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SAIA SCAFFOLD & ACCESS INDUSTRY ASSOCIATION

A BMU FIT FOR QUEENS

SAIA 2021 COMMERCIAL COLLABORATIVE PROJECT OF THE YEAR & SUSPENDED ACCESS PROJECT OF THE YEAR

A BMU FIT FOR QUEENS

SKY CLIMBER, LLC WAS AWARDED THE SCAFFOLD & ACCESS INDUSTRY ASSOCIATION (SAIA) 2021 COMMERCIAL COLLABORATIVE PROJECT OF THE YEAR AND THE 2021 SUSPENDED ACCESS PROJECT OF THE YEAR FOR THIS PERMANENT INSTALLATION PROJECT FOR QUEENS PLAZA PARK IN NEW YORK. THE COLLABORATING COMPANY WAS SAFEWAY ATLANTIC, LLC.

BY KIT M. CARROLL

Queens Plaza Park is a new residential tower in the Long Island City neighborhood of Queens, New York. Now the second-tallest building in Queens, the concave form of the tower curves gently toward the historic Long Island City Clock Tower, creating a visual expression of the present embracing the past.

There are many unique features to Queens Plaza Park, including its curving glass facade, its height, roof elements, and exterior features, all of which made the development of its building maintenance unit challenging. However, through teamwork and collaboration, SafwayAtlantic and Sky Climber produced and installed a one-of-a-kind building maintenance unit (BMU) for this tower.

A Tale of Two Towers

The story of this tower begins with another, very different tower. There is much about Queens Plaza Park that is influenced by the historic Long Island City Clock Tower that sits adjacent to it.

Built in 1927 by the Manhattan Company, the neo-Gothic clock tower loomed over Queens for 60 years as the borough's tallest commercial building at 14 stories. The building has been landmarked and is undergoing renovations to rebuild the iconic clock mechanisms and reopen as a commercial space.

When the New York City Landmarks Preservation Commission (LPC) granted official landmark designation to the Clock Tower, it allowed construction around it. When Handel Architects LLC designed the 755-foot residential tower called Queens Plaza Park, the resulting shape was concave, curving partially around the Clock Tower to create a closeness between the two buildings, while being deferential to the historic Clock Tower.

All About the Glass

During discussions for maintenance solutions with the Durst Organization, the developer and owner, and the Hunter Roberts Construction Group, the construction manager, Sky Climber, LLC and SafwayAtlantic focused on ways to provide complete access to the entire glass façade. And as with any building of this height, these maintenance strategies are pre-planned into the construction process.

The curtain wall features special windows designed to maximize sunlight while reducing glare and heat, improving energy efficiency and thus assisting in the goal of reaching LEED Platinum certification. Additionally, the south-facing curved side of the tower features glass with electrochromic

Sky Climber, LLC

• SAIA Member

The Sky Climber brand represents a multi-national family of companies brought together to meet a variety of safe access needs across several business verticals. Sky Climber, LLC, headquartered in Delaware, Ohio, is the industry leader in designing, manufacturing, and distributing suspended access equipment used in industrial/commercial construction and maintenance applications. Learn more at https://skyclimber.com/home/.

Durst and SafwayAtlantic staff visit Sky Climber's Spain BMU manufacturing facility for a factory inspection and review.

Photo credit: SafwayAtlantic

The BMU arrives on site in New York and installation begins.

Photo credit: SafwayAtlantic

glazing to further mitigate solar heat gain and glare through adaptive tinting. The maintenance plan and subsequent BMU design needed to include features to facilitate future glass replacement of individual glass panels, even at the building's furthest corners.

Planning and Manufacturing

In addition to requirements relating to the glass on Queens Plaza Park tower, the SafwayAtlantic and Sky Climber team considered several key factors when designing this system, including the total drop height, roof structures, and obstructions on the façade such as boiler flues.

Throughout 2019, the project requirements and several potential design solutions were reviewed. Durst was very involved in the design process and participated in buildability reviews and maintainability discussions. By the time façade work on the tower began that fall, a design was finalized, and Sky Climber began manufacturing the building maintenance unit in its Spain factory near Madrid. Durst and SafwayAtlantic staff visited Sky Climber's Spain Permanent Installation manufacturing facility in November 2019 for a factory inspection and review. Together, the team implemented changes to the building and the machine to improve user-friendliness and reduce year-over-year maintenance costs.

