PORT AUTHORITY NY NJ

Design Standards Unit

Mechanical, Electrical & Plumbing

Presentation to Port Authority TCAP Community

03.22.2022

AIR LAND RAIL SEA

Dept. / Personnel

- Kehinde Odunsi — Plumbing
- Frank Cuttita — Mechanical
- Jay Patel and Juan Ramirez — Electrical….< 5 kV

PORT AUTHORITY NY NJ

Plumbing Code Review

Presentation to Port Authority TCAP Community

03-22-2022

Kehinde Odunsi, PE
Sr. Engineer QAD

AIR LAND RAIL SEA

Review Process (Plumbing)

Reference Codes and Standards

- **NYC Construction Codes**
- 2014 NYC Building Code
- 2014 Fuel and Gas Code
- 2014 NYC Plumbing Code

- **New Jersey UCC as adopted NJAC 5:23**
- 2018 International Building Code, NJ Edition
- 2018 International Fuel and Gas Code
- 2018 National Standard Plumbing Code, New Jersey



Review Process (Plumbing)

Plumbing Review

- Work types – Minor additions, alterations or repairs – shall comply with current code provisions unless left in same arrangement and not hazardous. If your work falls under an alteration, it needs to be submitted.

- Scenario – Plumber removes a toilet that was leaking water to space below. Plumber realizes that cause of leak was old due to old lead piping. The lead piping should be removed and replaced with material acceptable for use as per 2014 NYC Plumbing Code.
- Plumbing fixture counts - prior code buildings have the option to use either the 1968 or 2014 NYC Plumbing Code.



Review Process (Plumbing)

Plumbing Review

- Materials
- Sanitary and Vent systems – Table 702.1 (PVC not permitted aboveground within buildings – 2015 TCRM requirement).
- Storm water systems – Table 1102.4 (PVC not permitted aboveground within buildings – 2015 TCRM requirement).
- Domestic water systems – Tables 605.3, 605.4, 605.5 and 605.8.*
- *Press and push fit joints are permitted as clarified in Buildings Bulletin 2010-010



Review Process (Plumbing)

Plumbing Review

- **Plumbing Fixtures**
- Need to show in a fixture schedule
- Specifications should indicate type, make, model along with required flow rates, and pressures.
- Summation of loads (fixture units, gpms) – clarify for new systems in addition to showing pipe sizes.
- **Water heaters**
- Load calculations
- Locations of discharge piping from temperature/pressure relief valve – must be visible.
- Maintenance of water temperature where distances exceed 20 feet to the farthest fixture (PC 607.1).



Review Process (Plumbing)

Plumbing Review

- **Backflow prevention**
- Primary – water service piping (PC 608.4) as per NYC DEP – approval required.
- Secondary, sprinkler and standpipe – (PC 608.3, 608.15, 608.16, and 608.17). Includes air gaps, vacuum breakers and double check valves. Some examples – coffee makers, pumps, dishwashers, etc.…
- **Indirect waste –** discharge is not via a hard connection to sanitary system **–** NYC Plumbing Code, Chapter 8 - sprinkler drain shall discharge via indirect waste (i.e. mop sink, standpipe, floor drain, etc…) – must be properly sized.
- **Grease waste interceptors, and oil separators –** if you have any discharge that is detrimental or can harm sewer pipes or cause harm to the sewer it cannot be discharged directly into the sewer (PC 302, Chapter 10).



Review Process (Plumbing)

Plumbing Review

New Gas Piping – shall be installed as per 2014 NYC Fuel and Gas Code. New piping shall require calculations for determination of pipe sizes, indicate assume pressure, pressure drop and total cfh.

Permanent sanitary and water connections*

- Every building in which plumbing fixtures are installed shall have drainage piping and be connected to the sewer (PC 701.2).
- Every structure equipped with plumbing fixtures and utilized for human occupancy shall be provided with potable water (602).
- Majority of trailers require permanent water hookups.

***Exception –** port a john shall be permitted for construction trailers with construction workers only (no office activity, or business, etc…).



Review Process (Plumbing)

Plumbing Review

Storm Drainage

- Sizing of drainage to include vertical and horizontal drain lines (PC 1105).
- Secondary drainage where roof perimeter extends above roof (PC 1107).

