

Precast Aids Multifamily Housing Market Expansion

As multi-housing building types evolve and grow, precast concrete components offer a variety of advantages to owners and architects

The multifamily housing market is evolving in several ways as consumers' needs and attitudes change, say housing experts. Those changes are impacting both the design of units and where they're located. In adapting to those changes and meeting the new preferences, owners and designers are finding that precast concrete components can provide cost-effective solutions that add benefits that can't be supplied with other approaches.

"We see a major proliferation of multifamily housing work coming that follows a trend of mid-rise projects in both the city and suburbs," says Scott Ziegler, principal at Ziegler Cooper Architects in Houston. The architectural firm recently completed a 27-story luxury high-rise condominium, the first one constructed in the city in 12 years. It features a distinctive, well-proportioned, residentially scaled façade made of precast concrete panels that resemble limestone. Other recent projects around the country have included precast concrete structural systems, while a large number feature hollowcore precast concrete slabs.

Multifamily housing projects are expected to moderate slightly in the next several years, with starts falling slightly from 312,000 units in 1999 to about 307,000 units in 2000 and 284,000 units in 2001, according to Robert J. Sheehan of consulting firm Regis J. Sheehan & Associates Inc.

Market Stability A Plus

Those estimates were echoed by Jack Goodman, chief economist for the

National Association of Home Builder's Multi-Housing Council. "I expect the volume of construction to remain consistent for the next few years," he says. That provides stability that allows developers to plan well, he notes. In the 1980s, starts veered randomly from a low of 162,000 in 1983 to a high of 669,000 only two years later. "The current production is a good area to be in, because it represents a sustainable figure with no wild fluctuations," he says. "And we expect these levels to continue, because there is a long-term demographic demand for housing units."

Multi-housing construction will continue strong due to the long-term demographic demand

The types of housing are changing, Ziegler says, because people's needs have changed. On the one hand, children who lived in the suburbs are rejecting that lifestyle once they grow up and are moving back to the city to be closer to entertainment centers. They also are tiring of long commutes to their downtown jobs. The Urban Land Institute estimates that the average commuting time per day has grown by one-half hour to 1½ hours in the past five years. "People are evaluating their quality of life and moving into the inner city to gain more time," Ziegler says.

Their parents also are finding they don't want the large empty homes where they raised those children, and they don't want to have to maintain the lawns, sidewalks and landscaping that goes with them. They, too, are moving to smaller residences in higher-density locations that offer the high-quality amenities, low maintenance and conveniences they desire. "They want secure garages, concierges, and a more pampered lifestyle."

Enclosed Parking Grows

Under-structure parking is becoming a key element in that approach, notes Edward J. Gregory, principal in Gregory Development Services in Tinley Park, Ill., and team leader for PCI's Multifamily Housing market group. This design achieves a number of goals that fit with the evolving marketplace. "Bringing the parking under the building offers security and weather protection, which residents are looking for," he says.

At the same time, this design appeals to owners because it opens up the space formerly devoted to ground-level parking. "The sea of blacktop is being used for green space and recreational activities," Gregory explains. "It also means the building can make better use of the available space and create a better ratio of building to land. That today is the secret to profit."

The 27-story Villa d'Este condominium project in Houston, being completed this summer, feature architectural precast concrete panels on its façade in two colors, helping to break up the mass of the building.



This trend is leading owners and architects to specify precast concrete components in their projects for several reasons, Gregory says. First, precast double tees, columns and beams can be used to construct the parking level, providing structural support for the overhead residences. They provide long, durable spans that open the space and create more efficiency in layouts, allowing more cars to park in less space.

In addition, the parking levels push the building's height to new levels. "A three-story walkup becomes a four- or 4 1/2-story building," he points out. "That presents a problem for wood-frame construction because of the structural support required." In some cases where local zoning ordinances restrict the overall height of a structure, architects have found that hollowcore slabs can help meet the need, thanks to their shallow depth of section. Rather than use 18 inches per floor for a suspended ceiling, 8-inch hollowcore components can be used, saving 10 inches per level, thus reducing structural material costs.

Precast Secures Parking

Under-housing parking also plays to precast's inherent fire safety, Gregory adds. "Vehicles filled with gasoline in an enclosed space offer the potential for great danger, especially being on the first floor," he explains. "By building the structure and parking level with precast concrete components, the owner and designers ensure that any fires are compartmentalized and that the structure doesn't weaken from the heat and cause structural damage that could injure residents or fire fighters during the event."

