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**RISING.  
ONE WORLD  
TRADE CENTER**

**ROUSTER  
TRANSFORMS  
THE MINING  
INDUSTRY**

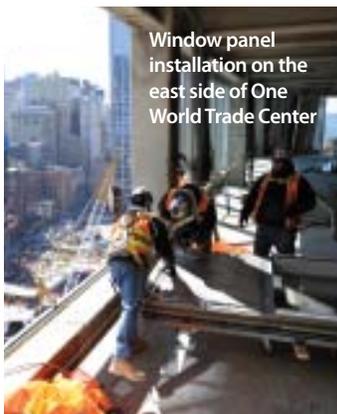


# HONOR JOB

RAISING  
THE 1  
WORLD  
TRADE  
CENTER

BY STEPHANIE AURORA LEWIS

**Americans decided after 9/11** to return to the site of the tragedy to build a tower bigger and more beautiful than what had been there before as if to tell the World that we will not be moved, we will not be backed into a corner. “It’s a thrill now to come down the West Side Highway and see the 1 World Trade Center as a beacon,” said Elizabeth H. Berger, president of the Downtown-Lower Manhattan Association. “The Lower Manhattan skyline is coming back. This is about the concentration of new, green, high-tech commercial space in the middle of what is now an exciting live-work community.”



Window panel installation on the east side of One World Trade Center

Image courtesy PAN/NU

Despite the emotionally-charged work atmosphere, the large sums of money it has taken to build, and lengthy negotiations, the new 1WTC is a successful, momentous feat. The 1WTC tower was designed by Skidmore, Owings, and Merrill (SOM) Architects and co-developed by The Port Authority of New York and New Jersey with The Durst Organization to be the tallest building in the Western Hemisphere reaching the prideful height of 1,776 feet at the tip of its antenna.



**“I had a sense of pride every time I walked onto the jobsite.”**

**- Tony Fastuca, ASC/Python America**

December 12, 2012: Ironworkers watch as the first section of the 408 foot cable-stayed antenna mast is lifted with SLINGMAX® Twin-Path High Performance Slings to the top of One World Trade Center. When completed, the spire will bring 1WTC to a staggering 1,776 feet tall, making it the tallest building in the Western Hemisphere.

The 1WTC tower has over 3 million square feet of office space with several signed leases including one with the prominent New York-based publisher Condé Nast. In addition to office space, the tower will also serve as a tool for radio and television transmission providing broadcasting services similar to that of the Empire State Building. By the time the tower is finished, it will have cost well over \$3 billion to construct. The 9/11 memorial is located near the tower that has a list of each victim immortalized there. An observation deck is provided for tourists to gain an elevated view of Manhattan from its southern location.

The 1WTC was also designed with cutting-edge green architectural features. The air quality for the tenants is high quality filtered air. 90% of the occupied spaces use natural lighting to lift morale and to reduce energy costs. The high performance glass curtain wall is highly insulated glass. Each floor has the ability to control the heating and cooling temperature for the particular tenants occupying the space. The tower also boasts of architectural features such as a 54-foot high entrance lobby, spaces with a minimum of 9 feet floor to ceiling sizes, and floor designs that do not have columns to interrupt flexible office and furniture designs.

Addressing safety concerns, the 1WTC tower has a special steel and concrete base designed in accordance with the New

York Police and Fire Departments. The elevator shafts are constructed with high strength block and grout. Likewise, the new transportation hub was strategically designed to protect the area from attack. Most of all, the soon-to-be Freedom Tower symbolizes America's resilient strength, beautiful creativity, and engineering innovation.

## THE STEEL CONSTRUCTION PROCESS

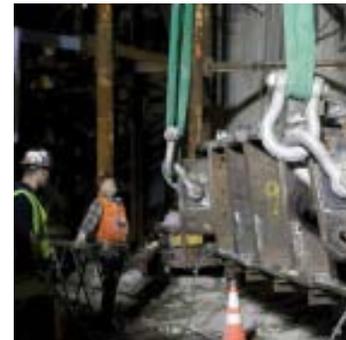
The Bilco Group and ASC Industries/PYTHON America supplied PYTHON High-Performance wire rope for the cranes that sat on the tower as it grew upwards floor by floor. Two cranes were devoted to steel construction and the other to concrete. The towers were constructed in such a way that once the steel arrived to the site, the ironworkers attached the load to a crane's hook with steel "choker" cables. Then, another group of ironworkers would handle and guide the steel bundles into place, securing the steel temporarily with tapered drift pins shoved through the matching bolt holes of the pieces to be connected. The choker cables were then released and the process started all over as the ironworkers replaced the pins with high-strength bolts.