Flood Hazard Resistance (PC 309) – A lot of our PA properties and structures are in flood hazard areas (Appendix G – 2014 NYC Building Code).



MEP Review Process

Code Compliance

- Reviews are based on the requirements of the applicable mechanical codes adopted by each local jurisdiction in which the Port Authority has facilities, as well as the requirements of the Port Authority Tenant Construction Review Manual (the TCRM).
- Reviews are performed by individual reviewers, in collaboration with the other reviewers in QAD DSU. All comments are vetted prior to being formally issued.
- Review dispositions are either Conceptual, Disapproved, Conditionally Approved, or Full Approval.

Basic Information

Review Elements

- QAD audits the construction documents to confirm that the design complies with code requirements, including but not limited to those for fresh outside air ventilation, fire barrier and smoke control barrier integrity.

- Any tenant initiated construction that exceeds Minor Work status is a TAA and must be reviewed by QAD – DSU.

- QAD audits conceptual designs and provides guidance but only recommends approval for construction when the construction documents are complete and signed and sealed by a licensed architect or engineer, registered in the state in which the project occurs.

PORT AUTHORITY NY NJ

Mechanical Code Review

Presentation to Port Authority TCAP Community

03-22-2022

Frank Cuttita, PE
Sr. Engineer QAD

AIR LAND RAIL SEA

Review Process (Mechanical)

Reference Codes and Standards

i. New Jersey: 2018 International Mechanical Code, NJ Edition

ii. New Jersey: New Jersey Uniform Construction Code, (Section 5:23)

iii. New Jersey: Energy Subcode: ASHRAE 90.1 - 2016

iv. New York City: 2014 New York City Mechanical Code

v. New York City: 2020 New York City Energy Conservation Code

Review Process (Mechanical)

Reference Codes and Standards (cont.)

vi. New York City: 1968 New York City Mechanical Code

vii. New York State: 2020 International Mechanical Code of NYS

viii. New York State: 2020 International Conservation Code of NYS

TENANT CONSTRUCTION REVIEW MANUAL

Requirements Highlights

- Airport Fueling
- PABT Fire /Smoke Dampers
- Use of PVC

Mechanical Review

Systems Presented Today

- Rooftop Supply Air and Exhaust Air Equipment
- Fire and Combination Fire/Smoke Dampers
- Kitchen Cooking Appliance Exhaust Hoods and Associated Equipment

ROOFTOP SUPPLY AIR OR EXHAUST AIR EQUIPMENT

Equipment Significance

- Can weigh anywhere from 200 to 30,000 lbs, or more
- Require openings (penetrations) in the roof structure for sheetmetal ductwork penetrations
- The installation may require separate penetrations for gas and electrical
- Requires framing for the openings (for passage of ductwork)
- Typically requires supplemental support steel to carry the weight of the units.

ROOFTOP SUPPLY AIR OR EXHAUST AIR EQUIPMENT

Submittal Problems / Omissions

- Often the 1st submission drawings omit roof opening information and details
- Often the “operating” weight of the equipment is missing from the equipment schedule
- Often the electrical usage information (i.e., wattage use, amperage use, circuit breaker size) is missing from the equipment schedule.

FIRE AND COMBINATION FIRE/SMOKE DAMPERS

Equipment Significance (cont.)

- Dampers installed within ductwork are mounted in and attached to metal sleeves.
- Dampers installed in ductwork need an access panel or door in the duct to access the damper for inspections or for resetting after a fire.
- Signs are required indicating where dampers are located

FIRE AND COMBINATION FIRE/SMOKE DAMPERS

Design Drawing Needs (for proper construction):

- Dampers need to be shown on the drawings where required in rated walls or partitions.
- Installation Details showing the installation of the FD or FSD in the wall or partition are required.
- Providing a Sequence of Operation indicating manner of operation of the dampers.

Kitchen Cooking Appliance Exhaust Hoods and Associated Equipment

Design Drawing Needs (for proper construction):

Grease Hoods- Must provide UL listing for Type 1 hood on EOR drawings- NOT foodservice dwgs

- Food Service drawings are good, but Code required aspects need to either go on the MEP set OR the Engineer should sign/seal the Foodservice drawings.

