORONTO OFFICE:	77 Belfield Road Etobicoke ON, Canada M9W 1G6	(416) 241 - 6967 Phone (416) 241 - 3229 Fax
SITE OFFICE:	Site Trailer on Vesey Street	(212) ### – #### Phone (212) ### – ####Fax
:	Project Manager	(917) 576 - 9182 Cell
Robert Mahoney:	General Superintendent	(732) 739 - 6989 Home (917) 576 - 9186 Mobile
Competent Site Person Certified Rigger	Site Supervisor	(646) 734 - 2777 Mobile
Richard Gilbert: OSHA 30 hours Site Safety Manager License	Corporate Safety Lic. #600013057 Lic. # 803	(212) 608 - 9575 Home (917) 576 - 9182 Mobile richard@dcmerectors.com

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PHOENIX CONSTRUCTORS JV

	115 Broadway, 14th floor New York, NY 10007	(212) 616- 5800 Phone (212) 566- 2350 Fax
:	Structural Project Manager	(###) ### - #### Cell
:	Project Engineer	(###) ### - #### Cell
:	Superintendent	(###) ### - #### Cell
John Kane:	Site Safety Manager	(845) 494- 2976 Cell

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The following is a list of topics that found in this section.

The topics of the meetings should reflect the hazards and conditions of the site.

The foreman or the person holding the safety meeting should read prior to the meeting the topic sheets he/she will use during the meeting. The sheets should be used only to prepare for the meeting. The words or examples can be changed to suit the crew you are addressing.

Always make certain that your group is not too big and that workers understood the intent of the safety meeting.

1. Employees responsibility in safe operations
2. Where does employee responsibility start?
3. Teamwork prevents accidents
4. Who's the loser?
5. Accept your safety responsibility
6. Courtesy
7. Ten basic safety rules
8. General safety rules for Total safety at work
9. Look and live
10. It could happen to you
11. The enemy
12. Signs mean what they say
13. Near misses
14. Do You Know Safety?
15. Spotting hazards
16. Short cuts
17. Waste
18. Stop unsafe acts program
19. Accident Investigation
20. Take safety home
21. Why wear hard hats?
22. Work clothing
23. Full Body Harness - lifelines
24. Foot protection
25. Work gloves
26. First Aid
27. Don't neglect cuts Suspended Access Equipment – Tiebacks
28. What about little injuries
29. Safe use of hand tools
30. Portable power tools
31. Defective tools
32. Common sense in a motor vehicle
33. Heavy equipment

SAMPLE
TO BE REVISED TO BE SITE SPECIFIC

34. Common sense concrete safety
35. Safe use of electricity
36. 110 volt electricity
37. Back injuries
38. Lifting
39. Handling materials safely
40. How to lift
41. Valuable windows Electric Tools – Basic Safety
42. The blind man
43. Eyes protection
44. Goggles vs. eye injuries
45. Housekeeping
46. "On the level"
47. Material storage
48. Fire prevention
49. Safety in arc welding and cutting
50. Oil and Oxygen and explosive combination
51. Prevention of falls
52. Slips and falls
53. Compressed gas cylinders
54. Scaffold safety
55. Ladders
56. Working on and around scaffolds
57. Plywood covers on floor openings
58. Protecting the public
59. Excavation protection
60. Hot weather safety
61. Fall hazards
62. Dangerous substances
63. Using gasoline safely

SAMPLE
TO BE REVISED TO BE SITE SPECIFIC

USE THESE SHEETS TO PROTECT YOUR CREW MEMBERS

IT IS THE FOREMAN RESPONSIBILITY TO ENSURE THAT HIS/HER CREW FOLLOWS ALL SAFETY RULES.

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No : 1

EMPLOYEES RESPONSIBILITY IN SAFE OPERATIONS

Purpose of Discussion:

TO TELL EMPLOYEES THAT THE SUCCESS OF THE DCM ERECTORS, INC. SAFETY PROGRAM DEPENDS ON THEM.

The Company's total injury prevention program cannot be achieved unless employees are dedicated to the prevention of accidents. Through the safety organization, all employees play an important part in making the job a safe and healthful place in which to work. However, improvements can only be made as we become aware of areas needing improvement. This job must be done by employees as individuals -in cooperation with Foremen and Superintendents.

A safety problem usually arises when a new worker is hired. The newcomer is unfamiliar with the construction site. He is not experienced in safe operating procedures or the use of safety equipment. He will have to be shown, perhaps many times, how to work safely and how to prevent accidents from happening to himself or to his fellow employees.

The older, more experienced worker has his own set of safety problems. He may become lax, taking shortcuts in his work operations or neglecting to use protective safety equipment because of that safe feeling brought about by familiarity.

DCM Erectors, Inc. carries much of the responsibility for providing a safe work environment. But supervision alone cannot accomplish the safety task. It can only be accomplished as you cooperate.
You are personally obligated to your fellow employees, and to yourself to recognize and suggest ways to improve the safety and health conditions on the site. Each person must in some way become his own «safety engineer».

As you keep a sharp eye out for job hazards, and as you personally set a good example of safe workmanship, you will contribute much toward the health and well-being of yourself and your co-workers.

CONCLUSION:
TAKE TIME TO BE SAFE

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No : 2

WHERE DOES EMPLOYEE RESPONSIBILITY START?

Purpose of Discussion:
TO TELL EMPLOYEES THE IMPORTANCE OF SAFETY AWARENESS.

DCM Erectors, Inc. provides you with the proper safety equipment and the proper procedure. Now the rest is up to you. You are responsible for yourself, wearing or not wearing your hard hat, safety glasses, safety footwear or following the proper procedures for a job you do each day.
Hard hats shall be worn by everyone on the job at all times.

When you walk on a jobsite you must always be aware that you are in a dangerous place, you must take precaution to protect yourself.

Our Accident Prevention Program isn't an umbrella that will protect you from yourself, the unsafe act maker. Unsafe acts have been and still are the cause of 80% of injuries in the construction industry.
If you come on the job with something else on your mind and more worried about your problems than what is happening around you, you are the Prime Target for an accident and the odds are you will have one. If someone hands you a unserviceable tool to use, do you use it, or do you get another one or repair it first? Only you can protect yourself by taking the proper precautions.

If you lose an eye, whose fault is it? Really is it the Company's fault or is it yours for not wearing eye protection provided? After all, Protective Equipment is there on site for you to use. If you choose to use minimum protection equipment and you get injured, whose fault is it? Be a part of the team and help stomp out unsafe acts.

CONCLUSION:
HUNTING LIONS WITH A JACKKNIFE IS AN UNSAFE ACT.

SAMPLE
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No : 3

TEAMWORK PREVENTS ACCIDENTS

Purpose of Discussions:
TO IMPRESS UPON EACH EMPLOYEE THE IMPORTANCE OF LOOKING OUT FOR THE SAFETY OF EACH OTHER.

Teamwork is what keeps production high on any job. In fact, it's teamwork between workers and management that has pushed production in this country to an all-time high. Teamwork prevents accidents, too. Teamwork for safety can push accidents down to an all-time low. All we have to do is to think of the other fellow's safety as well as our own. It's just a matter of good citizenship and good sportsmanship.

Take the matter of safe driving. The really safe driver not only looks out for his own safety, but he makes sure he doesn't endanger the life of anyone else. He gives up his right-of way sometimes to help another driver out of a jam. He slows down to let a driver cut back in after he has tried to pass and discovered something was coming in the other direction. It is not just a matter of the one drive having the right-of-way or being right, it's a matter of a little teamwork preventing accidents. The safe driver knows that some day he may do a foolish or reckless thing on the road and that it will take teamwork from some other fellow to prevent an accident.

What applies on the road applies also on the job. It's not just a matter of your working safely and following all the rules yourself. You've got to lend a hand occasionally to prevent or avoid an accident that may involve him. You can never tell what kind of situation is going to arise in which teamwork is needed to prevent an accident. You've got to solve each one as it arises by working together and helping the other fellow.

CONCLUSION
FOR TEAMWORK IN SAFETY, REMEMBER THE FOLLOWING POINT:

1. **IF YOU HAVE SUGGESTIONS FOR MAKING THE JOB A SAFER PLACE TO WORK, DON'T KEEP THEM TO YOURSELF. LET OTHERS KNOW ABOUT THEM.**
2. **IF YOU SEE SOMETHING WRONG, DON'T PASS THE BUCK. IF YOU CAN'T CORRECT IT EASILY YOURSELF, REPORT IT AND MAKE SURE THAT SOMEONE TAKES CARE OF IT.**
3. **IF A JOB IS TOO BIG FOR ONE PERSON, GET HELP; AND GIVE THE OTHER FELLOW A HAND IF HE NEEDS IT.**
4. **THINK A LITTLE FOR THE OTHER FELLOW - HIS SAFETY MAY DEPEND ON YOU.**

SAMPLE NOT TO BE USED

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No : 4

WHO'S THE LOSER?

Purpose of Discussion:
TO BRING EACH EMPLOYEE TO REALIZE THAT HE IS THE LOSER IF HE SUSTAINS AN INJURY.

Safety rules, safety meetings, safety posters, guards, barricades, warning signs! All are meant for you, to help prevent injury to you and to remind you to protect yourself.

After all, if you have an accident who suffers? Who loses? You do. And if you get a bad injury, your wife and kids suffer too. The pay check stops; the table gets a little bare, shoes wear out. Who's the loser? Figure it out for yourself.

So what to do about it? Well, you're paddling your own canoe. Violate the rules, pay no attention during safety meetings, ignore posters and warning signs, don't use guards, take chances and you're heading for an injury.

Safety is a matter of human behavior. Either you play it safe, or you trust your luck. There is no in-between. Either you plan it right with an added element of safety, or you take a chance. And the Chance-taker is an accident-maker.

So what to do about safety? Run your own safety program to protect yourself. Don't take chances. Plan your work to reduce the hazards to a minimum. Think before you act. Obey the rules of the project.

Danger exists in many situations. If you get in the habit of looking for hazards and then take the best means of minimizing them, you will be protecting yourself. And by protecting yourself, you'll make the job safer for the other fellow. What's more, point out hazardous conditions and dangers to a new or less experienced employee so he can protect himself and thereby lessen or remove dangers to you.

CONCLUSION:
OBEY THE SAFETY RULES AND BE ALERT FOR HAZARDS. DON'T BE A LOSER.

SAMPLE
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No : 5

ACCEPT YOUR SAFETY RESPONSIBILITY

Purpose of Discussion:
TO STRESS THE IMPORTANCE OF PERSONAL RESPONSIBILITY EACH EMPLOYEE HAS TO HIMSELF.

With so much talk about safety programs, it's easy to forget that our safety is primarily a personal responsibility. Our work places can be covered with safety posters and bulletins. We can be told of safe ways to do work, but none of these things can insure freedom from accidents unless we want to prevent them. It's up to us. Unless we'realize that our own actions determine whether or not accidents occur and unless we accept the responsibility for these actions, injuries will occur.

Who puts tools and equipment into motion and controls their movements? Who, but the individual, can control the placement of his body, the movement of his arms, legs and eyes and, most important, the activity of his brain? Man s ability to direct his own actions and control his environment carries with it the responsibility to use this direction and control so that his own creations do not destroy him or his fellow man.

Machines do not reach out and bite. Tripping hazards don't grab a person s feet. Hand tools don't slice and jab into flesh by themselves. But judging from the statements people use to describe their injuries, one would thing that the tools and equipment they us were alive. It's apparent that the people who made such statements are not fully aware that they are accountable for their own actions and must accept the responsibility for them. Little can be done to prevent their accidents and injuries until they do accept this responsibility. Injuries will be prevented when the employer responsibilities are met and each individual employee accepts his own responsibilities.

It is usually the immature person or the one with a complex who refuses to face up to the responsibilities of his own actions and decisions. Hard luck, conduct of other people, inadequate tools and unfavorable conditions are just a few of the favorite reasons these people use to absolve themselves of their personal responsibilities when things go wrong.

Accepting responsibility for our own actions is a sign of maturity. As it relates to safety, it means we have to believe firmly that it's up to us to do everything we can to prevent accidents. We must recognize that no one else can accept our safety responsibility for us.

CONCLUSION:
REMEMBER - ACCEPT YOUR SAFETY RESPONSIBILITY!

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No : 6

COURTESY

Purpose of Discussion:
TO STRESS THE IMPORTANCE OF EACH EMPLOYEE BEING A TEAM WORKER.

It may seem strange to suggest that courtesy and safety are partners. Lack of courtesy has caused an endless number of accidents. Most of us do things when we are behind the wheel of a car that we would not do anywhere else. We honk our horns; we cut in and anger other motorists. This upsets their emotional setup and makes them less competent to drive.
The discourteous person in construction is always doing things which imperil the comfort and safety of others. He forgets to do what he is suppose to do. He leaves a door open that should be kept shut. He doesn't put his tools where they are supposed to be. This person thinks only of himself and everyone's safety is threatened by his selfishness.
The courteous person is easy to work with. He is generally popular. He creates confidence and good humor.
Everyone is on safer ground when the atmosphere is friendly. Courtesy builds friendship.
Every Worker s Obligation:

1. Work safely
2. Think of the safety of fellow workers.
3. Use your knowledge and influence to prevent accidents.
4. Report unsafe conditions.
5. Contribute ideas to improve safety.
6. Not one of us walks alone.
7. We are members of a team, a home, a community, a world.

CONCLUSION:
SAFETY IS EVERYONE S RESPONSIBILITY – ACCEPT YOURS!

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No : 7

TEN BASIC SAFETY RULES

Purpose of Discussion:
TO REVIEW WITH ALL EMPLOYEES THE BASIC SAFETY RULES OF THE JOB.

1. Follow instructions, don't take chance and if you don't know - ask.
2. Correct or report unsafe conditions.
3. Help keep the jobsite clean and orderly.
4. Use the right tools and equipment for the job.
5. Report all injuries. Get First Aid immediately.
6. Use, adjust and repair equipment only when authorized.
7. Use prescribed protective equipment. Wear safe clothing. Keep them in good condition.
8. Don't horseplay and avoid distracting others.
9. When lifting, bend your knees and get help for heavy loads.
10. Comply with all safety rules and signs.

CONCLUSION:
REMEMBER - DO IT THE SAFE WAY!

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No : 8

GENERAL SAFETY RULES FOR TOTAL SAFETY AT WORK

Purpose of Discussion:
TO DISCUSS IN DETAIL THE SAFE WAY TO HAVE A SAFE JOB.

1. **Lifting**
   Keep your back straight
   Bend the knees
   Don't reach and lift
   Get help for heavy loads

2. **Falls & Falling objects**
   Look before you step
   Keep all walk areas clear
   Stay out from under loads
   Don't use unsafe ladders

3. **Steeping on nails**
   Remove all nail hazards
   Look before you step
   Keep debris to one side
   Nail down protruding nails

4. **Unsafe use of tools**
   Power tools are dangerous
   Keep guards in place
   Wear goggles when grinding
   Never adjust while running

5. **Unsafe tools & equipment**
   Inspect regularly
   Report all defects at once
   Use the right tool safely
   Put it away safely

6. **Opening**
   Cover floor openings securely
   Install guardrails
   Keep barricades in place
   Use guardrails on staging

7. **Protective equipment**
   Keep your hard hat on
   Protect eyes with goggles
   Never remove their guards
   Refuse to work in danger without it

8. **Housekeeping**
   A clean job is a safe job
   Use trash cans
   Pile materials safe and neat
   Rubbish is a fire hazard

9. **Teamwork**
   Plan all work with safety
   Protect other trades
   Protect fellow workers

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CONCLUSION:
REMEMBER - DO IT THE SAFE WAY!

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No : 9

LOOK AND LIVE

Purpose of Discussion:
TO IMPRESS UPON EACH EMPLOYEE THE IMPORTANCE OF LOOKING ABOUT BEFORE THEY ACT.

Accidents on construction jobs occur because the person who is injured fails to look . Look where you walk, stand, sit or climb. It's one of the most important and basic principles of accident prevention on a construction job. We've all heard of the painter who stepped back to admire his work, and fell from his scaffolding which was five stories high. It's good to admire your work, but certainly it's important to look before stepping in any direction. You might step into an open stairwell, off an edge of a platform, onto a pile of lumber, in the path of a moving vehicle or into the path of a swinging load.

Materials and equipment are constantly being handled and moved on any construction job. It's important that those working on the job be constantly alert to such movements. Look up, look down and look all around, so that there will be no occasion when you will walk into the path of a moving truck, an earth moving piece of machinery, an elevator or other type of hoisting equipment.

Normally, persons on a construction job don't do much sitting around. There are times, however, when the opportunity presents itself. It's important to look where you sit. On rare occasions, men have been killed because they chose to sit close to or behind machinery which suddenly moved. One of the most common excuses for an accident is the childish expression I didn't see . On a construction job, this is hardly a valid excuse. How can you explain the fact that you were struck by a piece of moving equipment by saying I didn't see it coming . What that really means is I wasn't looking.

On a construction job, scrap materials and debris are removed from the structure by throwing or dropping them to the ground level. No such materials should be thrown from a structure unless the person doing the throwing first looks to make sure that there is no one in the way. No worker should walk under a swinging load if it can be prevented at all. Being alert to what is going on overhead is very important for all workers, and the best way to be alert to overhead conditions is to occasionally look up.

Men have been killed on construction jobs as a result of falling through false ceilings or temporary floor covering. They did not take the time to look where they were stepping. By the same token, men have been injured while working in poorly lighted areas merely because they could not see. So, if the occasion prevents itself for you to work in a poorly lighted place, it is important for you to be especially cautious.

CONCLUSION:
BE AWARE OF WHO OR WHAT IS AROUND YOU.

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No : 10

IT COULD HAPPEN TO YOU

Purpose of Discussion:
TO BRING EACH EMPLOYEE TO REALIZE THAT PLACING SAFETY LAST CAN RESULT IN TRAGIC ACCIDENTS.

It was an obituary that really set you to thinking! Local man, age 36, dies after fifteen years in the hospital, following a construction accident.

Fifteen years of staring at the same ceiling, 180 months of complete dependence upon others; 780 weeks of hope erosion, with expenses towering to crowd everything else off the skyline; 5,475 days spent waiting for the night; 5,475 nights spent waiting for the day; 131,400 hours spent between four walls, fading flowers, medicinal smells, useless sympathy; shrinking in stagnation.

473,040,000 seconds of death before burial, and probably because of some little rigging error, the hanging scaffold gave way, the end dropped. One man was instantly killed, another is now selling real estate, unable to work in the trade.

This man wasn't so lucky. Death at 36! After 15 years of dying!

Within that period of time, a man usually gets married, has a family, climbs upward in the world, travels, fishes, hunts, begins to mature, enjoys a million sights, sounds and sensations.

Over these same 15 years, this man was a castaway on a lonely bed island. He absorbed tasteless food, slept a desperate sleep, suffered, cursed, cried, felt the bitterness kink his insides into knots at such ordinary sounds as laughter, free footsteps and hearty talk. For every person who dies in construction accidents, many others spend agonizing weeks, months, lifetimes of disability.

ARE YOU BORED WITH ALL THIS SAFETY TALK?

You risk a lifetime of disability, of 15 years of dying, when you forget to be safety conscious. Do you realize this?

Do you know what errors are yours, and what you must do to correct them?

CONCLUSION:
THE LIFE YOU SAVE MAY BE YOUR OWN.

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No : 11

THE ENEMY

Purpose of Discussion:
TO BRING TO THE ATTENTION OF ALL EMPLOYEES THAT APPROXIMATELY 80% OF ALL ACCIDENTS ARE CAUSED BY AN UNSAFE ACT BY AN EMPLOYEE AND NOT BY UNSAFE CONDITIONS AT THE JOBSITE.

I am more powerful than the combined armies of the world. I have destroyed more than all the wars of the nation. I massacre thousands of people in a single year. I am more deadly than bullets, and I have wrecked more homes than the mightiest guns. I spare no one and find victims among the rich and the poor alike; the young and the old; the strong and the weak. Widows and orphans know me to their sorrow.

I loom up in such proportions that I cast my shadow over every field of labor. I lurk in unseen places and do most of my work silently. You are warned against me, yet you heed me not.

I am relentless, merciless and cruel. I am everywhere; in the home, in the factory, at railroad crossings, on land, in the air and on the sea. I bring sickness, degradation and death, yet few seek out to destroy me.

I crush, I maim, I devastate. I give you nothing, and take all you have. I am your worst enemy.

CONCLUSION:
I AM CARELESSNESS.

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No : 12

SIGNS MEAN WHAT THEY SAY

Purpose of Discussion:
TO REMIND ALL EMPLOYEES TO ABIDE BY SIGNS ON THE JOB.

Take a Wet Paint sign, for instance. You know very well that there is a 10 to 1 chance the sign means what It'says. But chances are 10 to 1 you'll have an overwhelming urge to walk up and stick your finger in it, just to see whether the sign tells the truth.

Well, a little paint isn't going to hurt your finger, and maybe that s an easy way to convince yourself that signs really are put up for a reason.

When you fail to read and heed traffic and other safety signs, you are risking more than a smeared finger. You are endangering you life and the lives of your fellow citizens. Whether you work in an office, a shop, or outdoors, you'll find signs posted to keep you safe and sound. But remember that

ALL IMPORTANT SIGNS ARE NOT ALWAYS WRITTEN,
for example:

- A hole in the floor gaps and yearns to be covered.
- A leaning pile of material beckons for someone to keep it from falling.
- Protruding nails are saying, Pull me out or hammer me down .
- Machine guards laying on the floor in the way are telling someone to put them back in place.
- Grinding, welding, flying material suggests It's the eyes that need the protection of goggles.
- Falling material points to cleanup of all loose objects, etc.
- Defective tools shout to be replaced or repaired.
- We Must Believe In Unwritten Signs to Keep Safe.

CONCLUSION:
SAFETY SIGNS, WHETHER WRITTEN OR NOT, ARE TO BE RESPECTED.

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No : 13

NEAR MISSES

Purpose of Discussion:
TO REMIND EMPLOYEES NOT TO DISREGARD NEAR MISS ACCIDENTS.

How many times have you came close to an accident, shrugged it off as a near-miss , and gone on your way without giving it another through? We should all think twice about these near-misses. The difference between an accident and a near-miss is often a fraction of a second in timing, or a fraction of an inch in distance, and next time the difference may not be there.
Near-misses are warnings of accidents in the making. If we accept the warnings and look for the causes, we may be able to prevent similar situations from developing.
Few accidents occur without some advance warning. If we all heed the warning and check the why, most accidents can be eliminated.
A near-accident is an indication that something is wrong, and we should be warned by each near-accident that occurs. Ignoring the conditions that lead to near-accidents is an open invitation to an actual accident.
Let's not shrug off the near-misses as only close ones that don't count but let's find out why they happen and correct the conditions, if we can, or report them to the responsible person who can take corrective action.
Let's regard near-accidents the same as bad accidents and weed out the causes while we have the opportunity.

CONCLUSION:
REMEMBER: DON'T DISREGARD WARNINGS!!!

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No : 14

DO YOU KNOW SAFETY?

Purpose of Discussion:
TO IMPRESS UPON THE IMPORTANCE OF KNOWING THE SAFE WAY TO DO A JOB.

A carpenter knows how to install a door; an iron worker how to erect steel; a finisher how to hand-trowel a floor surface, and the balance of the various trades how to apply their skills, but how many of them KNOW safety? Below is a list of ten items to help you KNOW safety.

1. KNOW your JOB - what it involves and exactly how it'should be done - safely.
2. KNOW your TOOLS - how to use them safely and how to spot unsafe, worn-out tools.
3. KNOW your INDIVIDUAL CRAFT SAFETY RULES - designed to protect you from injury.
4. KNOW your RESPONSIBILITIES - to your family - employer - yourself and fellow workers.
5. KNOW your HAZARDS - be alert to all potential dangers around you and your fellow workers.
6. KNOW your SAFEGUARDS - learn what protects you and cooperate in using them.
7. KNOW your PENALTIES - for carelessness - pain - money loss. Be safe, not sorry.
8. KNOW your REWARDS - figure out the many advantages of working safely.
9. KNOW your REMEDIES - be prepared to do the right things in emergency - correct hazards to avoid emergency.
10. KNOW YOURSELF - recognize your limitations, reactions and weaknesses. Don't expose these to unsafe practices.

CONCLUSION:
IF ALL OF US WOULD REMEMBER THESE KNOWS WE CAN REDUCE OUR POTENTIAL ACCIDENT RATE ON THE JOB.

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No : 15

SPOTTING HAZARDS

Purpose of Discussion:
TO HELP THE WORKMEN BECOME MORE HAZARD-CONSCIOUS AND ALERT TO POTENTIAL DANGER.

HOW DO WE KNOW WHEN A CERTAIN CONDITION IS DANGEROUS TO OUR HEALTH OR SAFETY?

1. Past experiences with such conditions.
2. Common sense - logic.
3. When certain words are used to describe a condition. The following is a partial list of hazard-spotting words: (Foremen: You may start by giving a few words as examples, then let your men add to the list. Occasionally ask a volunteer to give an example of a situation which his word describes.)

PARTIAL HAZARD SPOTTING VOCABULARY

Bent	Excessive	Loud	Splintered
Broken	Explosive	Malfunctioning	Twisted
Buckled	Exposed	Marred	Torn
Burned	Flammable	Missing	Unfastened
Cluttered	Frayed	Mutilated	Unguarded
Contaminated	Frozen	Nauseous	Unstable
Corroded	Grinding	Noisy	Vibrating
Cracked	Hot	Overheated	Warped
Crooked	Impaired	Pierced	Worn
Dark	Inadequate	Pointed	Weak
Decayed	Inoperative	Protruding	
Decomposed	Intense	Rotting	
Defective	Irritating	Rusted	
Deformed	Jagged	Sharp	
Deteriorated	Jerky	Slipping	
Dirty	Leaking	Shaky	
Discolored	Littered	Spillage	
Dulled	Loose	Sprayed	

SAMPLE TO BE REVISED TO SITE SPECIFIC

CONCLUSION:
WE CAN ALL LEARN TO BE MORE SAFETY CONSCIOUS BY USING THIS VOCABULARY AND SPOTTING, REPORTING, AND CORRECTING HAZARDS BEFORE THEY BECOME ACCIDENTS.

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No : 16

SHORT CUTS

Purpose of Discussion:
TO REMIND ALL EMPLOYEES THAT A SHORT CUT IS NOT ALWAYS THE SAFEST WAY.

All of us, at one time or another, have exposed ourselves to possible injury by short-cutting when a few extra steps would have meant the safe way. We did so as kids when we jumped the fence instead of using the gate. We do so as men when we cross streets between intersections instead of at corners.
Many people, as the accident statistics plainly indicate, show almost complete disregard for the fact that minor safety violations may have serious consequences. If any of you are in the habit of short-cutting, we hope you will break that habit right now. In our work, short-cutting can be deadly. All of us know of incidents where a thoughtless act was the direct cause of an accident.

We know of a case where an Iron Worker tried to cross an opening by swinging on reinforcing rods. His hands slipped and he fell 20 feet onto a concrete floor. If he had bothered to take a few moments to walk around the opening, he would probably still be tying rods. None of us should expose ourselves to danger in a similar manner.

To be sure, the safe way isn't always the shortest way, but choosing the safe way is your personal responsibility. When you are told to go to work in a particular area, you are expected to take the safe route - not some shorter or more hazardous one. Nobody has a guardian angel, only his soul. He has to look out for himself. If there's no safe access to a particular job assignment, see to it that a safe access is provided.

Ladders or scaffolds are provided for high work. Use them, even though a high job may take only a few minutes, don't climb on false work or some improvised platform.
Steps, fixed ladders, or ramps are provided for you to get from one elevation to another. If they are not already provided, take time to have them installed.

Your first responsibility is to yourself. Remember that ladders, steps and walkways have been built to save you trouble and to save your life. Use them. If you see anyone taking short cuts, warn him of the danger involved and bring it to the attention of your supervisor.

CONCLUSION:
GAMBLING A FEW MINUTES AND A LITTLE ENERGY AGAINST A POSSIBLE LIFETIME OF PAIN AND MISERY IS A POOR BET. THE LIFE YOU SAVE MAY BE YOUR OWN.

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No : 17

WASTE

Purpose of Discussion:
TO BRING EACH EMPLOYEE TO REALIZE THAT ACCIDENTS ARE WASTEFUL.

Accidents are wasteful. There's no argument about that. But consider for a moment the ways in which they are wasteful.
Wasteful of the human body
Wasteful of human emotions
Wasteful of time
Wasteful of money
Wasteful of spoiled material
Wasteful of idle and damaged equipment
Wasteful of time spent in training men to replace injured workers
Wasteful of others safety efforts
What may seem like a little wasted time in being safe, saves plenty by preventing many more wasteful things later on.

CONCLUSION:
YOUR SAFETY IS WHAT YOU MAKE IT!

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No : 18

STOP UNSAFE ACTS PROGRAM

Propose of Discussion:
TO EMPHASIZE TO ALL JOBSITE SUPERVISION THAT SAFETY IS A YEAR ROUND BUSINESS THAT PAYS A DIVIDEND TO ALL EMPLOYEES.

If you are interested in a positive approach to your site accident prevention program, consider this:

S incere in its motives - it will cause good public relations and harmonious employee relations. Low cost experience relative to worker's compensation and uninsured cost will be a by-product of your program.

A nticipate the unexpected - you will want to eliminate every possibility of an accident.

F oreman directed - responsibility for accident prevention should be assigned with the same degree of seriousness as responsibility for quality and production.

E mployee participation - let your men know it's their program too.

T ailored to your needs - if your problem is falls , don't talk about be careful - talk about falls .

Y ear round emphasis -safety is not just a one a year flash in the pan campaign.

CONCLUSION
MAY THIS YEAR BE YOUR ZERO ACCIDENT YEAR.

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No : 19

ACCIDENT INVESTIGATION

Purpose of Discussion:
TO IMPRESS UPON EVERYONE ON THE PROJECT WITH THE FACT THAT GOOD ACCIDENT INVESTIGATION CAN PREVENT SUCH OCCURRENCES FROM HAPPENING IN THE FUTURE.

I. What is the difference between an accident and an injury ?

1. An Accident is an unintended occurrence that either caused or could have caused personal injury or material damage. We might also include the near miss in which it is just pure luck that no one was hurt or property damaged.
2. An injury is almost always the result of an accident. It is not the accident itself. It is important to remember this difference when reporting and investigating accidents.
3. Such problems as skin or lung disorders might be called injuries although they resulted from job conditions rather than an unexpected happening.

II. What is the single most important thing to determine in an accident investigation ?

1. The cause of the accident. Unless you know for sure what caused it, you will never know what to correct in the future.
2. There may also be other contributing factors. These must also be considered in deciding what corrective action to take. For example, if a man fell over some debris, you would immediately list debris and poor housekeeping as the major cause, but in your investigation you might find that the area was not well lighted. While this may not have caused him to fall, it certainly contributed to the conditions that caused the accident.
3. Generally, causes fall into two groups — unsafe conditions (physical causes) and unsafe acts (personal causes). Often you will find both in the same accident.

III. How do we investigate an accident?

1. We have two sources of information — objects and people.
2. Objects are good because they do not reflect poor memory or prejudice. Faulty hooks, frayed cables, broken guards, loose connections, etc. should be looked for.
3. People provide a better account of an accident but may present some problems. Try to concentrate on the facts; find out if the person actually saw the incident take place or are you getting secondhand information.

IV. What is the final result of an accident investigation?

1. The final result should always be that some preventive or corrective action is taken to eliminate if possible another similar incident.
2. Keep in mind that the prevention of accidents is the first order of business, but it is not always possible to eliminate the accident potential. In such cases, we must try to prevent the injury. For example, safety goggles or a hard hat will not prevent an accident but will prevent an injury.

SAMPLE TO BE REVISED TO BE SITE SPECIFIC

CONCLUSION:
NEVER SAY THAT AN EMPLOYEE SHOULD HAVE BEEN MORE CAREFUL OR THAT IT WAS A FREAK ACCIDENT. TAKE THE TIME TO DISCOVER WHAT REALLY CAUSED IT AND MORE IMPORTANT, HOW TO PREVENT IT.

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No : 20

TAKE SAFETY HOME

Purpose of Discussion:
TO INSIST THAT ALL EMPLOYEES TAKE THE SAFETY THEY LEARN AT WORK HOME WITH THEM.

The safety knowledge that you gain at work can make your home a lot safer place for you and your family.

Last year, about 24,000 people were killed in home accidents.

Take a few minutes — check your home — you'll be surprised at the number of safety hazards you'll find.

How are your ladders? If they are bad, discard them now! The value of a ladder can't match that of a broken back.

Is your extension cords three wire? Don't hang onto cords that are frayed or damaged. Bad cords cause shocks and fires.

Are your furnace and water heater in good repair? Do you have items piled or stored too close to either one? Better check.

Housekeeping is just as important at home as on the job. Litter cause tripping and falls, and breeds rodents and fire hazards.

Flammable liquids are dangerous. Check for safe storage of gasoline, thinners, solvents, cleaning fluids, etc.

Do you keep drugs, household chemicals, pesticides, as well as other dangerous items out of children s reach?

Smoke detectors save lives — no home should be without one. Check the batteries twice a year.

CONCLUSION:
THINK SAFETY — AT WORK — AT HOME — AT PLAY.

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No : 21

WHY WEAR HARD HATS?

Purpose of Discussion:
To examine the benefit of hard hats and some of the details of proper usage.

I. Who should wear hard hats, and when and where should they wear them?
1. Every employee of every contractor, vendor, visitors, public officials, architects, etc. shall wear a hard hat while on the project as long as they are not in the immediate office area.
2. Hard hats should be worn at all times during working hours because during this time, your head is never completely free from hazardous exposure.

II. Why is a hard hat so important?
1. The brain is the control center of the body. The slightest damage to any part of the brain will cause malfunction of some area of the body.
2. The possibility of falling or flying objects on a construction project is great enough to require the extra protection of a hard hat.
3. The hard hat has become a symbol of construction safety. If a workman does not wear the hard hat, it means that he is either not interested in construction or not interested in safety and we would prefer not to employ either type.

III. Why do some workmen object to wearing hard hats?

Objection: They are too heavy.
Answer: The average hard hat weighs about 14 ounces. Compared to man's head which weighs about 14 pounds, this is a negligible amount of weight, particularly in view of the protection offered. The helmets used in World War II weighed three pounds yet there was little objection because of the psychological feeling of security which they afforded.

Objection: They are too cold in winter.
Answer: That is what inner liners are for. There are some very warm ones available, but be sure that they do not defeat the purpose of the suspension.

Objection: They are too hot in summer.
Answer: A recent test in 110 temperature showed that the inside of a cloth cap and a felt hat were 2 degrees cooler than the outside temperature. The same test showed the temperature inside a hard hat to be from 5 to 12 degrees cooler. The material, reflection and air space made the difference.

Why wear hard hats?

IV. What should we look for in a good hard hat?
1. High-impact plastic material (not fiberglass or metal). Must meet ANSI standards.
2. Be sure it has not been altered in any way such as having holes drilled in it or having been exposed to excessive heat or chemical action.
4. A good sound suspension system, solidly anchored and well fitted.

CONCLUSION:
PLEASE DO NOT RISK YOUR CAREER, YOUR HEALTH, OR YOUR LIFE BY TRYING TO DECIDE WHETHER OR NOT TO WEAR THE HARD HAT. MAKE IT A WAY OF LIFE WHILE ON THE JOB. HARD HATS SHALL BE WORN BY EVERYONE ON THE JOB AT ALL TIMES.

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No : 22

WORK CLOTHING

Purpose of Discussion:
TO BRING OUT THE ESSENTIAL FEATURES OF PROPER CLOTHING ON THE JOB AND TO STRESS ITS IMPORTANCE.

I. What are the basic categories of work clothing and what should we'remember about each?

1. **Hard hats**
   a. They should be made of good quality plastic (not metal). Must meet ANSI standards.
   b. The suspension system must be sound and well fitted.
   c. It must not be altered in any way.
2. **Shirts and jackets**
   a. Shirts should be short sleeved or have straight cuffs which are buttoned closely. Avoid sleeves that are too loose or too long. Shirts are to be worn by all employees at all times.
   b. Do not roll the sleeves or leave them unbuttoned.
   c. Fussy shirts or sweaters are not recommended because of the ease with which they can catch sparks.
   d. Jackets should be buttoned or zippered at least chest high.
   (Foremen: As you point out some of these items about proper clothing, ask your men if they know the reasons for them.)
3. **Gloves**
   a. Gloves with holes in them defeat the purpose and do not give the protection for which they were designed.
   b. Use the right kind of glove for the work being done. For example, rubber gloves for electrical work, asbestos gloves for handling hot objects, plastic or synthetic rubber gloves for concrete work.
4. **Pants**
   a. Wear pants that are roomy enough and are of proper length - well off the ground so the bottom of the legs will not get frayed and become a tripping hazard.
   b. Pant legs are best without cuffs because they can catch sparks or other harmful matter.
   c. Make sure your belt end is short so it cannot get caught by anything.
   d. Straight legs rather than flared legs are a must for construction work.
   WORK CLOTHING
5. **Shoes**
   a. Tough, sturdy, comfortable work shoes are best for this type of work.
   b. Such shoes as loafers, sneakers, tennis shoes, sandals, or any shoes with thin soles are prohibited.

II. In summary, what are the most important points to remember about work clothing?

1. They should be durable - snag and tear resistant.
2. They should fit well - not too loose or too tight.
3. They should be laundered often for better skin protection.

SAMPLE
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4. They should be warm enough in winter and as thin as possible in summer yet give sufficient protection.

CONCLUSION:
WE SPEND A LOT MORE TIME IN WORK CLOTHES THAN WE DO IN DRESS CLOTHES. IMPROPER WORK CLOTHING CAN BE A SOURCE OF DANGER, SO THE WAY WE DRESS FOR WORK DESERVES ADDED CONSIDERATION.

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No : 23

FULL BODY HARNESS - LIFELINES

Purpose of discussion:
TO IMPRESS UPON ALL EMPLOYEES THE WHENS, WHERES AND WHYS OF FALL PROTECTION.

If all those hard working guys that were killed or seriously injured by falls last year could start that fatal day all over again would they be wearing a Full Body Harness?

Next time that you know you should, but are not wearing your safety belt, think about this — today, it could happen to you!

If you are working in high places buckle up and tie off. Remember this, by saving your own life, you might become your favorite hero.

Lifelines and lanyards must be anchored to a member which will support 5,400 pounds. The breaking strength must also be a minimum of 5,400 pounds. This means either a 3/4 inch manila or a 1/2 inch nylon rope. (Check manufacturer's specifications).

You must be tied off so that the maximum fall will be no greater than 6 feet.

Harnesses work best for confined areas such as tanks, shafts, manholes or places where it is possible to be buried by loose material or overcome by gas or fumes.

A harness permits lifting a person in a standing position — spreading the stress over their shoulders, back and waist.

CONCLUSION:
IF YOU'RE THE GUY THAT'S CLIMBING HIGH AND YOU CAN'T FLY, YOU BETTER TIE, SO YOU DON'T DIE.

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No : 24

FOOT PROTECTION

Purpose of Discussion:
TO REMIND OUR WORKMEN OF THE MANY DANGERS TO WHICH THEIR FEET ARE EXPOSED AND HOW TO AVOID THEM.

What are the most common causes of foot injuries?

1. **Heavy falling objects.** More than likely, these are objects that slip from our grasp rather than objects that fall from great heights.

2. **Crushing from rolling objects.** Such injuries may be caused by a rolling pipe or a motor vehicle, hand truck, Georgia buggy, etc.

3. **Laceration from edged tool.** Hazards may be such things as an axe, a power hand saw, a trowelling machine or a tamper.

4. **Burns.** Feet may be easily burned during welding or cutting by molten metal or hot objects.

5. **Electrical contact.** Our feet are generally our most direct connection between a point of electrical contact and the ground. This makes it dangerous to wear shoes that are wet or badly worn.

6. **Stepping on sharp objects.** Broken glass, nails, pieces of tie wire, sheet metal scraps, etc. are certain to cause puncture wounds unless housekeeping is continuous.

7. **Caustics and acids.** Getting cement in shoes or boots can cause bad chemical burns. Walking on such substances without proper footwear invites trouble.

8. **Sprained ankles.** These are mostly caused by stepping on uneven surfaces or on objects that were left in our paths.

9. **Slippery spots.** Obvious hazards are oil spills, water, ice, or mud. Less obvious but dangerous are such things as spray-on fireproofing residue, sand or fine gravel on a concrete floor, and welding rod ends.

10. **Excessive moisture.** Wet feet can cause all kinds of problems including colds or pneumonia with prolongs exposure.

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No : 25

WORK GLOVES

Purpose of Discussion:
TO EXPLAIN WHY WEARING GLOVES IS IMPORTANT, AND TO DESCRIBE THE VARIOUS TYPES OF WORK GLOVES USED BY YOUR EMPLOYEES.

I. How does our skin protect us?
   1. It acts as a protective envelope to keep germs from entering our body, and starting an infection.

II. What things can puncture or open up our skin?
   Slivers Metal shavings Wire or steel straps Burrs on metal
   Sharp glass Pipe threads Strong acids and lye Steel wool
   Damaged equipment Nails Rough material, (brick castings)

III. How do we protect our hands from these things?
   1. Wear proper gloves.
   2. Be careful how we handle objects.
   2. Watch for projections, both on objects and near our hands, when we move objects.

IV. Who can think of an example when wearing gloves saved him from an injury?
   Who can think of an accident what could have been prevented if the person was wearing gloves?
   Who can think of cases when gloves should not be worn? (Around moving machinery that could catch the glove.)

V. What types of gloves do we use on our jobs? Remember that correct gloves should be worn for each job. (Here is a general list; pick the one(s) that you use; show the actual glove.)
   1. Asbestos gloves should be used when there s sustained heat - to protect against burns as well as discomfort.
   2. Rubber gloves are worn by electricians and should be tested regularly for pinholes.
   3. Rubber, plastic, or synthetic rubber gloves for work with oils, grease, solvents, and concrete protect against burns, irritations, and dermatitis. Cleaning and concrete crews find them valuable.
   4. Leather work gloves are more durable. They resist sparks, moderate heat, chips, and rough objects, and provide some cushioning against blows. Generally speaking, they re heavy duty gloves. A welder requires a better type than the ordinary leather glove.
   5. Cotton or fabric gloves are suitable for protection against dirt, slivers, chafing, or abrasion. They aren't heavy enough for use with rough, sharp, or heavy material. Sometimes these lightweight gloves are worn over heavier gloves to keep them clean.
   6. Mittens are satisfactory where there s no need for finger action.
   7. Gauntlet-type gloves should be used where the wrists and forearms may be injured.

Foreman: Give one or two case histories of lost time due to hand injuries. Have sample gloves for display and tell the men where to get them. List the times and places on your project where you require their use.

SAMPLE

CONCLUSION:
WE WANT TO TAKE CARE OF YOUR HANDS. SO WEAR THE KIND OF GLOVES WHICH WILL PROTECT YOU FROM THE HAZARDS ON YOUR JOB, AND GET REPLACEMENTS WHEN THEY GET RAGGED OR DIRTY.

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No : 26

FIRST AID

Purpose of Discussion:
THIS IS NOT INTENDED AS A FIRST AID COURSE, BUT SIMPLY TO GIVE A FEW COMMON SENSE FUNDAMENTALS ABOUT WHAT TO DO IN CASE OF AN INJURY. THE FIRST RULE OF FIRST AID IS: IF YOU DO NOT KNOW HOW TO GIVE IT, DON'T TRY.

I. Where do you'report when you get a deep cut or painful burn or something in your eye?
   1. The first aid room. (Foremen: Give exact location and be sure everyone knows where to go, especially the new employees.)
   2. If you are hurt so that you cannot move, first aid will come to you. Do not try to move, because you may cause further injury.

II. What about small cuts, scratches, or burns?
   1. Do not try to treat them yourself.
   2. Any small injury where the skin is broken can admit germs and germs multiply fast — 4,000 times in 8 hours.
   3. Germs also travel fast. They can move from fingertip to shoulder in 8 to 10 minutes.
   4. Homemade treatments can do more harm than good.
   5. Tobacco juice or sucking the poison out actually adds germs to the wound. So can a dirty handkerchief.
   6. Pulling clothing away from a burn or rubbing your eye to get something out, can do additional damage.
   7. Let a trained first-aider take care of even the smallest wound so as to prevent possible infection.
   8. Punctures are the most dangerous of all small wounds because of the difficulty in cleaning the germs out.

III. Which injuries require the most urgent and immediate care?
   1. **Severe bleeding**. Direct pressure on the wound is the quickest and best method for an untrained person to stop the bleeding. Do not attempt a tourniquet.
   2. **Stoppage of breathing**. This happens in cases of drowning, electric shock, gas poisoning, suffocation, and head injuries. Breathing must be restored as quickly as possible by artificial respiration. If you do not know how to give artificial respiration, you should learn how as soon as possible through a Red Cross or Bureau of Mines first aid course.
   3. **Fractures**. Do not move the injured person unless he is in danger or further injury from a fire, wall collapse, poison gas, or some other imminent danger. You must prevent motion of the broken bones and adjacent joints, so even if you have to move the victim you should support the fracture to prevent further injury.

CONCLUSION:
TREAT ALL INJURIES WITH RESPECT BECAUSE THEY ARE ALL POTENTIALLY DANGEROUS.

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No : 27

DON'T NEGLECT CUTS

Purpose of Discussion:
TO LET ALL EMPLOYEES KNOW THAT IT IS A POLICY THAT ALL INJURIES NO MATTER HOW SMALL MUST BE REPORTED TO THEIR FOREMAN FOR CARE.

Infection is commonly spoken of a as «blood poisoning». It might interest us to know exactly what we mean by blood poisoning. The term itself indicates that it is a poisoning contributed directly to the blood.

There are two ways in which a poison can attack our bodies. It may be taken in through the mouth and enter the blood by way of our digestive organs, or it may enter directly into the blood stream through an abrasion or cut in the skin.

In any event, every poison works eventually through the blood and the poison of infections has been given the name blood poisoning because it works into the blood stream directly.

But what is blood poisoning? It is true that some poison such as arsenic or lead is sometimes injected into the blood through a bruise, cut or puncture.

But real blood poisoning is due, not to the injection of poison, but to the injection of an exceedingly dangerous living creature - a germ which is in all kinds of dust, in the air, and clinging to the surface of our skin, waiting for a chance to get into our blood.

The smallest scratch is large enough for it to enter, and in large bruises or deep cuts it comes in by the millions.

Now, if the cut is small and shallow, it is possible that washing with soap and water will carry away these deadly germs. If a good antiseptic is used, the germs will be killed. But if allowed to go unmolested, these germs, which are living creatures, will set up housekeeping in our blood, and from their hearthfires there are smoke and ashes.

It is the smoke and ash from their housekeeping that constitute the real poison, deadening the nerves, cluttering up the food passages in the tissues affected, and finally causing tissue to degenerate. Then an arm or a hand must be amputated to save a life.

The longer we let these little fellows go, the deeper will they get into the tissue and the more of them there will be. We cannot afford to give them a minute more than we positively must, in which to get started. Don't let microbes get into your blood stream through your own neglect! A cut neglected is a wound infected.

CONCLUSION:
GET FIRST AID TREATMENT IMMEDIATELY FOR ALL INJURIES.

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No : 28

WHAT ABOUT LITTLE INJURIES

Purpose of Discussion:
TO STRESS THE IMPORTANCE OF REPORTING ALL INJURIES NO MATTER HOW SMALL THEY MAY SEEM TO BE.

When we say Joe got hurt yesterday , we usually mean that something pretty serious happened to him. Maybe he broke a leg or sprained a wrist or got a cut that bled heavily. We don't usually think of a small cut or scratch or a blister, a bang on the shins or a bump on the head as an injury. If we get something in our eye, we don't think it's important unless it hurts badly or really damages the eyes.
In that thinking, we're half right - but we're also half wrong. The little injuries don't need to worry us, don't knock us off the job and into a hospital bed. They don't, that is, if we take the simple steps that are needed to keep the little injury from turning into something serious.

Back many years ago when Calvin Coolidge was president, his son got a blister on his foot - I think it was from playing tennis. It hurt a little, but he didn't think it was anything serious. He was half right - the blister was nothing to get scared of. But he was also half wrong - because he forgot that even a small hurt like that can become serious if it isn't handled right. So he didn't get proper treatment at first. That little blister got infected, and by the time he had it treated by a doctor, the infection had gone too far. That boy died.

There have been thousands of such cases - and for every such death there have been hundreds of other cases where a neglected wound caused very serious trouble, lost time from work, hospitalization or surgery, even though they did not kill.

It isn't just cuts and infections that are dangerous. Sometimes a guy gets a clout on the head that knocks him out or makes him dizzy. In a little while, he gets up and feels fine, figures he doesn't need a doctor. But sometimes there has been damage to the brain which needs repair, quick, and if the man doesn't go to get a checkup, his apparently small injury may kill him.

That happens on body injuries, too. There was a case recently of a football player who took a nasty body block in his midsection. He was yanked from the game, but he felt pretty good after a while and went home. He was dead before morning with a rupture spleen.

And, strange though it may seem, sometimes a person can even break bones without realizing that any serious damage has been done to them. They may neglect treatment, and then the docs have a tough time repairing the damage when they do get the case.

Those are just some of the reasons why we have the rule on this job: Report all injuries at once and get first aid treatment by trained first aid men, doctors or nurses.

That means all injuries - any cut, anything in the eye, any hard bump - particularly any shock in the head which makes you the least bit woozy or dizzy or knocks you out even for a second. That means sprains, wrenches and bruises.

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None of these things may be serious in themselves. But any one of them may start something that becomes serious through infection or neglect.

Chance are first aid will fix you up in a minute or two and tell you to go back to work. But don't gamble with your life and health by trying to play doctor yourself and deciding because you don't feel too bad you don't need any treatment.

One other point — unless you are trained in first aid and are authorized to handle cases, don't try to be an amateur doctor and treat others who are injured. You may do a lot more harm than good.

CONCLUSION
REPORT ALL INJURIES AT ONCE AND GET IMMEDIATE TREATMENT FROM THOSE QUALIFIED TO GIVE IT.

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No : 29

SAFE USE OF HAND TOOLS

Purpose of Discussion:
TO CALL ATTENTION TO THE PROPER USAGE OF HAND TOOLS AND TO EXHIBIT DEFECTIVE TOOLS AND WARN OUR MEN OF THEIR HAZARDS.

What is the basic rules for hand tool safety?

1. **Choose the right tool for the job. Never use a makeshift tool.**
   a. For example, do not try to loosen a stubborn nut by hammering on the wrench handle or using a piece of pipe as a wrench extension.
2. **Use only tools in good condition.**
   a. No tools with cracked or broken handles.
   b. Never use a tool without a handle.
   c. No mushroomed or broken heads.
      (1) Chips or spalls usually come off corners, so round off corners to prevent spalling.
      (2) Keep heads ground down to new metal, free of cracks and hard spots.
      (3) When grinding, avoid overheating, which burns out carbon and spoils the temper.
3. **Keep keen-edged blades sharps; store them safely when not in use.**
4. **Do not use a hammer with a hardened face on a highly tempered tool such as a drill or file. Chips may fly.**
5. **Use wrenches of the right size and type for the job.**
   a. Face the jaws of an adjustable wrench in the direction of the pull.
   b. Never use a wrench as a hammer.
   c. If possible, never push a wrench, always pull it and make sure that neither your hand nor the wrench handle is greasy or oily.
   d. Get a solid footing before you use a wrench so if it does slip, you won't be thrown off balance.
6. **Never apply a wrench to moving machinery; stop the machine, then remove all tools before starting it again.**
7. **Never use any tool in such a way that you will be injured if it breaks.**
8. **Be sure that the screwdriver you are about to use is adequate for the job.**
   a. See that it has a solid handle. Use an insulated handle if there is danger of shock.
   b. Check it for a straight shank and bit in good condition.
   c. Don't hold work in one hand and your screwdriver in the other.
   d. Don't hammer with or on a screwdriver.
9. **Store and carry tools safely. Keep tool boxes under-filled rather than over crowded. Cutting edges will not last long in a crowded box.**

(Foremen: For this talk, you should gather, in advance, some defective tools and ask your crew members to tell what kind of injuries can result from their use.)

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CONCLUSION

THE CONSTRUCTION INDUSTRY CALLS FOR THE USE OF MANY TYPES OF HAND TOOLS. HANDLE THEM WITH CARE; TREAT THEM CAREFULLY AND USE THEM EXACTLY FOR THE PURPOSE FOR WHICH THEY WERE MADE.

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No : 30

PORTABLE POWER TOOLS

Purpose of Discussion:
PORTABLE POWER TOOLS REQUIRE SKILL AND CARE TO INSURE A SAFE OPERATION. THIS TALK SHOULD EXAMINE THE HAZARDS OF POWER TOOLS AND WAYS TO AVOID INJURY.

I. What are the four major rules to follow for power tool safety?
   1. Select the power tool for the job.
   2. Be sure each tool is in good condition.
   3. Use it correctly.
   4. Put each tool away properly.

II What should be considered when you are sizing up a job and choosing the tool to use?
   1. Continuous work or extra tough jobs require higher capacity tools.
   2. After selecting the tool, check it over to make sure that:
      a. The trigger switch is not loose, and will stop automatically.
      b. The power cord has no breaks or cuts in the insulation.
      c. The plug provides a direct path to ground (third prong).
      d. The tool has no sparking brushes.
   3. If tools are to be used in the presence of flammable vapors or gases, make sure they are designed for such use.

III. What rules would you suggest for using portable electric power tools properly?
   1. Before plugging in a tool, be sure the switch lock is released. If the switch is on , it may cause the tool to travel.
   2. When using a heavy-duty, high-torque tool, brace yourself well or use slips. This is especially important if you are working from a ladder or in a high place.
   3. Always push in line with the drill to prevent bending and overloading, and to keep the drill under control.
   4. When using a drill to run attachments, always set the attachment properly and securely tighten the chuck, by inserting the gear key in each hole and taking a turn to equalize tension.
   5. Do not use an irregularly worn abrasive disc or wheel. It may cause the tool the wobble, pull off the work, and sometimes throw you of balance.
   6. Always wear goggles. When dust is stirred up, wear a respirator also.
   7. Keep guards in place. Portable saws have guards that are designed to operate freely in all cutting positions.
   8. Carry tools by their handles, never by the cord.

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No : 31

DEFECTIVE TOOLS

Purpose of Discussion:
TO INSTRUCT ALL EMPLOYEES TO NEVER USE DEFECTIVE TOOLS.

Our talk today concerns defective tools. There s an old time basic safety rule that covers this problem: don't use them. Simple, isn't it?

Defective tools are dangerous. Their use has resulted in many accidents, a lot of them serious and some of them fatal. Slipping wrenches have caused employees to fall from ladders or scaffolds. Loose handles on hammers and picks have resulted in serious head and body injuries. Far too many employees have lost eyes because they used chisels or drills with mushroomed heads. It could happen to you, but it wont if you follow the rule: don't use them.

I don't think we need to list all the defects you may run into with small hand tools. You're all familiar with them — those with split or cracked handles, and even crooked handles; mushroomed heads on chisels, drills, steel wedges; files without handles; worn-out jaws on wrenches; any many others. Let s just remember to check tools before we use them and to turn in all defective ones.

Powered tools, whether powered by electricity, air or gasoline require considerable skill and certainly complete attention on the part of the user even when they re in A-1 mechanical condition. When defective, these power tools can be killers. So, don't use them.

Although probably more accidents have occurred in the use of defective non-powered tools than in the use of hand operated power tools, injuries causes by the latter are usually more serious. Perhaps the most common defect with power operated tools is a broken, displaced or inoperative guard. Guards are placed on equipment to prevent injuries. Using tools with inoperative or broken guards can lead to disaster. A power saw with the guard wedged back is just as defective a machine as a power saw with a cracked blade. Either one is dangerous.

Electric power tools can have defective switches, poorly insulated cords, and most often, no provisions for grounding. Air powered tools and equipment show up on the job with valves that will not completely open or closer. On gasoline engine equipment, probably the most common defect is an out-of-order throttle.

A concrete finisher was using a gasoline engine finishing machine on the surface of a floor slab. The engine was controlled by a hand throttle on the handle of the machine. The operator knew that this hand throttle was out of order and would not effectively control or shut of the engine. He had known about the throttle before the concrete floor was started and should have reported the situation to his foreman. But he took a chance, and here s was happened.

SAMPLE REFERENCE SITE SPECIFIC

The machine got out of control and jumped off the slab into an adjacent sand bay where the three revolving blades continued spinning in the sand. The operator grabbed the handle and worked the throttle. It wouldn't shut off the engine. So he leaned over the machine to reach for the carburetor, and his abdomen came in contact with the 4 inch knob in the middle of the handle. The machine revolved once, kicking him in the abdomen three times and knocking him unconscious. He was taken to the hospital with intestinal punctures and died before an operation could be performed.

CONCLUSION:
IN ORDER TO HAVE NO ACCIDENTS CAUSED BY DEFECTIVE TOOLS ON THE JOB, LET'S ALL REMEMBER THESE THREE POINTS:

1. **DOUBLE CHECK ALL TOOLS BEFORE YOU USE THEM.**
2. **TURN IN ALL DEFECTIVE TOOLS RIGHT AWAY.**
3. **NEVER USE A DEFECTIVE TOOL.**

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No : 32

COMMON SENSE IN A MOTOR VEHICLE

Purpose of Discussion:
TO EMPHASIZE THE MOST IMPORTANT FUNDAMENTALS OF DRIVING - NOT ONLY COMPANY VEHICLES AT WORK, BUT ALSO PRIVATE CARS FOR PERSONAL USE, SINCE MOTOR VEHICLE ACCIDENTS TAKE A TERRIBLE TOLL IN LIVES AND PRODUCTIVITY EACH YEAR.

I. What are some of the effects of motor vehicle accidents in this country?
   1. Recent figures show 55,800 persons killed in one year.
   2. Over 2,000,000 persons suffered disabling injuries in the same year.
   3. Motor vehicle accidents cost over $20 billion per year. Included in that figure is $6.6 billion lost by workmen in wages alone.

II. The cause of most vehicle accidents belongs to one of three categories. What are they?
   1. Driving and road conditions
   2. Vehicle condition.
   3. Driver attitude and performance.

III. What road conditions contribute to numerous accidents?
   1. **Inner-city conditions**. Here we have narrow streets, business congestion, morning and evening rush hours, a great number of pedestrians, noise, confusion, and lights, signs, and distractions of all kinds.
   2. **Rural roads**. Roads that are not always in good repair, cars coming out of small side roads, farm equipment and animals are all hazards to driving in rural areas particularly at night.
   3. **Wet pavement**. A combination of water and oil residue cause slippery conditions. At high speed in heavy rain, your car's front tires can actually leave the pavement and ride on water. Extreme caution is required, especially since visibility is poor in wet weather.

IV. Most accidents are caused by either human error or equipment failure. What can you do to help insure the dependability of your vehicle?
   1. Check it over pretty good at the beginning of each shift. Pay particular attention to brakes and steering mechanism.
   2. Also check out your tires, horn, lights, wipers, coupling devices, and fire extinguisher.
   3. Be sure that a regular schedule of preventive maintenance is followed.

V. Why is driver attitude so important?
   1. Motor vehicles seldom cause accidents or injuries by themselves. Generally the blame can be placed on one of the following drivers:
      a. **Hot tempered drivers.** They take offense at every little thing - have to get revenge.
      b. **Know-it-all drivers.** They pay little attention to traffic rules.
      c. **Show-off drivers.** These are the ones who take unnecessary risks to attract attention and are very dangerous. They are emotionally insecure.
      d. **Careless drivers.** The ones who do not realize that safety behind the wheel is a full time job.

SAMPLE
NOT REVIEWED TO BE SITE SPECIFIC

e. **Inconsiderate drivers.** No one else seems to have any rights on the road.
f. **Drinking drivers.** They are the worst hazards on the roads. The chances of a drunk driver causing an accident are 25 times greater than those of a sober driver.

CONCLUSION:
DRIVERS HAVE A SERIOUS RESPONSIBILITY FOR THEY HAVE DIRECT CONTROL OVER PROPERTY AND THE LIVES OF OTHERS AS WELL AS THEIR OWN. THEY MUST NOT ONLY MANAGE THEIR OWN VEHICLE, BUT BE PREPARED FOR ANYTHING THAT OTHER DRIVERS MAY DO.

SAMPLE
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United States of America

No : 33

HEAVY EQUIPMENT

Purpose of Discussion:
TO ACQUAINT OUR WORKMEN WITH THE BASIC RULES OF SAFETY IN THE OPERATION OF HEAVY EQUIPMENT SO THAT EVERYONE CAN COOPERATE WITH THE OPERATORS TO A GREATER EXTENT.

I. What are some of the fundamental rules for heavy equipment safety? (Foremen: Get your men to volunteer any rules that they can think of, then ask them why they believe as they do. The rules then become a personal commitment.)
   1. Keep the machines away from power lines, particularly where booms are used around overhead lines.
   2. If a boom should come in contact with overhead lines.
      a. The operator should stay on the machine until the boom is cleared or the current is cut off.
      b. Everyone on the ground should stay away from the machine.
      c. If the operator has to leave the machine, he should jump, not step of.
   3. Everyone should stay from under the boom or the load while hoisting, lowering, crawling, or turning. Use tag lines for guiding long material.
   4. The operator should never:
      a. Swing a load over ground crew.
      b. Swing over a truck until the driver has left the cab.
      c. Overload buckets or booms.
      d. Back up without being sure that everybody is in the clear.
   5. Be sure that all slings, ties, and hooks are properly placed and secured before hoisting.
   6. Keep hands clear to cables feeding in on drums or sheaves.
   7. Never try to get on or off a machine while it is in motion. Only the operator is allowed to ride any part of any machine at any time.
   8. Never clean or oil a machine while any part is in motion.
   9. Cables and clamps should be inspected daily by a competent person.
   10. The operator shall shut off power and lock all controls before leaving the cab.
   11. The operator is instructed to take signals from only one person. This applies to both hand signals and telephone signals.
   12. Avoid working too close to an excavation or undercutting a bank.
   13. The operator should be sure all controls are in a neutral position when shutting the machine down.
   14. The machine should always be kept in good condition, especially the controls and brakes.
   15. Keep the steps and surfaces free of oil and grease.

CONCLUSION:
EVEN THOUGH THIS IS A BRIEF LIST OF RULES, IT 'SHOULD SERVE AS A REMINDER THAT HEAVY EQUIPMENT TAKES THE LIVES OF MANY CONSTRUCTION EMPLOYEES EACH YEAR. EQUIPMENT MUST BE TREATED WITH RESPECT.

SAMPLE
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No : 34

COMMON SENSE CONCRETE SAFETY

Purpose of Discussion:
TO STIMULATE INTEREST IN THE PREVENTION OF INJURIES WHILE FORMING, PLACING, AND FINISHING CONCRETE.

I. Is personal protection necessary in concrete work?
   1. Personal protection in the form of shirts, gloves, and boots is required because prolonged exposure of the skin to either wet concrete or dry cement can cause painful chemical burns.
   2. Men involved directly in sandblasting concrete must wear a respirator with a source of air supply and a hood.
   3. Concrete finishers who are chipping, wire brushing or using power impact or rotary tools should wear safety goggles or face shields.

II. What about working around reinforcing steel?
   1. Safety belts properly secured shall be worn by any workman who is working from the steel structure without the benefit of a scaffold.
   2. No workman is to be allowed to work over vertically protruding rods unless they have been covered to prevent the possibility of impalement.
   3. Watch out for bundles of reinforcing steel rods that have been improperly rigged for moving. Always use a two part sling — never a single choker.
   4. To prevent dangerous recoiling of a roll of wire mesh, be sure the ends are securely fastened down.

III. What are some of the safety items to remember in using tools and equipment in concrete work?
   1. Bull floats. These should have handles that are nonconductive. They should be made of fiberglass, wood, or have a rubber sheath.
   2. Powered trowels. If these machines are manually guided, they shall have a switch that automatically shuts off the power when the operator removes his hands from the handle.
   3. Concrete buggies. Sometimes called Georgia buggies. It is important that the handles do not extend beyond the wheels on either side. This is necessary to protect the knuckles when dumping the concrete.
   4. Concrete buckets. Where buckets have hydraulic or pneumatic operated gates, they shall have a positive safety latch to prevent premature or accidental dumping.

IV. What are some of the important rules to follow in the actual placement of concrete?
   1. Check the formwork. It must be strong enough, supported, braced, and checked during the pour to prevent distortion or failure.
   2. When the crane operator cannot see the spot where to place the concrete, an experienced signalman shall be used.
   3. It is absolutely forbidden for anyone to ride on the bucket for any reason. Also, workmen should stay away from under the bucket at all times.

SAMPLE
FORMAT TO BE SITE SPECIFIC

4. Concrete trucks shall be equipped with backup alarms or shall have a competent signalman when backing up. Also, if parked on a slope, the wheels shall be chocked and the brakes set.

CONCLUSION:
There are many ways that an employee can be injured before concrete is ready to use. The ones who recognize the hazards are the ones who can prevent the accident.

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No : 35

SAFE USE OF ELECTRICITY

Purpose of Discussion:
UNDER CONTROL, ELECTRICITY IS A GREAT SERVANT. WHEN MISUSED OR TREATED CARELESSLY, IT CAN KILL. THIS DISCUSSION SHOULD ESTABLISH SOME IMPORTANT RULE FOR ELECTRICAL USAGE.

I. What are the basic rules for the average workman (not an electrician) to remember?
   1. Assume that all electric wires are hot or energized. If your body comes in contact with any current, even low voltage, it could be serious.
   2. When work is being done on a circuit, It'should be deactivated and a danger tag put on the switch. Never remove a tag or touch the switch.
   3. Check extension cords for burned spots, bare wires, brittle, cracked, or frayed insulation. Turn in defective cords immediately. Do not try to repair them yourself.
   4. Do not hang extension cords over sharp objects and do not hang objects on a cord. They are for light and power only.
   5. Do not allow traffic to travel over electric cords and do not pile objects or materials on them. This is not only dangerous but shortens the useful life of the cord.
   6. Do not overload circuits either here or at home. Even if you get by with it, you are doing permanent damage to the insulation and trouble will eventually result.
   7. Do not bridge a fuse; this is inviting certain disaster. If a fuse is needed or repairs are necessary, call an electrician.
   8. Do not use or fool with electrical equipment while your hands are wet or bleeding. Also avoid standing in water or on a wet surface.
   9. Report any unusual conditions such as sparking, smoking, or odors from electrical equipment.
   10. Report to First Aid promptly if you sustain a shock or burn. Electrical burns should be treated immediately as they are sometimes quite deep, heal slowly, and there is a high probability of infection.
   11. The slightest tingle from electric tools should be reported and the tool removed from service. That tingle means the insulation is breaking down somewhere and it could result in a fatal shock next time.
   12. The switch panels that have been installed by electricians are not to be touched or adjusted in any way by anyone other than the electrician. These switches are on or off for a purpose and if tampered with, could mean the electrocution of a fellow workman.
   13. Never use water on an electrical fire; use carbon dioxide or dry chemical.

SAMPLE NOT REVISED TO SITE SPECIFIC

CONCLUSION:
ELECTRICITY MUST NEVER BE TAKEN FOR GRANTED. IT DESERVES ALL THE RESPECT YOU CAN GIVE IT. LEARN TO UNDERSTAND IT AND USE IT CAUTIOUSLY.

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No : 36

110 VOLT ELECTRICITY

Purpose of Discussion:
TO CREATE A HEALTHY RESPECT FOR 110 VOLTS; TO TELL WHERE THE DANGERS ARE AND HOW TO AVOID THEM.

I. Why is 110 volts dangerous?
   1. We are so accustomed to using 110 volt power without incident that we forget the hazards that exist.
   2. Although we may occasionally get a slight jolt or tingle and think nothing of it, the same jolt under different circumstances could be fatal.
   3. At any time when your hands become sweaty, your socks or shoes become moist, or you move onto an area that is damp, you greatly increase the danger of serious shock or burn.
   4. One of the laws of electricity is that it always tries to reach ground by the easiest path, the path of least resistance . If the outer meter shell of a tool becomes charged with electricity, the person using the tool sets up a direct path through his own body for the electricity in the tool to reach the ground.
      (Ground can be the earth or pipes or steel structure that runs to the earth.) In that way, he can get a severe electrical shock, even a fatal one.

II. What are some of the ways to avoid electrical shock?
   1. Never attempt to make electrical repairs of any kind out on the job. You may plug in equipment, throw switches, and maybe change a light bulb but that is all.
   2. Before working with electrical equipment, make sure your hands and feet are dry. If you have to work on a damp or wet surface, wear rubber boots or stand on dry boards.
   3. Before you plug in an extension cord, a drop light, or a piece of electrical equipment, look it over closely. Examine the plug to see that the wires are not frayed where they enter it. Run your hand along the cord and look for sharp kinks and ragged insulation.
   4. Make sure the tool is integrally grounded before plugging it in. Never use a plug with only two prongs.
   5. As soon as the cord is plugged in, see that it will be protected while it is in use. If a cord has to run across an aisle, string it overhead if you can. If it must run along the floor, protect It'so it cannot be run over or jerked loose or become a tripping hazard.
   6. If anything goes wrong with a piece of electrical equipment while you are using it or if you get a shock, turn off the power and report the trouble immediately.

III. Foremen: Relate a case history to your men or have one of them relate something from his experience. Case histories have a much greater influence than statistics and rules.

CONCLUSION:
A 110-VOLT LINE CAN BE A KILLER. AN ESTIMATED 650 OF THE 1,000 ELECTRICAL DEATHS EACH YEAR ARE CAUSED BY THE COMMON 110-VOLT ELECTRICITY.

SAMPLE SITE SPECIFIC SAFETY PLAN

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No : 37

BACK INJURIES

Propose of Discussion:
TO STRESS THE IMPORTANCE OF PROPER LIFTING.

Back injuries cost you money through lost time and medical expenses.
Injuries to the back can be very painful, and once injured, you're much more likely to hurt it again.
The best way to avoid back injuries is to use your head and follow these tips:

Think before you lift!

1. Size up the load — if It's too heavy, or too awkward, get help — more manpower or mechanical equipment is usually available.
2. Never reach and lift.
3. Be careful not to twist and bend at the same time.
4. Don't try a sudden jerk or quick lift.

Learn to lift the correct way!

1. Place your feet about shoulder width apart, conveniently close to the object you're lifting.
2. Bend your knees and keep your back straight.
3. Get a good grip on the object.
4. Lift gradually by straightening your legs, letting your leg and thigh muscles bear the load.
5. When putting a load down, reverse the procedure.

CONCLUSION:
THE BACK YOU SAVE WILL BE YOUR OWN!

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No : 38

LIFTING

Purpose of Discussion :
TO TELL THE IMPORTANCE OF CORRECT LIFTING PROCEDURE, AND TO INSTRUCT EMPLOYEES IN IT.

I. What are the four types of injuries we can give ourselves by lifting a heavy object incorrectly?
   1. We can strain our back
   2. We can get a hernia.
   3. We can drop the object on our feet; and
   4. We can damage our hands.

   These are not only painful, but can hae serious and lasting consequences.

II. When you have a lifting job to do, how should you be prepared?
   1. If you handle items that have rough or sharp edges, you should wear the proper gloves.
   2. Know the safe way to lift.

III. What is the safe way to lift?
   1. Consider the size,weight, and shape of the object to be carried. Do not lift more than you can handle comfortably. If necessary, get help.
   2. Have a good footing. Set feet solidly, one foot slightly ahead of the other for more effectiveness. Feet should be far enough apart to give good balance and stability.
   3. Get close to the load. Bend legs about 90 degrees at the knees. Crouch, do not squat, as it takes about twice the effort to get up from a squat.
   4. Get a good, firm grip, keep this grip while lifting and carrying. Before changing your grip, set the object down.
   5. Keep your back straight. It may be far from vertical, but It'should not be arched. Bend at your hips, not the middle of your back. Take a deep breath and hold it until you have the load up in a good comfortable position.
   6. To lift, straighten your legs and at the same time, bring your back to a vertical position. Do not twist your body when lifting, carrying, or setting and object down.
   7. Never carry a load you cannot see over or around. Make sure your path is clear, hands, and fingers are in the clear.

IV. Foremen: Have several objects of different sizes and shapes at your meeting for lifting purposes. Have volunteers demonstrate the correct way to lift. Get as much participation as possible. Point our some of the specific lifting hazards on the project:

CONCLUSION:
BEING PROPERLY PROTECTED, USING THE SAFE WAY TO LIFT, AND KEEPING ALERT SO YOU DON'T TRIP OVER THINGS OR SQUEEZE YOUR HANDS, WILL HELP YOU LIFT AND CARRY A HEAVY OR BULKY OBJECT SAFELY.

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No : 39

HANDLING MATERIALS SAFELY

Purpose of Discussion:
SINCE 25% OF ALL DISABLING INJURIES OCCUR AS A RESULT OF MATERIAL HANDLING, WE NEED TO LOOK AT SOME CAUSES AND WAYS TO PREVENT SUCH INJURIES.

I. What are the three predominant ways of handling material?
   1. Manually. This is the physical lifting, carrying, stacking, etc. without mechanical assistance.
   2. Using non-powered tools. Some of the tools that we use are: chainfalls, come-alongs, wheelbarrows, shovels, buckets, rollers, jacks, chutes, handtrucks, and crowbars.
   3. Powered equipment. This would include most heavy equipment such as cranes and pans as well as material hoists, fork lifts, trucks of all sizes, and conveyors.

II. What injuries are most common in manual handling of material and what causes them?
   1. Cuts, bruises, splinters, mashed fingers and toes, fractures, and a variety of strains and sprains are most common.
   2. Back strain is one of the most difficult injuries to diagnose and treat. It is most often caused by improper lifting.
   3. Causes are such things as: slivers, jagged edges, burns, rough surfaces, slippery surfaces, pinch points, and carelessness.

III. What rules should be followed in manual material handling?
   1. Wear gloves and/or other personal protective equipment.
   2. If the item is too heavy or bulky, get help in handling it.
   3. On a lift that requires two or more, work together - have one man call signals.
   4. Use correct lifting methods.
   5. Keep a firm grip on material being moved.
   6. Look where you are going - watch your step.
   7. Before setting it down, be sure your fingers and toes are in the clear.

IV. What should be look for in determining the safety of non-powered material handling tools?
   1. Be sure wooden handles are smooth with no splinters or cracks.
   2. handles are firmly secured.
   3. Knuckle guards are in place, particularly on wheelbarrows.
   4. Foot brakes, where present, should work properly.
   5. Wheels are in good shape and turn freely.
   6. Parts should be replace before they become bacly worn.

V. What other hazards exist in material handling operations?
   1. Wire rope used in rigging and lifting may have broken strands or frayed ends. These not only weaken the rope, but may cause hand injuries.
   2. Banding iron is widely used to secure bundles, boxes, or to fasten materials to a pallet. When removed and left lying around, they may cause trips and falls, lacerations, and puncture wounds.

SAMPLE FOR REFERENCE ONLY SITE SPECIFIC

3. Unpacking of materials always results in an accumulation of combustibles. Such trash must be removed at once to reduce the fire hazard.

CONCLUSION:
ALTHOUGH THIS HAS BEEN A VERY BRIEF LOOK AT SOME OF OUR SAFETY PROBLEMS, IT'SHOULD HEIGHTEN OUR INTEREST IN PREVENTING INJURIES DUE TO MATERIAL HANDLING.

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No : 40

HOW TO LIFT

Purpose of Discussion:
TO TEACH ALL EMPLOYEES SAFE LIFTING PROCEDURES.

How many of you have been instructed on the proper method of lifting? Recently a considerable number of construction workers have reported to First Aid with back strains-many of which were the result of improper lifting. since there is a right way to do everything, let's make sure that each of you is instructed as to the right way of lifting. Back strain and hernia are likely to develop if we bend at the waist when we lean over to pick up a heavy or awkward object or piece of material. As we all know, such injuries are not only very painful, they often have serious and lasting consequences.

First, there's always the chance of something slipping and landing on your toes. Always make sure that they are protected by safety shoes. When lifting objects that have rough or sharp edges, make sure that you have a pair of good tough gloves. The safe way to lift, as you've heard dozens of times, is "bend the knees; keep the back straight". this is necessary because if you bend at your waist and lean over with your back horizontal the load is too far from the center of balance. All the strain is on the lower back muscles, which aren't built to take it. The result can be a sparined back or worse injury.
By "bending your knees", we don't mean to squat until you sit on your heels. You won't have any leg power to raise a load from that position. Your position at the start of the lift should be more of a crouch, so the power of your leg muscles can be exerted . When we say, "keep the back straight", we don't mean straight up like a flagpole for you'd be off balance. We mean reasonably straight, so the back muscles won't be doing all the work.

The most important rules to remember for safe lifting are these:

1. Wear gloves when handling rough equipment or material.
2. Be sure of a good grip and good footing.
3. Keep the load close to the body.
4. See that your fingers and toes are in the clear.
5. Bend your knees and use your leg muscles.
6. Don't twist your body while lifting.
7. Don't try to lift or carry a load that's beyond your physical ability-get help!

CONCLUSION:
THE BACK YOU SAVE WILL BE YOUR OWN

SAMPLE
FOR REVISED TO DEPT SPECIFIC

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No : 41

VALUABLE WINDOWS

Purpose of Discussion:
TO BRING EACH EMPLOYEE O A REALIZATION THAT THEIR EYES ARE NOT REPLACEABLE.

Doctors say that your eyes have some natural forms of protection.
They're fitted efficiently into sockets guarded by bone all around, for one thing. Then, too, eyelids blink faster than you think at a threat of danger.

Eyelashes try to flick dust and other tiny particles away from your eyes. Tears act as an automatic sprinkler system to help keep your eyes washed clear of troublesome substances.

It's nice to have these safeguards, but you can't depend on them for 100% protection.

For complete protection, you have to make use of safety glasses and goggles. You can use them to supplement your eyes' natural guarding devices.

Keep your valuable windows to the world working safely and efficiently!

CONCLUSION:
YOUR EYES ARE PRICELESS — PROTECT THEM!

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No : 42

THE BLIND MAN

Purpose of Discussion:
TO BRING EACH EMPLOYEE TO A REALIZATION THAT SEEING IS THE MOST IMPORTANT SENSE THAT MAN HAS.

Did you ever pass a blind man on the street? Did you ever wonder what his life is and what he thinks the world looks like? Does he know or remember the sights in a world which he no longer sees each day?

