The New NY Bridge Project Quarterly Magazine

NewNYBridge.com

THE NEW NY BRIDGE

SUMMER 2015

IN THIS ISSUE

THE NEW NY BRIDGE

Andrew M. Cuomo
Governor of New York State

MESSAGE FROM THE GOVERNOR

The summer of 2015 will be remembered as the time when the New NY Bridge truly began to take shape over the Hudson River. After another icy winter made working on the river dangerous, the men and women on the project to replace the Tappan Zee are back out in full force and making visible progress. In fact, overall construction is now 42 percent complete – a remarkable milestone after more than a decade of arguing and government dysfunction delayed the start of the project. More and more concrete piers for the new twin-span bridge are now rising out of the water. The *I Lift NY* super crane has now placed the first structural steel girders over those new piers, and in the fall construction of the 419-foot-tall main span towers will get underway, an extraordinary sight to behold.

While the project isn't quite at the halfway mark, the economic impact has been absolutely astounding. So far, more than 3,000 people have worked on the project and at the peak of construction this summer there will be more than 1,100 craft workers out on the water between Rockland and Westchester. That number still does not include project oversight or all the other jobs at the steel factories, concrete plants and various off-site facilities that are producing material for this historic project.

The Thruway Authority's design-build contractor, Tappan Zee Constructors (TZC) has already done business with nearly 600 companies across New York State – many of them right here in the Hudson Valley – and that number keeps rising every month along with the bridge itself. So far, subcontracts worth more than $167 million have been awarded to federally-certified disadvantaged business enterprises, more than halfway to TZC's goal of $314 million for small minority, women, disabled and veteran-owned companies over the life of the project.

The recently approved 2015-16 state budget includes a $1.285 billion Thruway Stabilization Fund to support Thruway capital projects including the New NY Bridge and to ensure there will be no toll increase on the entire New York State Thruway in 2015. And $750 million will go directly to the New NY Bridge project this year as part of our ongoing efforts to keep future Tappan Zee tolls a low as possible. My team is also continuing to seek new and alternative financing options to help protect tollpayers.

We have also put new leadership in place at the Thruway Authority to help lead the way on this effort. In April, Onondaga County Executive Joanie Mahoney was confirmed as the new chair of the Thruway Authority Board of Directors. And in June, Bob Megna, the state's longtime budget director, was confirmed as executive director of the Thruway Authority. Both Joanie and Bob are as committed to the New NY Bridge and to serving the people of this great state as I am, and I am confident that their leadership will benefit this project and the people it serves greatly.

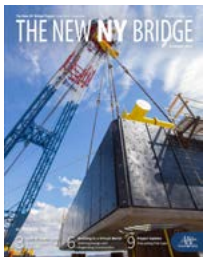
In short, we are well on our way to completing one of the largest and most impactful infrastructure projects in the nation – and we will continue the good work until the job is done. New Yorkers deserve nothing less. ■

Andrew M. Cuomo
Governor of New York State

Andrew M. Cuomo Governor | New York State Thruway Authority | New York State Department of Transportation | Federal Highway Administration

FEEDBACK

We want to hear from you. Share your thoughts on the project and more by emailing us at *Info@NewNYBridge.com*



ON THE COVER

I Lift NY makes its first lift on April 24, 2015.

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The New NY Bridge Quarterly Magazine is produced by the New NY Bridge team of the New York State Thruway Authority. The publication is created in collaboration with Tappan Zee Constructors, LLC, the design-build contractor for the project.

Andrew M. Cuomo, Governor of New York State
Joanne M. Mahoney, Chair, New York State Thruway Authority
Robert L. Megna, Executive Director, New York State Thruway Authority

HEAVY LIFTING

SUPER CRANE BEGINS

CARRYING ITS WEIGHT – AND THEN SOME

The *I Lift NY* super crane took center stage on the New NY Bridge project on April 24 by lifting a 600-ton concrete segment of the new bridge's foundation. The massive raising was the first of what will be hundreds of lifts the giant machine will carry out as it helps build the new crossing. Literally years of planning and preparation went into outfitting the massive crane for the specific needs of the New NY Bridge project.

