

Precast concrete apartments match creative energy of Chicago neighborhood

The Lucy Gonzalez Parsons Apartments is a seven-story, 100-unit, 126,000 ft² (11,700 m²) affordable housing complex in Chicago, Ill.

One notable feature of the project is that it was a totally prefabricated build, involving the use of hollow-core floors and ceilings, exterior and interior structural wall panels, DELTABEAM columns, and precast concrete stairs provided by Wells of Albany, Minn.

This approach offered several advantages, including efficient and consistent production, enhanced quality control, and accelerated construction time lines. The prefabricated elements were carefully designed and manufactured off-site, ensuring precision and minimizing on-site labor requirements.

To exemplify the creative energy of the Logan Square neighborhood, the apartments showcase unique architectural elements. The front and back of the building feature faceted precast concrete panels with custom-stained coloring that reflects the developer's branding, providing character and dimension to this new urban residential structure. The lower exterior levels incorporate a darker stain and formliner concrete that mimics shiplap siding to add visual dimension. At the street-facing corner entrance of the building, precast concrete elements support a cantilevered edge, allowing for unobstructed corner window views for the 4500 ft² (420 m²) retail space.

Prefabricated concrete is excellent for affordable urban housing like this project because of its structural integrity and superior sound resistance as well as nearly nonexistent maintenance. Concrete resists fire, mold, insects, and weather.

The ease of installation also resulted in competitive costs. Prefabrication supported extremely fast building erection, taking only 45 days, thus minimizing disruptions within the neighborhood and allowing the project to stay on schedule.

The project faced several challenges during its development, particularly its transformation from a parking lot to a residential complex. Limited access to the urban site necessitated a strategic approach, leading to the project being built in three phases. This phased construction allowed the team to work from the back of the site to the front, optimizing logistics and minimizing disruption to neighboring areas.



With limited access to this urban site, totally prefabricating the components of the Lucy Gonzalez Parsons Apartments, a seven-story multifamily residential complex in Chicago, Ill., ensured quality control and facilitated construction scheduling. Courtesy of Wells.

“All exterior walls are stacking load-bearing and shear-resisting structural walls,” says Auggy Chung, vice president of sales for Wells. “Trying to maintain structural integrity and accommodate the irregular opening patterns was a major challenge. By using high-strength concrete together with special load-bearing detailing and reinforcement, we were able to meet all the architectural design requirements and keep the precast efficiency.”

There were some shipping constraints: tall panels loaded on slant racks had to use a different route because of low bridge clearances. “The streets around the site were very busy, and we used flaggers to help manage our deliveries,” he says, “but these problems were not anything unusual. We have had similar challenges on other projects in Chicago.”

—William Atkinson

Florida's native plants inspire park buildings

The Winter Park Library and Events Center in Winter Park, Fla., is part of a campus that serves as a civic and cultural hub. The three precast concrete structures provided by Gate Precast in Kissimmee, Fla., are a two-story library, an events center with a rooftop terrace, and a portico that ushers visitors from the street and welcomes them into the campus. Each of these three buildings is distinctive in scale and function, but a common aesthetic sensibility unites them.

The structure features angled exterior precast concrete walls and shaded outdoor areas. The rose-colored, pigmented architectural precast concrete panels convey a distinctive look, with exterior walls that lean outward as they rise from the base. The convex exterior walls would have been almost impossible to achieve with any other cladding material.

The design team modeled compound, convex exterior walls with a series of scalloping, frond-like patterns that allude to native vegetation. All panels were built using twisting-shaped forms with connection plates set at twisted and varying elevations.

The outward-slanting precast concrete panels posed the biggest precast concrete engineering design challenge. The degree of slant varies from the corners to the middle of the building. Construction using these pieces created handling and installation challenges, especially on the corner where all three buildings meet. The team had to carefully review the construction sequencing at that juncture because parts of the library overlapped with the events center and portico, restricting access.

"During design, we used our five-axis CNC machine to cut the profiles created by our in-house programmer," says Bruce Bartscher, vice president of operations for Gate Precast.

Installing the panels at an acute angle was a particular challenge. The panels had to be pulled into the building at the

bottom, which required a way to hold the panels. A model with precise coordinates was sent to a third-party surveyor hired by the erector. To release each panel, every corner of that piece was shot to elevation and plane. Only a few panels could be made with a single mold because each panel was designed with a different skew, twist, or angle, resulting in unique erection picks. Team Precast Group erectors used Lift Gear Hire of Lakeland, Fla., to design rigging to pull the panels into position.

The arches establish the form of the pavilions, with vaulted rooflines and sweeping windows creating a porous relationship between interior and exterior as natural light is drawn deep into the buildings. Given the constantly changing slant and varying radius arch, the angle between the precast concrete panels and building structural steel beams varies from panel to panel.

A rolling bearing connection design was used to reduce the number of different bearing connections. Notably, the rolling bearing connection was also an erection-friendly connection. Lateral connections near the bottom of the panels used a push-pull connection that allowed for easy adjustment of the slant of the panel, a design that proved to be efficient and effective.

The panel types on the buildings are unique. Finite element analysis was performed on each panel type to analyze stress changes during shipping and installation and to ensure that the precast concrete facade can withstand hurricane-strength winds. Because the design features forms with limited repetition, 50 different forms were needed for the three buildings. The finish had to be uniform over a steep incline, which was challenging because the concrete wanted to flow to the lowest level. Radiused and warped shapes required extra attention during the placement of concrete, reveals, and side rails. All production forms were fabricated with stacked plywood that had been cut on a computer numerical control machine to ensure accuracy.

—William Atkinson 

Three precast concrete structures—a two-story library, an events center with a rooftop terrace, and a portico—are part of the revitalization of a 23-acre (9.3 ha) public park in Winter Park, Fla. Courtesy of © Dror Baldinger, FAIA.

To erect the concrete wall panels for the Winter Park Library and Events Center, erectors had to pull the panels into the building at the bottom. Courtesy of Gate Precast Co.

