

THE NEW NY BRIDGE

WINTER 2016



IN THIS ISSUE

3 Project Update:
Substructure
Nears Completion

4 Construction Update:
Forging Strength

10 Educational Outreach:
Inspiring Young Minds





Andrew M. Cuomo
Governor of New York State

MESSAGE FROM THE GOVERNOR

Driving across the Tappan Zee, people can't help but be impressed by the scenic beauty of Westchester and Rockland counties. Similarly impressive is the significant progress made this year on the New NY Bridge project — the iconic newcomer to the landscape.

As work on the superstructure progresses, commuters are seeing the bridge literally rising from the water before their eyes and stretching ever farther across the Hudson.

The sight of massive steel-blue girders and dozens of powerful cranes working in concert to turn this critical infrastructure project from blueprint to reality is truly remarkable. Since debuting in April, the *I Lift NY* super crane has placed more than a mile of those girders and hundreds of concrete road deck panels have already been installed.

The latest visible sign of progress is the construction of the outward angled main span towers, which will grow to 419 feet to support the new road deck and some 50 million vehicles per year.

I am proud to say the New NY Bridge project has become a national symbol of how to rebuild critical infrastructure, so much so that the Tappan Zee was recently featured on the

cover of the 2016 federal budget. It has also become a national model for how to successfully engage the surrounding communities.

The project's unprecedented community outreach plan has resulted in more than 700 community meetings, educational outreach to more than 25,000 students and the approval of \$9.6 million in grants to local residents and communities most impacted by construction.

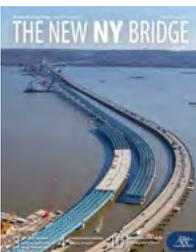
And we continue to create jobs. More than 5,000 engineers, planners, designers, builders, craft workers and more have already played a role in this historic undertaking. To date, 633 New York-based subcontractors and suppliers have worked on this project.

So next time you drive by and see the considerable progress made on the project, take a moment to thank the thousands of dedicated people who are helping to make it happen right here in the great state of New York. ■

Andrew M. Cuomo
Governor of New York State

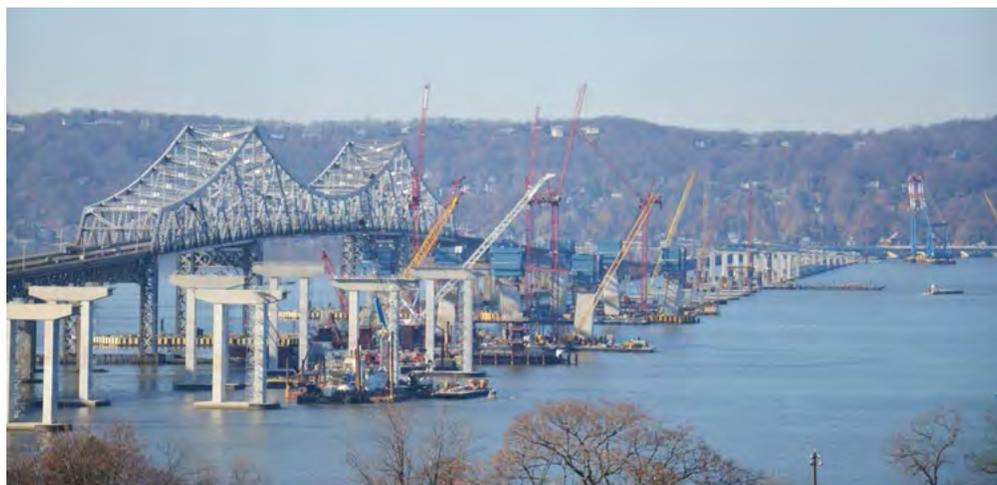
FEEDBACK

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



ON THE COVER

The first section of road deck marks another milestone for the New NY Bridge project.



Andrew M. Cuomo
Governor



New York State
Thruway Authority



New York State
Department of
Transportation



Federal Highway
Administration

THE NEW NY BRIDGE

PUBLICATION ISSUE NO. 7 | WINTER 2016

©2016 New York State Thruway Authority

The New NY Bridge 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

SUBSTRUCTURE NEARS COMPLETION

America's largest bridge project continues to move forward with the installation of girders, road deck and everything else the bridge must carry over the water.

The previous two years saw the completion of most **substructure** work on the project, including piles and pier columns. These bridge elements are primarily vertically oriented, stretching from deep below the river to dozens of feet above its surface. By contrast, the **superstructure** work is horizontal and is increasingly becoming the focus of the project.

