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# EW

## ELEVATOR WORLD

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ELEVATOR WORLD

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# Vessel

Elevators, New Construction

NYC

Team overcomes unique challenges to create “one of the world’s most complicated elevators.”

*submitted by Dru Brooks, Liberty Elevator Corp.*

One of the most ambitious property developments in decades came to fruition in spring 2019 in the heart of NYC when Related Cos. opened phase one of its much-anticipated Hudson Yards megadevelopment. The ultramodern neighborhood includes an 88-story residential tower, a 73-story mixed-use property, a more-than-1-million-ft<sup>2</sup> luxury retail center and 14 acres of landscaped public space surrounding Manhattan’s newest “must-see” attraction, which, at the time of this writing, was called *Vessel*.

*Vessel* is the extraordinary Hudson Yards centerpiece, designed by London’s Heatherwick Studios as interactive artwork to be experienced through a multitude of perspectives, outwardly and within. It is a 16-story geometric latticework of copper-colored steel and concrete comprising 154 interconnecting flights of stairs, 80 landings and nearly 2,500 steps.

Visitors enjoy the view from inside the cab.



Construction began in April 2017, with *Vessel* opening in March 2019. It has been both praised and panned, with *Fortune* calling it “Manhattan’s answer to the Eiffel Tower” and, on the opposite end of the spectrum, several high-profile art critics describing it as “gaudy.” In any case, it was an ambitious undertaking. After an initial cost estimate of US\$75 million, the cost of the Related Cos.-funded project ended up rising to an estimated US\$200 million, which Thomas Heatherwick of Heatherwick Studios attributed to the complexity of construction of the steel pieces.<sup>[1]</sup>

Related Cos. chairman and founder Stephen Ross said *Vessel* would be like a “12-month Christmas tree” for the city, while Heatherwick intended visitors to climb and explore it like a giant jungle gym.<sup>[1]</sup> That, however, may prove difficult for many visitors, so Related and Heatherwick reached out to Liberty Elevator Corp. to create, install and maintain an elevator that seamlessly fits within the open structure’s artistic aesthetic and complies with strict Americans With Disabilities Act (ADA) requirements.

## Specifications

**Height:** 139 ft

**Speed:** Up to 100 ft/min

**Motor:** 4- and 20- Dana BREVENI® Motion Systems geared motors

**Materials:** Rack-and-pinion elevating system with leveling platform

**Openings:** Four

**Controllers:** Cimolai technology with Siemens programmable-logic-controller control box

Liberty Elevator worked with Cimolai of Italy to create a custom elevator shaft to fit along the contours of the structure with an oval, glass elevator cab that offers 360° views and universal access from its base to the landing at the pinnacle of the 150-ft-tall *Vessel*. The elevator provides a smooth, quiet ride with extraordinary views of *Vessel*’s interior. Liberty Elevator Chief Executive of Project Operations Danny Girgis states:

*“We drew from diverse technologies in a multitude of industries to overcome our unique challenges in creating one of the world’s most complicated elevators. Our goal was to be ADA-compliant and provide a unique transportation experience for visitors that captures the aesthetics of this unorthodox, yet beautiful, structure.”*

## Challenges

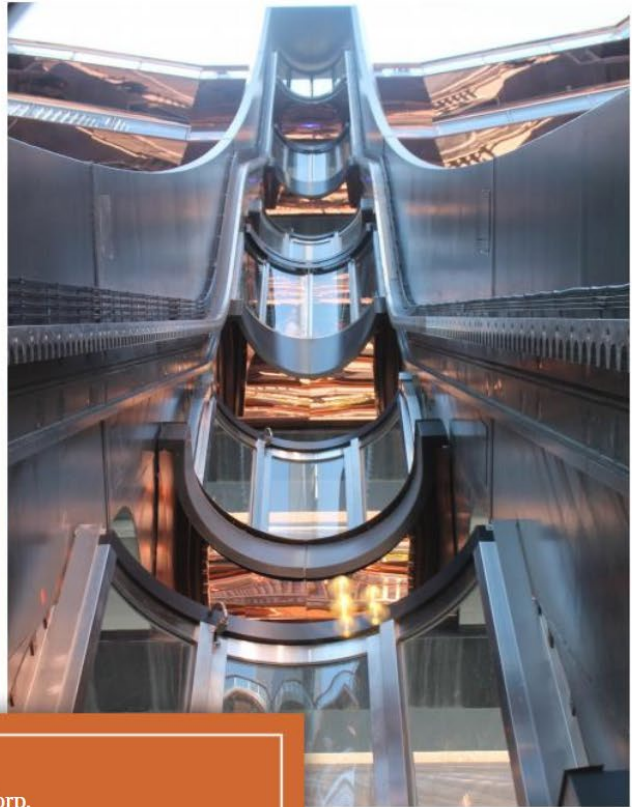
Liberty Elevator was challenged with integrating the elevator within *Vessel*’s open-air structure without compromising its artistic integrity, virtually hiding it in plain sight. The structure rises, widening to 150 ft at the top from a base 50 ft across with five openings. This created a unique challenge to design an elevator “shaft” along a nonlinear path with multiple pitch angles that still makes contact with all eight floors of varying depths. Once the shaft was designed, a custom drive system was implemented to account for the undulating curvature of the track, while allowing leveling of the cab floor at each of the eight landings.