As steel was brought up to each new level on the tower, large steel guide cables were secured from the columns to the floor below. The steel guide cables were then released as beam connections were made between columns. Corrugated metal deck was then spread over the steel floor members and welded down. Once all of the steel connections were finished and all of the steel decking installed, the floors were given over to the concrete contractors to finish each composite flooring system.

## THE TOWER'S LEGENDARY ANTENNA

SOM's vision for the top of the Freedom Tower was a crowning sculpture designed by the famed sculptor Kenneth Snelson. The sculpture was designed to sheath and work in conjunction with the communications platform ring and a 408-foot, cable-stayed antenna mast. When the project was recently near completion, The Durst Organization

(3 below) Images courtesy of ASC Industries/PYTHON America



Joe Woolhead / Courtesy of Silverstein Properties

who sought to reduce project costs deleted the antenna's sculpture from the building.

Still compelling for mention, the design for the antenna had been a mast protected by a one-of-a kind fiberglass panel system that was designed to resist wind loading, and to create a protected maintenance area. At the base of the mast, a tetrahedral lattice ring supported the media transmission equipment. The lattice ring braced eight radio-frequency transparent Kevlar guy cables that supported the mast. When lit at night, a beacon at the top was to send out a horizontal light beam that could have been seen from miles away.

The sculptor artist Kenneth Snelson's "art is concerned with nature in its primary aspect, the patterns of physical forces in three dimensional spaces." Snelson's work is ethereal and embodies complex

One World Trade Center under construction.



**“In our business, one wrong move, one mistake, could be costly. So we take proper training very seriously.”**

**– Jason Lemberg, The Bilco Group**

geometries that can only be realized through the use of elegantly strung wires. Used for artistic expressions, wire rope makes his sculptural installations throughout the world remarkable. SOM Architects fought to keep the sculpture, stating it was a critical part of their design.

**THE FASTEST ELEVATORS IN THE WEST**

It is not hard to imagine why the new Freedom Tower would house the world’s third fastest elevators after knowing what happened during the tragic fall of the previous towers

and how vertical transportation was cut off. 54 high-speed destination dispatch passenger elevators are included for building occupants and tourists to have access to sufficient and fast vertical transportation from many points throughout the tower.

ThyssenKrupp Elevator, one of the world’s leading manufacturers of vertical and horizontal transportation technology, supplied all 73 elevators and eleven escalators for the 1 World Trade Center tower. This is the largest order that ThyssenKrupp Elevator has provided for any single building in history. The fastest elevators in the Northern

Hemisphere are designed to move at an alarming 29.5 feet per second. ThyssenKrupp also stated that the elevators are designed to protect the passengers from ear-popping effects while ascending tourists to the observation decks in less than one minute. Of the \$150 million contract, 64 of the elevators will be gearless, six are machine-room-less, and one is a geared elevator.

Brugg Wire Rope supplied a large portion of the hoist cable wire ropes for the Freedom Tower’s elevator collection along with suppliers from Switzerland and the Czech Republic. In an interview with Brugg’s Martin Rhiner and

Joe Woodhead | Courtesy of Silverstein Properties

Artistic Rendering of the completed One World Trade Center at night



Image courtesy: JPM/NU

Doug Ingenthron, Doug Walker, Associate Editor with the Rome News-Tribune, discovered that the largest cable Brugg supplied is one-and-three-eighths of an inch in diameter. Each hoist cable is approximately 1,340 feet long and weighs over one ton due to its incredible length. In sum, Brugg supplied more than 826,000 linear feet of steel cables used for all of the Tower's elevators. The wire rope cables used for the elevators have steel cores as opposed to the traditional sisal rope-based core. Rhiner stated to the Rome News-Tribune that they were awarded the contract because of their Rope Life Prediction program.

## WIRE ROPE INSPECTION TRAINING

Bilco Wire Rope, a PYTHON America master distributor provided the non-rotating high performance ropes for the tower cranes on the 1WTC. "As such, Bilco Wire Rope provided thousands of feet of PYTHON rope for the tower cranes and the cranes themselves were provided by Favco," says Jason Lemberg, Sales Manager for The Bilco Group. Lemberg was the main operator for the project that represented both The Bilco Group and ASC/PYTHON America as the main providers of wire rope

for the building's construction crews in the field.

