

Aqua Building

Chicago, IL



The Aqua Tower is an 82-story, mixed-use building designed by Jeanne Gang, founder of Studio Gang Architects. This is the largest project ever awarded to an American firm headed by a woman. Located in downtown Chicago, it was named to fit the nautical theme of the owner's other structures in the development complex. Enhancing that imagery are wave-like reinforced concrete balconies with unique, irregular shapes that make the skyscraper's façade appear to undulate. The balconies were created by combining concrete and epoxy-coated reinforcing bar in customized, reusable concrete forms.

The outdoor terraces on the 819-foot-tall building cantilever from 2 to 12 feet and differ in shape from floor to floor in response to the view, solar shading, and size and type of dwelling. They resemble the striated limestone outcroppings that are common to the Great Lakes region and also suggest the wave-like motion produced by bodies of water. Computer modeling determined the shape of each balcony, but because each level's footprint varies, the calculations were performed floor by floor.

The tower's east-west orientation maximizes its winter solar performance. The reinforced concrete balconies extend further on the southern façade to increase shading and reduce solar exposure in the summer while allowing passive warming in the winter. To accommodate the balcony cantilever, the structure features 28-foot column spacing and a slightly larger column with 9-inch reinforced concrete slabs for each floor.

Working closely with the contractor and mechanical contractor, Studio Gang Architects found the high number of shape variations in the floor slabs could be achieved without increasing the building's construction timetable. The balconies' shapes also provide protection against wind loading, minimizing the amount of damping required to ensure stability even in high winds.

The 1.9-million-square-foot project features epoxy-coated reinforcing bar in all of the balconies as well as in the five-level, 500,000-square-foot below-grade parking structure. Epoxy-coated reinforcing bar was used in these strategic areas to ensure no corrosion induced damage would occur. Approximately 2445 tons of epoxy-coated reinforcing bar was used.

To accommodate the fluid nature of the balconies' designs, the contractor ordered reinforcing bar in three different lengths rather than fabricate bar to custom lengths in the field. The savings in labor costs and field adjustments easily compensated for the cost of the added steel.

Team

Developer:

Magellan Development Group

Architect:

Jeanne Gang, Studio Gang Architects

Architect of Record:

Loewenberg & Associates

Engineer:

Magnusson Klemencic Associates

General Contractor:

James McHugh Construction Co.

Design Criteria:

- Create a distinctive look for an urban mixed-use development with no two floors alike.
- Create reinforced concrete balconies unique to each dwelling that provide an undulating appearance that aids solar shading and wind flow.

Epoxy-Coated Reinforcement: 2445 ton

Photography:

Magnusson Klemencic Associates

Steve Hall © Hedrich Blessing

Awards:

2008 – The American Architecture award by the Chicago Athenaeum Museum of Architecture & Design.



Epoxy-Coated Reinforcing Steel

COST-EFFECTIVE CORROSION PROTECTION

A Better Product Using More Than 40 Years of Improved Manufacturing and Coating Technologies.