ОБІЖНИК -NEWSLETTER

ТОВАРИСТВСО УКРАЇНСЬКИХ ІНЖЕНЕРІВ АМЕРИКИ – *НЮ ЙОРК*

UKRAINIAN ENGINEERS' SOCIETY OF AMERICA – *NEW YORK BRANCH*

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From the President's Desk

Welcome to a new year and another volume of the New York City chapter's newsletter. This month's issue has an interesting technical article prepared by Myrosia Dragan, PE which was presented at last year's International Bridge Conference in Pittsburgh. We also have a small recap of the end of the year Yalynka.

As this month's technical article illustrates, we welcome and encourage submissions from members on various technical topics. In addition to being suitable for the local New York City newsletter, these materials may be included on the Society's web site, in the National newsletter, and in the "Visiti" or Engineering News.

Next, I would like to touch on the topic of "volunteering." As I mentioned in previous issues of the newsletter, an organization exists to unite a group of like-minded people within some set of common goals. In order to achieve these common goals, however, a certain degree of manpower is required.

Since UESA does not maintain a full-time professional staff to handle its various administrative, publishing, coordination, and communication tasks, it must rely on good willed volunteers to handle these duties. These people ultimately donate a good amount of personal time and effort so that the Society can achieve its common goals.

The local chapter needs such volunteers. During the month of either February or March, the New York City chapter will hold elections for its board of directors. If you would like to volunteer your time to serve on the board in some capacity, please contact either Dr. Lew Dobrjansky (718-762-8531) or myself (212-719-9700).

The key requirement is that you are willing to donate your time on a consistent basis. As such, it is irrelevant whether you are 20-something or 60-something, studying, working or retired. All are most certainly welcome.

I'd ask that interested parties contact Dr. Dobrjansky or myself by early February so that we may generate the required ballots and schedule the required meeting/election on or before mid-March.

Until next time……..

Marco Shmerykowsky, PE
Марко Шмериковський

Happy New Year !!!
2003

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Щасливого Нового Року !!!
2003

2002 New York City Yalynka

As in past years, the New York City Chapter of the Ukrainian Engineers Society of America together with the Ukrainian Medical Association, and the Ukrainian Institute of America, held its annual "Yalynka" . The event took place on Saturday evening, December 14, 2002 at the Ukrainian Institute of America in New York City.

2002 Christmas Tree in Rockefeller Center

Over 120 people attended for an evening of holiday cheer. The evening began with a program prepared under the direction of Dr. Ihor Magun of the New York Metro chapter of the Ukrainian Medical Association of North America.

Guests at the annual NYC Yalynka

Upon the conclusion of the program a few short words were spoken by Mr. Marco Shmerykowsky, PE, the president of the New York Chapter of the Ukrainian Engineers' Society of America. After the program, the guests were invited to enjoy a hot buffet and refreshments. Members and friends celebrated the holiday cheer into the early hours of the next morning.

(Additional photos from the event are available on the UESA web site at the following address: http://www.uesa.org/news/20021214/20021214-nyc.html)

The Emergency Reconstruction of Goose Creek Bridge

MYROSIA DRAGAN, P.E.,
TAMS, an Earth Tech Company, NY, NY

ABSTRACT: *Only a single, winter construction season was allowed for reconstruction of the side spans of the Goose Creek Bridge over a tidal waterway. Construction proceeded directly adjacent to the existing bascule span, kept operational. Typical construction time was reduced by the use of precast concrete elements, the use of non-conventional abutments and the pre-purchase of materials by the bridge owner prior to selection of a contractor.*

INTRODUCTION and PROJECT BACKGROUND

The Goose Creek Bridge is located on the south shore of New York's Long Island and carries Wantagh State Parkway over a tidal waterway named Goose Creek. The parkway provides access to the extremely popular beaches and recreation areas of Jones Beach State Park.

FAILURE OF THE EXISTING BRIDGE - In April 1998, two of the piles supporting the bridge lost support entirely and settled sharply. This led to the failure of the cap beam on top of that particular pile bent. The bridge was immediately closed to traffic.

FAST-TRACK BRIDGE REPLACEMENT

TIME CONSTRAINTS - The schedule for bridge replacement had one over-riding goal: open six lanes of the parkway to traffic by Memorial Day 1999. The schedule was set by working back from that date; this gave a 9-month construction season (Labor Day 1998 to Memorial Day 1999); a 6-week window for letting and bidding (mid-July to September 1998, as determined by NYSDOT); and just under 3 months for design.