Being outdoors and totally exposed to the full myriad of NYC weather presented additional challenges. From humid sea air coming off the Atlantic Ocean in the summers, to heavy nor’easter snowstorms in the winter, the elevator needed to be as resilient and reliable as the city itself for the thousands of guests visiting each day.

*Continued*



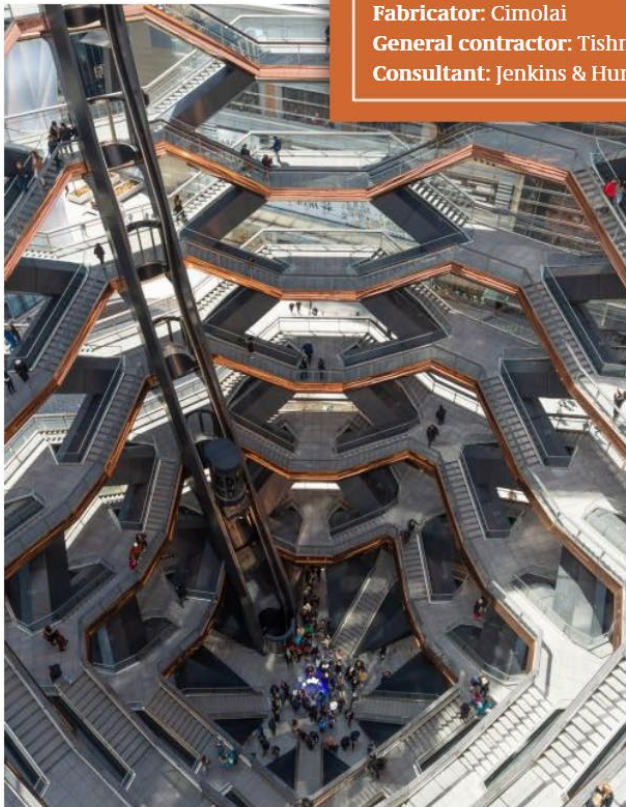
One of the landings



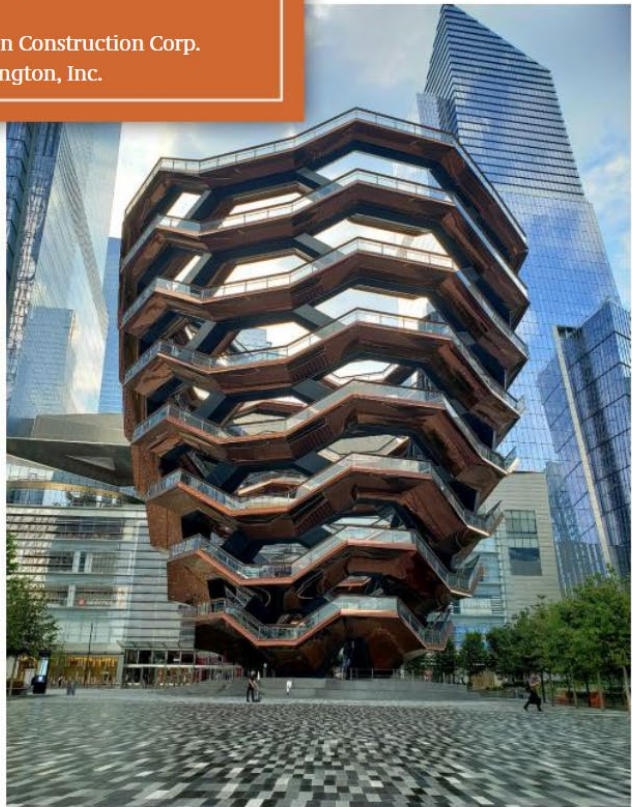
Close-up of the shaft

### Credits

**Installer:** Liberty Elevator Corp.  
**Designer/architect:** Heatherwick Studios  
**Owner/developer:** Related Cos.  
**Fabricator:** Cimolai  
**General contractor:** Tishman Construction Corp.  
**Consultant:** Jenkins & Huntington, Inc.



The Vessel elevator "hides in plain sight."



Vessel Plaza

## Technology

Working with its network of vendors, Liberty Elevator created a one-of-a-kind lift system that utilizes an array of new technologies. The custom, oval glass cab is wireless and implements an electrical busbar system. Wireless controls are remotely located with commands transmitted via WiFi from the machine room to the cab. This system regulates and tracks all movements without traditional cables.

The cab fully includes all controls, motors and utilities. To permit visitors to observe the extraordinary views within *Vessel*, the system's mechanics – including heating and cooling elements – are hidden within the floor.

The rack-and-pinion design allows for precise positioning and pivoting of the integrated motor body independent of the cab platform, undulating as it elevates along the multipitched track, while keeping the cab level throughout travel.

## Reference

[1] [wikipedia.org/wiki/Vessel\\_\(structure\)](https://en.wikipedia.org/wiki/Vessel_(structure))