The inaugural lift placed the largest approach span pile cap, a house-sized tub of concrete, upon a group of foundation piles. The lift was carried out by a team of highly-skilled crane operators, deck hands and mechanics as well as an equally-adept crew aboard several tugboats. The team placed the pile cap with remarkable precision, accurate to within a fraction of an inch.

Once the tub and piles are filled with steel-reinforced concrete, the structure will serve as an unyielding base for a set of the new bridge's pier columns.

Without *I Lift NY*, the operation would have required either an alternative construction approach or a different foundation design altogether. As one of the largest floating cranes in the world, the powerhouse machine will lift the heaviest sections of the new bridge as it is built as well as the largest portions of the old bridge as it is dismantled – with most pieces weighing between 900 and 1,100 tons.

Owned by Tappan Zee Constructors, LLC (TZC) and officially registered with the U.S. Coast Guard as the Left Coast Lifter, the super crane's extraordinary capabilities will be instrumental to completing the new bridge in 2018. ■

» I Lift NY began working on the New NY Bridge project on April 24, raising a 600-ton segment of the new twin-span crossing.

TZC Team Member Ronald Burgess

Hudson Valley residents can take pride in knowing that one of their own is behind the controls of *I Lift NY*: New Rochelle native Ron Burgess, who possesses more than 30 years of experience in operating large floating cranes and a familiarity of the Hudson River that only a local could hold, is a perfect fit for the job.

As *I Lift NY* was modified and prepared for the project over the past several months, Burgess became intimately familiar with every inch of the 328-foot machine and its numerous systems.

"Operating a machine as big and complex as this is absolutely a team sport," says Burgess. "Our extensive training enables us to function as one highly-coordinated unit, ensuring the success and safety of our very precise operations."

I Lift NY Online

Scan the QR code or visit the link below to access more information, including footage of *I Lift NY*'s first lift.

NewNYBridge.com/Gallery

KEEP ON TUGGIN'

TUGBOATS MOVE THE PROJECT FORWARD

Most daily operations on the New NY Bridge project would be impossible without the contributions of a few small but mighty vessels. The project's tugboats serve as its circulatory system, delivering materials and equipment to where they are needed on the river.

Tugs have been utilized to move vessels since steam engines were introduced on ships. For more than a century, they have guided large vessels in and out of New York Harbor and up and down the Hudson River. Today, the project's tugboats perform much the same duties with highly-efficient diesel engines.

A mainstay of day-to-day construction, project tugs also have assisted with some of the larger operations of the project. Ocean-going tugs guided the *I Lift NY* super crane along its 6,000-mile journey from San Francisco to New York in early 2014. The tugs brought the massive machine down the California coast, through the Panama Canal and up the east coast to New York Harbor in only a few weeks. The open-sea tugs are continuing to aid the project, delivering enormous foundation elements from Virginia to the project site.

Daily construction operations utilize two types of tugboats: push tugs and towing tugs. Push tugs like the Pilgrim (pictured above) are equipped with flat, steel front ends that allow them to nudge barges and equipment into desired positions. Towing tugs are built with winches and thick cables to pull equipment with great strength.