Tony Fastuca, Vice President of Sales and Marketing for ASC/PYTHON America, and Lemberg provided many training sessions including: inspection criteria methods, inspections of wires within the ropes, and inspections of the rope conditions for the construction workers in the field. Their training seminars also included procedures for the proper installation of the ropes for the cranes. Additional training sessions were developed for the benefit of representatives from the Port Authority as well as from the Department of Building Inspectors.

"Any time our product is used, we like to give our customers as much training as possible. This is a unique aspect of The Bilco Group and our joint efforts with ASC/PYTHON America," says Lemberg. "In our business, one wrong move, one mistake, could be costly. So we take proper training very seriously." The Bilco Group is supplying the ropes and hardware for the erectors for the 4 Tower as well as for the WTC site transportation hub. The Bilco Group has been distributing wire rope and related rigging products for over 30 years.

The SLINGMAX® Twin-Path High Performance Slings used on the construction site at the 1WTC were manufactured by ASC Industries, a SLINGMAX® fabricator in the United States. These high performance slings are made with K-SPEC® Core Yarn with Dyneema®, the World's Strongest Fiber™. They are highly abrasion resistant, lift high capacities, are inspected with fiber optics and early warning indicators (EWI), can be repaired if damaged, and have less than 1% stretch. "For the 1WTC project, the highest capacity slings we provided had a 250,000 lbs. capacity," says Lemberg.

Fastuca says, when asked what it was like to be a part of the 1 World Trade Center tower, "I had a sense of pride every time I walked onto the jobsite. The union of American technologies, manufacturing, and creativity represented there at ground zero is an amazing illustration of how we all banded together to produce an outstanding architectural wonder." ■



courtesy of PANYNJ

## WE HONOR IRONWORKERS LOCAL 40 FOR THEIR HARD WORK. TO ALL AMERICANS, WE WILL NEVER FORGET.

1. In eleven years, a team of more than 200 Ironworkers clad in fluorescent vests and hard hats have built One World Trade Center.
2. Standing exactly 1,776 feet tall, the new World Trade Center will be America's tallest building.
3. The tower will contain more than 48,000 tons of structural steel (the equivalent of over 22,000 full-size passenger cars) and more than 200,000 cubic yards of concrete (the equivalent of a continuous sidewalk from New York to Florida.)
4. The tower features a cable-stayed antenna consisting of two major components: a 408-foot mast and a communications platform ring. To add more support against wind, eight RF (radio-frequency) transparent Kevlar guy cables are connected from the mast back to the ring.
5. Two Manitowoc crawler cranes were used to erect the perimeter steel at the base of the tower. The larger of these cranes has an 835-ton lifting capacity, making it the largest crane ever used in Manhattan.
6. Within the tower, an EFCO self-jacking lift system was used for constructing the massive core walls.
7. 1WTC will feature LEED Gold certification, the standard for sustainability construction and green initiatives, making it one of the most environmentally friendly buildings of its size ever created.
8. The tower plan by Daniel Libeskind, Master Planner for the World Trade Center site, began as a napkin sketch made after he descended into the 70-foot chasm created by the twin towers' absence.
9. The site also features the 9/11 Memorial, which consists of two pools that reside in the footprints of the original Twin Towers, surrounded by a plaza of almost 400 oak trees. The design was selected from a design competition that included more than 5,000 entrants from 63 nations.
11. The price tag for 1WTC is estimated at over \$3.8 Billion, which will make it the world's most-expensive office building ever constructed. Most of the cost overruns are due to the security measures being taken in the design of the building. The entire 16-acre site, which is owned by the Port Authority of New York and New Jersey, has a projected price tag of \$14.8 billion.

Source: Information contained herein was obtained from [www.WTC.com](http://www.WTC.com), a website intended to serve as a comprehensive and updated source of reliable information on the rebuilding of the World Trade Center (WTC), [www.onewtc.com](http://www.onewtc.com), a website provided by The Durst Corporation, to provide public information about One World Trade Center, and from the Port Authority of New York & New Jersey at [www.panynj.gov/wtcprogress](http://www.panynj.gov/wtcprogress).



Tony Fastuca

Jason Lemberg

Contributed by: ASC INDUSTRIES/PYTHON AMERICA & THE BILCO GROUP