Kitchen Cooking Appliance Exhaust Hoods and Associated Equipment

Submittal Problems

- Rooftop equipment (exhaust fan and make-up air unit) are omitted from the plans every now and then.
- Clear indication that the make-up air unit's OA intake opening has enough clearance from other exhaust openings usually goes missing.
- Not providing UL710 listing

Misc. Common Errors & Omissions - Mechanical Review

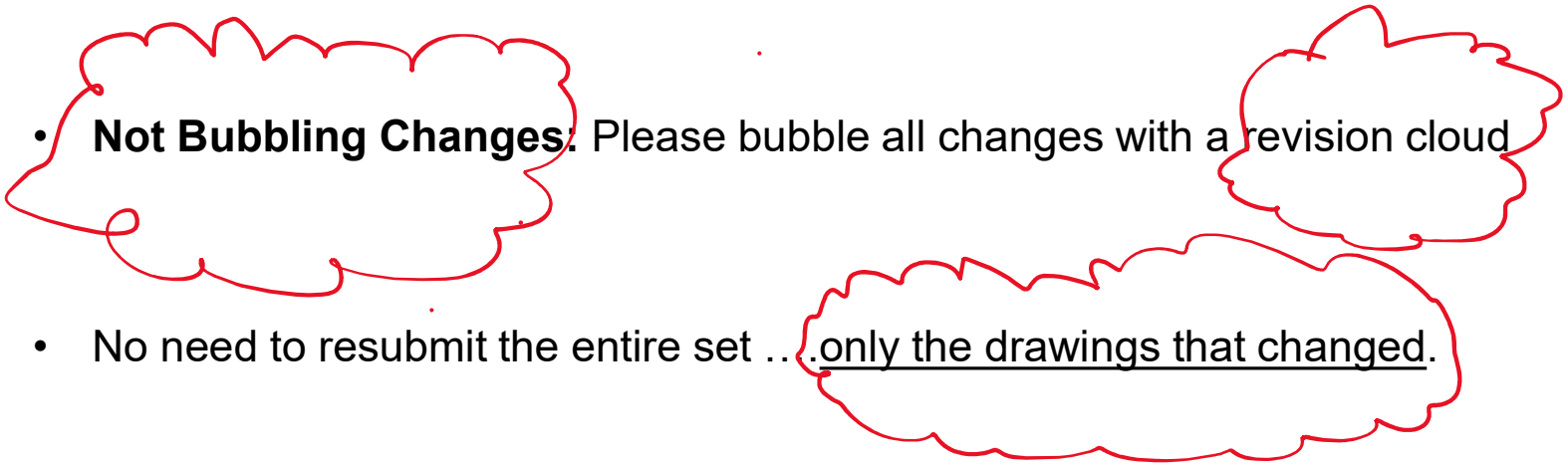
Recurring Code Issues / Omissions

- Ventilation Calculations not provided. Ref: NYCMC and IMC Chapter 4, Section 403.
- Fire and Fire/Smoke Dampers and installation details not shown on the plans. Ref: NYCMC Chapter 1, Section 106.8 and IMC Chapter 1, Sections 106.3 and 106.4.
- Kitchen Exhaust Grease Duct Slope and Cleaning Access Door Locations not shown on the plans. Ref: NYCMC and IMC Chapter 5, Section 506.

Mechanical Review

Other Submittal Problems (cont.)

- **Not Bubbling Changes:** Please bubble all changes with a revision cloud



- No need to resubmit the entire set …only the drawings that changed.

PORT AUTHORITY NY NJ

Electrical Code Review

Presentation to Port Authority TCAP Community

03-22-2022

Jayesh Patel, PE
Sr. Engineer QAD

Juan Ramirez, PE, PhD
Consultant

AIR LAND RAIL SEA

Electrical Code Review

Electrical Codes and Standards - Reference

- 2015 Tenant Construction Review Manual (TCRM) – Section 9
- 2017 National Electrical Code (NEC) (NJ & NYS)
- 2011 NY City Electrical Code (based on 2008 NEC)
- 2019 NFPA 241- Standard for Safeguarding Construction, Alteration, and Demolition Operations (Good-Practice)
- 2021 NFPA-70E - Standard for Electrical Safety in the Workplace® (Good-Practice)

Electrical Code Review

Review Background Reference

- QAD Design Standards
- We perform a building code audit similar to the NYC Department of Buildings and State of New Jersey-Department of Community Affairs.