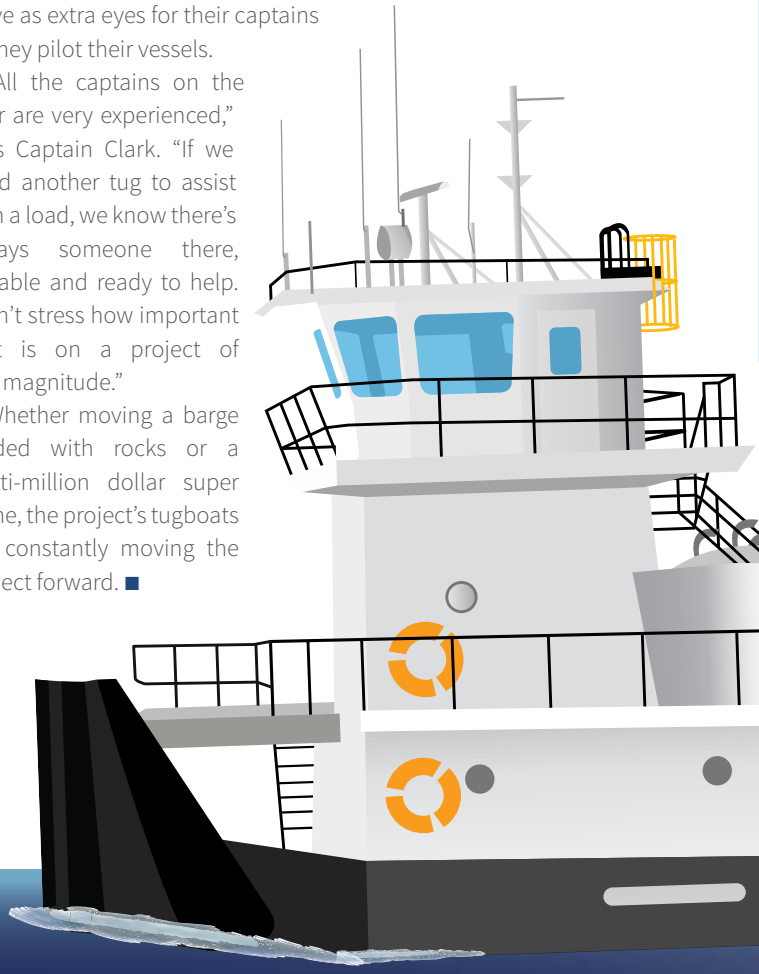
Despite their comparatively small size, tugs can be enormously powerful. The most powerful can produce more than 1,200 horsepower, far exceeding even the 725 horsepower of NASCAR race cars. Tugs focus their power on vessel-moving strength, rather than speed, and many tugboats are capable of pushing barges holding hundreds of cars.

Given the intense level of activity on the Hudson River, it's critical that tug captains and their deckhands communicate effectively with each other and others on the project site to ensure that materials are delivered in a safe and efficient manner. As Captain Bob Clark of the Pilgrim, the largest push tug on the project, says, "This project isn't like typical tug operations, where you move loads back and forth the same way every day. Things here are dynamic and when management calls in an order, it's up to us to make it happen."

The Pilgrim, built specifically for the New NY Bridge project, typically moves large precast materials around the construction area (learn more on Page 8) to deliver them to floating cranes for installation. Deckhands have the demanding job of connecting tugs to these hefty materials, some weighing close to 600 tons. They also serve as extra eyes for their captains as they pilot their vessels.

"All the captains on the river are very experienced," says Captain Clark. "If we need another tug to assist with a load, we know there's always someone there, capable and ready to help. I can't stress how important that is on a project of this magnitude."

Whether moving a barge loaded with rocks or a multi-million dollar super crane, the project's tugboats are constantly moving the project forward. ■



Q&A 3D MODELING

Ever since he was in high school in the 1990s, Robert Allen has used computer modeling programs to improve the design and management of construction projects, cutting his teeth with models that aided his father, the owner of a small construction company.

Just as computer games have undergone revolutionary improvement since the days of Super Nintendo in the 90s, so too has the field of computer modeling. Allen's team at HDR Inc. – a leading architectural and engineering firm that is part of the TZC consortium – is using some of the most highly sophisticated 3D modeling programs in existence to plan the construction of the New NY Bridge project.

Utilizing a process called building information modeling (BIM), HDR designed the new bridge and compiled every detail in a secure database before any actual construction commenced. Refinements to the design are being carried out as construction progresses, with BIM aiding designers and builders in overcoming the unforeseeable challenges that emerge on every large construction project. For many decades after the bridge is completed, the BIM model, which contains nearly one million points of data, will assist maintenance teams in keeping the bridge safe. We sat down with Allen to learn more about BIM.

Q When was the New NY Bridge project 3D model developed?

We began designing the bridge in a 3D space long before the builders began construction. We received environmental data, conditions and requirements from the New York State Thruway Authority and proceeded from there. The model helped us produce over 8,000 design sheets in about 18 months. That model was expanded and edited to become the one we use today.

Q What is the full scope of the model?