His memories are as empty as his tin cup. When it comes to sight, all he has left are memories. Perhaps he remembers an accident which robbed him of his sight - an accident which could have been prevented if he had only protected his eyes. Needless accidents rob people of sight every day.
Shut your eyes and shut them tight. Keep them closed for 10 seconds. What do you see? Nothing, and that is exactly what a blind man sees.

If you wore safety glasses all your life and they prevented an eye injury to your eyes just once, wouldn't the wearing of this equipment be worthwhile?

CONCLUSION:
INSIST ON AND WEAR YOUR EYE PORTECTION

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No : 43

EYES PROTECTION

Purpose of Discussion:
TO CREATE A GREATER RESPECT FOR OUR VISION AND TEACH HOW TO PROTECT OUR EYES.

I. What of the more common causes of eyes injuries?

1. **Flying objects getting in the eyes**. The following are some of the causes:
   a. Cleaning with compressed air - chips and dust flying at random.
   b. Using a pneumatic chipping hammer particles becoming dislodged into the air.
   c. Scraping and cleaning metal surfaces, particularly if they are rusty.
   d. Pouring concrete with the splashing that results.
   e. Mushroomed heads on chisels. The metal pieces break of with great force.
   f. Nails that fly when they are not hit squarely on the head.
   g. Windy weather with excessive dust and other particles in the air.
   h. Grinding. Sparks and metal fragments are a constant hazard plus the possibility of the grinding wheel breaking.
2. **Fumes and gases such as:**
   a. Fumes from the kettle which melts tar for roofing operations.
   b. Fumes from many welding operations.
   c. Numerous other chemical used in construction can cause eye damage by direct contact or the fumes can cause irritation.
3. **Exposure to welding**. Serious eye damage can result from the ultra-violet and infrared radiation from welding when the naked eye is exposed to it without protection.

II. What are the major types of eye protection devices?

1. **Clear goggles**. These come in numerous forms but they should be comfortable, close-fitting, and well ventilated. Frequent washing with soap and warm water is recommended for good visibility. They are easily scratched, so a little extra effort in handling them will prolong their usefulness.
2. **Welding goggles**. These have tinted lenses. They may be the eye cup type or the type that cover spectacles.
3. **Safety spectacles**. The lenses are hardened glass and generally have plastic side-shields. They may have tinted or clear glass.
4. **Face shield**. This is not as convenient as goggles but covers and protects the entire face, both front and sides.
5. **Welding helmet**. Provides maximum protection during welding.

III. What should be done in case of an eye injury or irritation?

1. Do not try to take care of it yourself. Refrain from rubbing the eye as you may cause additional damage.
2. Seek first aid immediately and you will be referred to professional treatment, if necessary.

CONCLUSION:
Eyes are too valuable to be subjected to undue hazards. Protect them whenever possible. It is hard to look at the bright side of life through a glass eye.

SAMPLE TO BE REVIEWED FOR SITE SPECIFIC

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No : 44

GOGGLES VS. EYE INJURIES

Purpose of Discussion:
TO BRING EACH EMPLOYEE TO A REALIZATION THAT THEIR EYES ARE NOT REPLACEABLE.

Eyes protection devices have been used in the construction industry since 1910. Many of you know of men who have been spared injury or even blindness because they wore their goggles at the right time.
Sometimes a flying particle will strike with the force of bullet. To protect the eyes from such particles and corrosive vapors and liquids, various devices are used. Depending on the job, you wear goggles, an eye shield, a face mask or spectacle-type safety glasses. There is eye protection that will suit every type of eposure. Safety goggles and glasses can take a terrific blow. Your eyes can't. People who wear spectacles with corrective lenses may need goggles which can be worn over them for protection against damage or breakage. This "covers all protection" can be oversize cup-type goggles or an eye shield.

Believe me, eye protection on this job is necessary for a good reason. If you don't use it, you could, within the next few months, lose an eye on the work right around here. In fact, it could happen within the next few minutes after you return to work if you don't protect your eyes.

There are many operations on construction projects where it is mandatory for workers to wear eye protection. I am going to read a partial list of these:
Chipping, sledging and hammering on metal, stone and concrete
Use of manual, pneumatic or powder-actuated impact tools
Caulking, brushing and grinding
Drilling, scaling and scraping
Babbitting, soldering and casting of hot metals
Handling of hot tar, oils and liquids and molten substances
Handling of acids, caustics and creosoted materials
Gas welding, cutting and brazing
Electric arc welding and cutting, and other opreations which subject the eyes to flying particles, dust, hot liquids, molen substances, gases, fumes and liquids

It's important to recognize eye hazards and anticipate where they may be present. In addition to the eye dangers I just mentioned, there are many others that shouldn't be overlooked. For instance, when drilling overhead or when excessive dust is present, suitable goggle will give helpful protection.

Some men object to goggles because they fog up. Fogging does occur because sweat vaporizes, and since it can't get out, coasts the inside of the lens. If you sweat a lot, wear a handkerchief or sweatband around your forehead to keep perspiration off your goggles. Use anti-fog liquid when necessary.

SAMPLE TO BE USED TO ESTABLISH SPECIFIC

Men have said that goggles are uncomfortable. Usually the fact is they just don't fit. Good fit is important. Whenever your goggles annoy you just remember that you can't see with a glass eye, so arrange to make them comfortable. Compensation of any amount certainly won't take the place of eyesight. It'should be easy to decide which you'd rather do-take the risk or take a minute to put your goggles on, before you do a job that requires eye protection. Like many other personal safety devices, large quantities of goggles are produced each year. But, like other safety devices, we don't always keep them handy or use them when we should. There will always be goggles but we are on our last pair of eye.

CONCLUSION:
LET'S BE SMART; LET'S USE EYE PROTECTION WHEN EYE HAZARDS ARE PRESENT.

SAMPLE
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No : 45

HOUSEKEEPING

Purpose of Discussion:
THE LAW REQUIRES THAT OUR WORKPLACES BE FREE OF RECOGNIZED HAZARDS. DISCUSS THE ADVANTAGES OF GOOD HOUSEKEEPING AND HOW TO ACHIEVE A CLEAN JOB SITE.

I. What are some of the advantage of good housekeeping?
1. It eliminates many of the tripping hazards that cause a large portion of our accident.
2. It makes fire prevention easier when we get rid of combustible materials such as paper, scraps of wood, etc.
3. It is easier to work with materials that are neatly stacked.
4. Work goes more smoothly when work areas and stairways are kept clear and free of debris and materials lying around at random.
5. Morale is higher because everyone prefers to work in an atmosphere of cleanliness and order. Poor workmanship, poor attitudes, and poor housekeeping go hand in hand.

II. What can we do to maintain a cleaner job?
1. Have plenty of trash barrels strategically placed near eating areas and next to water coolers where paper cups are used.
2. Have regular pick-up routine for trash barrels, particularly those near eating areas.
3. Insist that subcontractors remove all trash which they cause before large amounts accumulate.
4. Establish a routine for stacking form materials as soon as they are stripped instead of just throwing them aside as so often happens.
5. Materials of all kinds must be stacked properly.
6. Saw sheds are particularly hard to keep clean because scraps and sawdust accumulate very quickly. Clean-up should be a continuous effort.
7. Stairways should receive special attention and no hoses, cables, electric cords or tools should remain on the stairs at any time.
8. Oil and grease spills must be cleaned up immediately as they are the frequent causes of slips and falls.

III. Foremen: These are but a few of the many ways to make the job site more attractive and safer. Your crew can offer manymore specific ideas. Give an example of bad housekeeping and ask your men what type of injuries might result.

CONCLUSION:
NONE OF US LIKE TO WORK IN A DIRTY, CLUTTERED PLACE SO WE SHOULD ALL DO OUR PART AS INDIVIDUALS TO MAINTAIN THE TYPE OF JOB SITE THAT WE CAN BE PROUD OF.

SAMPLE TO BE REVISED TO BE SITE SPECIFIC

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No : 46

"ON THE LEVEL"

Purpose of Discussion:
TO STRESS THE IMPORTANCE OF GOOD HOUSEKEEPING IN ORDER TO PREVENT ACCIDENTS.

Next to traffic accidents, more people are killed by falls than by any other kind of accident. You don't have to fall off of something to get hurt. In fact, more people are hurt falling on the same level than falling from high places, mostly because somebody didn't think to follow these precautions:

1. Wiping up spilled liquids such as water, oil, grease and coffee.
2. Clearing cluttered aisles of tripping hazards (tools on the floor, electrical cords, etc.)
3. Reporting or replacing uneven or worn floors.

These cause "on the level" accidents, so let's keep our eyes open and report all hazards at once to your safety supervisor.

CONCLUSION:
HELP KEEP YOUR WORK AREA SAFE AND CLEAN.

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No : 47

MATERIAL STORAGE

Purpose of Discussion:

TO SHOW THAT PROPER MATERIAL STORAGE IS A BIG CONTRIBUTOR TO SAFETY IN CONSTRUCTION AND THAT THERE IS NOTHING DIFFICULT ABOUT STORING MATERIALS — IT IS JUST A COMMON-SENSE ARRANGEMENT OF ALL ITEMS THAT GO INTO AN OPERATION.

I What are the two main requirements of efficient material storage?

1. Items must be piled and arranged so that they cannot fall over to damage themselves or cause accidents
2. They must be readily accessible and easily handled.

II. What are the most important points to remember when storing and handling the many items which we use here?

1. Give each pile a firm foundation. See that the floor or yard surface is even.
2. Use blocks or sills to keep items out of mud.
3. Do not pile materials beyond a safe height, as determined by:
   a. Safe load limit of the floor
   b. Type of material
   c. Strength of containers
   d. Fire protection requirements
4. Never store materials close to sources of heat.
5. Cross-tie (interlock) the pile if materials are of a shape to permit this. Use dunnage or interlocked timbers, when necessary, to keep a pile from shifting. Check barrels or other round objects that might roll.
6. Never obstruct the path of (and to) fire fighting equipment. Keep doorways clear.
7. Small items should be stored in boxes or bins, should be well identified, and should be out of the weather.
8. Refer to OSHA standards for maximum heights at which various materials can be stacked; for example, brick - 7 feet and lumber to be handled manually - 16 feet.

III. How about some tips on material handling?

1. Wear gloves to protect your hands and any other personal protection that may be necessary.
2. Move heavy materials with a crane, motorized handtruck, or forklift.
3. Be sur that slings, lines, chokers, chains, and all other rigging apparatus is properly secured. Stand clear of the load.
4. Handle all material in such a way as to protect yourself and your co-workers.

Foreman: For this discussion you should have a copy of the OSHA standards 1926.250-251 for referal in case of questions. The meeting should be held near some stored material which can be used as illustration. Actual case histories of injuries caused by improper material handling and storage may be used to good average as teaching aids.

CONCLUSION:

PROPER MATERIAL STORAGE IS SIMPLY GOOD HOUSEKEEPING. GOOD HOUSEKEEPING IS INDICATIVE OF AN ORDERLY, SMOOTH-RUNNING PROJECT.

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No : 48

FIRE PREVENTION

PURPOSE OF DISCUSSION:
TO DISTINGUISH BETWEEN DIFFERENT TYPES OF FIRES; TO KNOW WHAT TYPE OF EXTINGUISHER TO USE; AND TO KNOW THE PROCEDURE TO FOLLOW IN CASE OF FIRE.

I. What are the three major types of fires on construction projects?
   1. Class "A" fires. These consist of such things as rubbish, paper, rags, scrap lumber, etc. having glowing embers.
   2. Class "B" fires. These are flammable liquids, oils, grease, paint, fuels, etc.
   3. Class "C" fires. These are fires originating in electrical equipment.

II. Which extinguishers are recommended for these different types of fires?
   1. Class "A" fires require a cooling agent such as water or foam. You may use: a water hose or can, a pump type water can, a pressurized extinguisher, or a soda-acid extinguisher. Dry chemical and even carbon dioxide extinguishers are effective on small fires although they have very little cooling effect.
   2. The recommended extinguisher for class "B" fires are the carbon dioxide, the dry chemical, and the foam. Water is not effective because such fires require a smothering action for extinguishment. Also, to throw a stream of water on flaming oil or gas may splatter burning liquids over a wide area and possibly spread the fire out of control.
   3. Use only carbon dioxide or dry chemical on a class "C" for electrical fire. Never use a water extinguisher on live electrical equipment; you could be electrocuted by the current following the water stream to your body.

III. What are the steps to follow when a fire is discovered?
   1. Know what to do. Do not let a fire catch you not knowing where the nearest extinguisher or alarm is.
   2. If the fire is small and the proper methods are available, put the fire out.
   3. If it is too much to handle, sound the alarm. Do not underestimate a fire.
   4. Evacuate the area. If necessary, help unconscious, disabled or other persons in trouble.
   5. Stand by near the fire so you can meet and direct the fire fighters to the fire.
   6. You are responsible for preventing fires, but you are not obigated to fight major fires. As a general rule, do not join supervisor or fire fighter.

SAMPLE
REVIEWED TO BE SPECIFIC

CONCLUSION:
THE BEST WAY TO AVOID A DAMAGING FIRE IS TO PREVENT IT, BUT IF IT HAPPENS KNOW WHAT TO DO!

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No : 49

SAFETY IN ARC WELDING AND CUTTING

Purpose of Discussion:
SINCE ARC WELDING IS A COMMON PRACTICE ON MOST PROJECTS, IT IS IMPORTANT THAT EVERY WORKMAN UNDERSTAND THE HAZARDS INVOLVED AND WAYS TO AVOID WELDING AND CUTTING INJURIES.

I. What bodily protection should a welder use?
   1. Clothing should cover all of the body and be free of oil and grease. Woolen clothing is not as easy to ignite as cotton clothing and offers a little more protection from changes in temperature.
   2. Flame-resistant aprons, vests, leggings, capes, and gauntlet gloves should be worn as needed. They are generally made of leather or asbestos.
   3. Pockets and cuffs invite sparks. Collars and cuffs of shirts and jackets should be buttoned and pants cuffs turned up inside. Pockets should be eliminated or have buttoned flaps.
   4. High quality welding helmets are required. They should have the proper shade of welding lens and an adequate supply of cover lenses should be available.
   5. Safety goggles or spectacles with tinted lenses should be worn under the welding helmet.
   6. When welding or cutting lead, zinc, cadmium-coated, lead-bearing or other toxic materials and the fumes cannot be satisfactorily removed, persons in the area shall wear respiratory devices.

II. What are some of the basic safety procedures which welders should observe?
   1. See that sufficient ventilation is provided.
   2. The welder should be sure that his hood is in place before stricing an arc.
   3. Shields should be placed to protect others from the rays of the arc. Other workmen in the area should be warned to avoid looking at an arc with the naked eye.
   4. Before commencing a welding operation, the area should be inspected to see that there are no combustible materials close by. If there are, and it is impractical to remove them, they must be shielded or otherwise protected.
   5. On all welding operations, a fire extinguisher shall be on hand.
   6. Welding cable is subjected to severe abuse as it is dragged over work in progress and across sharp corners. Special cable with high quality insulation should be used. Frequent inspection should be made and defective cable replaced or properly repaired.
   7. A fire-resistant bucket or container should be provided for the disposal of electrode stubs. If they are thrown around loosely, they present a slipping hazard.
   8. Frames of all electric welding machines shall be grounded.
   9. Hot electrode holders must not be dipped in water for cooling purposes. The possibility of electric shock is too great.
   10. No welding should ever be done on a drum or container which formerly contained gasoline or some other flammable liquid unless it has been properly cleaned.

SAMPLE
NOT REQUIRED TO BE SITE SPECIFIC

CONCLUSION:
EVEN THOUGH WE ARE NOT ALL WELDERS, WE ALL NEED TO BE AWARE OF SAFE PRACTICES AS THEY RELATE TO WELDING. AWARENESS MEANS A SAFER PROJECT.

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No : 50

OIL AND OXYGEN AND EXPLOSIVE COMBINATION

Purpose of Discussion:
TO STRESS TO ALL EMPLOYEES THE DANGERS ASSOCIATED WITH OIL AND OXYGEN.

Recently on a project in Ohio, a boilermaker was changing an oxygen cyliner on his oxy-acetylene cutting outfit. He had removed the regulator from the empty cylinder and was preparing to connect a full cylinder of oxygen. He "cracked open" the valve of the oxygen cylinder to blow any dust out, as is proper. He then placed his gloved hand in front of the valve to check its pressure. At that point, his glove exploded in flames. The craftsman was treated for second degree burns of the hand and missed several days work.
This man, when questioned as to how he thought his glove ignited stated that "he thought maybe an ember remained in the material of his glove and provided the ignition source". That certainly sounds logical but the investigation proved this to be painfully false.
The real cause of his gloved hand bursting into flames was placing his OIL soaked gloves directly in the stream of oxygen being discharged from the new cylinder. 100% oxygen, when it comes into contact with oil or grease, causes rapid oxidation of the oil or grease allowing for self-ignition as described.
To protect against this problem, the following general rules shall be complied with:

1. **Don't lubricate or allow oils or grease to come into contact with oxygen fittings on regulators, hoses, etc.**

2. **Don't handle oxygen cylinders or fittings with oil or grease impregnated gloves or rags — the smallest amount of oil or grease can be enough to cause ignition.**

CONCLUSION:
REMEMBER — OIL AND OXYGEN DON'T MIX.

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No : 51

PREVENTION OF FALLS

Purpose of discussion
TO EXPLAIN A FEW OF THE FACTORS THAT CONTRIBUTE TO FALLS AND THEIR SERIOUS RESULTS.

I. What, in general, are the most frequent causes of falls on a construction project?
   1. Tripping over debris, tools, scraps, hoses, etc.
   2. Climbing on loose or poorly stacked material.
   3. Walking on slick surfaces.
   4. Wearing defective shoes or pant cuffs that are too long.
   5. Allowing open-sided floors and floor holes.
   6. Working on make-shift platforms.
   7. Running or jumping.

II. What are some of the more hazardous conditions which may cause falls?
   1. **Stairways**. running, carrying objects that block view of the steps, failure to use handrails, inattention, and poor lighting are but a few causes of falls. Take time to look where you step and use the handrail.
   2. **Ladders**. Select a ladder that suits the job. Be sure it is in good condition. Place it and secure it properly. Face the ladder and hold on when going up or down. Do not try to reach too far out when working. Stepladders should be long enough for you to stand on the second step below the top.
   3. **Scaffolds**. Never erect a weak or inadequate scaffold. Even if a scaffold is to be used only a short time, it should be solidly constructed according to OSHA standards with guardrails, midrails, and toe-boards.
   4. **Housekeeping**. A man whose footing is secure is not likely to fall. good housekeeping is essential to secure footing. Carelessly strewn nails, accumulations of wood, trash, grease, oil, etc. lead to certain falls.
   5. **Floor openings**. Floor openings must be covered. the hole should be covered securely with a cover big enough and rigid enough to prevent failure or displacement. It'should be marked with a warning sign and everyone reminded of its presence.

CONCLUSION:
FALLS ARE THE MOST FREQUENT CAUSES OF INJURIES IN THE CONSTRUCTION INDUSTRY. TO PREVENT FALLS, THE BEST SAFETY DEVICE IS A CAREFUL WORKER.

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No : 52

SLIPS AND FALLS

Purpose of Discussion:
TO EMPHASIZE THE SERIOUSNESS OF SLIPS AND FALLS, AND TO POINT UP SPECIFIC REMEDIES THAT CAN BE APPLIED TO PREVENT SLIPS AND FALLS.

I. Who can guess what type of accident causes more injuries than any other?
   1. Slips and falls, both at home and at work, injure and kill more people than any other except automobile accidents.
   2. About 60 people per day are killed by falls while auto accidents claim 145 lives per day.

II. What are the causes of most falls?
   1. Climbing around on stacked material. Such stacks are not meant to be climbed on - stay off.
   2. Carrying a load you cannot see over. You – and anyone you happen to bump into – can easily go down.
   3. Scrap materials and tools left lying around. Keep working areas as clear as possible. It doesn't take much to trip a man.
   4. Using a defective ladder, or using the wrong way. Make sure the ladder you use is in good shape and is long enough. Secure it, and hang onto it with both hands when you go up or down.
   5. Using boxes or other substitutes for ladders.
   6. Using unsafe scaffolds. OSHA is very clear on the requirements for safe scaffolds. Be sure the scaffolds you use is solid and safe to work on.
   7. Slippery places caused by spilled liquids, wet surfaces snow, ice, gravel, mud, loose stones, wet clay, etc., etc.
   8. Cluttered stairways and stairways that are poorly lighted.
   9. Open elevator shafts. Replace guardrails and barricades immediately and report all shafts that are unguarded.
   10 Running or jumping and horesplay. Walk—don't run, and act your age.
   11. Lifting while standing on an insecure surface. Make sure that your feet are firmly planted and not in danger of slipping before attempting to lift.
   12. Floor openings or holes. These must be guarded or covered according to OSHA regulations.
   13. Pant cuffs. They can trip you, especially when you are going down stairs.
   14. Defective shoes. Shoes that are falling apart or are not meant to be worn to work can cause both tripping and fatigue, both accident-makers.

III. Foreman: Ask your men to give you as many causes of falls as they can think of. Use the above list to help keep the discussion moving and to fill in for causes which they may not mention. List below some areas of possible falling hazards on your project.

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CONCLUSION:
TO PROTECT OURSELVES FROM FALLS LET'S WATCH WHERE WE WALK, WHERE WE CLIMB, AND WHERE WE CARRY MATERIALS. NEVER LEAVE A HAZARD THAT MAY CAUSE SOMEONE ELSE TO FALL.

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No : 53

COMPRESSED GAS CYLINDERS

Purpose of Discussion:
A FREQUENTLY OBSERVED VIOLATION OF SAFETY PROCEDURES IS MISUSE AND CARELESS ATTITUDE WHEN HANDLING COMPRESSED GAS CYLINDERS. BE SURE YOUR EMPLOYEES KNOW HOW TO HANDLE AND USE COMPRESSED GAS CYLINDERS SAFELY.

I. Safe ways to store compressed gas cylinders:
1. Accept only cylinders that have a valve protection cap.
2. Cylinders should always be stored on end on a smooth surface in well-ventilated areas. They should be chained or otherwise secured.
3. Different gases should be separated. Empty cylinders should be marked "empty" and stored apart from full cylinders.
4. Do not store cylinders of flammable gases near highly flammable substances.
5. Never store near heat sources. Cylinders are not designed for temperatures greater than 130°F. Never let sparks or molten metal fall on cylinders.

II. Safe ways to handle compressed gas cylinders:
1. Move cylinders by rounded-back truck. Chain in for security. Never use a magnetic crane or a sling.
2. For short distances, roll cylinder on bottom edge — never drag.
3. Never drop or bang cylinders together. Never use them as a roller for heavy equipment.
4. If a cylinder becomes caked with ice and snow, take it inside and thaw it gradually before opening it. Do not use a steam hose — the heat may melt the fusible plug.

III. Safe ways to use compressed gases:
1. Keep metal cap in place until ready to use a cylinder.
2. Use cylinder upright. Keep secure from being knocked over.
3. Make sure the threads of the regulator fit those of the cylinder. Do not force mis-mated connections.
4. Before installing the reducer, "crack" the cylinder valve for an instant to clear out any dust or dirt. NOTE: This does not apply to hydrogen.
5. Open cylinder valves slowly. Always use the pressure-reducing regulator. Use regulators only for gases for which they are meant.
6. Never use compressed oxygen as a substitute for compressed air.

IV. Safe ways for storing empty cylinders:
1. Mark empty cylinders "EMPTY". Close valve. Replace protection cap.
2. Never mix gases in a cylinder or use it for any purpose other than those intended by the supplier.
3. Always consider a cylinder to be full. Accidents have occured when containers under partial pressure were thought to be empty.

V. Foremen: Be sure to have cylinders, regulators, caps, hand truck with chain, etc., to illustrate your discussion material. List below the areas of the project where compressed gas is being used.

SAMPLE
TO BE REVISED TO BE SITE SPECIFIC

CONCLUSION:
BE SURE YOU KNOW WHAT'S IN THE CYLINDER BEFORE YOU USE IT, AND HANDLE ALL COMPRESSED GAS CYLINDERS WITH CARE, EVEN "EMPTY" ONES.

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No : 54

SCAFFOLD SAFETY

Purpose of Discussion:
A FALL FROM A SCAFFOLD INVARIABLY RESULTS IN A SERIOUS INJURY. WORKMEN MUST BE CONTINUALLY ON THE ALERT FOR DEFECTIVE SCAFFOLDS AND IMPROPER USE.

I. What are some of the basic, common-sense things to remember about scaffolds?
   1. Five major kinds of mishaps may occur on and around scaffolds:
   a. A workman may fall while climbing up or down.
   b. He may fall from the working deck.
   c. An object may fall from a scaffold onto someone below.
   d. An object may fall from above onto a workman on the scaffold.
   e. Because of poor construction, the scaffold itself may tilt or even collapse causing injury.
   2. Height is not the only safety factor — short falls are also dangerous.
   3. When scaffolds and staging are properly designed and constructed and when workmen observe proper safety measure and maintenance, there are no greater hazards on scaffolds than in any other work area.
   4. There must be secure footing for uprights. This is especially important when they rest on earth, sand, mud, or other loose material.
   5. Top rails, mid rails, and toe boards all contribute to scaffold safety and are required by law on scaffols over 10 feet high.
   6. Toe boards are fastened to the inside of uprights, with metal tubular scaffold, the toe boards are nailed to the platform planks or bolted to the inside of the uprights.
   7. Nails used in constructing scaffolds should be of the proper size and a minimum of four per joint is recommended. Nails should be driven home — no double headed nails, please.
   8. Scaffold working platforms must be kept free of rubbish and of snow, ice, oil, or grease. Planks should be cleated on the bottom to prevent lateral displacement.
   9. Tools should not be left on scaffolds overnight, nor should there be stockpiling of materials on scaffolds.
   10. Never build an open fire upon or near a wooden scaffold or a metal scaffold with flammable components.
   11. Men working on a swinging scaffold or any scaffold where back rails are impractical, shall wear a safety belt with the lanyard properly fastened to an independent safety line.
   12. Overhead protection must be used where men on scaffolds ar exposed to the hazard of falling objects. Hard hats must be worn in all cases.
   13. All timber planking must be scaffold grade as recognized by approved grading rules. 2 x 4's, discarded form materials, etc., are unacceptable.
   14. Tubular scaffolds shall be tied to the building or structure at intervals not to exceed 30 feet horizontally and 26 feet vertically.

Foremen: Hold your tool box meeting near a scaffold where you can point out the important features of its construction. Encourage the men to add thoughts of their own to those listed above.

SAMPLE NOT REVISED TO SITE SPECIFIC

CONCLUSION:
MOST CONSTRUCTION WORKERS SPEND AT LEAST PART OF THEIR TIME ON SCAFFOLDS AND THAT TIME SHOULD BE SPENT FREE OF RECOGNIZED HAZARDS. ONLY THOSE WHO BUILD AND USE SCAFFOLDS CAN KEEP THEM SAFE.

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No : 55

LADDERS

Purpose of Discussion:
TO STRESS TO ALL EMPLOYEES THE PROPER USE OF LADDERS.

Be sure your ladder is resting on a firm, skid-proof base. When possible have a second person steady it.

Don't overreach while on a ladder. It's easier and safer to climb down and move the ladder over a few feet.

Face the ladder and grip firmly with both hands while climbing either up or down. Don't try to climb too fast.

Be sure ladder rungs and your shoes are free of mud, grease and oil.
Keep metal ladders away from wires and electrical connections to avoid possibility of electrical shock.

Be sure to use the right length ladder for the job.

Be sure the ladder is in safe condition.

CONCLUSION:
DON'T BET YOUR LIFE – STOP – THINK – BE SAFE!

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No : 56

WORKING ON AND AROUND SCAFFOLDS

Purpose of Discussion:
THIS IS NOT SO MUCH ON HOW TO BUILD SCAFFOLDS BUT HOW TO USE THEM FOR THE SAFETY OF ALL CONCERNED.

I. What are the two most common types of accidents involving scaffolds?
   1. A person falling from a scaffold.
   2. Objects falling from a scaffold onto people below.

II. What are some basic rules to follow in preventing falls from scaffolds?
   1. Inspect the scaffold you are going to work on before you use it.
   2. If you have to climb ladders to get onto the scaffold, you should watch your step and observe safe practices regarding use of ladders. Some ladders are vertical which increases the hazard of falling.
   3. Make sure that a portable access ladder extends at least 3 feet above the platform that It'serves. It'should be tied of at the top and a firm, level base is a must for both ladder and scaffold.
   4. Hold onto the siderail extension of the ladder when getting on and off the scaffold platform. Do not carry material up or down the ladder.
   5. Keep scaffolds free of waste material which can cause tripping or falling accidents.
   6. Be sure that top rails, mid rails, and toeboards are secure. Do not forget the ends of the scaffold-rails they are jsut as important as those in back of you.
   7. Never use a makeshift scaffold. This would include anything that you may throw together to get yourself up in the air to do that "short" job. For instance, using a good scaffold plank with poor supports such as brick, concrete blocks, boxes, etc. is inviting trouble. Never use a lean-to scaffold.
   8. Never jump from the scaffold to the ground.

III. How can we cut down the hazard of falling objects?
   1. Observe good housekeeping rules on work platforms-keep them free of debris.
   2. Make sure that toeboards are in place continuously along the scaffold to prevent material from rolling or being kicked of.
   3. Do not allow tools to lie loose on the platform.
   4. If there is anyone working above you, there should be overhead protection on your scaffold. This, plus your hard hat will protect you against falling objects.
   5. Never throw any tool or other object to another person. The chance that it might become a falling object is too serious to risk.

IV. Foreman: This is just a brief list of rules to follow and not a complete guide to scaffold safety. Have your crew contribute ideas and suggestions so that safety becomes their idea as well as yours.

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No : 57

PLYWOOD COVERS ON FLOOR OPENINGS

Purpose of Discussion:
TO STRESS THE PROPER METHOD OF PROTECTING FLOOR OPENINGS.

Safely covering a floor opening with a piece of plywood requires more than just laying the material over the hole or even nailing it down.

Total safety on the job means a total job of eliminating a hazard. Half a job... inadequate or incomplete jobs of covering hole hazards can result only in half, inadequate or incomplete accident prevention.
A recent accident illustrates the point. A carpenter on a floor above called down to a laborer to hand him a sheet of plywood. The laborer walked over to a sheet lying on the floor, picked it up, took a step or two forward in the act of standing the plywood up and he went sailing right down through a hole in the floor. Why did it happen?

Although originally nailed down with concrete nails, a small piece of plywood over the hole wasn't large enough to overlap it adequately. Traffic over it, springing the plywood, loosened the nails.
The plywood over the hole wasn't marked in any way, there was no warning of any kind on it. The man mistook it for a piece of loose material laying on the floor.

He wasn't told about it. he wasn't made aware of the fact that the covering of floor opening was a job procedure calculated to prevent accidents. Nor was he told that he must maintain and report such danger situation.

Anything less than total safety is no safety at all. The total safety attitude must be kept in mind when floor openings are being covered.

1. The hole should be covered securely with a cover bit enough and rigid enough to prevent failure. All covers must be secured against accidental displacement.
2. All floor opening covers shall be marked to identify the hazard. A highly visible "X" spray painted from corner to corner of the floor opening cover will properly identify all hazardous floor openings.
3. Every employee on the job should be made aware of the proper procedure for the covering of hazardous floor openings.
4. Frequent inspections are necessary to insure that floor openings remain properly covered and identified.

CONCLUSION:
DO IT THE SAFE WAY.

SAMPLE
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No : 58

PROTECTING THE PUBLIC

Purpose of Discussion:
TO CREATE AN AWARENESS OF THE RESPONSIBILITY THAT WE HAVE TO PROTECT THOSE OTHER THAN OURSELVES WHO HAPPEN TO BE ON OR NEAR OUR PROJECT.

I. Why should we be responsible for the well-being of non-employees?
1. By building on this site, we are creating hazards which did not exist before. People who have reason to be in this area are not accustomed to these conditions.
2. The general public is not always aware of the many hazards that are present on a construction site.
3. Over the years, construction projects have been legally designaed as "attractive hazards", thereby placing the responsibility on the contractor to protect the public.

II. What categories of people are our biggest problems?
1. **Elderly** - Older people are not as agile as they once were. Thet fall more easily and they fall hard. They are not alert to danger and definitely need protection.
2. **Children** - A construction project is more fun than a circus and a thousand times more dangerous. Signs and warnings are not effective. Children must be kept out.
3. **Sightseers** - Many times people will become overly curious while watching construction and venture into areas where their well-being is endangered. People should be provided a place to watch which is outside the perimeter of the project.

III. What are the most important precautions to take for the protection of the public?
1. On sites where pedestrians must walk by, a covered sidewalk must be furnished which has an even, non-skid surface and is lighted at night.
2. The perimeter of the project should be lighted at night for the protection of vehicles, guards, pedestrians or whoever may be near at night. Lights also help prevent theft.
3. Barricades are essential, particularly around excavations, trenches, holes or any surface condition that could cause a fall or other injury.
4. Where vehicles are frequently entering or leaving the site, a flagman should be used.
5. Plenty of signs should be used so there is no excuse for adults not knowing that hazards exist and that employees only are allowed in the work areas.
6. All power, except that which is absolutely necessary should be turned off after work and turned on again the next morning.
7. The project should be fenced as completely as possible and the fence inspected regularly to see that there are no breaks or holes under the fence. Neither wire, cable nor chain shall be used as gate protection.
8. Often members of the general public are injured or there is property damage because loose material has blown off the buildings. All materials must be secured to prevent this from happening.

CONCLUSION:
GUARDING THE PUBLIC AGAINST DAMAGES OR INJURIES IS ONE OF OUR MOST SERIOUS RESPONSIBILITIES. FAILURE TO DO SO COULD RESULT IN A GREAT LOSS OF OUR GOOD WILL OR EVEN OUR JOBS INSURANCE COST COULD INCREASE.

SAMPLE

DCM ERECTORS INC.
110 East 42nd Street Suite 1710 Phone: (212) 599 – 1603
New York, NY 10017 Fax: (212) 599 – 1615
United States of America

No : 59
EXCAVATION PROTECTION

Purpose of Discussion:
TO EMPHASIZE THE BASIC REQUIREMENTS FOR SAFE OPERATIONS IN AND AROUND EXCAVATING.

I. What should be done to protect the public and employees from the hazards of an excavation?
   1. Build sound, strong walkways, runways, ramps, steps, and barricades around the excavation as needed.
   2. Be sure that walkways, sidewalks, etc. are kept clear of excavated materials or other construction.
   3. All employees exposed to vehicular traffic will be issued, and must wear, warning vests made of reflectorized or other highly visible material.
   4. Everyone must stand in the clear while vehicle are being loaded with excavated material from end loaders, power shovels, etc.
   5. If a public sidewalk has been undermined by an adjacent excavation, It'shall be shored to support at least 125 pounds per square foot.
   6. Public walkways must be adequately lighted both for pedestrians and vehicular traffic.

II. What precautions must be overserved before beginning an excavation?
   1. Determine whether there are any underground installations which may be encountered such as sewer lines, telephone lines, water lines, gas lines or power lines.
      a. If there are any, lay out their exact location.
      b. Contact the utility companies involved and advise them of the proposed work.
   2. Surface hazards such as trees, boulders, or small structures must be removed before excavating is begun.

III. What are some of the more important aspects of safety to remember during excavation and while working in an excavation?
   1. The walls and faces of excavations must be guarded by a substantial shoring system or by sloping of the earth to the angle of repose. The extent of the sloping and shoring depends on a number of things such as.
      a. Depth of the excavation.
      b. Water content of the surrounding earth.
      c. Possible changes due to freezing, drying, or other environmental effects.
      d. Loading on the banks caused by structures or stored materials.
      e. Vibration from equipment blasting, traffic, etc.
   2. If the stability of adjoining buildings is threatened by an excavation, it is required that adequate shoring, bracing and underpinning be installed and inspected daily.
   3. All excavated material shall be kept back at least 2 feet from the edge of an excavation.
   4. Materials used for support systems must always be in good condition. This includes such items as sheeting, sheet piling, cribbing, pipe, steel beams and timbers.
   5. If mobile equipment is used near an excavation stop logs or barricades must be used to keep equipment from accidentally going into excavation.

CONCLUSION:

SAMPLE
TO BE REVISED FOR SITE SPECIFIC

THE ABOVE POINTS ARE JUST A FEW OF MANY THINGS THAT MUST BE REMEMBERED, BUT MOST IMPORTANT IS THE USE OF COMMON SENSE ALERTNESS, AND RESPECT FOR THE DANGERS IN EXCAVATION WORK.

SAMPLE
TO BE REVISED TO BE SITE SPECIFIC

DCM ERECTORS INC.
110 East 42nd Street Suite 1710 Phone: (212) 599 – 1603
New York, NY 10017 Fax: (212) 599 – 1615
United States of America

No : 60

HOT WEATHER SAFETY

Purpose of Discussion:
HOT WEATHER IS JUST AROUND THE CORNER. HERE ARE SOME THINGS THAT ARE WORTH KNOWING ABOUT HEAT-RELATED PROBLEMS.

Normally, the healthy body responds to excessive heating by sweating and dilating (enlargement) of the blood vessels of the skin. Both events can result in blood circulation problems. Loss of salt and water reduces blood volume and enlargement of blood vessels of the skin divert blood from other organs resulting in dizziness, and fainting. Loss of salt can result in muscle cramps. Some of us are more prone to heat-related problems — the very young, the elderly, and those with certain diseases such as diabetes, and hardening of the arteries. Those of you on a carbohydrate-free ketogenic diet are even more susceptible.
There are three medical problems that are related to heat. They are:

1. **Heat cramps** - painful muscle spasms usually following strenuous work.
2. **Heat exhaustion** - (heat prostration or collapse) the usual form is dizziness or fainting with profuse sweating frequently accompanied by nausea and tiredness. The person fainting soon recovers when the head is placed down and the feet up. Most important, the person continues to sweat.
3. **Heat stroke** - this is rare but extremely dangerous. There is a gross malfunction of the body's heat regulation system resulting in lack of sweating. Persons found in a state of collapse, with hot, red skin and not sweating during hot weather should immediately be doused with cold water or ice and transported immediately to a hospital emergency room for treatment.

Some of the things that we can do to reduce the possibility of heat exhaustion, heat cramps or heat stroke are:

1. Avoid wearing heavy clothing which will hold body heat and make it dificult for perspiration to evaporate.
2. Wearing too little clothing can expose us to sunburn or to the direct protects against falling objects, but also from the direct rays of the sun. Tests show the temperature under most hard hats is 10 degrees cooler than an unprotected head.
3. Wear light colored clothing which reflects sunlight rather than absorbs it.
4. Drink plenty of fluids.
5. Do not take salt tablets, instead you should increase your intake of salt by sprinkling more on your food. (Persons with hypertension), heart trouble or certain types of kidney disease should check with their physician in regards to this increase of salt. Salt tablets, while provided on many jobs for many years, have been found by physicians to create more problems for employees, when taken regularly and in excessive amounts. This, in the person who has undiagnosed hypertention, heart problems or kidney disease, can cause serious illness or even death.

SAMPLE
TO BE REVISED TO BE SITE SPECIFIC

DCM ERECTORS INC.
110 East 42nd Street Suite 1710 Phone: (212) 599 – 1603
New York, NY 10017 Fax: (212) 599 – 1615
United States of America

No : 61

FALL HAZARDS

Purpose of Discussion:
TO TELL ALL EMPLOYEES ABOUT FALL HAZARDS ON THIS JOBSITE.

1. Implement 100% tie off.
2. Wear proper clothes for your safety.
3. Use the proper tools for the job.
4. Make sure SCAFFOLDING are safety erected with guardrails and ladders.
5. AREAL LIFTS and SCISSORS LIFTS : Wear body belt and attach a lanyard to the boom or basket at all times.
6. Keep your mind on our work at all times.
7. Watch where you are walking.
8. Avoid the use of illegal drugs or alcohol or being under the influence of same on the project. If your physician prescribes drugs that warn against driving or using machinery or other working activities, let your supervisor know.
9. Never distract the attention of fellow workers.
10. Keep walking and working surfaces clear of litter and debris.
11. Keep walking and working surfaces as level as possible.
12. Wear fall protection equipment as prescribed for each job.
13. Never enter an area which has been roped off or barricaded.
14. Keep away from the edges of cuts, embankments, trenches, holes and/or pits. Make sure adequate protection is put in place.

Field Supervisor or Foremen:
Add to the above any other safety points that you think important for this job site.

SAMPLE
TO BE REVISED TO BE SITE SPECIFIC

DCM ERECTORS INC.
110 East 42nd Street Suite 1710 Phone: (212) 599 – 1603
New York, NY 10017 Fax: (212) 599 – 1615
United States of America

No : 62

DANGEROUS SUBSTANCES

Purpose of Discussion:
TO INFORM OUR PEOPLE OF THE HARMFUL PROPERTIES OF SOME OF THE MORE COMMON SUBSTANCES FOUND IN CONSTRUCTION.

I. In what forms do we find substances which may be injurious to our health?
1. **Liquids** - Examples would be gasoline, alcohol, solvents, thinners acids, etc.
2. **Solids** - There would include lye, ciment, lime, asbestos, fiberglass, etc.
3. **Gases** - These take the form of fume, smoke, vapor, or may be completely invisible. Engine exhaust or welding fumes would fall in theis category.

II. In what ways may toxic (poisonous) materials do physical damage?
1. **Inhalation** - By breathing certain gases into our respiratory system we can suffer damage ranging from a headache to a fatality depending on the nature of the gas and the length of exposure.
2. **Absorption** - This is when certain chemicals are absorbed into the body through the skin. The result may be only an annoying rash or it could be a serious illness.
3. **Ingestion** - This refers to the entering of toxic substances into the body orally by eating food that we have contaminated with dirty hands.

III. How do we recognize dangerous liquids?
1. Never rely on the appearance or the smell of a chemical for identification. The label will generally carry the following information:
   a. The name of the product or its most dangerous ingredient.
   b. It will have the word "Danger", "Warning", or "Caution", depending on how hazardous it is.
   c. It will tell what the hazard is. For example, it will say if it is extremely flammable, if the vapors are poisonous, or if it will cause burns or corrosive.
   d. It will tell what should be done to prevent injury, such as to keep it away from heat, avoid breathing the vapors, keep it off the skin, wear goggles when handling.
   e. First aid information is sometimes given telling what to do in case of contact or exposure.

IV. What are some of the more harmfull substances that we should be aware of in construction?
1. Solvents of all kinds such as gasoline, naptha, benzene, carbon tetrachloride, and wood alcohol.
2. Carbon Monoxide - This is one of the deadliest of all and is always present when you run a gas engine in an enclosed space. If you suspect such poisoning, get fresh air and help quickly.
3. Epoxy Resins - These can cause skin problems and damage lungs and nasal pasages. Use personal protection.

Foremen: Each job has its own particular harmful substances. Before holding this discussion, you should make a list of the ones your men may come in contact with. Have samples available and help your mean to identify them. Substitute your own list for IV above or refer to section 4 of this binder MSDS.

SAMPLE TO BE REVISED BY SITE SPECIFIC

CONCLUSION:
THE BEST WAY TO PREVENT INJURY FROM EXPOSURE TO HARMFUL SUBSTANCES IS TO TEACH THE DANGERS INVOLVED AND HOW TO RECOGNIZE THEM. THEY ARE NOT AS OBVIOUS AS AN OPEN DITCH OR A BROKEN LADDER.

SAMPLE
TO BE REVISED TO BE SITE SPECIFIC

DCM ERECTORS INC.
110 East 42nd Street Suite 1710 Phone: (212) 599 – 1603
New York, NY 10017 Fax: (212) 599 – 1615
United States of America

No : 63

USING GASOLINE SAFELY

Purpose of Discussion:
TO HELP YOUR EMPLOYEES UNDERSTAND THE NATURE OF GASOLINE AND THE HAZARDS PRESENT IN ITS USE.

Q. How many people are killed every year by improper use of gasoline?
A. About 1,000.

Q. What makes gasoline dangerous?
A (1) When it vaporizes and mixes with the oxygen of the air and is then subject to being ignited by an open flame or by static electricity.
(2) Even when containers are empty, there can be a very explosive gasoline-air mixture inside.

Q. Is gasoline "safe" in very cold weather?
A. No. Gasoline can ignite at temperatures as low as 45° below zero.

Q. Can pouring (or transferring) gasoline from can to can be dangerous?
A. (1) Yes, if the area is not free from open flames or other sources of ignition.
(2) Yes, if containers are not bonded. Otherwise, a static electric charge can build up, causing a spark which could ignite a vapor / air mixture.
(3) Flammable liquids must never be poured down ordinary drains or sewers.

Q. Are glass containers dangerous?
A. (1) Yes, they can break and spill gasoline, causing vapors which can become ignited.
(2) An approved safety can must be used which has a flash-arresting screen, spring-closing lid and spout cover. (Foremen should exhibit such a can and demonstrate its use.)

Q. Why is cleaning parts or washing hands in gasoline dangerous?
A. (1) Gasoline removes oil from the skin and can cause serious rashes and skin irritations.
(2) Breathing the fumes can be hazardous.
(3) With leaded fuels, lead can enter the body through the skin.

Q. Are gasoline-soaked clothes or rags dangerous?
A. (1) Yes, changes clothes right away if they become soaked with a flammable liquid. Not only will changing prevent skin troubles, but could prevent a bad burn if the retained vapor in the clothing should catch fire.
(2) Dispose of all oily rags in covered metal containers.

Foremen: List specific areas of the project where gasoline hazards might exist.

SAMPLE
TO BE REVISED TO BE SITE SPECIFIC

CONCLUSION:
GASOLINE IS USED FOR ONE PURPOSE, TO CAUSE AN EXPLOSION. WHEN THIS EXPLOSION IS IN THE CYLINDER OF AN ENGINE, IT PROVIDES USEFUL POWER WHEN IT ISN'T, IT CAN CAUSES DEATH AND MILLIONS OF DOLLARS IN PROPERTY DAMAGE.

SAMPLE
TO BE REVISED TO BE SITE SPECIFIC

DCM ERECTORS INC.

110 East 42nd Street Suite 1710
New York, NY 10017
United States of America

Phone: (212) 599 – 1603
Fax: (212) 599 – 1615

The following is a list of forms to be used when required on this project:

From DCM Erectors, Inc.

1. Safety Orientation Training Record
2. Disciplinary Action
3. Weekly Safety Meeting Presence Form
4. C.2
5. Man-Basket Pre-lift Sign in sheet
6. Man-Basket daily inspection sheet
7. Lifting Plan issued by Port Authority

Forms **1, 2, 3**, 4 and **5** must be completed and copies sent to **DCM Erectors, Inc.** (NY office) and **Phoenix Constructors JV**.

SAMPLE
TO BE REVISED TO BE SITE SPECIFIC

DCM ERECTORS INC.

110 East 42nd Street Suite 1710
New York, NY 10017
United States of America

Phone: (212) 599 – 1603
Fax: (212) 599 – 1615

TRANSPORTATION HUB
WORK PACKAGE 20
Safety Orientation Training Record
Ironwokers

My signature below certifies that I have been advised of the following safety instructions for the New York Times Project. In addition, my initials indicate that I fully understand these policies and that any infraction of these rules may result in my immediate removal from the New York Times Site.

- **Fall Protection:**

I understand that as per the Occupational Safety and Health Administration (OSHA) rules, that whenever I am exposed to a fall hazard of greater than 15', I must be tied off at all times unless I am in the process of connecting steel in which case, I must be tied off when exposed to a fall hazard of over 30'. (**Note**: The process of connecting steel means that I am located next to a connection point and the steel is being hoisted to my location).

_____
Initials

I have been issued a safety harness equipped with double lanyards that allow me to always be tied off to an anchorage point when travelling at any elevation. (**Note:** Although OSHA only requires that you be tied off at 15' or 30', everyone is encouraged to achieve 100% tie-off)

_____
Initials

I understand that OSHA regulations require that I have been trained in the hazards associated with steel erection as listed in the Code of Federal Regualtions 29, 1926, Subpart "R" of the standard. I received this training on _____ from _____

Date_____ **Local # or Employer**_____

_____
Initials

I understand that it is my employer's responsibility to provide anchorage points or equipment that allow me to be tied off 100% of the time and if these anchorage points or equipment are NOT available, it is my right and obligation to refuse to perform the particular task where the anchorage points are not available without fear of reprocussion.

_____
Initials

SAMPLE
TO BE REVISED TO BE SITE SPECIFIC

I understand that I must be tied off at all times when workiing from a float, scaffold, angel wing, scisor-lift, zoom-boom, etc.

_____
Initials

- **Ladders:**

I understand that as per the Occupational Safety and Health Administration (OSHA) rules, a stairway or ladder shall be provided at all personnel points of access where there is a break in elevation of 19 inches (48 cm) or more, and no ramp, runway, sloped embankment, or personnel hoist is provided. (**Note**: This includes when accessing flatbed trailers.)

_____
Initials

I understand that when using a stepladder, it must be in the open position and can not be used to access an elevation unless it is securely fastened to an immovable object that will prevent it from tipping over.

_____
Initials

I understand that all straight ladders must be tied off. In addition, the ladder must extend at least 36" past the point of egress and the ladder must be set up on a 4 to 1 ratio.

_____
Initials

I understand that when I use a ladder that is located at the outer perimeter of the building, I must be tied off prior to climbing the ladder and remain tied off 100% of the time.

_____
Initials

- **Personal Protective Equipment (PPE):**

I understand that hard hats are required to be worn 100% of the time while on site.

_____
Initials

SAMPLE
TO BE REVISED TO BE SITE SPECIFIC

I understand that safety glasses must be worn all the time and specialy while performing the following task:

- Chipping
- Painting
- Driving pins
- Removing loose scale from steel members
- And when walking near other employees performing these tasks.

_____
Initials

I understand that the appropriate PPE must be worn when performing the following task:

- Welding – Welding hood
- Cutting and burning – Burning goggles with the appropriate tint
- Grinding – Face shield with safety glasses or welding hood with clear lens

_____
Initials

SAMPLE
TO BE REVISED TO BE SITE SPECIFIC

I have received the orientation as indicated above. I am aware of, understand, and agree to comply with the safety rules and other policies and procedures for the AMEC Construction Management, Inc. project named below.

Project: **TRANSPORTATION HUB – WORK PACKAGE 20**

Date: _____

Company Name: **DCM Erectors, Inc.**

Employee Name: _____

Employee Signature: _____

DCM ERECTORS INC.

110 East 42nd Street Suite 1710
New York, NY 10017
United States of America

Phone: (212) 599 – 1603
Fax: (212) 599 – 1615

DISCIPLINARY ACTION

Date: _____

Employee's Name: _____ Project Name: **WORK PACKAGE 20**

Violation Site Location: _____ Project Location: **New York, NY**

DESCRIPTION OF VIOLATION: _____

☐ **FIRST WARNING:** GIVEN FOR NON-COMPLIANCE WITH SAFETY PLAN OR OSHA STANDARDS

☐ **SECOND WARNING:** GIVEN FOR NON-COMPLIANCE WITH SAFETY PLAN OR OSHA STANDARDS

☐ **THIRD WARNING:** GIVEN FOR NON-COMPLIANCE WITH SAFETY PLAN OR OSHA STANDARDS

SAMPLE
TO BE REVISED TO BE SITE SPECIFIC

Employee's Signature: _____

Site Supervisor's Signature: _____

Site Supervisor's Signature: _____

Note: **ALL WARNINGS CAN BE FOLLOWED BY IMMEDIATE DISMISSAL**

Copies to: **New York Office, General Contractor, Union Steward and Worker**

SAFETY MEETING SIGN IN SHEET

SITE SPECIFIC SAFETY PLAN

DCM ERECTORS INC.

110 East 42nd Street Suite 1710
New York, NY 10017
United States of America

Phone: (212) 599 – 1603
Fax: (212) 599 – 1615

Date: _____

Foreman: _____

Project Name: **WORK PACKAGE 20**

Project Location: **New York, NY**

TOPICS	**COMMENTS FROM WORKERS**

NAME *(Please Print)*	**SIGNATURE**

SAMPLE
TO BE REVISED TO BE SITE SPECIFIC

Meeting Held by: _____

Send copy on a weekly basis to: Main Office, and General Contractor

DCM ERECTORS INC.

110 East 42nd Street Suite 1710
New York, NY 10017
United States of America

Phone: (212) 599 – 1603
Fax: (212) 599 – 1615

EMPLOYER'S REPORT OF WORK-RELATED ACCIDENT/OCCUPATIONAL DISEASE

Send this notice directly to Chair, Workers' Compensation Board at address shown on reverse side within ten (10) days after accident occurs ANSWER ALL QUESTIONS FULLY A copy should also be provided to your workers' compensation insurance carrier

Failure to timely file Form C-2, as required by Section 110 of the Workers' Compensation Law, is a misdemeanor punishable by a fine of not more than $1,000, in addition, the Board or Chair may impose a penalty of up to $2,500

TYPEWRITE PREPARATION IS STRONGLY RECOMMENDED-INCLUDE ZIP CODE IN ALL ADDRESSES-EMPLOYEE'S SS NO MUST BE ENTERED BELOW

WCB CASE NO (If Known)	CARRIER CASE NO	CARRIER COD WC POLICY NO	DATE OF ACCIDENT	EMPLOYEE'S SS NO

1 (a) EMPLOYER'S NAME **DCM Erectors, Inc.**	(b) EMPLOYER'S MAILING ADDRESS **110 E. 42nd St, Suite 1710, NYC 10017**	(c) OSHA CASE/FILE NO
(d) LOCATION (If Different from Mailing Address) **200 Murray St., New York, NY**	(e) NATURE OF BUSINESS (Principal Products, Services, etc) **Construction**	(f) NYS UI EMPLOYER REG NO
2 (a) INSURANCE CARRIER	(b) CARRIER'S ADDRESS	
3 (a) INJURED PERSON (First, MI Last)	(b) ADDRESS (Includes No & Street, City, State, Zip & Apt No)	

ACCIDENT

4 (a) ADDRESS WHERE ACCIDENT OCCURRED **200 Murray Street** **New York, NY**	(b) COUNTY	(c) WAS ACCIDENT ON EMPLOYER'S PREMISES? YES **X** NO
5 TIME OF ACCIDENT AM PM	6 DEPT WHERE REGULARLY EMPLOYED **Construction**	7 (a) DATE STOPPED WORK BECAUSE OF THIS INJURY/ILLNESS	(b) WAS EMPLOYEE PAID IN FULL FOR DAY? **X YES** NO

INJURED PERSON

8 SEX	9 AGE	10 OCCUPATION (Specific job title at which employed) **Hired**	
11 (a) AVERAGE EARNINGS PER WEEK?		(b) TOTAL EARNINGS PAID DURING 52 WEEKS PRIOR TO DATE OF ACCIDENT (Include bonuses overtime, value of lodging, etc)	
12 (a) PART OR FULL TIME EMPLOYEE? **Full Time**		(b) INJURED EMPLOYEE'S WORK WEEK (Indicate days of week usually worked) **Mon - Fri**	

NATURE OF INJURY

13 (a) NATURE OF INJURY AND PART(S) OF BODY AFFECTED	14 (a) DID YOU PROVIDE MEDICAL CARE? YES NO	(b) IF YES, WHEN?
15 (a) NAME AND ADDRESS OF DOCTOR	(b) NAME AND ADDRESS OF HOSPITAL	
16 (a) HAS EMPLOYEE RETURNED TO WORK? YES NO	(b) IF YES, GIVE DATE	(c) AT WHAT WEEKLY WAGE?

NOTE: FORM C-11 MUST BE FILED EACH TIME THERE IS A CHANGE IN EMPLOYMENT STATUS

CAUSE OF ACCIDENT

17 WHAT WAS EMPLOYEE DOING WHEN INJURED? (Please be specific Identify tools, equipment or material the employee was using)

18 HOW DID THE ACCIDENT OR EXPOSURE OCCUR? (Please describe fully the events that resulted in injury or occupational disease Tell what happened and how it happened Please use separate sheet if necessary)

19 OBJECT OR SUBSTANCE THAT DIRECTLY INJURED EMPLOYEE, e g , the machine employee struck against or which struck him/her; the vapor or poison inhaled or swallowed, the chemical that irritated his/her skin In cases of strains, the thing (s)he was lifting, pulling, etc

FATAL CASES

20 (a) DATE OF DEATH	(b) NAME/ADDRESS OF NEAREST RELATIVE	(c) RELATIONSHIP

DATE EMPLOYER/SUPERVISOR FIRST KNEW OF INJURY	DATE OF THIS REPORT	IF FORM IS SUBMITTED BY EMPLOYER, COMPLETE A & B BELOW IF FORM IS SUBMITTED BY THIRD PARTY, COMPLETE A, B, C & D BELOW

SAMPLE
TO BE USED ON SITE SPECIFIC

DCM ERECTORS INC.

110 East 42nd Street Suite 1710
New York, NY 10017
United States of America

Phone: (212) 599 – 1603
Fax: (212) 599 – 1615

ACKNOWLEDGEMENT

Date: _____

Employee's Name: _____ Project Name: **WORK PACKAGE 20**

Trade (Union Local): _____ Project Location: **New York, NY**

PERSONNEL PROTECTIVE EQUIPMENT

I HAVE RECEIVED **SAFETY GLASSES AND OTHER PROTECTIVE EQUIPMENT** NECESSARY TO PERFORM MY DUTIES AS AN EMPLOYEE OF DCM ERECTORS, INC. UPON TERMINATION OF EMPLOYMENT, I WILL RETURN THE ABOVE MENTIONED PERSONNEL PROTECTIVE EQUIPMENT.

EMPLOYEE'S INITIAL: _____

HAZARD COMMUNICATION

I HAVE BEEN ADVISED OF WHERE TO FIND THE **M**ATERIAL **S**AFETY **D**ATA **S**HEET (MSDS) SHEETS FOR ANY MATERIAL THAT WILL BE USED ON THIS SITE. I ALSO HAVE BEEN TRAINED ON HOW TO USE THE INFORMATION FOUND ON THE **M**ATERIAL **S**AFETY **D**ATA **S**HEET (MSDS).

EMPLOYEE'S INITIAL: _____

FALL PROTECTION EQUIPMENT AND TRAINING

I HAVE RECEIVED A **FULL BODY HARNESS** AND **SHOCK ABSORBING LANYARD**, I HAVE ALSO RECEIVED TRAINING ON HOW TO USE THE DCM FALL PROTECTION SYSTEM, MAINTENANCE OF MY HARNESS, LANYARD AND OSHA STANDARDS IN REGARDS TO FALL PROTECTION.

EMPLOYEE'S INITIAL: _____

Employee's Signature: _____

DCM ERECTORS INC.

110 East 42nd Street Suite 1710
New York, NY 10017
United States of America

Phone: (212) 599 – 1603
Fax: (212) 599 – 1615

Date held on: _____

Project Name: **WORK PACKAGE 20**

Project Location: _____

PRE-LIFT MEETING

SAMPLE
TO BE REVISED TO BE SITE SPECIFIC

	Name	Signature
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		

Meeting Held By: _____

Copy to: Main Office, Field Office

DCM ERECTORS INC.

110 East 42nd Street Suite 1710
New York, NY 10017
United States of America

Phone: (212) 599 – 1603
Fax: (212) 599 – 1615

Checked On: _____

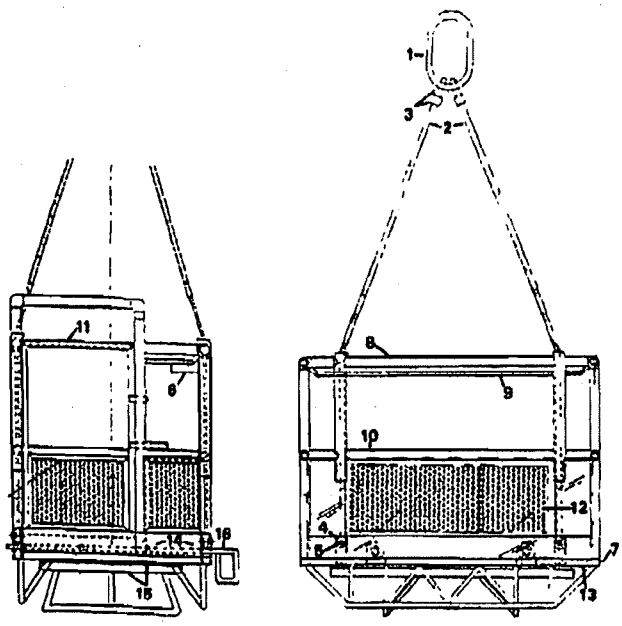
Serial Number: **401393**

Model Number: **BM3-900G**

Men Capacity: **3**

		OK
1	MASTER LINK	☐
2	SLINGS	☐
3	SLINGS EYES AND SWAGED UPPER-END LIFTING	☐
4	SWAGED LOWER-END FITTINGS	☐
5	SLING ATTACHEDMENT PINS WITH COTTER KEYS	☐
6	DATA PLATE	☐
7	FRAME	☐
8	GUARDRAIL	☐
9	INNER GUARDRAIL	☐
10	MID-RAIL	☐
11	ACCESS GATE LOCK AND HINGES	☐
12	PERFORATED PANELS	☐
13	FLOOR GRATING	☐
14	TOEBOARD	☐
15	TEST WEIGHT AND EYE BOLT	☐
16	TEST WEIGHT ATTACHEMENT PINS	☐

SAMPLE
TO BE REVISED



DCM ERECTORS INC.

110 East 42nd Street Suite 1710
New York, NY 10017
United States of America

Phone: (212) 599 – 1603
Fax: (212) 599 – 1615

LIFTING PLAN

I. GENERAL INFORMATION

Project: **TRANSPORTATION HUB – WORK PACKAGE 20**

Location: **WORLD TRADE CENTER SITE**

Date / Time of Lift: _____

Object To Be Lifted: _____

Purpose of Lift:
___ Inspection
___ Maintenance
_X_ Installation
___ Emergency Response
___ Dismantling
___ Demolition
___ Repair
___ Relocation
Other: _____

New York City Critical Lift Categories:

___ 95 % of crane manufactures lift capacity
___ Limited Clearance, Drift, or Interference
___ Unique Rigging Requirement
___ Tandem Lift
___ Asymmetrical Object
___ Fragile / Thin Shell

NYS Licensed PE To Engineer Lift:

Name: _____ Name: _____

License Type: _____ License Type: _____

License Number: _____ License Number: _____

Expiration Date: _____ Expiration Date: _____

State of License: _____ State of License: _____

SAMPLE
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DCM ERECTORS INC.
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New York, NY 10017
United States of America
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Fax: (212) 599 – 1615

World Trade Center Unique Lift Categories:

___ Blind Lift
___ Lifts Over Public
___ Fuel Tank
___ Requested by REO/Safety
___ Lift Slab/Wall Slab
___ Personnel Lift Platform
___ Gas Cylinder Cage
___ Pre-Cast

___ Other: _____

NYS Licensed P.E. or NYC Licensed or Special Rigger To Develop Lift Plan:

Name: _____ Name: _____

License Type: _____ License Type: _____

License Number: _____ License Number: _____

Expiration Date: _____ Expiration Date: _____

State of License: _____ State of License: _____

Material Delivery To Site / Gate To Be Used: GATE #2

Location To Unload / Method: _____

Staging Area: _____

Lift Pathway: _____

Fall Protection for Personnel: _____

Coordination with PATH Operations: _____

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II. PERSONAL INVOLVED WITH LIFT

Prime Contractor: **PHOENIX CONSTRUCTORS JV**

Contractor To Perform Lift: **DCM ERECTORS, INC.**

Lift Supervisor: _____

Safety Manager Present During Lift: _____

Identification of Rigging Crew

a) Crew Foreman-

_____

b) Signal Person-

_____

c) Crew-

_____

_____

Crane Operator:

Name: _____
Name: _____
License Type: _____ License
Type: _____
License Number: _____ License Number: _____
Expiration Date: _____ Expiration Date: _____

Name and Title of Person To
Inspect Sling and Attachments Prior To Lift: _____

Individual To Conduct Pre-Lift Field Meeting: _____

Method of Communication Between Signal Person and Crane Operator: _____

_____

_____

_____

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III. CRANE DESCRIPTION and ENGINEERED PICK

1	Crane Name And Model Number			
2	NYC DOB C&D Number		Expiration Date	
3	Boom Configuration		Boom Length	
4	Block Capacity In Tons		Total Weight Of Crane Including Counterweight In Tons	
5	Cable Diameter Inches		Cable Reeving/No. Of Parts	
6	Weight Of Material To Be Picked in Kips		Block And Rigging Weight in Kips	
7	De-rating or Safety Factor		Gross Design Pick Weight in Kips	
8	Rigging Below Hook: Type		Rigging Capacity As Configured in Kips	
9	Above Ground Utilities/Surface Encumbrances			
10	Underground Utilities Or Obstructions			
11	Ground Capacity Tons/sf		Matting Type	

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12	Outriggers		Dunnage	
13	Boom Radius in Feet		Boom Angle	
14	Picking Capacity Per Crane Chart in Kips			
15	Engineered Submittal Number			

IV. Personnel Lift PLATFORMS

Refer to NYC DOB RS-19: 23.6, and OSHA Subpart N: 29 CFR 1926.550(g)
The Load Line Must Support Without Failure at Least Seven (7) Times The Maximum *Intended Load*
The Personnel Platform Must Support Without Failure Its Own Weight, and At Least Five (5) Times The Maximum Intended Load
Provide Technical Specifications for Selected Personnel Lift Platform

a) Name(s) of Occupant(s) in Platform: _____

b) Task To Be Performed: _____

c) Method of Platform to Crane Communication: _____

d) Method to Attach Additional Safety Line From Lift to Load Line Above The Ball: _____

e) Name and Title of Person to Conduct Load Test on Personnel Platform Prior to Occupancy:
_____

f) Type of Personnel Fall Protection for Platform Operations/Method of Attachment: _____

Comments / Notes
_____
_____
_____

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United States of America

Phone: (212) 599 – 1603
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Date Prepared: _____

Prepared By: _____

Company: **DCM Erectors, Inc.**

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HAZCOM

The following is our Hazard Communication Plan that was developed specifically for the

TRANSPORTATION HUB
WORK PACKAGE 20
New York, NY

Our goal is to inform and limit the exposure of our workforce to hazards that may be present while performing the required tasks to bring this project to completion. This program and the Material Safety Data Sheets (attached in section 8 of this manual) are designed to provide the workers with the information required to safely use, handle and store the hazardous chemicals that are required for this project.

This hazard communication program includes guidelines on identification of chemical hazards and the preparation and proper use of containers' label, placards and other types of warning devices.

SAMPLE
TO BE REVISED TO BE SITE SPECIFIC

A. CHEMICAL INVENTORY

1. **To be Announced** maintains an inventory of all known chemicals in use on the work site. A chemical inventory list is available.

2. Hazardous chemicals brought onto the work site by all other trades will be included on the hazardous chemical inventory list kept by the general contractor.

B: CONTAINER LABELING

1. All chemicals on the site will be stored in their original or approved containers with a proper label attached, except small quantities for immediate use. Any container not properly labeled should be given to **To be Announced** for labeling or proper disposal.

2. Workers may dispense chemicals from original containers only in small quantities intended for immediate use. Any chemical left after work is completed must be returned to the original container or **To be Announced** for proper disposal.

3. No unmarked containers of any size are to be left in the work area unattended.

4. **To be Announced** will rely on manufacturer applied labels whenever possible and will ensure that these labels are maintained. Containers that are not labeled or on which the manufacturer's label has been removed will be relabeled.

5. **To be Announced** will ensure that each container is labeled with the identification of the hazardous chemical contained and any appropriate hazard warning.

C. MATERIAL SAFETY DATA SHEETS

1. Employees working with hazardous chemical may request a copy of the material safety data sheet (MSDS). Requests for MSDS sheets should be made to **To be Announced**

2. MSDS's are available and standard chemical reference may also be available on site to provide immediate reference to chemical safety information.

3. If a MSDS sheet is not available on site, you can contact the New York office, the telephone number is (212) 599 – 1603 and requests it. Your request should be made in writing if time permitting. Always specify for when the information is requested (urgent or in three days from now).

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D. EMPLOYEE TRAINING

Employees will be trained to work with hazardous chemicals.

Employee training will include:
1. Methods that may be used to detect release of hazardous chemical(s) in the workplace.
2. Physical and health hazards associated with chemicals.
3. Protective measures to be taken.
4. Safe work practices, emergency responses and use of personal protective equipment.
5. Information on the Hazard Communication Standard, including
   - Labeling and warning systems, and
   - An explanation of Material Safety Data Sheets.

E. PERSONAL PROTECTIVE EQUIPMENT

Required "PPE" is available from **To be Announced.** Any employee found in violation of "Personal Protective Equipment" requirements may be subject to disciplinary actions up to and including discharge as per our "Disciplinary Policy".

"Personal Protective Equipment" equipment will always be made available free issue to all of our workers and will be replaced should it be damaged or worn out.

Always inspect your "Personal Protective Equipment" at the beginning of your shift and after lunch break for any signs of damage or wear and tear.

F. HAZARD OF NON-ROUTINE TASK

1. **To be Announced** will inform employees of any special tasks that may arise which would involve possible exposure to hazardous chemicals.

2. Review of safe work procedures and use of required PPE will be conducted prior to the start of such tasks. Where necessary, areas will be posted to indicate the nature of the hazards involved.

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TO BE REVISED TO BE SITE SPECIFIC

G. INFORMING OTHER EMPLOYERS (OTHER SUB-CONTRACTORS)

1. Other on-site employers are required to adhere to the provisions of the Hazard Communication Standard.

2. Information on hazardous chemicals known to be present will be exchanged with other employers. Employers will be responsible for providing necessary information to their employees.

3. Other on-site employers will be provided with a copy of **DCM Erectors, Inc.** hazard communication program.

H. POSTINGS

DCM Erectors, Inc. has posted information for employees at this job site on the Hazard Communication Standard. This information can be found attached to this hazard communication program.

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TO BE REVISED TO BE SITE SPECIFIC

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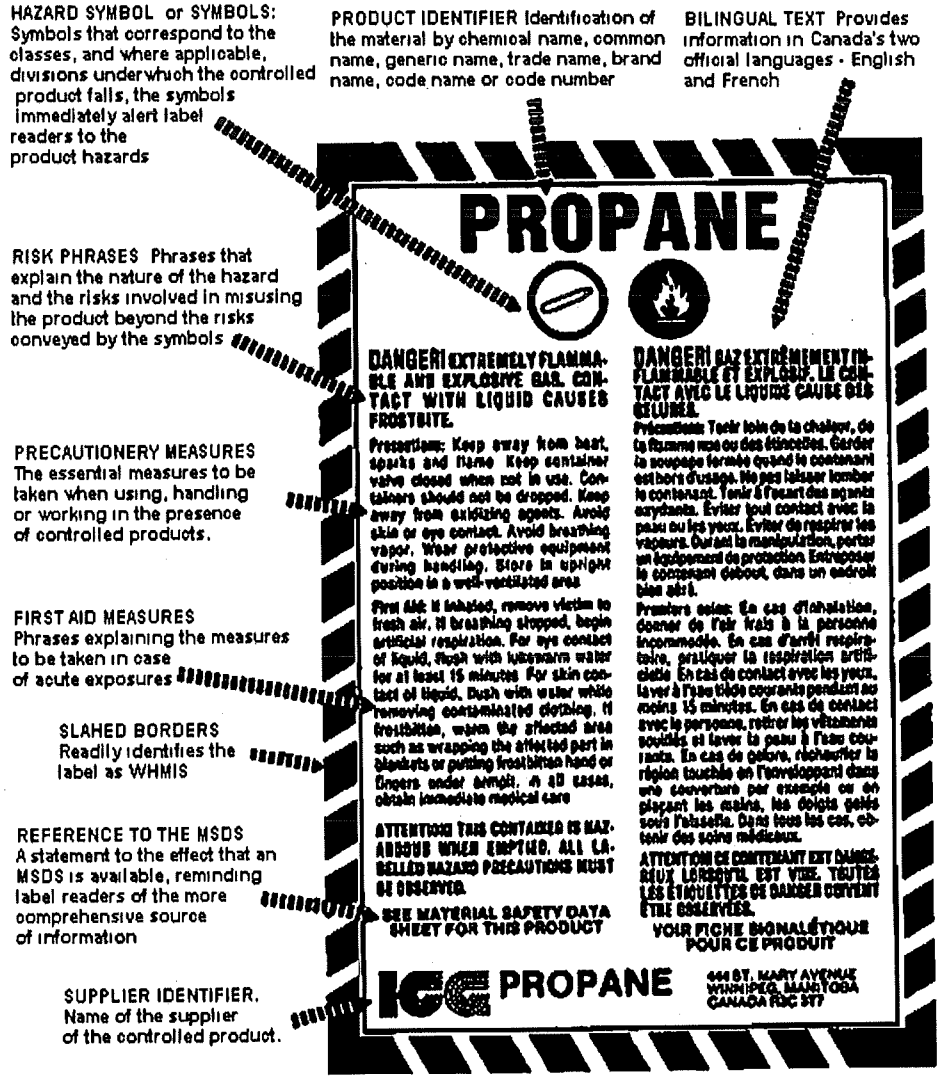
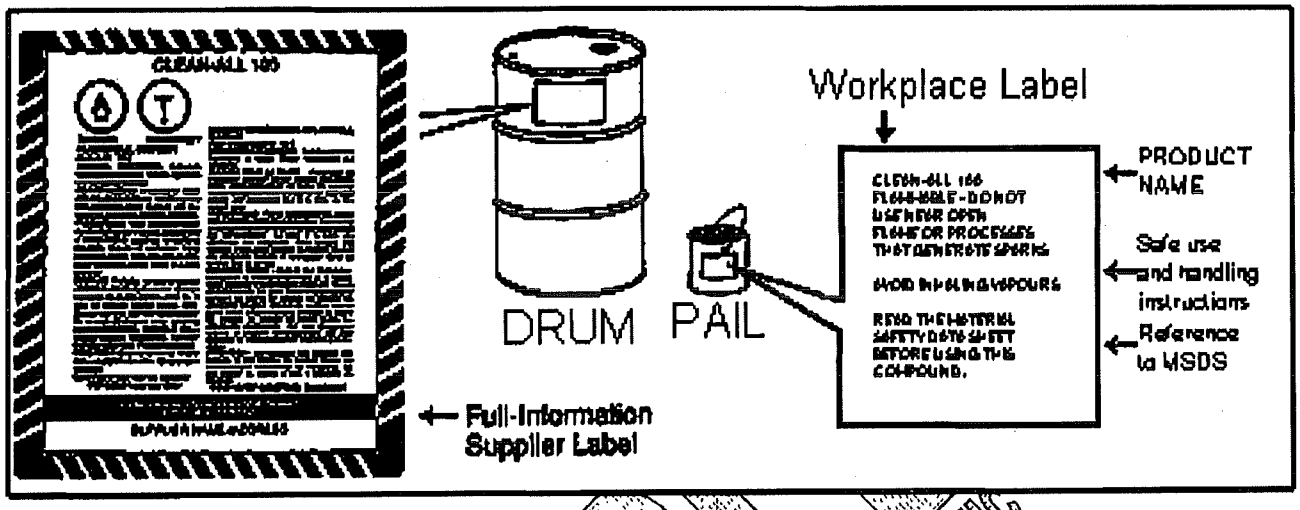
LABELS:

1. Make sure that when hazardous materials arrive at the jobsite, the proper supplier labels are in place, they meet the written and if damaged, they are replaced.



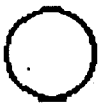
2. Ensure a workplace label is used when hazardous materials are decanted from an original container into a workplace container.

3. Ensure a workplace label is attached to a container where the supplier label has become illegible or has been accidentally removed.



4. Ensure there is a MSDS for each hazardous material on the jobsite.

5. Ensure that the employees know where to find the Material Safety Data Sheet Binder in the site office and that it is available at all times to them.

	CLASS	SYMBOL	EXAMPLE
CLASS A:	Compressed Gas A substance that at room temperature (20 C) is in a gaseous state and kept under pressure.		oxygen
CLASS B:	Flammable and Combustible Material A solid, liquid, or gas that will ignite and continue to burn if exposed to a flame.		acetone
Class C:	Oxidizing Material A substance that will cause another substance to burn.		chromic acid
CLASS D:	Poisonous and Infectious Material 1) Materials causing immediate and serious toxic effects		ammonia
	2) Materials causing other toxic effects (Cancer-causing materials are included here.)		asbestos
	3) Biohazardous Infectious Material		contaminated blood products
Class E:	Corrosive Material A substance that will erode steel or aluminum, or destroy animal tissue.		hydrochloric acid sodium hydroxide
Class F:	Dangerously Reactive Material A material which will react with water to produce a poisonous gas or which will undergo a reaction if the container is heated, pressurized, or agitated.		acetylene

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CHEMICAL INVENTORY LIST AND "MSDS" SHEETS ON FILE

	HAZARDOUS CHEMICAL	OPERATION/AREA USED	MSDS on FILE
1	**Acetylene**	Burning and Cutting	YES
2	**Oxygen**	Burning and Cutting	YES
3	**Welding Wire or Rod**	Joining steel members together	YES
4	**Grinding Discs**	Cleaning welds/cuts	YES
5	**Structural Steel**	Erect in place	YES
6	**Propane**	Pre-heating steel for welding	YES
7	**WD-40**	Preparing Bolts	YES
8	**Galvanized Deck**	Part of structure supporting concrete when poured until curred.	YES
9	**Galvalite**	Galvanizing repair compound.	YES
10	**Shear Stud Connector**	Steel shear connectors to deck	YES
11	**Ceramic Ferrules**	Part of process to weld shear connectors to deck	YES
12	**International – Interchar 212**	Intumescent paint used as fire proofing for steel member that are architectualy exposed to the view	YES
13	**International – Thinner**	To dilute paint or clean equipment	YES
14	**International – InterZinc 52**	Primer to be used as first coat before applying intumescent paint	YES

SAMPLE
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The MSDS sheets listed above are attached following this page.`

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General Contractor's Information

The attachments listed below have been incorporated in this safety plan to provide necessary information or procedures our supervision and workforce need to know that is specific to this project.

a. **Safety Booklet from Port Authority**
b. **Site Logistic Plan**
c. **Customer's Drawings**

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SITE USE ONLY

DCM ERECTORS INC.

