

In the Heart of Manhattan, a New Neighborhood is Rising—Literally

Perimeter protection screens allow NYC's Hudson Yards skyscrapers to safely soar.

The massive Hudson Yards urban development project in New York City has so far gained two titles: the nation's largest private real estate development and the most complex construction project in the city's history. The megaproject has essentially created 28 acres of new land in Manhattan by covering a large working rail yard. From this new land, several skyscrapers are rising to provide more than 1 million square feet of high-end retail and mixed-use space and 18 million square feet of amenity-packed commercial and residential space. When completed, the development also will include a cultural arts center, a public school and 14 acres of public open space.

All but one skyscraper are being constructed on top of the new land, which was created by constructing two foundation "platforms" that bridge over 30 active train tracks, three rail tunnels and the new Gateway Tunnel. Three hundred caissons support the platforms and buildings. The four- to five-foot-diameter pipe are filled with concrete and drilled 20 to 80 feet deep into the bedrock between existing tracks. The towers will extend from the caisson foundations, through the platforms, and then climb skyward to complete the transformation from rail yard to dynamic neighborhood.

Because the expansion is uncharacteristically large and high, advanced safety measures are needed to protect construction workers exposed to extreme height conditions. The most common safety concerns in these types of projects are falls due to slips, trips and strong gusts of wind. Pedestrians below also need protection from falling debris.

As a result, three contractors working on four Hudson Yards skyscrapers are providing their crews with full perimeter protection by using Doka's automatic climbing formwork Xclimb 60 with Xbright protection screen system. Specifically designed for high-rise projects, the gapless enclosure keeps workers, along with their tools and materials, safely inside the work area while keeping out the wind, rain and other elements. It essentially allows the worker to feel as secure as if the work was being performed on the ground. The system is anchored to the structure at all times, and its structure-guided hydraulic repositioning mechanism can be operated to move screens from level to level, even in windy conditions. When cranes are available, users can opt to quickly reposition the modular, large-panel screens easily by crane, if desired.

Safety with Perimeter Protection Screens

The protection provided by Doka's Protection screen Xclimb 60 with framed enclosure Xbright enables all work to be carried out in complete safety, protected from all weather conditions. Additionally, the enclosure is added protection to prevent tools and materials from falling off the structure, protecting property, workers and any passersby below. Perimeter protection screens reduce the need for safety harnesses and can provide safe access to stairs. A loading platform can be integrated into the protection screen for straightforward, safe repositioning or

cycling of slab shoring and wall formwork, tools and other materials. Loading platforms are also ideal for adding staging space to the work area.

“One of our challenges is working around the trades as we build up. Space is at a premium,” says Hugh McCallion, a foreman with Cross Country Construction of Elmsford, N.Y., one of the contractors working on Hudson Yards skyscrapers. The Cross Country project team is adding a loading platform to their perimeter protection screen system so workers can store and move equipment and materials safely, without getting in each other’s way.

Below are the four projects using Doka’s Protection screen Xclimb 60 with framed enclosure Xbright system. Each tower features its own unique and often complex design. Doka also is providing engineering, permitting and pre-assembly services as well as onsite project management and field services to ensure each climbing protection screen system is a perfect fit for the project, no matter the building perimeter shape.

“We have an extensive engineering department that includes several professional engineers, which allows us to do everything in-house and under one roof,” says Tom Ammiano Sr., P.E., a structural engineer with Doka.

15 Hudson Yards

The curvaceous 960,000-square-foot LEED Gold-designed building will be the first residential building to open at Hudson Yards in 2018 and will offer 390 for-sale and rental residences. The typical floor is 12 feet high and typical floor area is approximately 93 feet by 152 feet. When completed, the tower will stand 71 stories (900 feet) tall, with exterior corners curving and sides folding in as it rises upward. To keep construction crews safe, Cross Country Construction is using 31 protection screens and five loading platforms, for a total of 72 vertical profiles.

“One of the challenges with this project is that the corners of the tower slant as it goes up,” says Tadas Ciuckys, engineering manager, special projects, with Doka. “We had to design special screens with special floor supports that would eliminate the need to modify screens on the jobsite.”

“The building shape is changing as we go up the structure,” concurs McCallion. “It will eventually look like a four-leaf clover at the top. We needed the protection screen system to climb incrementally, from level to level, without having to disconnect the panels and then reconnect them to fit the new shape. These panels have expandable sides to keep them enclosed, which is working out pretty good for us.”

The screens are 51 feet tall and engineered to incline by three degrees to accommodate the building design’s slanting, curved corners at the top—without having to make time-consuming modifications at the jobsite.