The model includes the entire bridge itself, of course, but also the adjoining facilities and bridge landings. This is extremely important to the project team, as the connections to the existing landscape and highway are fundamental to the bridge's complete design. For the bridge itself, the model covers everything from maintenance walkways and gantries to the road deck and the 419-foot towers.

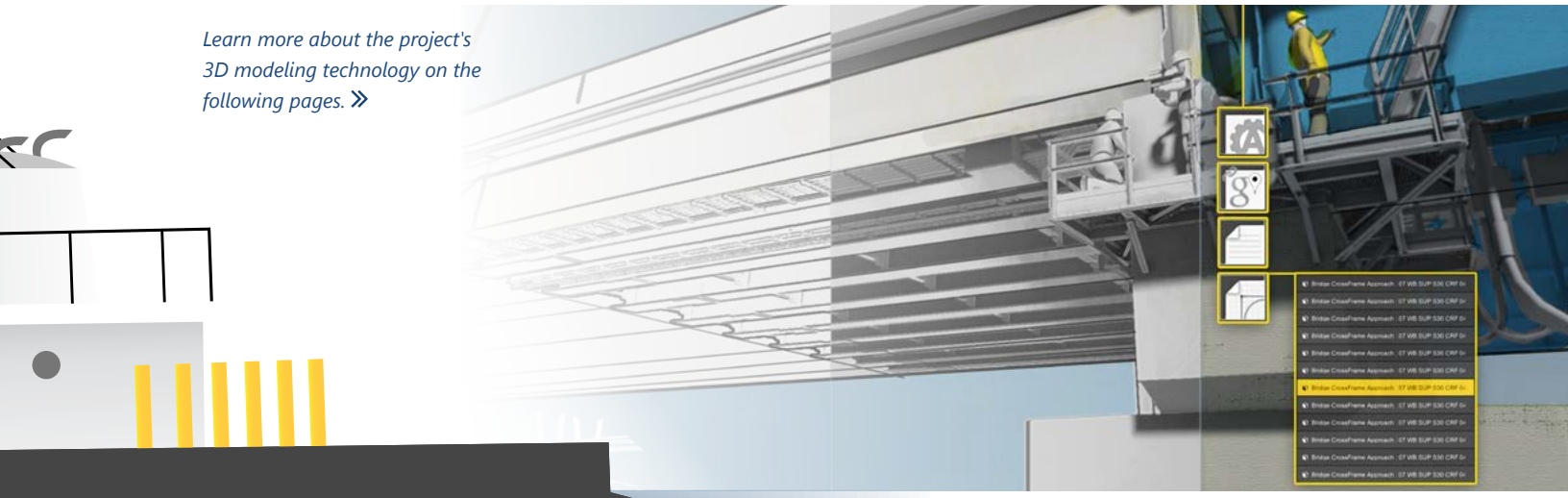
Q What are the advantages of the dynamic 3D model?

The 3D model is instrumental in detecting when conflicts exist in the design of the new bridge, which inevitably occur on a project as massive and complex as the New NY Bridge project. This is crucial as there are over 900 designers working with the BIM system and their work must be 100 percent compatible. BIM also allows the team to view the bridge from a nearly infinite variety of angles, something that cannot be done with a static 2D model. If need be, aspects of the 3D model can be converted into the traditional 2D format or even displayed as data on a spreadsheet.

Q How will the BIM model help beyond design and construction phases?

The model will be adapted into a program used on tablet computers, which will help the Thruway maintenance team keep track of each and every element of the new crossing for generations to come. For example, clicking on any individual girder or panel will bring up useful information, such as when it was installed and when it needs replacement, if at all. The system even has a built-in calendar to notify the team when to check on certain aspects of the bridge, serving as an extremely valuable and efficient tool to extend the longevity of the bridge.

Learn more about the project's 3D modeling technology on the following pages. »



THE NEW **NY** BRIDGE

BUILDING IN A VIRTUAL WORLD

Refining Design and Organizing Construction

Long before the first foundations of the New NY Bridge project were installed, architects and engineers were building the new crossing in a virtual setting.

The scale and complexity of the 3.1-mile crossing, the largest bridge and highway infrastructure project in North America, led the project team to utilize state-of-the-art building information modeling (BIM). BIM enables designers to visualize a structure in three dimensions (3D) and from countless vantage points.