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Technical Proposal Item No.: ***5.6 M/WBE Utilization***
RFP/Contract No.: W0TC-GC1-2-KN0186-020
Station Construction and Transit Hall Structure to Grade
Structural Steel, Intumescent Coating, Metal Deck & Precast Work
New York, NY
February 22, 2009

DCM Erectors, Inc will adopt Phoenix Constructors, JV and The Port Authority of New York and New Jersey goals of seventeen (17 %) or better M/WBE utilization on this project. We will strive to achieve these goals via M/WBE firms providing us with procurement services, engineering and drafting services, crane engineering and rental, metal deck installation, precast concrete installation and safety equipment/supervision/installation services. We have solicited proposals through Engineering News Record and F W Dodge. We have also sent out solicitation letters to firms we normally do business with such as Solera Construction, Inc, GLS Enterprises, Inc, Vista Engineering, Inc and Lambco Erecting Company. We have received interest in pricing steel fabrication from Owen Steel Company, Columbia, SC a WBE. We have received interest in performing surveying work from Hirani Engineering an MBE.

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Technical Proposal Item No.: ***5.7 Equipment List***
RFP/Contract No.: W0TC-GC1-2-KN0186-020
Station Construction and Transit Hall Structure to Grade
Structural Steel, Intumescent Coating, Metal Deck & Precast Work
New York, NY
February 22, 2009

DCM Erectors, Inc will supply equipment necessary to perform the work. It will minimally consist of the following:

- Five (5) 440 ton Crawler Cranes – Liebherr 1400/Manitowoc 16000
- One (1) 35 ton Rough Terrain – Rubber Tired Hydraulic Crane
- One (1) Tractor/Trailer in Hole
- Three (3) Welding Sleds consisting of air compressor, 24 welding machines and generator
- Six (6) Zoom Booms (Man Lifts)
- Ten (10) Scissor lifts
- Three (3) Man Shanties
- Three (3) Tool Cribs
- One (1) Office Trailer
- Assorted Small Tools/Consumables

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Technical Proposal Item No.: ***5.8 Exceptions and Alternate Proposals***
RFP/Contract No.: W0TC-GC1-2-KN0186-020
Station Construction and Transit Hall Structure to Grade
Structural Steel, Intumescent Coating, Metal Deck & Precast Work
New York, NY
February 22, 2009

DCM Erectors, Inc has some Technical Items which we feel are restrictive and wish to discuss during our oral presentation. Notwithstanding anything in the drawings or specifications, we are performing this work in accordance to Standard AISC Tolerances Listed in the AISC Code of Standard Practice.

We also have several ***Proprietary*** Commercial Voluntary Alternatives which may be attractive to you and your client including but not limited to:

- Reduce contract retainage from 10 % to 5% at 50% of Contract Value, 2.5 % at 75% of Contract Value and 1% at substantial completion
- If Phoenix Constructors, JV agrees to pay for raw steel mill material directly with a deposit at time of mill order and balance due upon being ready to ship from mill
- If Phoenix Constructors, JV agrees to award this project within 15 days after Commercial bid submission and provides released for construction documents so that materials can be ordered
- If Phoenix Constructors agrees not to require a performance and payment bond
- If Phoenix Constructors, JV agrees to make progress payments every two weeks in lieu of monthly
- If Phoenix Constructors, JV provides us a Significant down payment within 30 days of contract signing,

We will provide you with these commercial alternatives in our commercial proposal

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Technical Proposal Item No.: ***10 Means and Methods Plan***
RFP/Contract No.: W0TC-GC1-2-KN0186-020
Station Construction and Transit Hall Structure to Grade
Structural Steel, Intumescent Coating, Metal Deck & Precast Work
New York, NY
February 22, 2009

DCM Erectors, Inc's ***Means and Methods Plan*** is based upon generally following the phasing plans presented by Brendan Reilly of Phoenix Constructors, JV at the second mandatory pre-bid meeting held January 15, 2009. We will have similar crawler cranes on WTC Tower # 1 Freedom Tower that will become available for use on this project after we complete lower steel erection on Freedom Tower. For the purpose of this bid, we have included for five (5) 440 Ton crawler cranes such as Liebherr 1400/Manitowoc 16000. Maximum pick weight and radius will be determined for each individual piece. We will use two (2) crane picks as required to install each piece in its location. We will use full chart capacity by radius as required. We will endeavor to make picks at less than 80% of Charted Capacity. As required, two cranes will be used to keep within these numbers.

We intend to hire Ruby & Associates to engineer our temporary shoring system for Path/1 Line Box Girders/Super Columns. We will have other Engineering Firms (KAJ Engineers, David Stringer Engineering Company and Vista Engineering Company, Inc) performing crane/rigging/heavy pick engineering/analysis.

We attach our phasing/rigging diagrams/descriptions by work area for your review and comment.

We will design/fabricate special work scaffolds for all welded joints. These will be used for installation also. We will also provide access walkways between all shoring towers so that our crews may move from point to point.

All fabricated materials will be shipped to and unloaded at our shop/yard in South Plainfield, NJ. We will install special shape steel lifting lugs/temporary erection connections in our shop in South Plainfield, NJ. All work area steel will be loaded and shipped to Phoenix Constructors, JV marshalling area/site gate for inspection and then final delivery to job site. Precast and steel for platforms in Path Area will be loaded on railcars at our yard and shipped to Path rail access area for inspection and transport to unloading area at site. Oversize/Overweight loads to come into New York City at night. They will report to inspection site and then jobsite once cleared.

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Technical Proposal Item No.: ***10 Means and Methods Plan Area 1 Path Structure***
RFP/Contract No.: W0TC-GC1-2-KN0186-020
Station Construction and Transit Hall Structure to Grade
Structural Steel, Intumescent Coating, Metal Deck & Precast Work
New York, NY
February 22, 2009

- Phoenix Constructors, JV is designing, supplying and installing an extension to the East – West Corridor for the purpose of receiving our delivery trucks and our operating two (2) 440 ton Cranes upon. This temporary structure will run from Line D50 to D20 in an East/West Direction. This structure will then turn south from Line D25 to D20 to Line A2.
- All deliveries will enter the site from West Street across from the already installed East West Corridor and onto the Phoenix Constructors, JV Crane Platform at the North end of the project. ***Some Deliveries for Area 2 1-9 Box will also be required.***
- We will use the North Crane on the platform to unload and pass materials to the South Crane.
- For two (2) crane picks, unloading will still be performed by one crane and placed on the platform between the two cranes. The pick will be engineered for loads on each crane. The cranes will pick and place components to their final location. At all times, the cranes will maintain a bay separation from each other on the platform. These cranes will erect all portions of the Path Structure.

A general area work description follows:

- Survey/Prepare Bearing Plates on North/South Shear Wall
- Install Shoring Towers for East/West Vierendeel Trusses and Center Spine if North/South Girders and East Box Girder
  from Phoenix Crane Platform
- Unload and set bearings on Super Columns
- Unload and assemble East Box Girder on Shoring Tower
- Align, set cambers bolt and weld as required
- Unload and assemble North/South Arches Over Path moving West to East as suggested on CSS 263 – 267. Assemblies may be spliced slightly different from what is shown on drawings
- Once North/South Girders are installed West of Crane Platform and East Box Girder is installed, commence dismantling of Phoenix Crane Platform from the South
- Remove one crane
- Install South Portion of Vierendeel Truss on Line AS1

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remaining 5 Arch

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Technical Proposal Item No.: ***10 Means and Methods Plan Area 1 Path Structure***
RFP/Contract No.: W0TC-GC1-2-KN0186-020
Station Construction and Transit Hall Structure to Grade
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New York, NY

- February 22, 2009Dismantle Phoenix Crane Platform to North of M Line
- Install Remainder of Center Spine
- Install remainder of Arches from South Vierendeel to Center Spine
- Dismantle Phoenix Crane Platform to North of BS1 line
- Install BS1 Line Vierendeel Truss to Center Spine on line M
- Dismantle remaining portion of North South Phoenix Crane Platform
- Erect North Portion of Arches complete with Columns from East West Phoenix Crane Platform
- Dismantle balance of Phoenix Crane platform and remaining crane
- Perform Path Platform Level work as tracks are taken out of service
- Load materials onto work trains in NJ rail yard provided Phoenix Constructors, JV
- Install new steel columns and girders necessary to support precast
- Depending upon alternate(s), install platform level framing complete with precast planks and units below
- Construct a custom lifting device (gizmo) for precast boxes
- Load precast boxes on work train and transport to site
- Lift and place precast boxes for mezzanine
- Continue platform and mezzanine work as future tracks are taken out of service

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Technical Proposal Item No.: ***10 Means and Methods Plan Area 2 - 1&9 Box***
RFP/Contract No.: W0TC-GC1-2-KN0186-020
Station Construction and Transit Hall Structure to Grade
Structural Steel, Intumescent Coating, Metal Deck & Precast Work
New York, NY
February 22, 2009

- All steel for the west super columns and west truss will be delivered via the East West Corridor and Phoenix Constructors, JV provided crane/loading platform previously described in work area 1.
- Unloading for West Side parts will be by the North Crane as described previously in area 1. The North Crane will pass steel parts to the South Crane. Two Crane picks will be performed as previously described in work area 1.
- All steel for the east side super columns, east side truss and all top and bottom box ties will be unloaded by a crawler crane sitting on the South Church Street Crane Perch. We will provide tractor(s)/trailer(s) as required to move all parts across work area 3 to feed the two cranes working on the east side of the 1-9 box.

A general description of the work tasks follows:

- Assemble Street Service Crane on Phoenix Crane Platform on Church Street
- Assemble two (2) 440 ton crawler cranes in the Transit Hall Area utilizing the Church Street Service crane
- Walk the assembled cranes to the east side of 1-9 Box (Greenwich Street)
- Assemble two crawler cranes on East- West Connector and walk onto Phoenix Constructors Crane Platform running North South on West Side of 1-9 Box
- Unload material for top/bottom and East side from Church Street onto Trailer in hole for transshipment to East side Crawlers.
- Unload material for West Side from East-West Connector/ West Side Phoenix Constructors Crane Platform.
- Install shoring on both sides of 1-9 Box for Truss assembly
- Build Super Columns in place in four (4) locations on shores
- Assemble Trusses on East & West sides of 1-9 Box. Bolt and weld as required
- Install top level steel with cranes
- Install lower invert framing by hand feeding from one side. Bolt/weld as required
- Install jacking stools, jacks and wedges
- Preload 1-9 Box
- Rework existing hangers and install horizontal web reinforcing plates.
- Cut and remove lower hangers as required

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- After others pour concrete, unload ribs with Church Street Service crane to trailer in hole and transship to workplace
- Lift approximately 40'-0" sections into place and tack weld
- Complete weld joints in place and grind smooth
- Jack Loads into super columns
- Remove Shoring

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Technical Proposal Item No.: ***10 Means and Methods Plan Area 3***
RFP/Contract No.: W0TC-GC1-2-KN0186-020
Station Construction and Transit Hall Structure to Grade
Structural Steel, Intumescent Coating, Metal Deck & Precast Work
New York, NY
February 22, 2009

- Phoenix Constructors, JV is designing, furnishing and installing a crane/loading platform down the center of work area 3 and the South Church Street Crane Perch. All these platform/perches will be designed to support 440 ton crawler crane(s) or multiples as required.
- With a crawler crane on the south Church Street Crane Perch, we will unload steel and crane parts either into the hole or the crane platform depending upon what phase we are constructing at the time.
- For Steel required by the West Crane, the east crane will pass material to the west crane. All steel for the east crane will be placed/passed by crane on South Church Street Crane to east crane.

A general description of our area work plan follows:

- With crawler cranes still in position for East side 1-9 Box truss, place shoring to install the West end Arch
- Set bearings on Super Columns
- Unload all components with Church Street Crane to trailers below
- Move components to assembly area and commence assembly
- Final assemble in place bolt and weld
- Install East End Truss subject to footing availability
- Install Shoring Towers
- Unload components with Church Street Crane
- Assemble Truss Components Set Camber Bolt/Weld
- Coordinate with Phoenix Constructors, JV to install wall plates, spall mplates, beams etc in lower levels
- Remove all cranes including Church Street Crane
- After Phoenix Constructors, JV completes concrete work and Phoenix Constructors, JV Crane Platform is in place, reassemble three cranes 1 on Church Street utilized to assemble two on platform
- Unload steel with Church Street Crane and pass it out to cranes on platform
- Unload and install ring beams on shoring
- Install shoring for East – West Box Girder
- Assemble Box Girder with cranes

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- Bolt and weld splices after final alignment is complete
- Install cover plates/top flange and weld all joints
- Install shoring for East West Upper Box Girders
- Assemble East and West Box Girders
- Final Align/Bolt/Weld Splices
- Bolt/Weld Joints
- Continue installing all box girders
- Align/Bolt/Weld
- Unload remainder of steel framing
- Layout & install connections to walls, insert plates at other bldg WTC 2 & 3
- Align, bolt plumb and weld framing
- Dismantle cranes

DCM ERECTORS INC.

110 East 42nd Street
Suite 1704
New York, NY 10017
Tel. (212) 599-1603 Fax (212) 599-1615

April 30, 2009

Phoenix Constructors, JV
115 Broadway, 18th Floor
New York, NY 10006

Attention: Mr. Javed Qureshi, Contract Administrator

Reference: EDC and Maple Trade Finance Generic Support Letters
Commercial Proposal Submission – Best and Final Offer
World Trade Center Transportation Hub – Bid Package 20
RFP/Contract: W0TC-GC1-2 KN0186-020
Station Construction and Transit Hall Structure to Grade Furnish, Fabricate and Erect Structural Steel, Intumescent Fire Resistant Coating, Metal Decking & Precast Concrete Work
DCM Erectors, Inc Bid 801E054

Dear Mr. Qureshi:

We attach generic support letters from Maple Trade Finance and EDC for DCM Erectors, Inc. They will issue actual letters of support once we provide them with copies of our actual executed subcontract agreement. They will perform their due diligence to verify that your client, The Port Authority of New York and New Jersey, has the ability to make contract progress payments and issue change orders in a timely manner so as not to impair the balance sheets of DCM Erectors, Inc. We may be seeking the proper individuals within in your client's organization that our support group may wish to correspond with so that they may perform their due diligence and will ask for your assistance regarding same.

Very truly yours
DCM Erectors, Inc

Jeffrey S. Gannett
Vice President

Maple
TRADE FINANCE

April 30, 2009

Port Authority of New York & New Jersey
225 Park Avenue South
New York, NY 10003

Re: Construction of the World Trade Centre Transportation Hub Project, New York City, NY

Maple Trade Finance Inc. is pleased to learn that our client, DCM Erectors, is being considered for the World Trade Center Transportation Hub project.

DCM has been a client of Maple Trade Finance Inc. since August 2005 during which time we have had the opportunity to provide DCM with the financing for a number of significant projects in New York, Canada and the Bahamas. The projects currently include Tower 1 and the East/West Connector.

Maple Trade Finance is a wholly owed subsidiary of the Maple Financial Group; a Canadian based global financial organization with over $50 Billion is assets and offices worldwide. With access to the asset base of the Maple Group, through Maple Bank GMbH, we offer our clients an unparalleled opportunity to acquire financing for domestic and export projects.

We welcome the opportunity to provide DCM with the financing necessary, within the parameters of their existing credit facility, to ensure the successful completion of this and/or other projects. However, the extent of our financial involvement is dependent upon and subject to an assessment of the project, our standard due diligence, and approval by the Maple Trade Finance Inc. Credit Committee.

Please do not hesitate to contact us if we can be of further assistance.

Regards,

Maple Trade Finance Inc.

Carole-Ann Miller
President

cc. Larry Davis, DCM Erectors

5475 Spring Garden Road, 7th floor, Halifax, NS B3J 3T2 • T: (902) 444-5566 • F: (902) 444-5567
Toll Free: 1-866-444-6555 • Toll Free Fax: 1-877-655-5567 www.mapletradefinance.ca

EDC
Export Development Canada
Exportation et développement Canada

April 30, 2009

Mr. Larry Davis
President
Davis Construction Management Group Ltd.
100-77 Belfield Road
Toronto, Ontario
M9W 1G6

Dear Mr. Davis:

Re:
- Non-Binding Letter of Interest
- Contract Frustration Insurance (CFI)
- WTC Transportation Hub contract between DCM Erectors and the Port Authority of New York and New Jersey (PANYNJ)

Based on the information that has been provided to date, it appears that EDC would be prepared to consider providing CFI coverage up to USD10 million to insure the credit and commercial risks of The Port Authority of New York and New Jersey for the above mentioned contract.

This letter of interest does not constitute a binding commitment or offer of EDC to provide CFI support. Any issuance of a binding commitment by EDC to provide CFI support would be subject to, among other conditions, a full contract review satisfactory to EDC, credit approval, the completion of due diligence acceptable to EDC, receipt of requisite corporate authority, and such other terms and conditions as EDC may, in its discretion, require.

Please do not hesitate to contact the undersigned should you have any questions.

Yours truly,

Lynne Thomas
Underwriter
Contract Insurance and Bonding
Export Development Canada
Tel: 613-597-8645
Fax: 613-597-8504
Email: lthomas@edc.ca

Paolo Utano
Underwriter
Contract Insurance and Bonding

Cc. Juzer Yusufali, EDC Regional Account Manager, 1-416-862-1267

Revised Document

phoenix constructors JV

WTC TRANSPORTATION HUB
RFP/CONTRACT NO.: W0TC-GC1-2-KN00186-020
STATION CONSTRUCTION AND TRANSIT HALL STRUCTURE TO GRADE
FURNISH, FABRICATE AND ERECT STRUCTURAL STEEL, INTUMESCENT FIRE RESISTANT COATING, METAL DECK & PRECAST CONCRETE WORK

PROPOSAL INVITATION LETTER

November 21, 2008

DCM Erectors, Inc.
110 East 42nd Street
New York, NY 10017

Attention: Mr. Larry Davis

Reference: Phoenix Constructors, JV
Request for Proposal (RFP) No.: W0TC-GC1-2-KN00186-020
Structural Steel, Intumescent Fire Resistant Coating, Metal Deck & Precast Concrete Work

Phoenix Constructors, JV is pleased to invite you to submit a competitive proposal for Work Package No. 20 "Station Construction and Transit Hall-Structure to Grade" – Structural Steel, Intumescent Fire Resistant Coating, Metal Deck & Precast Concrete Work for the Port Authority of New York and New Jersey WTC Transportation HUB Project located in New York City.

Work Package # 20 consists of three distinct Work Areas, identified as:

1. **Work Area 1 – PATH Station**
   Approximately 10,500 US Tons of steel

2. **Work Area 2 – 1 Line Subway Box (Greenwich Street Corridor)**
   Approximately 8,000 US Tons of steel

3. **Work Area 3 – Transit Hall**
   Approximately 3,500 US Tons of steel

Under this Work Package Subcontractors will have the option to submit separate proposals, inclusive of all costs and obligations for the following scopes of work:

Option A:
Furnish, Fabricate and Erect Structural Steel, Intumescent Fire Resistant Coating, Metal Deck & Precast Concrete Work applicable to **Work Area 1 –PATH Station**.

Option B:
Furnish, Fabricate and Erect Structural Steel, Intumescent Fire Resistant Coating, Metal Deck & Precast Concrete Work applicable to **Work Areas 2 + 3 – 1 Line Subway Box + Transit Hall**.

As well as submitting a proposal for one of the above options, Subcontractors will have the option to submit an additional proposal for the following alternate scope of work:

Alternate Option C:

Furnish, Fabricate and Erect Structural Steel, Intumescent Fire Resistant Coating, Metal Deck & Precast Concrete Work applicable to **Work Areas 1 + 2 + 3 – PATH Station + 1 Line Subway Box + Transit Hall**.

For the purposes of general information, the preliminary quantity of structural steel for the entire Work Package #20 (all Work Areas) is approximately 22,000 US Tons, of which approximately 50% of the steel is classified as "Special Shape Exposed Steel" and the remaining 50% of the steel is classified as "Standard Profile and Built-Up Sections," including 1-Line Subway Box steel.

Due to the size and nature of the different specialty trade requirements, bidders are permitted to select a team of subcontractors or form a joint venture or consortium to bid the RFP.

For the 1st Step of the RFP, only select drawings for Work Package #20 will be issued to the bidders in order to provide the bidders with a general understanding of the scope of work. Drawings showing the work of other disciplines will not be issued with the 1st Step of the RFP, however such drawings are available for review at the Phoenix Constructors JV office. The remainder of the Work Package #20 drawings will be issued to the short-listed bidders during the 2nd Step of the RFP.

For the convenience of the bidders, one (1) copy of the select drawings issued for the 1st Step of the RFP will be sent directly to steel fabricators who are familiar with the "Special Shape Exposed Steel" structures. A list of these steel fabricators who are familiar with "Special Shape Exposed Steel" structures is attached to this letter for solicitation / consultation at the sole discretion of prime bidder. The list is provided for general information only.

In preparing your proposal, it is essential that you adhere to the requirements of the enclosed Request for Proposal (RFP). Please refer to the "Instructions to Offers" that is included in this RFP package for full details regarding submission of your bid proposal.

This RFP is comprised of two steps:

1) During the **1st Step of the RFP**, the bidders will acknowledge receipt of the RFP documents, including any addenda, and will provide a statement of their intent to submit a proposal. The bidders will be required to attend a **MANDATORY Pre-Bid meeting to be held on Wednesday, 12/3/2008, at the Phoenix Constructors JV offices, located at 115 Broadway, 18th Floor**. The bidders will also submit the required pre-qualification documents for their company and for their team members' companies. Based on review of the pre-qualification documents, Phoenix Constructors JV and The Port Authority will short-list the bidders who will be allowed to continue to the 2nd Step of the RFP. *Please refer to the "Instructions to Bidders" for full details on the required submittals for the 1st Step of the RFP.*

2) The selected subcontractor teams / joint venture partners will be invited to participate in the **2nd Step of the RFP**. The selected bidders will be required to attend a second **MANDATORY Pre-Bid Meeting and Site Walk-Through**, which will be held on **Tuesday 12/16/2008 through Wednesday 12/17/2008, starting at 8:00AM EST**

each day. The meeting will be held at the Phoenix Constructors JV offices, located at 115 Broadway, 18th Floor. During the 2nd Step of the RFP, the bidders will submit their Technical Proposal, Commercial Proposal, and Method Statement. *Please refer to the "Instructions to Bidders" for full details on the required submittals for the 2nd Step of the RFP.*

Phoenix Constructors JV requires that each bidder provide a bid bond / guarantee equivalent to a minimum of **two and one half percent (2 1/2%)** of the bid price with their bid proposal that is submitted during the 2nd Step of the RFP. The "bid guarantee" shall consist of a firm commitment such as a bond, certified check, or other negotiable instrument accompanying the bid, as assurance that the bidder will, upon acceptance of his bid, execute such contractual document as may be required within the time specified.

All proposals MUST be **SEALED** and MUST clearly state on the outside of the package:

**"SEALED PROPOSAL FOR RFP NUMBER: "W0TC-GC1-2-KN00186-020"
"CONTRACT TITLE: "STATION CONSTRUCTION AND TRANSIT HALL STRUCTURE TO GRADE - STRUCTURAL STEEL, INTUMESCENT FIRE RESISTANT COATING & PRECAST CONCRETE WORK" Option A or Option B, and Alternate Option C (if applicable).**

All proposals for the **1st Step of the RFP** must be received at our address below on or before **12/09/2008**, and will be opened only after that time.

All proposals for the **2nd Step of the RFP** must be received at our address below on or before **2/9/2009**, and will be opened only after that time.

Proposals received after these times shall not be accepted.

All Requests For Information (RFIs) shall be written via Letter, E-mail or Facsimile, and should be addressed to:

Phoenix Constructors, JV
115 Broadway, 18th Floor
New York, NY 10006
Attention: Javed Qureshi

e-mail:javed.qureshi@phoenixconstructors.com
Phone (646) 467-7219
Fax (212) 566-2302

All costs and expenses incurred by you in preparing your proposal will be borne solely by you. You will be informed whether or not your proposal has been successful. The award will be made on a "BEST VALUE BASIS" to Phoenix Constructors JV and The Port Authority. We reserve the right to reject any or all proposals. Further, we may award any part or phase of the Work to any one or more of the bidders. Actual award of the Contract is contingent upon execution of formal documents satisfactory to both parties.

You are requested to sign the attached copy of this letter in the space provided below and return it to us as acknowledging receipt of this RFP and the enclosures referenced therein and as confirmation of your intention to submit a proposal by the closing date. Should you not wish to submit a proposal you are requested to return all Request for Proposal materials.

It should be noted that Phoenix Constructors JV prohibits the participation of any of its respective affiliates in this solicitation process.

Very truly yours,

Javed I. Qureshi
Contract Administrator
Office 646-467-7219
Fax 212-566-2302
Cell

Enclosures:

Receipt Acknowledged: _____
(please sign)

Name _____
(please print)

Title: _____

Date: _____

INSTRUCTIONS TO OFFERORS

1.0 INTRODUCTION

Phoenix Constructors JV ("PC"), acting under its contract with the Port Authority of New York and New Jersey ("PANYNJ"), requests that you submit a proposal for a Lump Sum, Fixed Price type of contract, **Furnish, Fabricate and Erect Structural Steel, Intumescent Fire Resistant Coating, Metal Deck & Precast Concrete Work** as indicated in the contract drawings and specifications for the Station Construction and Transit Hall Structure to Grade (Work Package 20) (Contract WTC-284.458) for the Port Authority of New York and New Jersey WTC Transportation HUB Project located in New York City, USA.

Work Package #20 has been organized into three distinct Work Areas (WA) for Subcontractor's consideration and pricing.

1. **Work Area 1 – Path Station**
2. **Work Area 2 – 1 Line Subway Box** (Greenwich Street Corridor)
3. **Work Area 3 – Transit Hall**

Under this Work Package Subcontractors will have the option to submit separate proposals, inclusive of all costs and obligations for the following scopes of work:

<u>Option A</u>:
Furnish, Fabricate and Erect Structural Steel, Intumescent Fire Resistant Coating, Metal Deck & Precast Concrete Work applicable to **Work Area 1 – PATH Station.**

<u>Option B</u>:
Furnish, Fabricate and Erect Structural Steel, Intumescent Fire Resistant Coating, Metal Deck & Precast Concrete Work applicable to **Work Areas 2 + 3 – 1 Line Subway Box + Transit Hall**.

As well as submitting a proposal for one of the above options, Subcontractors will have the option to submit an additional proposal for the following alternate scope of work:

<u>Alternate Option C</u>:
Furnish, Fabricate and Erect Structural Steel, Intumescent Fire Resistant Coating, Metal Deck & Precast Concrete Work applicable to **Work Areas 1 + 2 + 3 – PATH Station + 1 Line Subway Box + Transit Hall**.

The RFP is comprised of two Steps:

1) **1st Step of the RFP**: Bidders will acknowledge receipt of the RFP documents, including any addenda, provide a statement of their intent to submit proposal, and submit the required pre-qualification information/documents, described in detail in Section 2.0 (below). There will be a **MANDATORY Pre-Bid meeting to be held on Wednesday, 12/3/2008, at the Phoenix Constructors JV offices, located at 115 Broadway, 18th Floor**. Based on review of the pre-qualification documents, Phoenix Constructors JV and The Port Authority will short-list the bidders who will be allowed to continue to the 2nd Step of the RFP.

2) **2nd Step of the RFP**: The short-listed bidders will be invited to a second **MANDATORY Pre-Bid Meeting and Site Walk-Through**, which will be held on **Tuesday 12/16/2008 through Wednesday 12/17/2008, starting at 8:00AM EST each day**. The meeting will be held at the Phoenix Constructors JV offices, located at 115 Broadway, 18th Floor. During the 2nd Step of the RFP, the bidders will submit their Technical Proposal, Commercial Proposal, and Method Statement, described in Sections 4.0, 5.0, and 6.0 (below).

PERTINENT DATES:

Request for Proposals Issued: 11/21/2008

1st Step RFP Mandatory Pre-bid Meeting: 12/02/2008

1st Step RFP Bidder's Questions/RFI – "Last Request Date": 12/02/2008

1st Step RFP Response to Questions/RFI – "Last Response Date": 12/05/2008

1st Step RFP Pre-Qualification Package Due Date: 12/09/2008

Short-List Bidders (by PCJV & PANYNJ): 12/10/2008 thru 12/12/2008

Inform Short-List Bidders Approved for 2nd Step Bidding Process: 12/12/08

2nd Step RFP Mandatory Pre-bid Meeting / Site Walk-Through
(by Invitation only): **12/16/2008 thru 12/17/2008**

2nd Step RFP Issued to Short-List Bidders: 12/16/2008 thru 12/17/2009

2nd Step RFP Bidder's Questions/RFI – "Last Request Date": 1/30/2009

2nd Step RFP Response to Questions/RFI – "Last Response Date": 2/5/2009

2nd Step RFP Proposals Due Date: 2/9/2009

Open Bids: 2/10/2009

Bid Review: 2/10/2009 thru 2/18/2009

Meetings with Selected Bidders & Request for Bid Clarifications/BAFO: 2/20/2009 thru 2/23/2009

Bid Clarifications / BAFO from Selected Bidders: 2/24/2009 thru 3/4/2009

Oral Presentations by Selected Bidders: Date To Be Determined

Finalize Bid Review and Recommend for Award: 3/05/2009 thru 3/09/2009

Anticipated Contract Award Date: 3/17/2009

2.0 1ST STEP OF THE RFP: SUBMISSION OF PRE-QUALIFICATIONS

The 1st Step of the RFP process is the submission of Pre-Qualification Package, described below, by the interested parties. If two or more companies plan on forming a Joint Venture for this project, EACH of the companies must submit a Pre-Qualification Package.

During the 1st Step of the RFP, there will be a **MANDATORY Pre-Bid Meeting**, held on Wednesday, **12/3/2008**, at the Phoenix Constructors JV offices, located at 115 Broadway, 18th Floor.

As part of the Pre-Qualification package, the Subcontractor is to identify its intention to submit proposal(s) for:

Option A:
Furnish, Fabricate and Erect Structural Steel, Intumescent Fire Resistant Coating, Metal Deck & Precast Concrete Work applicable to **Work Area 1 – PATH Station**.

Option B:
Furnish, Fabricate and Erect Structural Steel, Intumescent Fire Resistant Coating, Metal Deck & Precast Concrete Work applicable to **Work Areas 2 + 3 – 1 Line Subway Box + Transit Hall**.

Alternate Option C:
Furnish, Fabricate and Erect Structural Steel, Intumescent Fire Resistant Coating, Metal Deck & Precast Concrete Work applicable to **Work Areas 1 + 2 + 3 – PATH Station + 1 Line Subway Box + Transit Hall**.

Please direct your **sealed** pre-qualification packages to the mailing address identified below on or before the closing date and time. **PC reserves the right to reject any Pre-Qualification Packages received after the deadline.**

Identify the package or envelope **on the outside** as "Pre-Qualification Package in Response to: **RFP: W0TC-GC1-2-KN0186-020**." Furnish, Fabricate and Erect Structural Steel, Intumescent Fire Resistant Coating, Metal Deck & Precast Concrete Work. **Option A or Option B, and Alternate Option C (if applicable).**

Address package to:
Mr. Javed Qureshi
Contract Administrator
Phoenix Constructors, JV
115 Broadway, 18th Floor
New York, New York 10006

Tel: 646.467.7219; Fax: 212.566.2302
E-mail: javed.qureshi@Phoenixconstructors.com

The Offeror can contact the Contract Administrator to verify delivery of their bid proposal prior to official closing of the RFP.

Pre-Qualification Packages are to include:

2.1 NOTIFICATION OF INTENT TO PROPOSE/BID: In order to ensure that all prospective Offerors have received the solicitation and any amendments thereto, PC requests that a prospective Offeror notify PC in writing indicating that the Offeror intends to submit a proposal in response to this solicitation indentifying RFP WTC-GC1-2-KN0186 Furnish, Fabricate & Erect Structural Steel, Intumescent Fire Resistant Coating, Metal Deck & Precast Concrete Work. The Offeror may transmit the notification to the Contract Administrator (Javed Qureshi) via e-mail or fax.

2.2 TEAM MEMBERS / JOINT VENTURE PARTNERS: Include a statement identifying your team members / joint venture (JV) partners (if any), and their respective roles in the team / joint venture organization, as well as any other trade subcontractors / venders who will be performing work as a 2nd tier subcontractor under your management. The following roles must be identified:

a. Identification of Prime Subcontractor

b. Identification of Joint Venture Partners

c. Identification of Steel Fabricators for " Special Shape Exposed Steel"

d. Identification of Steel Fabricators for "Standard Profile and Built Up Sections"

e. Identification of Steel Fabricators for 1-Line Steel

f. Identification of Steel Erectors for "Special Shape Exposed Steel"

g. Steel Erectors for "Standard Profile and Built Up Sections"

h. Steel Erectors for 1-Line Steel

i. Identification of Intumescent Fire Resistant Coating Manufacture/ Supplier

j. Identification of Intumescent Fire Resistant Coating Applicator

k. Identification of Precast Concrete Fabricator

l. Identification of Precast Concrete Erector

m. Identification of Engineering Support Firm

2.3 PREQUALIFICATION FORMS: Exhibit 30A Representations and Certifications and Exhibit 30B Subcontractor Pre-Qualification Questionnaire must be filled out in their entirety by all members of your team/ JV

2.4 FINANCIAL STATEMENTS: Provide Financial Reports, Balance Sheets, and Profit and Loss Statements for the previous three (3) years for all members of your team/JV.

2.5 BONDING CAPACITY: Payment and Performance Bonds are required for all subcontract work over $300,000.00. Provide the name and contact information for your Bonding Company as well as your Bonding limit.

2.6 TECHNICAL QUALIFICATIONS AND CERTIFICATIONS: List all team members' or joint venture partners' qualifications and certifications. Prime Offeror should be a Certified Fabricator or a Certified Erector by the American Institute of Steel Construction or equivalent as approved and accepted by the Port Authority. Other fabricators selected for the team / joint venture should be AISC certified, or equivalent for non-USA firms, as applicable for the type of work to be performed. All erectors should be certified as AISC category Advanced Certified Steel Erectors or equivalent. The following certifications must be identified:

a. AISC Certification - Steel Fabrication Shop(s), or equivalent for non-USA firms

b. AISC Certification - Steel Erector(s)

2.7 SIMILAR TYPE OF WORK COMPLETED AND REFERENCES: List representative projects that demonstrate the extent to which the Offeror and their team members / joint venture partners have relevant experience in large-scale complex transportation structures of similar scope and complexity under the same demanding schedule, on other CM/GC Contracts; similar experience working within a major metropolitan area and with its public agencies; similar work in an urban environment and adjacent to operating railroad corridors, including measures used to minimize operational impacts to railroad operations; similar projects with complex utility relocations, projects with high security requirements, and projects with complex inter-agency coordination. Provide references for previous (dating back 5 years) and current projects with an initial contract value of $10,000,000 or greater. References shall include Client Name and Address, Client Technical Point of Contact and phone number, Contract Number, Brief Description of Work Scope, Contract Type, Period of Performance, Contract value.

2.8 MANAGEMENT TEAM: The organization of the project, including the identification of key personnel and their responsibilities and inter-relationships, and changes to the organization anticipated as the project evolves. Include organization charts that illustrate the reporting structure of the project team, identifying specific staff to be assigned to this project. In addition, the management plan shall include other key technical, subcontractor and/or consulting staff. Provide a full description of the reporting structure, including the role of each legal entity of the Subcontractor and the roles of any team members / joint venture partners / second tier subcontractor(s). You shall also describe other personnel who, while not directly assigned to the implementation, may support it in some way. For each key staff member of the project team indicate estimated percentage of time to be dedicated to the project (i.e. 100%, 50%, etc.). Be sure to show points of interaction with Phoenix Constructors' staff. Include resumes of all management and key technical personnel to be assigned. The resumes shall clearly emphasize the experience that is relevant to the project.

2.9 SHOP STAFF, AVERAGE SHIFTS, BACKLOG: Provide the following information pertaining to the fabrication shop(s): Number of shop production employees, average number of shifts, annual production in man hours and tons, descriptions of normal fabrication types, names, positions and experience of key personnel, current backlog listing indicating present and anticipated workload for the next twelve months, expressed in percent of normal annual volume.

2.10 QUALITY ASSURANCE, QUALITY CONTROL, QUALITY MANAGEMENT: The Offeror shall describe its Quality Assurance/Quality Control (QA/QC) organization; how the QA/QC plan extends to its subcontractors and others in the supply chain; resources and procedures the Offeror will use for evaluating construction activities and products and related activities, which shall conform to the client's WTC Quality Assurance Project Program as per Article 14 of Exhibit 1 Statement of Work and Exhibit 18.

2.11 SAFETY MANAGEMENT AND RECORDS: The Offeror shall describe the organization (including safety personnel), resources and procedures to be used for creating a safe environment for contractors, subcontractors, the Port Authority, PATH, NYCT personnel and the public during the life of the project, which shall conform to the client's WTC Site Safety Program as per Exhibit 15A. Provide a statement with regard to the Offeror and its team members' past record of worker and workplace safety, including any Recordable Accidents, Lost Time Accidents, and Experience Modification Rating (EMR) for the past three years. Provide copies of safety awards received from comparable projects, if any. This information must be submitted in order for PC to consider your pre-qualification package.

3.0 2nd STEP OF THE RFP: MANDATORY PRE-BID MEETING

Once the Pre-Qualification Packages are received, Phoenix Constructors JV and The Port Authority will review the information and will short-list the bidders who will allowed to continue to the 2nd Step of the RFP. The selected bidders will be invited for the second **Mandatory Pre-Bid Meeting and Site Walk-Through, which will be held on 12/16/2008 and 12/17/2008, starting at 8:00AM EST each day.** The purpose of this meeting is for the short-listed bidders to review the Scope of Work with Phoenix Constructors JV and PANYNJ. The meeting will be held at the Phoenix Constructors JV offices, located at 115 Broadway, 18th Floor. Subcontractors will be limited to six (6) participants and are reminded to have safety vests, safety glasses, boots, and hard hats for the use of each of their participants. Subcontractors will not be allowed to participate in the site walk-through without proper safety gear.

4.0 2nd STEP OF THE RFP: SUBMISSION OF TECHNICAL AND COMMERCIAL PROPOSALS

You must submit your proposal based on these "Instructions to Offerors", the enclosed Invitation Letter and draft Sample Subcontract. All proposals must be submitted in writing. **Telephone, email or facsimile proposals will not be accepted**.

Please direct your **sealed** proposal to the mailing address identified below on or before the closing date and time. **PC reserves the right to reject any proposal received after the deadline.**

Identify the package or envelope **on the outside** as "Pre-Qualification Package in Response to: **RFP: W0TC-GC1-2-KN0186-020**." Furnish, Fabricate and Erect Structural Steel, Intumescent Fire Resistant Coating, Metal Deck & Precast Concrete Work. **Option A or Option B, and Alternate Option C (if applicable).**

Address package to:
Mr. Javed Qureshi
Contract Administrator
Phoenix Constructors, JV
115 Broadway, 18th Floor
New York, New York 10006

Tel: 646.467.7219; Fax: 212.566.2302
E-mail: javed.qureshi@Phoenixconstructors.com

The Offeror can contact the Contract Administrator to verify delivery of their bid proposal prior to official closing of the RFP.

4.1 BID BOND/GUARANTEE: Phoenix Constructors JV requires that each bidder provide a bid bond/guarantee equivalent to a minimum of **two and one half percent (2 1/2%)** of the bid price with their bid proposal. The "bid guarantee" shall consist of a firm commitment such as a bond, certified check, or other negotiable instrument accompanying a bid, as assurance that the bidder will, upon acceptance of his bid, execute such contractual document as may be required within the time specified.

4.2 QUESTIONS OR COMMENTS REGARDING SOLICITATION: The Offeror shall submit any comments or questions regarding the Solicitation to the Procurement Manager in writing ~~early enough to allow sufficient time for a response prior to the proposal due date~~. Offeror shall not communicate with any other Offeror, employee or consultant employed by PC or the PANYNJ with respect to the subject matter of this Solicitation. The Offeror may transmit questions and comments via fax or e-mail. PC will answer all questions in writing and provide a copy of all questions and answers to all Offerors. If the RFP requires an addendum to resolve issues regarding the RFP, PC will issue an amendment to those Offerors who have not declined to participate in time for them to consider the addenda before finalizing and submitting their offers.

4.3 AMENDMENTS TO SOLICITATION: If this RFP is changed, it will be done so via written addendum. Unless otherwise stated, all terms and conditions that are not modified will remain unchanged. The Offeror shall acknowledge receipt of all Addendum(s) by stating in the offer that the Offeror has received the Addendum(s) and has considered it/them in formulating their proposal.

4.4 PACKAGE CONTENTS: Inside the **sealed** delivered package, there must be **two separate, sealed envelopes** labeled "Technical Proposal" and "Commercial Proposal" and they must contain the items listed below in Sections 5.0 and 6.0. Both the Technical Proposal and the Commercial Proposal must be **sealed** and contain an original, plus three (3) copies. The original of your offer must be clearly marked "Original." The copies must be identical to the original and may be photocopied from the original after signature.

Each package containing material you wish to be considered as part of your offer must be sealed with a self-adhesive label contained in the RFP Package, (to be furnished by Phoenix Constructors JV), marked "Sealed Offer." Your failure to use these labels may result in the inadvertent opening of the package and may cause your offer to be rejected.

4.5 ORAL PRESENTATIONS: After a review of all proposal submissions, an oral presentation to the selection committee and others, as appropriate, may be requested. It should be noted that firms selected to make presentations may be given brief advance notice. Presentations will be limited to 60 minutes, and include the material contained in your proposal. The presentation will be followed by an approximately 30-minute question and answer session. Proposer's staff providing the presentation shall be led by the proposed Project Manager, who may be supported by no more than five (5) other senior staff members who are proposed to work on this project.

5.0 TECHNICAL PROPOSAL

The Offeror shall provide one original and three copies of the Technical Proposal that includes:

5.1 MANAGEMENT PLAN: This Section specifies the minimum content of the Management Plan that shall be submitted as part of the Proposal. The Plan shall describe how the Offeror intends to manage and perform the Work of the Project.

5.1.1 The organization of the project, including the identification of key personnel and their responsibilities and inter-relationships, and changes to the organization anticipated as the Project evolves. Include organization charts that illustrate the reporting structure of the Project team, identifying specific staff to be assigned to this Project. In addition, the Plan shall include other key technical, subcontractor and or consulting staff. Provide a full description of the reporting structure, including the role of each legal entity of the contractor and the roles of any subcontractor(s). You shall also describe other personnel who, while not directly assigned to the implementation, may support it in some way. For each key staff member of the Project team indicate estimated percentage of time to be dedicated to the Project (i.e. 100%, 50%, etc.). Be sure to

show points of interaction with Phoenix Constructors' staff. Include resumes of all management and key technical personnel to be assigned. The resumes shall clearly emphasize the experience that is relevant to the Project.

5.1.2 The Offeror shall identify its approach toward the management of this Project including scope and complexity.

5.1.3 The Offeror shall describe the capability of the organization to perform required tasks and include the Offerors' annual volume in dollars of construction for the past five years, anticipated volume for the current year and plan for the next five years.

5.1.3 Occasionally, subcontractors and material suppliers go bankrupt during the course of a Project. The Offeror shall describe what actions it would take to protect "Phoenix Constructors JV / Port Authority" from being adversely affected by such an occurrence.

5.1.4 Since the achievement of milestones and management of the construction schedule is of the essence for this Project, the Offeror shall describe the organization that will have the primary responsibility for control and reporting of the Progress Schedule, and its techniques for effective and timely controls and reporting.

5.2 SCHEDULE: Offeror shall provide a detailed construction sequence / schedule to demonstrate how the work will be completed within the required schedule. Provide enough detail so that PC will be able to evaluate the proposal and approach being taken to the scope of work.

5.3 COST AND SCHEDULE CONTROLS: "PC" believes that it can better manage the Project if it is continually aware of its cost and schedule status. The Offeror shall describe controls and procedures to be used for management and monthly reporting of progress, problems, changes, and forecasts to complete, schedules and costs (including estimating and trending), including the names and positions of responsible parties. Such controls and procedures shall, at a minimum, be in conformance with the requirements specified in the Contract documents

Accordingly, the Offeror shall describe its approach for schedule preparation, updating and reporting in accordance with the Contract documents.

5.4 QUALITY ASSURANCE, QUALITY CONTROL, QUALITY MANAGEMENT: The Offeror shall describe its Quality Assurance/Quality Control (QA/QC) organization; how the Plan extends to subcontractors and others in the supply chain; resources and procedures the Offeror will use for evaluating construction activities and products and related activities, which shall conform to the client's

WTC Quality Assurance Project Program as per Article 15 of Exhibit 1 Statement of Work and Exhibit 18.

5.5 SAFETY: The Offeror shall describe the organization, including personnel, resources and procedures to be used for creating a safe environment for contractors, subcontractors, Phoenix Constructors JV, the Authority, PATH, NYCT personnel and the public during the life of the Project, which shall conform to the client's WTC Site Safety Program as per Exhibit 15A.

5.6 M/WBE UTILIZATION: The Offeror shall describe its plan to meet the combined goal for participation by Minority – owned / Women – owned Business Enterprises (M/WBE) as set forth in Exhibit 21G.

5.7 EQUIPMENT AND MATERIAL LIST: Provide a list in Exhibit 2A of equipment and materials which will be made available for this effort.

5.8 EXCEPTIONS and ALTERNATE PROPOSALS: Exceptions to technical requirements or contract terms and conditions will not be accepted and may render the proposal "non responsive" and subject to rejection. PC must be able to evaluate and compare all technical proposals based upon the same technical requirements and contract terms and conditions as specified in the solicitation.

However, the Offeror may also submit an alternate proposal "in addition" to the primary proposal stated above. Please note that an alternate proposal submitted by itself is non responsive to the solicitation and will be rejected. The alternate proposal must be in a distinctly separate technical and cost volume that clearly list the exceptions to the solicitation (technical and/or commercial terms), and must set forth the addition/deletion to the solicitation (technical and or commercial terms) and the amount of change (increase/decrease) to the price or cost of the primary proposal.

6.0 COMMERCIAL/PRICE PROPOSAL

The Commercial Proposal shall consist of the Offerors' proposed pricing and other non technical information, as outlined below. The price table in (Exhibit 2A) will constitute all anticipated work included in the fixed price offer for this work based on the currently known scope of work as described by the attached Statement of Work (Contract, Exhibit I).

6.1 CONTRACTOR PRICING AS FORMATTED IN EXHIBIT 2A: Contractor Pricing and Invoicing Instructions including all Commercial Schedules and requested markups. Use of other than the commercial formats provided may be cause for rejection of your proposal.

6.2 CONTRACTOR'S SIGNATURE AUTHORIZATION: The Offeror shall provide a list of officers who are authorized to approve Contract Documents, Contract Modifications, and to make commitments on behalf of the subcontractor.

6.3 EXCEPTIONS: Written statement confirming that there are no exceptions to the Scope of Work or Contract Terms and Conditions.

This primary Commercial Proposal must include prices for all technical requirements and contract terms and conditions as provided in the solicitation. Any technical or commercial qualifications and/or exceptions listed must be contained in an "alternate proposal" (see Section 3.1.5 under Technical Proposal above).

6.4 INSURANCE: Completed Insurance Certificates satisfactory to Phoenix Constructors JV / PANYNJ Requirements (Exhibit 11).

6.5 OCIP: Owner's Contractors Insurance Program – In accordance with Exhibit 11A provide a statement confirming that the Offeror agrees to be subject to the provisions of the Owner's Contractor Insurance Program. Complete and return the required forms as specified in Exhibit 11A.

6.6 EQUAL EMPLOYMENT OPPORTUNITY CERTIFICATION: In accordance with EXHIBIT 24A, Equal Employment Opportunity Certification, please sign and return the form as required.

6.7 DAVIS-BACON COMPLIANCE STATEMENT: Provide a statement of compliance to the Davis-Bacon requirements as described in EXHIBIT 24B, Schedule of Minimum Wage Rates. All labor used by the contractor for the Work is subject to the Davis Bacon Act, Contract Work Hours and Safety Standards Act, Copeland (anti kickback) Act and the Fair Labor Standards Act. These regulations establish Federal minimum wage rates and overtime rates, and labor reporting requirements for the contractor.

Each subcontractor **MUST** fully **complete** and sign the **certified payroll provided in Exhibit 24B** on a weekly basis. As a prerequisite for payment, not limiting any other prerequisites for payment, the Subcontractor must **submit** all respective certified payrolls to the Contractor **at the time of invoicing.**

6.8 SUBCONTRACTOR REQUEST FORM: If the Offeror intends to utilize any Sub-Subcontractors, Submit Exhibit 13, Subcontractor Request Form, for each Sub-Subcontractor.

6.9 BONDING: Payment and Performance Bonds satisfactory to Phoenix Constructors JV Requirements (Exhibit10).

6.10 UNION AGREEMENTS: Provide one complete copy of all union / labor agreements and a letter certifying that all agreements are attached as applicable to the scope of work.

6.11 PERMITS AND LICENSES: Offeror shall submit with its proposal, the certificate of license number which grants them the authority to work as a contractor in the state, county and/or municipality where the work is to be performed.

7.0 DEFINITIONS

For all purposes of this Request for Proposal document, except as otherwise expressly provided herein, the terms defined shall have the meanings assigned to them in this Article.

"Owner" or "PANYNJ" or "The Authority" means Port Authority of New York and New Jersey

"Company" or "PC" means Phoenix Constructors, JV

"Contractor" or "Subcontractor" means successful Offeror.

"Addendum" means any document(s) issued by Phoenix Constructors JV to all Offerors during the offering period, that contains additional information or corrections made by Phoenix Constructors JV to this Request for Proposal document.

"Offeror " means the person, corporation, partnership, joint venture or other organization which has submitted a proposal to Phoenix Constructors JV for performance of the Work.

"Successful Offeror" means the Offeror whose proposal has been accepted by Phoenix Constructors JV in writing.

"Subcontract" means the contractual document signed by the Successful Offeror and Phoenix Constructors JV in the form as defined in this Request for Proposal document.

"Request For Proposal" or "RFP" means the solicitation to offer and includes all Addenda.

Terms defined in this Article importing the singular also include the plural, and vice versa, where the context requires.

8.0 PREPARATION COSTS

Neither Phoenix Constructors JV and/or Owner will be responsible for any costs or expenses in preparing and/or submitting your proposals or subsequent meetings,

interviews or in providing any supplemental information. Offeror is responsible for any and all costs associated with submitting his proposal.

9.0 RIGHT OF ACCEPTANCE

Phoenix Constructors JV and/or Owner reserve the right to accept any proposal other than the lowest cost proposal and to accept or reject any proposal in whole or in part, or to reject all proposals with or without notice or reasons and, if no proposal is accepted, to abandon the Work or to have the Work performed in such other manner as Phoenix Constructors JV / PANYNJ may elect.

Partial or incomplete proposals may be deemed non-responsive. You will be informed whether or not your proposal was successful.

10.0 OFFEROR'S MODIFICATION AND WITHDRAWAL OF PROPOSAL

You may, without prejudice to yourself, modify or withdraw your proposal by written request, provided that the request is received by PC prior to the offer due date and time that your proposal was to be submitted. Following withdrawal of your proposal, you may submit a new proposal provided that such new proposal will be received on or before the due date and time.

PC or PANYNJ may modify any provision(s) or part(s) of the Request for Proposal documents at any time prior to the award of a contract.

11.0 PHOENIX CONSTRUCTORS JV POLICY

In accordance with PC's policy, all qualified Offerors are entitled to receive equal opportunities. The offering or receiving of gifts, entertainment, payments, loans or other favors for the purpose of being placed on a Offerors' list, obtaining a contract, or favorable treatment under a contract, is prohibited. Furthermore, it is PC's policy that in the event an Offeror or Subcontractor is found to have offered or given a gratuity to obtain a contract or favorable treatment thereunder, the Offeror or Subcontractor involved will be refused further offer considerations by all of PC's entities. PC may also obtain those remedies available under law and the Contract, including, but not limited to, termination for default. Your attention is invited specifically to those articles in Representations and Certifications relating to Termination for Default and Gratuities.

12.0 INFORMATION BROKERING

PC considers completely unacceptable the acquisition or use of sensitive or confidential information for which Offerors or their agents or representatives are not entitled, such as competing for Offerors' proposal data, evaluations of proposals submitted by Offerors, and ranking of proposals. Offerors are required to notify PC immediately of any solicitation or approach offering (a) confidential offer information (including evaluations of

offer information), (b) improper influence which would affect the award of any contract associated with this project.

Offerors are further required to notify PC immediately if they come into possession of confidential information (including evaluation of offer information). Failure to comply with the foregoing may result in disqualification of the Offeror.

13.0 MINORITY BUSINESSES

Consideration is to be given to minority businesses for the supply of services and commodities for the World Trade Center HUB Project.

13.1. In addition, for awards expected to be in excess of $100,000, in accordance with Exhibit 21G, all Subcontractors of "PC" working on the WTC Hub who intend to purchase material or services, are required to establish contractor policies and procedures to take affirmative steps to encourage Minority and Women's Business Enterprises to seek business opportunities on the Project.

13.2 You are requested to obtain quotations for materials and services from minority owned enterprises. Potential minority subcontractors and material suppliers should be identified in proposals as such.

14.0 PRICING CONDITIONS

14.1 Pricing, stated in U.S. dollars, must be in accordance with the provisions of Exhibit 2A – Contractor Pricing and Invoicing Instructions. The blanks in Exhibit 2A – Contractor Pricing and Invoicing Instructions must be completed and returned by all Offerors as your commercial proposal.

14.2 Proposal validity-period is requested for 90 days after the closing date of this RFP.

14.3 **All pricing must be firm for the duration of this Contract.**

14.4 The quoted price(s) must include all costs to you for materials, labor, equipment, testing and any and all items of expense, fees, taxes, duties, overhead and profit for your full and complete performance of the Work as set forth herein.

14.5 All pricing information and requests for information identified in this RFP must be provided. Failure to comply with this request may result in a rejection of any proposal. **PC reserves the right to request and have you furnish any accounting breakdown of all contract prices including "cost or pricing data" as required**. This request may be made after contract price has been finalized with the Successful Offeror and for any Change Orders to the Contract issued by PC.

14.6 If you are the selected Subcontractor, you will be responsible for acquiring any and all licenses (applicable contractor's license(s), business license(s), etc.) and permits required to perform the Work, excluding building permits.

14.7 You are advised that quantities reflected on the drawings are for informational purposes only and that each Offeror is responsible for determining quantities required to perform the Work. The only exception shall be where PC has provided bills of quantities in Exhibit 2A for Offerors' insertion of unit prices.

14.8 Upon award, PC will issue one reproducible set of drawings for the selected Subcontractor's use in obtaining all construction prints. No additional construction drawings will be issued by PC for the Successful Offerors' use in performance of the Work.

14.9 You must define all materials to be purchased that cannot be obtained within 14 days after approval of design drawings.

14.10 Proposals for this Work are being requested from other Offerors.

14.11 In the case of any discrepancy between words and figures, the words shall prevail. In the case of errors in addition or extension, the unit prices quoted shall prevail.

14.12 You are advised that the Successful Offerors' personnel, including subcontractors, will be required to attend a safety orientation meeting. (This includes the entire labor force and all new hires). The meeting will last approximately ***two*** hours. All costs are to be included in your quoted prices.

In addition, the Successful Offeror will be expected to conduct weekly gang box safety meetings which shall be attended by all its craft employees. These meetings will last approximately ***one half*** hour.

14.13 The successful Offeror shall be expected to have all their employees who shall be working within the confines of the "1- Line Subway and PATH Tracks" to undergo track training which shall be conducted by the New York City Trans (NYCT) and PATH. All costs shall be included in your quoted prices. The approximate cost is $2,000 for a 15 employee class to be paid by the Subcontractor to the agency conducting the required training.

14.14 In addition, the successful Offeror shall obtain Security Clearance Passes from the Port Authority for all their personnel entering the site. The successful Offeror's information shall be provided to the Port Authority to obtain the passes.

Subcontractors and their respective employees, subcontractors, and suppliers must comply with all security requirements set forth in this Subcontract including

Exhibit 41 "WTC PATH Identification Guidelines For Subcontractors;" and all additional security requirements imposed by The Port Authority of New York and New Jersey, Phoenix Constructors, or any additional party that Phoenix Constructors in their sole determination believes shall have the ability to request such requirements. Other than the actual Secure Worker Access Consortium (SWAC) enrollment cost of $250.00 per individual, the Subcontractor shall be solely responsible for all costs and/or expenses associated with the security, enrollment and identification,procedures and requirements set forth within this Subcontract.

15.0 INSURANCE

15.1 The Successful Offeror must, as a minimum requirement, provide the insurance coverage as described in the Article entitled Insurance of the Sample Subcontract.

15.2 Exhibit 11 titled "Insurance Rider" provides a statement confirming that the Offeror agrees to obtain the Insurance required.

15.3 Owner's Contractors Insurance Program (OCIP) – In accordance with Exhibit 11A, provides a statement confirming that the Offeror agrees to be subject to the provisions of the Owner's Contractor Insurance Program. Complete and return the required forms as specified in Exhibit 11A.

15.4 Subcontractor shall name Phoenix Constructors JV, PANYNJ and other expressly specified parties as additional insureds and furnish a waiver of subrogation in favor of both.

15.5 You must complete and submit the insurance data requested in the Proposal Forms, as verification of possession of the above required insurance provisions.

16.0 EXCEPTIONS AND DEVIATIONS

16.1 Except as provided for below in section16.2 no qualifications to any requirement, provision, specification or stipulation of this RFP document shall be made by you. Failure to comply with this condition may result in a rejection of any proposal.

16.2 If you feel it would be advantageous to PC and/or PANYNJ to deviate from the requirements, conditions and provisions set forth in the RFP, you may present such departures as an "alternative proposal," marked as such and presented with your primary proposal, explaining in full detail the nature and extent of your proposed departure and the consequent impact on the prices, schedules or any other aspect of your proposal.

Such departures must be clearly identified and listed in a separate section of the

proposal devoted explicitly to that purpose. Considerations of any alternate proposal will be at the sole discretion of PC and/or PANYNJ.

16.3 The submission of a proposal indicates acceptance by you of all conditions contained herein.

16.4 During the proposal review, PC will not be responsible for identifying or resolving any deviations that may be contained in your proposal. If you are awarded the Subcontract, the only deviations recognized will be those mutually agreed upon and incorporated into the Subcontract in writing.

17.0 DISCREPANCIES AND OMISSIONS/ADDENDA

Should you find discrepancies in or omissions from the Solicitation documents, or should their intent or meaning appear unclear or ambiguous, you must notify the contract administrator named in the Proposal Invitation Letter for resolution. Replies to such notices will be made in the form of a written Addendum to the Solicitation documents issued simultaneously to all Offerors. You must acknowledge receipt of all Addenda in your proposal cover letter. Phoenix Constructors JV and/or Owner will not be bound by, and you must not rely on, any oral interpretations or clarifications of the Solicitation documents.

Deadline for the submittal of questions and inquires is provided in Section 1.0 above.

18.0 CONFIDENTIALITY AGREEMENT

You may be required to sign a confidentiality agreement for extra sensitive information provided to you. You will be informed about this in more detail during the job-walk.

19.0 RETURN OF DOCUMENTS

In the event that you decide not to submit a proposal, you are required to return all Solicitation documents to the contract administrator named in the Proposal Invitation Letter.

20.0 TAXES

This is a tax exempt project for all material that shall be permanently incorporated into the project at completion.

21.0 LOCAL LABOR AND SERVICES

Local contractors, including suppliers of materials, services and labor forces are to be utilized in performance of the Work to the maximum extent practical. For all labor, Offeror shall be in compliance with the Davis Bacon requirements as stated herein.

21.1 Contractors/Subcontractor shall mean those companies which are licensed or can be licensed to do business in the state of New York.

21.2 Labor forces shall mean personnel from qualified to perform the work for which they are employed.

22.0 SIGNATURE REQUIREMENTS

Your proposal must be signed by a duly authorized officer of your organization. If your organization is a corporation, the proposal must be signed in its name and on its behalf and under seal by a duly authorized signing officer of the corporation and must be accompanied by a certified copy of a resolution of the corporation authorizing such execution. The office held by the signing officer must be shown.

If you submit a proposal as a partnership or joint venture, you must submit with your proposal a "Power of Attorney" executed by all of the general partners or members of the joint venture designating and appointing one of the general partners or members of the joint venture as a "Management Sponsor," and authorizing the Management Sponsor to sign the proposal on your behalf, to act for and bind you in all matters relating to the proposal and, in particular, to agree that each partner or member of the joint venture are jointly and severally liable for any and all of the duties and obligations assumed by you under the proposal and the contract, if awarded. The proposal must be signed on behalf of the partnership or joint venture in its legal name by the Management Sponsor.

If requested by Phoenix Constructors JV, satisfactory evidence of the authority of any signatory to sign on behalf of your organization must be furnished.

Only unified sums, rates, prices, or conditions will be accepted. Sums, rates, prices or any conditions which differ between individual parties of a partnership or joint venture will not be accepted.

23.0 BONDING

23.1 Performance and payment bonds may be required in the penal sum of one hundred percent (100%) of the Contract Price for each bond. Refer to Exhibit 10 regarding format of required bonds. These bonds may be requested in the form of a bank guarantee or letter of credit.

23.2 Bond Premium Reimbursement: Phoenix Constructors JV shall reimburse the Subcontractor the lesser of the bid amount or the amount actually paid by the Subcontractor for any bonding premiums. As a condition precedent to the associated reimbursement, the Subcontractor must provide sufficient evidence, in a manner that is satisfactory to the Phoenix Constructors JV, that such premiums have been paid.

23.3 The surety and / or bank selected by you must be acceptable to Phoenix Constructors JV. The minimum requirements are:

23.3.1 Licensed to conduct business in ~~the State~~ in which the Work will be performed. Named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published annually (on 1 July) in Circular 570 by the Department of Treasury.

23.3.2 Immediately following offer selection, Phoenix Constructors JV. shall determine if complete performance and payment bonds will be required of the selected Subcontractor. The requirement for the Successful Offeror to complete and submit these forms will be made after a final determination of bond requirements and prior to finalizing the Contract. There is no requirement for these forms to be completed or submitted with your proposal. THE SUCCESSFUL OFFEROR WILL NOT BE ALLOWED ON THE JOBSITE UNTIL THE BOND REQUIREMENTS (IF APPLICABLE) ARE COMPLIED WITH AND COPIES OF COMPLETED BONDS ARE RECEIVED AND APPROVED BY PHOENIX CONSTRUCTORS JV / PANYNJ.

24.0 QUALIFICATION STANDARDS AND EVALUATION

24.1 Criteria

"PC" will make the award on a "BEST VALUE BASIS" to the responsible Offeror whose Proposal is most advantageous to Phoenix Constructors / PANYNJ. Accordingly, "PC" may not necessarily make an award to the Offeror with the highest ranking on non cost factors nor award to the Offeror with the lowest compensation proposal if doing so would not be in the overall best interest of "PC" and the Port Authority of New York and New Jersey. As proposals are considered by "PC" to be more equal in their technical merit, the evaluated cost or price becomes more important so that when technical proposals are evaluated as essentially equal, cost or price may be the deciding factor.

1st Step of RFP

Subcontractor **Pre-Qualification** Packages will be evaluated with the following overall criteria on a "BEST VALUE BASIS" at the sole discretion of Phoenix Constructors JV / PANYNJ:

- Team Composition, including but not limited to Company Histories, Experience, and References
- Company Certifications (e.g. AISC Shop Certification(s) or equivalent)

- Financial Records, Balance Sheet, Assets, Income
- Management Team, Resumes of Key Personnel
- Shop Staff, Average Shifts, Productivity, Backlog
- Bonding or Acceptable Equivalent and Insurance Capabilities
- Safety Records (Recordable Incidents, Lost Work Day, EMR)
- Quality Control / Quality Assurance Procedures

2nd Step of RFP

Subcontractor **Proposals** will be evaluated with the following overall criteria on a "BEST VALUE BASIS" at the sole discretion of Phoenix Constructors JV / PANYNJ:

- Proposed Price
- Technical and Management Approach
    - Management of Fabrication, Erection, Connection Engineering, Detailing Components
    - Cranes, Equipment, Site Logistics, Means and Methods Plan
- Ability to Meet Schedule
- Quality Control Plan
- EHS / Safety Plan
- M/WBE Participation Plan
- Exceptions or Qualifications

25.2 Investigation, Discussions, Negotiations

"PC" may investigate responsibility, references or any aspect of the Offerors' Prerequisites, Technical or Experience and Business Risk Proposals, cost, or pricing as necessary to determine whether the Offeror is qualified or to confirm the accuracy and/or validity of any of the information presented. An Offerors' failure to supply information promptly following oral or written notice by "PC" may be grounds for disqualification and rejection of its Proposal. "PC" representatives may visit the Offerors' facilities, and the Offeror shall cooperate in making any

reasonable arrangements in these regards. Each Offeror may be invited for a presentation, interview and meeting to discuss any aspect of its Offer and to answer specific questions.

PC may request a Best and Final Offer from those offerors deemed to be technically qualified and within the competitive price range. However, PC reserves the right to (1) negotiate with any selected offeror(s) or (2) may select and award based upon the original proposals without oral presentations, discussions, or negotiations.

25.3 Financial Capability Determination Information

PC reserves the right, prior to award, to require the Offeror to submit information that PC will use to make a determination whether the Offeror has the financial capability to perform the contemplated contract. Such information may include, but not be limited to: annual reports; lines of credit with financial institutions and suppliers; SEC Form 10K, and any other information that may be required by PC.

25.4 Single Proposal

In the event a single Offer is received, "PC" may conduct a price and/or cost analysis of the Offer. The Offeror may be required to furnish cost and pricing data to support this effort. Negotiations may be conducted with the single Offeror or the Offer may be rejected.

26.0 NOTICES TO OFFERORS

26.1 Precedence of Requirements

In the event of a conflict among the provisions of the RFP instructions, the RFP correspondence, other documents and the resulting contract, the terms of the contract shall govern.

26.2 Phoenix Constructors JV prohibits the participation of any of its respective affiliates in this solicitation process.

27.0 PROTEST PROCEDURES

If the instance arises that a Subcontractor feels that there are faults in Phoenix Constructors JV's procurement operations, the Subcontractor must file a formal protest. All protests must be received in writing and be concise and logically presented to facilitate review by the Phoenix Constructors JV. All protests will include:

- Name and address of the protestor including telephone and fax number and email address
- The solicitation title and number

- The contract title and number
- A statement concerning the protestor's interest in the award or non-award of the Subcontract/Purchase Order for the purpose of filing the protest
- A comprehensive statement of the legal and factual grounds for the protest that must include a detailed description of the resulting prejudice to the protestor
- Copies of all relevant and supporting documents and information
- The relief required and the reasons therefore

All protests must be submitted to:

Phoenix Constructors, JV
Procurement Manager
115 Broadway, 18th Floor
New York, NY 10006

Protests based upon alleged apparent improprieties of the solicitation shall be filed before proposal opening or the closing date for receipt of proposals or bids. In all other cases protests shall be filed no later than five (5) business days after the basis of the protest is known or should have been known, whichever is earlier. The written protest must be received no later than 5:00PM on the fifth day.

Failure to comply with any of the protest requirements will be just cause for the dismissal of the protest.

Upon receipt of the protest, the Contract Administrator will review the basis of the protest and supporting data and use best efforts to issue a decision within 10 days after receipt of the protest. The Contract Administrator may take any action or make any request he/she deems necessary in order to investigate the protest, including but not limited to, extending the time to issue a decision in order to obtain evidence and other pertinent information.

The protestor will be provided a copy of the written decision by the Contract Administrator. This decision will be considered final unless within three (3) business days of receipt of the written decision the protestor appeals to the Phoenix Constructors' Procurement Manger. The appeal must be sent by certified mail to the address listed above.

No evidence or information may be introduced or relied upon in the appeal that has not been presented to the Contract Administrator. The Procurement Manager will review the appeal, supporting documents, and the decision of the Contract Administrator and issue a written decision within five (5) days of receipt if practical. The Procurement Manager may take any action or make any requests he or she deems necessary including extending the time to issue a decision in order to render a decision on the appeal.

The decision by the Procurement Manager or his/her designee shall be conclusive, final and not subject to further appeal to any entity or agency.

The FTA will only entertain a protest that alleges that the Phoenix Constructors JV failed to follow their protest procedures. Any protest concerning the PC's failure to follow protest protocol must be filed in accordance with FTA Circular.

END OF INSTRUCTIONS TO OFFERORS

EXHIBIT 1

STATEMENT OF WORK

TABLE OF CONTENTS

ARTICLE	DESCRIPTION
1.0	INTRODUCTION / BACKGROUND
2.0	DESCRIPTION OF WORK – GENERAL
3.0	DESCRIPTION OF WORK – SPECIFIC
4.0	TECHNICAL REQUIREMENTS AND ORDER OF PRECEDENCE
5.0	MATERIAL, EQUIPMENT, FURNISHED BY SUBCONTRACTOR
6.0	MATERIAL, EQUIPMENT, OR SERVICES FURNISHED BY CONTRACTOR
7.0	GENERAL CONDITIONS
8.0	ENGINEERING REQUIREMENTS
9.0	PERFORMANCE SCHEDULE AND SEQUENCE OF WORK
10.0	REPORTING REQUIREMENTS AND COORDINATION MEETINGS
11.0	DATA REQUIREMENTS
12.0	COMMUNICATIONS
13.0	CLEAN-UP, SAFETY, WORK RULES AND REGULATIONS
14.0	QUALITY CONTROL
15.0	CONSTRUCTION

Approvals	Print Name	Signature
Project Manager	Brian Reilly	
Procurement Manager	William T. DeCamp III	

Subcontractor's Initials____

Company's Initials ____

SCOPE OF WORK

1.0 INTRODUCTION / BACKGROUND

The purpose of this Statement of Work is to define the scope of the **Furnish, Fabricate and Erect Structural Steel, Intumescent Fire Resistant Coating, Metal Deck & Precast Concrete Work** to be performed as a component of the Station Construction and Transit Hall Structure to Grade, Work Package #20 Contract No: WTC-284.458 at the World Trade Center PATH Station Project.

Work Package #20 has been organized into three distinct Work Areas (WA) for the Subcontractor's consideration and pricing:

1. **Work Area 1 - PATH Station**
2. **Work Area 2 – 1 Line Subway Box** (Greenwich Street Corridor)
3. **Work Area 3 – Transit Hall**

1.1 During the 1st Step of the RFP, the bidders will be required to attend a **MANDATORY Pre-Bid meeting to be held on Wednesday, 12/3/2008, at the Phoenix Constructors JV offices, located at 115 Broadway, 18th Floor**.

1.2 A site visit and attendance at the pre-bid meeting are mandatory for the Subcontractor to see existing conditions and to completely understand the site logistics and access to the work area. Therefore, there will be a second **Mandatory Pre-Bid Meeting / Site Walk-Through** for the 2nd Step of the RFP. The meeting will be held on **Tuesday 12/16/2008 through Wednesday 12/17/2008, starting at 8:00AM EST each day**. The meeting will be held at the Phoenix Constructors JV offices, located at 115 Broadway, 18th Floor.

1.3 Security Requirements

The Subcontractor is advised that certain drawings and/or documents to be furnished to the Subcontractor for the purposes of preparing this bid are marked "Confidential and Privileged". These drawings and/or documents are security stamped and traceable to the Subcontractor. They may not be scanned, copied, transmitted, or reproduced by any means or methods without express written consent of the Port Authority

Subcontractor's Initials____

Company's Initials ____

of New York and New Jersey (PANYNY). The Subcontractor is to appoint an Officer of the Company to administer and monitor the security of all Confidential and Privileged documents. This officer is subject to approval by the Owner, and may be required to participate in training relating to document security. All security plans remain the sole property of PANYNJ and are subject to audit and return on demand by PANYNJ. The Subcontractor is further advised that the World Trade Center Construction Site is subject to rigorous security control. All trucks are subject to inspection and all employees are issued site security badges with daily check-in scanning.

Exhibit "41" Subcontractor SWAC WTC PATH ID Badge Guidelines are project requirements and are part of the contractual obligations. The Subcontractor must include all costs associated with the process stated therein.

WTC ID or VEHICLE PASS – "The Port Authority of NY & NJ World Trade Center Site Rules and Regulations" (Rules and Regulations), as provided in this Request for Proposal, is hereby incorporated by reference in its totality. As required by the Rules and Regulations Part B, Section 3(a), all Subcontractors performing work on site are required to obtain valid WTC Site IDs. The Subcontractor is advised that all employees accessing the World Trade Center Construction Site will be required to apply for an access card issued by The Port Authority, which involves submitting to a background check and attending a mandatory, Port Authority provided, one (1) hour safety class. Please note that this process must be started immediately, as there is a lead time on scheduling the classes and processing the paperwork.

As described in the Rules and Regulations Part B, Section 3(c), "All WTC Site IDs and Vehicle Passes are the property of The Port Authority of New York and New Jersey." In accordance with the Rules and Regulations Part B, Section 2 (b), upon the completion of Subcontractor's associated work, all WTC Site IDs or Vehicle Passes **MUST BE RETURNED** to the WTC Site Manager or his or her designee. Failure to return such identification will result in associated penalties and may, at the sole determination by Phoenix Constructors JV, result in a delay of final payment until the return of all associated identification.

2 DESCRIPTION OF WORK – GENERAL

2.1 Definitions:

Subcontractor's Initials____

Company's Initials ____

2.1.1 All references in this Exhibit 1 Statement of Work, the Drawings and the Specifications to "Contractor" or "Subcontractor" shall mean the Subcontractor.

2.1.2 All references in this Exhibit 1 Statement of Work to "Company" shall mean Phoenix Constructors JV.

2.1.3 All references in this Exhibit 1 Statement of Work to "Owner" or "Authority" shall mean the Port Authority of New York and New Jersey.

2.1.4 All references in this Exhibit 1 Statement of Work to the "Engineer" shall mean The Port Authority of New York & New Jersey.

2.1.5 All references in this Exhibit 1 Statement of Work to the "Architect" shall mean Downtown Design Partnership and The Port Authority of New York & New Jersey.

2.2 Subcontractor shall include all engineering, field measuring, detailed shop drawings, labor, equipment, materials, and each and every item of expense to perform the **Furnish, Fabricate and Erect Structural Steel, Intumescent Fire Resistant Coating, Metal Deck & Precast Concrete Work** in accordance with Work Package No. 20 - Station Construction and Transit Hall (Contract 284.458) shown on the project drawings and specifications, including but not limited to the tasks described in Section 3.0.

2.3 Work shall be performed in accordance with the requirements of the contract drawings, specifications and exhibits listed in Section 4.0. Subcontractor is advised that the project will be constructed in and around an active railroad and an electrical substation.

2.4 The Subcontractor acknowledges having visited the job site to thoroughly familiarize himself with the **Work Areas** and all existing conditions. The Subcontractor shall field measure and survey all existing conditions as required.

2.5 Sufficient manpower shall be provided at all times to maintain progress of the Work. A shortage of labor in the industry shall not be accepted as an excuse for not properly manning the job.

2.6 The Subcontractor represents that he is familiar with and has expertise in the performance of the Work. Further, the Subcontractor is cognizant of, and agrees to, the project requirements for premium quality consistent

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Company's Initials ____

with a first class building in accordance with the best practices of the trade.

2.7 The Subcontractor has examined the Drawings, Specifications, and Exhibits listed in Sections 4.3, 4.4 & 4.5 and shall identify all options and cost savings available to Phoenix Constructors JV and the Owner while providing the highest quality of work. Modifications made to conform to all applicable Codes and good practice will be included at no additional costs. All other drawings for the project are available for review and reference at Phoenix Constructors JV's office. The Subcontractor will review these drawings for examination of the work of others and investigation of the Subcontractor's Work which may also be shown on other drawings not included under Sections 4.3, 4.4 and 4.5. The Subcontractor will also review detail sheets in other packages (WP #9 and WP#21) that require coordination with the work included in this contract. The current drawings for WP #9 and WP #21 are available for review at the Phoenix Constructors JV office. A copy of these drawings will be provided to the successful bidder upon contract award.

2.8 Immediately upon award of the Contract, the Subcontractor will prepare complete shop drawings and present required submittals for approval as required by the Engineer/Architect. The Subcontractor shall submit samples of all materials for approval, as described in the Specifications. The materials used on the project shall match the approved samples in all situations, and shall be in strict accordance with the approved range in order to assure uniformity of appearance and design intent.

Shop drawings and submittals shall be produced in a sequence consistent with job progress as approved by Phoenix Constructors JV and Engineer / Architect through the approved shop drawing and submittal schedule. Shop drawing distribution and procedure shall be approved by Phoenix Constructors JV prior to the start of the Work.

2.9 The Subcontractor shall bear all costs for the shipment of construction documents, shop drawings, samples, etc. to Phoenix Constructors JV from the Subcontractor by overnight delivery service, as determined necessary by Phoenix Constructors JV.

2.10 The Subcontractor shall attend job meetings scheduled by Phoenix Constructors JV, will properly coordinate the Work with the work of others, and resolve any matters related to completion of the Work on schedule. The Work of the Subcontractor shall be performed in a manner that does not impede or delay another subcontractor / contractor in the performance of his work.

Subcontractor's Initials____

Company's Initials ____

The Subcontractor shall coordinate the Work with other trades so as to ensure that **built-in items are furnished in sufficient time for the subject trade to include them in their work**. Added costs resulting from a failure to comply with this requirement shall be borne by the Subcontractor

2.11 The Subcontractor will protect existing construction while performing the Work. Any work performed by others that is damaged by the Subcontractor or its employees or agents shall be the sole responsibility of the Subcontractor to repair or replace at no additional cost to Phoenix Constructors JV, including adjacent work damaged due to the corrective work of the Subcontractor.

2.12 The Subcontractor shall maintain Superintendents or Foremen at the jobsite during any time in which its employees are working on the Project site.

2.13 All deliveries of material shall be coordinated with Phoenix Constructors JV's field personnel, giving a minimum of 72 hours advance notice. The Contract price includes weekend and off-hour deliveries as scheduled by the Subcontractor and or Phoenix Constructors JV. The Subcontractor shall pay special attention to the ingress / egress restrictions imposed by the PANYNJ, PATH and NYCT.

2.14 The Subcontractor will maintain the Construction Schedule as established by Phoenix Constructors JV and will properly staff the Project to keep up with the job progress. The Subcontractor will submit an overall fabrication and installation schedule prior to award of the Contract, and this schedule shall be further established and coordinated in detail with Phoenix Constructors JV. In addition, the Subcontractor shall submit a detailed payment breakdown for approval.