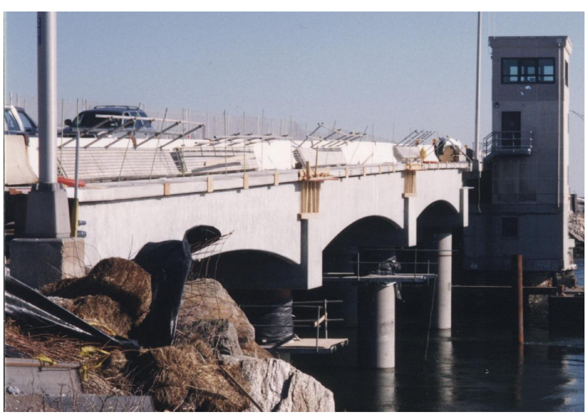
DESIGN CONSIDERATIONS - The replacement design had to meet current criteria. The controlling factors were design for future predicted scour and design for liquefaction of the site soils under earthquake loading. The combination of seismic and scour criteria, unaccounted for in the original bridge's 1920's design, resulted in the need for a drastically deeper foundation for the replacement bridge.

In order to meet the design criteria in a cost-effective manner, it was decided that span lengths would be doubled from thirty feet to sixty feet. Each new pile bent consists of six 54-inch diameter prestressed concrete cylinder piles. Pile embedment as deep as 100 feet below the mud line was required.

The emergency reconstruction of Goose Creek Bridge nearing completion in May 1999.

An added challenge was to match the character and aesthetic feel of the new bridge to the original, to retain the integrity and historical flavor of the parkway and surrounding Park land, taken as a whole. (Wantagh Parkway is eligible for the National Register of Historic Places).

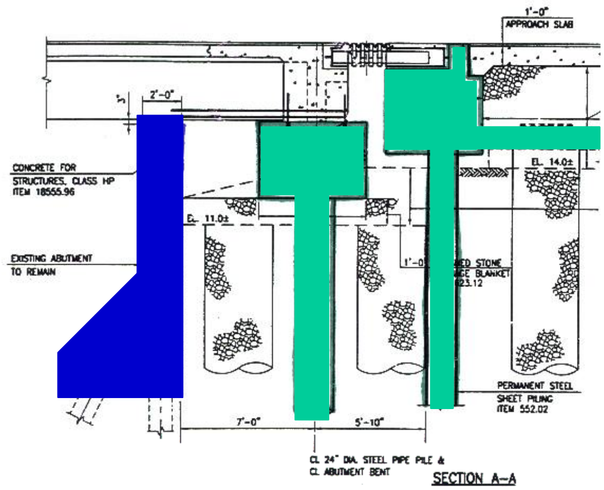
The use of concrete was natural, given the historic considerations (and the harsh, marine environment). The 60-foot replacement spans on 54-inch diameter concrete cylinder piles approximate the proportions of the original 30-foot spans on 2-foot square concrete piles. In addition, architectural precast fascia panels with a curved soffit were provided, to replicate the arched appearance of the original superstructure.



Replacement spans are 60 feet long on 54-inch diameter prestressed concrete cylinder piles. Precast concrete panels used on fasciae to provide arched appearance.

CONSTRUCTION CONSIDERATIONS - It was determined that the use of cast-in-place concrete should be limited. This was for two reasons: the time factor for curing, and the fact that construction would have to take place during the winter months, in a harsh marine environment.

Also, a non-conventional abutment was designed. Use of an abutment bent configuration eliminated the mass placement and curing of concrete required for a typical abutment.



The original reinforced concrete abutment (shown at left) remains in place. The new abutment bent was installed on the land side of the original abutment.

The new abutment consists of an abutment bent, with concrete cap on steel pipe piles; and of steel sheet piling with deadman anchors retaining the approach roadway.

Each new abutment bent consists of 24-inch diameter steel pipe piles topped with a concrete cap beam. The approach roadways are retained behind steel sheet piling, anchored with deadmen. The steel piles for the abutment bent were driven into undisturbed soil between the existing, abandoned abutments and the newly-installed sheet piling.

The use of an abutment bent and sheet piling retaining wall allowed time-savings: the existing abutment did not need to be removed, excavation for footing placement was not required, and, as mentioned, mass concrete placement and cure time were eliminated.

TRAFFIC CONSIDERATIONS - Lane closures were allowed in winter; one lane in each direction had to remain open. As a result, two stages of construction were planned.

CONSTRUCTION SEQUENCE

PRE-PURCHASE OF PILES - NYSDOT, the bridge owner, decided that the prestressed concrete cylinder piles for the pile bents should be acquired early. The piles would then be ready and waiting once a contractor was awarded the construction contract, and actual construction, beginning with installation of the piles, could begin almost immediately.

PREPARATION FOR FOUNDATION WORK - In preparation for the installation of abutment bents, the approaches to the bridge required some modification. Steel sheet piling was driven behind the existing, abandoned concrete abutments, to retain the approach roadway. Seismic considerations dictated the densification of the retained soil; this was accomplished through the use of stone columns (whose installation was not on the critical path).