Precast concrete also offers a sturdy structure with a low Sound Transmission Class. This means that vibrations from other apartments, as well as noise from home-entertainment systems are dampened. The combination of its inherent noncombustible composition and its sound-attenuation capabilities are serving as marketing points for owners, Gregory says. "Today, housing residents are asking what the walls and floors are made out of, and they understand the benefits of having sturdy, sound-dampening structures. They're feeling much more need for tranquility after the high level of stress they experience through the day."

Houston's Villa D'Este Condominiums is a striking example of how precast

concrete can be used to create high-density luxury projects. The 27-story project features precast concrete architectural panels with local limestone aggregates with a light sandblasted finish and two face mixes.

The owner, Giorgio Borlenghi of Interfin Corp., had a clear vision of what he wanted to achieve architecturally, says Ziegler. "He wanted a residential-looking design, which meant no glass curtain wall. We decided to create a design using indigenous Texas stone and adding a limestone look. That let us achieve an image of strength and dignity in the detailing." Adding to this were deep-set windows that required careful casting to provide the returns and alignment required.

Two Finishes Featured

The project's two finishes include a soft, warm wheat color for the facing with a light, white/vanilla color for the "shoulders" and trim on the edges. "This coloring emphasized the verticality of the project and broke up the building's mass," Ziegler says. Adding to this was horizontal fluting that was cast into the panels and textures created with form liners to create two-foot bands of rougher finishes. "The concept suggests large, oversized stone blocks as seen on many European buildings," he explains. "We were able to achieve that rhythm and

break up the massiveness of the color by adding texture and pattern."

A key challenge for the precaster, Coreslab Structures Inc. in Cedar Park, Texas, came in casting the detailed window returns. "There was a very narrow range for coloring in those components," notes Ziegler. "To hit that tone exactly so many times took a lot of work." The fluting on the panels also required careful handling, he adds, as any chips would have destroyed a piece's viability.

Erection of the panels was interrupted when the crew had to switch from a night erection to a staggered daytime plan to minimize nighttime noise for nearby residences. "Our two-day cranes were so busy working the structure that there was no hook time for the precast components," explains Mark Ludlow, senior project manager at Pepper-Lawson Construction L.P., the Houston-based general contractor. Adding to that was a constricted site, with a major bayou on one side and the concrete staging area on another. "We really only had two sides to work from, so when the night-time erection was eliminated, it became a logistical nightmare."

Ludlow and the construction team created a staggered schedule in which the precast components were erected from 5 to 10 p.m. on Monday, 10 a.m. to 10 p.m. on Tuesday, Wednesday and

Multifamily Housing Starts 1990-2001

YEAR	TOTAL (in thousands)	PERCENT Change
1990	260.0	—
1991	137.0	-17.3
1992	140.0	+ 2.2
1993	133.0	-5.0
1994	223.0	+67.7
1995	245.0	+9.9
1996	315.0	+28.6
1997	296.0	-6.0
1998	304.0	+2.7
1999	312.0	+2.6
2000*	307.0	-1.6
2001*	284.0	-7.5

Source: U.S. Department of Commerce; forecasts
(*) by Regis J. Sheehan & Associates, December 1999

The recent stability in the multifamily housing market offers developers more confidence in planning for the future, say housing experts. It also ensures there are no drastic swings in demand or supply that impact costs.

Thursday and 11 a.m. to 3:30 p.m. on Friday. "This gave them enough time to speed the erection while also providing us with time early each day to progress in other areas. It required close coordination and logistical handling." Ludlow completed the load lists himself to ensure no details were missed and to keep everything moving. The result of the teamwork was that the erection finished two weeks ahead of schedule.

In all, some 1,670 precast concrete pieces were cast, some featuring two mixes and three finishes in the same panel along with ribbed textures. The pieces included flat panels, curved panels, flat panels with bullnoses and curved panels with flat spandrels attached and bullnoses. "The key to getting this project built was working hand-in-hand with the engineer and architect," says Bob McGee, project manager for Coreslab. "We received the design considerations well in advance of doing the drawings, which helped considerably. Our engineering staff often gets on board very early to ensure the pieces take full advantage of what we can do."