Electrical Code Review

Critical Comments Made Based of 2015 TCRM

General Findings

Responsibility for design or code compliance **shall not be delegate** to contractors. See 2015 TCRM Section 2.II

Wrong Sign & Seal - seal does not belong to the State where the project is developing.

The design documents shall be sealed and signed by the Architect or Engineer of Record (AOE, EOR) licensed to practice in the State in which the proposal construction is to be performed. See 2015 TCRM Section 2.II

incomplete drawings or key information is missing.

The design documents, such as drawings, reports, computations, and specifications shall be submitted with Tenant Construction or Alteration Application. See 2015 TCRM Section 2.II

Electrical Code Review

Critical Comments – 2015 TCRM

- Exploded-view drawings of existing and proposed electrical manholes in which the tenant performs any work shall be submitted for review
- PVC conduits shall not be used within buildings.
- The minimum size underground conduit for power and communication systems shall be 2 inches. Provide a minimum of 25% spare conduits but not less than 2 spare conduits in each duct bank.
- Shop drawings of medium voltage or service entrance switchgear shall be submitted for PA approval in advance of fabrication. The PA may request to participate in the factory inspection of the switchgear.

Electrical Code Review

Critical Comments – 2015 TCRM – Cont.

Medium Voltage Power System, JFK and LGA Airports:

- The tenant's drawings shall include a complete one-line diagram showing all primary connections, switching and interlocks; power sources, routing and feeder designations; size and type of feeder and conduit; KVA rating; types and voltages of all transformers; and all load data in justification of the amount of power requested.

- The load letter shall be prepared and submitted to PA in the format similar to utility company letters and should provide a breakdown of major types of loads, indicate the largest motor load, total anticipated demand, etc
- Typically, for large-scale TAA's, a short circuit current calculation and coordination study for the proposed power system shall be submitted for review.

Medium Voltage Power System, JFK and LGA Airports Cont.

- Metering equipment to be installed outdoors shall have a NEMA Type 3R enclosure. Meters and totalizer will be provided by PA and shall be installed by the Tenant.

Electrical Systems for Tenants at Port Authority Owned and Operated Buildings

- All tenancies shall be metered.
- Ground rods shall be copper, ¾" diameter, and ten feet long.
- Ground cables shall be soft-drawn copper, Class 'B' stranding and connected to the ground rods by exothermal welds

Electrical Systems for Tenants at Port Authority owned and operated buildings Cont.

- Panelboards shall have a main circuit breaker, 100% neutral bus, ground bus, copper buses, bolt-on type line circuit breakers, and be UL listed.

- Each panelboard shall contain at least 25% additional space for future circuits.

- Single pole breakers shall not be ganged to form multipole breakers and ‘Series’ rated equipment shall not be acceptable.

Electrical Code Review

Critical Comments – 2015 TCRM – Cont.

Details Electrical Review – Summary

- The power distribution system (feeders, switchgear, transformers, panels and over-current protective devices), including coordination of plans regarding connections and available capacities with PA utilities.

- A one-line diagram giving source identification, conductor types and sizes, connected and demand loads, basis of source capacity, voltage drop, and adequacy of over-current protection shall be presented.

- Characteristics of special loads, e.g., large motor loads, shall be detailed. Key- and mechanical- interlocks shall be shown, identifying operational procedures for energizing, de-energizing and grounding of medium voltage equipment.

Electrical Code Review

Details Electrical Review – Summary – Cont.

- Mechanical: Ventilation and cooling of electrical rooms; diffusion of battery gases; fire and smoke detection for air handling systems
- Grounding, including system grounding of derived systems such as transformers and generators. All grounding conductors sizing and type must be shown on drawings.
- Physical safety, such as clearances around equipment, and exit provisions from within electric rooms.
- Demolition works, all electrical and communication cables and manholes shall be identified.