PILE INSTALLATION -

Piers - The project design called for installation of the 54-inch prestressed concrete cylinder piles in the channel bottom, with embedment depths approaching 100 feet. 160-foot long piles were purchased to accommodate the required embedment criteria. The handling and installation of these piles was difficult, due to their great length and weight. Adding to the difficulty was the need to do this work from barges - the only practical way to complete the installation in the waterway.

The piles were to be lifted by a barge-based crane, positioned, placed and then driven to the required penetration criteria.

While installing the first piles, the contractor encountered large, buried pieces of debris in the channel bottom - the prestressed concrete piles could not be driven through this debris.

Installation of 160-foot long prestressed concrete cylinder piles adjacent to the existing bascule span, which is on much shorter timber piles.

A new pile installation scheme needed to be implemented. The contractor built steel grillage assemblies to serve as templates for the pile installation. He then drove large steel piles, as sleeves, at the locations specified for prestressed concrete pile installation. The steel sleeves were then cleaned out, by divers. Then, the prestressed concrete piles were positioned, lowered into place and released. The sheer weight of each pile settled it into the sand about 30 feet. Driving, and some jetting, were used to advance the piles into their final position.

Bascule span monitoring - It was decided that the existing bascule span would remain in place and operational throughout construction of the replacement side spans. The pile driving operations took place within about 35 feet of the existing bascule piers - and to depths far exceeding the depth of the bascule pier piles. A monitoring system was set up to determine the effect of the pile driving on the bascule piers, and to ensure that the bascule span did not move. This was critical for two reasons - first, to ensure structural stability, and second, to make sure that the bascule leaves remained aligned and could be opened and closed.

Template for prestressed concrete cylinder pile installation (steel casing has already been removed).

Abutments - The abutment bent pile installation and sheet piling installation proceeded smoothly. The 24-inch diameter steel pipe piles for the abutment bent were driven on land between the existing, abandoned concrete abutments and the newly installed sheet piling that retains the approach roadways.

BENT CAP AND SUPERSTRUCTURE ERECTION - The pier cap beams were precast in two halves - one half was erected during the first stage of construction, the second was erected during the second stage. A narrow cast-in-place closure pour was used to connect the two halves. The cap beams at the abutments were cast-in-place.

The contractor precast the cap beams at an off-site casting yard and barged the precast units to the bridge site. The cap beams were lifted from the barge by crane and set in place atop the piles. Steel rebar cages cast into the cap beams were inserted into the already-installed piles, to form a permanent connection.

Bearings were then set in place on the cap beams and prestressed concrete I-beams were erected. The beams were erected in 60-foot lengths and were made continuous with cast-in-place concrete end blocks.

The deck, made up of 10-foot wide panels, was also precast off-site. The panels were brought to the site and set in place atop the beams. Holes were precast into the panels at regular intervals, to allow for installation of dowels; these dowels were drilled into the beams to act as shear connectors and were then grouted in place. Finally, the precast architectural panels were installed at the bridge fasciae.

CONCLUSION

The project constraints dictated a compressed schedule for bridge replacement - from start of design to construction completion was about thirteen months. The design was done in under three months; construction began Labor Day 1998 and was substantially completed by Memorial Day 1999. It was only during this winter construction period that traffic could be reduced to a single lane in each direction, allowing the replacement bridge to be built in two stages.

The use of precast concrete elements allowed for rapid erection in the harsh, winter marine environment. Precasting ensured high quality concrete fabrication, an important consideration in the corrosive, marine environment. The need for on site forming and cold weather concreting, with its associated need for enclosures and heating, was eliminated. Secondary benefits of using precast elements included minimizing environmental impacts in this coastal area and allowing for historically-sensitive detailing.

The selection of a non-conventional abutment type was beneficial for two reasons: it eliminated the need for mass placement and curing of concrete in cold weather, as would have been the case for a conventional abutment; and it also allowed the existing abutment to remain in place, eliminating the need for excavation and demolition and the need for environmental permitting for work in tidal wetland zones.

The bridge owner's decision to be flexible in their procurement methods also yielded great time-savings. By pre-purchasing the prestressed concrete cylinder piles for the piers before the project was bid, the bridge owner eliminated lead time for the order, manufacture and delivery of piles from the contractor's schedule. The contractor was able to start installing piles almost immediately after being notified of the bid award, eliminating fabrication and delivery time from the limited construction window.

ACKNOWLEDGEMENT

Project owner: New York State Department of Transportation, Region 10

Contractor: Anselmi & DeCicco, Maplewood, NJ

Project designer: TAMS, an Earth Tech Company

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Treasurer:	Myrosia Dragan

Keep Us Informed!!!

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