GOETHALS BRIDGE REPLACEMENT PROJECT

NEWSLETTER

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VOLUME 10
THIRD QUARTER
2016

The New Goethals Bridge Has Great Legs

Once a ferry crossing that helped to establish Staten Island as an important link in the overland stage coach route between Philadelphia and New York, the existing Goethals Bridge was designed and built to standards appropriate to the dawn of the automobile age. After nearly 90 years of reliable service, the current crossing on Interstate 278 is being replaced by a dual-span, state-of-the-art, cable-stayed structure connecting Elizabeth, NJ and Staten Island, NY.

Crossing the Arthur Kill with a 900-foot main span, the new, cable-stayed bridge provides significant navigational improvement for marine traffic. Including sidespans, each-cable-stayed span boasts 1,635 feet of suspended deck. Back spans are 368 feet and the main span is 900 feet. This means that the new Goethals Bridge will be higher and wider than its predecessor and stand on spectacularly sturdy "legs."

The new Goethals Bridge, the first major bridge constructed in New York City since the Verrazano Narrows Bridge in 1964, is anything but conventional. According to Seth Condell, Project Manager for the Bridge Replacement lead engineering firm Parsons, "rather than rely on conventional foundation construction methods that utilize a field of H piles pounded into bedrock and tied together with cast concrete at each pier, the decision was made to utilize drilled shaft construction methods that rely on a single shaft 4.5 to 9.5 feet in diameter to support and to transition directly into each approach span supporting column."

In a similar manner, each tower is supported by six large diameter drilled shafts tied together with massive footings. This approach, Condell said, required minimal soil excavation and addressed potential issues on the New York side of the bridge which sits in a tidal salt marsh just east of Old Place Creek, a tidal and sub-tidal wetland habitat located in northwestern Staten Island. The area is one in which the soil may "liquefy" during an earthquake because the bedrock itself is on an incline. The new Goethals Bridge's two-column, wide-footed foundation both continues the bridge's two-pylon tower architectural theme and is designed to withstand these environmental rigors.

Building the wide-footed shaft

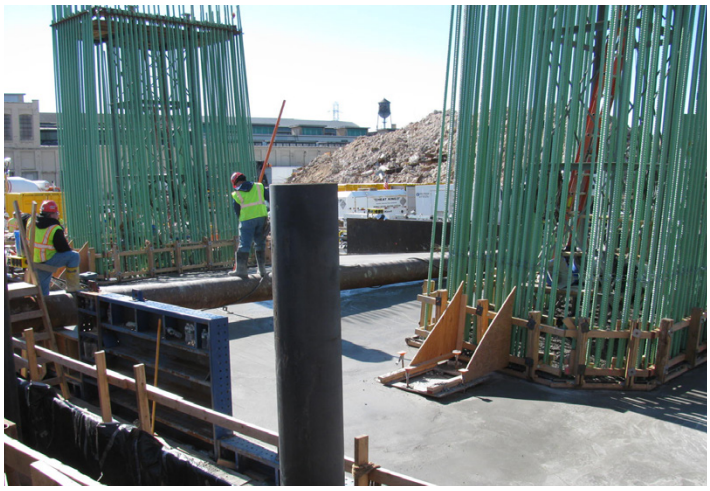
To create the shaft, workers drove a large round pipe, or casing, directly into the bedrock, and then used a giant drill bit to drill through the soil to the rock. A rock drill was then used to further penetrate the rock and create a "rock socket." It is this rock socket, Condell said, that anchors the bridge in place. The rock socket is a cage of reinforcing steel that is lowered into the excavation which then is filled to ground level using what is called the "tremie" concrete placement method, which uses a pipe through which the concrete is poured below water level. The lower end of the pipe is kept immersed in fresh concrete so that concrete rising from the bottom displaces the water without washing out the cement content. The process continues up to the surface. Above ground level, concrete forms are used to place concrete using traditional casting methods up to the pier cap.

A 150-year service life

Virtually every aspect of construction, Condell explained, must meet the new bridge's mandated service life. For the foundations, this service life is required to reach 150 years. This means every location has a clearly defined corrosion/exposure ranking. A corrosion protection plan is developed for that location, which includes coating the reinforcing steel, corrosion-resistant concrete mix design, limited permeability mixes, and surface sealers. From the bedrock up, the new Goethals Bridge is built to last.

Progress on the Bridge

View of the New Jersey Westbound Tower footing. Forms are in place at the bottom of the photo (South Tower leg) with concrete placed. Reinforcing steel can be seen in the north leg.



Vertical reinforcing bars for the very first Tower lift at the New Jersey Eastbound Tower. This is where the outward cant of the Tower legs are born. Between the bars, one can make out the internal bracing used to hold the bars prior to concrete placement.

Progress on the superstructure steel on the New York backspan falsework.

Both New Jersey Towers can be seen here, with Eastbound paving the way. All four Tower legs have the climbing forms, or "birdcages" installed. The Eastbound Tower has the first superstructure girders installed at the deck level.

Girders Rising on the New Goethals Bridge

Construction proceeds apace on the new Goethals Bridge. Rising up are the first members of what will be a 397 girder army to support the approach roadways for the Goethals Replacement Bridge.

Each 100-ton girder, manufactured in central Pennsylvania, stands up to 176 feet long, three-and-a-half feet wide, and nearly eight feet tall. Workers outfit the girders with tubes to carry water for the bridge's fire suppression system and to house electrical wiring for bridge lights. When installed, five girders will stand between each set of two capped columns.

1. **Workers readying girders for installation on the new Goethals Bridge.**
2. **Raising girders one at a time to support the new Goethals Bridge Roadway.**
3. **Rising up across the Arthur Kill — a view of the New Jersey backspan.**
4. **Looking up at the new Goethals Bridge New York approach.**

Trades on the Bridge

Irene Eliopoulos, Local 15 Operator Apprentice – New York

Irene Eliopoulos has always liked working with her hands. The Flushing High School (Queens) graduate began her career as an auto mechanic. "I liked mechanic work and I liked working in a car dealership," she says.

Then a friend told her about bigger opportunities that could become available to her through Nontraditional Employment for Women (NEW), a nonprofit group founded in 1978 to work with unions to bring women into the skilled construction trades. She signed up and entered a training program that combined hands-on shop skills, classroom instruction, job development, and placement services. "You take an entrance exam," she says, "and if you pass, you take courses in New York City, and at graduation, NEW helps you enter the union and get a job in any trade."

Irene graduated from NEW's pre-apprenticeship program and joined union Local 15 as an apprentice. The work, she says, seemed similar to the work she had done as a mechanic. The union assigned her to the Goethals Bridge Replacement Project where she "helps with the water treatment plant, general and light machine maintenance, heat systems and lighting, and welding."

Day to day, she checks in with the various trades to see whether they require maintenance support. Her favorite assignment? Running equipment, the payloaders, the telehandler, cranes, forklifts.

Two days a week, she continues her training. "Wednesday evenings is maintenance and work on cranes. All day Saturday, we run equipment unless you are a welder. " She says she likes the program's flexibility in that if you want to become a welder, the union will put you on that path if they think you are good at it. They want you to be a well-rounded journeyman when you get your (union) book, so you can be more marketable.

Irene expects to receive her union book this summer. "This Local has a lot of opportunities," she says. "Whatever you want to do, whatever you can do, is what they'll send you out there to do.

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> Irene Eliopoulos

Contact Information

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