PORT AUTHORITY NY NJ

Tenant Construction & Alteration Process (TCAP)

Inspections - MEP-FP

EXAMPLES

March 22, 2022

AIR LAND RAIL SEA

Inspections

- On-going Inspections by A/EOR and Special Inspections
- A/EOR Preliminary Inspections (prior to the issuance of the Certifications) – inform REO
- Partial Inspection (no occupancy) with the PA
- Partial Inspection (for phased occupancy) with the PA
- Final Inspection with the PA
- Re-inspections with the PA (achieving first time success saves time and resources)

Inspection Hierarchy

- A/EOR is **responsible for 100%** inspection of the work and that it has been completed per the approved plans and all applicable codes and regulations
  - *If the A/EOR does the job right, we should have a 100% inspection pass rate!*

- Resident Engineers **audit** the on-going and completed construction and should be confident that the A/EOR has fulfilled their obligations

- Inspections will not be scheduled if:
  - There are open Rider Comments
  - A/EOR has not visited the site and performed inspections
  - Resident Engineer *audits* the work and finds issues
  - A complete certification package was not yet submitted

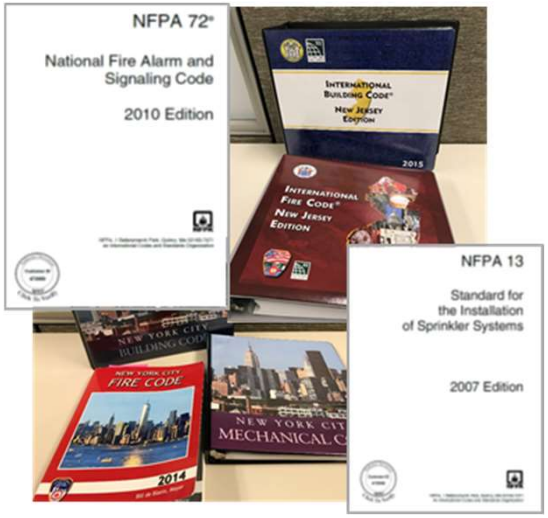
- QAD attends acceptance inspections and testing, and provides verification that the process is followed
  - *If all the above actions are executed correctly, this becomes a formality*

For ANY Type of Inspection

- Area of Inspection must be inspected by the A/EOR prior to requesting PA inspection (surrounding area that might directly impact the occupancy, such as egress, must also be compliant)
- Certification Package to be delivered to the REO prior to scheduling any inspection, to include the following:
  - ❑ Cover Letter/Special Inspection Acceptance - Signed and sealed by A/EOR on the company letterhead (use standard language provided in Bulletin 2021 – 002)
  - ❑ Certification PH 2 12 or PH 3 14 - Signed and sealed by A/EOR
  - ❑ Sketch of the inspection area if needed (sketch must be signed and sealed, uniquely numbered and dated, include TAA number, and referenced in the certification)
  - ❑ Special Inspection Check List signed and sealed by A/EOR and by appropriate Special Inspector(s)
  - ❑ Complete package of Special Inspection & Test Reports
  - ❑ Record Documents – Signed and sealed by A/EOR and delivered to the Tenant Coordinator with a copy of transmittal to REO

Other Documents to be Submitted

- ❑ Air balance test results
- ❑ Duct smoke detector velocity & sensitivity test
- ❑ Duct leakage test
- ❑ Domestic water pressure test
- ❑ Fire alarm pre tests printouts
- ❑ Sequence of operations for all FSD's
- ❑ Contractor's Material and Test Certificates for… Piping (NFPA)
- ❑ Emergency lighting level reading
- ❑ Alarm Audibility Test
- ❑ Structural steel Inspections and lab tests (including Ultrasonic Test Procedure, UT reports, UT equipment qualification records, Special inspection reports for the bolting, lab testing reports for all structural bolts, mill certifications for steel, etc.)
- ❑ Concrete Special Inspection and test reports (field reports, cylinder strength testing reports, etc.)
- ❑ Other inspections as required by scope of work



PORT AUTHORITY NY NJ
AIR LAND RAIL SEA

Inspection Checklist (General)

- ❑ Fireproofing (missing or damaged during construction)
- ❑ Fire rated Construction (walls, floors, ceilings, shafts....)
- ❑ Firestopping (rated walls, floors, stair and elevator shafts…)
- ❑ Access Hatches in Rated Construction (fire rated hatches, spring closure…)
- ❑ Fire Rated Doors and Permanent Door Labels (closure, latch, coordinator…)
- ❑ Egress Path (clear path, lighting, stairs, door swing, hardware, outside…)
- ❑ Exit Signage (location, visible, emergency circuit / battery, unobstructed view…)
- ❑ Emergency Lighting (egress path, exits, throughout…)
- ❑ Ceiling Construction (support, bracing, anchors, pull tests, light fixtures indep. Supp - 56 lbs…)
- ❑ Electrical Components (Grounding, labeling, enclosures, GFCI….)