2.15 The Subcontractor understands and agrees that time is of the essence, and that overtime and multi-shift work will be required to maintain pace with the Construction Schedule. The Subcontractor shall adhere to the work restrictions and working hours as depicted in Exhibit 96 - Attachment "D" Revision # 0 – October 17, 2008 "Hours of Work", particularly in relation to scheduling closures / shut-downs / or General Orders (GO) for the PATH or NYCT stations or tracks. Any overtime / shift work will be performed at no additional cost to Phoenix Constructors JV or to the Authority.

Subcontractor's Initials____

Company's Initials ____

2.16 The Subcontractor is responsible for its own welding hookups.

2.17 Where initial protection of openings via safety planking is by others, and the Subcontractor removes such protection in order to perform the Work, the Subcontractor will provide whatever safety planking and/or other temporary protection necessary to protect all openings while working in the area in accordance with the regulations of all governmental agencies having jurisdiction, and shall replace the initial safety planking when the Work is completed in said area.

2.18 The furnishing of temporary protection around the work area as per OSHA requirements is to be by the Subcontractor. Should the Subcontractor remove same for the installation of the Work, the Subcontractor shall provide manpower to guard opening until temporary protection is reinstalled by the Subcontractor.

2.19 The Subcontractor will be fully responsible for all engineering, surveying, and layout of his Work. Axis lines and bench marks will be provided by Phoenix Constructors JV.

2.20 The Subcontractor will be responsible for rigging and hoisting all of his equipment and material.

2.21 The Subcontractor shall furnish labor, materials, design, engineering and equipment to erect, dismantle and transport any cradles, temporary support systems, working platforms, and scaffolds required to perform and complete his work.

2.22 All materials delivered shall be adequately protected from weather in accordance with the manufacturer's recommendations at all times, and shall be received and stored at the jobsite in an approved manner and location as established by Phoenix Constructors JV. There is limited onsite space for storage; the Subcontractor is solely responsible for scheduling and staging deliveries as required and coordinating delivery logistics with the Phoenix Constructors JV superintendent.

2.23 All trash and debris generated by the Subcontractor shall be placed in containers provided by Phoenix Constructors JV. All oversized debris (that which does not fit in a mini-container without breaking up) shall be brought to a designated area by the Subcontractor. Subcontractor will hoist these containers to grade as directed by Phoenix Constructors JV.

Subcontractor's Initials____

Company's Initials ____

2.24 All Work furnished or installed by or through the Subcontractor shall be fabricated and installed using only experienced labor and labor which is compatible with the local union jurisdiction to ensure labor harmony. The Subcontractor shall advise Phoenix Constructors JV immediately of any labor disputes experienced or anticipated.

2.25 Should questions of union jurisdiction arise, the Subcontractor shall immediately take steps to settle such disputes and will use such labor as may be determined to have jurisdiction, at no additional cost to Phoenix Constructors JV. The Subcontractor will be responsible for time lost and monetary damages because of delays arising from such disputes.

2.26 The Subcontractor shall provide Phoenix Constructors JV with the names and addresses of material manufacturers, suppliers and second-tier subcontractors anticipated to be used. These subcontractors shall be governed by all Commercial, General Terms and Conditions and Supplementary Conditions (including insurance & bonding requirements by which the Subcontractor is governed. **No second tier subcontractors may be used or allowed to enter the jobsite without prior written approval from Phoenix Constructors JV and the Authority.**

2.27 All Work shall be in accordance with the requirements of the Engineer / Architect, the New York City Building Code, the Owner's inspecting agencies, and any other governmental agencies having jurisdiction.

2.28 The Subcontractor is aware that Phoenix Constructors JV expects the fabrication and installation of all Work to be in perfect condition; no allowances will be made for substandard work. Punch lists issued by the Engineer/Architect must be completed prior to final payment. If, during the performance of punch-list work, the Subcontractor damages other and/or adjacent work, the Subcontractor shall be solely liable for the costs of repairing the damaged work.

2.29 Prior to installation of the Subcontractor's work, the Subcontractor shall inspect all surfaces to which the work shall be installed upon or fastened to, in order to verify that these sub-surfaces have been prepared properly, or are in an acceptable condition to receive the work. Should any deficiencies be found, the Subcontractor shall notify Phoenix Constructors JV immediately in writing. Installation of the Work shall signify acceptance of the underlying materials.

2.30 The Subcontractor is aware that Phoenix Constructors JV will provide an on-site Safety Manager. The Subcontractor shall provide

Subcontractor's Initials____

Company's Initials ____

his own full time on site Safety Manager / Representative. The Subcontractor and its Site Safety Manager / Representative will cooperate and comply with Phoenix Constructors JV's Safety Manager in addition to complying with the rules and regulations of the Department of Transportation, Department of Highways, and the Port Authority of New York and New Jersey, PATH and NYCT

2.31 The Subcontractor is required by OSHA regulations to institute a hazard communication program. Under said program, the Subcontractor must inform both Phoenix Constructors JV and all other contractors on the site of any hazardous chemicals being used by the Subcontractor's employees on the Project. The Subcontractor shall provide Phoenix Constructors JV and all other contractors with copies of a Material Safety Data Sheet (MSDS), warn other contractors in the Subcontractor's work area of the existence of any hazardous chemicals, insure that any containers containing hazardous chemicals are appropriately labeled, and maintain an inventory of any such chemicals.

2.32 All scheduled job safety meetings will be attended by designated Subcontractor personnel. Tool box meetings will be held with the Subcontractor's own workers. Records of these meetings will be kept at the job site office by Phoenix Constructors JV.

2.33 Field tickets for authorized work must be presented for signature to Phoenix Constructors JV's Superintendent on a daily basis and invoiced within thirty (30) days. Claims submitted after thirty (30) days will be rejected. Phoenix Constructors JV's Superintendent's signature indicates only the following:

The signature of the Phoenix Constructors JV Project Superintendent signifies that work was done and/or verifies time and/or materials expended.

The actual determination of work being extra to the contract must be established by the Phoenix Constructors JV Project Manager and approved by Owner.

2.34 The Subcontractor shall comply with, and cooperate (and cause its subcontractors and material-men to so comply and cooperate) with other contractors, Phoenix Constructors JV and Architect/Engineer in complying with Legal Requirements, including but not limited to OSHA requirements. Among other things, the Subcontractor shall be responsible for performing corrective work within specified periods to cure, appealing from decisions or orders requesting evidentiary material as may be

Subcontractor's Initials____

Company's Initials ____

necessary or as may be requested by Phoenix Constructors JV to fully protect the rights and interest of Phoenix Constructors JV, Owner, and Architect / Engineer, with respect to possible, threatened or pending proceedings by others, except violations caused by others.

2.35 Alcohol, drugs and weapons shall not be allowed on the job site under any circumstances, and the use thereof shall be cause for immediate expulsion of the personnel responsible and revocation of the offender's site security badge. There is no smoking on site.

2.36 The Work of the Subcontractor shall commence upon execution of this contract or notification to proceed. The Subcontractor must immediately satisfy specific contract requirements, which will otherwise prohibit on-site activities, delay work, and/or prevent payment. Within two weeks of Notice to Proceed, the **Subcontractor shall prepare and submit to Phoenix Constructors JV the following documents:**

- Insurance Compliance & Certificates
- Bonding Compliance & Certificates
- Submittal, Fabrication and Installation Schedules & Logs
- Trade Payment Breakdown
- MBE/WBE Subcontracting Plan
- Quality Control Plan

2.37 The Subcontractor shall at its own expense, prepare, maintain and update progress schedules for approval per Exhibit 97 – Specifications Division 1, Chapter 1, General Provisions, Progress Schedule. The Subcontractor shall also provide the necessary input and information for Phoenix Constructors JV's master schedule.

2.38 The Subcontractor shall abide by all requirements of the State of New York, City of New York and the Port Authority of New York and New Jersey for Work in or adjacent to areas of the project. The Subcontractor shall make every effort to minimize the impact of all construction activity to pedestrians.

2.39 All professional engineering and design costs, performance of site surveys, investigate analysis, etc., which may be required for the

Subcontractor's Initials____

Company's Initials ____

preparation and submission of the Subcontractor's shop drawings, details, calculations, procedures, including erection for temporary work / shoring and performance of coordination are included in the scope of the Work.

2.40 While working on site, Subcontractor's Superintendents and Foremen will have radios keyed into Phoenix Constructors JV's frequency. Radios are to remain **on** at all times that the Subcontractor's manpower is on site.

2.41 Logistics and Utilization of Cranes on the Jobsite

The following assumption and criteria are to be taken into consideration during planning and preparing this RFP:

The Subcontractor shall submit a Means and Methods Statement with their proposal. The Means and Methods Statement shall include how the Subcontractor intends to distribute and erect large structural elements to remote areas of the site including the types, sizes and locations of the Cranes planned for the work. Furthermore, the Means and Methods Statement shall indentify if any temporary access ramps or trestles are planned and included in their proposal to facilitate material distribution and steel erection at the jobsite.

2.42 The Site Access and Staging Restrictions described in Attachment "F", Revision #0, dated October 17, 2008 and below are included in this scope of work.

2.43 Information about and the requirements of Work Trains and Transfer Yard described in Attachment "F", Revision #0, dated October 17, 2008 and below is included in this scope of work.

2.44 Information and the requirements of about Record Documents described in Attachment "F", Revision # 0, dated October 17, 2008 and below is included in this scope of work.

3 DESCRIPTION OF WORK – SPECIFIC:

Work Package # 20 consists of three distinct Work Areas, identified as:

A. Work Area 1 – PATH Station

B. Work Area 2 – 1-Line Subway Box (Greenwich Street Corridor)

Subcontractor's Initials____

Company's Initials ____

C. Work Area 3 – Transit Hall

3.1 For the convenience of the Subcontractor for preparing the bid proposal, the following general identification regarding the different types of steel – "Special Shape Exposed Steel", "Standard Profile Steel and Built up Sections", and "1-Line Steel" – relating to Work Areas 1, 2, and 3 is made. This identification is only for general information to aid the Subcontractor's initial understanding of the scope of work and may not encompass the complete scope of work. The Subcontractor is fully responsible for their own take off and identification of the steel types and components as per the contract documents.

3.1.1 **Special Shape Exposed Steel:** The Special Shape Exposed Steel is shown in the contract drawings and documents and mainly consists of the following elements:

A) **Work Area 1 – PATH Station:** Trusses, Ribs, Arches, Center spine, Platform Longitudinal Girders, Platform Columns, Mezzanine Floor Steel, Columns above Mezzanine Level to Roof Framing, Bent Plates and Bottom Plates for Slab at Elevation 307'.

B) **Work Area 2 – 1-Line Subway Box** (Greenwich Street Corridor): Mezzanine Arches (Ribs) below the 1-Line Subway Box.

C) **Work Area 3 – Transit Hall:** East Elevators; East Stairs, Landings and MTA access; West Stairs, Landings and MTA access, East end arch, West end arch, Columns.

3.1.2 **Standard Profile Steel and Built up Sections:**

A) **Work Area 1 – PATH Station:** Box Girders, Plate Girders.

B) **Work Area 2 – 1 Line Subway Box** (Greenwich Street Corridor): Columns at Elevation 231' (Plates)

C) **Work Area 3 – Transit Hall:** Structural encasement plates, Structural Embedments for Transit Hall Slabs/Walls, Columns, Framing for floor slabs.

3.1.3 **1 Line Subway Box (Greenwich Street Corridor):**

B) **Work Area 2- 1 Line Subway Box:** West Super Columns, East Super Columns, 1 Line Subway Box East Arch, 1 Line Subway Box West Arch, 1 Line Subway Box Transverse Beams.

Subcontractor's Initials____

Company's Initials ____

3.2 Under this Work Package, Subcontractors have the option to submit their separate proposals, inclusive of all costs and obligations, for the following scopes of work:

A. **Option A: Furnish, Fabricate and Erect Structural Steel, Intumescent Fire Resistant Coating, Metal Deck & Precast Concrete Work applicable to all Work Area 1 Path Station**

B. **Option B: Furnish, Fabricate and Erect Structural Steel, Intumescent Fire Resistant Coating, Metal Deck &Precast Concrete Work applicable to Work Areas 2+3 1- Line Subway Box and Transit Hall.**

As well as submitting a proposal for one of the above options, Subcontractors will have the option to submit an additional proposal for the following alternate scope of work:

C. **Alternate Option C:**
Furnish, Fabricate and Erect Structural Steel, Intumescent Fire Resistant Coating, Metal Deck & Precast Concrete Work applicable to Work Areas 1+2+3 Combined.

The scopes of work associated with Work Areas 1, 2, and 3 are further described herein:

3.2.1 Work Area 1 – PATH Station

All work as per this Exhibit 1 – Statement of Work for Work Area 1 – PATH Station West Bathtub. The general boundaries of Work Area 1 are marked on PCJV Sketches SK-1, SK-2, and SK-3 dated November 6, 2008. At the different elevations, the boundary of Work Area 1 zigzags and straddles adjacent Work Packages (WP #9 and WP #21) where work is being performed by other contractors. Work performed in other Work Packages is shown as "N.I.T.P." ("Not In This Package") on the contract drawings. The scope of work for Work Area 1 is roughly delineated by and inclusive of all work shown on the contract drawings that is west of the expansion joint at grid line D13. Fabrication and erection of the PATH Hall East Box Girder between grid lines D13 and D19 is included in Work Area 1. The super columns on grid lines D1 and D13 are NOT included in Work Area 1 and are to be fabricated and installed by the Subcontractor for Work Area 2, as shown on PCJV Sketches SK-1, SK-2, and SK-3 dated

Subcontractor's Initials____

Company's Initials ____

November 6, 2008. Subcontractor shall pay special attention to the required construction phasing and sequence of construction.

NOTE: The Subcontractor is made aware that the foundations for the Super columns will not be in place until a later date. The construction and erection of the PATH Hall East Girder, the Transit Hall West End Arch at gridline WX, the 1 Line Subway Box west arch truss at grid D13, and the 1 Line Subway Box east arch truss at gridline D1 are to be constructed on temporary support system designed by the Subcontractor, in order for Work Area 1 Path Station and Work Area 3 Transit Hall construction to proceed without the benefit of having permanent foundations in place. Once the permanent foundations are in place, the scope of this Subcontractor includes transferring loads to the permanent foundation structure.

3.2.2 Work Area 2 – 1 Line Subway Box (Greenwich Street Corridor)

All work as per this Exhibit 1 – Statement of Work for Work Area 2 – 1 Line Subway Box (Greenwich Street Corridor). The general boundaries of Work Area 2 are marked on PCJV Sketches SK-1, SK-2, and SK-3 dated November 6, 2008. At the different elevations, the boundary of Work Area 2 zigzags and straddles adjacent Work Packages where work is being performed by other contractors. Work performed in other Work Packages is shown as "N.I.T.P." ("Not In This Package") on the contract drawings. The scope of work for Work Area 2 is roughly delineated by and inclusive of all work shown on the contract drawings that is east of the expansion joint at grid line D13 and west of the expansion joint at grid line D1. The Line 1 West Arch Truss at grid line D13 and the Line 1 East Arch Truss at grid line D1 are included in Work Area 2. The supply and installation of the super columns with bearing assemblies on grid lines D1 and D13 is included in Work Area 2, as shown on PCJV Sketches SK-1, SK-2, and SK-3 dated November 6, 2008. The reinforced concrete footings for all super columns will be constructed by Phoenix Constructors JV. The PATH Hall East Box Girder between grid lines D13 and D19 and the Transit Hall West End Arch at grid line WX are NOT included in Work Area 2. Subcontractor shall pay special attention to the required construction phasing and sequence of construction.

The scope of work includes the steel column jackets shown on the contract drawings within the boundaries of Work Area 2.

Subcontractor's Initials____

Company's Initials ____

NOTE: The Subcontractor is made aware that the foundations for the Super columns will not be in place until a later date. The construction and erection of the PATH Hall East Girder, the Transit Hall West End Arch at gridline WX, the 1 Line Subway Box west arch truss at grid D13, and the 1 Line Subway Box east arch truss at gridline D1 are to be constructed on temporary support system designed by the Subcontractor, in order for Work Area 1 Path Station and Work Area 3 Transit Hall construction to proceed without the benefit of having permanent foundations in place. Once the permanent foundations are in place, the scope of this Subcontractor includes transferring loads to the permanent foundation structure.

3.2.3 Work Area 3 – Transit Hall

All work as per this Exhibit 1 – Statement of Work for Work Area 3 – Transit Hall East Bathtub. The general boundaries of Work Area 3 are marked on PCJV Sketches SK-1, SK-2, and SK-3 dated November 6, 2008. At the different elevations, the boundary of Work Area 3 zigzags and straddles adjacent Work Packages where work is being performed by other contractors. Work performed in other Work Packages is shown as "N.I.T.P." ("Not In This Package") on the contract drawings. The scope of work for Work Area 3 is roughly delineated by and inclusive all work shown on the contract drawings that is east of the expansion joint at grid line D1. The fabrication and erection of the Transit Hall West End Arch at grid line WX is included in Work Area 3.

The scope of work includes the steel column jackets shown on the contract drawings within the boundaries of Work Area 3.

The scope of work includes furnishing and installing the steel spall plates with shear studs (to the underside of the cast-in-place concrete slab) and built up beams.

3.3 Furnish, Fabricate and Erect Structural Steel, Intumescent Fire Resistant Coating, Metal Deck & Precast Concrete Work applicable to all Work Areas 1, 2 & 3:

This Exhibit 1 Statement of Work is intended to define, but not limit, the work performed under this subcontract.

The Work shall include all labor, materials, supervision, equipment, engineering, shop drawings, erection drawings, Cranes, rigging and lifting devices, accessories, tools, services, shipping, transportation, customs

Subcontractor's Initials____

Company's Initials ____

duties and fees, insurance, handling, offloading, storing and other things necessary for the complete performance of the supply, furnish, fabrication, delivery and erection of **Structural Steel, Intumescent Fire Resistant Coating, Metal Deck & Precast Concrete Work** of Work Package # 20 - Station Construction and Transit Hall Structure to Grade - in strict accordance with this Statement of Work, the contract drawings and specification and with the all subcontract documents.

The Work shall include each and every item of expense required to furnish, fabricate, and install all structural steel sections and members including, but not limited to, beams, built-up beams, columns, built-up columns including welded studs and couplers, built-up composite section, arches, backspan arches, ribs- arches, center spine, box girders, plate girders, trusses, composite trusses, struts, angles, channels, gusset plates, plates, stiffeners, splices, support angles, hangers, connections, bolts, shop welding, billet plates, bearing plates, bearing assemblies, built up fascia, field welding, bolting, moment connections, fracture critical members, anchor bolts and embed plates, anchors, expansion bolts, metal deck, pour stops , edgings including reinforcing and framing for the openings in the metal deck, sheer studs, void forms, lenton weldable mechanical couplers, steel channels with welded couplers, spall plates with studs, steel jackets for reinforced concrete and steel column, temporary support and bracing steel, cranes, rigging, lifting and hoisting devices, jacking, temporary construction work platforms, cradles, scaffolding, engineering, quality control and all other members and elements associated with the steel erection method and sequence used by the Subcontractor to complete the Work.

The Work shall include all steel column jackets as shown on drawings.

The Work also shall include furnishing and installing of the precast concrete elements: floor planks, duct units, wall panels and stairs.

The Work shall include all surface preparation and coating of the steel as per the contract documents, including primer paint and Intumescent Fire Resistant Coating.

The Work shall include all engineering, shop drawings, labor and material required for the supply, fabrication, delivery, and erection of the columns, beams, arches, trusses, built up sections, and plate girders, fabricated from flat steel and curved plates, shaped and welded to acute angles and radiuses. The arches, consists mainly of built up heavy steel plate welded sections with flat and curved plates, forming the exposed exterior of the sections. The work includes full penetration welds, ground smooth,

Subcontractor's Initials____

Company's Initials ____

surfaces prepared to SSPC-SP10 (Near White Blast cleaning, unless noted otherwise on the drawings) and coated with primer paint compatible with the specified Intumescent fire resistant coating system and subsequently coated with the Intumescent fire resistant coating as specified in the contract documents. All fabricated steel is to be delivered and off loaded Freight on Board (F.O.B.) to the **World Trade Center jobsite. All structural elements are to be checked and assembled to manageable sections prior to being delivered to the jobsite for erection by the Subcontractor as required.** The Subcontractor is solely responsible for all loss, breakage or damage to the fabricated products occurring prior to final installation on site and acceptance by Phoenix Constructors JV and the Owner. The acceptance of the fabricated products at the fabrication shop and/or at the holding area, does not release the Subcontractor from their contractual obligations for any defects and misfits discovered later on at the job site from.

This Subcontractor is required to fabricate and assemble the structural members in the shop to the greatest extent possible. The Subcontractor is also required to properly mark and match-mark materials for field assembly.

In an effort to maintain the highest quality and achieve the highest aesthetical standards, it is required that any and all field splice locations shall be fabricated as a single unit, with a precision-cut joint or shall be pre-assembled into a single unit to confirm the connection fit-up prior to shipping.

Splices will be permitted only where indicated on the contract drawings or approved shop drawings. Bidders must pre-qualify additional splices (beyond what is shown on contract drawings) if required with sketches with their bid proposal. Any other field splices will not be permitted.

3.4 The scope of the Work includes all steel pipe sleeves, electrical device boxes and embeds that are built into the steel arches or other steel members.

3.5 The scope of the Work includes all transom steel tabs attached or built into the steel to receive storefronts by others.

3.6 The scope of the Work includes furnishing and installation of Lenton weldable couplers welded in the fabrication shop and supply only of the anchor bars and terminators.

Subcontractor's Initials____

Company's Initials ____

3.7 The scope of the work includes C10 Channels including Lenton weldable mechanical couplers and the threaded bars, shown on drawings.

3.8 The scope of the Work includes all shop-applied prime painting, with the exception of field connections areas that are to be masked out. The Work includes field painting the previously masked out areas after field connections are completed and field touch up of areas where shop-applied coatings were damaged.

3.9 The scope of the Work includes SSPC –SP10 surface preparation on all steel elements and primer paint according to the painting specification, unless otherwise noted on the contract documents.

3.10 Intumescent Fire Resistant Coating: The scope of the Work includes SSPC – SP10 surface preparation, primer paint according to painting specification and compatible with Intumescent Coating System, and UL approved two (2) hour fire rated assembly, unless otherwise noted in the contract documents. The Work includes any top coat required to warranty adherence of the Intumescent fire resistant coating and to meet UL 263 for exterior exposure. The final surface appearance to be smooth with slight orange peel texture, in accordance with the approved sample. The scope of work also includes all field application of coating system at locations of field connections, field splices and repairs of areas damaged during shipping to the storage area and damage that occurs during erection.

3.11 The scope of the Work includes all costs associated with engineering, fabricating and testing of samples to obtain UL designs for fire rated assemblies for the intumescent fire resistant coating thicknesses, related to the shapes and assemblies associated with this project.

3.12 All supports, cradles, containers, protection and other devices or equipment required for shipment / interim storage and steel erection are part of this scope of work.

3.13 The scope of work includes shipment of all fabricated members to the World Trade Center jobsite. The Subcontractor shall bear all costs associated with shipping the fabricated material to the jobsite, including but not limited to customs costs, dues, customs release bonds, agent fees, demurrage charges, loading and unloading charges at the receiving port(s) in the USA. The scope of this Work includes shipment of the fabricated members to a location provided by the Subcontractor and approved by Phoenix / Port Authority of New

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Company's Initials ____

York & New Jersey, which shall be located in the New York Metropolitan area within a 25 mile radius of the WTC Construction Site. Shipment to this location is required to be Freight On Board. The Subcontractor shall bear all costs associated with shipping the fabricated material to the holding area, including but not limited to custom costs, dues, custom release bonds, agent fees, demurrage charges, unloading and loading charges at the receiving port in the USA. The scope of work includes transporting the material from the receiving port to the holding area and unloading at the storage facility. All shipments received, must have a bill of landing accompany the delivery. The scope of work also includes loading the material at the holding area for transportation to the WTC site and unloading of the material at the WTC site.

3.14 The Subcontractor is responsible for complying with and implementing the Sustainable Design Requirements and Performance Criteria as described in the contract specifications Section 01352 and Section 05120, 1.05. All submittals must accompany appropriate documentation for compliance with Sustainable Design Guidelines for WTC Redevelopment Projects, dated 25 March 2005, plus errata issued 7 August 2006 and "LEED" (Leadership in Energy and Environmental Design) for New Construction (NC) version 2.1 rating of certified, silver, gold and platinum, as set forth by the US Green Building Council.

Note: The 500 mile restriction on material procurement for structural steel is waived for the structural steel related to this work package.

The structural steel shall contain a minimum of 40 percent (by weight) recycled content calculated by adding the percentage of the post-consumer recycled content to one-half of the percentage of the post-industrial recycled content. Certify the recycle content in accordance with the Sustainable Design Submittal Requirements of specification Section 05120.

Metal deck shall contain a minimum of 25 percent (by weight) recycled content calculated by adding the percentage of post-consumer recycled content to one-half of the post-industrial recycled content percentage. Certify the recycled contents in accordance with the Sustainable Design Submittal Requirements of specification Section 05311.

3.15 All connection designs, detailing and erection drawings prepared by the Subcontractor shall be performed under the supervision of a Professional Engineer licensed to practice in the State of New York, USA. **Calculations and Connection Details shall also bear the signature**

Subcontractor's Initials____

Company's Initials ____

and seal of a Professional Engineer licensed to practice in the State of New York, USA.

3.16 The Subcontractor shall design and provide any stiffeners, doubler plates, reinforcing plates, etc. and connections that may be required to develop and /or transfer the forces and/ or connection design criteria shown on the contract documents.

3.17 The Subcontractor shall provide all lifting points, pad eyes and all other necessary handling devices.

3.18 The scope of work includes Shop Standards, Shop Details, and Erection Drawings with specific information as described in the contract documents. **All submittals and drawings shall be provided in the English language and Imperial units.**

3.19 All shop drawings and submittals shall be planned and prepared in accordance with specification Division 1, Article 75.

3.20 Steel Mock-Ups

As per specification section 05120 Para 1.06 J., the Subcontractor shall prepare all steel mock-ups, as indicated in the contract documents, to demonstrate the proposed fabrication procedure and verify inspect-ability of each weld within the assembly.

3.21 Structural Steel "Type 1" Samples:

A. **Finished Painted Samples:** Two samples of 12" by 12" by ½ thick steel plates with full penetration groove weld full length plate. Weld shall be ground in accordance with specification Section 05120 Para 2.02 F.2 and plate shall be properly prepared to finish painted in accordance with requirements of specification section 05120.

B. **Required Painted Samples:** (to be prepared in the presence of the Engineer): Two samples of 12" by 12" by ½ inch thick steel plate with full penetration groove weld full length of plate. Plate shall be intentionally damaged with two gouges at least 2 inch long by ¼ inch in depth and repaired. Plate shall be straightened and welds shall be grinded smooth. Plate shall be properly prepared and finished painted in accordance with the requirements of specification Section 05120.

3.22 General Notes:

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Company's Initials ____

A. Phoenix Constructors JV and the Owner will not be responsible for loss, breakage or damage to any facilities arising directly or indirectly out of or in conjunction with the work being or to be performed by the Subcontractor. The Subcontractor is responsible for all repairs.

B. Phoenix Constructors JV Procurement personnel must approve all changes in writing before changes are executed by the Subcontractor. Subcontractor will record all changes on the final as-built documents.

3.23 For the purpose of this work, all fabrication shops shall be certified as follows:

A. Under the AISC certification program as Category STD (Standard for Steel Building Structures).

B. For members designated on the contract documents as bridge members, the fabrication shop(s) shall be certified under the AISC certification program as Category CBR (Major Steel Bridge).

C. For members designated on the contract documents as FCM's, the fabrication shop(s) shall have a fracture critical endorsement of the AISC if a firm is in the U.S.A.

D. For fabricators located outside the U.S.A. without AISC certification, fabricator shall be certified under a certification program with requirements deemed equivalent to the applicable AISC Category, as determined by the Authority.

E. If prime fabricator subcontracts any portion of the work, the subcontractor is subject to the same requirements as the prime fabricator.

3.24 As per specification section 05120 Para 1.08.C.1, the fabricator shall employ a welding consultant responsible for the review or writing all shop and field welding procedures (see also Specification Section 05120 Para 1.07.B.1d). The proposed welding consultant shall be submitted for approval by PANYNJ.

3.25 Subcontractor shall employ a Structural Steel Consultant for the sole purpose of checking inter-phase connection details and coordination of steel fabrication among all fabrication facilities and

Subcontractor's Initials____

Company's Initials ____

joint venture partners and/or subcontractors to the Prime Subcontractor, including trouble shooting shop fabrication misfits and schedule issues. The proposed Structural Steel Consultant shall be submitted for approval by Phoenix Constructors JV.

3.26 The Scope of work includes built in MEP and/or electrical box housings, conduits and mountings into the structural steel elements. The Scope of work includes MEP penetrations, housing and seating as indicated on the drawings and contract documents.

3.27 The Subcontractor is to provide unit prices for lifting and placing equipment that has limited or no access after the steel framing is complete. This equipment would include items such as MEP, escalator, and elevator equipment. The Subcontractor shall hoist and place such equipment at the direction of Phoenix Constructors JV, based on the approved unit rates. **See Exhibit 2A** for a list of equipment that will potentially require hoisting and placing.

3.28 The Structural steel Subcontractor shall furnish and deliver all embedded items as required for structural steel installation. This includes angles, anchor bolt assemblies, plates, bearing plates, channels, etc. that are required to be cast in with concrete pours. These items shall be delivered early, during concrete work by others, and out of sequence with the balance of the project.

3.29 The Subcontractor shall furnish and install all support angles or plates required for structural steel framing that are mechanically fastened to the concrete. Reference drawing details for this type of typical conditions.

3.30 The Work includes all elevator shaft, escalator and hoist-way related structural steel members. This shall include all elevator support beams that are shown in the contract documents.

3.31 The Work shall be furnished and installed in accordance with the contract Drawings and Specifications and subsequent approved drawings prepared by the Architect and/or Engineers for the project. Any deviations from said Drawings and Specifications shall require prior written approval from Phoenix Constructors JV. The cost of any corrective work required as a result of unapproved deviations shall be born solely by the Subcontractor. The Subcontractor shall not perform any extra or unit price work without prior written approval to Phoenix Constructors JV. Any extra work performed without such approval shall not be reimbursed.

Subcontractor's Initials____

Company's Initials ____

3.32 The Subcontractor includes all trade specific work unless noted otherwise in this scope of work as being "specifically excluded". All on-site, trade specific work will be governed by New York City Union Labor requirements.

3.33 All beam penetrations detailed on the drawings are included in the scope of work. All other penetrations that are not shown on the drawings will be performed as directed by Phoenix per unit price schedule.

3.34 The Subcontractor shall be responsible to prepare and "touch-up" painting of all field connections masked out during fabrication, welds, abraded areas, and otherwise damaged finish on shop applied paint, primer, or Intumescent fire resistant coating after the erection is complete.

3.35 Out of sequence work and "leave outs": this Subcontractor shall, as directed by Phoenix Constructors JV / PANYNJ, omit the erection of designated members as necessary for hoist-ways, material loading locations, temporary holes, shafts, etc. or for operations of other subcontractors. The members are to be stored in approved locations until Phoenix Constructors JV requires their installation. All out of sequence fabrication required for the installation of these omitted members shall be included.

3.36 This Subcontractor will cooperate in hoisting for other trades as designated by Phoenix Constructors JV and compensation shall be made directly from those trades to this Subcontractor at reasonable rates listed in the Unit Price Schedule. Should the unit rate not be appropriate, a reasonable rate will be negotiated based on the type of hoisting that is required.

3.37 The Scope of work includes mobilization, dismantling and removing of the hoisting equipments (Cranes) from the work area and completing leave out framing as directed by Phoenix Constructors JV.

3.38 Mill Order: The Subcontractor shall be prepared to place the steel mill order(s) with the fabrication plant within twenty (20) working days after receipt of the notice of award or subcontract based upon development of a connection engineering model (**Tekla / X- Model**).

3.39 The scope of work includes designing, engineering, procuring, fabricating and installing all temporary support systems and shielding required for the erection and installation of the permanent steel structure, precast concrete members and roof structure, as well as removing and disposing of the same after completion of the

Subcontractor's Initials____

Company's Initials ____

work. All temporary support steel to have one coat of primer paint. All design and engineering of the temporary support systems are to be performed under the supervision of a New York State licensed Professional Engineer (PE) and all drawings and calculations of temporary support systems are to be signed and sealed by the New York State licensed PE and submitted for Phoenix Constructors JV and PANYNJ approval prior to implementation.

3.40 The scope of work includes shipment of all precast members to the World Trade Center jobsite. The Subcontractor shall bear all costs associated with shipping the fabricated material to the jobsite, including but not limited to customs costs, dues, customs release bonds, agent fees, demurrage charges, loading and unloading charges at the receiving port(s) in the USA.

3.41 The drawings and specifications represent and show the required work in detail, integrating all aspects of the Work, including the suggested sequence of the Work, availability of specific areas, access restraints and other relevant field conditions for the erection of the structural steel members, metal deck, precast concrete units and application of intumescent fire resistance coating system.

3.42 Precast Concrete: The Scope of the Work includes supply, fabrication and installation of precast Concrete floor planks, duct units, wall panels and precast stairs in accordance with the drawings, specifications and the contract documents. The scope of work consists of shop drawings, engineering, formwork, off site precasting, curing, trucking to the job site, hoisting and setting the units in place. The scope of work includes supply and installation of elastomeric pads, steel plates and angles welded in place as detailed and shown on contract drawings. The scope of the Work includes supply and installation of stainless steel threaded rods and nuts, drilling and grouting of dowels, grouting of joints and girder splices, as shown on the contract drawings. The precast concrete scope of work includes supply and casting of inserts, dowels, corner angles with welded shear studs and embeds as referenced in the contract documents.

Also included in the Work is the design, furnishing, installation and removal of all temporary support structures required to erect the precast concrete units over the PATH tracks.

3.43 The Scope of Work includes hauling of the fabricated steel and precast concrete members from the holding area to the job site and preparing and assembling all components in accordance with the Subcontractor's proposed erection method and sequence in

Subcontractor's Initials____

Company's Initials ____

accordance with the field conditions and availability of the site, as stated in the contract documents. The proposed method and sequence of steel and precast concrete erection shall be submitted for Phoenix Constructors JV and PANYNJ approval.

3.44 For guidance in preparing the Means and Methods Statement and bid proposal, the Subcontractor is advised to refer to the contract drawings, specifications, and documents for full description of the suggested construction phasing, constraints and temporary support systems. The Scope of Work includes the construction phasing, temporary protection and shielding described and depicted on the contract documents.

3.45 The Scope of work includes, shop drawings, engineering, supply and installation of Metal Deck and shear connectors, pour stops including reinforcing and framing for the openings in the metal deck. The scope of the work includes cutting and fitting of the metal deck to accommodate shop welded lenton coupler sockets and installation of the threaded lenton coupler rods as per contract documents.

3.46 The Scope of work includes shop and/or field applied Intumescent coating to all steel members including shop fabricated steel and field connections. Fabricated steel will have shop applied, SSPC-SP10 surface preparation, a primer coat according to the painting specifications that is compatible with the specified Intumescent Coating.

3.47 The proposed Intumescent coating material and application to be identical to representative assemblies tested for the fire performance characteristics, according to test method indicated by UL or other testing and inspecting agency acceptable to the Authority. The Subcontractor is responsible for the fire performance testing in order to secure UL ratings/design for all assemblies, as well as the Fire Performance Characteristics tested per ASTM E119, Surface Burning Characteristics tested per ASTM E84 and Rating per building code of New York City for building classification and construction groups, or other New York Department of Building approval acceptable to the Port Authority of New York and New Jersey for use in New York City, USA.

3.48 The Scope of the Work includes all supports, cradles, containers, protection and other devices, equipment or material required for storage of material at the fabrication shop or holding area and hauling the material from the holding area to the job site.

Subcontractor's Initials____

Company's Initials ____

3.49 The Scope of the Work includes all engineering, shop drawings, details and erection drawings showing the sequence of erection for all temporary support systems, bracings and other devices necessary for the steel component assembly, erection in place, and permanent connection of the steel trusses, girders, arches and all other members. The Work also includes erection of the temporary work and removal at a later stage.

3.50 The Scope of Work includes all supports, cradles, temporary bracings, propping and other devices required to align and stabilize steel members during the steel erection process and completion of permanent connections.

3.51 The Scope of Work includes leaving part of the temporary supports and stabilizing steel in place, for removal at a later stage as directed by Phoenix Constructors JV. The removal of the temporary support may entail overhead restraints where crane access will not be available. Temporary supports will need to be removed in sections utilizing alternate equipment that will not exceed the loading criteria for the new station mezzanine floor. All submittals, including shop drawings and calculations are to be prepared in accordance with the contract specifications.

3.52 All design and erection drawings for temporary construction supports, bracing and rigging shall be prepared by the Subcontractor under the supervision of a Professional Engineer licensed to practice in the State of New York, USA. Drawings and calculations shall also bear the signature and seal of a Professional Engineer licensed to practice in the state of New York, USA.

3.53 The Subcontractor shall grind smooth all lifting points, pad eyes and all other necessary handling devices, prepare surface and touch up primer and/or intumescent coating application per contract documents.

3.54 All welding, both in the shop and in the field shall be performed by welders, inclusive of all required fire watches, certified by AWS or other agency as acceptable to the Port Authority.

3.55 The Subcontractor shall provide for, and include all costs for, off-site storage of all fabricated materials, which are to be kept ready for delivery within 72 hours of notice from Phoenix Constructors JV.

3.56 The Subcontractor shall unload all items fabricated under this scope of work and shall place these in a location at the project site designated by

Subcontractor's Initials____

Company's Initials ____

Phoenix Constructors JV. There is very limited space on site for storage of material prior to erection.

3.57 The Subcontractor shall field measure all conditions affecting his work prior to fabrication unless directed otherwise by Phoenix Constructors JV.

3.58 Subcontractor shall survey and verify all dimensions and elevations as indicated on the plans and provide connection detailing calculations and drawings signed and sealed by this Contractor's NY Professional Engineer. Calculations shall be submitted at the same time as the shop drawings. Subcontractor is aware of the typical details and requirements of the Engineer and will perform the steel work in accordance with these standards.

3.59 Any modification of bracing, shoring, or posting for rigging equipment into the structure must be submitted to and approved by the Engineer and Phoenix Constructors JV. The Structural Engineer employed by this Subcontractor shall provide any calculations or drawings required by local codes or ordinances covering the analysis of any loads imposed to the permanent structure due to rigging equipment and shall affix a licensed professional engineer's seal to same.

The Subcontractor shall submit drawings for approval showing rigging equipment, locations and connection details for any steel that will be added to the structure if required to support the rigging equipment. The Subcontractor shall also submit calculation for approval for all loading conditions for rigging equipment.

3.60 Subcontractor shall coordinate his work with that of other trades, as closely as possible, inclusive of power requirements for welding. Coordination meetings with any other trades affected by this Subcontractor's work may be called by Phoenix Constructors JV for this purpose.

3.61 Subcontractor must furnish any scaffolding, rigging, labor, tools, tool shed, workers shanties, equipment, etc., that is necessary for the execution of his work, including obtaining permits for same and payment of all fees. Subcontractor is to include in his price two relocations for each of these shanties. The Subcontractor is advised that there is very limited space on site for shanties or field offices.

3.62 Subcontractor shall fabricate and install all work true, plumb, and level and any corrective work shall be this Subcontractor's responsibility to correct at no cost to Phoenix Constructors JV.

Subcontractor's Initials____

Company's Initials ____

3.63 All materials shall be delivered in manufacturer's/fabricator's original packaging (as applicable), with piece marks to clearly identify the items. Deliveries shall be coordinated with Phoenix Constructors JV. Prior to and following delivery to site, all materials shall be properly stored and protected from weather at all times. The Subcontractor shall be responsible for the handling, storage, protection and security of all equipment and materials supplied under this contract until work is complete and turned over to Phoenix Constructors JV.

3.64 Subcontractor shall submit a lifting plan showing crane/equipment placement, as well as anticipated loads and crane/equipment capacity. The crane placement and lifting plan shall be signed and sealed by a New York State licensed PE and submitted for Phoenix Constructors JV and PANYNJ approval.

3.65 Organizational Interfaces

Work will be per the drawings and specifications.

3.66 The scope of the Work includes all other work not specifically described but required to perform the above said scope.

3.67 Work Not Included

- Any work specifically noted "NIC" or "NITP" on the contract drawings is excluded from this scope of work.
- Cast in place concrete is not included.
- Demolition of existing structure is not included.

3.68 Work shown as "Mezzanine Level Precast Alternate" instead of cast-in-place concrete to be priced as an "Alternate" for Owner's approval and inclusion in this work package.

3.69 Hours of Work and Platform / Track Outage

Refer PANYNJ Attachment "D" Revision # 0 – October 17, 2008

3.70 Site Conditions and Known Hazards Include, But Are Not Limited To:

- Dust (Eye Protection)
- Poor lighting

Subcontractor's Initials____

Company's Initials ____

- High Voltage
- Tripping Hazards
- Elevated Work Zones (Fall Hazard)
- Work Adjacent to an Active Railroad
- Work in and around Public Areas.

3.71 Additional Safety Requirements

In addition to the safety requirements contained in the contract documents, the Subcontractor shall adhere and enforce the following:

Subcontractors to submit pre-task plans for any work identified by Phoenix Constructors JV that would warrant such plans.

Abide by the attached WTC Site Traffic Rules and Load Chart attached. Be specifically mindful that pre approval of truck loads is required.

Subcontractor will provide an approved Safety Plan and hold site specific safety meetings. Minutes of these meetings will be provided in a timely manner to Phoenix Constructors JV Safety Department.

Personal Protective Equipment, including but not limited to: Safety Glasses, Work Boots, High Visibility Reflectorized Safety Vests, Gloves, etc. must be worn at all times when in a work area.

Subcontractor to comply with "DOB Rules and Requirements for Crane Inspections"

4. TECHNICAL REQUIREMENTS AND ORDER OF PRECEDENCE

The primary bidding documents for the establishment of the scope of work and for determining construction costs are the Project Drawings, the Project Specifications and other documents as specified in this Subcontract. As such, requirements contained in this summary of the scope of work shall be considered as examples, and not an exhaustive set of requirements. The purpose of highlighting some of the basic requirements is intended to be illustrative, rather than specific or detailed.

If a conflict occurs between this description of work, and the detailed engineering drawings or specifications, the drawings and specifications will take precedence.

Subcontractor's Initials____

Company's Initials ____

If a conflict exists between the contract drawings and specifications, the Subcontractor shall promptly provide written notice to Phoenix Constructors JV for resolution before proceeding. Failure to obtain resolution from Phoenix Constructors JV shall result in the Subcontractor proceeding at its own risk.

All Work shall be performed in strict accordance with the Drawings, Specifications, Exhibits, and any other documents, which by this reference are made a part of the Subcontract, including this Statement of Work.

All inspections by the Owner shall be arranged by Phoenix Constructors JV. Subcontractor shall request such inspection through Phoenix Constructors JV only after the Work is ready for inspection.

4.1 Design Interfaces

Design and detailing of connections, engineering, design and detailing of temporary support structures, designing and implementation within the approved criteria and tolerances, protection shields, working platforms, crane lifting plans and all other elements necessary for the safe erection and installation of the work is included in this scope of work. All design and engineering work for this subcontract shall be performed by New York State licensed and qualified professionals employed by the Subcontractor and subject to approval by the Engineer/ Architect of the Record.

Subcontractor shall submit to Phoenix Constructors JV a Job Hazard Analysis (JHA) for all crane erection and dismantling procedures. This analysis shall include an evaluation of all project specific risks based on actual conditions to be encountered, and a mitigation plan for those tasks.

4.2 Codes and Standards

Reference the information contained in the Drawings and Specifications.

4.3 Specifications

Refer to Exhibit 98

Attachment 'S' Specification "Confidential & Privileged"

Attachment 'A' Specifications "Unrestricted"

4.4 Drawings

Refer to Exhibit 99

Subcontractor's Initials____

Company's Initials ____

Attachment 'S' "Confidential & Privileged"

Attachment 'A' "Unrestricted"

4.5 Exhibits / Attachments

Refer to Exhibit 96

Attachment letter dated 10/17/2008

Attachments 'A', 'B', 'C', 'D', 'E', 'F', and 'S' dated 10/17/2008

Exhibit 30A – Representation and Certifications

Exhibit 30B – Subcontractor Prequalification Questionnaire

NOTE: Exhibits 30A and 30B **MUST** be completed and originals submitted with the RFP. All signatures **MUST** be original and preferably in BLUE ink, no photocopies.

Refer to Schedule 1 of the Contract for a Complete Listing of the Exhibits.

Upon Contract award, the following Attachments will be issued electronically: 2D, 3, 4, 21A, 21D, 21E, 21F

5 MATERIAL, EQUIPMENT, FURNISHED BY SUBCONTRATOR

5.1 ALL MATERIALS AND EQUIPMENT REQUIRED TO DESIGN, ENGINEER/DETAIL, FABRICATE, DELIVER TO THE JOBSITE, AND ERECT ALL ITEMS LISTED IN SECTION 3.0 AND PRESENTED IN CONTRACT DRAWINGS AND SPECIFICATIONS ARE TO BE FURNISHED BY THE SUBCONTRACTOR.

6 MATERIAL, EQUIPMENT, OR SERVICES FURNISHED BY COMPANY

6.1 Phoenix Constructors JV will furnish or cause to be furnished to Subcontractor, without cost to Subcontractor the items below in connection with performance of the Work:

All labor and equipment required for the maintenance and protection of traffic.

Axis lines and benchmarks shall be provided by Phoenix Constructors JV.

Subcontractor's Initials____

Company's Initials ____

Water & General lighting.

Note: There is limited power available at the jobsite. Subcontractor is responsible for generating and providing any additional or supplemental power required for the performance of his Work.

7 GENERAL CONDITIONS

7.1 General Notes:

All Work must comply with OSHA, local, state and federal regulations, as well as a project specific requirements defined by Phoenix Constructors JV and the Port Authority.

Subcontractor agrees that the Work shall be executed in accordance with the generally accepted construction practices and is required to assume sole and complete responsibility for job site conditions during the course of the project, including safety to all persons and property at all times.

7.2 This is a tax exempt project. All materials that will permanently be incorporated into the project at completion shall be tax exempt.

7.3 Subcontractor shall familiarize themselves with the Laws, Rules and Regulations regarding Environmental Matters of the Port Authority.

7.4 The on-site work is covered by OCIP. All contractors/subcontractors will be subject to approval of the Port Authority of New York and New Jersey (PANYNJ). The Subcontractor shall be able to obtain additional insurances in accordance with the insurance requirements of the Port Authority and the New York Transit Authority. Insurance requirements are available for viewing at the Phoenix Constructors Office.

7.5 Subcontractor shall adhere to the M/WBE requirements and percentages as set forth in the contract with the Port Authority.

7.6 Subcontractor's work shall be in strict accordance with the Site Quality Control Plan on file at Phoenix Constructors JV office.

7.7 Subcontractor's work shall be in strict accordance with the Site Safety Plan – Preliminary Health and Safety Plan (HASP) (Exhibit 15A) included in CD format (enclosed) and on file at Phoenix Constructors JV office.

Subcontractor's Initials____

Company's Initials ____

8 ENGINEERING REQUIREMENTS

8.1 Engineering required per the drawings, the specifications and this Statement of Work shall be provided by the Subcontractor.

8.2 Furnished by Company

For reference by the Subcontractor, Phoenix Constructors JV will supply or cause to be supplied the following information to the Subcontractor, without cost to Subcontractor, for or in connection with performance of the Work:

Phoenix Constructors JV Quality Control Plan – Exhibit 18

Phoenix Constructors JV Site Safety Plan – Health and Safety Program - Exhibit 15A

9 PERFORMANCE SCHEDULE AND SEQUENCE OF WORK

9.1 Subcontractor shall commence performance of the Work immediately after receiving Notice to Proceed from Company.

Invitation to Bid Proposals Issued: 11/21/2008

1st Step RFP; Bidder's Questions/RFI – "Last Request Date": 12/02/2008

1st Step RFP; Bidder's Questions/RFI – "Last Response Date": 12/05/2008

1st Step RFP Pre-bid Meeting 12/3/2008

1st Step, RFP, Pre Qualification / Intention to Submit Bid Proposal Due: 12/09/2008

Short List Offerors (Bidders): 12/10/2008 thru 12/12/2008

Inform Short List Bidders Approved for 2nd Step Bidding Process. 12/12/08

2nd Step RFP Mandatory Pre-bid Meeting / Site Visit by Invitation only: **12/16/2008 thru 12/17/2008**

2nd Step RFP Issued to Selected Offerors (Bidders): 12/16/2008 thru 12/17/2008

Subcontractor's Initials____

Company's Initials ____

2nd Step RFP; Bidder's Questions/RFI – "Last Request Date":1/30/2009

2nd Step RFP; Bidder's Questions/RFI – "Last Response Date":2/5/2009

2nd Step, RFP Due Date: 2/9/2009

Open Bids: 2/10/2009

Bid Review: 2/10/2009 thru 2/18/2009

Final Meeting with Selected Offerors (Bidders) & Request clarifications/BAFO: 2/20/2009 thru 2/23/2009

Clarifications / BAFO from Selected Bidders: 2/24/2009 thru 3/4/2009

Oral Presentations by Selected Bidders: TBD

Finalize and Recommend for Award: 3/05/2009 thru 3/13/2009

Anticipated Contract Award date: 3/17/2009

9.2 Time for completion:

(A) Path Hall Steel: 6/30/2010

(B) 1- Line Subway Box Steel: 6/10/2010

(C) Transit Hall Steel: 9/13/2011

10 REPORTING REQUIREMENTS AND COORDINATION MEETINGS

Subcontractor shall promptly submit the schedules and reports as work is completed as set forth below.

10.1 Schedules and Reports

Contract Daily Report (See Exhibit "21A").

All other schedules and reports as required elsewhere in this Contract.

10.2 Other Meetings

Subcontractor's Initials____

Company's Initials ____

Subcontractor participation in certain nonproductive activities shall be required. These activities shall include, but not be limited to:

Upon award of this Contract, Subcontractor shall be required to attend, a pre-construction meeting, prior to mobilization, at the job-site, or at another local location to be determined upon Contract award.

Indoctrination and orientation of all Subcontractors' employees prior to commencing work at the jobsite. (This includes the entire labor force and all new hires).

World Trade Center Site Identification Badging Process run by the Port Authority of New York and New Jersey is required for all Subcontractors' employees who will require access to the construction site. This process involves a background check and attendance at a mandatory safety class provided by the Port Authority.

A weekly gang box safety meeting shall be organized and conducted by Subcontractor and attended by all of Subcontractor's craft employees prior to commencement of work. Subcontractor shall be responsible for arranging and conducting this meeting with its craft employees.

11 DATA REQUIREMENTS

11.1 For all PCJV supplied documentation, one (1) copy only of such documentation will be provided by PCJV to Subcontractor.

11.2 Subcontractor shall submit the following data to PCJV as part of the Scope of Work:

Safety Program for review prior to commencement of Work.

All necessary QA/QC documentation as the work progresses.

QC Plan in accordance with Article 14.0, titled "Quality Control", subparagraph 14.2 for review prior to commencement of work.

11.3 Subcontractor's performance of his obligations hereunder shall not be deemed complete until Company is in receipt, on proper forms, of all Technical Data, As-Built Drawings, and other documents to be submitted to Company as part of Subcontractor's Scope of Work. Failure of

Subcontractor's Initials____

Company's Initials ____

Subcontractor to comply with the above data requirements will entitle Company to withhold any progress payment, or final payment, pending Company's receipt of all the above data without prejudice to any other remedy of Company.

11.4 All submittals (shop drawings, calculations, etc) shall be provided in English and Standard (Imperial) units and shall be in accordance with all USA standards (AISC, AWS, etc) as per the contract specifications.

11.5 Subcontractor shall show the Company Contract Number and identifying item numbers, if applicable, on all data submitted pursuant to this Article 11.0.

12 COMMUNICATIONS

All communications pursuant to or in connection with this Contract shall be identified by PCJV's Contract Number and shall be communicated as set forth below:

12.1 Contractual Notices

All contractual notices given under this Contract shall be sufficient if in writing and delivered in person to an officer of the party to be notified, or sent to the party to be notified, addressed as set forth below, by registered mail, telex, facsimile or cable. Telexes, facsimiles and cables must be confirmed in writing within three (3) days thereafter.

Contractual notices to PCJV shall be addressed to Company's Project Office set forth herein:

Phoenix Constructors JV
115 Broadway, 16th Floor
New York, NY 10006
Attn: Brian Reilly
646-467-7127 (phone)

With copy sent to:

Phoenix Constructors JV
115 Broadway, 18th Floor
New York, NY 10006
Attn: Javed I. Qureshi
646-467-7219 (phone)
212-566-2350 (fax)

Subcontractor's Initials____

Company's Initials ____

Contractual notices to Subcontractor shall be addressed to Subcontractor's Address set forth herein marked Attn.: TBD

13 CLEAN-UP SAFETY, WORK RULES AND REGULATIONS

13.1 Cleanup

Subcontractor shall at all times keep its work area in a neat, clean and safe condition and remove from the Owner's premises and the vicinity thereof and properly dispose of all debris and rubbish caused by Subcontractor's operations. Upon completion of the Work, Subcontractor shall promptly return unused materials furnished by PCJV and remove from Owner's premise all of Subcontractor's equipment, material, scaffolding and like items, leaving Owner's premises and the vicinity clean, safe and ready for use.

In the event Subcontractor shall fail to maintain its work area as described above and in a manner satisfactory to Company, or to effect such cleanup or removal immediately after receipt of written notice to do so, PCJV shall have the right without further notice to Subcontractor to perform such cleanup and remove such items on behalf of, at the risk of and at the expense of Subcontractor. Company may store items removed at a place of its choosing on behalf of Subcontractor and at Subcontractor's risk and expense. PCJV will promptly notify Subcontractor of such place of storage. Subcontractor shall promptly reimburse Company for the costs of such cleanup, removal and storage.

13.2 Safety

All Subcontractors working on the WTC Permanent PATH Terminal HUB Project shall have in effect their own safety plan and shall designate a Safety Manager / Representative. At a minimum, the Subcontractor's Safety Manager / Representative, shall have completed OSHA 30-Hour safety training. The Subcontractor's Safety Manager / Representative should also provide Phoenix Constructors JV with any other safety certifications or competent person training related to the trade of work. The Subcontractor's Safety Manager / Representative shall be on site at any times the Subcontractor's work force is on site.

Subcontractor's Initials____

Company's Initials ____

Subcontractor's Safety Manager / Representative shall be responsible for initiating the safety program, ensuring that jobsite safety requirements and procedures are being accomplished, conducting safety inspections of Work being performed, and documenting safety activities. The Safety Manager / representative will also be responsible for a continuing survey of its operations, to ensure that the probable causes of injury or accident are controlled and that operating equipment, tools and facilities are used, inspected and maintained as required by applicable safety and health regulations.

PCJV and Owner will have the right to stop Work whenever safety violations are observed which could jeopardize the well being of personnel and equipment. The expense of any such Work stoppage and resultant standby time shall be borne solely by the Subcontractor. The failure or refusal of Subcontractor to correct the observed violation may result in the termination of the Contract, and/or the dismissal from the jobsite of those responsible for such failure or refusal.

Subcontractor shall submit to Phoenix Constructors, prior to the commencement of any work, a detailed pre-task plan indicating how the **Subcontractor shall comply with Phoenix Constructors' 100% tie-off policy for all work conducted at heights greater than or equal to 6'-0" above a solid surface.** This plan shall include but not be limited to details on methodology for the tie-off of individuals engaged in connecting, bolting and decking. Subcontractor shall also outline how it intends to use manlifts and personnel netting.

Subcontractor shall provide to PCJV a copy of all reports made to government agencies or insurance companies relating to any jobsite accident or injury during Subcontractor's performance of the Work.

13.3 Work Rules and Regulations

Subcontractor shall comply with all work rules and regulations set forth in Exhibit 15A, entitled Health and Safety Program (HASP) Manual (CD).

13.4 Hazardous Substances

Subcontractor's Initials____

Company's Initials ____

Subcontractor shall comply with applicable hazardous substance disclosure requirements set forth in Exhibit "16" entitled HAZARDOUS AND TOXIC SUBSTANCES DISCLOSURE REQUIREMENTS.

13.5 OSHA Permits and Programs

Subcontractor shall initiate and maintain such permits and programs as may be necessary to comply with requirements set forth by the Occupational Safety and Health Administration (OSHA) and any other local, state and federal regulations, and the rules and regulations of the Port Authority.

A copy of all permits will be provided by Company prior to commencement of Work at the jobsite. If OSHA permits are not required to perform Work, a letter shall be submitted to Company prior to commencement of Work at the jobsite stating that no permits are required.

14 QUALITY CONTROL

14.1 **Subcontractor shall be responsible for the performance of all shop / field inspections and testing activities**. Subcontractor shall adhere to the Project Quality Procedures contained in Article 80 of Exhibit 97.

14.2 All **Shop and field** fabrication inspection shall be carried out by certified inspectors employed and paid by the Subcontractor.

14.3 The Subcontractor or supplier is to submit for approval a Quality Plan acceptable to both the Phoenix Constructors JV (PCJV) and the Port Authority of New York and New Jersey (PANYNJ). The Plan is to be compliant with Article 80 of Contract WTC284.458 GC and the FTA-IT-90-5001-02.1 - Quality Assurance and Quality Control Guidelines available on www.fta.dot.gov. The Plan is to include implementation procedures, checklists, and reporting forms as necessary to detail the specifics of the Quality Activities. Subcontractors will be responsible for their own Quality Control and subject to audit by PCJV and the PANYNJ. The Subcontractor or supplier is to submit for approval a Quality Manager by name, who is independent of production forces. The qualifications and documentation of qualifications must accompany the submittal. Subcontractors electing to comply with the PCJV Quality Plan contained in Exhibit 18 in lieu of their own must do so by affidavit agreeing to comply with the PCJV Plan and all subsequent revisions. Implementation Procedures, reporting forms, and checklists will still be required for categories of work not already covered under the PCJV Plan.

Subcontractor's Initials____

Company's Initials ____

15 CONSTRUCTION

Subcontractor shall provide, institute, and/or implement the following:

15.1 Security Program

Subcontractor is responsible for the security of its workers, tools, materials and equipment on (and to and from) the jobsite. All small tools and construction equipment belonging to Subcontractor must be clearly identified as such. Tools including personal tools are subject to inspection.

15.2 Construction Area Limits

PCJV and other Regulatory Agencies will designate the boundary limits of access roads, storage areas, and construction areas. Subcontractor shall not trespass in or on areas not so designated. Subcontractor shall be responsible for keeping all of its personnel out of areas not designated for Subcontractor's use.

15.3 Water Pollution

Subcontractor shall, at its expense, provide suitable facilities to prevent the introduction of any substances or materials into any stream, lake or other body of water which may pollute the water or constitute substances or materials deleterious to fish and wildlife.

15.4 Air Pollution

Subcontractor shall perform its Work so as not to discharge into the atmosphere from any source whatever smoke, dust, or other air contaminants in violation of the laws, rules and regulations of the governmental entities having jurisdiction.

15.5 Ventilating

Prevent hazardous accumulations of dust, fumes, mists, vapors or gases in areas occupied during construction;

Provide local ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied areas;

Subcontractor's Initials____

Company's Initials ____

Dispose of materials in manner that will not result in harmful exposure to persons or disrupt or otherwise effect operation of existing facilities.

Ventilate storage spaces containing hazardous, volatile or temperature sensitive materials.

15.6 Site Signs

Identification signboards and notices for safety or instruction are permitted on site only after approval of PCJV for format, location and quantity.

END OF SCOPE OF WORK

Subcontractor's Initials____

Company's Initials ____

PROPOSAL INVITATION LETTER

November 21, 2008

DCM Erectors, Inc.
110 East 42nd Street
New York, NY 10017

Attention: Mr. Larry Davis

Reference: Phoenix Constructors, JV
Request for Proposal (RFP) No.: W0TC-GC1-2-KN00186-020
Structural Steel, Intumescent Fire Resistant Coating, Metal Deck & Precast Concrete Work

Phoenix Constructors, JV is pleased to invite you to submit a competitive proposal for Work Package No. 20 "Station Construction and Transit Hall-Structure to Grade" – Structural Steel, Intumescent Fire Resistant Coating, Metal Deck & Precast Concrete Work for the Port Authority of New York and New Jersey WTC Transportation HUB Project located in New York City.

1. Work Package # 20 consists of three distinct Work Areas, identified as:

A. Work Area 1 – Path Station

B. Work Area 2 – 1 Line Subway Box (Greenwich Street Corridor)

C. Work Area 3 – Transit Hall

1.1 Under this Work Package Subcontractors will have the option to submit their stand alone proposals, inclusive of all Costs and obligations for the following scope of work:

A. Furnish, Fabricate and Erect Structural Steel, Intumescent Fire Resistant Coating, Metal Deck & Precast Concrete Work applicable to all Work Areas 1 + 2 + 3 (Combined Proposal).

B. Furnish, Fabricate and Erect Structural Steel, Intumescent Fire Resistant Coating, Metal Deck & Precast Concrete Work applicable to Work Area 1 only.

C. Furnish, Fabricate and Erect Structural Steel, Intumescent Fire Resistant Coating, Metal Deck & Precast Concrete Work applicable to Work Areas 2 + 3 (Combined Proposal).

In preparing your proposal, it is essential that requirements of the enclosed Request for Proposal are adhered to.

This invitation to bid comprises two steps.

1) The 1st Step begin with and the acknowledgement of receiving the bid documents and intent to submit a bid and ends with Pre-Qualification and shortlisting. Due to the size and nature of different specialty trade requirements, bidders are permitted to select their team of subcontractors or form a Joint Venture consortium to bid the RFP. There will be a MANDATORY Pre-Bid meeting on Tuesday 12/16/2008 thru Wednesday 12/17/2008.

   Other stipulations as stated in the attached "Instruction to Bidders, "Exhibit 1 Scope of Work" and "Exhibit 2A Subcontractors Pricing and Invoicing Instructions". The bidders are required to indentify their team of subcontractors, affiliates and Joint Venture partners, their specialty and roles in submitting the bid proposal "RFP-1st Step Submittal / Intention to Submit Bid Proposal" by 12/09/ 2008, indentifying interest in: **a) Work Areas 1+2+3 Combined Proposal. b) Work Area 1 Stand Alone Proposal, c) Work Area 2+3 Combined Stand Alone Proposal. The Bidder has the choice to submit any or all proposals at their discretion.**

The 1st Step Requirements / Submittals

a. Intention to submit proposals for :

   I. **Structural Steel, Intumescent Fire Resistant Coating, Metal Deck & Precast Concrete, Work Areas 1+2+3 Combined.**

   II. **Structural Steel, Intumescent Fire Resistant Coating, Metal Deck & Precast Concrete, Work Area 1 Only**

   III. **Structural Steel, Intumescent Fire Resistant Coating, Metal Deck & Precast Concrete, Work Areas 2+3 Combined.**

b. Identification of Prime Subcontractor

c. Identification of Joint Venture Partners

d. Identification of Steel Fabricators for "Calatrava Exposed Steel"

e. Identification of Steel Fabricators for "Standard Profile and Built Up Sections"

f. Identification of Steel Fabricators for 1-Line Steel

g. Identification of Steel Erectors for "Calatrava Exposed Steel"

h. Steel Erectors for "Standard Profile and Built Up Sections"

i. Steel Erectors for 1-Line Steel

j. AISC - Steel Fabrication Shop Certification

k. AISC - Steel Erection Certification

l. Identification of Intumescent Fire Resistant Coating Manufacture/ Supplier

m. Identification of Intumescent Fire Resistant Coating Applicator

n. Identification of Precast Concrete Fabricator

o. Identification of Precast Concrete Erector

p. Pre-qualifications - Joint Venture Partners (Exhibit 30A & 30B)

q. Financials - Joint Venture Partners

r. Bonding Capacity - Joint Venture Partners

s. Technical Qualifications - Joint Venture Partners

t. Similar Type of Work Completed - Joint Venture Partners

u. Resume of the Key Personnel – Joint Venture Partners

v. Current Backlog

2. Once the acknowledgement and intent to submit a bid is received, Phoenix will review the information and qualifications of the Subcontractors /Joint Venture partners and will shortlist the teams for the 2nd Step of the RFP submittal process. The selected contractors/teams will be invited for the step 2 **Mandatory Pre-Bid Meeting** and Site Walk Through in order to submit their bid proposal.

The 2nd Step Requirements / Submittals

a. Mandatory Pre-Bid Meeting Participation

b. **Bid Bond:** Phoenix Constructors JV requires that each bidder provide a bid guarantee equivalent to a minimum of **two and one half percent (2 1/2%)** of the bid price with their Bid Proposal. The "bid guarantee" shall consist of a firm commitment such as a bond, certified check, or other negotiable instrument accompanying the bid, as assurance that the bidder will, upon acceptance of his bid, execute such contractual document as may be required within the time specified.

c. Technical Proposal Submittal

d. Commercial Proposal Submittal

e. Method Statement Submittal

3. There will be a Pre-Proposal Meeting and Site Walk-Through for **The Selected Bidders** as stated above on **Tuesday 12/16/2008 thru Wednesday 12/17/2008, 8:00 AM EDT,** at the Phoenix Constructors Offices at 115 Broadway, 18th Floor. Subcontractors are limited to six (6) participants and are reminded to have safety vests, safety glasses, boots, and hard hats for their own use. Subcontractors will not be allowed to participate on the site-walk without proper safety gear.

4. For the purposes of general information, the preliminary Structural Steel quantities for this work package are in excess of 18,000 US Tons, of which approximately 50% of the steel is classified as "Calatrava exposed Steel and the remaining 50% of the Steel is classified as "Standard Profile and Built-Up Sections," including 1-Line steel.

5. For the convenience of the bidder, attached is a List of Steel Fabricators familiar with "Calatrava Exposed Steel Structures" / for solicitation / consultation at the sole discretion of prime bidder. This list is provided for general information only.

All proposals MUST be **SEALED** and MUST clearly state on the outside of the package:

"SEALED PROPOSAL FOR RFP NUMBER: "W0TC-GC1-2-KN00186-020"
"CONTRACT TITLE: "STATION CONSTRUCTION AND TRANSIT HALL STRUCTURE TO GRADE - STRUCTURAL STEEL, INTUMESCENT FIRE RESISTANT COATING & PRECAST CONCRETE WORK" Work Areas 1+2+3 or Work Area 1 or Work Areas 2+3

All proposals for the **Step-One RFP** must be received at our address below on or before **12/09/ 2008 at 5:00 PM, EDT**, and will be opened only after that time. Proposal

All proposals for the **Step-Two RFP** must be received at our address below on or before **2/9/2009 at 5:00 PM, EDT**, and will be opened only after that time.

All Requests For Information (RFIs) shall be written via Letter, E-mail or Facsimile, and should be addressed to:

Phoenix Constructors, JV
115 Broadway, 18th Floor
New York, NY 10006

Attention: Javed Qureshi
e-mail:javed.qureshi@phoenixconstructors.com
Phone (646) 467-7219
Fax (212) 566-2302

All costs and expenses incurred by you in preparing your proposal will be borne solely by you. You will be informed whether or not your proposal has been successful. Our selection will be based on the "BEST VALUE" to Phoenix, The Port Authority, and The FTA. We reserve the right to reject any or all proposals. Further, we may award any part or phase of the Work to

any one or more of the bidders. Actual award of the Contract is contingent upon execution of formal documents satisfactory to both parties.

You are requested to sign the attached copy of this letter in the space provided below and return it to us as acknowledged receipt of this RFP and the enclosures referenced therein and as confirmation of your intention to submit a proposal by the closing date. Should you not wish to submit a proposal you are requested to return all Request for Proposal material.

It should be noted that Phoenix Constructors JV prohibits the participation of any of its respective affiliates in this solicitation process.

Very truly yours,

Javed I. Qureshi
Contract Administrator
Office 646-467-7219
Fax 212-566-2302
Cell

Enclosures:

Receipt Acknowledged: _____
(please sign)

Name _____
(please print)

Title: _____

Date: _____

INSTRUCTIONS TO OFFERORS

1.0 INTRODUCTION

Phoenix Constructors JV ("PC"), acting under its contract with the Port Authority of New York and New Jersey ("PANYNJ"), requests that you submit a proposal for a Lump Sum, Fixed Price type of contract, **Furnish, Fabricate and Erect Structural Steel, Intumescent Fire Resistant Coating, Metal Deck & Precast Concrete Work** as indicated in the contract drawings and specifications for the Station Construction and Transit Hall Structure to Grade (Work Package 20) (Contract WTC-284.458GC) for the Port Authority of New York and New Jersey WTC Transportation HUB Project located in New York City, USA.

2.0 Work Package #20 has been organized into three distinct Work Areas (WA) for Subcontractor's consideration and pricing.

1. **Work Area 1 - Path Station**
2. **Work Area 2 – 1 Line Subway Box** (Greenwich Street Corridor)
3. **Work Area 3 – Transit Hall**

Under this Work Package Subcontractors will have the option to submit their stand alone proposals, inclusive of all costs and obligations for the following scope of work:

A. **Furnish, Fabricate and Erect Structural Steel, Intumescent Fire Resistant Coating, Metal Deck & Precast Concrete Work applicable to all Work Areas 1 + 2 + 3 (Combined Proposal).**

B. **Furnish, Fabricate and Erect Structural Steel, Intumescent Fire Resistant Coating, Metal Deck & Precast Concrete Work applicable to Work Area 1 only.**

C. **Furnish, Fabricate and Erect Structural Steel, Intumescent Fire Resistant Coating, Metal Deck & Precast Concrete Work applicable to Work Areas 2 + 3 (Combined Proposal).**

PERTINENT DATES:

Request for Proposals Issued: 11/21/2008

1st Step RFP; Bidder's Questions/RFI – "Last Request Date":12/02/2008

1st Step RFP; Bidder's Questions/RFI – "Last Response Date":12/05/2008

1st Step RFP, Pre Qualification / Intention to Submit Bid Proposal Due: 12/09/2008

* **Mandatory step 1 Pre-Bid Meeting 12/16/2008 thru 12/17/2008.**

Short List Offerors (Bidders):12/10/2008 thru 12/12/2008

Inform Short List Bidders Approved for 2nd Step Bidding Process. 12/12/08

Mandatory step 2 Pre-bid Meeting / Site Visit by Invitation only: **12/16/2008 thru 12/17/2008**

2nd Step RFP Issued to Selected Offerors (Bidders): 12/18/2008 thru 12/19/2009

2nd Step RFP; Bidder's Questions/RFI – "Last Request Date":1/30/2009

2nd Step RFP; Bidder's Questions/RFI – "Last Response Date":2/5/2009

2nd Step RFP Due Date: 2/9/2009

Open Bids: 2/10/2009

Bid Review: 2/10/2009 thru 2/18/2009

Final Meeting with Selected Offerors (Bidders) & Request Clarifications/BAFO: 2/20/2009 thru 2/23/2009

Clarifications / BAFO from Selected Bidders: 2/24/2009 thru 3/4/2009

Finalize and Recommend for Award: 3/05/2009 thru 3/09/2009

Anticipated Contract Award Date: 3/17/2009

2.0 SUBMISSION OF PREQUALIFICATIONS

The first Phase in the RFP process is the submission of Pre-Qualification Packages, described below, by the interested parties. If two or more companies plan on forming a Joint Venture for this project, each of the companies must submit a Pre-Qualification Package.

Please direct your **sealed** Prequalification packages to the mailing address identified below on or before the closing date and time. **PC reserves the right to reject any Prequalification Packages received after the deadline.**

Identify the package or envelope **on the outside** as "Prequalification Package in Response to: **RFP: W0TC-GC1-2-KN0186-020**." Furnish, Fabricate and Erect Structural Steel, Intumescent Fire Resistant Coating, Metal Deck & Precast Concrete Work. **Work Areas 1+2+3 or Work Area 1 or Work Areas 2+3.**

Address package to:

Mr. Javed Qureshi
Contract Administrator
Phoenix Constructors, JV
115 Broadway, 18th Floor
New York, New York 10006
Tel: 646.467.7219; Fax: 212.566.2302
E-mail: javed.qureshi@Phoenixconstructors.com

The Offeror can contact the Contract Administrator to verify delivery of their bid proposal prior to official closing of the RFP.

Pre-Qualification Packages are to include:

2.1 NOTIFICATION OF INTENT TO PROPOSE/BID: In order to ensure that all prospective Offerors have received the solicitation and any amendments thereto, PC requests that a prospective Offeror notify PC in writing indicating that the Offeror intends to submit a proposal in response to this solicitation indentifying RFP WTC-GC1-2-KN0186 Furnish, Fabricate & Erect Structural Steel, Intumescent Fire Resistant Coating, Metal Deck & Precast Concrete Work. The Offeror may transmit the notification to the Contract Administrator (Javed Qureshi) via e-mail or fax.

2.2 JOINT VENTURE PARTNERS: Include a statement identifying your Joint Venture partners (if any), and their respective roles in the Joint Venture organization as

well as any other trade subcontractors / venders who will be performing work as a 2nd tier subcontractor under your management.

2.3 PREQUALIFICATION FORMS: Exhibit 30A Representations and Certifications, and Exhibit 30B Subcontractor Pre-Qualification Questionnaire must be filled out in their entirety by all members of your Team/JV.

2.4 FINANCIAL STATEMENTS: Provide each subcontractor's Financial Reports, Balance Sheets, and Profit and Loss Statements for the previous three (3) years.

2.5 BONDING CAPACITY: Payment and Performance Bonds are required for all subcontract work over $300,000.00. Provide the name and contact information for your Bonding Company as well as your Bonding limit.

2.6 **TECHNICAL QUALIFICATIONS AND CERTIFICATIONS: List all subcontractor and/or Joint Venture partners' qualifications and certifications. Prime Offerors should be Certified Fabricator and or Certified Erector from American Institute of Steel Construction or equivalent approved and accepted by the Port Authority. Major Steel Bridge fabricators or equivalent subcontractors should be certified as AISC of Major Steel Bridge, Simple Steel Bridge, or Steel Building Structure, ISO9000 Requirements or equivalent, as appropriate for the work to be performed by them. All erectors should be certified as AISC category Advanced Certified Steel Erectors or equivalent.**

2.7 SIMILAR TYPE OF WORK COMPLETED AND REFERENCES: List representative projects that demonstrate: The extent to which the Offeror has relevant experience in large-scale complex transportation structures of similar scope and complexity under the same demanding schedule; experience on other CM/GC Contracts; similar experience working within a major metropolitan area and with its public agencies; work in an urban environment and adjacent to operating railroad corridors, including measures used to minimize operational impacts to railroad operations; projects with complex utility relocations; projects with high security requirements; and projects with complex interagency coordination. Provide references for previous (dating back 5 years) and current projects with an initial contract value of $10,000,000 or greater. References shall include Client Name and Address, Client Technical Point of Contact and phone number, Contract Number, Brief Description of Work Scope, Contract Type, Period of Performance, Contract value.

2.8 MANAGEMENT TEAM: The organization of the project, including the identification of key personnel and their responsibilities and inter-relationships, and changes to the organization anticipated as the Project evolves. Include organization charts that illustrate the reporting structure of the Project team, identifying specific staff to be assigned to this Project. In addition, the Plan shall

include other key technical, subcontractor and or consulting staff. Provide a full description of the reporting structure, including the role of each legal entity of the contractor and the roles of any subcontractor(s). You shall also describe other personnel who, while not directly assigned to the implementation, may support it in some way. For each key staff member of the Project team indicate estimated percentage of time to be dedicated to the Project (i.e. 100%, 50%, etc.). Be sure to show points of interaction with Phoenix Constructors' staff. Include resumes of all management and key technical personnel to be assigned. The resumes shall clearly emphasize the experience that is relevant to the Project.

2.9 SHOP STAFF, AVERAGE SHIFTS, BACKLOG: Provide the following information pertaining to your shop: Number of shop production employees, average number of shifts, annual production in man hours and tons, descriptions of normal fabrication types, names, positions and experience of key personnel, current backlog listing indicating present and anticipated workload for the next twelve months, expressed in percent of normal annual volume.

2.10 QUALITY ASSURANCE, QUALITY CONTROL, QUALITY MANAGEMENT: The Offeror shall describe its Quality Assurance/Quality Control (QA/QC) organization; how the Plan extends to subcontractors and others in the supply chain; resources and procedures the Offeror will use for evaluating construction activities and products and related activities, which shall conform to the client's WTC Quality Assurance Project Program as per Article 14 of Exhibit 1 Statement of Work and Exhibit 18.

2.11 SAFETY MANAGEMENT AND RECORDS: The Offeror shall describe the organization, resource and procedures to be used for creating a safe environment for contractors, subcontractors, the Authority, PATH, NYCT personnel and the public during the life of the Project, which shall conform to the client's WTC Site Safety Program as per Exhibit 15A. Provide a statement with regard to the Offeror(s) and its team members' past record of worker and workplace safety, including any Recordable Accidents, Lost Time Accidents, and Experience Modification Rating (EMR) for the past three years. Provide copies of safety awards received from comparable projects, if any. This information must be submitted in order for "PC" to consider your pre-qualification package.

3.0 MANDATORY PRE-PROPOSAL MEETINGS

Once the acknowledgement and intent to submit a bid is received, PANYNJ / Phoenix will review the information and qualifications of the Subcontractors / Joint Venture partners and will select the teams for the Second Phase of the RFP submittal process. The selected contractors/teams will be invited for the **Mandatory Pre-Proposal Meeting and Site Walk on 12/16/2008 thru 12/17/2008** in order review the Scope of Work with the PANYNJ and Phoenix Constructors JV.

4.0 SUBMISSION OF TECHNICAL AND COMMERCIAL PROPOSALS

4.1 **Bid Bond:** Phoenix Constructors JV requires that each bidder provide a bid guarantee equivalent to a minimum of **two and one half percent (2 1/2%)** of the bid price with their Bid Proposal. The "bid guarantee" shall consist of a firm commitment such as a bond, certified check, or other negotiable instrument accompanying a bid, as assurance that the bidder will, upon acceptance of his bid, execute such contractual document as may be required within the time specified.