The resulting machine is based on a Sky Climber T5 design but with several features that make it perfectly suited for Queens Plaza Park. Although telescoping BMU's typically extend 40 to 100 feet, this unit measures nearly 139 feet long at maximum extension with a 112-foot reach comprised of a five-piece telescoping jib.

The entire unit rotates 360-degrees from its stationary base, and the turning head rotates 180 degrees to allow for positioning of the suspended platform. A telescoping mast moves the vertical mast up and down to either use the machine or hide it in the parked position. A motor access catwalk allows access to the jib motors for maintenance. The cross bar for the auxiliary hoist is designed so that loads can be hung from three different positions to ensure coverage of all building sections.

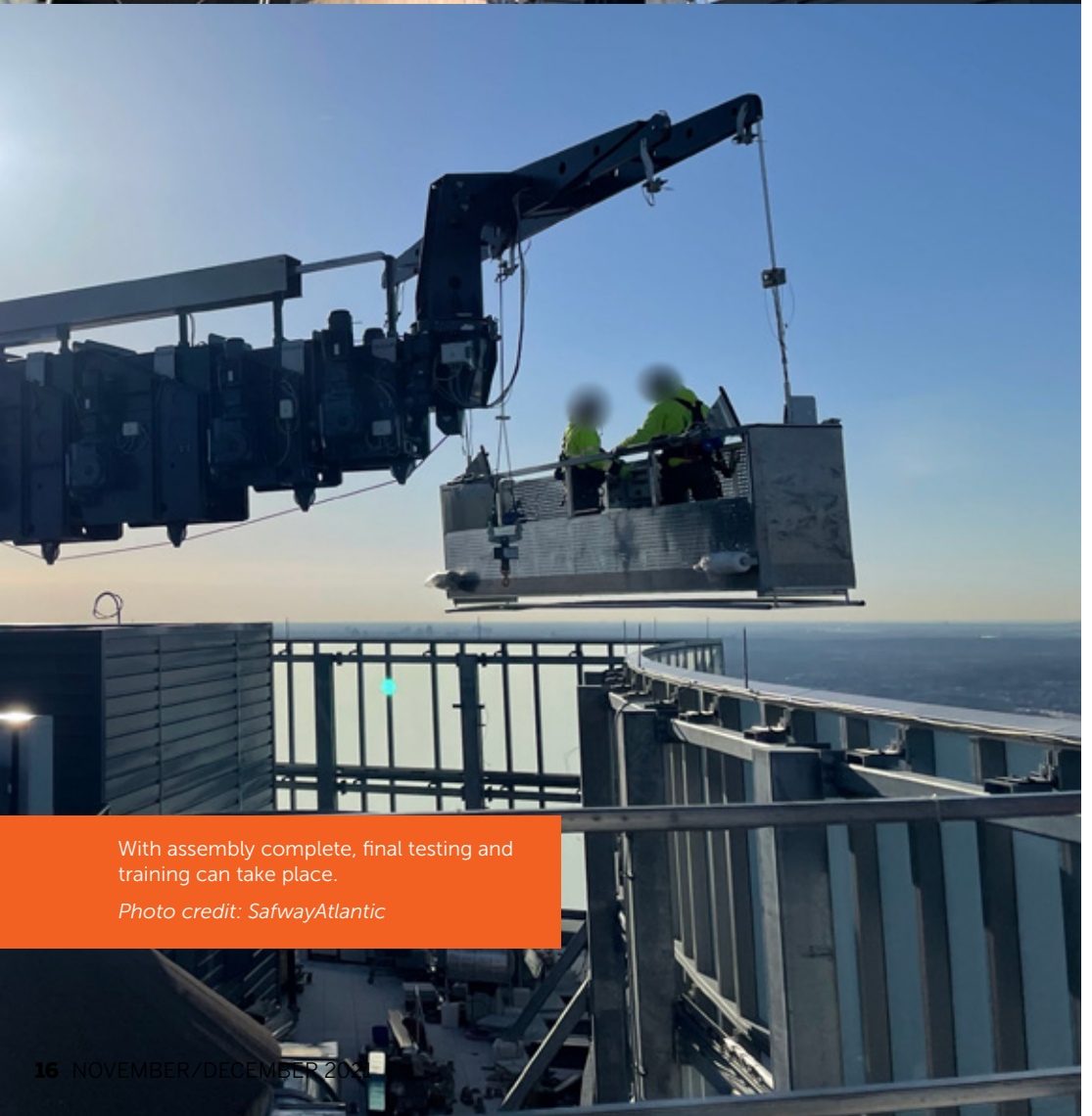
In total, this BMU has a vertical run of 785 feet on four conductor-core wire ropes. It is equipped with a telephone, anemometer, auxiliary hoist, and water tanks. The suspended access platform carries a load rating of 750 pounds,