Inspection Checklist (General)

- ❑ Seismic Bracing (Sprinkler, standpipe, gas lines, ceiling….)
- ❑ Vibration Isolators (HVAC, vibrating equipment, …)
- ❑ Labeling of Electrical Panels and Circuit Directory
- ❑ Bathroom Toilet Exhaust (make-up air,…)
- ❑ Trap Primer (when sanitary system drain traps is in danger of evaporating)
- ❑ Signage and Distraction Bands (glass partition, Lobbies, …)
- ❑ ADA (accessible route, bathrooms, …)
- ❑ Dampers (FD/FSD): "LISTED" Manufacturer's Instructions, Locations, frame the opening, opening size, blade in the plane of the wall, ID tag, break-away connections, retaining angles, access doors, mock-ups, etc.
- ❑ Elevators & Escalators
- ❑ Others …

After the Inspection

- All PA inspection comments will be discussed with the tenant's team during the inspection and summarized at the conclusion of the inspection.
- Following the inspection, the REO will officially issue the inspection comments matrix under PA cover letter through the TCAP Portal.
- The inspection comments matrix will combine comments from all PA departments participating in the inspection process (REO, QAD CS&I, food safety for food establishments, vertical transportation, etc.).
- The inspection comments matrix is a "living document" that will incorporate all comments generated during all official inspections.
- The tenant team must respond to the inspection comments matrix and share with the REO as soon as possible (within two weeks), indicating the status and disposition of each inspection comment.
- Architect / Engineer of Record must verify the completion of correction for all inspection comments listed on Inspections Comment Matrix
- All items must be completed and re-inspected by the Port Authority prior to issuance of the Final Certificate of Authorization to Occupy or Use

Helpful Hints

- A/EOR must compile a signed and sealed set of Record Documents based on the As-Built Drawings and information provided by the Contractor. This is mandatory before scheduling Final Inspection
- The Contractor is to keep the REO abreast of any changes to construction schedule. This allows the REO to plan for and better accommodate requests for inspections or facility shutdowns. Failure to notify the REO of schedule changes may result in delays
- Dates of drawings must match the latest QAD audited set of drawings
- A/EOR must be present on-site during construction to perform all inspections and certify the completeness of work prior to scheduling any inspections
- A/EOR and Contractor must remain engaged on the project until the Final Certificate of Authorization to Occupy or Use is issued by the Port Authority
- The A/EOR must review and accept all Special Inspection Reports. The A/EOR must submit copies of signed and sealed reports to the REO **as they are performed** under cover letter indicating acceptance

Helpful Hints

- The A/EOR must notify the REO if there is a project scope change. The REO will advise if Contract Documents need to be re-submitted for review based on impacts to life-safety or code conformance. Minor revisions can be reflected on the As-Built Drawings, with REO concurrence

- Scope changes should be submitted to Tenant Coordinator for review by PA staff (similar to rider comment responses and including narrative of changes)

- The A/EOR should address all inspection comments in a timely manner to avoid delays to re-inspections and project close-out

- Strive for excellence and follow all procedures in the TCAP manual

- Save money and time - Pass the first inspection with no inspection comments

SIX EXAMPLES OF INSTALLATIONS GONE WRONG; DEFICIENCIES FOUND DURING QAD INSPECTION:

1.) Installation incomplete – Fire Alarm Audible Notification Appliance not installed within ceiling framing. Incorrect – not installed in the ceiling.
2.) Installation incorrect – Security Visual Notification Appliance above the ceiling!
3.) Installation incorrect – coordination – no access.
4.) Design Issue? – coordination – missing device with no available location.
5.) Exit sign cannot be read.
6.) Smoke detector aligned with ceiling that was eliminated.

SHIFT FOCUS: No longer, "When can QAD come to my inspection?" – Instead, focus on:

"When will my project be ready for QAD to visit it?"