4.2 You must submit your proposal based on these Instructions to Offerors, the enclosed Invitation Letter and draft Sample Subcontract. All proposals must be submitted in writing in accordance with Section 4.0 above. **Telephone, email or facsimile proposals will not be accepted.**

ADDRESS OF SUBMITTAL: Please direct your **sealed** offer or bid package to the mailing address identified below on or before the closing date and time. **PC reserves the right to reject any offer/bid received after the deadline.**

Address offer to:

Mr. Javed Qureshi
Contract Administrator
Phoenix Constructors, JV
115 Broadway, 18th Floor
New York, New York 10006
Tel: 646.467.7219; Fax: 212.566.2302
E-mail: javed.qureshi@bovislendlease.com

Identify the package or envelope **on the outside** containing the offer as "Proposal in Response to: **RFP: W0TC-GC1-2-KN0186-020. "Structural Steel, Intumescent Fire Resistant Coating, Metal Deck & Precast Concrete Work". Work Areas 1+2+3 or Work Area 1 or Work Areas 2+3**
The Offeror may contact the Contract Administrator to verify that they have received the proposal.

4.3 QUESTIONS OR COMMENTS REGARDING SOLICITATION: The Offeror shall submit any comments or questions regarding the Solicitation to the Procurement Manager in writing early enough to allow sufficient time for a response prior to the proposal due date. Offeror shall not communicate with any other Offeror, employee or consultant employed by PC or the PANYNJ with respect to the subject matter of this Solicitation. The Offeror may transmit questions and comments via fax or e-mail. PC will answer all questions in writing and provide a copy of all questions and answers to all Offerors. If the RFP requires an addendum to resolve issues regarding the RFP, PC will issue an amendment to

those Offerors who have not declined to participate in time for them to consider the addenda before finalizing and submitting their offers.

4.4 AMENDMENTS TO SOLICITATION: If this RFP is changed, it will be done so via addendum. Unless otherwise stated, all terms and conditions that are not modified will remain unchanged. The Offeror shall acknowledge receipt of all Addendum(s) by stating in the offer that the Offeror has received the Addendum(s) and has considered it/them in formulating their proposal.

4.5 PACKAGE CONTENTS: Inside the **sealed** delivered package, there must be **two separate, sealed envelopes** labeled "Technical Proposal" and "Commercial Proposal" and they must contain the items listed below in Sections 5 and 6. Both the Technical Proposal and the Commercial Proposal must be **sealed** and contain an original, plus three (3) copies. The original of your offer must be clearly marked "Original." The copies must be identical to the original and may be photocopied from the original after signature.

Each package containing material you wish to be considered as part of your offer must be sealed with a self-adhesive label contained in the RFP Package, (to be furnished by contractor), marked "Sealed Offer." Your failure to use these labels may result in the inadvertent opening of the package and may cause your offer to be rejected.

5.0 TECHNICAL PROPOSAL

The Offeror shall provide one original and three copies of the Technical Proposal that includes:

5.1 MANAGEMENT PLAN: This Section specifies the minimum content of the Management Plan that shall be submitted as part of the Proposal. The Plan shall describe how the Offeror intends to manage and perform the Work of the Project.

5.1.1 The organization of the project, including the identification of key personnel and their responsibilities and inter-relationships, and changes to the organization anticipated as the Project evolves. Include organization charts that illustrate the reporting structure of the Project team, identifying specific staff to be assigned to this Project. In addition, the Plan shall include other key technical, subcontractor and or consulting staff. Provide a full description of the reporting structure, including the role of each legal entity of the contractor and the roles of any subcontractor(s). You shall also describe other personnel who, while not directly assigned to the implementation, may support it in some way. For each key staff member of the Project team indicate estimated percentage of time to be dedicated to the Project (i.e. 100%, 50%, etc.). Be sure to show points of interaction with Phoenix Constructors' staff. Include

resumes of all management and key technical personnel to be assigned. The resumes shall clearly emphasize the experience that is relevant to the Project.

5.1.2 The Offeror shall identify its approach toward the management of this Project including scope and complexity.

5.1.3 The Offeror shall describe the capability of the organization to perform required tasks and include the Offerors' annual volume in dollars of construction for the past five years, anticipated volume for the current year and plan for the next five years.

5.1.3 Occasionally, subcontractors and material suppliers go bankrupt during the course of a Project. The Offeror shall describe what actions it would take to protect "Phoenix Constructors JV / Port Authority" from being adversely affected by such an occurrence.

5.1.4 Since the achievement of milestones and management of the construction schedule is of the essence for this Project, the Offeror shall describe the organization that will have the primary responsibility for control and reporting of the Progress Schedule, and its techniques for effective and timely controls and reporting.

5.2 SCHEDULE: Offeror shall provide a detailed construction sequence / schedule to demonstrate how the work will be completed within the required schedule. Provide enough detail so that PC will be able to evaluate the proposal and approach being taken to the scope of work.

5.3 COST AND SCHEDULE CONTROLS: "PC" believes that it can better manage the Project if it is continually aware of its cost and schedule status. The Offeror shall describe controls and procedures to be used for management and monthly reporting of progress, problems, changes, and forecasts to complete, schedules and costs (including estimating and trending), including the names and positions of responsible parties. Such controls and procedures shall, at a minimum, be in conformance with the requirements specified in the Contract documents

Accordingly, the Offeror shall describe its approach for schedule preparation, updating and reporting in accordance with the Contract documents.

5.4 QUALITY ASSURANCE, QUALITY CONTROL, QUALITY MANAGEMENT: The Offeror shall describe its Quality Assurance/Quality Control (QA/QC) organization; how the Plan extends to subcontractors and others in the supply chain; resources and procedures the Offeror will use for evaluating construction activities and products and related activities, which shall conform to the client's

WTC Quality Assurance Project Program as per Article 15 of Exhibit 1 Statement of Work and Exhibit 18.

5.5 SAFETY: The Offeror shall describe the organization, resource and procedures to be used for creating a safe environment for contractors, subcontractors, Phoenix Constructors JV., the Authority, PATH, NYCT personnel and the public during the life of the Project, which shall conform to the client's WTC Site Safety Program as per Exhibit 15A.

5.6 M/WBE UTILIZATION: The Offeror shall describe its plan to meet the combined goal for participation by Minority – owned / Women – owned Business Enterprises (M/WBE) as set forth in Exhibit 21G.

5.7 EQUIPMENT AND MATERIAL LIST: Provide a list in Exhibit 2A of equipment and materials which will be made available for this effort.

5.8 EXCEPTIONS and ALTERNATE PROPOSALS: Exceptions to technical requirements or contract terms and conditions will not be accepted and may render the proposal "non responsive" and subject to rejection. PC must be able to evaluate and compare all technical proposals based upon the same technical requirements and contract terms and conditions as specified in the solicitation.

However, the Offeror may also submit an alternate proposal "in addition" to the primary proposal stated above. Please note that an alternate proposal submitted by itself is non responsive to the solicitation and will be rejected. The alternate proposal must be in a distinctly separate technical and cost volume that clearly list the exceptions to the solicitation (technical and/or commercial terms), and must set forth the addition/deletion to the solicitation (technical and or commercial terms) and the amount of change (increase/decrease) to the price or cost of the primary proposal.

6.0 COMMERCIAL/PRICE PROPOSAL

The Commercial Proposal shall consist of the Offerors' proposed pricing and other non technical information, as outlined below. The price table in (Exhibit 2A) will constitute all anticipated work included in the fixed price offer for this work based on the currently known scope of work as described by the attached Statement of Work (Contract, Exhibit I).

6.1 CONTRACTOR PRICING AS FORMATTED IN EXHIBIT 2A: Contractor Pricing and Invoicing Instructions including all Commercial Schedules and requested markups. Use of other than the commercial formats provided may be cause for rejection of your proposal.

6.2 CONTRACTOR'S SIGNATURE AUTHORIZATION: The Offeror shall provide a list of officers who are authorized to approve Contract Documents, Contract Modifications, and to make commitments on behalf of the subcontractor.

6.3 EXCEPTIONS: Written statement confirming that there are no exceptions to the Scope of Work or Contract Terms and Conditions.

This primary Commercial Proposal must include prices for all technical requirements and contract terms and conditions as provided in the solicitation. Any technical or commercial qualifications and/or exceptions listed must be contained in an "alternate proposal" (see Section 3.1.5 under Technical Proposal above).

6.4 INSURANCE: Completed Insurance Certificates satisfactory to Phoenix Constructors JV / PANYNJ Requirements (Exhibit 11).

6.5 OCIP: Owner's Contractors Insurance Program – In accordance with Exhibit 11A provide a statement confirming that the Offeror agrees to be subject to the provisions of the Owner's Contractor Insurance Program. Complete and return the required forms as specified in Exhibit 11A.

6.6 EQUAL EMPLOYMENT OPPORTUNITY CERTIFICATION: In accordance with EXHIBIT 24A, Equal Employment Opportunity Certification, please sign and return the form as required.

6.7 DAVIS-BACON COMPLIANCE STATEMENT: Provide a statement of compliance to the Davis-Bacon requirements as described in EXHIBIT 24B, Schedule of Minimum Wage Rates. All labor used by the contractor for the Work is subject to the Davis Bacon Act, Contract Work Hours and Safety Standards Act, Copeland (anti kickback) Act and the Fair Labor Standards Act. These regulations establish Federal minimum wage rates and overtime rates, and labor reporting requirements for the contractor.

Each subcontractor **MUST** fully **complete** and sign the **certified payroll provided in Exhibit 24B** on a weekly basis. As a prerequisite for payment, not limiting any other prerequisites for payment, the Subcontractor must **submit** all respective certified payrolls to the Contractor **at the time of invoicing.**

6.8 SUBCONTRACTOR REQUEST FORM: If the Offeror intends to utilize any Sub-Subcontractors, Submit Exhibit 13, Subcontractor Request Form, for each Sub-Subcontractor.

6.9 BONDING: Payment and Performance Bonds satisfactory to Phoenix Constructors JV Requirements (Exhibit10).

6.10 UNION AGREEMENTS: Provide one complete copy of all union / labor agreements and a letter certifying that all agreements are attached as applicable to the scope of work.

6.11 PERMITS AND LICENSES: Offeror shall submit with its proposal, the certificate of license number which grants them the authority to work as a contractor in the state, county and/or municipality where the work is to be performed.

7.0 DEFINITIONS

For all purposes of this Request for Proposal document, except as otherwise expressly provided herein, the terms defined shall have the meanings assigned to them in this Article.

"Owner" or "PANYNJ" means Port Authority of New York and New Jersey

Company or "PC" means Phoenix Constructors, JV

"Contractor" or "Subcontractor" means successful Offeror.

"Addendum" means any document(s) issued by Phoenix Constructors JV to all Offerors during the offering period, that contains additional information or corrections made by Phoenix Constructors JV to this Request for Proposal document.

"Offeror " means the person, corporation, partnership, joint venture or other organization which has submitted a proposal to Phoenix Constructors JV for performance of the Work.

"Successful Offeror" means the Offeror whose proposal has been accepted by Phoenix Constructors JV in writing.

"Subcontract" means the contractual document signed by the Successful Offeror and Phoenix Constructors JV in the form as defined in this Request for Proposal document.

"Request For Proposal" or "RFP" means the solicitation to offer and includes all Addenda.

Terms defined in this Article importing the singular also include the plural, and vice versa, where the context requires.

8.0 PREPARATION COSTS

Neither Phoenix Constructors JV and/or Owner will be responsible for any costs or expenses in preparing and/or submitting your proposals or subsequent meetings, interviews or in providing any supplemental information. Offeror is responsible for any

and all costs associated with submitting his proposal.

9.0 RIGHT OF ACCEPTANCE

Phoenix Constructors JV and/or Owner reserve the right to accept any proposal other than the lowest cost proposal and to accept or reject any proposal in whole or in part, or to reject all proposals with or without notice or reasons and, if no proposal is accepted, to abandon the Work or to have the Work performed in such other manner as Phoenix Constructors JV / PANYNJ may elect.

Partial or incomplete proposals may ~~not be accepted~~. You will be informed whether or not your proposal was successful.

10.0 OFFEROR'S MODIFICATION AND WITHDRAWAL OF PROPOSAL

You may, without prejudice to yourself, modify or withdraw your proposal by written request, provided that the request is received by PC prior to the offer due date and time that your proposal was to be submitted. Following withdrawal of your proposal, you may submit a new proposal provided that such new proposal will be received on or before the due date and time.

PC or PANYNJ may modify any provision(s) or part(s) of the Request for Proposal documents at any time prior to the award of a contract.

11.0 PHOENIX CONSTRUCTORS JV POLICY

In accordance with PC's policy, all qualified Offerors are entitled to receive equal opportunities. The offering or receiving of gifts, entertainment, payments, loans or other favors for the purpose of being placed on a Offerors' list, obtaining a contract, or favorable treatment under a contract, is prohibited. Furthermore, it is PC's policy that in the event an Offeror or Subcontractor is found to have offered or given a gratuity to obtain a contract or favorable treatment thereunder, the Offeror or Subcontractor involved will be refused further offer considerations by all of PC's entities. PC may also obtain those remedies available under law and the Contract, including, but not limited to, termination for default. Your attention is invited specifically to those articles in Representations and Certifications relating to Termination for Default and Gratuities.

12.0 INFORMATION BROKERING

PC considers completely unacceptable the acquisition or use of sensitive or confidential information for which Offerors or their agents or representatives are not entitled, such as competing for Offerors' proposal data, evaluations of proposals submitted by Offerors, and ranking of proposals. Offerors are required to notify PC immediately of any solicitation or approach offering (a) confidential offer information (including evaluations of offer information), (b) improper influence which would affect the award of any contract

associated with this project.

Offerors are further required to notify PC immediately if they come into possession of confidential information (including evaluation of offer information). Failure to comply with the foregoing may result in disqualification of the Offeror.

13.0 MINORITY BUSINESSES

Consideration is to be given to minority businesses for the supply of services and commodities for the World Trade Center HUB Project.

13.1. In addition, for awards expected to be in excess of $100,000, in accordance with Exhibit 21G, all Subcontractors of "PC" working on the WTC Hub who intend to purchase material or services, are required to establish contractor policies and procedures to take affirmative steps to encourage Minority and Women's Business Enterprises to seek business opportunities on the Project.

13.2 You are requested to obtain quotations for materials and services from minority owned enterprises. Potential minority subcontractors and material suppliers should be identified in proposals as such.

14.0 PRICING CONDITIONS

14.1 Pricing, stated in U.S. dollars, must be in accordance with the provisions of Exhibit 2A – Contractor Pricing and Invoicing Instructions. The blanks in Exhibit 2A – Contractor Pricing and Invoicing Instructions must be completed and returned by all Offerors as your commercial proposal.

14.2 Proposal validity-period is requested for 90 days after the closing date of this RFP.

14.3 **All pricing must be firm for the duration of this Contract.**

14.4 The quoted price(s) must include all costs to you for materials, labor, equipment, testing and any and all items of expense, fees, taxes, duties, overhead and profit for your full and complete performance of the Work as set forth herein.

14.5 All pricing information and requests for information identified in this RFP must be provided. Failure to comply with this request may result in a rejection of any proposal. **PC reserves the right to request and have you furnish any accounting breakdown of all contract prices including "cost or pricing data" as required**. This request may be made after contract price has been finalized with the Successful Offeror and for any Change Orders to the Contract issued by PC.

14.6 If you are the selected Subcontractor, you will be responsible for acquiring any and all licenses (applicable contractor's license(s), business license(s), etc.) and permits required to perform the Work, excluding building permits.

14.7 You are advised that quantities reflected on the drawings are for informational purposes only and that each Offeror is responsible for determining quantities required to perform the Work. The only exception shall be where PC has provided bills of quantities in Exhibit 2A for Offerors' insertion of unit prices.

14.8 Upon award, PC will issue one reproducible set of drawings for the selected Subcontractor's use in obtaining all construction prints. No additional construction drawings will be issued by PC for the Successful Offerors' use in performance of the Work.

14.9 You must define all materials to be purchased that cannot be obtained within 14 days after approval of design drawings.

14.10 Proposals for this Work are being requested from other Offerors.

14.11 In the case of any discrepancy between words and figures, the words shall prevail. In the case of errors in addition or extension, the unit prices quoted shall prevail.

14.12 You are advised that the Successful Offerors' personnel, including subcontractors, will be required to attend a safety orientation meeting. (This includes the entire labor force and all new hires). The meeting will last approximately ***two*** hours. All costs are to be included in your quoted prices.

In addition, the Successful Offeror will be expected to conduct weekly gang box safety meetings which shall be attended by all its craft employees. These meetings will last approximately ***one half*** hour.

14.13 The successful Offeror shall be expected to have all their employees who shall be working within the confines of the "1- Line and Path Tracks" to undergo track training which shall be conducted by the New York City Transit (NYCT and PATH). All costs shall be included in your quoted prices. The approximate cost is $2,000 for a 15 employee class.

14.14 In addition, the successful Offeror shall obtain Security Clearance Passes from the Port Authority for all their personnel entering the site. The successful Offeror's information shall be provided to the Port Authority to obtain the passes.

Subcontractors and their respective employees, subcontractors, and suppliers must comply with all security requirements set forth in this Subcontract including Exhibit 41 "WTC PATH Identification Guidelines For Subcontractors;" and all

additional security requirements imposed by The Port Authority of New York and New Jersey, Phoenix Constructors, or any additional party that Phoenix Constructors in their sole determination believes shall have the ability to request such requirements. Other than the actual Secure Worker Access Consortium (SWAC) enrollment cost of $250.00 per individual, the Subcontractor shall be solely responsible for all costs and/or expenses associated with the security, enrollment and identification procedures and requirements set forth within this Subcontract.

15.0 INSURANCE

15.1 The Successful Offeror must, as a minimum requirement, provide the insurance coverage as described in the Article entitled Insurance of the Sample Subcontract.

15.2 Exhibit 11 titled "Insurance Rider" provides a statement confirming that the Offeror agrees to obtain the Insurance required.

15.3 Owner's Contractors Insurance Program (OCIP) – In accordance with Exhibit 11A, provides a statement confirming that the Offeror agrees to be subject to the provisions of the Owner's Contractor Insurance Program. Complete and return the required forms as specified in Exhibit 11A.

15.4 Subcontractor shall name Phoenix Constructors JV, PANYNJ and other expressly specified parties as additional insureds and furnish a waiver of subrogation in favor of both.

15.5 You must complete and submit the insurance data requested in the Proposal Forms, as verification of possession of the above required insurance provisions.

16.0 EXCEPTIONS AND DEVIATIONS

16.1 Except as provided for below in section16.2 no qualifications to any requirement, provision, specification or stipulation of this RFP document shall be made by you. Failure to comply with this condition may result in a rejection of any proposal.

16.2 If you feel it would be advantageous to PC and/or PANYNJ to deviate from the requirements, conditions and provisions set forth in the RFP, you may present such departures as an "alternative proposal," marked as such and presented with your primary proposal, explaining in full detail the nature and extent of your proposed departure and the consequent impact on the prices, schedules or any other aspect of your proposal.

Such departures must be clearly identified and listed in a separate section of the proposal devoted explicitly to that purpose. Considerations of any alternate

proposal will be at the sole discretion of PC and/or PANYNJ.

16.3 The submission of a proposal indicates acceptance by you of all conditions contained herein.

16.4 During the proposal review, PC will not be responsible for identifying or resolving any deviations that may be contained in your proposal. If you are awarded the Subcontract, the only deviations recognized will be those mutually agreed upon and incorporated into the Subcontract in writing.

17.0 DISCREPANCIES AND OMISSIONS/ADDENDA

Should you find discrepancies in or omissions from the Solicitation documents, or should their intent or meaning appear unclear or ambiguous, you must notify the contract administrator named in the Proposal Invitation Letter for resolution. Replies to such notices will be made in the form of an Addendum to the Solicitation documents issued simultaneously to all Offerors. You must acknowledge receipt of all Addenda in your proposal cover letter. Phoenix Constructors JV and/or Owner will not be bound by, and you must not rely on, any oral interpretations or clarifications of the Solicitation documents.

Deadline for the submittal of questions and inquires is provided in Section 1.0 above.

18.0 CONFIDENTIALITY AGREEMENT

You may be required to sign a confidentiality agreement for extra sensitive information provided to you. You will be informed about this in more detail during the job-walk.

19.0 RETURN OF DOCUMENTS

In the event that you decide not to submit a proposal, you are required to return all Solicitation documents to the contract administrator named in the Proposal Invitation Letter.

20.0 TAXES

This is a tax exempt project for all material that shall be permanently incorporated into the project at completion.

21.0 LOCAL LABOR AND SERVICES

Local contractors, including suppliers of materials, services and labor forces are to be utilized in performance of the Work to the maximum extent practical. For all labor, Offeror shall be in compliance with the Davis Bacon requirements as stated herein.

Each subcontractor **MUST** fully **complete** and sign the **certified payroll provided in**

Exhibit 24B on a weekly basis. As a prerequisite for payment, not limiting any other prerequisites for payment, the Subcontractor must **submit** all respective certified payrolls to the Contractor **at the time of invoicing.**

21.1 Contractors/Subcontractor shall mean those companies which are licensed or can be licensed to do business in the state of New York.

21.2 Labor forces shall mean personnel from qualified to perform the work for which they are employed.

22.0 SIGNATURE REQUIREMENTS

Your proposal must be signed by a duly authorized officer of your company. If your company is a corporation, the proposal must be signed in its name and on its behalf and under seal by a duly authorized signing officer of the corporation and must be accompanied by a certified copy of a resolution of the corporation authorizing such execution. The office held by the signing officer must be shown.

If you submit a proposal as a partnership or joint venture, you must submit with your proposal a "Power of Attorney" executed by all of the general partners or members of the joint venture designating and appointing one of the general partners or members of the joint venture as a "Management Sponsor," and authorizing the Management Sponsor to sign the proposal on your behalf, to act for and bind you in all matters relating to the proposal and, in particular, to agree that each partner or member of the joint venture are jointly and severally liable for any and all of the duties and obligations assumed by you under the proposal and the contract, if awarded. The proposal must be signed on behalf of the partnership or joint venture in its legal name by the Management Sponsor.

If requested by Contractor, satisfactory evidence of the authority of any signatory to sign on behalf of your company must be furnished.

Only unified sums, rates, prices, or conditions will be accepted. Sums, rates, prices or any conditions which differ between individual parties of a partnership or joint venture will not be accepted.

23.0 BONDING

23.1 Performance and payment bonds may be requifed in the penal sum of one hundred percent (100%) of the Contract Price for each bond. A separate price must be submitted for the cost of a performance bond and a payment bond. Refer to Exhibit 10 regarding format of required bonds. These bonds may be requested in the form of a bank guarantee or letter of credit.

23.2 Bond Premium Reimbursement: Phoenix Constructors JV shall reimburse the Subcontractor for any bonding premiums actually paid by the Subcontractor. As

a condition precedent to the associated reimbursement, the Subcontractor must provide sufficient evidence, in a manner that is satisfactory to the Phoenix Constructors JV, that such premiums have been paid.

23.3 The surety and / or bank selected by you must be acceptable to Phoenix Constructors JV. The minimum requirements are:

23.3.1 Licensed to conduct business in the State in which the Work will be performed. Named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published annually (on 1 July) in Circular 570 by the Department of Treasury.

23.3.2 Immediately following offer selection, Phoenix Constructors JV. shall determine if complete performance and payment bonds will be required of the selected Subcontractor. The requirement for the Successful Offeror to complete and submit these forms will be made after a final determination of bond requirements and prior to finalizing the Contract. There is no requirement for these forms to be completed or submitted with your proposal. THE SUCCESSFUL OFFEROR WILL NOT BE ALLOWED ON THE JOBSITE UNTIL THE BOND REQUIREMENTS (IF APPLICABLE) ARE COMPLIED WITH AND COPIES OF COMPLETED BONDS ARE RECEIVED AND APPROVED BY PHOENIX CONSTRUCTORS JV / PANYNJ.

24.0 QUALIFICATION STANDARDS AND EVALUATION

24.1 Criteria

"PC" will make the award on a "BEST VALUE BASIS" to the responsible Offeror whose Proposal is most advantageous to Phoenix Constructors / PANYNJ. Accordingly, "PC" may not necessarily make an award to the Offeror with the highest ranking on non cost factors nor award to the Offeror with the lowest compensation proposal if doing so would not be in the overall best interest of "PC" and the Port Authority of New York and New Jersey. As proposals are considered by "PC" to be more equal in their technical merit, the evaluated cost or price becomes more important so that when technical proposals are evaluated as essentially equal, cost or price may be the deciding factor.

24.1.1 Subcontractor **Pre-Qualification** Packages will be evaluated with the following overall criteria for the best value basis at the sole discretion of Phoenix Constructors JV / PANYNJ:

Company History, Experience, References

- Company Certifications
- Financial Records, Balance Sheet, Assets, Income
- Management Team, Resume of Key Personnel
- Shop Staff, Average Shifts, Productivity, Backlog
- Bonding and Insurance Capabilities
- Safety Records (Recordable Incidents, Lost Work Day, EMR)

24.1.2 Subcontractor **Proposals** will be evaluated with the following overall criteria for the best value basis at the sole discretion of Phoenix Constructors JV / PANYNJ:

- Proposed Price
- Technical and Management Approach
- Management of Erection, Connection Engineering, Detailing Components
- Cranes, Equipment, Site Logistics
- Ability to Meet Schedule
- Quality Control
- Exception or Qualifications

25.2 Investigation, Discussions, Negotiations

"PC" may investigate responsibility, references or any aspect of the Offerors' Prerequisites, Technical or Experience and Business Risk Proposals, cost, or pricing as necessary to determine whether the Offeror is qualified or to confirm the accuracy and/or validity of any of the information presented. An Offerors' failure to supply information promptly following oral or written notice by "PC" may be grounds for disqualification and rejection of its Proposal. "PC" representatives may visit the Offerors' facilities, and the Offeror shall cooperate in making any reasonable arrangements in these regards. Each Offeror may be invited for a presentation, interview and meeting to discuss any aspect of its Offer and to answer specific questions.

PC may request a Best and Final Offer from those offerors deemed to be technically qualified and within the competitive price range. However, PC reserves the right to (1) negotiate with any selected offeror(s) or (2) may select

and award based upon the original proposals without oral presentations, discussions, or negotiations.

25.3 Financial Capability Determination Information

PC reserves the right, prior to award, to require the Offeror to submit information that PC will use to make a determination whether the Offeror has the financial capability to perform the contemplated contract. Such information may include, but not be limited to: annual reports; lines of credit with financial institutions and suppliers; SEC Form 10K, and any other information that may be required by PC.

25.4 Single Proposal

In the event a single Offer is received, "PC" may conduct a price and/or cost analysis of the Offer. The Offeror may be required to furnish cost and pricing data to support this effort. Negotiations may be conducted with the single Offeror or the Offer may be rejected.

26.0 NOTICES TO OFFERORS

26.1 Precedence of Requirements

In the event of a conflict among the provisions, the RFP instructions, the RFP correspondence, other documents and the resulting contract, the terms of the contract shall govern.

26.2 Phoenix Constructors JV prohibits the participation of any of its respective affiliates in this solicitation process.

27.0 PROTEST PROCEDURES

If the instance arises that a Subcontractor feels that there are faults in Phoenix Constructors JV's procurement operations, the Subcontractor must file a formal protest. All protests must be received in writing and be concise and logically presented to facilitate review by the Phoenix Constructors JV. All protests will include:

- Name and address of the protestor including telephone and fax number and email address
- The solicitation title and number
- The contract title and number
- A statement concerning the protestor's interest in the award or non-award of the Subcontract/Purchase Order for the purpose of filing the protest
- A comprehensive statement of the legal and factual grounds for the protest that must include a detailed description of the resulting prejudice to the protestor
- Copies of all relevant and supporting documents and information

- The relief required and the reasons therefore

All protests must be submitted to:

Phoenix Constructors, JV
Procurement Manager
115 Broadway, 18th Floor
New York, NY 10006

Protests based upon alleged apparent improprieties of the solicitation shall be filed before proposal opening or the closing date for receipt of proposals or bids. In all other cases protests shall be filed no later than five (5) business days after the basis of the protest is known or should have been known, whichever is earlier. The written protest must be received no later than 5:00PM on the fifth day.

Failure to comply with any of the protest requirements will be just cause for the dismissal of the protest.

Upon receipt of the protest, the Contract Administrator will review the basis of the protest and supporting data and use best efforts to issue a decision within 10 days after receipt of the protest. The Contract Administrator may take any action or make any request he/she deems necessary in order to investigate the protest, including but not limited to, extending the time to issue a decision in order to obtain evidence and other pertinent information.

The protestor will be provided a copy of the written decision by the Contract Administrator. This decision will be considered final unless within three (3) business days of receipt of the written decision the protestor appeals to the Phoenix Constructors' Procurement Manger. The appeal must be sent by certified mail to the address listed above.

No evidence or information may be introduced or relied upon in the appeal that has not been presented to the Contract Administrator. The Procurement Manager will review the appeal, supporting documents, and the decision of the Contract Administrator and issue a written decision within five (5) days of receipt if practical. The Procurement Manager may take any action or make any requests he or she deems necessary including extending the time to issue a decision in order to render a decision on the appeal.

The decision by the Procurement Manager or his/her designee shall be conclusive, final and not subject to further appeal to any entity or agency.

The FTA will only entertain a protest that alleges that the Phoenix Constructors JV failed to follow their protest procedures. Any protest concerning the PC's failure to follow protest protocol must be filed in accordance with FTA Circular.

END OF INSTRUCTIONS TO OFFERORS

TABLE OF CONTENTS

1.0 PAYMENT SCHEDULE

Full compensation to Subcontractor for full and complete performance by Subcontractor of all the Work, compliance with all terms and conditions of this Subcontract, and for Subcontractor's payment of all obligations incurred in, or applicable to, performance of the Work, shall be the sum of the following lump sums and the value of the unit prices set forth below, for adjusting future additions / deletions from the contractual scope.

1.1 Firm Fixed Price

The undersigned, having examined the proposed RFP / Contract documents for the work package referenced above and having visited the job site and examined the conditions affecting the work, hereby proposes and agrees to furnish all labor, materials, equipment, and appliances, and to perform operations necessary to complete the work as required by said proposed RFP / contract documents " Station Construction and Transit Hall Structure to Grade - Structural Steel, Intumescent Fire Resistant Coating, Metal Deck & Precast Concrete Work.

A. **Work Package # 20, Furnish, Fabricate and Erect, Structural Steel, Intumescent Fire Resistant Coating, Metal Deck & Precast Concrete Work**
SINGLE COMBINED PROPOSAL FOR WORK AREA 1, PATH STATION + WORK AREA 2, 1 LINE SUBWAY BOX + WORK AREA 3, TRANSIT HALL.

The total price for performing all work is $_____this is (in words) _____dollars.

B. **Alternate Option** - Furnish, Fabricate and Install Precast Concrete Floor and Walls instead of Cast in Place Concrete as indentified and depicted on the Contract drawings: S1311-1, S1312-1, S1313-1, S1314-1, S1411-1, S1412-1, S1413-1 & S1414-1

The total price for performing all work is $_____this is (in words) _____dollars.

The Price is firm and fixed for the duration of the Subcontract and is not subject to escalation for any cause. The price shall be furnished in US dollars and are not subject to change based upon currency fluctuations. Payment for actual quantities at the Unit Price

shall constitute full payment for the performance of the Subcontract and covers all cost of whatever nature incurred by the Subcontractor in accomplishing the Work in accordance with the provisions of this Subcontract.

Phoenix Constructors JV and Port Authority of New York and New Jersey has the exclusive right at their discretion to select and choose any single or combination of different proposals from the same or more than one bidder for the award. The bidders must consider and have appropriate allowance in their proposals for coordination and review of connection details at the common boundary lines for adjacent work packages, of the Work Package #20, WP#21 & WP# 9 & 9X, In addition to coordination with other WTC site stakeholders, i.e., memorial, tower 1,2,3 & 4, VOEC…

NOTE ** This pricing format **MUST** be used**

All prices shall be furnished in US Dollars and are not subject to change based upon world currency fluctuations.

	DESCRIPTION	UM	TOTAL PRICE
A1	**Furnish, Fabricate and Deliver Calatrava Exposed Steel for Work Area 1, Path Station to WTC Jobsite**	**Lump Sum**	**$**
A2	**Furnish, Fabricate and Deliver Caltrava Exposed Steel Work Area 2, 1 Line Subway Box**	**Lump Sum**	**$**
A3	**Furnish, Fabricate and Deliver Calatrava Exposed Steel Work Area 3, Transit Hall**	**Lump Sum**	**$**
B1	**Furnish, Fabricate and Deliver Standard Profile and Built up Section Steel For Work Area 1 , Path Station to WTC Jobsite**	**Lump Sum**	**$**
B2	**Furnish, Fabricate and Deliver Standard Profile and Built up Section Steel For Work Area 2, 1 Line Subway Box to WTC Jobsite**	**Lump Sum**	**$**
B3	**Furnish, Fabricate and Deliver Standard Profile and Built up Section Steel For Work Area 3, Transit Hall to WTC Jobsite**	**Lump Sum**	**$**
C1	**Shop Applied Surface Preparation, Zinc Primer & Intumscent Fire Resistant Coating Work for Work Area 1, Path Station**	**Lump Sum**	**$**
C2	**Shop Applied Surface Preparation, Zinc Primer & Intumscent Fire Resistant Coating Work for Work Area 2, 1 Line Subway Box**	**Lump Sum**	**$**

C3	Shop Applied Surface Preparation, Zinc Primer & Intumscent Fire Resistant Coating Work for Work Area 3, Transit Hall	Lump Sum	$
D1	Field Applied Surface Preparation, Zinc Primer & Intumscent Fire Resistant Coating Work for Work Area 1, Path Station	Lump Sum	$
D2	Field Applied Surface Preparation, Zinc Primer & Intumscent Fire Resistant Coating Work for Work Area 2, 1 Line Subway Box	Lump Sum	$
D3	Field Applied Surface Preparation, Zinc Primer & Intumscent Fire Resistant Coating Work for Work Area 3, Transit Hall	Lump Sum	$
E1	Furnish, Fabricate and Deliver Metal Deck Work for Work Area 1, Path Station to WTC Jobsite	Lump Sum	$
E2	Furnish, Fabricate and Deliver Metal Deck Work for Work Area 2, 1 Line Subway Box to WTC Jobsite	Lump Sum	$
E3	Furnish, Fabricate and Deliver Metal Deck Work for Work Area 3, Transit Hall to WTC Jobsite	Lump Sum	$
F1	Furnish, Fabricate and Deliver Precast Concrete Work for Work Area, Path Station to WTC Jobsite.	Lump Sum	$
F2	Furnish, Fabricate and Deliver Precast Concrete Work for Work Area 2, 1 Line Subway Box to WTC Jobsite.	Lump Sum	$
F3	Furnish, Fabricate and Deliver Precast Concrete Work for Work Area 3, Transit Hall to WTC Jobsite.	Lump Sum	$
G1	Steel Erection: Calatrava Exposed Steel Work Area 1, Path Station	Lump Sum	$
G2	Steel Erection: Calatrava Exposed Steel Work Area 2, 1 Line Subway Box	Lump Sum	$
G3	Steel Erection: Calatrava Exposed Steel Work Area 3, Transit Hall	Lump Sum	$
H.1	Steel Erection : Standard Profile and Built up Sections Work Area 1, Path Station	Lump Sum	$
H.2	Steel Erection : Standard Profile and Built up Sections Work Area 2, 1 Line Subway Box	Lump Sum	$
H.3	Steel Erection : Standard Profile and Built up Sections Work Area 3, Transit Hall	Lump Sum	$
I.1	Metal Deck & Shear Stud Installation Work Area 1, Path Station	Lump Sum	$

I.2	**Metal Deck & Shear Stud Installation Work Area 2, 1 Line Subway Box**	**Lump Sum**	**$**
I.3	**Metal Deck & Shear Stud Installation Work Area 3, Transit Hall**	**Lump Sum**	**$**
J.1	**Precast Concrete Erection. Work Area 1, Path Station**	**Lump Sum**	**$**
J.2	**Precast Concrete Erection. Work Area 2, 1 Line Subway Box**	**Lump Sum**	**$**
J.3	**Precast Concrete Erection. Work Area 3, Transit Hall**	**Lump Sum**	**$**

Note: The above lump sum price must be broken down as below for bid analysis for each individual and combination offers proposed.

Cost Break Down for Work Package 20-Part 1, Work Area 1- Path Station West Bathtub

1	**Payment and Performance Bond** **a). Payment Bond** **b). Performance Bond**	**Lump Sum** **Lump Sum**	**$** **$**
2.1	**Mobilization. Work Area 1, Path Station**	**Lump Sum**	**$**
2.2	**Mobilization. Work Area 2, 1 Line Subway Box**	**Lump Sum**	**$**
2.3	**Mobilization. Work Area 3, Transit Hall**	**Lump Sum**	**$**
3.1	**Shop Drawings and Engineering - Permanent Structure. Work Area 1, Path Station**	**Lump Sum**	**$**
3.2	**Shop Drawings and Engineering - Permanent Structure. Work Area 2, 1 Line Subway Box**	**Lump Sum**	**$**
3.3	**Shop Drawings and Engineering - Permanent Structure. Work Area 3, Transit Hall.**	**Lump Sum**	**$**
4.1	**Shop Drawings and Engineering - Temporary Support Structure. Work Area 1, Path Station.**	**Lump Sum**	**$**
4.2	**Shop Drawings and Engineering - Temporary Support Structure. Work Area 2, 1 Line Subway Box**	**Lump Sum**	**$**
4.3	**Shop Drawings and Engineering - Temporary Support Structure Work Area 3, Transit Hall**	**Lump Sum**	**$**
5.1	**Shop Drawings and Engineering – Working Platforms and Scaffolding. Work Area 1, Path Station**	**Lump Sum**	**$**

5.2	**Shop Drawings and Engineering – Working Platforms and Scaffolding. Work Area 2, 1 Line Subway Box**		
5.3	**Shop Drawings and Engineering – Working Platforms and Scaffolding Work Area 3, Transit Hall**		
6.1	**Shop drawings and Engineering Overhead Protection Shield and Side Walls for Construction Phasing. Work Area 1, Path Station**	**Lump Sum**	**$**
6.2	**Shop drawings and Engineering Overhead Protection Shield and Side Walls for Construction Phasing. Work Area 2, 1 Line Subway Box**		
6.3	**Shop drawings and Engineering Overhead Protection Shield and Side Walls for Construction Phasing. Work Area 3, Transit Hall**		
7.1	**Material - Permanent Steel Structure Work Area 1, Path Station**	**Lump Sum**	**$**
7.2	**Material - Permanent Steel Structure Work Area 2, 1 Line Subway Box**	**Lump Sum**	**$**
7.3	**Material - Permanent Steel Structure Work Area 3, Transit Hall**	**Lump Sum**	**$**
8.1	**Material -Temporary Steel Support Structure Work Area Part 1, Path Station**	**Lump Sum**	**$**
8.2	**Material -Temporary Steel Support Structure Work Area 2, 1 Line Subway Box**	**Lump Sum**	**$**
8.3	**Material -Temporary Steel Support Structure Work Area 3, Transit Hall**	**Lump Sum**	**$**
9.1	**Material Overhead Protection Shield and Side Walls. Work Area Part 1, Path Station**	**Lump Sum**	**$**
9.2	**Material Overhead Protection Shield and Side Walls. Work Area 2, 1 Line Subway Box**	**Lump Sum**	**$**
9.3	**Material Overhead Protection Shield and Side Walls. Work Area 3, Transit Hall**	**Lump Sum**	**$**
10.1	**Steel Fabrication - Permanent Structure Work Area 1, Path Station**	**Lump Sum**	**$**
10.2	**Steel Fabrication - Permanent Structure Work Area 2, 1 Line Subway Box**	**Lump Sum**	**$**
10.3	**Steel Fabrication - Permanent Structure Work Area 3, Transit Hall**	**Lump Sum**	**$**

11.1	Steel Fabrication - Temporary Structure Work Area 1, Path Station	Lump Sum	$
11.2	Steel Fabrication - Temporary Structure Work Area 2, 1 Line Subway Box	Lump Sum	$
11.3	Steel Fabrication - Temporary Structure Work Area 3, Transit Hall	Lump Sum	$
12.1	Cost for all necessary "individual dedicated UL Fire rated Assembly Tests" related to Intumescent Fire Resistant Coating for different shapes and assemblies required for the complete scope of Work Package # 20 including Engineering, fabrication of representative mockup for testing and obtaining UL Approved Fire Resistant Rated Assemblies for Calatrava (Special Shapes) Exposed Steel and other steel elements identified to receive Intumescent Fire Resistant Coating. Work Area 1, Path Station	Lump Sum	$
12.2	Cost for all necessary "Individual dedicated UL Fire Rated Assembly Tests" related to Intumescent Fire Resistant Coating for different shapes and assemblies required for the complete scope of Work Package # 20 including Engineering, fabrication of representative mockup for testing and obtaining UL Approved Fire Resistant Rated Assemblies for Calatrava (Special Shapes) Exposed Steel and other steel elements identified to receive Intumescent Fire Resistant Coating. Work Area 2, 1 Line subway Box	Lump Sum	$
12.3	Cost for all necessary "individual dedicated UL Fire rated Assembly Tests" related to Intumescent Fire Resistant Coating for different shapes and assemblies required for the complete scope of Work Package # 20 including Engineering, fabrication of representative mockup for testing and obtaining UL Approved Fire Resistant Rated Assemblies for Calatrava (Special Shapes) Exposed Steel and other steel elements identified to receive Intumescent Fire Resistant Coating. Work Area 3, Transit Hall	Lump Sum	$

13.1	**Surface Preparation, SSPC – SP10 and primer / coatings for areas not covered by intumescent coating. Work Area 1, Path Station**	**Lump Sum**	**$**
13.2	**Surface Preparation, SSPC – SP10 and primer / coatings for areas not covered by intumescent coating. Work Area 2, 1 Line Subway Box**	**Lump Sum**	**$**
13.3	**Surface Preparation, SSPC – SP10 and primer / coatings for areas not covered by intumescent coating. Work Area 3, Transit Hall**	**Lump Sum**	**$**
14.1	**Surface Preparation, SSPC – SP10, Primer and Shop Application of Intumescent Fire Resistant coating. Work Area 1, Path Station**	**Lump Sum**	**$**
14.2	**Surface Preparation, SSPC – SP10, Primer and Shop Application of Intumescent Fire Resistant coating. Work Area 2, 1 Line Subway Box**	**Lump Sum**	**$**
14.3	**Surface Preparation, SSPC – SP10, Primer and Shop Application of Intumescent Fire Resistant coating. Work Area 3, Transit Hall**	**Lump Sum**	**$**
15.1	**Surface Preparation, SSPC – SP10, Primer and Field Application of Intumescent Fire Resistant coating. Work Area 1, Path Station**	**Lump Sum**	**$**
15.2	**Surface Preparation, SSPC – SP10, Primer and Field Application of Intumescent Fire Resistant coating. Work Area 2, 1 Line Subway Box**	**Lump Sum**	**$**
15.3	**Surface Preparation, SSPC – SP10, Primer and Field Application of Intumescent Fire Resistant coating. Work Area 3, Transit Hall**	**Lump Sum**	**$**
16.1	**Provide intermediate storage holding area for fabricated steel within (25) mile radius of WTC job site for the full duration of the steel erection process + additional 3 months for receiving and Shaking out fabricated material prior to field installation. Work Area 1, Path Station**	**Lump Sum**	**$**
16.2	**Provide intermediate storage holding area for fabricated steel within (25) mile radius of WTC job site for the full duration of the steel erection process + additional 3 months for receiving and Shaking out fabricated material prior to field installation. Work Area 2, 1 Line Subway Box**	**Lump Sum**	**$**
16.3	**Provide intermediate storage holding area for fabricated steel within (25) mile radius of WTC**	**Lump Sum**	**$**

	job site for the full duration of the steel erection process + additional 3 months for receiving and Shaking out fabricated material prior to field installation. Work Area 3, Transit Hall		
17.1	Shipping, Customs, hauling, delivering and off loading fabricated steel at the Holding Area within 25 mile radius of WTC jobsite. Work Area 1, Path Station	Lump Sum	$
17.2	Shipping, Customs, hauling, delivering and off loading fabricated steel at the Holding Area within 25 mile radius of WTC jobsite. Work Area 2, 1 Line Subway Box	Lump Sum	$
17.3	Shipping, Customs, hauling, delivering and off loading fabricated steel at the Holding Area within 25 mile radius of WTC jobsite. Work Area 3, Transit Hall	Lump Sum	$
18	Allowance for Phoenix Constructors JV personnel for Air Fair Return Trip Tickets from New York to bidder's fabrication facilities including Hotel accommodation.	Lump Sum	$200,000
19.1	Loading and Hauling Fabricated Elements from holding area to the WTC job site as required. Work Area 1, Path Station	Lump Sum	$
19.2	Loading and Hauling Fabricated Elements from holding area to the WTC job site as required. Work Area 2, 1 Line Subway Box	Lump Sum	$
19.3	Loading and Hauling Fabricated Elements from holding area to the WTC job site as required. Work Area 3, Transit Hall	Lump Sum	$
20.1	Metal Deck: Shop drawing and Engineering Work Area 1, Path Station	Lump Sum	$
20.2	Metal Deck: Shop drawing and Engineering Work Area 2, 1 Line Subway Box	Lump Sum	$
20.3	Metal Deck: Shop drawing and Engineering Work Area 3, Transit Hall	Lump Sum	$
21.1	Metal Deck: Material & Fabrication Work Area 1, Path Station	Lump Sum	$
21.2	Metal Deck: Material & Fabrication Work Area 2, 1 Line Subway Box	Lump Sum	$
21.3	Metal Deck: Material & Fabrication Work Area 3, Transit Hall	Lump Sum	$

22.1	Metal Deck: Delivery to WTC Jobsite Work Area 1, Path Station	Lump Sum	$
22.2	Metal Deck: Delivery to WTC Jobsite Work Area 2, 1 Line Subway Box	Lump Sum	$
22.3	Metal Deck: Delivery to WTC Jobsite Work Area 3, Transit Hall	Lump Sum	$
23.1	Metal Deck: Installation Metal Deck & Shear Studs. Work Area 1, Path Station	Lump Sum	$
23.2	Metal Deck: Installation Metal Deck & Shear Studs. Work Area 2, 1 Line Subway Box	Lump Sum	$
23.3	Metal Deck: Installation Metal Deck & Shear Studs. Work Area 3, Transit Hall	Lump Sum	$
24.1	Shop Drawing and Engineering for Precast Concrete Units. Work Area 1, Path Station	Lump Sum	$
24.2	Shop Drawing and Engineering for Precast Concrete Units. Work Area 2, 1 Line Subway Box	Lump Sum	$
24.3	Shop Drawing and Engineering for Precast Concrete Units. Work Area 3, Transit Hall	Lump Sum	$
25.1	Fabrication and Furnishing of Precast Concrete Units. Work Area 1, Path Station	Lump Sum	$
25.2	Fabrication and Furnishing of Precast Concrete Units. Work Area 2, 1 Line Subway Box	Lump Sum	$
25.3	Fabrication and Furnishing of Precast Concrete Units. Work Area 3, Transit Hall	Lump Sum	$
26.1	Trucking and delivering Precast Concrete Units to the WTC Jobsite. Work Area 1, Path Station	Lump Sum	$
26.2	Trucking and delivering Precast Concrete Units to the WTC Jobsite. Work Area 2, 1 Line Subway Box	Lump Sum	$
26.3	Trucking and delivering Precast Concrete Units to the WTC Jobsite. Work Area 3, Transit Hall	Lump Sum	$
27.1	Temporary Support and Bracings for Precast Concrete Units. Work Area 1, Path Station	Lump Sum	$
27.2	Temporary Support and Bracings for Precast Concrete Units. Work Area 2, 1 Line Subway Box	Lump Sum	$
27.3	Temporary Support and Bracings for Precast Concrete Units. Work Area 3, Transit Hall	Lump Sum	$
28.1	Erection and Installation of Precast Concrete Units. Work Area 1, Path Station	Lump Sum	$

28.2	Erection and Installation of Precast Concrete Units. Work Area 2, 1 Line Subway Box	Lump Sum	$
28.3	Erection and Installation of Precast Concrete Units. Work Area 3, Transit Hall	Lump Sum	$
29.1	Supply and installation of temporary barricades and protection shields for construction phasing sequence. Work Area 1, Path Station	Lump Sum	$
29.2	Supply and installation of temporary barricades and protection shields for construction phasing sequence. Work Area 2, 1 Line Subway Box	Lump Sum	$
29.3	Supply and installation of temporary barricades and protection shields for construction phasing sequence. Work Area 3, Transit Hall	Lump Sum	$
30.1	Supply and installation of working platforms and scaffolding including multiple relocations to accommodate construction phasing. Work Area 1, Path Station	Lump Sum	$
30.2	Supply and installation of working platforms and scaffolding including multiple relocations to accommodate construction phasing. Work Area 2, 1 Line Subway Box	Lump Sum	$
30.3	Supply and installation of working platforms and scaffolding including multiple relocations to accommodate construction phasing. Work Area 3, Transit Hall	Lump Sum	$
31.1	Steel Erection of Temporary Structures Work Area 1, Path Station	Lump Sum	$
31.2	Steel Erection of Temporary Structures Work Area 2, 1 Line Subway Box	Lump Sum	$
31.3	Steel Erection of Temporary Structures Work Area 3, Transit Hall	Lump Sum	$
32.1	Removal of Temporary Structures Work Area 1, Path Station	Lump Sum	$
32.2	Removal of Temporary Structures Work Area 2, 1 Line Subway Box	Lump Sum	$
32.3	Removal of Temporary Structures Work Area 3, Transit Hall	Lump Sum	$
33.1	Cranes, Rigging and Lifting devices. Work Area 1, Path Station	Lump Sum	$
33.2	Cranes, Rigging and Lifting devices. Work Area 2, 1 Line Subway Box	Lump Sum	$

33.3	**Cranes, Rigging and Lifting devices.** **Work Area 3, Transit Hall**	**Lump Sum**	**$**
34.1	**Site logistics and Material delivery Access Ramps and Trestles** **Work Area 1, Path Station**	**Lump Sum**	**$**
34.2	**Site logistics and Material delivery Access Ramps and Trestles**	**Lump Sum**	**$**
34.3	**Site logistics and Material delivery Access Ramps and Trestles**	**Lump Sum**	**$**
35	**TOTAL BASE BID**	**Lump Sum**	**$**

a	**ALTERNATE OPTION** **Precast Concrete Floor & Walls Instead of Cast in Place Concrete as indentified and depicted on the contract documents.** **Reference Drawings: S1311-1, S1312-1, S1313-1, S1314-1, S1411-1, S1412-1, S1413-1, S1414-1**	**Lump Sum**	**$**
c	**Shop Drawings and Engineering**	**Lump Sum**	**$**
d	**Fabrication**	**Lump Sum**	**$**
e	**Trucking & Delivering Precast Slab Units to WTC Jobsite.**	**Lump Sum**	**$**
f	**Erection and Installation of Precast Units.**	**Lump Sum**	**$**
g	Total Precast Alternate Option	**Lump Sum**	**$**

1.1.1 To assist in the analysis of this proposal, the following information is REQUIRED TO BE COMPLETED by the Bidders. Failure to comply with this shall be considered Non Responsive RFP.

FOR ANALYSIS ONLY			
No.	**Description**	**Quantity**	**Unit of Measure**
1A	**Permanent Steel - Calatarva Exposed Steel**		**LBS.**
1B	**Permanent Steel – Standard Profile Steel and Built up Section.**		**LBS**
1C	**Permanent Steel – 1-Line Steel**		**LBS**
2	**Temporary Supports System for Steel Erection**		**LBS**
3	**Metal Deck**		**SQ. Ft**

4	**Precast Concrete Floor Slab**		**SQ. Ft**
5a	**Precast Concrete Slab Ducts, Type A1 to A5**		**No.**
5b	**Precast Concrete Slab Ducts, Type B1 to B5**		**No.**
5c	**Precast Concrete Slab Ducts, Type C1 to C5**		**No.**
5d	**Precast Concrete Slab Ducts, Type D1 to D5**		**No.**
6	**Precast Concrete Wall Units**		**SQ. Ft**
7	**Precast Concrete Stair Units**		**No.**
8	**Intumescent Coating**		**SQ. Ft**
9	**Paint coating excluding area covered by Intumescent coating.**		**SQ. Ft**
10	**Alternate Option – Precast Concrete Floor & Walls**		**SQ. Ft**

1. In the case of Item No. 1A, 1B and 1C the quantity shall be the number of pounds of structural steel to be fabricated / erected; Line Item No.2 Temporary support system for steel erection; No. 3 square feet of Metal Deck to be installed; Line Item No.4 Total square feet of Precast Concrete Floor Slab Installed; Item No. 5a, 5b & 5c Total number of typical Precast Concrete Slab ducts (Sections identified as 5a, 5b, 5c & 5d) installed; Item No.6 Precast Concrete wall units in square feet; Item No. 7 Precast Concrete Stair units; Item No.8 total square feet of Intumescent Coating applied; No. 9 Total square feet of painted steel excluding steel covered by Intumescent coating. Item No.10 Alternate Option - Precast Concrete floor & Walls

2. In order to be eligible for the award of the structural steel work of this work package, the bidder must meet the following requirements:

   A. The bid proposal must include Method Statement for Steel Fabrication including detailed information on all facilities to be used. Steel Erection methodology to include proposed temporary support structure, type and location of crane / lifting devices / sequence of steel erection, transferring load to permanent structure. The method statement to include basic steel erection sequence including milestone dates for compliance with the project schedule.

B. The bid proposal must include resumes of the Key Personnel allocated for this project including Project Manager, Shop & field Superintendents, Shop and Field Quality Control Managers, and person in-charge of Steel fabrication at the fabrication facility and Steel erection in the field.

C. Specification Sec. 07816 'Epoxy Intumescent Coating System' Page 4 Article 5. Submit at the time of the bid , the properties of the proposed product, on the manufacture's letterhead for each of the items listed below:

a). Tensile Strength: ASTM D638.

b). Bond Strength: ASTM D1002.

c). Compressive Strength: ASTM D695

d). Explosion: No delamination, no cracking when tested four bar over pressure test.

e). Hardness: ASTM D2240

f). Chemical Resistance: ISO2812-1

g). Water Absorption: ISO 2812-2

h). Flame Spread: Class A (Class 1) when tested in accordance with ASTM E84

i). Smoke Development: Class A (Class 1) when tested with ASTM e84

The undersigned understands and agrees to comply with and be bound by the subcontractors pricing and instructions and other RFP/ contract documents.

The Undersigned acknowledges the receipt of any addendum issued by listing all by number below:

_____

_____

The following Unit rates to be submitted with the RFP. Unit Rates to be inclusive of all material and labor costs. Unit Rates are fixed for the full duration of the contract.

No.	Description	Unit	Rate	
	Shop Drawing and Engineering	**Per Man hour**		
	Supply of additional Steel Beams Up to 12# / lnft **13 - 25# / lnft** **26 - 50# / lnft** **51 - 100#/ lnft** **101 - 150# / lnft** **151 - 200# / lnft** **200 - 300# / lnft** **300 – 398# / lnft** **Above 398# / lnft**	**Per Ton**	**Furnish**	**Installation**
	Sheer Studs - Furnish	**Each**	**Furnish**	**Installation**
	Weld-able Lenton Couplers with Rod	**Each**	**Furnish**	**Installation**
	<u>Columns</u> **Up to 100# / lnft** **101 - 200# / lnft** **201 - 300# lnft** **301 - 398# lnft** **Above 398# / lnt**	**Per Ton**	**Furnish**	**Installation**

	Plating of WF Columns (Plating only, not WF Columns) **1/2"** **1"** **2"** **3"** **4"** **6"** **8"**	**Per Ton**	**Furnish**	**Installation**
	Plate Girders and Built Up Columns. (50 ksi, 65 ksi) including stiffeners. **1" Plates** **2" Plates** **3" Plates** **4" Plates** **5" Plates** **6" Plates** **8" Plates**	**Per Ton**	**Furnish**	**Installation**
	Shop Fabrication of Steel Including Primer Paint	**Per Ton**		
	Field Fabrication of Steel Including primer Paint	**Per Ton**		
	Shop Applied Intumescent Coating Including Surface Preparation and	**Per SQ. Ft.**		

	Base Primer			
	Field Applied Intumescent Coating Including Surface Preparation and Base Primer	**Per SQ. Ft.**		
	Welding: 1/4 inch Fillet weld	**Per Lin. Ft.**		
	Welding: 5/16 inch Fillet Weld	**Per Lin. Ft.**		
	Welding: 1/2 inch Fillet Weld	**Per Lin. Ft.**		
	Welding : over 1/2 inch Fillet Weld	**Per Lin. Ft.**		
	Welding: 1/2 inch thick plate - Full Pen.	**Per Lin. Ft.**		
	Welding: 3/4 inch plate - Full Pen.	**Per Lin. Ft.**		
	Welding: 1 inch thick plate - Full Pen.	**Per Lin. Ft.**		
	Welding: 2 inch thick plate - Full Pen.	**Per Lin. Ft.**		
	Welding: 3 inch thick plate - Full Pen.	**Per Lin. Ft.**		
	Welding: 4 inch thick plate - Full Pen.	**Per Lin. Ft.**		
	Welding: 5 inch thick plate - Full Pen.	**Per Lin. Ft.**		
	Welding: 6 inch thick plate - Full Pen.	**Per Lin. Ft.**		
	Welding: 7 inch thick plate - Full Pen.	**Per Lin. Ft.**		
	Welding: 8 inch thick plate - Full pen.	**Per Lin. Ft.**		

	Utility Penetration through Steel Elements including reinforcement and stiffeners. Opening size	**Each**		
	Opening under 6"x 6"	**Each**		
	Opening size 6" x 6"	**Each**		
	Opening size 8" x 8"	**Each**		
	Opening size 8" x 12"	**Each**		
	Opening size 12"x 18"	**Each**		
	Opening size 18" x 24"	**Each**		
	Opening size 24"x 24"	**Each**		
	Opening size 24" x 30"	**Each**		
	Opening size 30"x 30"	**Each**		
	Temporary overhead Shielding Protection at active platforms for construction Phasing	**Per SQ. Ft.**		
	Temporary Barricade/ Protection Walls at Active Platforms	**Per SQ. Ft.**	**Furnish**	**Installation**
	Precast Concrete Unit – Typical Floor Planks	**Per SQ. FT**	**Furnish**	**Installation**
	Precast Concrete Units **Type A1 to A5** **Type B1 to B5** **Type C1 to C5** **Type D1 to D5**	**Each**	**Furnish**	**Installation**

	Precast Concrete Wall Units	**SQ. Ft**		
	Precast Concrete Stair Units	**Per Riser**		
	Unit rate per Crane pick as directed by Phoenix **Loads under 5 Ton** **Loads over 5 Ton** **MEP Equipment:** **(8) Power Distribution Centers 6'- 6"W x 8'- 0"H x 8'- 0"D 4,000lbs each** **(32) Power Distribution Centers 6'-0" x 8'- 0"H x 8'- 0"D 5,000 lbs each** **(6) 15KV Paralleling Switchgear 11'-0"W x 8'- 0"H x 8'- 0"D 10,000 lbs each** **(6) 2000KW, 13.8 KV Diesel Generator 21'- 0"L x 11'- 0"H x 8'- 0" D 45,000 lbs each** **(1) Generator Load Bank 12'- 0"L x 8'- 0"H x 6'- 0"D 19,000 lbs each** **(5) 2150 KVA Cast Coil Transformers 12'-0"W x 8'- 6"H x 6'-0"D 19,200 lbs each** **(5)Low Voltage Switchgear 4'-0"W x 8'-0"H x 6'-0"D 3500lbs each** **(10) Low Voltage Switchgear 5'-0"W x 8'-0"H x 6'-0"D 9,000lbs**	**Each Single Unit**		

	each **(5) 15 KV Primary Switch 4'-0"W x 8'-6"H x 6'-8"D 3000lbs each**			

Proposer:

Company Name: _____

By: (Officer) _____

Address:

_____

Date of Proposal: _____ Corporate Seal:

1.2 Supplemental Unit Rates, All-in Rates and Cost/Price Assumptions

No changes are authorized from the approved scope, unless they are approved in writing by the PC (i.e., co-signed amendment), prior to the time of execution.

When changes occur from the anticipated job site, the following unit rates will be used to negotiate changes which shall also be finalized through the PC as firm fixed price.

All pricing assumptions shall be clearly stated to allow a reviewer to assess the potential cost risks associated with the proposed design, and associated construction efforts.

1.3 Financial Terms

1.3.1 See Subcontract.

2.0 INVOICING INSTRUCTIONS

2.1 Invoices/Requisitions must be submitted by the 3rd day of each month to reflect work through the last Sunday of the previous month. Invoice/Requisitions received after the 3rd day will not be processed until the following month.

2.2 Contractual retention, calculated as ten percent of amount invoiced, shall be identified on the face of each progress invoice and withheld from amounts payable.

2.3 Subcontractor shall submit separate invoices in original and one copy complete with all supporting documentation (Exhibit 3 Partial Payment and Release, Exhibit 2A, Subcontractor Pricing and Invoicing Instructions, Appendix A, Schedule of Values) to Contractor's Office Address marked:

Phoenix Constructors, JV
115 Broadway
18th Floor
New York, NY 10006
Attn: Javed Qureshi

2.4 Subcontractor's invoices shall be clearly marked with this Subcontract Number and the appropriate milestone description of activities and/or work related to the billing.

2.5 Subcontractor's invoices shall indicate the time period during which the Work was performed for which the invoice is submitted.

2.6 Phoenix Constructors JV shall not be obligated to pay for invoice items not fully supported by approved progress measurements and any other such documentation as may be required. PCJV reserves the right to make provisional payment on an invoice in dispute, pending audit and reconciliation of the total charge.

2.7 Subcontractor shall sign each invoice certifying that all Work covered by the invoice is complete and that the invoice is correct, authentic and the only one issued for the Work described therein.

2.8 Any payments made shall not be construed to be an acceptance of defective Work nor relieve Subcontractor of any of its obligations.

2.9 Invoices for Cost-Reimbursable Work shall be prepared and submitted as follows:

2.9.1 Invoices for Labor shall be accompanied by Phoenix Constructors JV approved daily reports or time sheets listing workers name, classification, and straight time and overtime hours. Labor categories

and rates must correspond to those set forth in Rate Schedule "A" of this Exhibit 2A.

2.9.2 Invoices for Subcontractor-Owned Equipment shall be accompanied by Phoenix Constructors JV approved daily reports or time sheets listing the equipment type, number, size and hours. Equipment descriptions and rates must correspond to those set forth in the Rental Rate Blue Book (published by Machinery Information Division, K III Directory Corporation, 1735 Technology Drive, San Jose CA 95110)

2.9.3 Invoices for Subcontractor Rented Equipment shall be accompanied by Phoenix Constructors JV approved daily reports or time sheets listing equipment type, number, size and hours along with a copy of Subcontractor's rental agreement and invoice from supplier. The applicable markup as set forth in this Exhibit 2A shall be set forth separately.

2.9.4 Invoices for Materials shall be accompanied by field receiving documentation and a copy of Subcontractor's purchase order and invoice from supplier.

3.0 PRICING FOR CHANGES

Compensation to Subcontractor for changes in the Scope of Work, shall be in accordance with the provisions of Article 8, Change Orders of GC Long Form Subcontract Rev. 0, except to the extent otherwise provided below:

Phoenix Constructors JV may request, and Subcontractor shall provide, proposals for Scope of Work changes (additions and deletions) which are priced, at Phoenix Constructors JV option, by one or a combination of the following methods:

a. Negotiated Lump Sums based upon a mutually agreed Scope of Work.

b. Applicable unit prices set forth in Exhibit B, titled, Contract Unit Rates, if the Work is possible to be fairly classified under the Unit Price items.

c. Negotiated Unit Prices not established in the Contract.

d. On a "cost-reimbursement plus a fixed fee" basis, or at the labor and equipment rates as set forth in Rate Schedule “A” and “B”.

3.1 **Lower Tier Subcontracts**

3.1.1 All subcontracts and services provided by others for performance of changes or extra work requested by Phoenix Constructors JV, which have not been objected to by PCJV shall be at actual cost to Subcontractor of such subcontracts or services provided by others (not to exceed such subcontract price) plus a mark-up for all overhead and fee of Subcontractor thereon which shall not exceed 10%.

3.1.2 Subcontractor's invoices for work performed by any of Subcontractor's "lower tier subcontractors" may include an allowance for the "lower tier subcontractor's" overhead and fee which shall not exceed 10%.

3.1.3 In no instance shall the mark-ups or rates for changes provided by lower tier subcontractor to Subcontractor exceed the mark-ups or rates for changes as stipulated in this Article 3.0.

3.2 **Materials**

3.2.1 Compensation to Subcontractor for materials supplied by Subcontractor for incorporation into the permanent facility (excluding consumable, expendable, and small tools) shall be at actual invoiced cost to Subcontractor, delivered to project site, as substantiated by invoices certified paid or by such documentation as may be required by PCJV, plus a mark-up, for all fee and overhead expense not to exceed 10%.

3.2.2 Phoenix Constructors JV reserves the right to provide, at no cost to Subcontractor, materials, equipment, services, supplies or incidentals required to perform the Work. All refunds, trade discounts, rebates on materials, supplies and services, and all monies obtained from the disposal of surplus materials or supplies shall accrue to Owner.

3.3 **Labor**

Compensation to Subcontractor for construction labor, related costs and profit shall be in accordance with the rates set forth in Rate Schedule "A" entitled ALL INCLUSIVE LABOR RATES attached and incorporated herein.

3.4 **Equipment Rental**

3.4.1 Equipment rental rates, as set forth in the Rental Rate Blue Book (published by Machinery Information Division, K III Directory Corporation, 1735 Technology

Drive, San Jose CA 95110) shall apply for equipment used for extra work requested by Contractor.

Hourly rental for those items of equipment listed in the "Rental Rate Blue Book" shall be 100% of the applicable rates as listed in said book, reduced to an hourly basis (see formula below), except that such applicable rates shall be reduced by 50% for all hours of rental payable hereunder in excess of 8 hours each day. The edition of this publication to be used shall be the one in effect on the date of the actual rental of the equipment. The "Estimated Operating Cost per Hour" as set forth for such item of equipment in the Blue Book shall be added to the hourly rental for each hour that such equipment id actually engaged in performing Work. No amount of operating cost will be allowed during periods when such equipment is not actually engaged in performing Work (i.e. standby rental time). None of the provisions of the Blue Book shall be deemed referred to or included in this Contract except as specifically set forth in this Section.

When utilizing the rental rates appearing in the Blue Book, the Phoenix Constructors JV (or Authority Engineer) shall determine the applicable rate and the hourly rental determined therefrom by applying the following criteria:

The rate to be applied for an item if tool, equipment construction aid used on a particular Work package shall be the daily, weekly or monthly rates from the foregoing publication based on the total number of work days or portions thereof that a particular item of tool, equipment or construction aid, or substitute item of equipment is at the construction site for use by the Phoenix Constructors JV or subcontractors whether under this Contract if any other contract with the Authority. Included within this period will be (i) work days of idleness results from acts or omission of the PCJV, Authority or third persons, breakdowns in the tool, equipment or construction aid or any other cause (ii) work days on which the equipment is removed from the construction site solely to enable the performance of repairs thereon, and (iii) work days intervening between the removal of tool, delivery to the construction site of the same substitute tool, equipment or construction aide. The number of workdays in the period for each rate shall be as indicated below:

Three work days or less	Daily rate
More than three work days but not more than fifteen work days	Weekly rate

More than fifteen work days	Monthly rate

The pro rata portion which one-hour bears to the applicable rate shall be determined in accordance with the following formula:

Hourly rate based on daily rental	1/8 of Daily Rental from Blue Book
Hourly rate based on weekly rental	1/40 of Weekly Rental from Blue Book
Hourly rate based on monthly rental	1/176 of Monthly Rental from Blue Book

The rental rate shall be multiplied by the applicable regional adjustment factor shown for such item of tool, equipment or construction aid in the Blue Book. The adjustment factor shall not apply to the hourly operating cost.

If Phoenix Constructor JV (or Authority Engineer) should determine that the nature, number of pieces or size of the tool, equipment or construction aid used by the Subcontractor in connection with the Work is more pieces, or larger or more elaborate, as the case may be, than the size or nature of the minimum equipment determined by the Phoenix Constructors JV (or Authority Engineer) to be suitable for the Work, the reasonable rental will not be based upon the toot, equipment or construction aid used by the Subcontractor but will be based on the smallest quantity or smallest or least elaborate tool equipment or construction aid determined by the Phoenix Constructors JV (or Authority Engineer) to have been suitable for the performance of the work.

There will be added to the rental as computed above (a) the reasonable cost of transporting such tool, equipment or construction aid to and from the construction site, (b) with respect to Work performed in New Jersey, the taxes on the rental actually paid by the Subcontractor or lower tier subcontractor and (c) notwithstanding the number of hours during which such of tool, equipment or construction aid is utilized, the minimum rental therefore will be for a period of eight hours.

Notwithstanding anything to the contrary contained to the contrary contained in this numbered clause, the Phoenix Constructors JV and Authority shall not be liable for any amount attributable to the rental of non-powered hand tools.

3.4.2 For equipment which is specifically mobilized to the jobsite for extra work, Subcontractor shall separately identify such transportation costs (including: loading, off-loading, assembly and disassembly) when submitting proposals to Phoenix Constructors JV for performing extra work. Transportation costs shall not be applicable to equipment already mobilized on the site.

3.4.3 When Subcontractor's equipment does not resemble the equipment having rental rates listed in Rate Schedule "B" for extra work, the rental rate shall be negotiated and agreed upon in writing by Phoenix Constructors JV.

3.4.4 Compensation to Subcontractor for equipment used for extra work which is rented from third parties and does not resemble the equipment having rental rates listed in the "Rental Rate Blue Book" must be approved by Phoenix Constructors JV in writing prior to rental and shall be at actual cost to Subcontractor, delivered to project site, as substantiated by invoices certified paid or by such documentation as may be required by Phoenix Constructors JV plus a mark-up, for all profit and overhead expense of Subcontractor thereon, of not to exceed 10%.

3.5 Time Sheets

3.5.1 For all work performed on a cost-reimbursable basis, Subcontractor shall submit daily time sheets for approval by Phoenix Constructors JV. An approved copy of the time sheets, which shall detail all hours worked, materials installed and equipment used, must be submitted in support of Subcontractor's monthly billing.

4.0 Rate Schedules

4.1 Rate Schedule "A" – All Inclusive Labor Rates

4.2 Rate Schedule "B" – Equipment Rental Rates

4.3 Rate Schedule "C" – List of SubSubcontractors

RATE SCHEDULE "A"

ALL INCLUSIVE LABOR RATES

NOTES

1. VACATION: Includes vacations, statutory holidays, sick and other leave with pay.
2. ALLOWANCES: Includes workers compensation, unemployment insurance, and other taxes and insurance's measured by payroll, established employee benefits such as pension, health and life insurance's, bonus programs (excluding profit sharing), union assessments (if any), training funds, and industry and administration funds.
3. OVERHEAD AND PROFIT: Calculated on the base rate, overhead includes all home office and jobsite supervision above the level of general foreman and other non-manual personnel costs and all temporary, construction facilities shall not exceed 10%.
4. ALL INCLUSIVE RATE: Based on ____ **(To be completed in by Offerer)** hours per week ____ **(To be completed in by Offerer)** hours per day, ____ **(To be completed in by Offerer)** days per week.
5. TRAVEL ALLOWANCE: N/A
6. OVERTIME: The overtime rate per hour shall be limited to the actual cost to Subcontractor of the premium portion only of all applicable wages, craft fringe benefits and payroll burdens imposed by any governmental authority and measured by the compensation payable to employees. To establish the amount of payment, Subcontractor shall submit supporting documents satisfactory in form and content to Contractor for its verification and approval. If only one overtime rate is shown, it shall be applicable for all overtime hours.
7. LABOR RATES entered in the above schedule shall be based on labor agreements, if any, and rates in effect on the Proposal closing date, unless otherwise noted. The quoted labor rates may be adjusted as approved by Contractor to reflect subsequent changes in labor agreements or rates if applicable.
8. No Charges will be accepted by Contractor for labor not listed in Rate Schedule "A".
9. Labor rates for stand-by time when specifically ordered by Contractor shall be at _____% **(To be completed in by Offerer)** inclusive rates in this Rate Schedule "A" less the profit portion thereof.
10. Subcontractor shall not invoice for field support/supervisory personnel assigned to a change in the Scope of Work if the change does not extend the time such personnel are required on site by the original Scope of Work.

RATE SCHEDULE "A"

ALL INCLUSIVE LABOR RATES

TRADE OR CLASSIFICATION	BASE RATE	VACATION	ALLOWANCES		SUBTOTAL (1)	CALCULATED ON BASE RATE OVERHEAD & PROFIT at 10%		ALL-INCLUSIVE RATE (HR) (1)+(2)+(3)	TRAVEL ALLOWANCE (DAY)	OVERTIME RATE (HR)
Iron Worker-Journey Man										
Foreman - Iron Worker. Journey Man										
Crane Operator										
Oiler										
Welder										
Draftsman										
Shop Fabrication labor										
Dock Builder – Journey Men										
Foremen – Dock Builder Journey Men										
Carpenter										
Carpenter Foreman										
Mason										
Mason Foreman										

Lather										
Lather Foreman										

RATE SCHEDULE "B"

EQUIPMENT RENTAL RATE

NOTES

1. Rate Schedule "B" identifies all Subcontractor owned and rented equipment (excluding non powered hand tools) that may be used by Subcontractor in performance of the Work.
2. Rate Schedule "B" shall be calculated in accordance to Exhibit 2A clause 3.4.1.
3. Subcontractor shall, prior to rental of any equipment for changes in the scope, submit a stated value for the equipment being rented.
4. No payment shall be made for equipment which is not operating because it is broken down or undergoing repair, maintenance or overhaul.

RATE SCHEDULE "B"

EQUIPMENT RENTAL RATES

FOR EQUIPMENT, INCLUDING VEHICLES, THAT ARE REQUIRED IN THE PERFORMANCE OF THE WORK.

RATES

DESCRIPTION MAKE ANDMODEL	HOURLY	DAILY	WEEKLY	MONTHLY	STANDBY

RATE SCHEDULE "C"

LIST OF SUBSUBCONTRACTORS

The following is a detailed list of the subSubcontractors proposed for the Work.

Once Contractor has given its non-objection the subSubcontractors listed below shall not be changed except with Contractor's written approval.

SubSubcontractor	Description of Work	Union or Trade Affiliation, if any

1.0 Percentage of Work performed by Subcontractor's own forces: ____ **(To be completed by Offerer)**

2.0 Percentage of Work performed by subSubcontractors: ____ **(To be completed by Offerer)**

3.0 Contractor reserves the right to request financial information and work experience histories of the proposed subSubcontractors.

END OF EXHIBIT 2

TABLE OF CONTENTS

1.0 PAYMENT SCHEDULE

Full compensation to Subcontractor for full and complete performance by Subcontractor of all the Work, compliance with all terms and conditions of this Subcontract, and for Subcontractor's payment of all obligations incurred in, or applicable to, performance of the Work, shall be the sum of the following lump sums and the value of the unit prices set forth below, for adjusting future additions / deletions from the contractual scope.

1.1 Firm Fixed Price

The undersigned, having examined the proposed RFP / Contract documents for the work package referenced above and having visited the job site and examined the conditions affecting the work, hereby proposes and agrees to furnish all labor, materials, equipment, and appliances, and to perform operations necessary to complete the work as required by said proposed RFP / contract documents " Station Construction and Transit Hall Structure to Grade - Structural Steel, Intumescent Fire Resistant Coating, Metal Deck & Precast Concrete Work.

A. **Work Package # 20, Furnish, Fabricate and Erect, Structural Steel, Intumescent Fire Resistant Coating, Metal Deck & Precast Concrete Work**
SINGLE COMBINED PROPOSAL FOR WORK AREA 2, 1 LINE SUBWAY BOX + WORK AREA 3, TRANSIT HALL

The total price for performing all work is $_____this is (in words) _____dollars.

The Price is firm and fixed for the duration of the Subcontract and is not subject to escalation for any cause. The price shall be furnished in US dollars and are not subject to change based upon currency fluctuations. Payment for actual quantities at the Unit Price shall constitute full payment for the performance of the Subcontract and covers all cost of whatever nature incurred by the Subcontractor in accomplishing the Work in accordance with the provisions of this Subcontract.

Phoenix Constructors JV and Port Authority of New York and New Jersey has the exclusive right at their discretion to select and choose any single or combination of different proposals from the same or more than one bidder for the award. The bidders must consider and have appropriate allowance in their proposals for coordination and review of connection details at the common boundary lines for adjacent work packages,

of the Work Package #20, WP#21 & WP# 9 & 9X, In addition to coordination with other WTC site stakeholder, i.e., memorial, towers 1,2,3 & 4, VOEC …

NOTE ** This pricing format **MUST** be used**

All prices shall be furnished in US Dollars and are not subject to change based upon world currency fluctuations.