A second but significantly smaller phase of substructure work will commence after the existing Tappan Zee Bridge is demolished in 2017, clearing the way for the remaining piles, pile caps, piers and pier caps to be installed near the Rockland and Westchester shorelines.

The substructure supports the superstructure, which is comprised of more than 100,000 tons of American-forged steel girders, acres of road deck and the majority of the 419-foot main span towers.

Substructures are built in the following sequence:

1 Tubular steel piles, hundreds of feet long, are driven deep into the river bed and partially filled with steel-reinforced concrete. The first and by far largest phase of pile driving for the bridge—85 percent of the total—concluded last June.

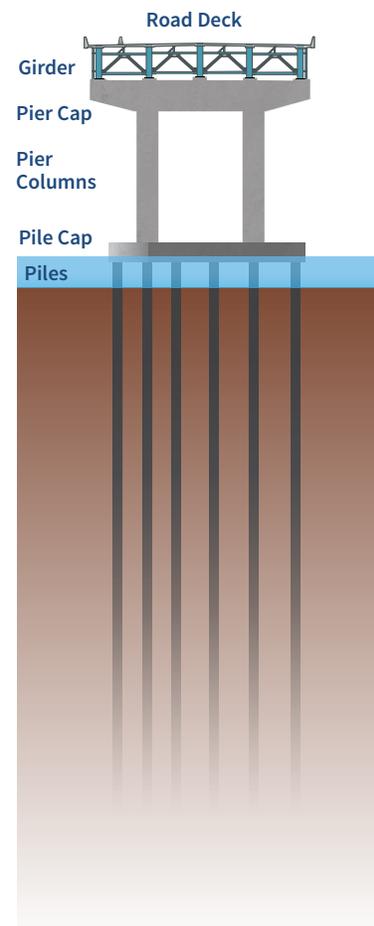
2 The piles are capped above the river's surface by reinforced concrete. As of November 2015, more than 60 pile caps have been installed, with several more to be constructed after the existing bridge's demolition.

3 Steel-reinforced concrete columns are then cast on top of the pile caps. The majority of bridge piers are now completed.

4 Pier caps complete the new bridge's substructure. More than three dozen pier caps have been completed to date, with many more being completed in the coming months. ■

» *Though much of it is underwater and invisible to the eye, the new bridge's substructure comprises a substantial portion of the river crossing.*

» *The new bridge's Rockland approach takes shape as the project nears completion of the current phase of substructure operations.*



Bridge Bearings

While tiny in comparison to other parts of the bridge, isolation bearings provide a critical benefit to the structure: stress reduction. Placed between pier caps and girders, the bearings protect the bridge by allowing movements caused by temperature-based expansion and contraction, as well as potential seismic activity. Cushioning against these unavoidable stresses helps ensure the strength and integrity of the bridge's more rigid elements.



FORGING STRENGTH

STEEL FORMS THE BACKBONE OF THE BRIDGE

The new bridge will rest on more than 260 million pounds of steel, which is roughly equal to the weight of half the 140,000 vehicles that cross the existing bridge every day. The resilient metal is being deployed on the fast-progressing project in a variety of ways.

The bridge's foundations, substructure and 419-foot towers are supported by vast, interwoven labyrinths of reinforcing steel, called rebar. Each of these steel reinforcements is treated with a special process called galvanization, which protects and extends the life of rebar. The steel bars are dipped into a hot bath of liquid zinc, which forms a crystalline "skin" over them that helps prevent corrosive factors such as salt water from rusting or otherwise causing degradation.

While the bridge's rebar will be encased in concrete, the exposed steel girders require a different treatment process to preserve their integrity and strength. The girders have a protective zinc-rich primer applied during their fabrication, followed by up to three coats of high-quality paint, which shields the steel from the elements, including moisture and salt from the river's brackish waters. ■



⤴ Thousands of tons of reinforcement and structural steel will support the New NY Bridge.



LOCALLY PRODUCED COUNTY FABRICATORS, LLC

Just up the road from the New NY Bridge project site, local manufacturer County Fabricators is making significant contributions to the future crossing. Among their responsibilities is fabricating mechanisms that align girders for precise placement, producing electrical conduit supports that are installed in the girders and building platforms that enable workers to safely access the *I Lift NY* super crane.

"As a Westchester business, we're especially proud to provide steel for this historic project in our own backyard. The project is enabling us to expand our business and make our mark on the region."