EXAMPLE:

Initial Comment:

Installation incomplete – Fire Alarm Audible Notification Appliance not installed within ceiling framing.

EXAMPLE:

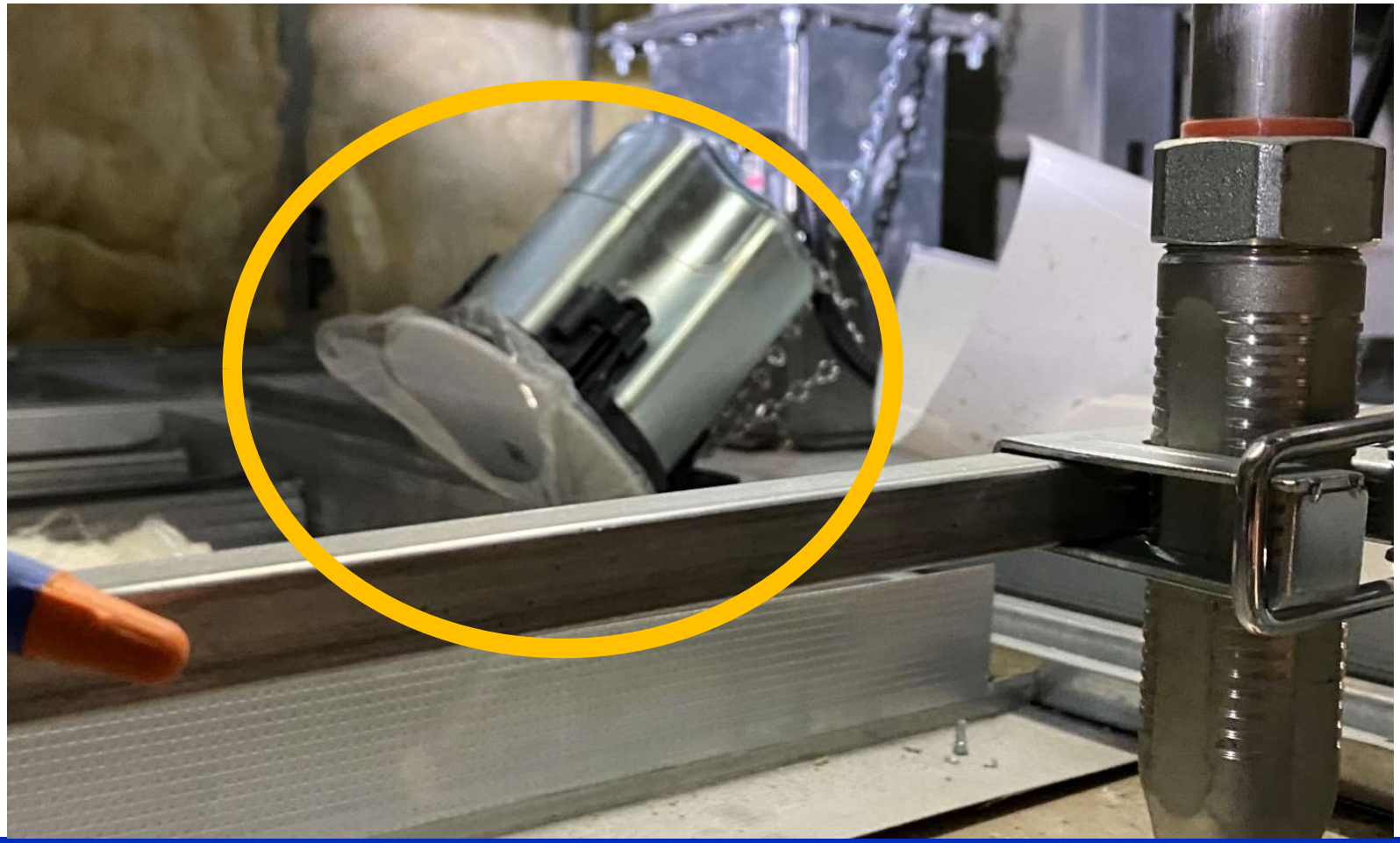
Initial Comment:

Installation incomplete – Fire Alarm Audible Notification Appliance not installed within ceiling framing.

Follow-up inspection =



Notification Appliance found resting on the drywall ceiling.