Another time-saver, says Ciuckys, is Doka’s proximity to the jobsite. “Our yard is close to the project, just 15 miles away, so we can deliver any needed material within a short time period.”

30 Hudson Yards

Scheduled to be completed in 2019, one side of this 2.6 million-square-foot tower slants upward so the structure can taper as it rises. The angular, LEED Gold-designed building will stand 1,296 feet tall with 92 floors, making it the second-tallest office building in New York—taller than the Empire State Building—and home to the highest outdoor observation deck in the city. The typical floor height is approximately 14 feet while the typical floor area is 180 feet by 239 feet. Contractor W&W Steel, from Oklahoma City, is using 35 protection screens that are 68 feet high, with approximately 92 vertical profiles.

30 Hudson Yards also is the first steel-framed building to utilize protection screens in the United States. As a result, the protection screens are specially engineered to climb the steel girders of the building rather than the traditional method of casting anchors into a concrete slab.

“We are more than formwork,” says Kyle Essig, a Doka account manager working with W&W Steel to provide the protection screen system for the steel-frame tower. “Our products and services are not restricted by the building material. Our work is about supporting the project, however needed. It is also about quickly reacting to changing conditions.”

This project, as with all projects using Doka products, is getting plenty of onsite support from the manufacturer. “As part of our field services, we provide training and assist in assembly to ensure that everyone is running the job smoothly and safely,” explains Rich Barton, field services supervisor with Doka.

35 Hudson Yards

Standing 1,000 feet tall, the tower will be the tallest residential building at Hudson Yards, with approximately 143 for-sale residences, office and retail space, and a more than 200-room luxury hotel with 60,000-square-foot fitness club and spa. The 79-floor building has several structure designs, starting with a rectangular base in which the podium floor area measures approximately 172 feet by 186 feet. The tower’s shape narrows as it rises up, with the rectangular base giving way to smaller square-shaped segments that become more rounded until finally, at the top floor, the tower takes on a clover shape with both curved corners and jutting corners. The typical floor height is 14 feet.

Contractor Roger & Sons Concrete, Lagrangeville, N.Y., is using 36 protection screens that are over 55 feet tall, eight loading platforms, one table lifting system (TLS) and two external climbing stair towers, for a total of 92 vertical profiles. Doka engineers custom-designed the hydraulic self-climbing protection screen system, loading platforms, table lifting system and stair towers to accommodate the building’s changing shape and rounded columns at the top, ensuring worker safety at each level of the building.

The TLS is an electric-powered lifting platform that can be easily integrated into DOKA protection screens to quickly and safely reposition floor-slab formwork, tools and other equipment—with no need for a crane. The lifting platform can be vertically repositioned in wind speeds up to 45 miles per hour.

In addition, like the protection screen system, the stair towers are anchored to the structure at all times.

Intermediate exits permit access to several work levels, from the working deck down to the cleanout floors. This ensures safe ingress and egress over the top four floors of the building for hundreds of workers, without the need for ladders. It can be put together quickly with frames and pre-assembled stairway elements.

55 Hudson Yards

Scheduled to open to the public in 2018, this commercial tower will provide office space, residences, a hotel and retail space. The 1.3 million-square-foot, sharp-cornered building will stand 780 feet tall with 51 floors. The typical floor height is approximately 13 feet and the typical floor area is 144 feet by 155 feet. Cross Country Construction is using 23 protection screens that are 53 feet 4 inches tall and 6 loading platforms, totaling 73 vertical profiles.

When completed, Hudson Yards is expected to gain another title: a model for the 21st-century urban experience, one in which vertical neighborhoods provide tenants with an unprecedented integration of buildings, streets, parks, utilities and public spaces so they can work, live and play. For those building these supertall structures, however, setting new standards for safety would be an ideal designation. Using full perimeter protection helps sets the bar for heightened safety when building in the sky.

“The goal is to be proud of the work we did—by building a strong, safe building that made our company money, and with no serious injuries,” says Greg Franzese, superintendent with Roger & Sons Concrete.

For more information on Doka’s [Protection Screen Xclimb 60 Xbright](#) guided climbing system, contact Doka at www.doka.com.

CAPTION:

Protection screens abound on four towers under construction on the Hudson Yards large-scale redevelopment project. The Doka Protection Screen Xclimb 60 Xbright is a guided climbing system for full perimeter protection. The full-area enclosure around the perimeter of the building enables all work to be carried out in complete safety, protected from all weather conditions. Credit: Doka