Due to crane capacity the BMU had to be lifted in pieces, and nested telescoping jib sections were then assembled on the roof.

Photo credit: SafwayAtlantic

Telescoping sections of the jib had to be assembled on the roof, requiring precise maneuvering from the crane operator and installation crew.

Photo credit: SafwayAtlantic



With assembly complete, final testing and training can take place.

Photo credit: SafwayAtlantic

and the auxiliary hoist load, for future glazing and maintenance work, is rated at 1500 pounds. The total dead weight of the entire machine is roughly 150,000 pounds.

Continuous stabilization of the platform to the building is achieved with "torpedoes" connected to track set in the façade. Mullion track torpedoes can be considered standard equipment, but in this case they were outfitted with special sensors that allow the platform to avoid colliding with protruding elements on the tower's exterior surfaces. At just under 56 feet long in its stored position, this machine tucks away cleanly when not in use.

Installation

The finished machine shipped to New York in January 2020, and Queens Plaza Park topped out six months later in June. Due to the capacity of the crane on site, the BMU had to be picked in pieces. This meant that nesting of the telescoping sections of the jib had to happen on site on the roof. This procedure required a delicate touch from the crane operator and the installation crew.

Temporary draw cables were threaded through each telescoping section before nesting to enable the installation of the suspension and auxiliary hoist wire ropes. This prevented personnel from having to crawl inside each section to pull the wire ropes during the commissioning phase of the install.

SafwayAtlantic teams completed installation of the building maintenance unit and all other system elements by September 2020.

Challenges and Innovation

Sky Climber and SafwayAtlantic teams faced a few challenges on this project. BMU machines for buildings of this size often circle the rooftop on a track or rail system to allow maximum access to every vertical surface of the edifice. However, other

A set of torpedoes engages the building's track system and ties the platform to the façade, adding stability from wind and helping the platform navigate around unique features in the tower's surface.

Photo credit: Sky Climber

roof structures such as the stair bulkhead, temporary generators, air handling units, and water storage tanks made a track system problematic. Additionally, the geometry of the roof would still have required a track-mounted machine to have a considerable outreach and a much taller mast. This mast would have needed a pit to descend into in the parked position. Instead, the team opted for a stationary machine that could simply reach further. Placed on top of the stair bulkhead, this beefed-up design eliminated the need for a track system and required less overall roof space.

Another challenge in this project was a result of the unique shape of the building which could introduce air vortices and currents that would affect the platform. An intermittently stabilized platform would have a tendency to move around more in the wind, resulting in a lower wind-speed operating threshold. This would have limited the number of operational days per year for the BMU. To address this the team introduced the torpedo and track system to tie the platform back to building. Using the system of track built into the façade, crews could help mitigate wind anomalies and keep the platform in place during use.

The BMU can be seen atop Queens Plaza Park from a neighboring rooftop.

Photo credit: Sky Climber

Another challenge on this project involved a high-temperature exhaust pipe that exits the side of the building down on a lower floor. This created an incredibly rare, but possible, chance that workers on the BMU platform could be exposed to high-temperature toxic emissions during an emergency. To address this, special sensors were added to the torpedoes attached to the platform. These sensors automatically stop the machine before it reaches the flue. The workers then engage a horizontal guide track which helps the platform maneuver around and reposition below the flue, keeping workers safely away from exhaust gasses on the outside of the building.

