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Squeezed

BY GARRET BROWNE, S.E.

The only way to go was up for a small, steel condo building on a narrow lot in a dense Chicago neighborhood.

CHICAGO'S NEAR NORTH SIDE HAS SEEN A BOOM OF CONDO BUILDINGS IN RECENT YEARS, many of them soaring, monolithic towers. So when a small, architecturally significant residential building is introduced to the neighborhood, it's worth taking notice.

"We wanted to create a modern building in the great tradition of the Second Chicago School steel and glass towers—buildings like the 860 Lake Shore Drive apartments by Mies van der Rohe and the John Hancock Building by SOM," says David Miller of Miller Hull Partnership, Seattle, the project's architect.

The new nine-story condominium building at 156 West Superior sits on a relatively narrow lot bounded by an existing vintage residential building to the east and alleys to the north and the west. The ground floor houses a lobby and tenant parking. Floors two through four contain three-bedroom units on the south and one-bedroom flats to the north, and floors five through nine are single residences. Each unit has an outdoor deck, and the ninth floor residence has an adjoining private roof deck connected by an internal stair.

Miller Hull wanted an exposed steel aesthetic and an open-plan unit layout that would maximize square footage. Miller explains that the primary façades on the south and north have three parts: the fully glazed steel frame with its bracing in the center, framed by the taught skin of the standing seam siding on the west, and the filigree of the cantilevered balconies on the east. By using steel the engineer was able to minimize structural intrusions into the space and maximize the glazing area, as the units feature floor-to-ceiling, commercial storefront windows that span nearly the entire front width of the building.

Down Under

The site contained urban fill for the first 10 ft, underlain by a layer of stiff clay, followed by softer "blue" clay. There was no requirement for a basement, and spread footings would

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have been difficult to construct due to lot line restrictions and required footing size. So, the decision was made to bear the building on deep caissons. Hardpan is about 80 ft below grade and gave the necessary bearing capacity for the column loads.

A total of seven caissons were used to support the building. Due to poor soil conditions at the ground level, the design team decided to create a structural slab supported by grade beams. The slab was formed on a drainage layer and the existing fill, and was designed to span between the grade beams. The grade beams also picked up some of the CMU shear walls and transferred these loads to the caissons, resulting in a more efficient use of the caissons. The parking area at the rear of the building is on a slab at grade, as ground-level parking was requested by the developer. Much of the column and wall layout was dictated by the parking spots and garage access.

Superstructure

The superstructure is a steel frame with composite deck. Lateral stability is provided by a mixture of braces and masonry shear walls around the elevator and stair cores. Because of code requirements for fire ratings, brace elements necessary for the structural integrity of the building must be fire-protected or enclosed in a fire rated-wall. However, bracing that provides stiffness beyond what is necessary for strength can remain exposed. Miller Hull took advantage of this for the front elevation of the building, where two-story steel rod "X" braces create a dramatic structural statement. They reside outside the building envelope, where they do not interfere with the glazing system or the detailing of the weather enclosure.

The spandrel beams on the front elevation are painted, but the steel immediately behind them is fireproofed, as it supports the occupied floor. Typical floor beams were designed with web penetrations to accommodate mechanical systems while maintaining ceiling heights.

Masonry walls for the elevator and stair cores provided ideal locations for shear walls, but because they were located towards the perimeter of the building, supplemental bracing was required at interior locations. This supplemental bracing was provided by adding diagonal straps to the interior metal stud walls and additional rod bracing on the west elevation.

The steel frame was erected in its entirety, followed by the other trades. As the reinforced CMU shear walls came afterwards, Thornton Tomasetti employed a rigid attachment to the steel frame in order to engage it laterally.

Inside and Out

While it isn't one of the larger residential projects to come onto the scene in Chicago's urban core lately, 156 West Superior is certainly one of the most pleasant to look at, especially at night when the large front windows turn it into a living lantern. According to Miller, "The building's structure is the primary architectural expression for the project." MSC

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