This visualization can identify potential design conflicts early in the process and allow designers to discover efficiencies that can help reduce cost and improve construction scheduling. The BIM 3D design model also helps to quantify and organize the materials needed for large projects. How many piles are needed in this location? How long is this section of road deck? Calculations such as these could be made through a more traditional design process, but they are more quickly solved and visually enhanced through 3D modeling.

BIM technology is helping the project team handle an astonishing amount of information with incredible efficiency, honing terabytes of data into an enormously useful tool. Employing BIM modeling on the project is not only helping deliver the new crossing as efficiently as possible, it is also advancing technology that will help build and maintain new bridges, highways, railroads and other infrastructure facilities in the years to come.

Building Information Modeling (BIM) Offers Real World Benefits

- Organizes an enormous amount of data
- Helps to precisely manage design and construction
- Schedules and tracks each element of the bridge
- Ensures that construction proceeds in strict accordance with design plans
- Links millions of documents and photos to a single database

Preparing for the Next 100 Years

BIM will continue to serve the new bridge and the New York State Thruway Authority long after the bridge is completed. Future maintenance teams will need to quickly access and analyze data that has been collected in the BIM database. Utilizing video-game-based technology, the project team developed a user-friendly viewer program that displays the bridge model in a realistic and interactive virtual manner.

Each of the approximately 500,000 bridge elements can be viewed with links to pertinent design and maintenance information. Maintenance crews will be able to view the model from mobile devices, laptops or desktop computers, allowing them to see every piece of the bridge at every possible angle.

“BIM creates a much better level of efficiency. From wherever we are, we’ll be able to virtually visit every inch of the bridge and have instant access to every detail,” said Jay Wagner, project oversight engineer for the Thruway Authority. “This incredibly powerful tool will revolutionize how we go about managing the bridge for generations to come.”

WHAT IS PRECASTING?
FABRICATING CONCRETE BUILDING BLOCKS

Precasting utilizes reusable molds to create concrete products. The molds, called forms, are used to craft hundreds upon hundreds of identical building blocks. Not only does this process reduce cost, it also ensures that every precast piece meets the highest quality standards.

The New NY Bridge project is using precast concrete segments wherever possible to help expedite construction. Many different aspects of the twin-span crossing will be built with precast materials, including the pile cap foundations, median barriers, retaining walls, arches, noise walls, parts of the landings and the bridge's road deck. Many of the precast units are designed to interlock with one another, allowing for swift and safe installation on the project site.

Crafting precast materials on land in highly regulated conditions rather than over the water helps ensure the highest quality for each and every unit. The deck panels, for example, are being created in climate-controlled areas, after which they cure to their full strength over the course of a month.

By reducing the amount of work carried out in the river's ever-changing conditions, the use of precast materials also improves safety.

Learn more about the materials and methods being used to construct the new crossing on **NewNYBridge.com**. ■

» Approximately 1,000 panels of the new bridge's road deck will be fabricated through a process called precasting.

CONSTRUCTION **UPDATE**

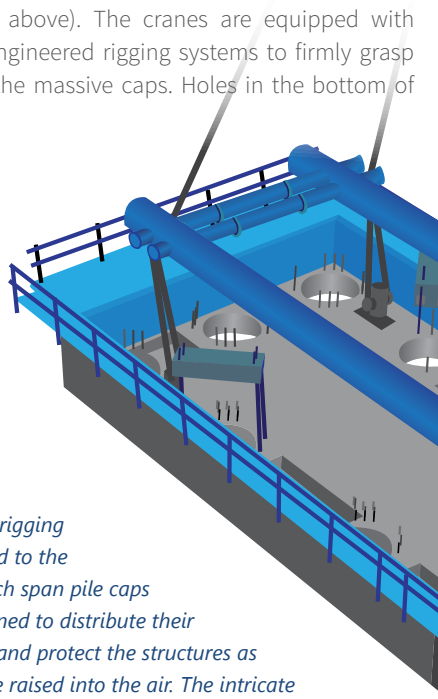
PRECAS
THE PIL
FOUNDATIONS PREPARED FOR CONS

Standing as the actual capstones of the new bridge's foundations, the approach span pile caps are concrete structures that are prepared for installation long before they arrive on the project site. Through a process called precasting, these monoliths, which range in weight from 300 to 600 tons, are produced at an off-site facility with great uniformity and efficiency.