Lastly, like so many others in 2020, the teams faced the challenge of the coronavirus pandemic. For the construction industry in general, the direct impacts of the pandemic varied according to region and project. While the BMU system was manufactured and shipped ahead of the outbreak, Durst's construction schedule for Queens Plaza Park slipped by several months as global supply chains slowed. While the contracted pick and install window was originally set for February 7th to April 10th, the building itself did not top out until June. When it did, SafwayAtlantic teams were ready and waiting to install the BMU system as per the revised schedule from the developer.

The combined goal was to design, engineer, fabricate, and install a system that provides comprehensive access to the façade of Queens Plaza Park. Together with the owner and the construction manager, SafwayAtlantic and Sky Climber accomplished this goal and delivered a building maintenance system that is truly fit for Queens.

About the Author

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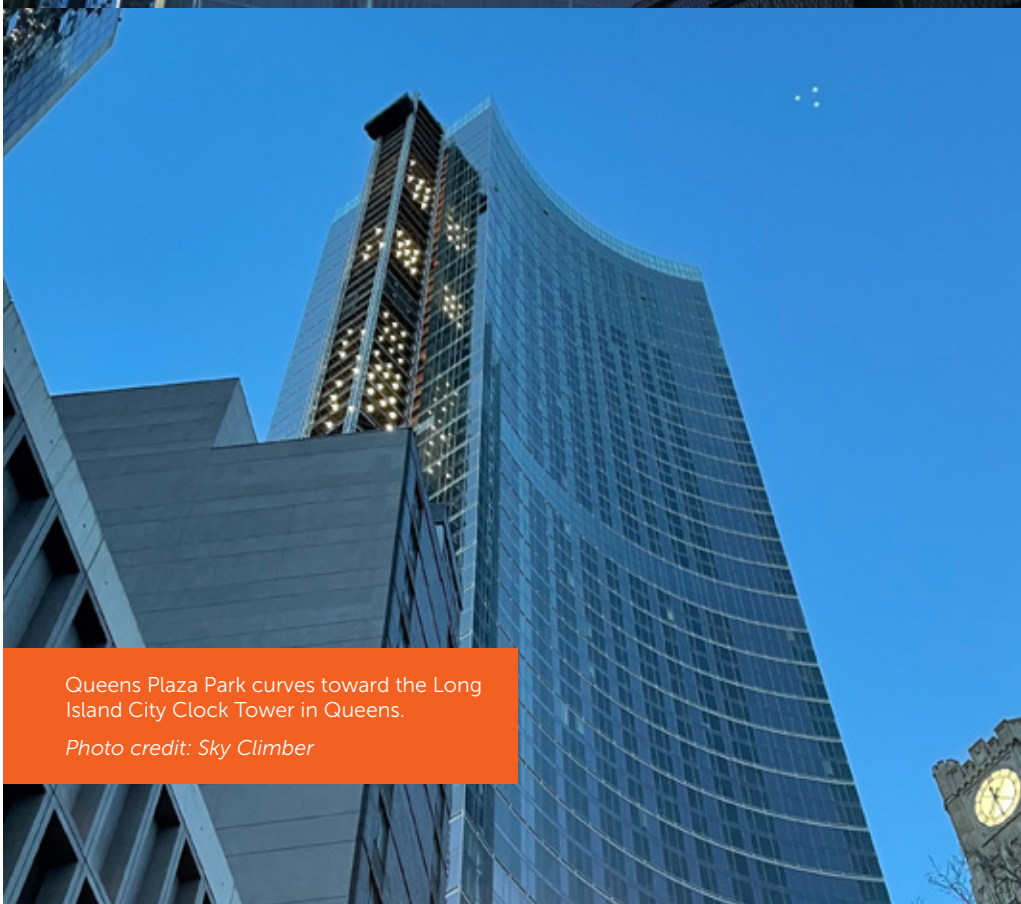
The building maintenance unit and platform in action at Queens Plaza Park.

Photo credit: Sky Climber



Queens Plaza Park curves toward the Long Island City Clock Tower in Queens.

Photo credit: Sky Climber