	DESCRIPTION	UM	TOTAL PRICE
A2	**Furnish, Fabricate and Deliver Caltrava Exposed Steel Work Area 2, 1 Line Subway Box**	**Lump Sum**	**$**
A3	**Furnish, Fabricate and Deliver Calatrava Exposed Steel Work Area 3, Transit Hall**	**Lump Sum**	**$**
B2	**Furnish, Fabricate and Deliver Standard Profile and Built up Section Steel For Work Area 2, 1 Line Subway Box to WTC Jobsite**	**Lump Sum**	**$**
B3	**Furnish, Fabricate and Deliver Standard Profile and Built up Section Steel For Work Area 3, Transit Hall to WTC Jobsite**	**Lump Sum**	**$**
C2	**Shop Applied Surface Preparation, Zinc Primer & Intumscent Fire Resistant Coating Work for Work Area 2, 1 Line Subway Box**	**Lump Sum**	**$**
C3	**Shop Applied Surface Preparation, Zinc Primer & Intumscent Fire Resistant Coating Work for Work Area 3, Transit Hall**	**Lump Sum**	**$**
D2	**Field Applied Surface Preparation, Zinc Primer & Intumscent Fire Resistant Coating Work for Work Area 2, 1 Line Subway Box**	**Lump Sum**	**$**
D3	**Field Applied Surface Preparation, Zinc Primer & Intumscent Fire Resistant Coating Work for Work Area 3, Transit Hall**	**Lump Sum**	**$**
E2	**Furnish, Fabricate and Deliver Metal Deck Work for Work Area 2, 1 Line Subway Box to WTC Jobsite**	**Lump Sum**	**$**
E3	**Furnish, Fabricate and Deliver Metal Deck Work for Work Area 3, Transit Hall to WTC Jobsite**	**Lump Sum**	**$**
F2	**Furnish, Fabricate and Deliver Precast Concrete Work Area 2, 1 Line Subway Box.**	**Lump Sum**	**$**
F3	**Furnish, Fabricate and Deliver Precast Concrete Work Area 3, Transit Hall**	**Lump Sum**	**$**

G2	**Steel Erection: Calatrava Exposed Steel Work Area 2, 1 Line Subway Box**	**Lump Sum**	**$**
G3	**Steel Erection: Calatrava Exposed Steel Work Area 3, Transit Hall**	**Lump Sum**	**$**
H.2	**Steel Erection : Standard Profile and Built up Sections Work Area 2, 1 Line Subway Box**	**Lump Sum**	**$**
H.3	**Steel Erection : Standard Profile and Built up Sections Work Area 3, Transit Hall**	**Lump Sum**	**$**
I.2	**Metal Deck & Shear Stud Installation Work Area 2, 1 Line**	**Lump Sum**	**$**
I.3	**Metal Deck & Shear Stud Installation Work Area 3, Transit**	**Lump Sum**	**$**
J.2	**Precast Concrete Erection. Work Area 2, 1 Line Subway Box**	**Lump Sum**	**$**
J.3	**Precast Concrete Erection. Work Area 3, Transit Hall**	**Lump Sum**	**$**

Note: The above lump sum price must be broken down as below for bid analysis for each individual and combination offers proposed.

Cost Break Down for Work Package 20-Part 1, Work Area 1- Path Station West Bathtub

1	**Payment and Performance Bond** **a). Payment Bond** **b). Performance Bond**	**Lump Sum** **Lump Sum**	**$** **$**
2.2	**Mobilization. Work Area 2, 1 Line Subway Box**	**Lump Sum**	**$**
2.3	**Mobilization. Work Area 3, Transit Hall**	**Lump Sum**	**$**
3.2	**Shop Drawings and Engineering - Permanent Structure. Work Area 2, 1 Line Subway Box**	**Lump Sum**	**$**
3.3	**Shop Drawings and Engineering - Permanent Structure. Work Area 3, Transit Hall**	**Lump Sum**	**$**
4.2	**Shop Drawings and Engineering - Temporary Support Structure. Work Area 2, 1 Line Subway Box**	**Lump Sum**	**$**
4.3	**Shop Drawings and Engineering - Temporary Support Structure. Work Area 3, Transit Hall**	**Lump Sum**	**$**
5.2	**Shop Drawings and Engineering – Working Platforms and Scaffolding. Work Area 2, 1 Line Subway Box**	**Lump Sum**	**$**

5.3	**Shop Drawings and Engineering – Working Platforms and Scaffolding Work Area 3, Transit Hall**	**Lump Sum**	**$**
6.2	**Shop drawings and Engineering Overhead Protection Shield and Side Walls for Construction Phasing. Work Area 2, 1 Line Subway Box**	**Lump Sum**	**$**
6.3	**Shop drawings and Engineering Overhead Protection Shield and Side Walls for Construction Phasing. Work Area 3, Transit Hall**	**Lump Sum**	**$**
7.2	**Material - Permanent Steel Structure Work Area 2, 1 Line Subway Box**	**Lump Sum**	**$**
7.3	**Material - Permanent Steel Structure Work Area 3, Transit Hall**	**Lump Sum**	**$**
8.2	**Material -Temporary Steel Support Structure Work Area 2, 1 Line Subway Box**	**Lump Sum**	**$**
8.3	**Material -Temporary Steel Support Structure Work Area 3, Transit Hall**	**Lump Sum**	**$**
9.2	**Material Overhead Protection Shield and Side Walls. Work Area 2, 1 Line Subway Box**	**Lump Sum**	**$**
9.3	**Material Overhead Protection Shield and Side Walls. Work Area 3, Transit Hall**	**Lump Sum**	**$**
10.2	**Steel Fabrication - Permanent Structure Work Area 2, 1 Line Subway Box**	**Lump Sum**	**$**
10.3	**Steel Fabrication - Permanent Structure Work Area 3, Transit Hall**	**Lump Sum**	**$**
11.2	**Steel Fabrication - Temporary Structure Work Area 2, 1 Line Subway Box**	**Lump Sum**	**$**
11.3	**Steel Fabrication - Temporary Structure Work Area 3, Transit Hall**	**Lump Sum**	**$**
12.2	**Cost for all necessary "individual dedicated UL Fire Rated Assembly Tests" related to Intumescent Fire Resistant Coating for different shapes and assemblies required for the complete scope of Work Package # 20 including Engineering, fabrication of representative mockup for testing and obtaining UL Approved Fire Resistant Rated Assemblies for Calatrava (Special Shapes) Exposed Steel and other steel elements identified to receive Intumescent Fire Resistant Coating. Work Area 2, 1 Line subway Box**	**Lump Sum**	**$**

12.3	**Cost for all necessary "Individual dedicated UL Fire rated Assembly Tests" related to Intumescent Fire Resistant Coating for different shapes and assemblies required for the complete scope of Work Package # 20 including Engineering, fabrication of representative mockup for testing and obtaining UL Approved Fire Resistant Rated Assemblies for Calatrava (Special Shapes) Exposed Steel and other steel elements identified to receive Intumescent Fire Resistant Coating. Work Area 3, Transit Hall**	**Lump Sum**	**$**
13.2	**Surface Preparation, SSPC – SP10 and primer / coatings for areas not covered by intumescent coating. Work Area 2, 1 Line Subway Box**	**Lump Sum**	**$**
13.3	**Surface Preparation, SSPC – SP10 and primer / coatings for areas not covered by intumescent coating. Work Area 3, Transit Hall**	**Lump Sum**	**$**
14.2	**Surface Preparation, SSPC – SP10, Primer and Shop Application of Intumescent Fire Resistant coating. Work Area 2, 1 Line Subway Box**	**Lump Sum**	**$**
14.3	**Surface Preparation, SSPC – SP10, Primer and Shop Application of Intumescent Fire Resistant coating. Work Area 3, Transit Hall**	**Lump Sum**	**$**
15.2	**Surface Preparation, SSPC – SP10, Primer and Field Application of Intumescent Fire Resistant coating. Work Area 2, 1 Line Subway Box**	**Lump Sum**	**$**
15.3	**Surface Preparation, SSPC – SP10, Primer and Field Application of Intumescent Fire Resistant coating. Work Area 3, Transit Hall**	**Lump Sum**	**$**
16.2	**Provide intermediate storage holding area for fabricated steel within (25) mile radius of WTC job site for the full duration of the steel erection process + additional 3 months for receiving and Shaking out fabricated material prior to field installation. Work Area 2, 1 Line Subway Box**	**Lump Sum**	**$**
16.3	**Provide intermediate storage holding area for fabricated steel within (25) mile radius of WTC job site for the full duration of the steel erection process + additional 3 months for receiving and Shaking out fabricated material prior to field installation. Work Area 3, Transit Hall**	**Lump Sum**	**$**

17.2	Shipping, Customs, hauling, delivering and off loading fabricated steel at the Holding Area within 25 mile radius of WTC jobsite. For Work Area 2, 1 Line Subway Box	Lump Sum	$
17.3	Shipping, Customs, hauling, delivering and off loading fabricated steel at the Holding Area within 25 mile radius of WTC jobsite. For Work Area 3, Transit Hall	Lump Sum	$
18	Allowance for Phoenix Constructors JV personnel for Air Fair Return Trip Tickets from New York to bidder's fabrication facilities including Hotel accommodation.	Lump Sum	$100,000
19.2	Loading and Hauling Fabricated Elements from holding area to the WTC job site as required. Work Area 2, 1 Line Subway Box	Lump Sum	$
19.3	Loading and Hauling Fabricated Elements from holding area to the WTC job site as required. For Work Area 3, Transit Hall	Lump Sum	$
20.2	Metal Deck: Shop drawing and Engineering Work Area 2, 1 Line Subway Box	Lump Sum	$
20.3	Metal Deck: Shop drawing and Engineering Work Area 3, Transit Hall	Lump Sum	$
21.2	Metal Deck: Material & Fabrication Work Area 2, 1 Line Subway Box	Lump Sum	$
21.3	Metal Deck: Material & Fabrication Work Area 3, Transit Hall	Lump Sum	$
22.2	Metal Deck: Delivery to WTC Jobsite Work Area 2, 1 Line Subway Box	Lump Sum	$
22.3	Metal Deck: Delivery to WTC Jobsite Work Area 3, Transit Hall	Lump Sum	$
23.2	Metal Deck: Installation Metal Deck & Shear Studs. Work Area 2, 1 Line Subway Box	Lump Sum	$
23.3	Metal Deck: Installation Metal Deck & Shear Studs. Work Area 3, Transit Hall	Lump Sum	$
24.2	Shop Drawing and Engineering for Precast Concrete Units. Work Area 2, 1 Line Subway Box	Lump Sum	$
24.3	Shop Drawing and Engineering for Precast Concrete Units. Work Area 3, Transit Hall	Lump Sum	$
25.2	Fabrication and Furnishing of Precast Concrete Units. Work Area 2, 1 Line Subway Box	Lump Sum	$
25.3	Fabrication and Furnishing of Precast Concrete Units. Work Area 3, Transit Hall	Lump Sum	$

26.2	Trucking and delivering Precast Concrete Units to the WTC Jobsite. Work Area 2, 1 Line Subway Box	Lump Sum	$
26.3	Trucking and delivering Precast Concrete Units to the WTC Jobsite. Work Area 3, Transit Hall	Lump Sum	$
27.2	Temporary Support and Bracings for Precast Concrete Units. Work Area 2, 1 Line Subway Box	Lump Sum	$
27.3	Temporary Support and Bracings for Precast Concrete Units. Work Area 3, Transit Hall	Lump Sum	$
28.2	Erection and Installation of Precast Concrete Units. Work Area 2, 1 Line Subway Box	Lump Sum	$
28.3	Erection and Installation of Precast Concrete Units. Work Area 3, Transit Hall	Lump Sum	$
29.2	Supply and installation of temporary barricades and protection shields for construction phasing sequence. Work Area 2, 1 Line Subway Box	Lump Sum	$
29.3	Supply and installation of temporary barricades and protection shields for construction phasing sequence. Work Area 3, Transit Hall	Lump Sum	$
30.2	Supply and installation of working platforms and scaffolding including multiple relocations to accommodate construction phasing. Work Area 2, 1 Line Subway Box	Lump Sum	$
30.3	Supply and installation of working platforms and scaffolding including multiple relocations to accommodate construction phasing. Work Area 3, Transit Hall	Lump Sum	$
31.2	Steel Erection of Temporary Structures Work Area 2, 1 Line Subway Box	Lump Sum	$
31.3	Steel Erection of Temporary Structures Work Area 3, Transit Hall	Lump Sum	$
32.2	Removal of Temporary Structures Work Area 2, 1 Line Subway Box	Lump Sum	$
32.3	Removal of Temporary Structures Work Area 3, Transit Hall	Lump Sum	$
33.2	Cranes, Rigging and Lifting devices. Work Area 2, 1 Line Subway Box	Lump Sum	$
33.3	Cranes, Rigging and Lifting devices. Work Area 3, Transit Hall	Lump Sum	$
34.2	Site logistics and Material delivery Access Ramps and Trestles. Work Area 2, 1 Line Subway Box	Lump Sum	$

34.3	**Site logistics and Material delivery Access Ramps and Trestles.**	**Lump Sum**	**$**
35	**TOTAL BASE BID**	**Lump Sum**	**$**

1.1.1 To assist in the analysis of this proposal, the following information is REQUIRED TO BE COMPLETED by the Bidders. Failure to comply with this shall be considered Non Responsive RFP.

FOR ANALYSIS ONLY			
No.	**Description**	**Quantity**	**Unit of Measure**
1B	**Permanent Steel – Standard Profile Steel and Built up Section.**		**LBS**
1C	**Permanent Steel – 1-Line Steel**		**LBS**
2	**Temporary Supports System for Steel Erection**		**LBS**
3	**Metal Deck**		**SQ. Ft**
4	**Precast Concrete Floor Slab**		**SQ. Ft**
5	**Left Blank – not Applicable**	**N/A**	**N/A**
6	**Precast Concrete Wall Units**		**SQ. Ft**
7	**Precast Concrete Stair Units**		**No.**
8	**Intumescent Coating**		**SQ. Ft**
9	**Paint coating excluding area covered by Intumescent coating.**		**SQ. Ft**

1. In the case of Item No., 1B and 1C the quantity shall be the number of pounds of structural steel to be fabricated / erected; Line Item No.2 Temporary support system for steel erection; No. 3 square feet of Metal Deck to be installed; Line Item No.4 Total square feet of Precast Concrete Floor Slab Installed; Item No. 5 is left blank as not applicable ; Item No.6 Precast Concrete wall units in square feet; Item No. 7 Precast Concrete Stair units; Item No.8 total square feet of Intumescent Coating applied; No. 9 Total square feet of painted steel excluding steel covered by Intumescent coating.

2. In order to be eligible for the award of the structural steel work of this work package, the bidder must meet the following requirements:

A. The bid proposal must include Method Statement for Steel Fabrication including detailed information on all facilities to be used. Steel Erection methodology to include proposed temporary support structure, type and location of crane / lifting devices / sequence of steel erection, transferring load to permanent structure. The method statement to include basic steel erection sequence including milestone dates for compliance with the project schedule.

B. The bid proposal must include resumes of the Key Personnel allocated for this project including Project Manager, Shop & field Superintendents, Shop and Field Quality Control Managers, and person in-charge of Steel fabrication at the fabrication facility and Steel erection in the field.

C. Specification Sec. 07816 'Epoxy Intumescent Coating System' Page 4 Article 5. Submit at the time of the bid , the properties of the proposed product, on the manufacture's letterhead for each of the items listed below:

a). Tensile Strength: ASTM D638.

b). Bond Strength: ASTM D1002.

c). Compressive Strength: ASTM D695

d). Explosion: No delamination, no cracking when tested four bar over pressure test.

e). Hardness: ASTM D2240

f). Chemical Resistance: ISO2812-1

g). Water Absorption: ISO 2812-2

h). Flame Spread: Class A (Class 1) when tested in accordance with ASTM E84

i). Smoke Development: Class A (Class 1) when tested with ASTM e84

The undersigned understands and agrees to comply with and be bound by the subcontractors pricing and instructions and other RFP/ contract documents.

The Undersigned acknowledges the receipt of any addendum issued by listing all by number below:

The following Unit rates to be submitted with the RFP. Unit Rates to be inclusive of all material and labor costs. Unit Rates are fixed for the full duration of the contract.

No.	Description	Unit	Rate	
	Shop Drawing and Engineering	**Per Man hour**		
	Supply of additional Steel Beams Up to 12# / lnft **13 - 25# / lnft** **26 - 50# / lnft** **51 - 100#/ lnft** **101 - 150# / lnft** **151 - 200# / lnft** **200 - 300# / lnft** **300 – 398# / lnft** **Above 398# / lnft**	**Per Ton**	**Furnish**	**Installation**
	Sheer Studs - Furnish	**Each**	**Furnish**	**Installation**
	Weld-able Lenton Couplers with Rod	**Each**	**Furnish**	**Installation**
	<u>Columns</u> **Up to 100# / lnft** **101 - 200# / lnft** **201 - 300# lnft**	**Per Ton**	**Furnish**	**Installation**

	301 - 398# lnft **Above 398# / lnt**			
	Plating of WF Columns (Plating only, not WF Columns) **1/2"** **1"** **2"** **3"** **4"** **6"** **8"**	**Per Ton**	**Furnish**	**Installation**
	Plate Girders and Built Up Columns. (50 ksi, 65 ksi) including stiffeners. **1" Plates** **2" Plates** **3" Plates** **4" Plates** **5" Plates** **6" Plates** **8" Plates**	**Per Ton**	**Furnish**	**Installation**
	Shop Fabrication of Steel Including Primer Paint	**Per Ton**		
	Field Fabrication of Steel Including primer Paint	**Per Ton**		

	Shop Applied Intumescent Coating Including Surface Preparation and Base Primer	**Per SQ. Ft.**		
	Field Applied Intumescent Coating Including Surface Preparation and Base Primer	**Per SQ. Ft.**		
	Welding: 1/4 inch Fillet weld	**Per Lin. Ft.**		
	Welding: 5/16 inch Fillet Weld	**Per Lin. Ft.**		
	Welding: 1/2 inch Fillet Weld	**Per Lin. Ft.**		
	Welding : over 1/2 inch Fillet Weld	**Per Lin. Ft.**		
	Welding: 1/2 inch thick plate - Full Pen.	**Per Lin. Ft.**		
	Welding: 3/4 inch plate - Full Pen.	**Per Lin. Ft.**		
	Welding: 1 inch thick plate - Full Pen.	**Per Lin. Ft.**		
	Welding: 2 inch thick plate - Full Pen.	**Per Lin. Ft.**		
	Welding: 3 inch thick plate - Full Pen.	**Per Lin. Ft.**		
	Welding: 4 inch thick plate - Full Pen.	**Per Lin. Ft.**		
	Welding: 5 inch thick plate - Full Pen.	**Per Lin. Ft.**		
	Welding: 6 inch thick plate - Full Pen.	**Per Lin. Ft.**		
	Welding: 7 inch thick plate - Full Pen.	**Per Lin. Ft.**		
	Welding: 8 inch thick plate - Full	**Per Lin. Ft.**		

	pen.			
	Utility Penetration through Steel Elements including reinforcement and stiffeners. Opening size	Each		
	Opening under 6"x 6"	Each		
	Opening size 6" x 6"	Each		
	Opening size 8" x 8"	Each		
	Opening size 8" x 12"	Each		
	Opening size 12"x 18"	Each		
	Opening size 18" x 24"	Each		
	Opening size 24"x 24"	Each		
	Opening size 24" x 30"	Each		
	Opening size 30"x 30"	Each		
	Temporary overhead Shielding Protection at active platforms for construction Phasing	Per SQ. Ft.		
	Temporary Barricade/ Protection Walls at Active Platforms	Per SQ. Ft.	Furnish	Installation
	Precast Concrete Unit – Typical Floor Planks	Per SQ. FT	Furnish	Installation
	Precast Concrete Wall Units	SQ. Ft		
	Precast Concrete Stair Units	Per Riser		
	Unit rate per Crane pick as directed by Phoenix Loads under 5 Ton	Each Single Unit		

	Loads over 5 Ton **MEP Equipment:** **(8) Power Distribution Centers 6'- 6"W x 8'- 0"H x 8'- 0"D 4,000lbs each** **(32) Power Distribution Centers 6'-0" x 8'- 0"H x 8'- 0"D 5,000 lbs each** **(6) 15KV Paralleling Switchgear 11'-0"W x 8'- 0"H x 8'- 0"D 10,000 lbs each** **(6) 2000KW, 13.8 KV Diesel Generator 21'- 0"L x 11'- 0"H x 8'- 0" D 45,000 lbs each** **(1) Generator Load Bank 12'- 0"L x 8'- 0"H x 6'- 0"D 19,000 lbs each** **(5) 2150 KVA Cast Coil Transformers 12'-0"W x 8'- 6"H x 6'-0"D 19,200 lbs each** **(5)Low Voltage Switchgear 4'-0"W x 8'-0"H x 6'-0"D 3500lbs each** **(10) Low Voltage Switchgear 5'-0"W x 8'-0"H x 6'-0"D 9,000lbs each** **(5) 15 KV Primary Switch 4'-0"W x 8'-6"H x 6'-8"D 3000lbs each**			

Proposer:

Company Name: _____

By: (Officer) _____

Address:

_____

Date of Proposal: _____ Corporate Seal:

1.2 **Supplemental Unit Rates, All-in Rates and Cost/Price Assumptions**

No changes are authorized from the approved scope, unless they are approved in writing by the PC (i.e., co-signed amendment), prior to the time of execution.

When changes occur from the anticipated job site, the following unit rates will be used to negotiate changes which shall also be finalized through the PC as firm fixed price.

All pricing assumptions shall be clearly stated to allow a reviewer to assess the potential cost risks associated with the proposed design, and associated construction efforts.

1.3 **Financial Terms**

1.3.1 See Subcontract.

2.0 INVOICING INSTRUCTIONS

2.1 Invoices/Requisitions must be submitted by the 3rd day of each month to reflect work through the last Sunday of the previous month. Invoice/Requisitions received after the 3rd day will not be processed until the following month.

2.2 Contractual retention, calculated as ten percent of amount invoiced, shall be identified on the face of each progress invoice and withheld from amounts payable.

2.3 Subcontractor shall submit separate invoices in original and one copy complete with all supporting documentation (Exhibit 3 Partial Payment and Release, Exhibit 2A, Subcontractor Pricing and Invoicing Instructions, Appendix A, Schedule of Values) to Contractor's Office Address marked:

Phoenix Constructors, JV

115 Broadway
18th Floor
New York, NY 10006
Attn: Javed Qureshi

2.4 Subcontractor's invoices shall be clearly marked with this Subcontract Number and the appropriate milestone description of activities and/or work related to the billing.

2.5 Subcontractor's invoices shall indicate the time period during which the Work was performed for which the invoice is submitted.

2.6 Phoenix Constructors JV shall not be obligated to pay for invoice items not fully supported by approved progress measurements and any other such documentation as may be required. PCJV reserves the right to make provisional payment on an invoice in dispute, pending audit and reconciliation of the total charge.

2.7 Subcontractor shall sign each invoice certifying that all Work covered by the invoice is complete and that the invoice is correct, authentic and the only one issued for the Work described therein.

2.8 Any payments made shall not be construed to be an acceptance of defective Work nor relieve Subcontractor of any of its obligations.

2.9 Invoices for Cost-Reimbursable Work shall be prepared and submitted as follows:

2.9.1 Invoices for Labor shall be accompanied by Phoenix Constructors JV approved daily reports or time sheets listing workers name, classification, and straight time and overtime hours. Labor categories and rates must correspond to those set forth in Rate Schedule "A" of this Exhibit 2A.

2.9.2 Invoices for Subcontractor-Owned Equipment shall be accompanied by Phoenix Constructors JV approved daily reports or time sheets listing the equipment type, number, size and hours. Equipment descriptions and rates must correspond to those set forth in the Rental Rate Blue Book (published by Machinery Information Division, K III Directory Corporation, 1735 Technology Drive, San Jose CA 95110)

2.9.3 Invoices for Subcontractor Rented Equipment shall be accompanied by Phoenix Constructors JV approved daily reports or time sheets listing

equipment type, number, size and hours along with a copy of Subcontractor's rental agreement and invoice from supplier. The applicable markup as set forth in this Exhibit 2A shall be set forth separately.

2.9.4 Invoices for Materials shall be accompanied by field receiving documentation and a copy of Subcontractor's purchase order and invoice from supplier.

3.0 PRICING FOR CHANGES

Compensation to Subcontractor for changes in the Scope of Work, shall be in accordance with the provisions of Article 8, Change Orders of GC Long Form Subcontract Rev. 0, except to the extent otherwise provided below:

Phoenix Constructors JV may request, and Subcontractor shall provide, proposals for Scope of Work changes (additions and deletions) which are priced, at Phoenix Constructors JV option, by one or a combination of the following methods:

a. Negotiated Lump Sums based upon a mutually agreed Scope of Work.

b. Applicable unit prices set forth in Exhibit B, titled, Contract Unit Rates, if the Work is possible to be fairly classified under the Unit Price items.

c. Negotiated Unit Prices not established in the Contract.

d. On a "cost-reimbursement plus a fixed fee" basis, or at the labor and equipment rates as set forth in Rate Schedule "A" and "B".

3.1 Lower Tier Subcontracts

3.1.1 All subcontracts and services provided by others for performance of changes or extra work requested by Phoenix Constructors JV, which have not been objected to by PCJV shall be at actual cost to Subcontractor of such subcontracts or services provided by others (not to exceed such subcontract price) plus a mark-up for all overhead and fee of Subcontractor thereon which shall not exceed 10%.

3.1.2 Subcontractor's invoices for work performed by any of Subcontractor's "lower tier subcontractors" may include an allowance for the "lower tier subcontractor's" overhead and fee which shall not exceed 10%.

3.1.3 In no instance shall the mark-ups or rates for changes provided by lower tier subcontractor to Subcontractor exceed the mark-ups or rates for changes as stipulated in this Article 3.0.

3.2 **Materials**

3.2.1 Compensation to Subcontractor for materials supplied by Subcontractor for incorporation into the permanent facility (excluding consumable, expendable, and small tools) shall be at actual invoiced cost to Subcontractor, delivered to project site, as substantiated by invoices certified paid or by such documentation as may be required by PCJV, plus a mark-up, for all fee and overhead expense not to exceed 10%.

3.2.2 Phoenix Constructors JV reserves the right to provide, at no cost to Subcontractor, materials, equipment, services, supplies or incidentals required to perform the Work. All refunds, trade discounts, rebates on materials, supplies and services, and all monies obtained from the disposal of surplus materials or supplies shall accrue to Owner.

3.3 **Labor**

Compensation to Subcontractor for construction labor, related costs and profit shall be in accordance with the rates set forth in Rate Schedule "A" entitled ALL INCLUSIVE LABOR RATES attached and incorporated herein.

3.4 **Equipment Rental**

3.4.1 Equipment rental rates, as set forth in the Rental Rate Blue Book (published by Machinery Information Division, K III Directory Corporation, 1735 Technology Drive, San Jose CA 95110) shall apply for equipment used for extra work requested by Contractor.

Hourly rental for those items of equipment listed in the "Rental Rate Blue Book" shall be 100% of the applicable rates as listed in said book, reduced to an hourly basis (see formula below), except that such applicable rates shall be reduced by 50% for all hours of rental payable hereunder in excess of 8 hours each day. The edition of this publication to be used shall be the one in effect on the date of the actual rental of the equipment. The "Estimated Operating Cost per Hour" as set forth for such item of equipment in the Blue Book shall be added to the hourly rental for each hour that such equipment id actually engaged in performing Work. No amount of operating cost will be allowed during periods when such equipment is not actually engaged in performing Work (i.e. standby rental time). None of the

provisions of the Blue Book shall be deemed referred to or included in this Contract except as specifically set forth in this Section.

When utilizing the rental rates appearing in the Blue Book, the Phoenix Constructors JV (or Authority Engineer) shall determine the applicable rate and the hourly rental determined therefrom by applying the following criteria:

The rate to be applied for an item if tool, equipment construction aid used on a particular Work package shall be the daily, weekly or monthly rates from the foregoing publication based on the total number of work days or portions thereof that a particular item of tool, equipment or construction aid, or substitute item of equipment is at the construction site for use by the Phoenix Constructors JV or subcontractors whether under this Contract if any other contract with the Authority. Included within this period will be (i) work days of idleness results from acts or omission of the PCJV, Authority or third persons, breakdowns in the tool, equipment or construction aid or any other cause (ii) work days on which the equipment is removed from the construction site solely to enable the performance of repairs thereon, and (iii) work days intervening between the removal of tool, delivery to the construction site of the same substitute tool, equipment or construction aide. The number of workdays in the period for each rate shall be as indicated below:

Three work days or less	Daily Rate
More than three work days but not more than fifteen work days	Weekly Rate
More than fifteen work days	Monthly Rate

The pro rata portion which one-hour bears to the applicable rate shall be determined in accordance with the following formula:

Hourly rate based on daily rental	1/8 of Daily Rental from Blue Book
Hourly rate based on weekly rental	1/40 of Weekly Rental from Blue Book

Hourly rate based on monthly rental	1/176 of Monthly Rental from Blue Book

The rental rate shall be multiplied by the applicable regional adjustment factor shown for such item of tool, equipment or construction aid in the Blue Book. The adjustment factor shall not apply to the hourly operating cost.

If Phoenix Constructor JV (or Authority Engineer) should determine that the nature, number of pieces or size of the tool, equipment or construction aid used by the Subcontractor in connection with the Work is more pieces, or larger or more elaborate, as the case may be, than the size or nature of the minimum equipment determined by the Phoenix Constructors JV (or Authority Engineer) to be suitable for the Work, the reasonable rental will not be based upon the toot, equipment or construction aid used by the Subcontractor but will be based on the smallest quantity or smallest or least elaborate tool equipment or construction aid determined by the Phoenix Constructors JV (or Authority Engineer) to have been suitable for the performance of the work.

There will be added to the rental as computed above (a) the reasonable cost of transporting such tool, equipment or construction aid to and from the construction site, (b) with respect to Work performed in New Jersey, the taxes on the rental actually paid by the Subcontractor or lower tier subcontractor and (c) notwithstanding the number of hours during which such of tool, equipment or construction aid is utilized, the minimum rental therefore will be for a period of eight hours.

Notwithstanding anything to the contrary contained to the contrary contained in this numbered clause, the Phoenix Constructors JV and Authority shall not be liable for any amount attributable to the rental of non-powered hand tools.

3.4.2 For equipment which is specifically mobilized to the jobsite for extra work, Subcontractor shall separately identify such transportation costs (including: loading, off-loading, assembly and disassembly) when submitting proposals to Phoenix Constructors JV for performing extra work. Transportation costs shall not be applicable to equipment already mobilized on the site.

3.4.3 When Subcontractor's equipment does not resemble the equipment having rental rates listed in Rate Schedule "B" for extra work, the rental rate shall be negotiated and agreed upon in writing by Phoenix Constructors JV.

3.4.4 Compensation to Subcontractor for equipment used for extra work which is rented from third parties and does not resemble the equipment having rental rates listed in the "Rental Rate Blue Book" must be approved by Phoenix Constructors JV in writing prior to rental and shall be at actual cost to Subcontractor, delivered to

project site, as substantiated by invoices certified paid or by such documentation as may be required by Phoenix Constructors JV plus a mark-up, for all profit and overhead expense of Subcontractor thereon, of not to exceed 10%.

3.5 Time Sheets

3.5.1 For all work performed on a cost-reimbursable basis, Subcontractor shall submit daily time sheets for approval by Phoenix Constructors JV. An approved copy of the time sheets, which shall detail all hours worked, materials installed and equipment used, must be submitted in support of Subcontractor's monthly billing.

4.0 Rate Schedules

4.1 Rate Schedule "A" – All Inclusive Labor Rates

4.2 Rate Schedule "B" – Equipment Rental Rates

4.3 Rate Schedule "C" – List of SubSubcontractors

RATE SCHEDULE "A"

ALL INCLUSIVE LABOR RATES

NOTES

1. VACATION: Includes vacations, statutory holidays, sick and other leave with pay.
2. ALLOWANCES: Includes workers compensation, unemployment insurance, and other taxes and insurance's measured by payroll, established employee benefits such as pension, health and life insurance's, bonus programs (excluding profit sharing), union assessments (if any), training funds, and industry and administration funds.
3. OVERHEAD AND PROFIT: Calculated on the base rate, overhead includes all home office and jobsite supervision above the level of general foreman and other non-manual personnel costs and all temporary, construction facilities shall not exceed 10%.
4. ALL INCLUSIVE RATE: Based on ____ **(To be completed in by Offerer)** hours per week ____ **(To be completed in by Offerer)** hours per day, ____ **(To be completed in by Offerer)** days per week.
5. TRAVEL ALLOWANCE: N/A
6. OVERTIME: The overtime rate per hour shall be limited to the actual cost to Subcontractor of the premium portion only of all applicable wages, craft fringe benefits and payroll burdens imposed by any governmental authority and measured by the compensation payable to employees. To establish the amount of payment, Subcontractor shall submit supporting documents satisfactory in form and content to Contractor for its verification and approval. If only one overtime rate is shown, it shall be applicable for all overtime hours.
7. LABOR RATES entered in the above schedule shall be based on labor agreements, if any, and rates in effect on the Proposal closing date, unless otherwise noted. The quoted labor rates may be adjusted as approved by Contractor to reflect subsequent changes in labor agreements or rates if applicable.
8. No Charges will be accepted by Contractor for labor not listed in Rate Schedule "A".
9. Labor rates for stand-by time when specifically ordered by Contractor shall be at _____% **(To be completed in by Offerer)** inclusive rates in this Rate Schedule "A" less the profit portion thereof.
10. Subcontractor shall not invoice for field support/supervisory personnel assigned to a change in the Scope of Work if the change does not extend the time such personnel are required on site by the original Scope of Work.

RATE SCHEDULE "A"

ALL INCLUSIVE LABOR RATES

TRADE OR CLASSIFICATION	BASE RATE	VACATION	ALLOWANCES		SUBTOTAL (1)	CALCULATED ON BASE RATE OVERHEAD & PROFIT at 10%		ALL-INCLUSIVE RATE (HR) (1)+(2)+(3)	TRAVEL ALLOWANCE (DAY)	OVERTIME RATE (HR)
Iron Worker-Journey Man										
Foreman - Iron Worker. Journey Man										
Crane Operator										
Oiler										
Welder										
Draftsman										
Shop Fabrication labor										
Dock Builder – Journey Men										
Foremen – Dock Builder Journey Men										
Carpenter										
Carpenter Foreman										
Mason										
Mason Foreman										

Lather										
Lather Foreman										

RATE SCHEDULE "B"

EQUIPMENT RENTAL RATE

NOTES

1. Rate Schedule "B" identifies all Subcontractor owned and rented equipment (excluding non powered hand tools) that may be used by Subcontractor in performance of the Work.
2. Rate Schedule "B" shall be calculated in accordance to Exhibit 2A clause 3.4.1.
3. Subcontractor shall, prior to rental of any equipment for changes in the scope, submit a stated value for the equipment being rented.
4. No payment shall be made for equipment which is not operating because it is broken down or undergoing repair, maintenance or overhaul.

RATE SCHEDULE "B"

EQUIPMENT RENTAL RATES

FOR EQUIPMENT, INCLUDING VEHICLES, THAT ARE REQUIRED IN THE PERFORMANCE OF THE WORK.

RATES

DESCRIPTION MAKE ANDMODEL	HOURLY	DAILY	WEEKLY	MONTHLY	STANDBY

RATE SCHEDULE "C"

LIST OF SUBSUBCONTRACTORS

The following is a detailed list of the subSubcontractors proposed for the Work.

Once Contractor has given its non-objection the subSubcontractors listed below shall not be changed except with Contractor's written approval.

SubSubcontractor	Description of Work	Union or Trade Affiliation, if any

1.0 Percentage of Work performed by Subcontractor's own forces: ____ **(To be completed by Offerer)**

2.0 Percentage of Work performed by subSubcontractors: ____ **(To be completed by Offerer)**

3.0 Contractor reserves the right to request financial information and work experience histories of the proposed subSubcontractors.

END OF EXHIBIT 2

TABLE OF CONTENTS

1.0 PAYMENT SCHEDULE

Full compensation to Subcontractor for full and complete performance by Subcontractor of all the Work, compliance with all terms and conditions of this Subcontract, and for Subcontractor's payment of all obligations incurred in, or applicable to, performance of the Work, shall be the sum of the following lump sums and the value of the unit prices set forth below, for adjusting future additions / deletions from the contractual scope.

1.1 Firm Fixed Price

The undersigned, having examined the proposed RFP / Contract documents for the work package referenced above and having visited the job site and examined the conditions affecting the work, hereby proposes and agrees to furnish all labor, materials, equipment, and appliances, and to perform operations necessary to complete the work as required by said proposed RFP / contract documents " Station Construction and Transit Hall Structure to Grade - Structural Steel, Intumescent Fire Resistant Coating, Metal Deck & Precast Concrete Work.

A. **Work Package # 20, Furnish, Fabricate and Erect, Structural Steel, Intumescent Fire Resistant Coating, Metal Deck & Precast Concrete Work**
PROPOSAL FOR WORK AREA 1, PATH STATION

The total price for performing all work is $_____this is (in words) _____dollars.

B. **Alternate Option -** Furnish, Fabricate and Install Precast Concrete Floor and Walls instead of Cast in Place Concrete as indentified and depicted on the Contract drawings: S1311-1, S1312-1, S1313-1, S1314-1, S1411-1, S1412-1, S1413-1 & S1414-1

The total price for performing all work is $_____this is (in words) _____dollars.

The Price is firm and fixed for the duration of the Subcontract and is not subject to escalation for any cause. The price shall be furnished in US dollars and are not subject to change based upon currency fluctuations. Payment for actual quantities at the Unit Price shall constitute full payment for the performance of the Subcontract and covers all cost of whatever nature incurred by the Subcontractor in accomplishing the Work in accordance with the provisions of this Subcontract.

Phoenix Constructors JV and Port Authority of New York and New Jersey has the exclusive right at their discretion to select and choose any single or combination of different proposals from the same or more than one bidder for the award. The bidders must consider and have appropriate allowance in their proposals for coordination and review of connection details at the common boundary lines for adjacent work packages, of the Work Package #20, WP#21 & WP# 9 & 9X, In addition to coordination with other WTC site stakeholders, i.e., memorial, towers 1,2,3 & 4, VOEC…

NOTE ** This pricing format **MUST** be used**

All prices shall be furnished in US Dollars and are not subject to change based upon world currency fluctuations.

	DESCRIPTION	UM	TOTAL PRICE
A1	**Furnish, Fabricate and Deliver Calatrava Exposed Steel for Work Area 1, Path Station to WTC Jobsite**	**Lump Sum**	**$**
B1	**Furnish, Fabricate and Deliver Standard Profile and Built up Section Steel For Work Area 1 , Path Station to WTC Jobsite**	**Lump Sum**	**$**
C1	**Shop Applied Surface Preparation, Zinc Primer & Intumscent Fire Resistant Coating Work for Work Area 1 Path Station**	**Lump Sum**	**$**
D1	**Field Applied Surface Preparation, Zinc Primer & Intumscent Fire Resistant Coating Work for Work Area 1, Path Station**	**Lump Sum**	**$**
E1	**Furnish, Fabricate and Deliver Metal Deck Work for Work Area 1, Path Station to WTC Jobsite**	**Lump Sum**	**$**
F1	**Furnish, Fabricate and Deliver Precast Concrete Work for Work 1 Path Station to WTC Jobsite.**	**Lump Sum**	**$**
G1	**Steel Erection: Calatrava Exposed Steel Work Area 1, Path Station**	**Lump Sum**	**$**
H.1	**Steel Erection : Standard Profile and Built up Sections Work Area 1, Path Station**	**Lump Sum**	**$**
I.1	**Metal Deck & Shear Stud Installation Work Area 1, Path Station**	**Lump Sum**	**$**
J.1	**Precast Concrete Erection. Work Area 1, Path Station**	**Lump Sum**	**$**

Note: The above lump sum price must be broken down as below for bid analysis for each individual and combination offers proposed.

Cost Break Down for Work Package 20-Part 1, Work Area 1- Path Station West Bathtub

1.1	**Payment and Performance Bond** **a). Payment Bond** **b). Performance Bond**	**Lump Sum** **Lump Sum**	**$** **$**
2.1	**Mobilization.** **Work Area 1, Path Station**	**Lump Sum**	**$**
3.1	**Shop Drawings and Engineering - Permanent Structure. Work Area 1, Path Station**	**Lump Sum**	**$**
4.1	**Shop Drawings and Engineering - Temporary Support Structure. Work Area 1, Path Station**	**Lump Sum**	**$**
5.1	**Shop Drawings and Engineering – Working Platforms and Scaffolding.** **Work Area 1, Path Station**	**Lump Sum**	**$**
6.1	**Shop drawings and Engineering Overhead Protection Shield and Side Walls for Construction Phasing.** **Work Area 1, Path Station**	**Lump Sum**	**$**
7.1	**Material - Permanent Steel Structure** **Work Area 1, Path Station**	**Lump Sum**	**$**
8.1	**Material -Temporary Steel Support Structure** **Work Area 1, Path Station**	**Lump Sum**	**$**
9.1	**Material Overhead Protection Shield and Side Walls. Work Area 1, Path Station.**	**Lump Sum**	**$**
10.1	**Steel Fabrication - Permanent Structure** **Work Area 1, Path Station.**	**Lump Sum**	**$**
11.1	**Steel Fabrication - Temporary Structure** **Work Area 1, Path Station.**	**Lump Sum**	**$**
12.1	**Cost for all necessary "individual dedicated UL Fire rated Assembly Tests" related to Intumescent Fire Resistant Coating for different shapes and assemblies required for the complete scope of Work Package # 20 including Engineering, fabrication of representative mockup for testing and obtaining UL Approved Fire Resistant Rated Assemblies for Calatrava (Special Shapes) Exposed Steel and other steel elements identified to receive Intumescent Fire Resistant Coating.** **Work Area 1, Path Station**	**Lump Sum**	**$**
13.1	**Surface Preparation, SSPC – SP10 and primer / coatings for areas not covered by intumescent**	**Lump Sum**	**$**

	coating. Work Area 1, Path Station		
14.1	Surface Preparation, SSPC – SP10, Primer and Shop Application of Intumescent Fire Resistant coating. Work Area 1, Path Station	Lump Sum	$
15.1	Surface Preparation, SSPC – SP10, Primer and Field Application of Intumescent Fire Resistant coating. Work Area 1, Path Station	Lump Sum	$
16.1	Provide intermediate storage holding area for fabricated steel within (25) mile radius of WTC job site for the full duration of the steel erection process + additional 3 months for receiving and Shaking out fabricated material prior to field installation. Work Area 1, Path Station	Lump Sum	$
17.1	Shipping, Customs, hauling, delivering and off loading fabricated steel at the Holding Area within 25 mile radius of WTC jobsite. Work Area 1, Path Station	Lump Sum	$
18.1	Allowance for Phoenix Constructors JV personnel for Air Fair Return Trip Tickets from New York to bidder's fabrication facilities including Hotel accommodation. Work Area 1, Path Station	Lump Sum	$100,000
19.1	Loading and Hauling Fabricated Elements from holding area to the WTC job site as required. Work Area 1, Path Station	Lump Sum	$
20.1	Metal Deck: Shop drawing and Engineering Work Area 1, Path Station	Lump Sum	$
21.1	Metal Deck: Material & Fabrication Work Area 1, Path Station West Bathtub	Lump Sum	$
22.1	Metal Deck: Delivery to WTC Jobsite Work Area 1, Path Station	Lump Sum	$
23.1	Metal Deck: Installation Metal Deck & Shear Studs. Work Area 1, Path Station	Lump Sum	$
24.1	Shop Drawing and Engineering for Precast Concrete Units . Work Area 1, Path Station	Lump Sum	$
25.1	Fabrication and Furnishing of Precast Concrete Units. Work Area 1, Path Station West Bathtub	Lump Sum	$
26.1	Trucking and delivering Precast Concrete Units to the WTC Jobsite Work Area 1, Path Station	Lump Sum	$
27.1	Temporary Support and Bracings for Precast Concrete Units Work Area 1, Path Station	Lump Sum	$
28.1	Erection and Installation of Precast Concrete Units	Lump Sum	$

	Work Area 1, Path Station		
29.1	**Supply and installation of temporary barricades and protection shields for construction phasing sequence. Work Area 1, Path Station**	**Lump Sum**	**$**
30.1	**Supply and installation of working platforms and scaffolding including multiple relocations to accommodate construction phasing. Work Area 1, Path Station**	**Lump Sum**	**$**
31.1	**Steel Erection of Temporary Structures Work Area 1, Path Station**	**Lump Sum**	**$**
32.1	**Removal of Temporary Structures Work Area 1, Path Station**	**Lump Sum**	**$**
33.1	**Cranes, Rigging and Lifting devices. Work Area 1, Path Station**	**Lump Sum**	**$**
34.1	**Site logistics and Material delivery Access Ramps and Trestles. Work Area 1, Path Station**	**Lump Sum**	**$**
35.1	**TOTAL BASE BID**	**Lump Sum**	**$**

a	**ALTERNATE OPTION** **Precast Concrete Floor & Walls Instead of Cast in Place Concrete as indentified and depicted on the contract documents.** **Reference Drawings: S1311-1, S1312-1, S1313-1, S1314-1, S1411-1, S1412-1, S1413-1, S1414-1**	**Lump Sum**	**$**
b	**Payment & Performance Bond:** **Payment Bond** **Payment Bond**	**Lump Sum** **Lump Sum**	**$** **$**
c	**Shop Drawings and Engineering**	**Lump Sum**	**$**
d	**Fabrication**	**Lump Sum**	**$**
e	**Trucking & Delivering Precast Slab Units to WTC Jobsite.**	**Lump Sum**	**$**
f	**Erection and Installation of Precast Units.**	**Lump Sum**	**$**
g	**Total Precast Alternate Option**	**Lump Sum**	**$**

1.1.1 To assist in the analysis of this proposal, the following information is REQUIRED TO BE COMPLETED by the Bidders. Failure to comply with this shall be considered Non Responsive RFP.

FOR ANALYSIS ONLY			
No.	**Description**	**Quantity**	**Unit of Measure**
1A	**Permanent Steel - Calatarva Exposed Steel**		**LBS.**
1B	**Permanent Steel – Standard Profile Steel and Built up Section.**		**LBS**
2	**Temporary Supports System for Steel Erection**		**LBS**
3	**Metal Deck**		**SQ. Ft**
4	**Precast Concrete Floor Slab**		**SQ. Ft**
5a	**Precast Concrete Slab Ducts, Type A1 to A5**		**No.**
5b	**Precast Concrete Slab Ducts, Type B1 to B5**		**No.**
5c	**Precast Concrete Slab Ducts, Type C1 to C5**		**No.**
5d	**Precast Concrete Slab Ducts, Type D1 to D5**		**No.**
6	**Precast Concrete Wall Units**		**SQ. Ft**
7	**Precast Concrete Stair Units**		**No.**
8	**Intumescent Coating**		**SQ. Ft**
9	**Paint coating excluding area covered by Intumescent coating.**		**SQ. Ft**
10	**Alternate Option – Precast Concrete Floor & Walls**		**SQ. Ft**

1. In the case of Item No. 1A and 1B the quantity shall be the number of pounds of structural steel to be fabricated / erected; Line Item No.2 Temporary support system for steel erection; No. 3 square feet of Metal Deck to be installed; Line Item No.4 Total square feet of Precast Concrete Floor Slab Installed; Item No. 5a, 5b & 5c Total number of typical Precast Concrete Slab ducts (Sections identified as 5a, 5b, 5c & 5d) installed; Item No.6 Precast Concrete wall units in square feet; Item No. 7 Precast Concrete Stair units; Item No.8 total square feet of Intumescent Coating applied; No. 9 Total square feet of painted steel excluding steel covered by Intumescent coating. Item No.10 Alternate Option - Precast Concrete floor & Walls

2. In order to be eligible for the award of the structural steel work of this work package, the bidder must meet the following requirements:

   A. The bid proposal must include Method Statement for Steel Fabrication including detailed information on all facilities to be used. Steel Erection methodology to include proposed temporary support structure, type and location of crane / lifting devices / sequence of steel erection, transferring load to permanent structure. The method statement to include basic steel erection sequence including milestone dates for compliance with the project schedule.

   B. The bid proposal must include resumes of the Key Personnel allocated for this project including Project Manager, Shop & field Superintendents, Shop and Field Quality Control Managers, and person in-charge of Steel fabrication at the fabrication facility and Steel erection in the field.

   C. Specification Sec. 07816 'Epoxy Intumescent Coating System' Page 4 Article 5. Submit at the time of the bid , the properties of the proposed product, on the manufacture's letterhead for each of the items listed below:

      a). Tensile Strength: ASTM D638.

      b). Bond Strength: ASTM D1002.

      c). Compressive Strength: ASTM D695

      d). Explosion: No delamination, no cracking when tested four bar over pressure test.

      e). Hardness: ASTM D2240

      f). Chemical Resistance: ISO2812-1

      g). Water Absorption: ISO 2812-2

      h). Flame Spread: Class A (Class 1) when tested in accordance with ASTM E84

      i). Smoke Development: Class A (Class 1) when tested with ASTM e84

The undersigned understands and agrees to comply with and be bound by the subcontractors pricing and instructions and other RFP/ contract documents.

The Undersigned acknowledges the receipt of any addendum issued by listing all by number below:

_____

_____

The following Unit rates to be submitted with the RFP. Unit Rates to be inclusive of all material and labor costs. Unit Rates are fixed for the full duration of the contract.

No.	Description	Unit	Rate	
	Shop Drawing and Engineering	**Per Man hour**		
	Supply of additional Steel Beams Up to 12# / lnft **13 - 25# / lnft** **26 - 50# / lnft** **51 - 100#/ lnft** **101 - 150# / lnft** **151 - 200# / lnft** **200 - 300# / lnft** **300 – 398# / lnft** **Above 398# / lnft**	**Per Ton**	**Furnish**	**Installation**
	Sheer Studs - Furnish	**Each**	**Furnish**	**Installation**
	Weld-able Lenton Couplers with Rod	**Each**	**Furnish**	**Installation**
	<u>Columns</u> **Up to 100# / lnft**	**Per Ton**	**Furnish**	**Installation**

	101 - 200# / lnft **201 - 300# lnft** **301 - 398# lnft** **Above 398# / lnt**			
	Plating of WF Columns (Plating only, not WF Columns) **1/2"** **1"** **2"** **3"** **4"** **6"** **8"**	**Per Ton**	**Furnish**	**Installation**
	Plate Girders and Built Up Columns. (50 ksi, 65 ksi) including stiffeners. **1" Plates** **2" Plates** **3" Plates** **4" Plates** **5" Plates** **6" Plates** **8" Plates**	**Per Ton**	**Furnish**	**Installation**
	Shop Fabrication of Steel Including	**Per Ton**		

	Primer Paint			
	Field Fabrication of Steel Including primer Paint	**Per Ton**		
	Shop Applied Intumescent Coating Including Surface Preparation and Base Primer	**Per SQ. Ft.**		
	Field Applied Intumescent Coating Including Surface Preparation and Base Primer	**Per SQ. Ft.**		
	Welding: 1/4 inch Fillet weld	**Per Lin. Ft.**		
	Welding: 5/16 inch Fillet Weld	**Per Lin. Ft.**		
	Welding: 1/2 inch Fillet Weld	**Per Lin. Ft.**		
	Welding : over 1/2 inch Fillet Weld	**Per Lin. Ft.**		
	Welding: 1/2 inch thick plate - Full Pen.	**Per Lin. Ft.**		
	Welding: 3/4 inch plate - Full Pen.	**Per Lin. Ft.**		
	Welding: 1 inch thick plate - Full Pen.	**Per Lin. Ft.**		
	Welding: 2 inch thick plate - Full Pen.	**Per Lin. Ft.**		
	Welding: 3 inch thick plate - Full Pen.	**Per Lin. Ft.**		
	Welding: 4 inch thick plate - Full Pen.	**Per Lin. Ft.**		
	Welding: 5 inch thick plate - Full Pen.	**Per Lin. Ft.**		
	Welding: 6 inch thick plate - Full Pen.	**Per Lin. Ft.**		

	Welding: 7 inch thick plate - Full Pen.	**Per Lin. Ft.**		
	Welding: 8 inch thick plate - Full pen.	**Per Lin. Ft.**		
	Utility Penetration through Steel Elements including reinforcement and stiffeners. Opening size	**Each**		
	Opening under 6"x 6"	**Each**		
	Opening size 6" x 6"	**Each**		
	Opening size 8" x 8"	**Each**		
	Opening size 8" x 12"	**Each**		
	Opening size 12"x 18"	**Each**		
	Opening size 18" x 24"	**Each**		
	Opening size 24"x 24"	**Each**		
	Opening size 24" x 30"	**Each**		
	Opening size 30"x 30"	**Each**		
	Temporary overhead Shielding Protection at active platforms for construction Phasing	**Per SQ. Ft.**		
	Temporary Barricade/ Protection Walls at Active Platforms	**Per SQ. Ft.**	**Furnish**	**Installation**
	Precast Concrete Unit – Typical Floor Planks	**Per SQ. FT**	**Furnish**	**Installation**
	Precast Concrete Units **Type A1 to A5**	**Each**	**Furnish**	**Installation**

	Type B1 to B5 **Type C1 to C5** **Type D1 to D5**			
	Precast Concrete Wall Units	**SQ. Ft**		
	Precast Concrete Stair Units	**Per Riser**		
	Unit rate per Crane pick as directed by Phoenix **Loads under 5 Ton** **Loads over 5 Ton** **MEP Equipment:** **(8) Power Distribution Centers 6'- 6"W x 8'- 0"H x 8'- 0"D 4,000lbs each** **(32) Power Distribution Centers 6'-0" x 8'- 0"H x 8'- 0"D 5,000 lbs each** **(6) 15KV Paralleling Switchgear 11'-0"W x 8'- 0"H x 8'- 0"D 10,000 lbs each** **(6) 2000KW, 13.8 KV Diesel Generator 21'- 0"L x 11'- 0"H x 8'- 0" D 45,000 lbs each** **(1) Generator Load Bank 12'- 0"L x 8'- 0"H x 6'- 0"D 19,000 lbs each** **(5) 2150 KVA Cast Coil Transformers 12'-0"W x 8'- 6"H x 6'-0"D 19,200 lbs each** **(5)Low Voltage Switchgear**	**Each Single Unit**		

	4'-0"W x 8'-0"H x 6'-0"D 3500lbs each **(10) Low Voltage Switchgear 5'-0"W x 8'-0"H x 6'-0"D 9,000lbs each** **(5) 15 KV Primary Switch 4'-0"W x 8'-6"H x 6'-8"D 3000lbs each**			

Proposer:

Company Name: _____

By: (Officer) _____

Address:

_____

Date of Proposal: _____ Corporate Seal:

1.2 Supplemental Unit Rates, All-in Rates and Cost/Price Assumptions

No changes are authorized from the approved scope, unless they are approved in writing by the PC (i.e., co-signed amendment), prior to the time of execution.

When changes occur from the anticipated job site, the following unit rates will be used to negotiate changes which shall also be finalized through the PC as firm fixed price.

All pricing assumptions shall be clearly stated to allow a reviewer to assess the potential cost risks associated with the proposed design, and associated construction efforts.

1.3 Financial Terms

1.3.1 See Subcontract.

2.0 INVOICING INSTRUCTIONS

2.1 Invoices/Requisitions must be submitted by the 3rd day of each month to reflect work through the last Sunday of the previous month. Invoice/Requisitions received after the 3rd day will not be processed until the following month.

2.2 Contractual retention, calculated as ten percent of amount invoiced, shall be identified on the face of each progress invoice and withheld from amounts payable.

2.3 Subcontractor shall submit separate invoices in original and one copy complete with all supporting documentation (Exhibit 3 Partial Payment and Release, Exhibit 2A, Subcontractor Pricing and Invoicing Instructions, Appendix A, Schedule of Values) to Contractor's Office Address marked:

Phoenix Constructors, JV
115 Broadway
18th Floor
New York, NY 10006
Attn: Javed Qureshi

2.4 Subcontractor's invoices shall be clearly marked with this Subcontract Number and the appropriate milestone description of activities and/or work related to the billing.

2.5 Subcontractor's invoices shall indicate the time period during which the Work was performed for which the invoice is submitted.

2.6 Phoenix Constructors JV shall not be obligated to pay for invoice items not fully supported by approved progress measurements and any other such documentation as may be required. PCJV reserves the right to make provisional payment on an invoice in dispute, pending audit and reconciliation of the total charge.

2.7 Subcontractor shall sign each invoice certifying that all Work covered by the invoice is complete and that the invoice is correct, authentic and the only one issued for the Work described therein.

2.8 Any payments made shall not be construed to be an acceptance of defective Work nor relieve Subcontractor of any of its obligations.

2.9 Invoices for Cost-Reimbursable Work shall be prepared and submitted as follows:

2.9.1 Invoices for Labor shall be accompanied by Phoenix Constructors JV approved daily reports or time sheets listing workers name, classification, and straight time and overtime hours. Labor categories and rates must correspond to those set forth in Rate Schedule "A" of this Exhibit 2A.

2.9.2 Invoices for Subcontractor-Owned Equipment shall be accompanied by Phoenix Constructors JV approved daily reports or time sheets listing the equipment type, number, size and hours. Equipment descriptions and rates must correspond to those set forth in the Rental Rate Blue Book (published by Machinery Information Division, K III Directory Corporation, 1735 Technology Drive, San Jose CA 95110)

2.9.3 Invoices for Subcontractor Rented Equipment shall be accompanied by Phoenix Constructors JV approved daily reports or time sheets listing equipment type, number, size and hours along with a copy of Subcontractor's rental agreement and invoice from supplier. The applicable markup as set forth in this Exhibit 2A shall be set forth separately.

2.9.4 Invoices for Materials shall be accompanied by field receiving documentation and a copy of Subcontractor's purchase order and invoice from supplier.

3.0 PRICING FOR CHANGES

Compensation to Subcontractor for changes in the Scope of Work, shall be in accordance with the provisions of Article 8, Change Orders of GC Long Form Subcontract Rev. 0, except to the extent otherwise provided below:

Phoenix Constructors JV may request, and Subcontractor shall provide, proposals for Scope of Work changes (additions and deletions) which are priced, at Phoenix Constructors JV option, by one or a combination of the following methods:

a. Negotiated Lump Sums based upon a mutually agreed Scope of Work.

b. Applicable unit prices set forth in Exhibit B, titled, Contract Unit Rates, if the Work is possible to be fairly classified under the Unit Price items.

c. Negotiated Unit Prices not established in the Contract.

d. On a "cost-reimbursement plus a fixed fee" basis, or at the labor and equipment rates as set forth in Rate Schedule "A" and "B".

3.1 Lower Tier Subcontracts

3.1.1 All subcontracts and services provided by others for performance of changes or extra work requested by Phoenix Constructors JV, which have not been objected to by PCJV shall be at actual cost to Subcontractor of such subcontracts or services provided by others (not to exceed such subcontract price) plus a mark-up for all overhead and fee of Subcontractor thereon which shall not exceed 10%.

3.1.2 Subcontractor's invoices for work performed by any of Subcontractor's "lower tier subcontractors" may include an allowance for the "lower tier subcontractor's" overhead and fee which shall not exceed 10%.

3.1.3 In no instance shall the mark-ups or rates for changes provided by lower tier subcontractor to Subcontractor exceed the mark-ups or rates for changes as stipulated in this Article 3.0.

3.2 Materials

3.2.1 Compensation to Subcontractor for materials supplied by Subcontractor for incorporation into the permanent facility (excluding consumable, expendable, and small tools) shall be at actual invoiced cost to Subcontractor, delivered to project site, as substantiated by invoices certified paid or by such documentation as may be required by PCJV, plus a mark-up, for all fee and overhead expense not to exceed 10%.

3.2.2 Phoenix Constructors JV reserves the right to provide, at no cost to Subcontractor, materials, equipment, services, supplies or incidentals required to perform the Work. All refunds, trade discounts, rebates on materials, supplies and services, and all monies obtained from the disposal of surplus materials or supplies shall accrue to Owner.

3.3 Labor

Compensation to Subcontractor for construction labor, related costs and profit shall be in accordance with the rates set forth in Rate Schedule "A" entitled ALL INCLUSIVE LABOR RATES attached and incorporated herein.

3.4 Equipment Rental

3.4.1 Equipment rental rates, as set forth in the Rental Rate Blue Book (published by Machinery Information Division, K III Directory Corporation, 1735 Technology Drive, San Jose CA 95110) shall apply for equipment used for extra work requested by Contractor.

Hourly rental for those items of equipment listed in the "Rental Rate Blue Book" shall be 100% of the applicable rates as listed in said book, reduced to an hourly basis (see formula below), except that such applicable rates shall be reduced by 50% for all hours of rental payable hereunder in excess of 8 hours each day. The edition of this publication to be used shall be the one in effect on the date of the actual rental of the equipment. The "Estimated Operating Cost per Hour" as set forth for such item of equipment in the Blue Book shall be added to the hourly rental for each hour that such equipment id actually engaged in performing Work. No amount of operating cost will be allowed during periods when such equipment is not actually engaged in performing Work (i.e. standby rental time). None of the provisions of the Blue Book shall be deemed referred to or included in this Contract except as specifically set forth in this Section.

When utilizing the rental rates appearing in the Blue Book, the Phoenix Constructors JV (or Authority Engineer) shall determine the applicable rate and the hourly rental determined therefrom by applying the following criteria:

The rate to be applied for an item if tool, equipment construction aid used on a particular Work package shall be the daily, weekly or monthly rates from the foregoing publication based on the total number of work days or portions thereof that a particular item of tool, equipment or construction aid, or substitute item of equipment is at the construction site for use by the Phoenix Constructors JV or subcontractors whether under this Contract if any other contract with the Authority. Included within this period will be (i) work days of idleness results from acts or omission of the PCJV, Authority or third persons, breakdowns in the tool, equipment or construction aid or any other cause (ii) work days on which the equipment is removed from the construction site solely to enable the performance of repairs thereon, and (iii) work days intervening between the removal of tool, delivery to the construction site of the same substitute tool, equipment or construction aide. The number of workdays in the period for each rate shall be as indicated below:

Three work days or less	Daily Rate
More than three work days but not more than	Weekly Rate

fifteen work days	
More than fifteen work days	Monthly Rate

The pro rata portion which one-hour bears to the applicable rate shall be determined in accordance with the following formula:

Hourly rate based on daily rental	1/8 of Daily Rental from Blue Book
Hourly rate based on weekly rental	1/40 of Weekly Rental from Blue Book
Hourly rate based on monthly rental	1/176 of Monthly Rental from Blue Book

The rental rate shall be multiplied by the applicable regional adjustment factor shown for such item of tool, equipment or construction aid in the Blue Book. The adjustment factor shall not apply to the hourly operating cost.

If Phoenix Constructor JV (or Authority Engineer) should determine that the nature, number of pieces or size of the tool, equipment or construction aid used by the Subcontractor in connection with the Work is more pieces, or larger or more elaborate, as the case may be, than the size or nature of the minimum equipment determined by the Phoenix Constructors JV (or Authority Engineer) to be suitable for the Work, the reasonable rental will not be based upon the toot, equipment or construction aid used by the Subcontractor but will be based on the smallest quantity or smallest or least elaborate tool equipment or construction aid determined by the Phoenix Constructors JV (or Authority Engineer) to have been suitable for the performance of the work.

There will be added to the rental as computed above (a) the reasonable cost of transporting such tool, equipment or construction aid to and from the construction site, (b) with respect to Work performed in New Jersey, the taxes on the rental actually paid by the Subcontractor or lower tier subcontractor and (c) notwithstanding the number of hours during which such of tool, equipment or construction aid is utilized, the minimum rental therefore will be for a period of eight hours.

Notwithstanding anything to the contrary contained to the contrary contained in this numbered clause, the Phoenix Constructors JV and Authority shall not be liable for any amount attributable to the rental of non-powered hand tools.

3.4.2 For equipment which is specifically mobilized to the jobsite for extra work, Subcontractor shall separately identify such transportation costs (including: loading, off-loading, assembly and disassembly) when submitting proposals to Phoenix Constructors JV for performing extra work. Transportation costs shall not be applicable to equipment already mobilized on the site.

3.4.3 When Subcontractor's equipment does not resemble the equipment having rental rates listed in Rate Schedule "B" for extra work, the rental rate shall be negotiated and agreed upon in writing by Phoenix Constructors JV.

3.4.4 Compensation to Subcontractor for equipment used for extra work which is rented from third parties and does not resemble the equipment having rental rates listed in the "Rental Rate Blue Book" must be approved by Phoenix Constructors JV in writing prior to rental and shall be at actual cost to Subcontractor, delivered to project site, as substantiated by invoices certified paid or by such documentation as may be required by Phoenix Constructors JV plus a mark-up, for all profit and overhead expense of Subcontractor thereon, of not to exceed 10%.

3.5 Time Sheets

3.5.1 For all work performed on a cost-reimbursable basis, Subcontractor shall submit daily time sheets for approval by Phoenix Constructors JV. An approved copy of the time sheets, which shall detail all hours worked, materials installed and equipment used, must be submitted in support of Subcontractor's monthly billing.

4.0 Rate Schedules

4.1 Rate Schedule "A" – All Inclusive Labor Rates

4.2 Rate Schedule "B" – Equipment Rental Rates

4.3 Rate Schedule "C" – List of SubSubcontractors

RATE SCHEDULE "A"

ALL INCLUSIVE LABOR RATES

NOTES

1. VACATION: Includes vacations, statutory holidays, sick and other leave with pay.
2. ALLOWANCES: Includes workers compensation, unemployment insurance, and other taxes and insurance's measured by payroll, established employee benefits such as pension, health and life insurance's, bonus programs (excluding profit sharing), union assessments (if any), training funds, and industry and administration funds.
3. OVERHEAD AND PROFIT: Calculated on the base rate, overhead includes all home office and jobsite supervision above the level of general foreman and other non-manual personnel costs and all temporary, construction facilities shall not exceed 10%.
4. ALL INCLUSIVE RATE: Based on ____ **(To be completed in by Offerer)** hours per week ____ **(To be completed in by Offerer)** hours per day, ____ **(To be completed in by Offerer)** days per week.
5. TRAVEL ALLOWANCE: N/A
6. OVERTIME: The overtime rate per hour shall be limited to the actual cost to Subcontractor of the premium portion only of all applicable wages, craft fringe benefits and payroll burdens imposed by any governmental authority and measured by the compensation payable to employees. To establish the amount of payment, Subcontractor shall submit supporting documents satisfactory in form and content to Contractor for its verification and approval. If only one overtime rate is shown, it shall be applicable for all overtime hours.
7. LABOR RATES entered in the above schedule shall be based on labor agreements, if any, and rates in effect on the Proposal closing date, unless otherwise noted. The quoted labor rates may be adjusted as approved by Contractor to reflect subsequent changes in labor agreements or rates if applicable.
8. No Charges will be accepted by Contractor for labor not listed in Rate Schedule "A".
9. Labor rates for stand-by time when specifically ordered by Contractor shall be at _____% **(To be completed in by Offerer)** inclusive rates in this Rate Schedule "A" less the profit portion thereof.
10. Subcontractor shall not invoice for field support/supervisory personnel assigned to a change in the Scope of Work if the change does not extend the time such personnel are required on site by the original Scope of Work.

RATE SCHEDULE "A"

ALL INCLUSIVE LABOR RATES

TRADE OR CLASSIFICATION	BASE RATE	VACATION	ALLOWANCES		SUBTOTAL (1)	CALCULATED ON BASE RATE OVERHEAD & PROFIT at 10%		ALL-INCLUSIVE RATE (HR) (1)+(2)+(3)	TRAVEL ALLOWANCE (DAY)	OVERTIME RATE (HR)
Iron Worker-Journey Man										
Foreman - Iron Worker. Journey Man										
Crane Operator										
Oiler										
Welder										
Draftsman										
Shop Fabrication labor										
Dock Builder – Journey Men										
Foremen – Dock Builder Journey Men										
Carpenter										
Carpenter Foreman										
Mason										
Mason Foreman										

Lather										
Lather Foreman										

RATE SCHEDULE "B"

EQUIPMENT RENTAL RATE

NOTES

1. Rate Schedule "B" identifies all Subcontractor owned and rented equipment (excluding non powered hand tools) that may be used by Subcontractor in performance of the Work.
2. Rate Schedule "B" shall be calculated in accordance to Exhibit 2A clause 3.4.1.
3. Subcontractor shall, prior to rental of any equipment for changes in the scope, submit a stated value for the equipment being rented.
4. No payment shall be made for equipment which is not operating because it is broken down or undergoing repair, maintenance or overhaul.

RATE SCHEDULE "B"

EQUIPMENT RENTAL RATES

FOR EQUIPMENT, INCLUDING VEHICLES, THAT ARE REQUIRED IN THE PERFORMANCE OF THE WORK.

RATES

DESCRIPTION MAKE ANDMODEL	HOURLY	DAILY	WEEKLY	MONTHLY	STANDBY

RATE SCHEDULE "C"

LIST OF SUBSUBCONTRACTORS

The following is a detailed list of the subSubcontractors proposed for the Work.

Once Contractor has given its non-objection the subSubcontractors listed below shall not be changed except with Contractor's written approval.

SubSubcontractor	Description of Work	Union or Trade Affiliation, if any

1.0 Percentage of Work performed by Subcontractor's own forces: ____ **(To be completed by Offerer)**

2.0 Percentage of Work performed by subSubcontractors: ____ **(To be completed by Offerer)**

3.0 Contractor reserves the right to request financial information and work experience histories of the proposed subSubcontractors.

END OF EXHIBIT 2

ATTACHMENT B - SUBCONTRACT PROCUREMENT PROCESS

It is expected that Package 20 subcontracts will be the largest value subcontracts issued on this project. Due to the large nature of these subcontracts, time permitting, the RFP Process is to be broken down into two phases. The proposals submitted by subcontractors and vendors during both of these phases will be evaluated using the attached evaluation forms (Attachment B.1) on the following pages.

The First Phase is prequalification and the acknowledgement of receiving the RFP documents and intent to submit a proposal. Due to the size and nature of different specialty trade requirements, bidders are permitted to select their team of subcontractors or form a Joint Venture consortium to bid the complete RFP or Tasks as described in the Scope of Work and RFP Pricing Breakdown. The bidders are required to identify their team of subcontractors, affiliates and Joint Venture partners, their specialty and roles in submitting the proposal.

The First Phase Requirements / Submittals:

a. Joint Venture Partners / Trade Subcontractors
b. Pre-Qualifications / Representations and Certifications
c. Financial Statements
d. Bonding Capacity
e. Technical Qualifications
f. Similar Type of Work Completed
g. Resumes of the Key Personnel

Once the acknowledgement and intent to submit a proposal is received, PANYNJ / Phoenix will review the information and qualifications of the Subcontractors / Joint Venture partners and will select the pre-qualified bidders for the Second Phase of the RFP submittal process. The selected contractors/teams will be invited for the Mandatory Pre-bid Meeting and Site Walk in order to submit their proposals.

The Second Phase Requirements / Submittals:

a. Mandatory Pre Bid Participation
b. Technical Proposal Submittal (including schedule)
c. Commercial Proposal Submittal
d. Technical and Management Plan
c. Bid Bond

Once both phases of the proposal process are complete, Phoenix Constructors will award subcontracts on a best-value basis at the sole discretion of Phoenix Constructors, using FAR compliant procedures. It should also be noted Phoenix Constructors will require Payment and Performance Bonds for all major procurements, and may require Bid Bonds for other major procurements.

Date: _____ Contract Admin: _____

Package: _____ Contract Name: _____

Company: _____ Contract Number: _____

Pre-Qualification Evaluation Form

CRITERIA
Company History, Experience, References
Comments:
Company Certifications
Comments:
Financial Records, Balance Sheet, Assets, Income
Comments:
Management Team, Resumes of Key Personnel
Comments:
Shop Staff, Average Shifts, Productivity, Backlog
Comments:
Bonding and Insurance Capacities
Comments:
Safety Records (Recordable Incident Rates, Lost Work Day Rates, Experience Modification Rating)
Comments:
Quality Control Plan and Management
Comments:

Overall Comments:

Contract Administrator:

Print: _____ Sign: _____ Date: _____

Project Manager

Print: _____ Sign: _____ Date: _____

Date: _____ Contract Admin: _____

Package: _____ Contract Name: _____

Company: _____ Contract Number: _____

Technical Proposal Evaluation Form

CRITERIA
Technical and Management Approach
Comments:
Management of Erection, Connection Engineering, Detailing Components
Comments:
Cranes, Equipment, Site Logistics
Comments:
Ability to Meet Schedule
Comments:
Exceptions or Qualifications
Comments:

Commercial Proposal Evaluation Form

CRITERIA
Proposed Price
Comments:

Overall Comments:

Contract Administrator:

Print: _____ Sign: _____ Date: _____

Project Manager

Print: _____ Sign: _____ Date: _____

ATTACHMENT C - STRUCTURAL STEEL PROCUREMENT

Phoenix Constructors JV (PCJV) recommends procuring the WP20 Steel as an RFP to Furnish, Fabricate, & Erect the Structural Steel, Intumescent/Paint Coating, Metal Deck, & Precast Concrete Work. The RFP would divide WP20 into three "Work Areas":

A. **Work Area 1** – PATH Station,
Approximately 10,500 US tons of steel

B. **Work Area 2** – 1-Line Subway Box (Greenwich Street Corridor),
Approximately 8,000 US tons of steel

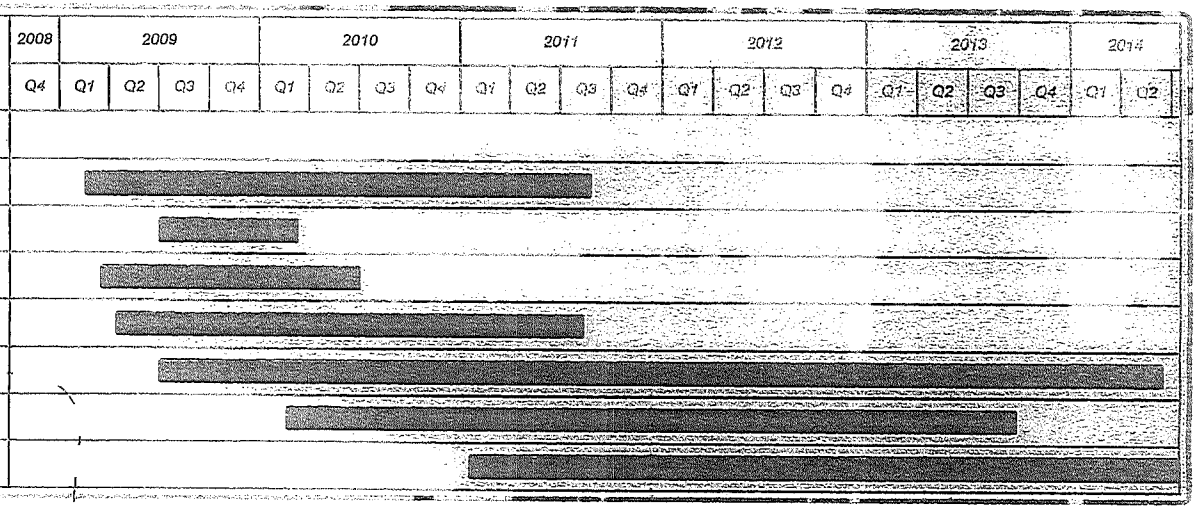
C. **Work Area 3** – Transit Hall,
Approximately 3,500 US tons of steel.

The bidders ~~would have the option to~~ submit proposals to perform all of the work (A + B + C)~~, or to perform the work associated with only Work Area 1 (A only), or to perform the work associated with Work Areas 2 and 3 (B + C).~~ Due to the complexity and magnitude of the steel work, PCJV envisions that a large, sophisticated steel fabricator or erector would act as the Prime Subcontractor for the work. The Prime Subcontractor would form a team of other subcontractors, as required to address each aspect of the work, e.g. fabricator(s) to furnish the Calatrava exposed steel, fabricator(s) to furnish the standard steel sections, fabricator(s) to furnish the built-up steel sections, a precast concrete fabricator, a supplier/applicator for the intumescent coating and other paint, erector(s) to erect the different types of steel, metal deck and precast concrete.