The tennis-court-sized precast pile caps unite groups of steel tubes called piles that have been driven deep into the riverbed. The caps distribute the weight of the bridge's piers, superstructure and traffic to the piles. Each approach span pile cap supports one side of the twin-span crossing.

The caps are cast in a climate-controlled, on-land environment by Bayshore Concrete Products, a leading precast concrete manufacturer in Cape Charles, Virginia. Following a thorough inspection, the caps are moved onto barges and transported to the project site.

When each pile cap arrives, work crews position it over a group of piles with a barge-mounted crane (as shown above). The cranes are equipped with specially-engineered rigging systems to firmly grasp and hoist the massive caps. Holes in the bottom of



» The rigging attached to the approach span pile caps is designed to distribute their weight and protect the structures as they are raised into the air. The intricate web of materials can weigh as much as 50 tons.

TING
E CAPS

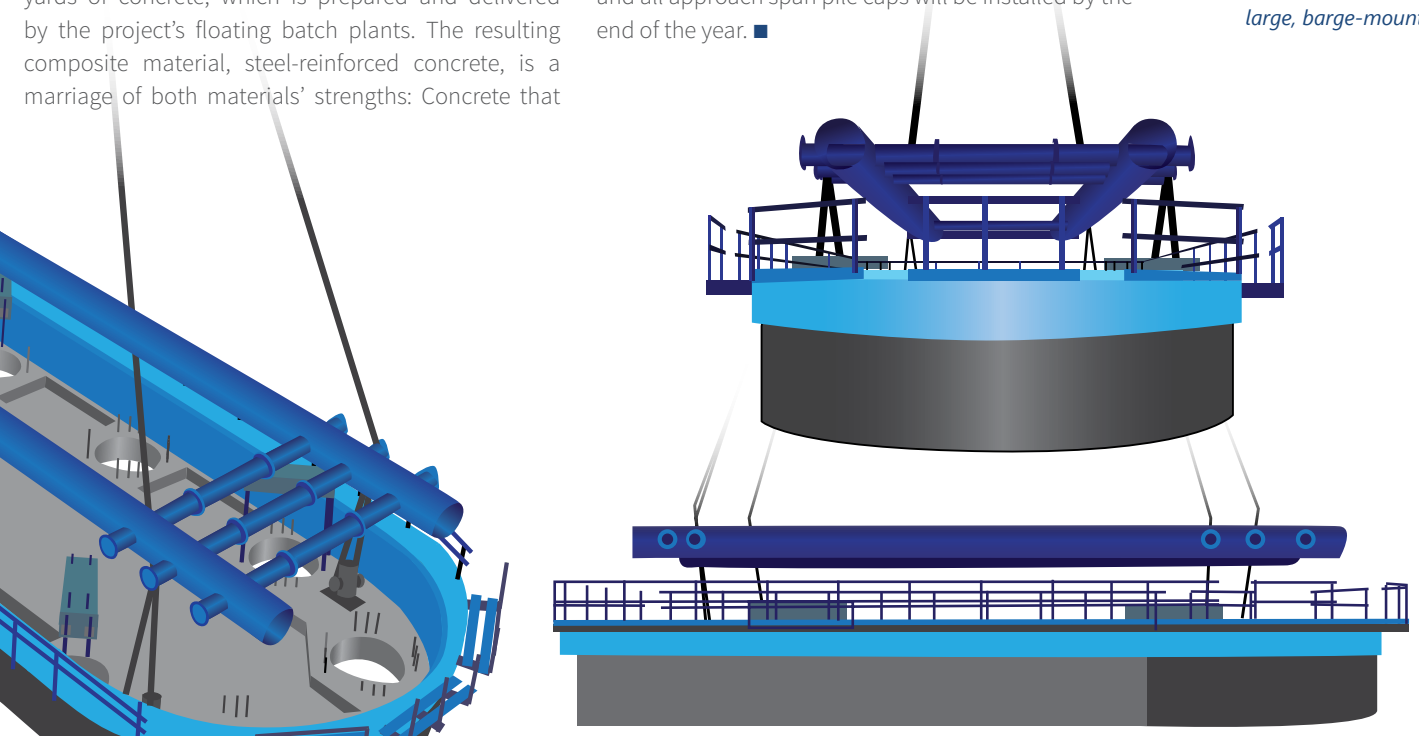
TRUCTION AT OFF-SITE LOCATION

the caps align with the piles. Concrete is then used to seal the caps to the exterior of the piles.