EXAMPLE:

Initial Comment: None; no deficiency was apparent prior to installation of ceiling grid.



EXAMPLE:

Initial Comment: None; no deficiency was apparent prior to installation of ceiling grid.

During subsequent inspection =

Security Visual Notification Appliance installed above the ceiling!

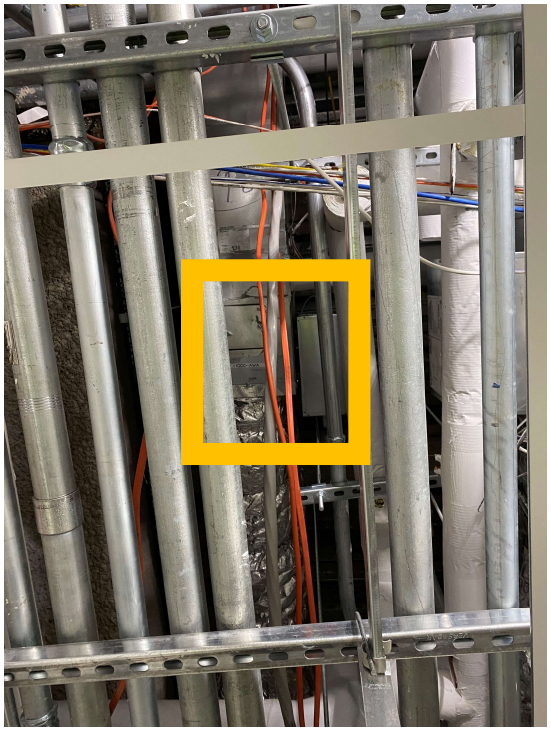




EXAMPLE:

Comment: No access to access door.

(“gap” approximately 8”)





EXAMPLE:

Initial Comment: Kitchen Hood wet chemical suppression system manual releasing station was not installed. Installation incomplete.

The 'corrective action' by the A/EOR and Contractor was to provide a temporary wall for mounting the device in a compliant location.



EXAMPLE:

Clear EXIT sign missing ‘Mylar’ insert – not readily visible from either side.



EXAMPLE:

Smoke detector located and positioned in anticipation of a suspended ceiling… Suspended Ceiling eliminated from the plan. The detector is in a non-compliant location subject to delayed activation.



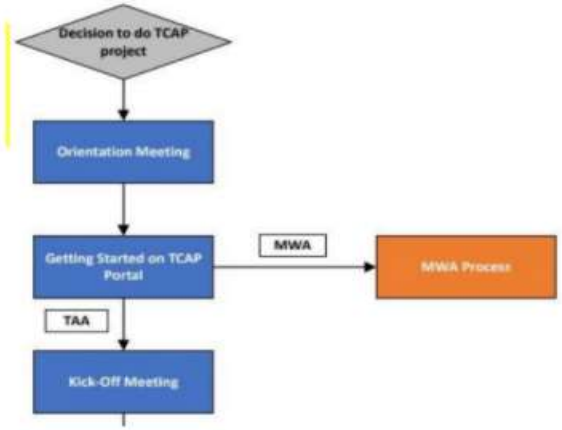
The detector is in a non-compliant location subject to delayed activation and had to be relocated to underside of the deck.

The TCAP Central Office

Start Here!
Interactive TCAP RoadMap

Download the Interactive TCAP Road Map using the link below for an overview of each step of the process. Once downloaded, click on the boxes in the flowchart and gain quick access to important TCAP forms and documents.

Click here to download Interactive TCAP Road Map

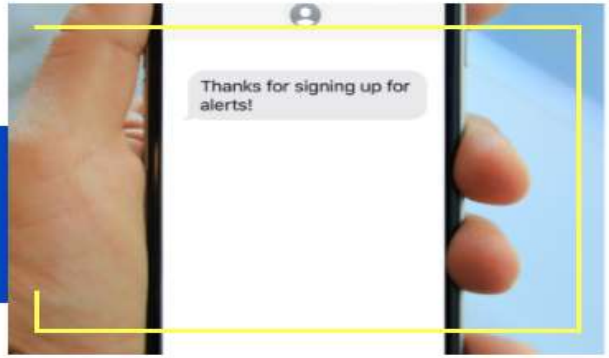


Contact TCAP Central office:
TCAP@panynj.gov

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