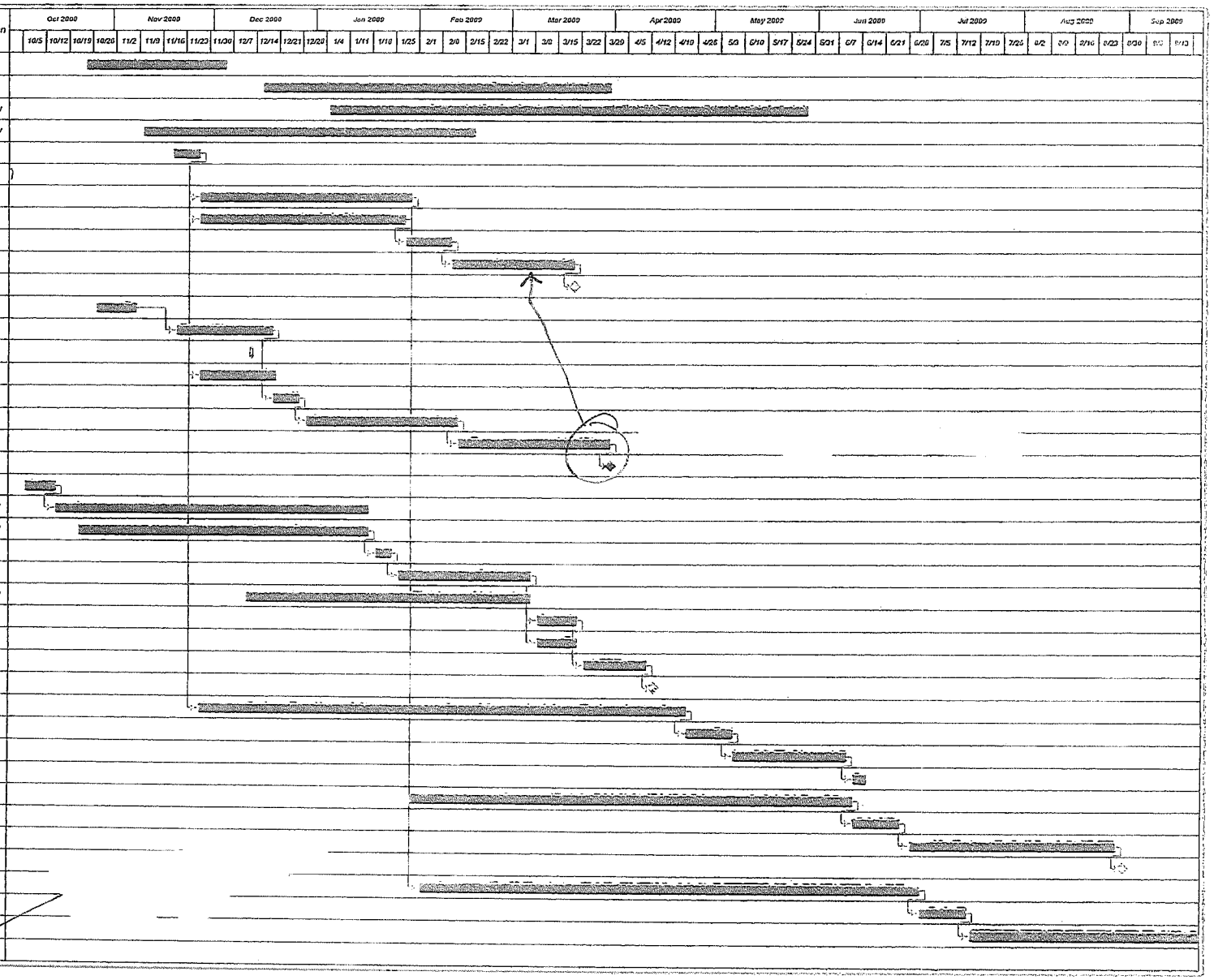
The procurement of this package would be executed as a two-phase RFP. Phase I of the RFP would be a pre-qualification phase for the bidders. The Prime Subcontractor would submit information about their company and their team members' companies. The required pre-qualification information for *each* of the proposed team members would include:

- Identification of Team Members
  - Fabricator(s) of Calatrava Exposed Steel
  - Fabricator(s) of Standard Steel Sections
  - Fabricator(s) of Built-up Steel Sections
  - Fabricator(s) of Precast Concrete Members
  - Erector(s) of Calatrava Exposed Steel
  - Erector(s) of Standard Steel Sections
  - Erector(s) of Built-up Steel Sections
  - Erector(s) of Precast Concrete Members
  - Supplier / Installer(s) of Metal Deck
  - Supplier / Applicator(s) of Intumescent and Paint Coatings
- Exhibits 30A & 30B (Representations & Certifications and Subcontractor Survey and Resource Questionnaire)
- Bonding capacity information
- Financial information
- Technical qualifications (shop certifications, etc.)
- Project references
- Fabrication shop information (i.e. capacity, backlog, number of employees)
- Quality Control / Quality Assurance management and procedures

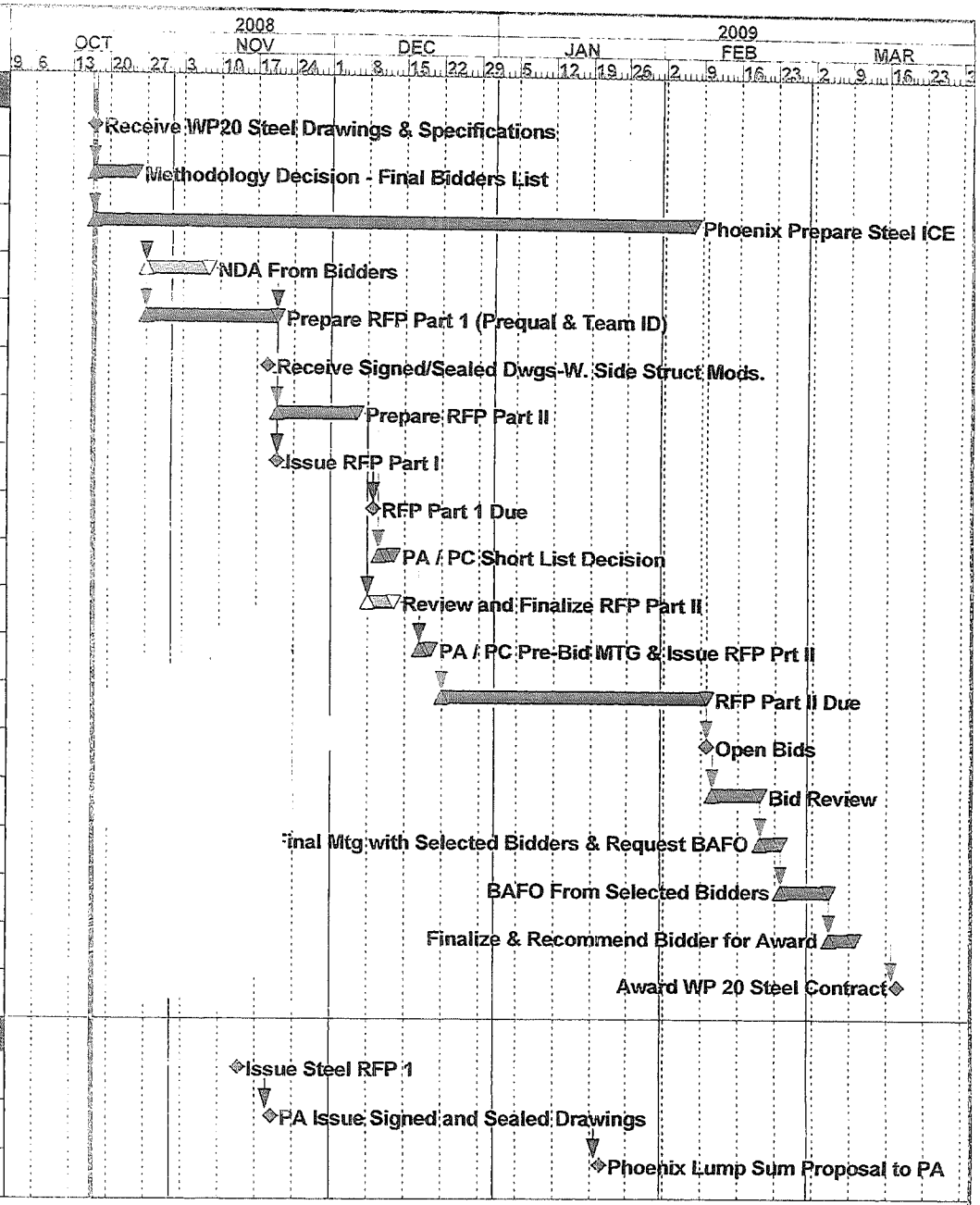
ID	WP 20 Package Strategy	Start	Finish
1	Support Memorial Roof package:	10/3/2008	10/3/2008
2	* Memorial roof	2/16/2009	8/25/2011
3	* Transit Hall, Found. & trestle	7/1/2009	3/11/2010
4	* Furnish/Fabricate/erect steel package	3/16/2009	7/2/2010
5	Greenwich Street package	4/13/2009	8/12/2011
6	MEP, site wide package	7/1/2009	6/16/2014
7	Transit Hall, Package Remainder work	2/19/2010	9/26/2013
8	Path station, Package Remainder work	1/19/2011	8/18/2015



ID	WP 20 Estimating Plan	Start	Finish	Duration
1	Planning level 1 (Framework)	10/24/2008	12/4/2008	6w
2	level 2 (Logical seq.)	12/16/2008	3/30/2009	15w
3	level 3 (Detailed)	1/5/2009	5/28/2009	20.8w
4	Means & method	11/10/2008	2/17/2009	14.4w
5	WP 20, Final Dwg received	11/19/2008	11/26/2008	1.2w
6	Support of Memorial opening Project estimate:	10/1/2008	10/1/2008	.2w
7	Steel ICE estimate	11/27/2008	1/29/2009	9.2w
8	Estimate	11/27/2008	1/27/2009	8.8w
9	Internal risk review	1/28/2009	2/10/2009	2w
10	Negotiations	2/11/2009	3/19/2009	5.4w
11	Award	3/20/2009	3/20/2009	0w
12	Steel procurement, Bidders list	10/27/2008	11/7/2008	2w
13	Pre-qualification period	11/20/2008	12/18/2008	4.2w
14	Pre-bid meeting	12/12/2008	12/12/2008	.2w
15	Drawing preparation	11/27/2008	12/19/2008	3.4w
16	RFP submission	12/19/2008	12/26/2008	1.2w
17	Bid period	12/29/2008	2/12/2009	6.8w
18	Bid review	2/13/2009	3/30/2009	6.4w
19	Steel mill orders	3/31/2009	3/31/2009	0w
20	Greenwich corridor, prel. drawings:	10/6/2008	10/14/2008	1.4w
21	Old/new work planning:	10/15/2008	1/16/2009	13.6w
22	Engineering coordination	10/22/2008	1/16/2009	12.6w
23	Final dwg	1/19/2009	1/23/2009	1w
24	Estimate	1/26/2009	3/6/2009	6w
25	Align 4B/4C/20	12/11/2008	3/6/2009	12.4w
26	Proposal	3/9/2009	3/20/2009	2w
27	Internal risk review	3/9/2009	3/20/2009	2w
28	Negotiation	3/23/2009	4/10/2009	3w
29	Award	4/13/2009	4/13/2009	0w
30	MEP estimate	11/27/2008	4/22/2009	21w
31	Risk review	4/23/2009	5/6/2009	2w
32	Negotiation	5/7/2009	6/9/2009	4.8w
33	Award	6/12/2009	6/15/2009	.4w
34	Transit Hall remaining, LS estimate	1/30/2009	6/11/2009	19w
35	Risk review	6/12/2009	6/25/2009	2w
36	negotiation	6/29/2009	8/28/2009	9w
37	Award	8/31/2009	8/31/2009	0w
38	Path remaining, LS estimate	2/2/2009	7/1/2009	21.6w
39	Risk review	7/2/2009	7/15/2009	2w
40	Negotiation	7/17/2009	9/30/2009	10.8w
41	Award	10/1/2009	10/1/2009	0w



Activity ID	Activity Description	Orig Dur	Early Start	Early Finish
PHOENIX CONSTRUCTORS				
SN1000	Receive WP20 Steel Drawings & Specifications	0	17OCT08	
SN1010	Methodology Decision - Final Bidders List	6	17OCT08	24OCT08
SN1080	Phoenix Prepare Steel ICE	75	17OCT08	06FEB09
SN1020	NDA From Bidders	10	27OCT08	07NOV08
SN1130	Prepare RFP Part 1 (Prequal & Team ID)	19	27OCT08	20NOV08
SN1040	Receive Signed/Sealed Dwgs-W. Side Struct Mods.	0	19NOV08*	
SN1030	Prepare RFP Part II	9	21NOV08	05DEC08
SN1140	Issue RFP Part I	0	21NOV08	
SN1050	RFP Part 1 Due	0	09DEC08	
SN1060	PA / PC Short List Decision	3	10DEC08	12DEC08
SN1150	Review and Finalize RFP Part II	5	08DEC08	12DEC08
SN1070	PA / PC Pre-Bid MTG & Issue RFP Prt II	2	18DEC08	19DEC08
SN1090	RFP Part II Due	32	22DEC08	09FEB09
SN1100	Open Bids	0	10FEB09	
SN1160	Bid Review	6	11FEB09	19FEB09
SN1170	Final Mtg with Selected Bidders & Request BAFO	2	20FEB09	23FEB09
SN1180	BAFO From Selected Bidders	7	24FEB09	04MAR09
SN1190	Finalize & Recommend Bidder for Award	3	05MAR09	09MAR09
SN1200	Award WP 20 Steel Contract	0		17MAR09
PA NY&NJ - Per WP 20 Letter Dated 10 - 17- 08				
SN170	Issue Steel RFP 1	0	14NOV08*	
SN180	PA Issue Signed and Sealed Drawings	0		19NOV08
SN190	Phoenix Lump Sum Proposal to PA	0		20JAN09



Start Date	24JAN06	0108
Data Date	17OCT08	
Run Date	05NOV08 11:26	

© Primavera Systems, Inc.

WTC TRANSPORTATION HUB
Preliminary Schedule
Package 20 - Steel Procurement

phoenix constructors JV

ATTACHMENT D - SUBCONTRACT PROCUREMENT PLANS

Trade:
Structural Steel

Approximate Budget:
$300,000,000.00

Potential Bidders:

DCM Erectors, W&W Steel, American Bridge, Owen Steel, Canam Steel, Schuff Steel, High Steel Structures, Koch Skanska, Cornell and Co.

History:

A large portion of steel installation work on this project thus far has been self-performed by Phoenix Constructors by the subsidiary company Skanska Mechanical and Structural. However, with the intricacies involved in the Calatrava design and the magnitude of work involved, it is essential to subcontract with a separate Structural Steel firm to perform the Furnishing, Fabrication, and Erection of this unique steel, just as it was with Work Package 8, East-West Connector, which was our first work which involved permanent, exposed Calatrava steel.

WP#	Work	Subcontractor	Value	Also Bid
6A	Structural Steel Erection	Skanska Mechanical	$2,465,000.00	Hellmark Steel
6A	Structural Steel Fabrication	Cives	$3,017,000.00	Hellmark Steel
8	Structural Steel Erection	DCM Erectors	$3,900,000.00	Cornell and Co.
8	Structural Steel Fabrication	EMESA	$5,375,130.00	Ingemetal, Augescon, Newport Industrial

Procurement Plan:
Phoenix Constructors JV (PCJV) recommends procuring the WP20 Steel as an RFP to Furnish, Fabricate, & Erect the Structural Steel, Intumescent/Paint Coating, Metal Deck, & Precast Concrete Work. The RFP would divide WP20 into three "Work Areas":

A. **Work Area 1** – PATH Station,
Approximately 10,500 US tons of steel
B. **Work Area 2** – 1-Line Subway Box (Greenwich Street Corridor),
Approximately 8,000 US tons of steel
C. **Work Area 3** – Transit Hall,
Approximately 3,500 US tons of steel.

The bidders would have the option to submit proposals to perform all of the work (A + B + C), or to perform the work associated with only ~~Work Area 1 (A only)~~; or to perform the work associated with ~~Work Areas 2 and 3 (B~~ + C). Due to the complexity and magnitude of the steel work, PCJV envisions that a large, sophisticated steel fabricator or erector would act as the Prime Subcontractor for the work. The Prime Subcontractor would form a team of other subcontractors, as required to address each aspect of the work, e.g. fabricator(s) to furnish the Calatrava exposed steel, fabricator(s) to furnish the standard steel sections, fabricator(s) to furnish the built-up steel sections, a precast concrete fabricator, a supplier/applicator for the intumescent coating and other paint, erector(s) to erect the different types of steel, metal deck and precast concrete.

Trade:
Electrical

Approximate Budget:
$200,000,000.00

Potential Bidders:
Kleinberg Electric, Five Star Electric, Smalls Electrical, Egg Electric, Welsbach Electric, Mass Electric, KND Contracting, E-J Electric, Gilson Electric, Adco Electrical, Community Electric, Fervant Electrical, Hellman Electric, JCF Electric, Danco Electrical, Fred Geller Electrical, GMA Electric, Hugh O-Kane Electric, Lowy & Donnath Inc, Michael Mazzeo Electric, Tech Contracting, Unity Electric, Volpe Electrical, Wade Electric, Zwicker Electric, AM Electric

History:
Due to the nature of the project, most of the electrical subcontracts awarded thus far have been for relocation and/or demolition work. The largest contract so far was awarded to Five Star Electrical for Work Package 6B, North Temporary Access, for $15M. All electrical subcontractors have performed well on this project, with no outstanding issues.

WP#	Work	Subcontractor	Value	Also Bid
0	Temp Power	Smalls	$283,000.00	Kleinberg, Egg, JB, Hellman
4A	East Basement Prep	E-J Electric	$191,700.00	Verde, Hellman, Hawkeye, Five Star, DL Blaine, Kleinberg
4B	East Bathtub	Egg Electric	$1,325,660.00	Five Star, Kleinberg, KND, Gilston
4B.1	Temporary Station	Egg Electric	$150,000.00	Sole Source
4C	Temp Station Demo	Five Star	$47,000.00	Gilston, Smalls, Kleinberg
5A	Platform D	Kleinberg	$190,000.00	Verde, Hellman, Hawkeye, Five Star, DL Blaine, E-J
5B	Ductbank Relocation	E-J Electric	$4,188,900.00	Egg, Kleinberg
6B	North Temp Access	Five Star	$15,390,000.00	Gilson, Mass, Kleinberg, E-J
8	East West Connector	Five Star	$97,000.00	Angel Electrical, Gilston, Five Star, Kleinberg, Egg, Kanta Electric
9	Underpinning	Egg Electric	$136,140.00	Kleinberg, Smalls, Welsbach
9	Weekend Support	Kleinberg	$136,200.00	Five Star, Egg, Welsbach, KND
9	Rail Relocation	Egg Electric	$250,400.00	Kleinberg, Welsbach
9	PATH Mezz	Kleinberg	$130,000.00	Five Star, JCF, JB, Egg
10.2	South Mezzanine	Egg Electric	$34,840.00	Kleinberg, Five Star, Smalls, JB, Fervant
18A	Route 9A MPT	Hellman	$396,000.00	None
21-10.3	South Mezzanine	Five Star	$1,243,310.00	Egg, Gilston, Kleinberg

Procurement Plan:
At this time Phoenix intends to divide the Electrical work into five distinct portions

1) Temporary Power and Distribution Services
2) High Voltage - Gear and Connections to ConEd
3) Power and Grounding
4) Systems and Controls
5) Lighting

Trade:
Mechanical/HVAC

Approximate Budget:
$200,000,000.00

Potential Bidders:

ASM Mechanical, Comfort Air HVAC, Durr Mechanical, Megrant Corp, United Air Conditioning, Grand Mechanical, Taggart Associates, TM&M Mechanical, A&A Industrial Piping, US Mechanical, Crescent Contracting, Heritage Mechanical, Dart Mechanical, F&G Mechanical, Fresh Meadows Mechanical, FW Sims, GDO Contracting, Henick-Lane Inc, JDP Mechanical, KSW Mechanical, Martin Associates, Nelson Air Device, Orion Mechanical, Sound Refrigeration, Surren Corp, Tri-State Mechanical, W.H. Peepels, WDF Inc, P.J. Mechanical, Blue Diamond, Bonland Industries, Center Sheet Metal, Building Technologies Corp, Carrier Corp, Control Solutions Group, Johnson Controls, Siemens Building Technologies, TEC Systems, Marietta Automated Systems, Integrated Systems and Services, TAC

History:

Due to the nature of the project thus far, there has been little need for Mechanical and HVAC work. Only in the case of new structures being constructed has there been a need for Mechanical and HVAC subcontracts such as for the North Temporary Access and the South Mezzanine.

WP#	Work	Subcontractor	Value	Also Bid
4B	East Bathtub	Grand Mech.	$83,800.00	None
6B	North Temp Access	Grand Mech.	$1,311,609.00	United AC, Heritage, A&A
21-10.3	South Mezzanine	Crescent Contr.	$1,243,310.00	FW Sims, Grand

Procurement Plan:

At this time Phoenix intends to award the Fire Protection work to five subcontractors:

1) Air HVAC East
2) Air HVAC West
3) Water HVAC East
4) Water HVAC West
5) Building Management System and Control

As with all other Work Package 20, Pheonix intends to use the two phase procurement plan as discussed in Attachment B. It is the opinion of Phoenix Constructors that all interested companies should be made aware of the procurement and be allowed to submit a first phase pre-qualification proposal, regardless of their size. While larger companies are more suited to handle a subcontract of this size, we believe that giving smaller firms the opportunity to review drawings and possibly form Joint Ventures with other firms, this would allow for added competition and cost savings. The two phase proposal process would also ensure that unqualified firms would not be allowed to submit a final proposal and tamper with the legitimacy of the procurement.

Schedule:

ATTACHMENT E - PRELIMINARY BIDDERS LISTS FOR SUBCONTRACT WORK

STRUCTURAL STEEL (PRIME BIDDERS):

DCM Erectors, Inc.
110 East 42nd Street
New York, NY 10017
Attn: Jeff Gannett, Barry King
Phone: (212) 599-1603
Fax: (212) 599-1615

W&W Steel, LLC.
1730 West Reno
Oklahoma City, Oklahoma 73106
Attn: Charles Dougherty, Mgr. Eastern Region
Phone: (405) 235-3621
Fax: (405) 236-4842

American Bridge.
1000 American Bridge Way
Coraopolis, PA 15108
Attn: Lanny Frisco
Phone: 412-631-1000
Fax: 412-631-200

Owen Steel Co, Inc.
727- Mauney Drive
Columbia, SC 29201
Attn: Mike Cooke, Jack Berdett
Phone: (803) 251-7680
Fax: (803) 251-7613

Canam Steel.
4010 Clay Street, P.O. Box 285
Point of Rocks, MD 21777
Attn: Peter Frantz
Phone: (301) 874-5141
Fax: (301) 874-5685

Schuff Steel – Gulf Coast Inc.
14500 Smith Road
Humble. TX 77396
Attn: Steve Knippel, President
Phone: (281) 441-5401

High Steel Structures, Inc.
1915 Old Philadelphia Pike
P.O. Box 10008
Lancaster, PA 17605-0008
Attn: Steve Bussanmas
Phone: (717) 390-4270
Fax: (717) 399-4102

Koch Skanska, Inc.
400 Roosevelt Ave.
Carteret, NJ 07008
Attn: Joe Dudek / Stephan Isaacson
Phone: (732) 969-1700
Fax: (732) 969-0197

Cornell & Company.
244 Cornell Lane
Westville, NJ 08098
Attn: Marian Craig
Phone: (856) 742-1900
Fax: (856) 349-1723

STRUCTURAL STEEL FIRMS THAT WILL BE RECOMMENDED TO THE PRIME BIDDERS FOR THE FURNISH AND FABRICATION OF CALATRAVA EXPOSED STEEL:

FCC Construccion, S.A.
Avda. General Perón, 36
28020 MADRID, SPAIN
Attn: Pedro Gómez, Francisco Esteban, Alberto de Pablos
Phone: 34 91 514 10 00

URSSA
Campo de los Palacios, 18 (Apdo.284)
E-01006 VITORIA-GASTEIZ, Spain
Attn: Pedro Barinaga, José Maria Lagos
Phone: 34 945 158 510
Fax: 34 945 158 513

Horta Coslada S.L.
C/. del Corral, s/n – Pol.Alcamar,
28816 Camarma de Esteruelas
MADRID, Spain
Attn: Jesús Otero Vázquez, Alejandro Otero Gutiérrez
Phone: 34 91 886 59 70

Augescon
La Rozona, 38 – Los Campos
33416 CORVERA DE ASTURIAS

PROPOSAL INVITATION LETTER

November 21, 2008

DCM Erectors, Inc.
110 East 42nd Street
New York, NY 10017

Attention: Mr. Larry Davis

Reference: Phoenix Constructors, JV
Request for Proposal (RFP) No.: W0TC-GC1-2-KN00186-020
Structural Steel, Intumescent Fire Resistant Coating, Metal Deck & Precast Concrete Work

Phoenix Constructors, JV is pleased to invite you to submit a competitive proposal for Work Package No. 20 "Station Construction and Transit Hall-Structure to Grade" – Structural Steel, Intumescent Fire Resistant Coating, Metal Deck & Precast Concrete Work for the Port Authority of New York and New Jersey WTC Transportation HUB Project located in New York City.

1. Work Package # 20 consists of three distinct Work Areas, identified as:

A. **Work Area 1 – Path Station**

B. **Work Area 2 – 1 Line Subway Box (Greenwich Street Corridor)**

C. **Work Area 3 – Transit Hall**

1.1 **Under this Work Package Subcontractors will have the option to submit their stand alone proposals, inclusive of all Costs and obligations for the following scope of work:**

A. **Furnish, Fabricate and Erect Structural Steel, Intumescent Fire Resistant Coating, Metal Deck & Precast Concrete Work applicable to all Work Areas 1 + 2 + 3 (Combined Proposal).**

B. ~~**Furnish, Fabricate and Erect Structural Steel, Intumescent Fire Resistant Coating, Metal Deck & Precast Concrete Work applicable to Work Area 1 only.**~~

C. ~~**Furnish, Fabricate and Erect Structural Steel, Intumescent Fire Resistant Coating, Metal Deck & Precast Concrete Work applicable to Work Areas 2 + 3 (Combined Proposal).**~~

In preparing your proposal, it is essential that requirements of the enclosed Request for Proposal are adhered to.

This invitation to bid comprises two steps.

1) The 1st Step begin with and the acknowledgement of receiving the bid documents and intent to submit a bid and ends with Pre-Qualification and shortlisting. Due to the size and nature of different specialty trade requirements, bidders are permitted to select their team of subcontractors or form a Joint Venture consortium to bid the RFP. There will be a MANDATORY Pre-Bid meeting on Tuesday 12/16/2008 thru Wednesday 12/17/2008.

   Other stipulations as stated in the attached "Instruction to Bidders, "Exhibit 1 Scope of Work" and "Exhibit 2A Subcontractors Pricing and Invoicing Instructions". The bidders are required to indentify their team of subcontractors, affiliates and Joint Venture partners, their specialty and roles in submitting the bid proposal "RFP-1st Step Submittal / Intention to Submit Bid Proposal" by 12/09/ 2008, indentifying interest in: a) **Work** Areas 1+2+3 Combined Proposal. ~~b) Work Area 1 Stand Alone Proposal, c) Work Area 2+3 Combined Stand Alone Proposal. The Bidder has the choise to submit any or all proposals at their discretion.~~

The 1st Step Requirements / Submittals

a. Intention to submit proposals for :

   I. **Structural Steel, Intumescent Fire Resistant Coating, Metal Deck & Precast Concrete, Work Areas 1+2+3 Combined.**

   II. ~~**Structural Steel, Intumescent Fire Resistant Coating, Metal Deck & Precast Concrete, Work Area 1 Only**~~

   III. ~~**Structural Steel, Intumescent Fire Resistant Coating, Metal Deck & Precast Concrete, Work Areas 2+3 Combined.**~~

b. Identification of Prime Subcontractor

c. Identification of Joint Venture Partners

d. Identification of Steel Fabricators for "Calatrava Exposed Steel"

e. Identification of Steel Fabricators for "Standard Profile and Built Up Sections"

f. Identification of Steel Fabricators for 1-Line Steel

g. Identification of Steel Erectors for "Calatrava Exposed Steel"

h. Steel Erectors for "Standard Profile and Built Up Sections"

i. Steel Erectors for 1-Line Steel

j. AISC - Steel Fabrication Shop Certification

k. AISC - Steel Erection Certification

l. Identification of Intumescent Fire Resistant Coating Manufacture/ Supplier

m. Identification of Intumescent Fire Resistant Coating Applicator

n. Identification of Precast Concrete Fabricator

o. Identification of Precast Concrete Erector

p. Pre-qualifications - Joint Venture Partners (Exhibit 30A & 30B)

q. Financials - Joint Venture Partners

r. Bonding Capacity - Joint Venture Partners

s. Technical Qualifications - Joint Venture Partners

t. Similar Type of Work Completed - Joint Venture Partners

u. Resume of the Key Personnel – Joint Venture Partners

v. Current Backlog

2. Once the acknowledgement and intent to submit a bid is received, Phoenix will review the information and qualifications of the Subcontractors /Joint Venture partners and will shortlist the teams for the 2nd Step of the RFP submittal process. The selected contractors/teams will be invited for the step 2 **Mandatory Pre-Bid Meeting** and Site Walk Through in order to submit their bid proposal.

The 2nd Step Requirements / Submittals

a. Mandatory Pre-Bid Meeting Participation

b. **Bid Bond:** Phoenix Constructors JV requires that each bidder provide a bid guarantee equivalent to a minimum of **two and one half percent (2 1/2%)** of the bid price with their Bid Proposal. The "bid guarantee" shall consist of a firm commitment such as a bond, certified check, or other negotiable instrument accompanying the bid, as assurance that the bidder will, upon acceptance of his bid, execute such contractual document as may be required within the time specified.

c. Technical Proposal Submittal

d. Commercial Proposal Submittal

e. Method Statement Submittal

3. There will be a Pre-Proposal Meeting and Site Walk-Through for **The Selected Bidders** as stated above on **Tuesday 12/16/2008 thru Wednesday 12/17/2008, 8:00 AM EDT**, at the Phoenix Constructors Offices at 115 Broadway, 18th Floor. Subcontractors are limited to six (6) participants and are reminded to have safety vests, safety glasses, boots, and hard hats for their own use. Subcontractors will not be allowed to participate on the site-walk without proper safety gear.

4. For the purposes of general information, the preliminary Structural Steel quantities for this work package are in excess of 18,000 US Tons, of which approximately 50% of the steel is classified as "Calatrava exposed Steel and the remaining 50% of the Steel is classified as "Standard Profile and Built-Up Sections," including 1-Line steel.

5. For the convenience of the bidder, attached is a List of Steel Fabricators familiar with "Calatrava Exposed Steel Structures" / for solicitation / consultation at the sole discretion of prime bidder. This list is provided for general information only.

All proposals MUST be SEALED and MUST clearly state on the outside of the package:

"SEALED PROPOSAL FOR RFP NUMBER: "W0TC-GC1-2-KN00186-020"
"CONTRACT TITLE: "STATION CONSTRUCTION AND TRANSIT HALL STRUCTURE TO GRADE - STRUCTURAL STEEL, INTUMESCENT FIRE RESISTANT COATING & PRECAST CONCRETE WORK" Work Areas 1+2+3 ~~Work Area 1 or Work Areas 2+3~~

All proposals for the **Step-One** RFP must be received at our address below on or before 12/09/ 2008 ~~at 5:00 PM, EDT~~, and will be opened only after that time.

All proposals for the **Step-Two** RFP must be received at our address below on or before **2/9/2009** ~~at 3:00 PM, EDT~~, and will be opened only after that time.

All Requests For Information (RFIs) shall be written via Letter, E-mail or Facsimile, and should be addressed to:

Phoenix Constructors, JV
115 Broadway, 18th Floor
New York, NY 10006

Attention: Javed Qureshi
e-mail:javed.qureshi@phoenixconstructors.com
Phone (646) 467-7219
Fax (212) 566-2302

All costs and expenses incurred by you in preparing your proposal will be borne solely by you. You will be informed whether or not your proposal has been successful. Our selection will be based on the "BEST VALUE" to Phoenix, The Port Authority, and The FTA. We reserve the right to reject any or all proposals. Further, we may award any part or phase of the Work to

any one or more of the bidders. Actual award of the Contract is contingent upon execution of formal documents satisfactory to both parties.

You are requested to sign the attached copy of this letter in the space provided below and return it to us as acknowledged receipt of this RFP and the enclosures referenced therein and as confirmation of your intention to submit a proposal by the closing date. Should you not wish to submit a proposal you are requested to return all Request for Proposal material.

It should be noted that Phoenix Constructors JV prohibits the participation of any of its respective affiliates in this solicitation process.

Very truly yours,

Javed I. Qureshi
Contract Administrator
Office 646-467-7219
Fax 212-566-2302
Cell 646-423-8317

Enclosures:

Receipt Acknowledged: _____
(please sign)

Name _____
(please print)

Title: _____

Date: _____

SCOPE OF WORK

1.0 INTRODUCTION / BACKGROUND

The purpose of this Statement of Work is to define the scope of the **Furnish, Fabricate and Erect Structural Steel, Intumescent Fire Resistant Coating, Metal Deck & Precast Concrete Work** to be performed as a component of the Station Construction and Transit Hall Structure to Grade, Work Package #20 Contract No: WTC-284.458 at the World Trade Center PATH Station Project.

Work Package #20 has been organized into three distinct Work Areas (WA) for the Subcontractor's consideration and pricing:

1. **Work Area 1 - PATH Station**
2. **Work Area 2 – 1 Line Subway Box** (Greenwich Street Corridor)
3. **Work Area 3 – Transit Hall**

1.1 A site visit and attendance at the pre-bid meeting are **mandatory** for the Subcontractor to see existing conditions and to completely understand the site logistics and access to the work area. The site visit / pre-bid meeting have been scheduled for ***Tuesday 12/16/2008 thru Wednesday 12/17/2008 at 8:00 AM by invitation only.*** *Bidder*s will meet at ***115 Broadway, 18th Floor*** and be escorted by Phoenix Constructors employees to the work site.

1.2 Security Requirements

The Subcontractor is advised that certain drawings and/or documents to be furnished to the Subcontractor for the purposes of preparing this bid ~~may be~~ marked "Confidential and Privileged." These drawings and/or documents are security stamped and traceable to the Subcontractor. They may not be scanned, copied, transmitted, or reproduced by any means or methods without express written consent of the Port Authority of New York and New Jersey (PANYNY). The Subcontractor is to appoint an Officer of the Company to administer and monitor the security of all Confidential and Privileged documents. This officer is subject to approval by the Owner, and may be required to participate in training relating to document security. All security plans remain the sole property of PANYNJ and are subject to audit and return on demand by PANYNJ. The

Subcontractor's Initials____

Company's Initials ____

2.1.3 All references in this Exhibit 1 Statement of Work to "Owner" or "Authority" shall mean the Port Authority of New York and New Jersey.

2.1.4 All references in this Exhibit 1 Statement of Work to the "Engineer" shall mean The Port Authority of New York & New Jersey.

2.1.5 All references in this Exhibit 1 Statement of Work to the "Architect" shall mean ~~Santiago Calatrava LLC~~, Downtown Design Partnership and The Port Authority of ~~New York & New~~ Jersey.

2.2 Subcontractor shall include all engineering, field measuring, detailed shop drawings, labor, equipment, materials, and each and every item of expense to perform the **Furnish, Fabricate and Erect Structural Steel, Intumescent Fire Resistant Coating, Metal Deck & Precast Concrete Work** in accordance with Work Package No. 20 - Station Construction and Transit Hall (Contract 284.458 GC) shown on the project drawings and specifications, including but not limited to the tasks described in Section 3.0.

2.3 Work shall be performed in accordance with the requirements of the contract drawings, specifications and exhibits listed in Section 4.0. Subcontractor is advised that the project will be constructed in and around an active railroad and an electrical substation.

2.4 The Subcontractor acknowledges having visited the job site to thoroughly familiarize himself with the **Work Areas** and all existing conditions. The Subcontractor shall field measure and survey all existing conditions as required.

2.5 Sufficient manpower shall be provided at all times to maintain progress of the Work. A shortage of labor in the industry shall not be accepted as an excuse for not properly manning the job.

2.6 The Subcontractor represents that he is familiar with and has expertise in the performance of the Work. Further, the Subcontractor is cognizant of, and agrees to, the project requirements for premium quality consistent with a first class building in accordance with the best practices of the trade.

2.7 The Subcontractor has examined the Drawings, Specifications, and Exhibits listed in Sections 4.3, 4.4 & 4.5 and shall identify all options and cost savings available to Phoenix Constructors JV and the Owner while providing the highest quality of work. Modifications made to conform to all

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2.11 The Subcontractor will protect existing construction while performing the Work. Any work performed by others that is damaged by the Subcontractor or its employees or agents shall be the responsibility of the Subcontractor to repair or replace at no additional cost to Phoenix Constructors JV, including adjacent work damaged due to the corrective work of the Subcontractor.

2.12 The Subcontractor shall maintain Superintendents or Foremen at the jobsite during any time in which its employees are working on the Project site.

2.13 **All deliveries of material shall be coordinated with Phoenix Constructors JV's field personnel, giving a minimum of 72 hours advance notice. The Contract price includes weekend and off-hour deliveries as scheduled by the Subcontractor and or Phoenix Constructors JV. The Subcontractor shall pay special attention to the ingress / egress restrictions imposed by the PANYNJ & PATH.**

2.14 **The Subcontractor will maintain the Construction Schedule as established by Phoenix Constructors JV and will properly staff the Project to keep up with the job progress. The Subcontractor will submit an overall fabrication and installation schedule prior to award of the Contract, and this schedule shall be further established and coordinated in detail with Phoenix Constructors JV. In addition, the Subcontractor shall submit a detailed payment breakdown for approval.**

2.15 **The Subcontractor understands and agrees that time is of the essence, and that overtime and multi-shift work will be required to maintain pace with the Construction Schedule. The Subcontractor shall adhere to the work restrictions and working hours as depicted in Exhibit 96 - Attachment "D" Revision # 0 – October 17, 2008 "Hours of Work", particularly in relation to scheduling closures / shut-downs / or General Orders (GO) for the PATH or NYCT stations or tracks. Any overtime / shift work will be performed at no additional cost to Phoenix Constructors JV.**

2.16 The Subcontractor is responsible for its own welding hookups.

2.17 Where initial protection of openings via safety planking is by others, and the Subcontractor removes such protection in order to perform the Work, the Subcontractor will provide whatever safety planking and/or other temporary protection necessary to protect all openings while working in the area in accordance with the regulations of all governmental agencies

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Company's Initials ____

having jurisdiction, and shall replace the initial safety planking when the Work is completed in said area.

2.18 The furnishing of temporary protection around the work area as per OSHA requirements is to be by the Subcontractor. Should the Subcontractor remove same for the installation of the Work, the Subcontractor shall provide manpower to guard opening until temporary protection is reinstalled by the Subcontractor.

2.19 The Subcontractor will be fully responsible for all engineering, surveying, and layout of his Work. Axis lines and bench marks will be provided by Phoenix Constructors JV.

2.20 The Subcontractor will be responsible for rigging and hoisting all of his equipment and material.

2.21 The Subcontractor shall furnish labor, materials, design, engineering and equipment to erect, dismantle and transport any cradles, temporary support systems, working platforms, and scaffolds required to perform and complete his work.

2.22 All materials delivered shall be adequately protected from weather in accordance with the manufacturer's recommendations at all times, and shall be received and stored at the jobsite in an approved manner and location as established by Phoenix Constructors JV. There is limited onsite space for storage; the Subcontractor is responsible for scheduling and staging deliveries as required and coordinating delivery logistics with the Phoenix Constructors JV superintendent.

2.23 **All trash and debris generated by the Subcontractor shall be placed in containers provided by Phoenix Constructors JV. All oversized debris (that which does not fit in a mini-container without breaking up) shall be brought to a designated area by the Subcontractor. Subcontractor will hoist these containers to grade as directed by Phoenix Constructors JV.**

2.24 All Work furnished or installed by or through the Subcontractor shall be fabricated and installed using only experienced labor and labor which is compatible with the local union jurisdiction to ensure labor harmony. The Subcontractor shall advise Phoenix Constructors JV immediately of any labor disputes experienced or anticipated.

2.25 Should questions of union jurisdiction arise, the Subcontractor shall immediately take steps to settle such disputes and will use such labor as

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Company's Initials ____

may be determined to have jurisdiction, at no additional cost to Phoenix Constructors JV. The Subcontractor will be responsible for time lost and monetary damages because of delays arising from such disputes.

2.26 The Subcontractor shall provide Phoenix Constructors JV with the names and addresses of material manufacturers, suppliers and second-tier subcontractors anticipated to be used. These subcontractors shall be governed by all Commercial, General Terms and Conditions and Supplementary Conditions (including insurance & bonding requirements by which the Subcontractor is governed. **No second tier subcontractors may be used or allowed to enter the jobsite without prior written approval from Phoenix Constructors JV.**

2.27 All Work shall be in accordance with the requirements of the Engineer / Architect, the New York City Building Code, the Owner's inspecting agencies, and any other governmental agencies having jurisdiction.

2.28 The Subcontractor is aware that Phoenix Constructors JV expects the fabrication and installation of all Work to be in perfect condition; no allowances will be made for substandard work. Punch lists issued by the Engineer/Architect must be completed prior to final payment. If, during the performance of punch-list work, the Subcontractor damages other and/or adjacent work, the Subcontractor shall be liable for the costs of repairing the damaged work.

2.29 Prior to installation of the Subcontractor's work, the Subcontractor shall inspect all surfaces to which the work shall be installed upon or fastened to, in order to verify that these sub-surfaces have been prepared properly, or are in an acceptable condition to receive the work. Should any deficiencies be found, the Subcontractor shall notify Phoenix Constructors JV immediately in writing. Installation of the Work shall signify acceptance of the underlying materials.

2.30 The Subcontractor is aware that Phoenix Constructors JV will provide an on-site Safety Manager. The Subcontractor shall provide his own Safety Manager / Representative. The Subcontractor and its Site Safety Manager / Representative will cooperate and comply with Phoenix Constructors JV's Safety Manager in addition to complying with the rules and regulations of the Department of Transportation, Department of Highways, and the Port Authority of New York and New Jersey.

2.31 The Subcontractor is required by OSHA regulations to institute a hazard communication program. Under said program, the Subcontractor must

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Company's Initials ____

inform both Phoenix Constructors JV and all other contractors on the site of any hazardous chemicals being used by the Subcontractor's employees on the Project. The Subcontractor shall provide Phoenix Constructors JV and all other contractors with copies of a Material Safety Data Sheet (MSDS), warn other contractors in the Subcontractor's work area of the existence of any hazardous chemicals, insure that any containers containing hazardous chemicals are appropriately labeled, and maintain an inventory of any such chemicals.

2.32 All scheduled job safety meetings will be attended by designated Subcontractor personnel. Tool box meetings will be held with the Subcontractor's own workers. Records of these meetings will be kept at the job site office by Phoenix Constructors JV.

2.33 Field tickets for authorized work must be presented for signature to Phoenix Constructors JV's Superintendent on a daily basis and invoiced within thirty (30) days. Claims submitted after thirty (30) days will be rejected. Phoenix Constructors JV's Superintendent's signature indicates only the following:

The signature of the Phoenix Constructors JV Project Superintendent signifies that work was done and/or verifies time and/or materials expended.

The actual determination of work being extra to the contract must be established by the Phoenix Constructors JV Project Manager and approved by Owner.

2.34 The Subcontractor shall comply with, and cooperate (and cause its subcontractors and material-men to so comply and cooperate) with other contractors, Phoenix Constructors JV and Architect/Engineer in complying with Legal Requirements, including but not limited to OSHA requirements. Among other things, the Subcontractor shall be responsible for performing corrective work within specified periods to cure any noted deficiencies, appealing from decisions or orders requesting evidentiary material as may be necessary or as may be requested by Phoenix Constructors JV to fully protect the rights and interest of Phoenix Constructors JV, Owner, and Architect / Engineer, with respect to possible, threatened or pending proceedings by others, except violations caused by others.

2.35 Alcohol, drugs and weapons shall not be allowed on the job site under any circumstances, and the use thereof shall be cause for immediate

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Company's Initials ____

expulsion of the personnel responsible and revocation of the offender's site security badge. There is no smoking on site.

2.36 The Work of the Subcontractor shall commence upon execution of this contract or notification to proceed. The Subcontractor must immediately satisfy specific contract requirements, which will otherwise prohibit on-site activities, delay work, and/or prevent payment. Within two weeks of Notice to Proceed, the **Subcontractor shall prepare and submit to Phoenix Constructors JV the following documents:**

- Insurance Compliance & Certificates
- Bonding Compliance & Certificates
- Submittal, Fabrication and Installation Schedules & Logs
- Trade Payment Breakdown
- MBE/WBE Subcontracting Plan
- Quality Control Plan

2.37 **The Subcontractor shall at its own expense, prepare, maintain and update progress schedules for approval per Exhibit 97 – Specifications Division 1, Chapter 1, General Provisions, Progress Schedule. The Subcontractor shall also provide the necessary input and information for Phoenix Constructors JV's master schedule.**

2.38 The Subcontractor shall abide by all requirements of the State of New York, City of New York and the Port Authority of New York and New Jersey for Work in or adjacent to areas of the project. The Subcontractor shall make every effort to minimize the impact of all construction activity to pedestrians.

2.39 All professional engineering and design costs, performance of site surveys, investigate analysis, etc., which may be required for the preparation and submission of the Subcontractor's shop drawings, details, calculations, procedures, and performance of coordination are included in the scope of the Work.

2.40 While working on site, Subcontractor's Superintendents and Foremen will have radios keyed into Phoenix Constructors JV's frequency. Radios are to remain on at all times that the Subcontractor's manpower is on site.

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2.41 Logistics and Utilization of Cranes on the Jobsite

The following assumption and criteria are to be taken into consideration during planning and preparing this RFP:

The Subcontractor shall submit a Means and Methods Statement with their proposal. The Means and Methods Statement shall include how the Subcontractor intends to distribute and erect large structural elements to remote areas of the site including the types, sizes and locations of the Cranes planned for the work. Furthermore, the Means and Methods Statement shall indentify if any temporary access ramps or trestles are planned and included in their proposal to facilitate material distribution and steel erection at the jobsite.

2.42 The Site Access and Staging Restrictions described in Attachment "F", Revision #0, dated October 17, 2008 and below are included in this scope of work.

2.43 Information about Work Trains and Transfer Yard described in Attachment "F", Revision #0, dated October 17, 2008 and below is included in this scope of work.

2.44 Information about Record Documents described in Attachment "F", Revision # 0, dated October 17, 2008 and below is included in this scope of work.

3 DESCRIPTION OF WORK – SPECIFIC:

Work Package # 20 consists of three distinct Work Areas, identified as:

A. Work Area 1 – PATH Station

B. Work Area 2 – 1-Line Subway Box (Greenwich Street Corridor)

C. Work Area 3 – Transit Hall

3.1 For the convenience of the Subcontractor for preparing the bid proposal, the following general identification regarding the different types of steel – Calatrava Exposed Steel, Standard Profile Steel and Built up Sections, and 1-Line Steel – relating to Work Areas 1, 2, and 3 is made. This identification is only for general information to aid the Subcontractor's initial understanding of the scope of work and may not encompass the

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Company's Initials ____

complete scope of work. The Subcontractor is fully responsible for their own take off and identification of the steel types and components as per the contract documents.

3.1.1 ~~Calatrava~~ **Exposed Steel:** ~~Shaped steel designed by Santiago Calatrava requiring specialized fabrication expertise in order to meet stringent tolerance and quality control requirements.~~ The exposed steel is shown in the contract drawings and documents and mainly consists of the following elements:

A) **Work Area 1 – PATH Station:** Trusses, Ribs, Arches, Center spine, Platform Longitudinal Girders, Platform Columns, Mezzanine Floor Steel, Columns above Mezzanine Level to Roof Framing, Bent Plates and Bottom Plates for Slab at Elevation 307'.

B) **Work Area 2 – 1-Line Subway Box** (Greenwich Street Corridor): Mezzanine Arches (Ribs) below the 1-Line Subway Box.

C) **Work Area 3 – Transit Hall:** East Elevators; East Stairs, Landings and MTA access; West Stairs, Landings and MTA access, East end arch, West end arch, Columns.

3.1.2 Standard Profile Steel and **Built up Sections:**

A) **Work Area 1 – PATH Station:** Box Girders, Plate Girders.

B) **Work Area 2 – 1 Line Subway Box** (Greenwich Street Corridor): Columns at Elevation 231' (Plates)

C) **Work Area 3 – Transit Hall:** Structural encasement plates, Structural Embedments for Transit Hall Slabs/Walls, Columns, Framing for floor slabs.

3.1.3 1 Line Subway Box **(Greenwich Street Corridor):**

B) **Work Area 2- 1 Line Subway Box:** West Super Columns, East Super Columns, 1 Line Subway Box East Arch, 1 Line Subway Box West Arch, 1 Line Subway Box Transverse Beams.

3.2 **Under this Work Package, Subcontractors have the option to submit their separate proposals, inclusive of all costs and obligations, for the following scopes of work:**

Subcontractor's Initials____

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A. **Furnish, Fabricate and Erect Structural Steel, Intumescent Fire Resistant Coating, Metal Deck & Precast Concrete Work applicable to all Work Areas 1, 2 & 3 (Combined Proposal).**

B. **Furnish, Fabricate and Erect Structural Steel, Intumescent Fire Resistant Coating, Metal Deck & Precast Concrete Work applicable to Work Area 1 only.**

C. **Furnish, Fabricate and Erect Structural Steel, Intumescent Fire Resistant Coating, Metal Deck & Precast Concrete Work applicable to Work Areas 2 & 3 (Combined Proposal).**

The scopes of work associated with Work Areas 1, 2, and 3 are further described herein:

3.2.1 Work Area 1 – PATH Station

All work as per this Exhibit 1 – Statement of Work for Work Area 1 – PATH Station West Bathtub. The general boundaries of Work Area 1 are marked on PCJV Sketches SK-1, SK-2, and SK-3 dated November 6, 2008. At the different elevations, the boundary of Work Area 1 zigzags and straddles adjacent Work Packages (WP #9 and WP #21) where work is being performed by other contractors. Work performed in other Work Packages is shown as "N.I.T.P." ("Not In This Package") on the contract drawings. The scope of work for Work Area 1 is roughly delineated by and inclusive of all work shown on the contract drawings that is west of the expansion joint at grid line D13. Fabrication and erection of the PATH Hall East Box Girder between grid lines D13 and D19 is included in Work Area 1. The super columns on grid lines D1 and D13 are NOT included in Work Area 1 and are to be fabricated and installed by the Subcontractor for Work Area 2, as shown on PCJV Sketches SK-1, SK-2, and SK-3 dated November 6, 2008. Subcontractor shall pay special attention to the required construction phasing and sequence of construction.

NOTE: The Subcontractor is made aware that the foundations for Super columns will not be in place until later date. The construction and erection of the 1 Line box east mezzanine box girder, the 1 line box truss west at grid D13, the 1 Line box truss east and arch of west abutment on grid D1 will be constructed on temporary support system designed by the Subcontractor, in order for Work Area 1 Path Station and Work Area 3 Transit Hall

Subcontractor's Initials____

Company's Initials ____

construction to proceed without the benefit of having permanent foundations in place. Once the permanent foundations are in place, the scope includes transferring load to permanent structure.

3.2.2 Work Area 2 – 1 Line Subway Box (Greenwich Street Corridor)

All work as per this Exhibit 1 – Statement of Work for Work Area 2 – 1 Line Subway Box (Greenwich Street Corridor). The general boundaries of Work Area 2 are marked on PCJV Sketches SK-1, SK-2, and SK-3 dated November 6, 2008. At the different elevations, the boundary of Work Area 2 zigzags and straddles adjacent Work Packages where work is being performed by other contractors. Work performed in other Work Packages is shown as "N.I.T.P." ("Not In This Package") on the contract drawings. The scope of work for Work Area 2 is roughly delineated by and inclusive of all work shown on the contract drawings that is east of the expansion joint at grid line D13 and west of the expansion joint at grid line D1. The Line 1 West Arch Truss at grid line D13 and the Line 1 East Arch Truss at grid line D1 are included in Work Area 2. The supply and installation of the super columns with bearing assemblies on grid lines D1 and D13 is included in Work Area 2, as shown on PCJV Sketches SK-1, SK-2, and SK-3 dated November 6, 2008. The reinforced concrete footings for all super columns will be constructed by Phoenix Constructors JV. The PATH Hall East Box Girder between grid lines D13 and D19 and the Transit Hall West End Arch at grid line WX are NOT included in Work Area 2. Subcontractor shall pay special attention to the required construction phasing and sequence of construction.

NOTE: The Subcontractor is made aware that the foundations for Super columns will not be in place until later date. The construction and erection of the 1 Line box east mezzanine box girder, the 1 line box truss west at grid D13, the 1 Line box truss east and arch of west abutment on grid D1 will be constructed on temporary support system designed by the Subcontractor, in order for Work Area 1 Path Station and Work Area 3 Transit Hall construction to proceed without the benefit of having permanent foundations in place. Once the permanent foundations are in place, the scope includes transferring load to permanent structure.

The scope of work includes the steel column jackets shown on the contract drawings within the boundaries of Work Area 2.

Subcontractor's Initials____

Company's Initials ____

necessary for the complete performance of the supply, furnish, fabrication, delivery and erection of **Structural Steel, Intumescent Fire Resistant Coating, Metal Deck & Precast Concrete Work** of Work Package # 20 - Station Construction and Transit Hall Structure to Grade - in strict accordance with this Statement of Work, the contract drawings and specification and with the all subcontract documents.

The Work shall include each and every item of expense required to furnish, fabricate, and install all structural steel sections and members including, but not limited to, beams, built-up beams, columns, built-up columns including welded studs and couplers, built-up composite section, arches, backspan arches, ribs- arches, center spine, box girders, plate girders, trusses, composite trusses, ~~Vierendeel trusses~~, struts, angles, channels, gusset plates, plates, stiffeners, splices, support angles, connections, bolts, shop welding, billet plates, bearing plates, built up fascia, field welding, bolting, moment connections, fracture critical members, anchor bolts and embed plates, anchors, expansion bolts, metal deck, pour stops , edgings including reinforcing and framing for the openings in the metal deck, sheer studs, void forms, lenton weldable mechanical couplers, steel channels with welded couplers, spall plates with studs, steel jackets for reinforced concrete and steel column, temporary support and bracing steel, cranes, rigging, lifting and hoisting devices, jacking, temporary construction work platforms, cradles, scaffolding and all other members and elements associated with the steel erection method and sequence used by the Subcontractor to complete the Work.

The Work shall include all steel column jackets as shown on drawings.

The Work also shall include furnishing and installing of the precast concrete elements: floor planks, duct units, wall panels and stairs.

The Work shall include all surface preparation and coating of the steel as per the contract documents, including primer paint and Intumescent Fire Resistant Coating.

The Work shall include all engineering, shop drawings, labor and material required for the supply, fabrication, delivery, and erection of the ~~custom made~~ columns, beams, arches, trusses, built up sections, and plate girders, fabricated from flat steel and curved plates, shaped and welded to acute angles and radiuses~~, to form the "Santiago Calatrava" design and desired intent~~. The arches, consists mainly of built up heavy steel plate welded sections with flat and curved plates, forming the exposed exterior of the sections. The work includes full penetration welds, ground smooth,

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Company's Initials ____

surfaces prepared to SSPC-SP10 (Near White Blast cleaning, unless noted otherwise on the drawings) and coated with primer paint compatible with the specified Intumescent fire resistant coating system and subsequently coated with the Intumescent fire resistant coating as specified in the contract documents. All fabricated steel is to be delivered and off loaded Freight on Board (F.O.B.) to the **holding area provided by and paid for by the Subcontractor. All structural elements are to be checked and assembled to the largest possible sections at holding area and delivered to the jobsite for erection by the Subcontractor as required.** The Subcontractor is responsible for all loss, breakage or damage to the fabricated products occurring prior to final installation on site and acceptance by Phoenix Constructors JV and the Owner. The acceptance of the fabricated products at the fabrication shop and/or at the holding area, does not release the Subcontractor from their contractual obligations for any defects and misfits discovered later on at the job site from.

This Subcontractor is required to fabricate and assemble the structural members in the shop to the greatest extent and / or largest member size possible. The Subcontractor is also required to properly mark and match-mark materials for field assembly.

In an effort to maintain the highest quality and achieve the highest aesthetical standards, it is required that any and all field splice locations shall be fabricated as a single unit, with a precision-cut joint or shall be pre-assembled into a single unit to confirm the connection fit-up prior to shipping.

Splices will be permitted only where indicated on the contract drawings or approved shop drawings. Bidders must pre-qualify additional splices (beyond what is shown on contract drawings) if required with sketches with their bid proposal. Any other field splices will not be permitted.

3.4 The scope of the Work includes all steel pipe sleeves, electrical device boxes and embeds that are built into the steel arches or other steel members.

3.5 The scope of the Work includes all transom steel tabs attached or built into the steel to receive storefronts by others.

3.6 The scope of the Work includes furnishing and installation of Lenton weldable couplers welded in the fabrication shop and supply only of the anchor bars and terminators.

Subcontractor's Initials____

Company's Initials ____

3.7 The scope of the work includes C10 Channels including Lenton weldable mechanical couplers and the threaded bars, shown on drawings.

3.8 The scope of the Work includes all shop-applied prime painting, with the exception of field connections areas that are to be masked out. The Work includes field painting the previously masked out areas after field connections are completed.

3.9 The scope of the Work includes SSPC –SP10 surface preparation on all steel elements and primer paint according to the painting specification, unless otherwise noted on the contract documents.

3.10 **Intumescent Fire Resistant Coating:** The scope of the Work includes SSPC – SP10 surface preparation, primer paint according to painting specification and compatible with Intumescent Coating System, and UL approved two (2) hour fire rated assembly, unless otherwise noted in the contract documents. The Work includes any top coat required to warranty adherence of the Intumescent fire resistant coating and to meet UL 263 for exterior exposure. The final surface appearance to be smooth with slight orange peel texture, in accordance with the approved sample. The scope of work also includes all field application of coating system at locations of field connections, field splices and repairs of areas damaged during shipping to the storage area and damage that occurs during erection.

3.11 **The scope of the Work includes all costs associated with engineering and fabricating samples ~~for testing and~~ obtaining UL designs for fire rated assemblies for the intumescent fire resistant coating thicknesses, related to the unique shapes and assemblies associated with this project ~~to the satisfaction of Port Authority~~.**

3.12 All supports, cradles, containers, protection and other devices or equipment required for shipment / interim storage and steel erection are part of this scope of work

3.13 **The scope of this Work includes shipment of the fabricated members to a location provided by the Subcontractor** and approved by Phoenix / Port Authority of New York & New Jersey, which shall be located in the New York Metropolitan area within a 25 mile radius of the WTC Construction Site. Shipment to this location is required to be Freight On Board. The Subcontractor shall bear all costs associated with shipping the fabricated material to the holding area, including but not limited to custom costs, dues, custom release bonds, agent fees, demurrage charges, unloading and loading charges at the receiving port in the USA.

Subcontractor's Initials____

Company's Initials ____

The scope of work includes transporting the material from the receiving port to the holding area and unloading at the storage facility. All shipments received, must have a bill of landing accompany the delivery. The scope of work also includes loading the material at the holding area for transportation to the WTC site and unloading of the material at the WTC site.

3.14 The Subcontractor is responsible for complying with and implementing the Sustainable Design Requirements and Performance Criteria as described in the contract specifications Section 01352 and Section 05120, 1.05. All submittals must accompany appropriate documentation for compliance with Sustainable Design Guidelines for WTC Redevelopment Projects, dated 25 March 2005, plus errata issued 7 August 2006 and "LEED" (Leadership in Energy and Environmental Design) for New Construction (NC) version 2.1 rating of certified, silver, gold and platinum, as set forth by the US Green Building Council.

Note: The 500 mile restriction on material procurement for structural steel is waived for the structural steel related to this work package.

The structural steel shall contain a minimum of 40 percent (by weight) recycled content calculated by adding the percentage of the post-consumer recycled content to one-half of the percentage of the post-industrial recycled content. Certify the recycle content in accordance with the Sustainable Design Submittal Requirements of specification Section 05120.

Metal deck shall contain a minimum of 25 percent (by weight) recycled content calculated by adding the percentage of post-consumer recycled content to one-half of the post-industrial recycled content percentage. Certify the recycled contents in accordance with the Sustainable Design Submittal Requirements of specification Section 05311.

3.15 All connection designs, detailing and erection drawings prepared by the Subcontractor shall be performed under the supervision of a Professional Engineer licensed to practice in the State of New York, USA. **Calculations and Connection Details shall also bear the signature and seal of a Professional Engineer licensed to practice in the State of New York, USA.**

3.16 The Subcontractor shall design and provide any stiffeners, doubler plates, reinforcing plates, etc. and connections that may be required to develop and /or transfer the forces and/ or connection design criteria shown on the contract documents.

Subcontractor's Initials____

Company's Initials ____

3.17 The Subcontractor shall provide all lifting points, pad eyes and all other necessary handling devices.

3.18 The scope of work includes Shop Standards, Shop Details, and Erection Drawings with specific information as described in the contract documents. **All submittals and drawings shall be provided in the English language and imperial units.**

3.19 All shop drawings and submittals shall be planned and prepared in accordance with specification Division 1, Article 75.

3.20 Steel Mock-Ups

As per specification section 05120 Para 1.06 J., the Subcontractor shall prepare all steel mock-ups, as indicated in the contract documents, to demonstrate the proposed fabrication procedure and verify inspect-ability of each weld within the assembly.

3.21 Structural Steel "Type 1" Samples:

A. **Finished Painted Samples:** Two samples of 12" by 12" by ½ thick steel plates with full penetration groove weld full length plate. Weld shall be ground in accordance with specification Section 05120 Para 2.02 F.2 and plate shall be properly prepared to finish painted in accordance with requirements of specification section 05120.

B. **Required Painted Samples:** (to be prepared in the presence of the Engineer): Two samples of 12" by 12" by ½ inch thick steel plate with full penetration groove weld full length of plate. Plate shall be intentionally damaged with two gouges at least 2 inch long by ¼ inch in depth and repaired. Plate shall be straightened and welds shall be grinded smooth. Plate shall be properly prepared and finished painted in accordance with the requirements of specification Section 05120.

3.22 General Notes:

A. Phoenix Constructors JV and the Owner will not be responsible for loss, breakage or damage to any facilities arising directly or indirectly out of or in conjunction with the work being or to be performed by the Subcontractor. The Subcontractor is responsible for all repairs.

Subcontractor's Initials____

Company's Initials ____

B. Phoenix Constructors JV Procurement personnel must approve all changes in writing before changes are executed by the Subcontractor. Subcontractor will record all changes on the final as-built documents.

3.23 Add an allowance of $200,000 for airfare and hotel accommodations for Phoenix Constructors JV personnel visits to fabrication facilities during the course of the contract and / or accommodation plus expenses for one or more PCJV staff for the duration of fabrication. The use of the allowance will be at the sole discretion of Phoenix Constructors JV. Any unused portion of the allowance will be credited to Phoenix Constructors JV for Owner credit at the completion of the contract.

3.24 For the purpose of this work, all fabrication shops shall be certified as follows:

A. Under the AISC certification program as Category STD (Standard for Steel Building Structures).

B. For members designated on the contract documents as bridge members, the fabrication shop(s) shall be certified under the AISC certification program as Category CBR (Major Steel Bridge).

C. For members designated on the contract documents as FCM's, the fabrication shop(s) shall have a fracture critical endorsement of the AISC if a firm is in the U.S.A.

D. For fabricators located outside the U.S.A. without AISC certification, fabricator shall be certified under a certification program with requirements deemed equivalent to the applicable AISC Category, as determined by the Authority.

E. If prime fabricator subcontracts any portion of the work, the subcontractor is subject to the same requirements as the prime fabricator.

3.25 As per specification section 05120 Para 1.08.C.1, the fabricator shall employ a welding consultant responsible for the review or writing all shop and field welding procedures (see also Specification Section 05120 Para 1.07.B.1d). The proposed welding consultant shall be submitted for approval by PANYNJ.

Subcontractor's Initials____

Company's Initials ____

shielding required for the erection and installation of the permanent steel structure, precast concrete members and roof structure, as well as removing and disposing of the same after completion of the work. All temporary support steel to have one coat of primer paint. All design and engineering of the temporary support systems are to be performed under the supervision of a New York State licensed Professional Engineer (PE) and all drawings and calculations of temporary support systems are to be signed and sealed by the New York State licensed PE and submitted for Phoenix Constructors JV and PANYNJ approval prior to implementation.

3.41 ~~The Subcontractor will provide a staging area within a 25 mile radius of~~ the WTC jobsite. Any steel or precast concrete ~~that~~ cannot be directly shipped to the site, must be shipped to the staging area and be ready for immediate delivery. All costs for multiple hauling and handling of the fabricated steel and precast concrete, including provision of the holding area, shall be included in the bid proposal.

3.42 The drawings and specifications represent and show the required work in detail, integrating all aspects of the Work, including the suggested sequence of the Work, availability of specific areas, access restraints and other relevant field conditions for the erection of the structural steel members, metal deck, precast concrete units and application of intumescent fire resistance coating system.

3.43 **Precast Concrete:** The Scope of the Work includes supply, fabrication and installation of precast Concrete floor planks, duct units, wall panels and precast stairs in accordance with the drawings, specifications and the contract documents. The scope of work consists of shop drawings, engineering, formwork, off site precasting, curing, trucking to the job site, hoisting and setting the units in place. The scope of work includes supply and installation of elastomeric pads, steel plates and angles welded in place as detailed and shown on contract drawings. The scope of the Work includes supply and installation of stainless steel threaded rods and nuts, drilling and grouting of dowels, grouting of joints and girder splices, as shown on the contract drawings. The precast concrete scope of work includes supply and casting of inserts, dowels, corner angles with welded shear studs and embeds as referenced in the contract documents.

Also included in the Work is the design, furnishing, installation and removal of all temporary support structures required to erect the precast concrete units over the PATH tracks.

Subcontractor's Initials____

Company's Initials ____

3.44 The Scope of Work includes hauling of the fabricated steel and precast concrete members from the holding area to the job site and preparing and assembling all components in accordance with the Subcontractor's proposed erection method and sequence in accordance with the field conditions and availability of the site, as stated in the contract documents. The proposed method and sequence of steel and precast concrete erection shall be submitted for Phoenix Constructors JV and PANYNJ approval.

3.45 For guidance in preparing the Means and Methods Statement and bid proposal, the Subcontractor is advised to refer to the contract drawings, specifications, and documents for full description of the suggested construction phasing, constraints and temporary support systems. The Scope of Work includes the construction phasing, temporary protection and shielding described and depicted on the contract documents.

3.46 The Scope of the Work includes field surface preparation and touch up of the steel primer paint and intumescent coating, including surface preparation, of all field connections masked out during fabrication.

3.47 The Scope of the Work includes field surface preparation and touch up of all primer coated surfaces and Intumescent coated surfaces that were abraded, scratched and/or otherwise damaged during shipping and hauling of the steel to the jobsite and during erection.

3.48 The Scope of work includes, shop drawings, engineering, supply and installation of Metal Deck and shear connectors, pour stops including reinforcing and framing for the openings in the metal deck. The scope of the work includes cutting and fitting of the metal deck to accommodate shop welded lenton coupler sockets and installation of the threaded lenton coupler rods as per contract documents.

3.49 The Scope of work includes shop and/or field applied Intumescent coating to all steel members including shop fabricated steel and field connections. Fabricated steel will have shop applied, SSPC-SP10 surface preparation, a primer coat according to the painting specifications that is compatible with the specified Intumescent Coating.

3.50 The proposed Intumescent coating material and application to be identical to representative assemblies tested for the fire performance characteristics, according to test method indicated by UL or other testing and inspecting agency acceptable to the Authority. The Subcontractor is responsible for the fire performance testing in order to secure UL

Subcontractor's Initials____

Company's Initials ____

ratings/design for all assemblies, as well as the Fire Performance Characteristics tested per ASTM E119, Surface Burning Characteristics tested per ASTM E84 and Rating per building code of New York City for building classification and construction groups, ~~and D.C.A. or M.E.A.~~ ~~approval~~ or other New York Department of Building approval acceptable to the Port Authority of New York and New Jersey for use in New York City, USA.

3.51 The Scope of the Work includes all supports, cradles, containers, protection and other devices, equipment or material required for storage of material at the fabrication shop or holding area and hauling the material from the holding area to the job site.

3.52 The Scope of the Work includes all engineering, shop drawings, details and erection drawings showing the sequence of erection for all temporary support systems, bracings and other devices necessary for the steel component assembly, erection in place, and permanent connection of the steel trusses, girders, arches and all other members. The Work also includes erection of the temporary work and removal at a later stage.

3.53 The Scope of Work includes all supports, cradles, temporary bracings, propping and other devices required to align and stabilize steel members during the steel erection process and completion of permanent connections.

3.54 The Scope of Work includes leaving part of the temporary supports and stabilizing steel in place, for removal at a later stage as directed by Phoenix Constructors JV. The removal of the temporary support may entail overhead restraints where crane access will not be available. Temporary supports will need to be removed in sections utilizing alternate equipment that will not exceed the loading criteria for the new station mezzanine floor. All submittals, including shop drawings and calculations are to be prepared in accordance with the contract specifications.

3.55 All design and erection drawings for temporary construction supports, bracing and rigging shall be prepared by the Subcontractor under the supervision of a Professional Engineer licensed to practice in the State of New York, USA. Drawings and calculations shall also bear the signature and seal of a Professional Engineer licensed to practice in the state of New York, USA.

Subcontractor's Initials____

Company's Initials ____

3.56 The Subcontractor shall grind smooth all lifting points, pad eyes and all other necessary handling devices, prepare surface and touch up primer and/or intumescent coating application per contract documents.

3.57 All welding, both in the shop and in the field shall be performed by welders, inclusive of all required fire watches, certified by AWS or other agency as acceptable to the Port Authority.

3.58 The Subcontractor shall provide for, and include all costs for, off-site storage of all fabricated materials, which are to be kept ready for delivery within 72 hours of notice from Phoenix Constructors JV.

3.59 The Subcontractor shall unload all items fabricated under this scope of work and shall place these in a location at the project site designated by Phoenix Constructors JV. There is very limited space on site for storage of material prior to erection.

3.60 The Subcontractor shall field measure all conditions affecting his work prior to fabrication unless directed otherwise by Phoenix Constructors JV.

3.61 Subcontractor shall survey and verify all dimensions and elevations as indicated on the plans and provide connection detailing calculations and drawings signed and sealed by this Contractor's NY Professional Engineer. Calculations shall be submitted at the same time as the shop drawings. Subcontractor is aware of the typical details and requirements of the Engineer and will perform the steel work in accordance with these standards.

3.62 Any modification of bracing, shoring, or posting for rigging equipment into the structure must be submitted to and approved by the Engineer and Phoenix Constructors JV. The Structural Engineer employed by this Subcontractor shall provide any calculations or drawings required by local codes or ordinances covering the analysis of any loads imposed to the permanent structure due to rigging equipment and shall affix a licensed professional engineer's seal to same.

The Subcontractor shall submit drawings for approval showing rigging equipment, locations and connection details for any steel that will be added to the structure if required to support the rigging equipment. The Subcontractor shall also submit calculation for approval for all loading conditions for rigging equipment.

3.63 Subcontractor shall coordinate his work with that of other trades, as closely as possible, inclusive of power requirements for welding.

Subcontractor's Initials____

Company's Initials ____

Coordination meetings with any other trades affected by this Subcontractor's work may be called by Phoenix Constructors JV for this purpose.

3.64 Subcontractor must furnish any scaffolding, rigging, labor, tools, tool shed, workers shanties, equipment, etc., that is necessary for the execution of his work, including obtaining permits for same and payment of all fees. Subcontractor is to include in his price two relocations for each of these shanties. The Subcontractor is advised that there is no space on site for shanties or field offices.

3.65 Subcontractor shall fabricate and install all work true, plumb, and level and any corrective work shall be this Subcontractor's responsibility to correct at no cost to Phoenix Constructors JV.

3.66 All materials shall be delivered in manufacturer's/fabricator's original packaging (as applicable), with piece marks to clearly identify the items. Deliveries shall be coordinated with Phoenix Constructors JV. Prior to and following delivery to site, all materials shall be properly stored and protected from weather at all times. The Subcontractor shall be responsible for the handling, storage, protection and security of all equipment and materials supplied under this contract until work is complete and turned over to Phoenix Constructors JV.

3.67 Subcontractor shall submit a lifting plan showing crane/equipment placement, as well as anticipated loads and crane/equipment capacity. The crane placement and lifting plan shall be signed and sealed by a New York State licensed PE and submitted for Phoenix Constructors JV and PANYNJ approval.

3.68 Subcontractor is advised that the lifting or picking of the steel and other material over an active track will be only permitted under G.O. or other times specifically approved by the Owner.

3.69 **Organizational Interfaces**

Work will be per the drawings and specifications.

3.70 The scope of the Work includes all other work not specifically described but required to perform the above said scope.

3.71 **Work Not Included**

Subcontractor's Initials____

Company's Initials ____

- Any work specifically noted "NIC" or "NITP" on the contract drawings is excluded from this scope of work.
- Cast in place concrete is not included.
- Demolition of existing structure is not included.
- Work shown as" Mezzanine Level Precast Alternate" instead of cast-in-place concrete to be priced as an alternate for Owners approval and inclusion in this work package

3.72 Hours of Work and Platform / Track Outage

Refer PANYNJ Attachment "D" Revision # 0 – October 17, 2008

3.73 Site Conditions and Known Hazards

- Dust (Eye Protection)
- Poor lighting
- High Voltage
- Tripping Hazards
- Elevated Work Zones (Fall Hazard)
- Work Adjacent to an Active Railroad
- Work in and around Public Areas.

3.74 Additional Safety Requirements

In addition to the safety requirements contained in the contract documents, the Subcontractor shall adhere and enforce the following:

Subcontractors to submit pre-task plans for any work identified by Phoenix Constructors JV that would warrant such plans.

Abide by the attached WTC Site Traffic Rules and Load Chart attached. Be specifically mindful that pre approval of truck loads is required.

Subcontractor's Initials____

Company's Initials ____

Refer to Schedule 1 of the Contract for a Complete Listing of the Exhibits.

Upon Contract award, the following Attachments will be issued electronically: 2D, 3, 4, 21A, 21D, 21E, 21F

5 MATERIAL, EQUIPMENT, FURNISHED BY SUBCONTRATOR

5.1 ALL MATERIALS AND EQUIPMENT REQUIRED TO DESIGN, ENGINEER/DETAIL, FABRICATE, DELIVER TO THE JOBSITE, AND ERECT ALL ITEMS LISTED IN SECTION 3.0 AND PRESENTED IN CONTRACT DRAWINGS AND SPECIFICATIONS ARE TO BE FURNISHED BY THE SUBCONTRACTOR.

6 MATERIAL, EQUIPMENT, OR SERVICES FURNISHED BY COMPANY

6.1 ~~Company~~ will furnish or cause to be furnished to Subcontractor, without cost to Subcontractor the items below in connection with performance of the Work:

All labor and equipment required for the maintenance and protection of traffic.

Axis lines and benchmarks shall be provided by Phoenix Constructors JV.

Water & General lighting.

~~Note:~~ There is limited power available at the jobsite. Subcontractor is responsible for generating and providing his own power for the performance of the Work.

7 GENERAL CONDITIONS

7.1 General Notes:

All Work must comply with OSHA, local, state and federal regulations, as well as a project specific requirements defined by Phoenix Constructors JV and the Port Authority.

Subcontractor agrees that the Work shall be executed in accordance with the generally accepted construction practices and is required to assume sole and complete responsibility for job site conditions during

Subcontractor's Initials____

Company's Initials ____

the course of the project, including safety to all persons and property at all times.

7.2 This is a tax exempt project. All materials that will permanently be incorporated into the project at completion shall be tax exempt.

7.3 Subcontractor shall familiarize themselves with the Laws, Rules and Regulations regarding Environmental Matters of the Port Authority.

7.4 The on-site work is covered by OCIP. All contractors/subcontractors will be subject to approval of the Port Authority of New York and New Jersey (PANYNJ). The Subcontractor shall be able to obtain additional insurances in accordance with the insurance requirements of the Port Authority and the New York Transit Authority. Insurance requirements are available for viewing at the Phoenix Constructors Office.

7.5 Subcontractor shall adhere to the M/WBE requirements and percentages as set forth in the contract with the Port Authority.

7.6 Subcontractor's work shall be in strict accordance with the Site Quality Control Plan on file at Phoenix Constructors JV office.

7.7 Subcontractor's work shall be in strict accordance with the Site Safety Plan – Preliminary Health and Safety Plan (HASP) (Exhibit 15A) included in CD format (enclosed) and on file at Phoenix Constructors JV office.

8 ENGINEERING REQUIREMENTS

8.1 Engineering required per the drawings, the specifications and this Statement of Work shall be provided by the Subcontractor.

8.2 Furnished by Company

For reference by the Subcontractor, Phoenix Constructors JV will supply or cause to be supplied the following information to the Subcontractor, without cost to Subcontractor, for or in connection with performance of the Work:

Phoenix Constructors JV Quality Control Plan – Exhibit 18

Phoenix Constructors JV Site Safety Plan – Health and Safety Program - Exhibit 15A

9 PERFORMANCE SCHEDULE AND SEQUENCE OF WORK

Subcontractor's Initials____

Company's Initials ____

11.2 Subcontractor shall submit the following data to Company as part of the Scope of Work:

Safety Program for review prior to commencement of Work.

All necessary Q.C. documentation as work is completed.

QC Plan in accordance with Article 14.0, titled "Quality Control", subparagraph 14.2 for review prior to commencement of work.

11.3 Subcontractor's performance of his obligations hereunder shall not be deemed complete until Company is in receipt, on proper forms, of all Technical Data, As-Built Drawings, and other documents to be submitted to Company as part of Subcontractor's Scope of Work. Failure of Subcontractor to comply with the above data requirements will entitle Company to withhold any progress payment, or final payment, pending Company's receipt of all the above data without prejudice to any other remedy of Company.

11.4 All submittals (shop drawings, calculations, etc) shall be provided in English and Standard (Imperial) units and shall be in accordance with all USA standards (AISC, AWS, etc) as per the contract specifications.

11.5 Subcontractor shall show the Company Contract Number and identifying item numbers, if applicable, on all data submitted pursuant to this Article 11.0.

12 COMMUNICATIONS

All communications pursuant to or in connection with this Contract shall be identified by Company's Contract Number and shall be communicated as set forth below:

12.1 Contractual Notices

All contractual notices given under this Contract shall be sufficient if in writing and delivered in person to an officer of the party to be notified, or sent to the party to be notified, addressed as set forth below, by registered mail, telex, facsimile or cable. Telexes, facsimiles and cables must be confirmed in writing within three (3) days thereafter.

Contractual notices to Company shall be addressed to Company's Project Office set forth herein:

Subcontractor's Initials____

Company's Initials ____

13.2 Safety

All Subcontractors working on the WTC Permanent PATH Terminal HUB Project shall have in effect their own safety plan and shall designate a Safety Manager / Representative. At a minimum, the Subcontractor's Safety Manager / Representative, shall have completed OSHA 30-Hour safety training. The Subcontractor's Safety Manager / Representative should also provide Phoenix Constructors JV with any other safety certifications or competent person training related to the trade of work. The Subcontractor's Safety Manager / Representative shall be on site at any times the Subcontractor's work force is on site.

Subcontractor's Safety Manager / Representative shall be responsible for initiating the safety program, ensuring that jobsite safety requirements and procedures are being accomplished, conducting safety inspections of Work being performed, and documenting safety activities. The Safety Manager / representative will also be responsible for a continuing survey of its operations, to ensure that the probable causes of injury or accident are controlled and that operating equipment, tools and facilities are used, inspected and maintained as required by applicable safety and health regulations.

PCJV and Owner will have the right to stop Work whenever safety violations are observed which could jeopardize the well being of personnel and equipment. The expense of any such Work stoppage and resultant standby time shall be for Subcontractor's account. The failure or refusal of Subcontractor to correct the observed violation may result in the termination of the Contract, and/or the dismissal from the jobsite of those responsible for such failure or refusal.

Subcontractor shall submit to Phoenix Constructors, prior to the commencement of any work, a detailed pre-task plan indicating how the **Subcontractor shall comply with Phoenix Constructors' 100% tie-off policy for all work conducted at heights greater than or equal to 6'-0" above a solid surface.** This plan shall include but not be limited to details on methodology for the tie-off of individuals engaged in connecting, bolting and decking. Subcontractor shall also outline how it intends to use manlifts and personnel netting.

Subcontractor's Initials____

Company's Initials ____

Subcontractor shall provide to PCJV a copy of all reports made to government agencies or insurance companies relating to any jobsite accident or injury during Subcontractor's performance of the Work.

13.3 Work Rules and Regulations

Subcontractor shall ~~comply with~~ all work rules and regulations set forth in Exhibit 15A, entitled Preliminary Health and Safety Plan (HASP) Manual (CD).

13.4 Hazardous Substances

Subcontractor shall comply with applicable hazardous substance disclosure requirements set forth in Exhibit "16" entitled HAZARDOUS AND TOXIC SUBSTANCES DISCLOSURE REQUIREMENTS.