Next, the piles and caps are fitted with labyrinths of steel reinforcing bars, called rebar. The tightly-hewn networks of rebar are then enclosed in up to 750 cubic yards of concrete, which is prepared and delivered by the project's floating batch plants. The resulting composite material, steel-reinforced concrete, is a marriage of both materials' strengths: Concrete that is able to withstand enormous compression and steel that can handle great amounts of tension.

The *I Lift NY* super crane was used to install the largest of the approach span pile caps. Dozens more will be installed by the project's fleet of smaller cranes and all approach span pile caps will be installed by the end of the year. ■

» The new bridge's approach span pile caps are installed over groups of steel piles that have been driven deep into the riverbed. The 300-to-600-ton platforms are lifted into place by large, barge-mounted cranes.



GIRL SCOUTS **EXPLORE ENGINEERING**

REACHING THE NEXT GENERATION OF BRIDGE BUILDERS

Girl Scout troops from Greenburgh and Elmsford recently were briefed by the New NY Bridge educational outreach team on how the project is being built. The experience offered the scouts, ranging in age from 5 to 18, real-world perspective on how science, technology, engineering and mathematics (STEM) academics can serve as intellectual building blocks for a bright future.

Partnering with Aaron Tang of Bricks 4 Kidz, an organization that fosters educational play through customized LEGO sets, the outreach team presented the scouts with models of the new bridge. The girls worked in teams to construct their bridges with the aid of tablet computers. Their experiences encouraged collaboration and problem-solving skills in a fun and exciting format.

"It was great to watch the girls interact as a team and get the experience of building a bridge through STEM," said Harriet Mendel, leader of the Greenburgh Girl Scouts. "At first, all I saw were little pieces, but soon enough there were little bridges popping up everywhere!"

> **"It was great to watch the girls interact as a team and get the experience of building a bridge through STEM."**
>
> **Harriet Mendel**
> **Greenburgh Girl Scout leader**

The more senior scouts were given an in-depth presentation led by project engineer Troy Calkins, who manages cost and schedule for the Thruway Authority and is the father of one of the participating scouts. The young women quizzed Calkins and the outreach team about various aspects of the bridge project, particularly focusing on its construction.

"Speaking with the Girl Scouts was important to me, as civil engineering and the engineering profession overall needs more women," said Calkins, who noted that only 12 percent of practicing civil engineers are women. "As a parent of a young daughter, I think it's important to nurture a love of math and science from an early age and to encourage girls to explore engineering as a possible career choice."

As construction continues, the project outreach team will continue engaging young minds. If you are interested in learning more about the New NY Bridge project's educational outreach effort, please contact the outreach team at **NewNYBridge.com/Contact**. ■

Meet the Falcons *Hudson, Bridge-ette and Zee*

Coming to you live from high above the Hudson River, the fastest members of the animal kingdom can be viewed in real time on our falcon cam! In February, the Tappan Zee Bridge's peregrine falcons returned to their man-made nest box atop the old bridge to mate, lay eggs and hatch chicks. The feathered couple hatched three chicks, two females and one male, in April.

As a way of introducing local youngsters to the endangered raptors and the project's efforts to ensure that construction does not harm them, the New NY Bridge project team reached out to local schools to invite their participation in a "name-the-chicks" contest. After many names were offered by local students, a public vote was carried out on the project website. The verdict: the chicks were dubbed Hudson, Bridge-ette and Zee.

Watch during the coming spring and summer as the chicks fledge into flying adult falcons via the 24/7 FalconCam, accessible on **NewNYBridge.com**.