The result is a luxury high-rise condominium that was 80 percent sold prior

Precast Offers SPEED

The ability of precast concrete components to be erected quickly offers considerable benefits to owners and designers. Casting can begin while site work is underway, allowing the structure and architectural panels to be erected quickly. This ensures the building is put in the dry quicker, allowing interior trades to begin work earlier.

"The quicker a revenue-generating building such as housing units can be brought online, the faster the owners begin to recoup their investment and the less money is spent on interim financing and interest," says Edward J. Gregory, principal in Gregory Development Services in Tinley Park, Ill., and team leader for PCI's Multifamily Housing market group.

"Precast concrete goes up relatively quickly, which allowed us to close in the building rapidly," says Mark Ludlow, senior project manager for general contractor Pepper-Lawson, which is working on the Villa D'Este Condominiums in Houston. That also is a key concern at the Renaissance Plaza project in Harlem, says Oldcastle Precast's Jim Messenger. "By setting 30,000 square feet of hollowcore per week, we're able to put up the building quickly and open it for occupancy faster. It also means materials aren't sitting at the site where security could become an issue."

The ability to erect in harsh weather also has kept the project on schedule and eliminated the need for adding contingency time that makes the work harder to predict. The result is significant cost savings due to earlier opening, fewer and faster crews, less scheduling difficulty and shorter financing terms.



The Central Harlem Renaissance Plaza project in New York City used precast concrete hollowcore slabs for its flooring units due to the material's speed of construction, economy, fire resistance, long span capability and acoustical control. Illustration: Greenberg Farrow Architecture Engineering Development

to its completion. Precast concrete erection began in January 1999 and finished in September, with finish work and customizing for individual tenants continuing until May. "I've seen many condos around the country, and this façade is a very dramatic treatment that will hold up well, unlike some of the exterior insulated finish systems I've seen," says Ziegler. "Precast offers a very durable material that's very flexible."

Precast Speeds Harlem Project

A major multi-housing project using precast components in another way can be seen in the Central Harlem Renaissance Plaza project in New York City. The project consists of an 11-story apartment complex containing 241 one-, two- and three-bedroom units and 60,000 square feet of retail space. The masonry building features 360,000 square feet of hollowcore slabs plus precast stairs and landings.

The project was designed by Greenberg Farrow Architects in New York, with Levine Builders of Douglaston, N.Y., serving as general contractor. Oldcastle Precast Inc. in South Bethlehem, N.Y., is supplying the 1,735 precast concrete components. The project is part of the larger \$125-million infusion of public and private development funds being used to revitalize

116th Street through the Anchor/Partnership Plaza program.

"The key concerns that the hollowcore slabs helped address were speed of construction and cost," explains Jim Messenger, a sales representative with Oldcastle. "Our numbers are about \$5 per installed square foot less than that for metal decking. The hollowcore also saves time, which adds labor savings." In addition, hollowcore's narrow profile provides overall material savings. The 8-inch-thick plank serves as both floor and ceiling element, compared to about 17 inches of space required for a metal deck and dropped ceiling. Saving 9 inches per floor for 11 floors results in a building about eight feet shorter with the same livable space, cutting material costs.

The long spans produced by the hollowcore slabs also created savings, notes Tom Epstein, project executive with Levine Builders. "We can span 30 feet across the building, which means we can use one slab to reach from the far side of the center corridor of apartments to the outside wall. That allows us to eliminate support columns on one side of the corridor and saves that cost." A three-hour fire rating was achieved with the slabs, he adds, providing excellent life-safety requirements.

The hollowcore also met acoustical concerns. The slabs provide a STC

(Sound Transmission Classification) of 56, compared to only 30 for wood floors. This helps dampen noise and vibration from apartments above or below, providing more privacy.

The project is being built in two sections, with each floor of 18,000 square feet of hollowcore being erected in about three days. When the structural framing is in place (which takes about one week), the next level of hollowcore is erected. When all 11 floors are in place, the other half of the project will be erected. "We've done a lot of this type of work," Epstein says. "The hollowcore works really well for this type of building. It goes up fast and offers a lot of benefits and savings."

With the continuing and steady need for multifamily housing options, and residents becoming more aware of the benefits offered by a durable, well-insulated and fire-safe structure, owners and designers both are finding that precast concrete components can meet their needs. The combination of economy, marketing benefits, speed and aesthetics create an unbeatable combination. ■

— Craig A. Shutt