13.5 OSHA Permits and Programs

Subcontractor shall initiate and maintain such permits and programs as may be necessary to comply with requirements set forth by the Occupational Safety and Health Administration (OSHA) and any other local, state and federal regulations, and the rules and regulations of the Port Authority.

A copy of all permits will be provided by Company prior to commencement of Work at the jobsite. If OSHA permits are not required to perform Work, a letter shall be submitted to Company prior to commencement of Work at the jobsite stating that no permits are required.

14 QUALITY CONTROL

14.1 **Subcontractor shall be responsible for the performance of all shop / field inspections and testing activities**. Subcontractor shall adhere to the Project Quality Procedures contained in Article 80 of Exhibit 97.

14.2 All **Shop and** field fabrication inspection shall be carried out by certified inspectors employed and paid by the Subcontractor.

14.3 The Subcontractor or supplier is to submit for approval a Quality Plan acceptable to both the Phoenix Constructors JV (PCJV) and the Port Authority of New York and New Jersey (PANYNJ). The Plan is to be compliant with Article 80 of Contract WTC284.458 GC and the FTA-IT-90-

Subcontractor's Initials____

Company's Initials ____

Subcontractor shall perform its Work so as not to discharge into the atmosphere from any source whatever smoke, dust, or other air contaminants in violation of the laws, rules and regulations of the governmental entities having jurisdiction.

15.5 Explosives

~~Subcontractor shall be responsible for the proper handling, transportation, storage and use of explosives and shall, at its expense, make good any damage caused by its handling, transporting, storage and use of explosives.~~

15.6 Ventilating

Prevent hazardous accumulations of dust, fumes, mists, vapors or gases in areas occupied during construction;

Provide local ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied areas;

Dispose of materials in manner that will not result in harmful exposure to persons or disrupt or otherwise effect operation of existing facilities.

Ventilate storage spaces containing hazardous, volatile or temperature sensitive materials.

15.7 Site Signs

Identification signboards and notices for safety or instruction are permitted on site only after approval of PCJV for format, location and quantity.

END OF SCOPE OF WORK

Subcontractor's Initials____

Company's Initials ____

INSTRUCTIONS TO OFFERORS

1.0 INTRODUCTION

Phoenix Constructors JV ("PC"), acting under its contract with the Port Authority of New York and New Jersey ("PANYNJ"), requests that you submit a proposal for a Lump Sum, Fixed Price type of contract, **Furnish, Fabricate and Erect Structural Steel, Intumescent Fire Resistant Coating, Metal Deck & Precast** Concrete Work as indicated in the contract drawings and specifications for the Station Construction and Transit Hall Structure to Grade (Work Package 20) (Contract WTC-284.458[redacted]) for the Port Authority of New York and New Jersey WTC Transportation HUB Project located in New York City, USA.

2.0 Work Package #20 has been organized into three distinct Work Areas (WA) for Subcontractor's consideration and pricing.

1. **Work Area 1 - Path Station**
2. **Work Area 2 – 1 Line Subway Box** (Greenwich Street Corridor)
3. **Work Area 3 – Transit Hall**

Under this Work Package Subcontractors will have the option to submit their stand alone proposals, inclusive of all costs and obligations for the following scope of work:

A. **Furnish, Fabricate and Erect Structural Steel, Intumescent Fire Resistant Coating, Metal Deck & Precast Concrete Work applicable to all Work Areas 1 + 2 + 3 (Combined Proposal).**

B. **Furnish, Fabricate and Erect Structural Steel, Intumescent Fire Resistant Coating, Metal Deck & Precast Concrete Work applicable to Work Area 1 only.**

C. **Furnish, Fabricate and Erect Structural Steel, Intumescent Fire Resistant Coating, Metal Deck & Precast Concrete Work applicable to Work Areas 2 + 3 (Combined Proposal).**

well as any other trade subcontractors / venders who will be performing work as a 2nd tier subcontractor under your management.

2.3 PREQUALIFICATION FORMS: Exhibit 30A Representations and Certifications, and Exhibit 30B Subcontractor Pre-Qualification Questionnaire must be filled out in their entirety by all members of your Team/JV.

2.4 FINANCIAL STATEMENTS: Provide each subcontractor's Financial Reports, Balance Sheets, and Profit and Loss Statements for the previous three (3) years.

2.5 BONDING CAPACITY: Payment and Performance Bonds are required for all subcontract work over $300,000.00. Provide the name and contact information for your Bonding Company as well as your Bonding limit.

2.6 TECHNICAL QUALIFICATIONS AND CERTIFICATIONS: List all subcontractor and/or Joint Venture partners' qualifications and certifications. Prime Offerors should be Certified Fabricator and or Certified Erector from American Institute of Steel Construction or equivalent approved and accepted by the Port Authority. Major Steel Bridge fabricators or equivalent subcontractors should be certified as AISC of Major Steel Bridge, Simple Steel Bridge, or Steel Building Structure, ISO9000 Requirements or equivalent, as appropriate for the work to be performed by them. All erectors should be certified as AISC category Advanced Certified Steel Erectors or equivalent.

2.7 SIMILAR TYPE OF WORK COMPLETED AND REFERENCES: List representative projects that demonstrate the extent to which the Offeror has relevant experience in large-scale complex transportation structures of similar scope and complexity under the same demanding schedule; experience on other CM/GC Contracts; similar experience working within a major metropolitan area and with its public agencies; work in an urban environment and adjacent to operating railroad corridors, including measures used to minimize operational impacts to railroad operations; projects with complex utility relocations; projects with high security requirements; and projects with complex interagency coordination. Provide references for previous (dating back 5 years) and current projects with an initial contract value of $10,000,000 or greater. References shall include Client Name and Address, Client Technical Point of Contact and phone number, Contract Number, Brief Description of Work Scope, Contract Type, Period of Performance, Contract value.

150,000,000

2.8 MANAGEMENT TEAM: The organization of the project, including the identification of key personnel and their responsibilities and inter-relationships, and changes to the organization anticipated as the Project evolves. Include organization charts that illustrate the reporting structure of the Project team, identifying specific staff to be assigned to this Project. In addition, the Plan shall

4.0 SUBMISSION OF TECHNICAL AND COMMERCIAL PROPOSALS

4.1 **Bid Bond:** Phoenix Constructors JV requires that each bidder provide a bid guarantee equivalent to a minimum of **two and one half percent (2 1/2%)** of the bid price with their Bid Proposal. The "bid guarantee" shall consist of a firm commitment such as a bond, certified check, or other negotiable instrument accompanying a bid, as assurance that the bidder will, upon acceptance of his bid, execute such contractual document as may be required within the time specified.

4.2 You must submit your proposal based on these Instructions to Offerors, the enclosed Invitation Letter and draft Sample Subcontract. All proposals must be submitted in writing in accordance with Section 4.0 above. **Telephone, email or facsimile proposals will not be accepted.**

ADDRESS OF SUBMITTAL: Please direct your sealed offer or bid package to the mailing address identified below on or before the closing date and time. **PC reserves the right to reject any offer/bid received after the deadline.**

Address offer to:

Mr. Javed Qureshi
Contract Administrator
Phoenix Constructors, JV
115 Broadway, 18th Floor
New York, New York 10006
Tel: 646.467.7219; Fax: 212.566.2302
E-mail: javed.qureshi@bovislendlease.com

Identify the package or envelope **on the outside** containing the offer as "Proposal in Response to: **RFP: W0TC-GC1-2-KN0186-020. "Structural Steel, Intumescent Fire Resistant Coating, Metal Deck & Precast Concrete Work". Work Areas 1+2+3** ~~or Work Area 1 or Work Areas 2+3~~
The Offeror may contact the Contract Administrator to verify that they have received the proposal.

4.3 QUESTIONS OR COMMENTS REGARDING SOLICITATION: The Offeror shall submit any comments or questions regarding the Solicitation to the Procurement Manager in writing early enough to allow sufficient time for a response prior to the proposal due date. Offeror shall not communicate with any other Offeror, employee or consultant employed by PC or the PANYNJ with respect to the subject matter of this Solicitation. The Offeror may transmit questions and comments via fax or e-mail. PC will answer all questions in writing and provide a copy of all questions and answers to all Offerors. If the RFP requires an addendum to resolve issues regarding the RFP, PC will issue an amendment to

those Offerors who have not declined to participate in time for them to consider the addenda before finalizing and submitting their offers.

4.4 AMENDMENTS TO SOLICITATION: If this RFP is changed, it will be done so via addendum. Unless otherwise stated, all terms and conditions that are not modified will remain unchanged. The Offeror shall acknowledge receipt of all Addendum(s) by stating in the offer that the Offeror has received the Addendum(s) and has considered it/them in formulating their proposal.

4.5 PACKAGE CONTENTS: Inside the **sealed** delivered package, there must be **two separate, sealed envelopes** labeled "Technical Proposal" and "Commercial Proposal" and they must contain the items listed below in Sections 5 and 6. Both the Technical Proposal and the Commercial Proposal must be **sealed** and contain an original, plus three (3) copies. The original of your offer must be clearly marked "Original." The copies must be identical to the original and may be photocopied from the original after signature.

Each package containing material you wish to be considered as part of your offer must be sealed with a self-adhesive label contained in the RFP Package, (to be furnished by ~~Contractor~~), marked "Sealed Offer." Your failure to use these labels may result in the inadvertent opening of the package and may cause your offer to be rejected.

5.0 TECHNICAL PROPOSAL

The Offeror shall provide one original and three copies of the Technical Proposal that includes:

5.1 MANAGEMENT PLAN: This Section specifies the minimum content of the Management Plan that shall be submitted as part of the Proposal. The Plan shall describe how the Offeror intends to manage and perform the Work of the Project.

5.1.1 The organization of the project, including the identification of key personnel and their responsibilities and inter-relationships, and changes to the organization anticipated as the Project evolves. Include organization charts that illustrate the reporting structure of the Project team, identifying specific staff to be assigned to this Project. In addition, the Plan shall include other key technical, subcontractor and or consulting staff. Provide a full description of the reporting structure, including the role of each legal entity of the contractor and the roles of any subcontractor(s). You shall also describe other personnel who, while not directly assigned to the implementation, may support it in some way. For each key staff member of the Project team indicate estimated percentage of time to be dedicated to the Project (i.e. 100%, 50%, etc.). Be sure to show points of interaction with Phoenix Constructors' staff. Include

WTC Quality Assurance Project Program as per Article 15 of Exhibit 1 Statement of Work and Exhibit 18.

5.5 SAFETY: The Offeror shall describe the organization, resource and procedures to be used for creating a safe environment for contractors, subcontractors, Phoenix Constructors JV., the Authority, PATH, NYCT personnel and the public during the life of the Project, which shall conform to the client's WTC Site Safety Program as per Exhibit 15A.

5.6 M/WBE UTILIZATION: The Offeror shall describe its plan to meet the combined goal for participation by Minority – owned / Women – owned Business Enterprises (M/WBE) as set forth in Exhibit 21G.

5.7 EQUIPMENT AND MATERIAL LIST: Provide a list in Exhibit 2A of equipment and materials which will be made available for this effort.

5.8 EXCEPTIONS and ALTERNATE PROPOSALS: Exceptions to technical requirements or contract terms and conditions will not be accepted and may render the proposal "non responsive" and subject to rejection. PC must be able to evaluate and compare all technical proposals based upon the same technical requirements and contract terms and conditions as specified in the solicitation.

However, the Offeror may also submit an alternate proposal "in addition" to the primary proposal stated above. Please note that an alternate proposal submitted by itself is non responsive to the solicitation and will be rejected. The alternate proposal must be in a distinctly separate technical and cost volume that clearly list the exceptions to the solicitation (technical and/or commercial terms), and must set forth the addition/deletion to the solicitation (technical and or commercial terms) and the amount of change (increase/decrease) to the price or cost of the primary proposal.

6.0 COMMERCIAL/PRICE PROPOSAL

The Commercial Proposal shall consist of the Offerors' proposed pricing and other non technical information, as outlined below. The price table in (Exhibit 2A) will constitute all anticipated work included in the fixed price offer for this work based on the currently known scope of work as described by the attached Statement of Work (Contract, Exhibit I).

6.1 CONTRACTOR PRICING AS FORMATTED IN EXHIBIT 2A: Contractor Pricing and Invoicing Instructions including all Commercial Schedules and requested markups. Use of other than the commercial formats provided may be cause for rejection of your proposal.

6.10 UNION AGREEMENTS: Provide one complete copy of all union / labor agreements and a letter certifying that all agreements are attached as applicable to the scope of work.

6.11 PERMITS AND LICENSES: Offeror shall submit with its proposal, the certificate of license number which grants them the authority to work as a contractor in the state, county and/or municipality where the work is to be performed.

7.0 DEFINITIONS

For all purposes of this Request for Proposal document, except as otherwise expressly provided herein, the terms defined shall have the meanings assigned to them in this Article.

"Owner" or "PANYNJ" means Port Authority of New York and New Jersey

Company or "PC" means Phoenix Constructors, JV

"Contractor" or "Subcontractor" means successful Offeror.

"Addendum" means any document(s) issued by Phoenix Constructors JV to all Offerors during the offering period, that contains additional information or corrections made by Phoenix Constructors JV to this Request for Proposal document.

"Offeror " means the person, corporation, partnership, joint venture or other organization which has submitted a proposal to Phoenix Constructors JV for performance of the Work.

"Successful Offeror" means the Offeror whose proposal has been accepted by Phoenix Constructors JV in writing.

"Subcontract" means the contractual document signed by the Successful Offeror and Phoenix Constructors JV in the form as defined in this Request for Proposal document.

"Request For Proposal" or "RFP" means the solicitation to offer and includes all Addenda.

Terms defined in this Article importing the singular also include the plural, and vice versa, where the context requires.

8.0 PREPARATION COSTS

Neither Phoenix Constructors JV and/or Owner will be responsible for any costs or expenses in preparing and/or submitting your proposals or subsequent meetings, interviews or in providing any supplemental information. Offeror is responsible for any

and all costs associated with submitting his proposal.

9.0 RIGHT OF ACCEPTANCE

Phoenix Constructors JV and/or Owner reserve the right to accept any proposal other than the lowest cost proposal and to accept or reject any proposal in whole or in part, or to reject all proposals with or without notice or reasons and, if no proposal is accepted, to abandon the Work or to have the Work performed in such other manner as Phoenix Constructors JV / PANYNJ may elect

Partial or incomplete proposals may ~~not be accepted~~. You will be informed whether or not your proposal was successful.

10.0 OFFEROR'S MODIFICATION AND WITHDRAWAL OF PROPOSAL

You may, without prejudice to yourself, modify or withdraw your proposal by written request, provided that the request is received by PC prior to the offer due date and time that your proposal was to be submitted. Following withdrawal of your proposal, you may submit a new proposal provided that such new proposal will be received on or before the due date and time.

PC or PANYNJ may modify any provision(s) or part(s) of the Request for Proposal documents at any time prior to the award of a contract.

11.0 PHOENIX CONSTRUCTORS JV POLICY

In accordance with PC's policy, all qualified Offerors are entitled to receive equal opportunities. The offering or receiving of gifts, entertainment, payments, loans or other favors for the purpose of being placed on a Offerors' list, obtaining a contract, or favorable treatment under a contract, is prohibited. Furthermore, it is PC's policy that in the event an Offeror or Subcontractor is found to have offered or given a gratuity to obtain a contract or favorable treatment thereunder, the Offeror or Subcontractor involved will be refused further offer considerations by all of PC's entities. PC may also obtain those remedies available under law and the Contract, including, but not limited to, termination for default. Your attention is invited specifically to those articles in Representations and Certifications relating to Termination for Default and Gratuities.

12.0 INFORMATION BROKERING

PC considers completely unacceptable the acquisition or use of sensitive or confidential information for which Offerors or their agents or representatives are not entitled, such as competing for Offerors' proposal data, evaluations of proposals submitted by Offerors, and ranking of proposals. Offerors are required to notify PC immediately of any solicitation or approach offering (a) confidential offer information (including evaluations of offer information), (b) improper influence which would affect the award of any contract

associated with this project.

Offerors are further required to notify PC immediately if they come into possession of confidential information (including evaluation of offer information). Failure to comply with the foregoing may result in disqualification of the Offeror.

13.0 MINORITY BUSINESSES

Consideration is to be given to minority businesses for the supply of services and commodities for the World Trade Center HUB Project.

13.1. In addition, for awards expected to be in excess of $100,000, in accordance with Exhibit 21G, all Subcontractors of "PC" working on the WTC Hub who intend to purchase material or services, are required to establish contractor policies and procedures to take affirmative steps to encourage Minority and Women's Business Enterprises to seek business opportunities on the Project.

13.2 You are requested to obtain quotations for materials and services from minority owned enterprises. Potential minority subcontractors and material suppliers should be identified in proposals as such.

14.0 PRICING CONDITIONS

14.1 Pricing, stated in U.S. dollars, must be in accordance with the provisions of Exhibit 2A – Contractor Pricing and Invoicing Instructions. The blanks in Exhibit 2A – Contractor Pricing and Invoicing Instructions must be completed and returned by all Offerors as your commercial proposal.

14.2 Proposal validity-period is requested for 90 days after the closing date of this RFP.

14.3 **All pricing must be firm for the duration of this Contract.**

14.4 The quoted price(s) must include all costs to you for materials, labor, equipment, testing and any and all items of expense, fees, taxes, duties, overhead and profit for your full and complete performance of the Work as set forth herein.

14.5 All pricing information and requests for information identified in this RFP must be provided. Failure to comply with this request may result in a rejection of any proposal. **PC reserves the right to request and have you furnish any accounting breakdown of all contract prices including "cost or pricing data" as required.** This request may be made after contract price has been finalized with the Successful Offeror and for any Change Orders to the Contract issued by PC.

14.6 If you are the selected Subcontractor, you will be responsible for acquiring any and all licenses (applicable contractor's license(s), business license(s), etc.) and permits required to perform the Work, excluding building permits.

14.7 You are advised that quantities reflected on the drawings are for informational purposes only and that each Offeror is responsible for determining quantities required to perform the Work. The only exception shall be where PC has provided bills of quantities in Exhibit 2A for Offerors' insertion of unit prices.

14.8 Upon award, PC will issue one reproducible set of drawings for the selected Subcontractor's use in obtaining all construction prints. No additional construction drawings will be issued by PC for the Successful Offerors' use in performance of the Work.

14.9 You must define all materials to be purchased that cannot be obtained within 14 days after approval of design drawings.

14.10 Proposals for this Work are being requested from other Offerors.

14.11 In the case of any discrepancy between words and figures, the words shall prevail. In the case of errors in addition or extension, the unit prices quoted shall prevail.

14.12 You are advised that the Successful Offerors' personnel, including subcontractors, will be required to attend a safety orientation meeting. (This includes the entire labor force and all new hires). The meeting will last approximately ***two*** hours. All costs are to be included in your quoted prices.

In addition, the Successful Offeror will be expected to conduct weekly gang box safety meetings which shall be attended by all its craft employees. These meetings will last approximately ***one half*** hour.

14.13 The successful Offeror shall be expected to have all their employees who shall be working within the confines of the "1- Line and Path Tracks" to undergo track training which shall be conducted by the New York City Transit (NYCT and PATH). All costs shall be included in your quoted prices. The approximate cost is $2,000 for a 15 employee class.

14.14 In addition, the successful Offeror shall obtain Security Clearance Passes from the Port Authority for all their personnel entering the site. The successful Offeror's information shall be provided to the Port Authority to obtain the passes.

Subcontractors and their respective employees, subcontractors, and suppliers must comply with all security requirements set forth in this Subcontract including Exhibit 41 "WTC PATH Identification Guidelines For Subcontractors;" and all

proposal will be at the sole discretion of PC and/or PANYNJ.

16.3 The submission of a proposal indicates acceptance by you of all conditions contained herein.

16.4 During the proposal review, PC will not be responsible for identifying or resolving any deviations that may be contained in your proposal. If you are awarded the Subcontract, the only deviations recognized will be those mutually agreed upon and incorporated into the Subcontract in writing.

17.0 DISCREPANCIES AND OMISSIONS/ADDENDA

Should you find discrepancies in or omissions from the Solicitation documents, or should their intent or meaning appear unclear or ambiguous, you must notify the contract administrator named in the Proposal Invitation Letter for resolution. Replies to such notices will be made in the form of an Addendum to the Solicitation documents issued simultaneously to all Offerors. You must acknowledge receipt of all Addenda in your proposal cover letter. Phoenix Constructors JV and/or Owner will not be bound by, and you must not rely on, any oral interpretations or clarifications of the Solicitation documents.

Deadline for the submittal of questions and inquires is provided in Section 1.0 above.

18.0 CONFIDENTIALITY AGREEMENT

You may be required to sign a confidentiality agreement for extra sensitive information provided to you. You will be informed about this in more detail during the job-walk.

19.0 RETURN OF DOCUMENTS

In the event that you decide not to submit a proposal, you are required to return all Solicitation documents to the contract administrator named in the Proposal Invitation Letter.

20.0 TAXES

This is a tax exempt project for all material that shall be permanently incorporated into the project at completion.

21.0 LOCAL LABOR AND SERVICES

Local contractors, including suppliers of materials, services and labor forces are to be utilized in performance of the Work to the maximum extent practical. For all labor, Offeror shall be in compliance with the Davis Bacon requirements as stated herein.

Each subcontractor MUST fully complete and sign the certified payroll provided in

Exhibit 24B on a weekly basis. As a prerequisite for payment, not limiting any other prerequisites for payment, the Subcontractor must **submit** all respective certified payrolls to the Contractor **at the time of invoicing.**

21.1 Contractors/Subcontractor shall mean those companies which are licensed or can be licensed to do business in the state of New York.

21.2 Labor forces shall mean personnel from qualified to perform the work for which they are employed.

22.0 SIGNATURE REQUIREMENTS

Your proposal must be signed by a duly authorized officer of your company. If your company is a corporation, the proposal must be signed in its name and on its behalf and under seal by a duly authorized signing officer of the corporation and must be accompanied by a certified copy of a resolution of the corporation authorizing such execution. The office held by the signing officer must be shown.

If you submit a proposal as a partnership or joint venture, you must submit with your proposal a "Power of Attorney" executed by all of the general partners or members of the joint venture designating and appointing one of the general partners or members of the joint venture as a "Management Sponsor," and authorizing the Management Sponsor to sign the proposal on your behalf, to act for and bind you in all matters relating to the proposal and, in particular, to agree that each partner or member of the joint venture are jointly and severally liable for any and all of the duties and obligations assumed by you under the proposal and the contract, if awarded. The proposal must be signed on behalf of the partnership or joint venture in its legal name by the Management Sponsor.

If requested by Contractor, satisfactory evidence of the authority of any signatory to sign on behalf of your company must be furnished.

Only unified sums, rates, prices, or conditions will be accepted. Sums, rates, prices or any conditions <u>which differ between individual parties of a partnership or joint venture</u> will <u>not</u> be accepted.

23.0 BONDING

23.1 Performance and payment bonds may be required in the penal sum of one hundred percent (100%) of the Contract Price for each bond. A separate price must be submitted for the cost of a performance bond and a payment bond. Refer to Exhibit 10 regarding format of required bonds. These bonds may be requested in the form of a bank guarantee or letter of credit.

23.2 <u>Bond Premium Reimbursement:</u> Phoenix Constructors JV shall reimburse the Subcontractor for any bonding premiums actually paid by the Subcontractor. As

and award based upon the original proposals without oral presentations, discussions, or negotiations.

25.3 Financial Capability Determination Information

PC reserves the right, prior to award, to require the Offeror to submit information that PC will use to make a determination whether the Offeror has the financial capability to perform the contemplated contract. Such information may include, but not be limited to: annual reports; lines of credit with financial institutions and suppliers; SEC Form 10K, and any other information that may be required by PC.

25.4 Single Proposal

In the event a single Offer is received, "PC" may conduct a price and/or cost analysis of the Offer. The Offeror may be required to furnish cost and pricing data to support this effort. Negotiations may be conducted with the single Offeror or the Offer may be rejected.

26.0 NOTICES TO OFFERORS

26.1 Precedence of Requirements

In the event of a conflict among the provisions, the RFP instructions, the RFP correspondence, other documents and the resulting contract, the terms of the contract shall govern.

26.2 Phoenix Constructors JV prohibits the participation of any of its respective affiliates in this solicitation process.

27.0 PROTEST PROCEDURES

If the instance arises that a Subcontractor feels that there are faults in Phoenix Constructors JV's procurement operations, the Subcontractor must file a formal protest. All protests must be received in writing and be concise and logically presented to facilitate review by the Phoenix Constructors JV. All protests will include:

- Name and address of the protestor including telephone and fax number and email address
- The solicitation title and number
- The contract title and number
- A statement concerning the protestor's interest in the award or non-award of the Subcontract/Purchase Order for the purpose of filing the protest
- A comprehensive statement of the legal and factual grounds for the protest that must include a detailed description of the resulting prejudice to the protestor
- Copies of all relevant and supporting documents and information

ATTACHMENT "B" DATED 11/14/03

Bid Breakdown

		A West Bathtub	B One Line	C East Bathtub	D Totals
1	Tons of Steel				
2	Steel Material price				
3	Fabrication Price				
4	Intumescent Coatings				
5	Shipping and Handling FOB Job Site				
6	Erection Labor				
7	Metal Deck and Studs Labor and Material				
8	Precast Concrete Labor and Materials				
9	Erection Equipment				
10	Temporary Construction				
11	Engineering				
12	Quality Control				
13	Totals				

Instructions

i Insert in line 1 the tonnage of steel to be fabricated and erected.
ii Insert in lines 2 thru 12 the dollar value of the work described
iii Insert in column D the sum total of columns A, B, and C for each row1 thru 12
iv Insert in row 13 the sum total of rows 2 thru 12 for each column A, B, and C
v Insert in cell 13D the sum total of cells 2D thru 12D. This total shall be equal to the sum total of cells 13A thru 13C
vi The Value in Cell 13D must equal the Bid Amount.

DCM ERECTORS INC.

December 12, 2008

Phoenix Constructors, JV
115 Broadway
18th Floor
New York, NY 10006
Attention: Mr. Javed Querishi, Contract Administrator

Reference: Prequalification Information for DCM Erectors, Inc
RFP/Contract No.: W0TC-GC1-2-KN0186-020
Station Construction and Transit Hall Structure to Grade
Structural Steel, Intumescent Coating, Metal Deck & Precast Work
New York, NY

Dear Mr. Querishi:

We enclose an original and two copies of our bidder prequalification package as requested in your November 21, 2008 Proposal Invitation Letter.

Please feel free to contact us should you have any questions relative to our organization/capabilities.

Very truly yours,
DCM Erectors, Inc

Jeffrey S. Gannett
Vice President

1

ERECTORS INC.

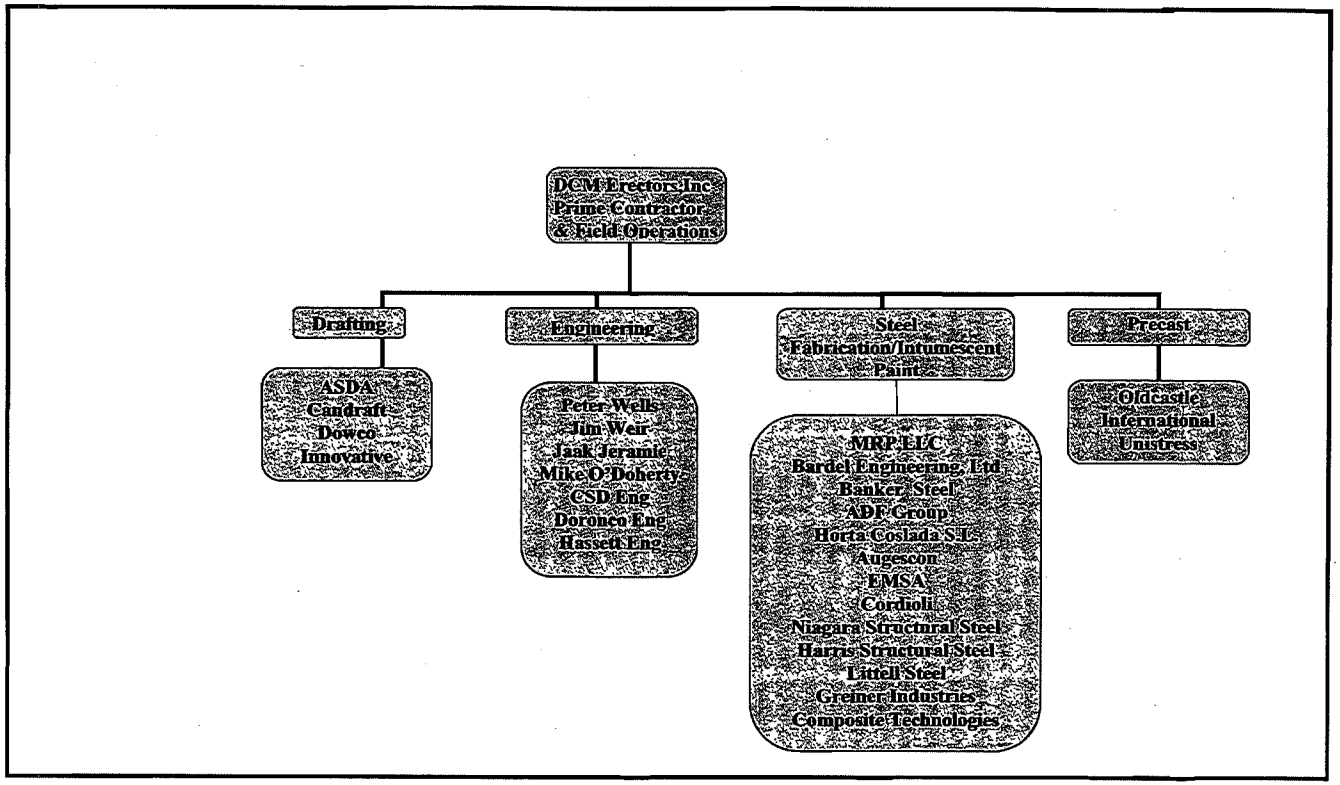
110 East 42nd Street
Suite 1704
New York, NY 10017
Tel. (212) 599-1603 Fax (212) 599-1615

Prequalification Item No.: ***2.2 Team Members***
RFP/Contract No.: W0TC-GC1-2-KN0186-020
Station Construction and Transit Hall Structure to Grade
Structural Steel, Intumescent Coating, Metal Deck & Precast Work
New York, NY
December 12, 2008

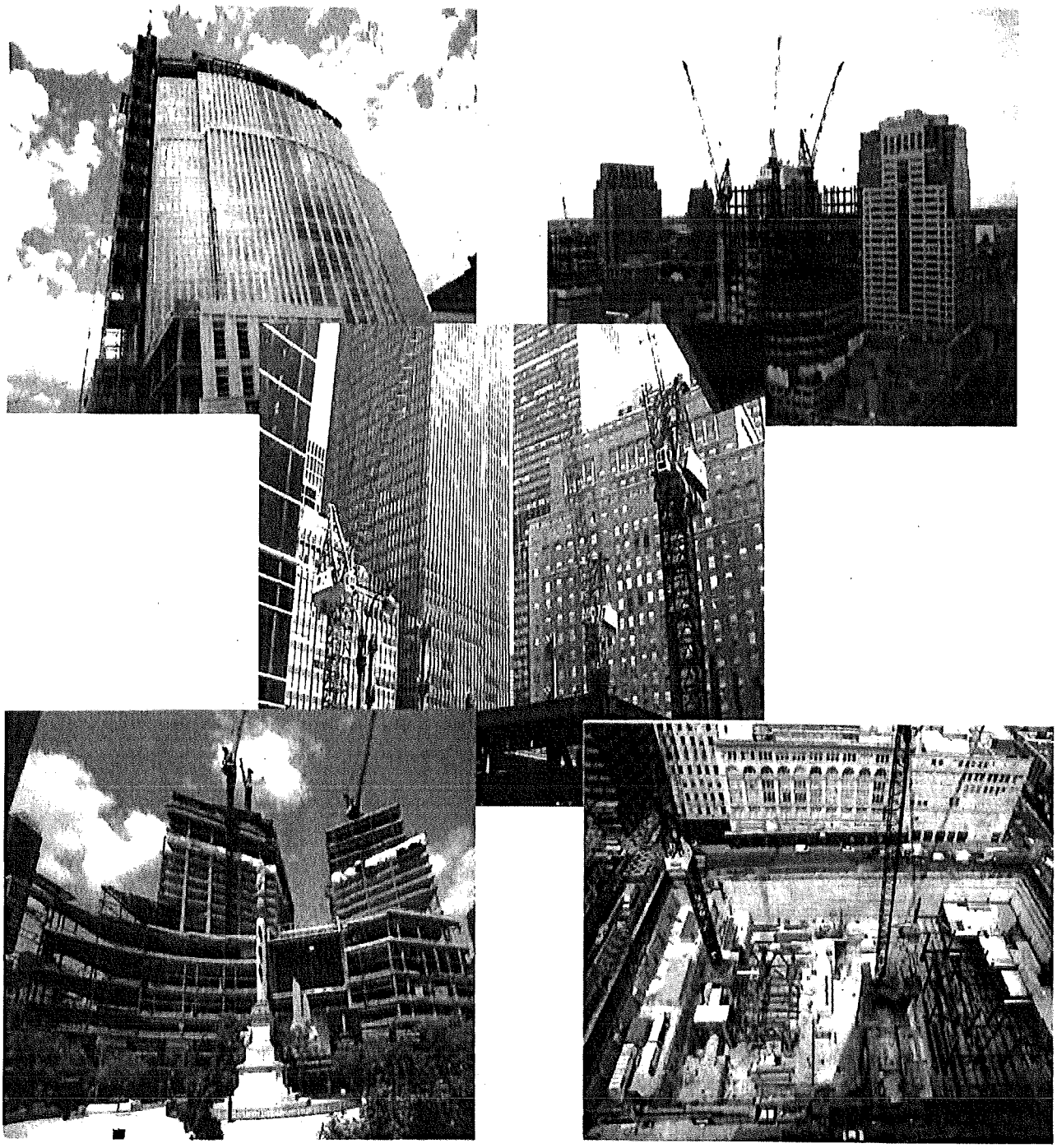
DCM Erectors, Inc intends to be the Prime Contractor. DCM will be responsible for all phases of the project from drafting/engineering and day to day administration through final installation of all materials in accordance with plans and specifications. We have attached an organizational chart which groups our current subcontractors into categories of Drafting, Engineering, Steel Fabrication/Intumescent Coating and Precast. DCM Erectors, Inc will self perform all field operations. We have listed multiple firms for each category so as to have ample capacity to accomplish this work in the tight time constraints as outlined at the Pre- Bid Meeting of December 3, 2008.

DCM Erectors, Inc
Phoenix Constructors, JV
RFP/Contract No. : W0TC-GC1-2-KN0186-020
Station Construction and Transit Hall Structure to Grade
Structural Steel, Intumescent Coating, Metal Deck & Precast Work
New York, NY

Stage One Proposed Team Members



DCM ERECTORS, INC.



110 East 42nd Street, Suite 1710, New York, NY 10017
Phone: (212) 599 - 1603, Fax: (212) 599 - 1615

Please visit us at **www.dcmerectors.com**

Dated July 15, 2004

PICTURES ON THE COVER

Upper Left	U. S. Federal Courthouse, Tillary and Adams street Brooklyn, NY Structural Steel and Curtain Wall System erection.
Upper Right	330 Jay Street Family Courthouse, Brooklyn, NY Structural Steel and Precast erection.
Center	Bear Sterns, 383 Madison Avenue, New York, NY Structural Steel erection.
Lower Left	AOL – Time Warner, 10 Columbus Circle, New York, NY Structural steel erection.
Lower Right	731 Lexington Avenue, New York, NY Structural steel erection.

WHO WE ARE

We are a vertically integrated steel construction company. As a member of The Davis Group of Companies, we have access to the services of our other affiliated companies providing drafting, engineering, proprietary tower crane climbing systems, crane logistics plans, metal decking installation, furnishing and installation of miscellaneous iron, curtain wall/window/storefront installation, pre-cast panel installation and structural steel fabrication. We attach a list of our affiliated companies and their specialties for your records. We have a major equipment yard (Federated Equipment) and emergency repair steel fabrication facility (MRP,LLC) located in South Plainfield, NJ which can perform last minute changes and assemble smaller components into large modules to facilitate tricky job site logistical problems.

WHAT WE CAN OFFER

Services we can provide:

- Project Management
- Coordination
- Logistics, planning and scheduling
- Cranes or other specialized equipment (logistics and sourcing).
- Drafting/Engineering
- Fabrication

We can install the following:

- Deck.
- Structural steel
- Miscellaneous metal.
- Curtain wall panels.
- Precast panels.
- Window systems.

Equipment we own:

- 1 TG-1900 Tower Crane
- 2 TG-1500 Tower Crane
- 1 Favco 220 Tower Crane
- 35 Ton Timberland Stiff Legg Derrick
- 6 Internal (Basket) Jumping Systems
- 2 External (Top Climber) Jumping System
- 2 Generators
- 3 Compressors
- 70 Welding Machines (Various power source)
- 1 20' Flat bed
- Office and men trailers
- 20' containers for storage
- 3 OSHA approved Rescue Basket
- Our own designed Fall Protection System.
- Hand tools such as TC Guns, Impact wrench, reamers, chain-fall, come-a-long, hydraulic jacks, survey equipment, hand tools, etc...

NOTE: Through Federated Equipment we also have exclusive access to 4 additional TG-1900 Tower Cranes.

THE DAVIS GROUP OF COMPANIES

DCM Erectors, Inc., (Canada)
25 Belfield Road, Etobicoke, ON, M9W 1E8
Phone: 416-241-6967, Fax: 416-241-3239
Installers of structural steel for new grass roots/ refurbished structures and transportation projects

DCM Erectors, Inc., (U.S.)
110 East 42nd Street, Room 1710, New York, NY 10017,
Phone: 212-599-1603, Fax: 212-599-1615
Installers of structural steel for new grass roots/ refurbished structures and transportation projects

Federated Equipment Company, LLC,
220 Wyckoff Avenue, Piscataway, NJ 08854,
Phone: 732-968-6061, Fax: 732-968-6998
Design, manufacture, maintenance and instalation of sophisticated high rise climbing tower crane solutions for steel and concrete buildings.

Solera Construction, Inc/DCM Erectors, Inc, J. V.,
110 East 42nd Street, Room 1710, New York, NY 10017,
Phone: 212-599-1603, Fax: 212-599-1615
Installers of metal decking, miscellaneous metals, curtain wall and precast concrete for building and transportation projects

MRP, LLC,
1640 New Market Avenue, South Plainfield, NJ 07080,
Phone: 732-968-6061, Fax: 732-968-5675
Suppliers of structural steel to the trade, manufacturer of highly engineered crane parts and spectacular sign structures.

Automated Steel Detailing Associates Ltd.,
25 Belfield Road, Rexdale, Ontario M9W 1E8.
Phone: 416-241-6967, Fax: 416-241-3239
Providers of drafting and engineering to the trades for crane logistics, field work and fabrication drawings.

Bardel Engineering
Snow Valley Road, Barrie, ON
Phone: 705-730-1551, Fax: 705-730-7618
Suppliers of structural steel to the trade and pre-engineered temporary bridges.

Torway Construction Ltd.
Paradise Beach Road, P. O. Box CR-55236, Nassau, Bahamas
Phone: 242-363-5206, Fax: 242-557-3395
General contractor that can resolve your needs for building a private home, condos or commercial building.

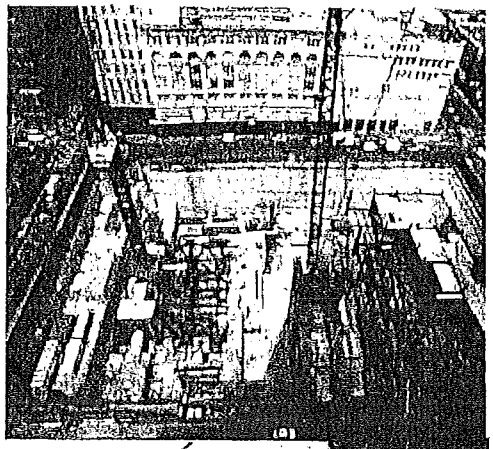
PAST PROJECTS

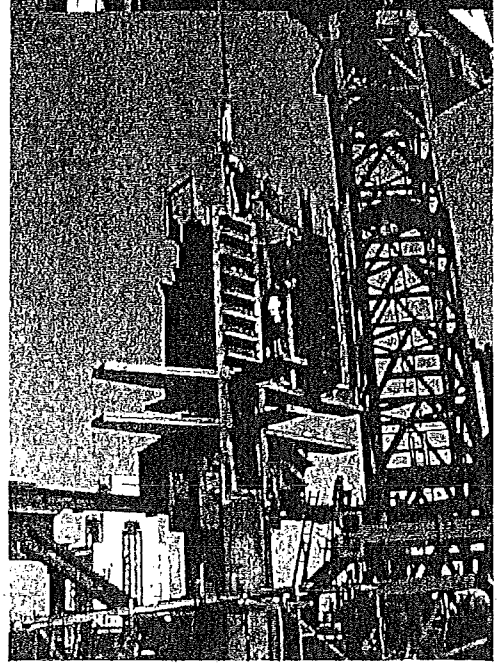
Project Name	Description	Customer
383 Madison Avenue	High rise building	Turner Construction Co
Meyers Garage	Mid rise building	J. A. Jones - GMO
New York Public Library	Addition to existing building	F. J. Sciame
Brooklyn US Federal Courthouse	High rise building	J. A. Jones - GMO
360 Madison Avenue	Addition to existing building	Pavarini
Random House	High rise building	Plaza Construction
Whitehall Ferry Terminal	Low rise building	Tishman/Harris
Columbus Circle	Twin tower high rise	Bovis Lend Lease
330 Jay St., Family Courthouse	High rise	Turner Construction Co
731 Lexington Avenue	High rise	Bovis Lend Lease
St Francis College	Addition to existing building	R. C. Dolner
Columbus University, Social Studies	High rise	Bovis Lend Lease
Calhoun School	Addition to existing building	F. J. Sciame
Fulton Fish Market	Warehouse type building	Turner Construction Co

ONGOING OR FUTURE PROJECTS

Project Name	Description	Customer
Metropolitan Museum of Art	Renovation of 2 Wings	R. C. Dolner
Pierpont Morgan Library, NY, NY	Low rise building	F. J. Sciame
555 West 23rd Street, NY, NY	1st floor of in steel	Levine Brothers
Home Depot @ 731 Lex. Ave. NY, NY	Tenant fit-up	Bovis Lend Lease
Pepsi Sign, Queens, NY	Structural Steel	Landmark Sign
580 Fifth Avenue	Elevator Core Addition	Pavarini/McGovern

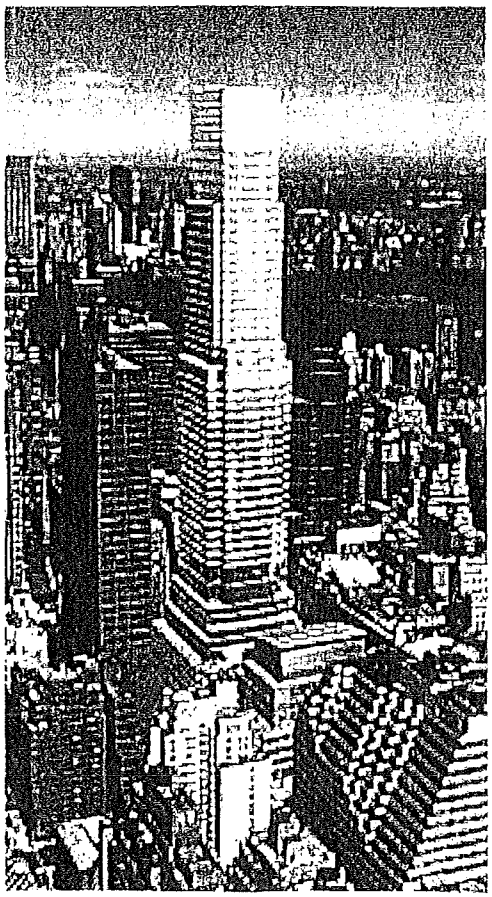
731 Lexington Avenue - New York, NY



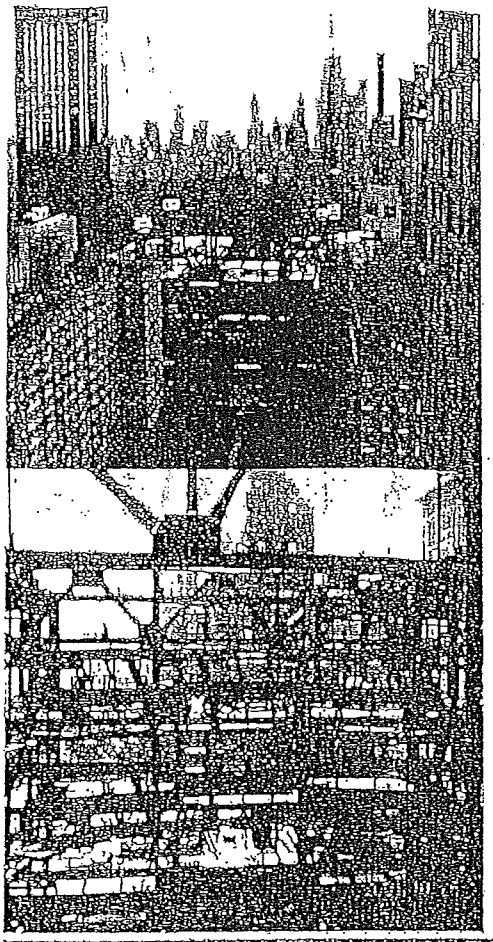


Bloomberg Financial @ 731 Lexington Avenue, NY, NY.
30 Steel Floors, 23,000 Tons, 1.1 million sf metal deck,
Thornton-Tomasetti, PC – Structural Engineers,
Bovis Lend Lease LMB, Inc- Construction Manager,
ADF Group, Inc, Terrebonne, Quebec- Steel Fabricator

Another hybrid composite structure consisting of a 15 floor low rise retail/mechanical space connected to a 30 steel floor/20 floor reinforced concrete residential tower via a four floor pipe truss/AESS cafeteria/atrium. The steel structure utilized plate box type columns up to 8 inches in thickness. These columns were field welded together to form a stiff structure to accept the residence above. The project used three tower cranes (Two self climbing in the steel tower portion. One "Free Standing" in the low rise retail area). Federated Equipment later modified and repositioned one crane for the Superstructure Concrete Contractor's use.

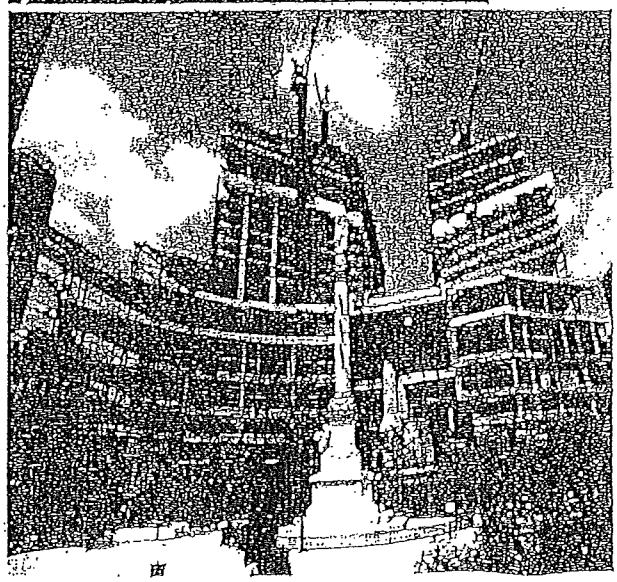


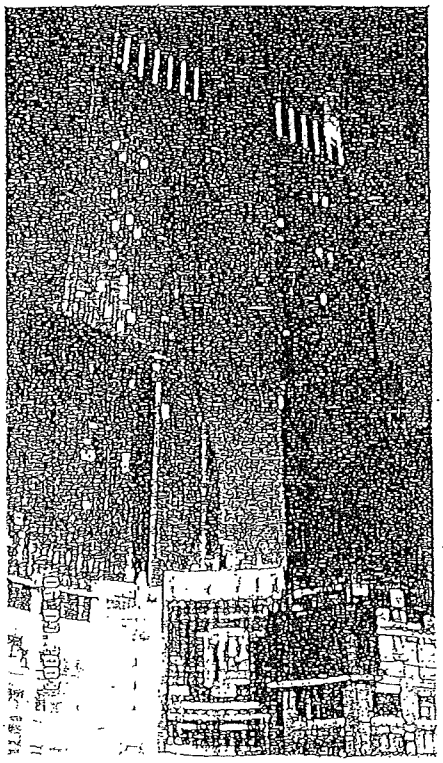
AOL/Time Warner Center - New York, NY



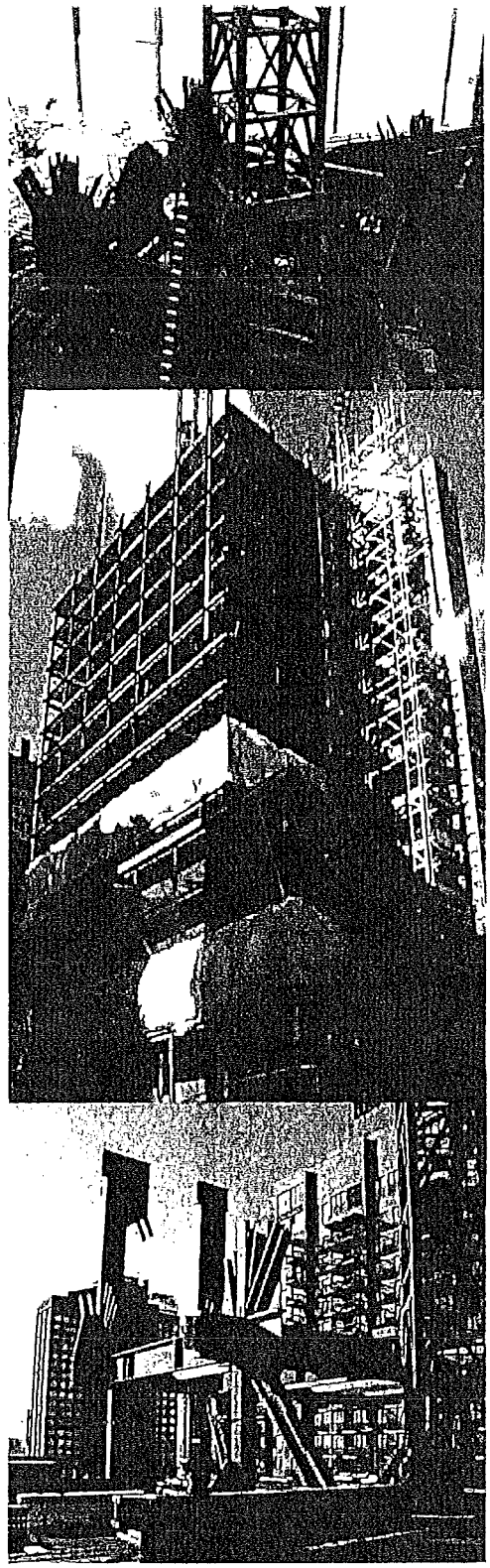
AOL/TimeWarner Center, 10 Columbus Circle, NY, NY 24 Floors and 19 floors respectively, 23,000 Tons,
2.1 million sf Metal Deck,
Cantor-Seinuk, PC – Structural Engineer,
Bovis Lend Lease LMB, Inc – Construction Manager,
ADF Group, Inc, Terrebonne, Quebec- Steel Fabricator

Two steel towers on top of a two (2) block area building podium. These two towers supported an additional thirty (30) floors of residential/hotel on top of them. There were seven (7) individual owner/tenants each with their own unique structure requirements which had to be accommodated and schedule maintained. This was the second in a series of composite structures which utilize reinforced concrete as a vertical/lateral stabilizing diaphragm material requiring extremely close coordination with superstructure concrete contractor. Federated Equipment Company, LLC provided up to five (5) cranes to construct this project. Four of these cranes were tower cranes. Federated later modified two of these tower cranes to meet the superstructure concrete contractor's specifications for location, line speed and reach.



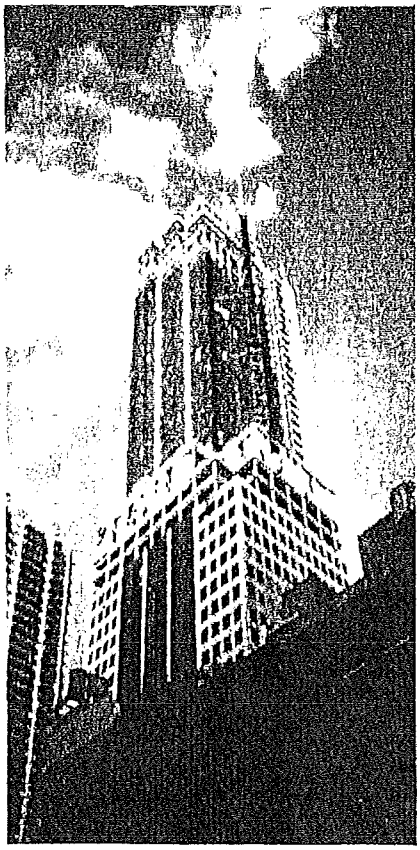


Random House - New York, NY

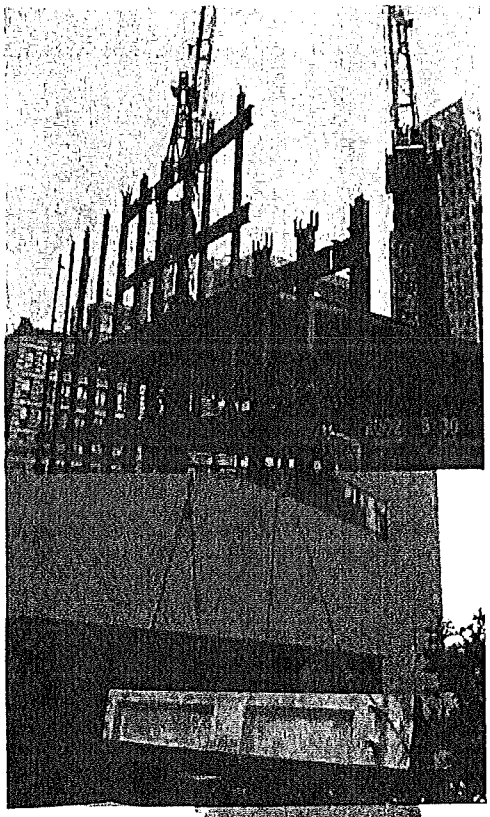


Random House, 1767 Broadway, NY, NY
26 Steel Floors, 12,000 tons ,
800,000 sf metal deck, Precast Stairs,
Thornton-Tomasetti, PC – Structural Engineers,
Plaza Construction, Inc- Construction Manager,
ADF Group, Inc, Terrebonne, Quebec-Steel Fabricator

This was another hybrid composite structure with 26 intense steel floors for one tenant and an additional 30 floors of reinforced concrete construction for a hotel/residence. Steel was very heavy due to slenderness of overall structure with massive weight of concrete structure transferred to steel and foundations below. One of the first users of a precast stair system in a high rise. Stairs arrived on site as a unit and were able to be utilized almost immediately for other trade access to work floor with out need for temporary wood treads or concrete fill. Two self climbing cranes were utilized. Federated Equipment performed crane modification/repositioning for superstructure concrete contractor.

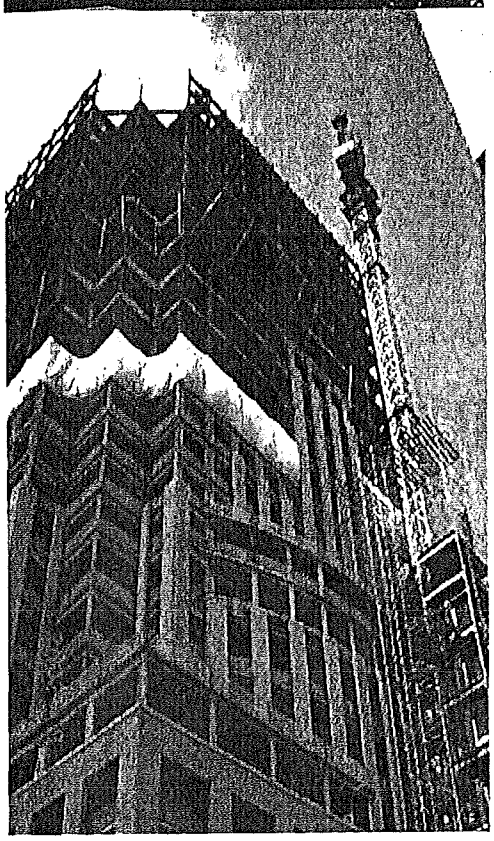


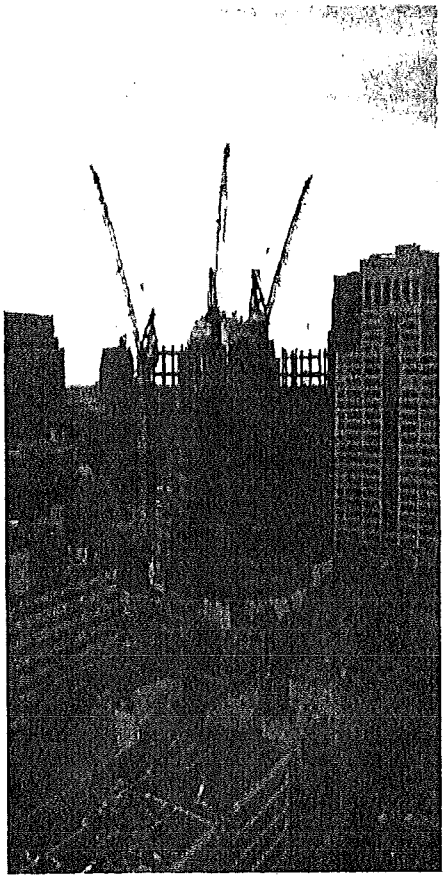
330 Jay Street - Brooklyn, NY



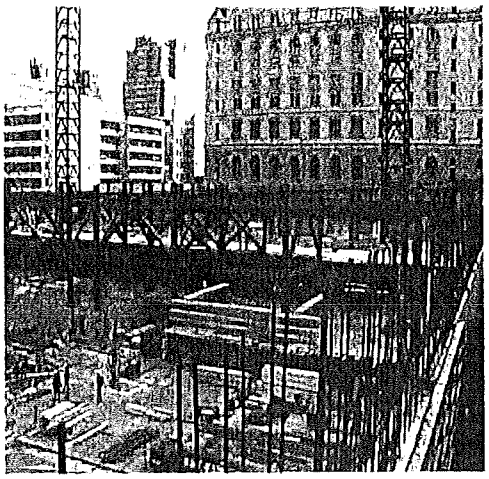
New Family Courthouse, 330 Jay Street, Brooklyn, NY
32 Floors, 15,400 tons, 1.3 million sf Metal Deck,
805 Architectural Precast Column Covers,
Gilsanz, Murray & Stefieck, PC – Structural Engineers,
Turner Construction- Construction Manager,
Owen Steel Company, Inc, Columbia, SC-Steel Fabricator

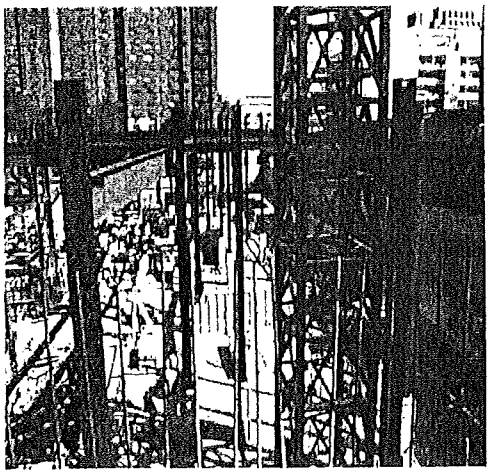
This tall New York City Family Court Building utilized a Vierendeel "tree" type column exterior. With this type structure, you get excellent building stiffness and also "Progressive Collapse" criteria. The concept also allows for less erectable pieces than one would normally have in a conventional type structure. It also provides uniform window spacing on a regular pattern. Three self-erecting tower cranes were utilized on this site for schedule purposes and precast installation requirements. Some of the corner column covers exceeded 44,000 lbs in capacity and had to be passed to the other cranes due to site logistics and subway requirements.





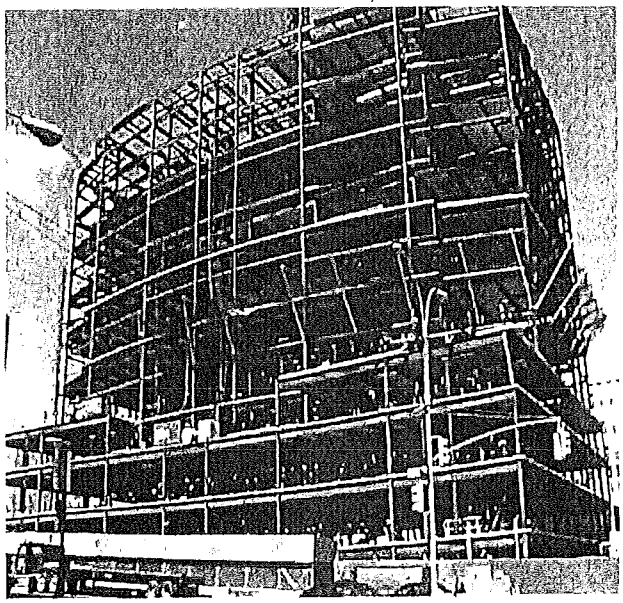
New US Federal Courthouse - Brooklyn, NY



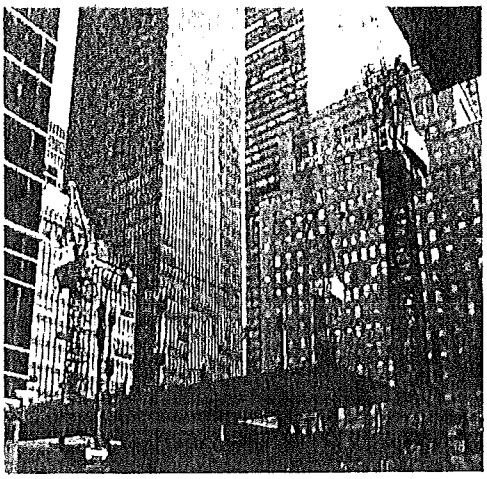


225 Cadman Plaza, Brooklyn, NY
15 Floors, 3600 Tons, 600,000 SF Metal Deck,
Narov Associates, PC- Structural Engineers,
Jones-GMO – Construction Manager,
ADF Group, Inc, Terrebonne, Quebec – Steel Fabricator

This new era curved façade Federal Courthouse was attached to a 10 story high reinforced concrete atrium which had a curved skylight on top of it. This project was the first in the area to utilize "progressive collapse" design criteria. This criteria allows for the "sacrificing" of certain columns while maintaining building stability should there be an incident at the facility. This project originally started with two (2) external climbing cranes and finished with one internal self climbing tower crane due to schedule issues.

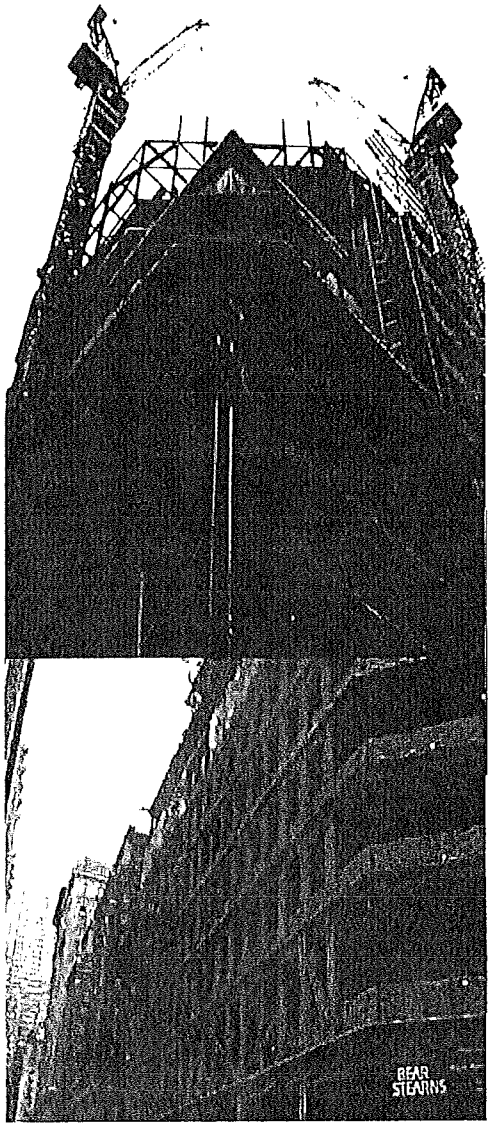


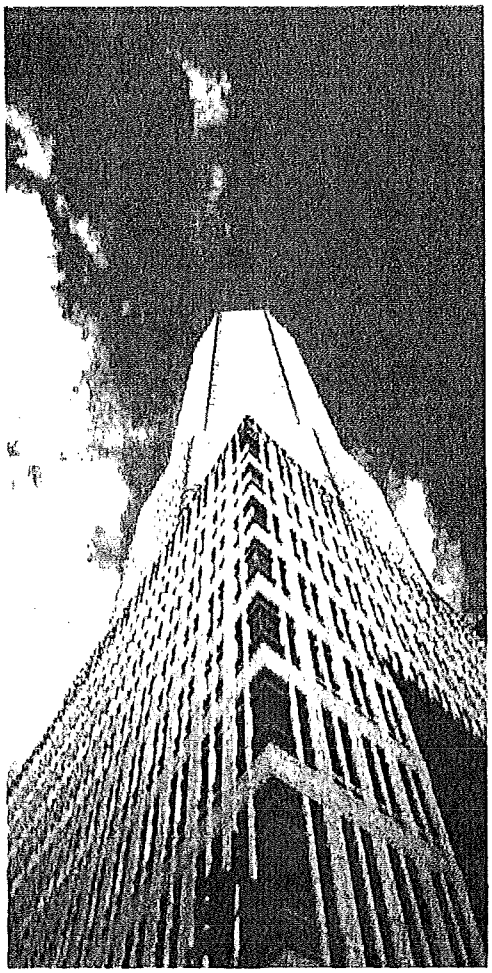
Bear Sterns Headquarter - New York, NY



383 Madison Avenue, NY, NY
50 Floors, 18,000 Tons, 1,100,000 SF of Metal Deck,
Cantor - Seinuk, PC – Structural Engineer,
Turner Construction – Construction Manager,
ADF Group, Inc, Terrebonne, Quebec – Steel Fabricator

Unlike normal projects, this one was "out of the hole at twentieth floor." The building foot print was an entire city block with Metro North Commuter Railroad tracks running beneath on one side and deep rock excavation foundation on the other. This city block really wanted to become the hexagonal office towers after the twentieth floor. The majority of the building columns were "sloped" attempting to line up with the hexagonal tower. Three self-climbing tower cranes were utilized and were repositioned as required to accommodate the changing framing and the uniqueness of the site.

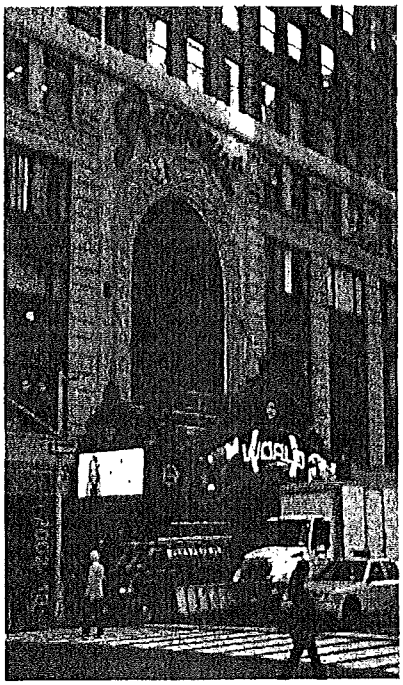


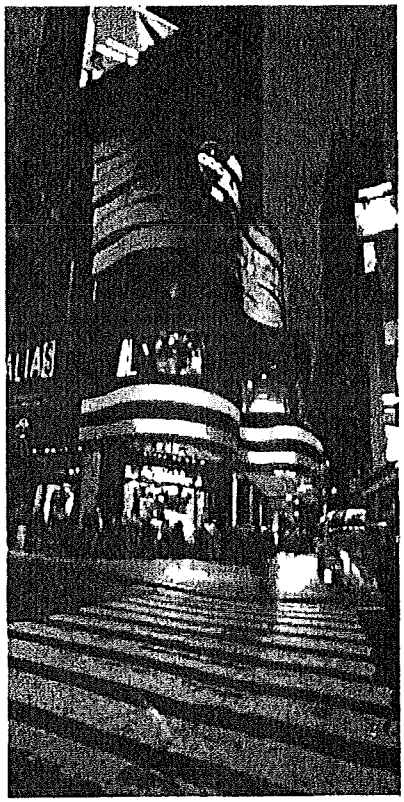


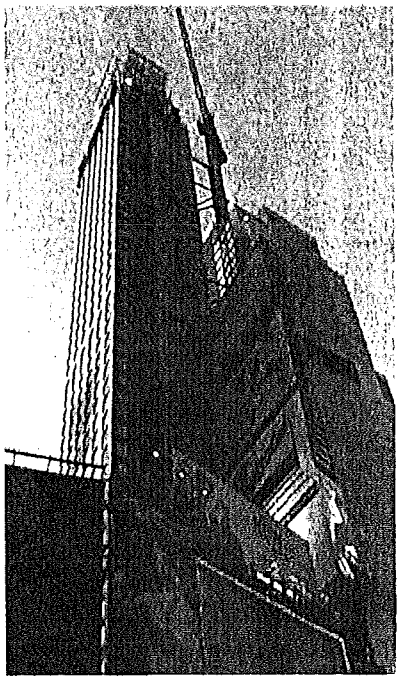
In addition, DCM Principals/Employees have worked on the following additional structures with previous employers:

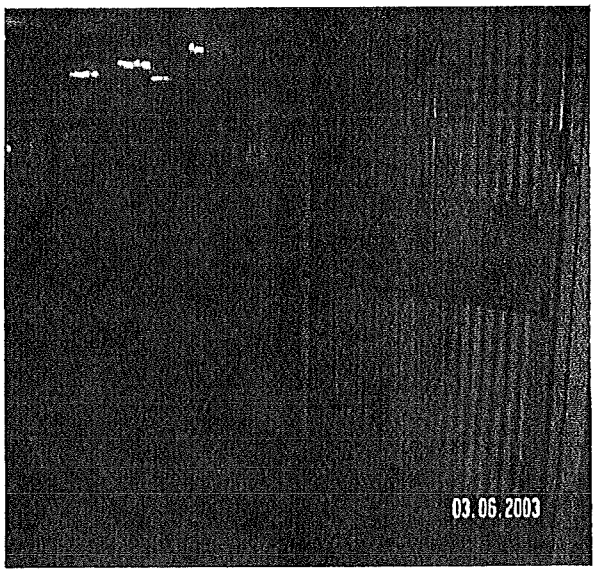
a. Battery Park City, NY, NY- Towers A, B, C & Winter Garden
b. Swiss Bank Tower, NY, NY
c. Four Times Square, NY, NY
d. 1133 Avenue of The Americas, NY, NY
e. 730 Third Avenue, NY, NY
f. Park Avenue Atrium, NY, NY
g. Madison Square Garden Sky Boxes & Felt Forum Theater, NY, NY
h. Lehman College Natatorium, Bronx, NY
i. Hostos Community College Academic Center, Bronx, NY
j. 125 East 57th Street, NY, NY
k. Grand Central Terminal Modifications, NY, NY
l. US Air Terminal, Laguardia Airport, Queens, NY
m. Terminal One, JFK Airport, NY, NY
n. Terminal Four, JFK Airport, NY, NY
o. New York Hospital over FDR Drive, NY, NY
p. Hospital for Special Surgery over FDR Drive, NY, NY
q. Stadium 1 USTA, Flushing Meadows, NY
r. Bertlesmann Building Modifications and Sign Structure, 1540 Broadway, NY, NY
s. John Jay College of Criminal Justice, NY, NY
t. One Canadian Place, Toronto, Ontario

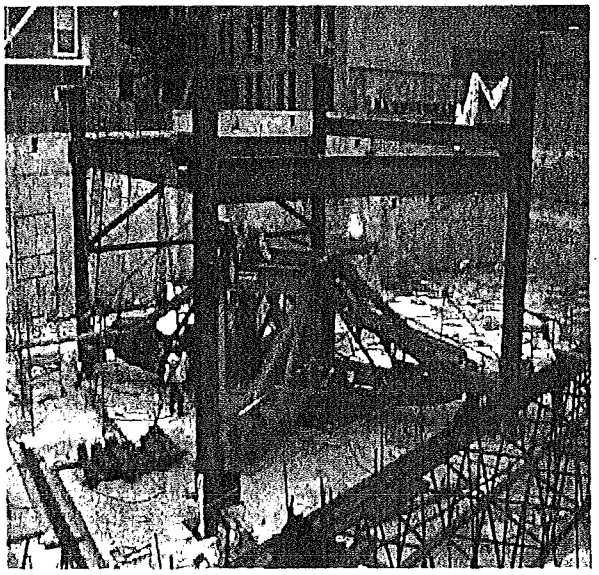
MRP L. L. C.











1640 New Market Avenue, South Plainfield, NJ 07080

Daled March 03, 2004

MRP L. L. C.

Phone: (732) 968 - 6061, Fax: (732) 968 - 5675

PICTURES ON THE COVER

Upper Left	WWF Marquis/Sign Structure, 1501 Broadway Avenue, New York, NY.
Upper Center	Good Morning America – ABC Studios/Window Mullions/Ribbons Sign Structure, 1500 Broadway Avenue, New York, NY.
Upper Right	Planet Hollywood Crown, East Face and Free Standing Sign Structure, 1567 Broadway Avenue, New York, NY.
Lower Left	Brass Grab Rail ADA Improvements, Grand Central terminal, New York, NY
Lower Right	Internal Climbing Tower Crane Base/Lower Basket Assembly complete with machined parts, pins and hydraulics, Columbia University School of Social Science, New York, NY

Dated March 03, 2004

WHO WE ARE

A structural and specialty steel fabrication plant centrally located in South Plainfield, New Jersey. We have the ability to fabricate projects both large and small in our 63,000 square feet shop, our staff of 25 fabricators and with a yearly capacity of 7,500 tons. As a member of the Davis Group we have access the services of other affiliated company providing drafting, equipment and erecting services.

WHAT WE CAN OFFER

Services we can provide:

- Project Management
- Coordination
- Logistics, planning and scheduling
- Cranes or other specialized equipment (logistics and sourcing).
- Drafting/Engineering
- Fabrication

We can install the following:

- Deck.
- Structural steel
- Miscellaneous metal.
- Curtain wall panels.
- Precast panels.
- Window systems.

THE DAVIS GROUP OF COMPANIES

DCM Erectors, Inc., (Canada)
25 Belfield Road, Etobicoke, ON, M9W 1E8
Phone: 416-241-6967, Fax: 416-241-3239
Installers of structural steel for new grass roots/ refurbished structures and transportation projects

DCM Erectors, Inc., (U.S.)
110 East 42nd Street, Room 1710, New York, NY 10017,
Phone: 212-599-1603, Fax: 212-599-1615
Installers of structural steel for new grass roots/ refurbished structures and transportation projects

Federated Equipment Company, LLC,
220 Wyckoff Avenue, Piscataway, NJ 08854,
Phone: 732-968-6061, Fax: 732-968-6998
Design, manufacture, maintenance and instalation of sophisticated high rise climbing tower crane solutions for steel and concrete buildings.

Solera Construction, Inc/DCM Erectors, Inc, J. V.,
110 East 42nd Street, Room 1710, New York, NY 10017,
Phone: 212-599-1603, Fax: 212-599-1615
Installers of metal decking, miscellaneous metals, curtain wall and precast concrete for building and transportation projects

MRP, LLC,
1640 New Market Avenue, South Plainfield, NJ 07080,
Phone: 732-968-6061, Fax: 732-968-5675
Suppliers of structural steel to the trade, manufacturer of highly engineered crane parts and spectacular sign structures.

Automated Steel Detailing Associates Ltd.,
25 Belfield Road, Rexdale, Ontario M9W 1E8.
Phone: 416-241-6967, Fax: 416-241-3239
Providers of drafting and engineering to the trades for crane logistics, field work and fabrication drawings.

Bardel Engineering
Snow Valley Road, Barrie, ON
Phone: 705-730-1551, Fax: 705-730-7618
Suppliers of structural steel to the trade and pre-engineered temporary bridges.

Torway Construction Ltd.
Paradise Beach Road, P. O. Box CR-55236, Nassau, Bahamas
Phone: 242-363-5206, Fax: 242-557-3395
General contractor that can resolve your needs for building a private home, condos or commercial building.

Dated March 03, 2004

PAST PROJECTS

Project Name	Description	Customer
1501 Broadway Marquee	Sign Structure	Gabe Construction
GCT Service Platform	Miscellaneous Metals	Innovax Pillar
USTA - Sign	Sign Structure	Innovax Pillar
GCT – ADA Renovations	Miscellaneous Metals	Innovax Pillar
ABC Studios at Time Square	Mullions and Sign Structure	Tishman
Planet Hollywood	Sign Structure	J. A. Jones - GMO
NASDAQ – Time Square	Sign Structure	Landmark Signs
4 Season Hotel – 58 Street NY	Window System	Tishman

ONGOING PROJECTS

Project Name	Description	Customer
731 Lexington Avenue	Tenants Fit-Out	Bovis Lend Lease
The Calhoun School Phase II	Structural Steel	F. J. Sciame
71 Walker St, Chicago	Modification to Crane Basket & temp. steel	Federated Equipment
111 Wacker Dr. Chicago	Modification to Crane Basket & temp. steel	Federated Equipment
Pierpont Morgan Library, NY, NY	Structural Steel and Metal Deck	F. J. Sciame
555 West 23rd Street, NY, NY	Structural Steel	Levine Brothers
Home Depot @ 731 Lex. Avenue, NY, NY	Structural Steel and Metal Deck	Bovis Lend Lease
Pepsi Sign, Queens, NY	Structural Steel	Landmark Sign

Dated March 03, 2004