The Tappan Zee Bridge falcon nest box is maintained by the New York State Thruway Authority. The New NY Bridge will include a new peregrine falcon nest box high atop its towers.

OUR COMMUNITY TIMELINE

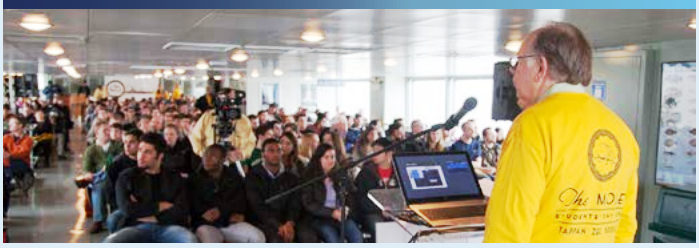
The New NY Bridge project team is actively involved in the community, partnering with local stakeholders and groups, leading educational outreach efforts and sharing project updates.

AMERICAN ASSOCIATION OF UNIVERSITY WOMEN

The project team led a discussion and progress report on the new bridge with the Westchester branch of the American Association of University Women, a non-profit group devoted to advancing equity for women.

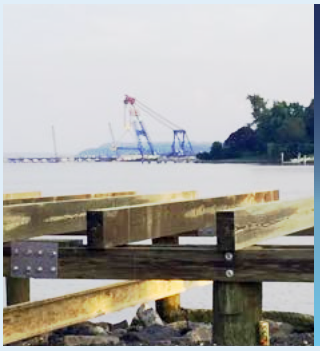
MOLES BOAT TOUR

The Moles, a fraternal organization of heavy construction professionals, joined with the New York State Thruway Authority and Tappan Zee Constructors, LLC in organizing a boat tour of the New NY Bridge project site for nearly 400 civil engineering students from 20 different academic institutions.



CHAPPAQUA STEM FEST

The project team met with hundreds of students at the inaugural Chappaqua STEM Fest at Robert E. Bell Middle School. Through their interaction, the team demonstrated the importance of STEM academics – science, technology, engineering and mathematics – and highlighted potential career paths.



ROCKLAND VIEWING PLATFORM

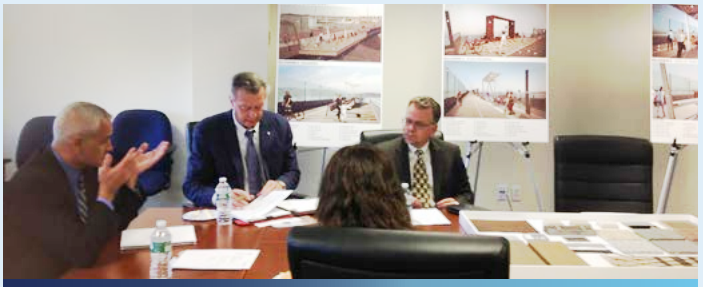
Opening to the public this summer, the Rockland viewing platform will be located on a pier in Memorial Park, Nyack.

ANNE M. DORNER MIDDLE SCHOOL

The project's outreach team met with students at Anne M. Dorner Middle School in Ossining on the eve of the students' entry in the 2015 Engineering Encounters Bridge Design Contest. The team showed students how engineering fundamentals are being applied to the bridge project.

LOWER HUDSON ENGINEERING EXPO

A group of potential future bridge builders was given a project briefing at the Lower Hudson Engineering Expo at White Plains High School, where they learned about career opportunities in engineering.



VISUAL QUALITY PANEL MEETING

Composed of local experts, planning officials and cultural representatives, the visual quality panel helped the New NY Bridge project team develop thoughtful design concepts for the new bridge's shared-use path.

2015 ANNUAL MEETINGS

Held in both Westchester and Rockland counties on May 12 and 14, respectively, the project's annual public meetings gave interested residents and others the opportunity to learn about construction progress to date and upcoming activities on site.

THE NEW **NY** BRIDGE

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NEWNYBRIDGE.COM

The project website provides detailed information about the design and construction of the New NY Bridge. Check back often to see the latest project progress.

1-855-TZBRIDGE

Our phone hotline is open 24 hours a day, 7 days a week, ready for your questions and comments. You can reach us at 1-855-TZBridge (1-855-892-7434).