Kristina Benza
CEO, County Fabricators



STEEL WORKS



Steel is one of the most common building materials in the world, with more than a billion tons produced each year. While steel can be produced in various ways, a common method is called continuous casting, which is being used to fabricate many of the project’s essential components.

Steel is an alloy, meaning that it is a combination of several materials, including coal, limestone and iron ore. These raw elements are carefully measured and combined together in varying ratios, depending on the desired product. The materials are smelted together in a blast furnace, forming a soup of molten metal as hot as 3,000 degrees Fahrenheit. The mixture is then transferred from the furnace by an enormous ladle, which allows workers to apply further treatments to the concoction until it arrives at the necessary working temperature.

The liquid metal is then poured into a casting machine, which holds the mold for the steel’s final form. The semiliquid steel emerges from the mold and is promptly moved by a series of rollers. The rollers morph

the malleable metal into long slabs, which are finally ready to be treated and cooled to a solid state.

At the end of the process, the finished product is ready to be combined with other sections of steel. ■

Transporting Finished Products

Scan the QR code or visit the link below to see how the project transports completed segments of steel.



NewNYBridge.com



MAKING CONNECTIONS

STEEL GIRDERS LINK PIERS, STRETCH ACROSS THE HUDSON

In July, the lines of the new bridge began to be drawn across the Hudson River in the form of steel-blue girders. By connecting piers, the placement of the massive sections of welded steel is literally enabling the bridge to become a bridge.

More than 100,000 tons of steel girders will go into the New NY Bridge project. With the distance between pier caps extending as far as 400 feet, individual girders are assembled into groups (typically of three) on land, floated down river via barge and lifted into place to fill the enormous gaps. This design and construction method was premised on the ability

to pick up and place the massive assemblies with one of the largest marine cranes in the world, the *I Lift NY* super crane.

In addition to supporting the road deck, the girder assemblies include infrastructure to carry communications, electrical power, water and compressed air to support bridge operations.

As more and more steel arrives from the project's girder assembly facility in Albany County over the coming year, the new bridge will continue taking shape across the river.



NewNYBridge.com

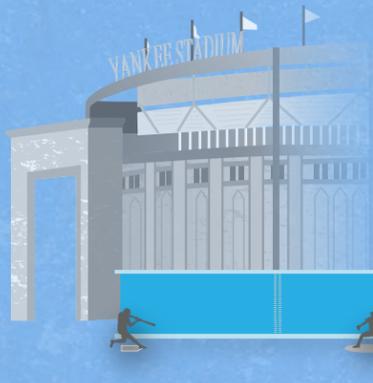
GIRDER INSTALLATION Online

Scan the QR code or visit the link below to access more information, including video of the first girder assembly's installation.



I LIFT NY

The enormous girder assemblies are feasible only because of the immense lifting power of the project's *I Lift NY* super crane, one of the largest marine cranes in the world.



SWINGING FOR THE FENCES

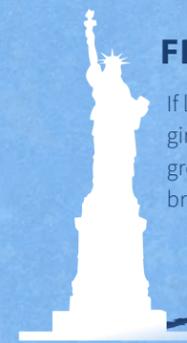
The project's girder assemblies measure up to 410 feet long – longer than the distance from home plate to the centerfield wall at Yankee Stadium.

410FT

CONNECTING STEEL

Crew members use up to 6,600 bolts to connect individual 12-foot-tall steel girders into a three-girder assembly.

6,600 x



FROM LANDMARK TO LANDMARK

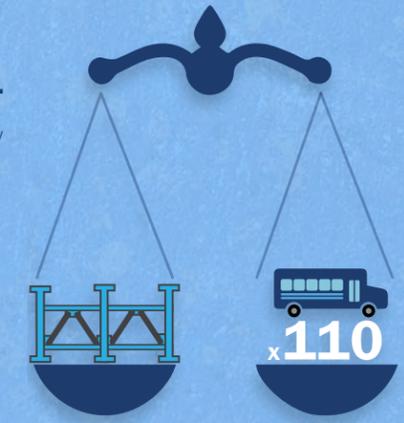
If laid end to end, the new bridge's girders would stretch over 31 miles, greater than the distance from the bridge to the Statue of Liberty.



31 MILES

HEAVY METAL

The first girder assembly to be installed tipped the scale at 1,100 tons – approximately equal to the weight of 110 school buses.



PUSHING FORWARD

INSTALLING GIRDERS AT THE SHORELINES



The vast majority of the new bridge's steel-blue girder assemblies are being installed across the Hudson River with the barge-based *I Lift NY* super crane. The massive machine, capable of raising 1,900 tons at once, has been instrumental to the project's progress in recent months. However, the crane's enormous berth limits its accessibility in areas near the Westchester and Rockland shorelines. For these locations, Tappan Zee Constructors, LLC (TZC) is using innovative yet simple alternatives to safely place structural steel.

In Rockland County, TZC is utilizing a number of smaller cranes to install individual girders near the shoreline and on land. A work trestle extending from the shoreline hosts several cranes above the shallow water, allowing them to install steel in the area. An additional, land-based crane is used to help connect girders to the landing of the new bridge. These smaller machines raise each girder individually, due to their limited lifting capacity.

In Westchester County, TZC faces decidedly different circumstances, with steep inclines and a major rail line running parallel to the shoreline that prevent the use of traditional methods for structural steel installation. After careful planning and coordination with the MTA Metro-North Railroad and the Thruway Authority, TZC engineered a creative solution: Instead of lifting the girder assemblies into place, TZC is "pushing" them from the Westchester abutment over the Metro-North tracks until they reach the first concrete pier in the river.

The inventive method of installation requires several steps to accomplish. First, TZC gathers individual steel girders on land near the Westchester abutment. Crews then connect the individual beams into a single girder assembly and place it on a specially-designed track system. The track is designed to help guide the girder assembly as it is pushed westward. Additional girders are then attached to the assembly, increasing its length and allowing it to be pushed farther.

The operation, which began in October, is anticipated to conclude by the end of 2015. The remaining work over the Metro-North tracks will

only occur on a single Friday overnight this December, during which time the Metro-North schedule will be slightly altered. This approach maximizes safety for both workers and the public and minimizes any potential impact to railroad passengers. TZC will suspend construction activities when passenger trains pass through the work area, resuming when given the "all clear" instruction by Metro-North. ■

By the Numbers

700 Tons Approximate weight of each girder assembly

550 Feet Average length of each girder assembly

40 Work days of activity to complete

3 Parallel girder assemblies total

3 Nights of activity over Metro-North tracks

LOOKING AHEAD

PLACING THE NEW ROAD DECK



After installing the new bridge's structural steel, Tappan Zee Constructors, LLC has begun installing the next portion of the twin-span structure: the road deck.

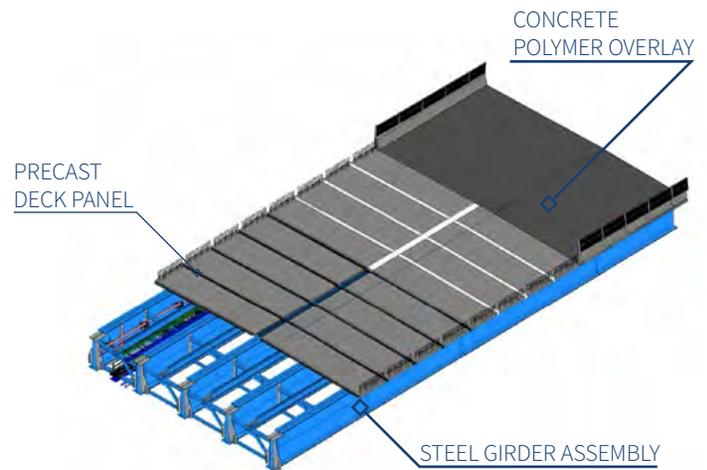
Over the coming year, the road deck will progress with more than 6,000 steel-reinforced concrete panels of varying sizes and specifications. The larger panels weigh approximately 74,000 pounds, equivalent to the weight of a humpback whale.

Each deck panel is precast under controlled conditions to exacting tolerances, ensuring they fit together precisely. The panels are manufactured at off-site locations to match the field crew's installation sequence. By creating the materials away from the varying conditions of the Hudson River, the project team is ensuring faster construction,

greater quality, lower cost and a safer environment for workers.

After the panels are barged to the project site, they are raised into place by the project's armada of cranes. The edges of the panels are then joined together and encapsulated in concrete, creating a smooth, even surface. When fully assembled, the deck panels will comprise a surface area of 65 acres – greater than the deck space of all 19 U.S. Navy aircraft carriers currently in service.

Installation of the road deck will continue throughout the coming year. Follow the latest progress by visiting the project website, NewNYBridge.com. ■



⚡ *The individual precast deck panels are joined together atop the previously-installed steel girder assemblies. Then the entire surface is covered with a concrete polymer overlay to ensure durability and a safe, smooth ride for drivers.*

WESTCHESTER GIRDER INSTALLATION

STEP BY STEP



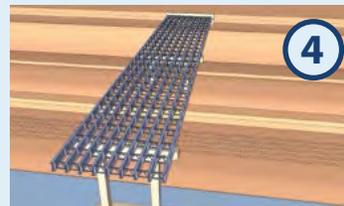
The girders are transported to the project site via truck in approximately 100-foot segments and are assembled into larger units on land. The large size of the assemblies minimizes the amount of construction required above the Metro-North rail lines.



The girder assemblies are slowly rolled out from the abutment on a specially-constructed track system and guided by a system of cables until they reach the first set of piers, which are on land.



Additional girders are attached to the end of the just-pushed assemblies and then pushed above the Metro-North tracks before reaching the second set of piers, which are in the water.



The process is repeated with multiple assemblies, creating a solid steel structure that will support the new bridge's road deck.



INSPIRING YOUNG MINDS

Now in its third year of engaging local students, the project's educational outreach team is visiting classrooms throughout the Hudson Valley and beyond with a curriculum that focuses on the many interdisciplinary skills behind the New NY Bridge. Building on previous efforts that have reached an estimated 25,000 students, the team is showing that brainpower is the driving force of the project.

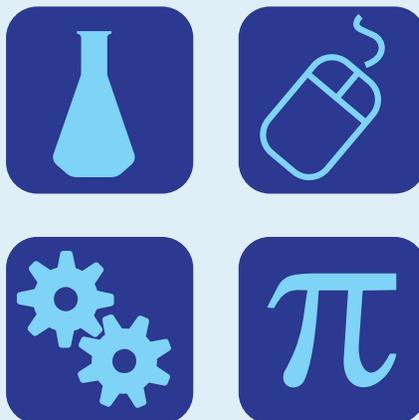
Whether it's the engineer behind a specialized lifting system, the environmental specialist protecting wild falcons or the designer of enormous pile caps, each profession takes center stage during the team's schoolroom presentations.

Complex concepts such as Newton's laws of motion and Archimedes' principle of buoyancy are framed in their real-world applications on the bridge project, giving students an understanding of how theory shapes reality. The presentations also provide educational points that teachers can incorporate in their own curricula.

For the duration of the project, the project team will continue to engage 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. ■

✦ *The New NY Bridge outreach team is promoting creative learning opportunities and hands-on problem solving experiences.*

Promoting S.T.E.M. Academics



Across the nation in recent years, four specific subjects – science, technology, engineering and mathematics – are taking growing prominence. The New NY Bridge project is showing students how mastery of these key subjects is essential to building modern marvels such as the new crossing as well as achieving success in other beneficial pursuits.

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.



HUDSON VALLEY ECONOMIC DEVELOPMENT COUNCIL MEETING

A summer board meeting of the Hudson Valley Economic Development Council was held aboard a vessel touring the New NY Bridge project site, emphasizing how the project is benefiting the local economy.



HISTORICAL SOCIETY OF ROCKLAND COUNTY BOAT TOUR

Working closely with project leadership, members of the Historical Society of Rockland County organized three public boat tours of the project site last summer, offering close-up views of construction.

HAVERSTRAW RIVER ARTS FESTIVAL

Children and parents alike learned about the new bridge project at a weekend-long celebration of the Hudson River in Haverstraw. Kids were encouraged to build their own bridge out of LEGO pieces.



CLASSIC CAR NIGHT

The project's outreach team connected with hundreds of car enthusiasts at the Nyack Council's Classic Car night in Rockland County.

THE HILLTOP SCHOOL

Students from The Hilltop School in West Nyack, participating in New York State's Board of Cooperative Educational Services program, received a briefing about progress on the new twin-span project.



NYACK BOAT CLUB YOUTH

When the boating season was in full swing, the project team reinforced the importance of boater safety with young mariners from the Nyack Boat Club.



NEWNYBRIDGE.COM

The new and improved NewNYBridge.com, which launched in November, provides a wealth of current and historical information about the project, including the latest news releases, informational articles and social media postings.



@NEWNYBRIDGE

A vintage postcard from the late 50s and our newest version side by side.





THE NEW **NY** BRIDGE



@NEWNYBRIDGE

Stay connected to the project and receive real-time updates by following us on Twitter via your social media accounts and/or mobile devices.



GET UPDATES BY EMAIL

Prefer to receive project information in your email inbox? Visit NewNYBridge.com to subscribe for email updates.



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).