

Precast concrete becomes a facade and money-saver

New method links West Sac factory to downtown lofts

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by [Anne Gonzales](#)

Correspondent

It seems only fitting that the construction technique for Plaza Lofts is groundbreaking.

The eight-story mixed-use project at 9th and J streets in downtown Sacramento is one of a new wave of long-awaited residential and retail high-rises aimed at reinvigorating the downtown. The building, which will have 225 loft-style apartments and 21,000 square feet of street-level retail space, is being built using an up-and-coming framing system new to the California construction scene.

Plaza Lofts is using a "total precast" building system and a "hybrid moment frame," a method being touted by architects and developers for its cost savings and seismic durability.

Plaza Lofts is only the second residential building to use the system in the state, and it's the first use of the system in the greater Sacramento area.

Precast concrete construction, or pouring concrete at a factory into forms, has been used in the building industry for decades. Structural precast concrete is used in bridge girders and columns, and beams for parking garages, stadiums and offices, while architectural precast is the concrete poured into molds for exterior finishes, often used in Class A offices, hospitals and schools. Total precast systems combine structural and architectural precast, so that the structural elements also act as the facade of the building.

New twist: California couldn't fully enjoy the benefits of total precast systems in office and residential buildings because of worries of collapse during an earthquake.

But new technology, called a hybrid moment frame, uses steel cables like rubber bands that allow buildings to rock during an earthquake, then snap back into place. The technique, developed with the National Science Foundation and tested by University of California San Diego, is designed to save people's lives and limit structural damage.

Total precast systems are common in the United States and much of the world, but it's the hybrid moment frame that could help total precast catch on in the California building industry, said Don Clark, president of business development for Clark Pacific in West Sacramento. Clark Pacific has been making architectural precasts for years, including those for Sacramento's Shriners Hospital and for the attorney general's headquarters, and is now one of a handful of manufacturers of the hybrid moment frame.

"This is designed for life safety, meaning it will not collapse during an earthquake, and it's designed for immediate re-occupancy of the building after an earthquake," Clark said of the hybrid moment frame.

"This is breakthrough technology."

In typical precast buildings, steel and manufactured beams, columns and floor components form a structural skeleton for the building. Then, the exterior skin is hung from the frame. In hybrid moment frames, precast beams and columns are made off-site, erected and then cinched together with steel cables, a method called "post-tension."

In the Plaza Lofts project, an exposed precast ribbed floor system will form the ceiling of each of the units.

The structure is total precast, because the precast material serves not only as the frame, but as the finished exterior, said architect Curtis Owyang, vice president and design principal at LPA Sacramento Inc. Total precast systems are not typically used for residential projects because of seismic concerns, he said. Owyang had heard about the hybrid moment frame from consultants and brought the idea to the attention of the Plaza Lofts developer, CIM Group of Hollywood.

"At first, we were attracted to the system for economic and structural reasons," Owyang said. "The total precast system saves money, time and labor, resulting in construction cost savings."

Total precast buildings can go up 25 percent to 40 percent quicker than standard buildings, which means buildings start generating revenue sooner. Total precast also saves an estimated 5 percent to 10 percent in construction costs.

Total precast can bring nicer, more attractive buildings to cities, anchoring and helping to shape the face of a community, according to the Precast Concrete Institute, a North American trade group. Because much of the construction is prefabricated, it is cleaner, safer and causes less noise and disruption for the neighbors of a work site.

Adornments and money: That the system can incorporate architectural cast finishes is a plus. Owyang said the precast columns and beams become the exterior finish as well as structure, doing away with the need to put on an exterior finish or paint. That saves money during construction and over time in maintenance costs.

"They can do things with the concrete to make it look certain ways, using different colors and textures," Owyang said. For Plaza Lofts, various colors were incorporated into the precast system to accentuate different parts of the building.

Manufacturers then can sandblast the surface of the precast concrete so different levels are created, making textures and patterns.

"It adds detail and design to building," Owyang said, adding that the process can be used to make concrete look like granite. "The more you sandblast the surface, the more aggregate is exposed, until it takes on a granite-like appearance."

Rob Wurl, director of development for CIM, said Plaza Lofts is the company's first foray into hybrid moment frames, and he hopes to use it again in future projects. He said the system is cost-efficient, with savings varying depending on steel and concrete prices.

"The overall cost of the system was lower, and it's delivered in place," Wurl said, citing the off-site casting which turns into the façade. "The structural member is also the exterior of the building."

Total precast means fewer shear walls are needed to keep the building from tipping over. Fewer interior columns are needed, creating interior openness and more opportunities for windows allowing in natural light. Owyang said that feature allowed designers to use large expanses of glass for the residential apartments, which isn't typical in precast construction.

"Some apartments at Plaza Lofts will have 32 lineal feet across the whole frontage of this project, creating lots of natural light," he said. That would have been too difficult and expensive with conventional framing.

Owyang added: "It's going to be amazing, because some people will be able to wake up in the morning and see City Hall from their windows."

Other buildings likely to follow: Clark said the system has been used in parking structures and a shopping center, but only once before in a residential project, a 39-story apartment high-rise in San Francisco.

Already, however, Clark Pacific is working with Sutter Health to use the hybrid moment frame for a parking structure for the new Mills Peninsula Hospital in Burlingame. And Clark Pacific is part owner of a planned four-story office building in West Sacramento, where they will also use the new system.

"This has a very good chance of taking off," Clark said of the system. He said his company is hosting some Southern California developers wanting to see Plaza Lofts.

Wurl said the project as a whole fits in with CIM's philosophy of infill urban development in major American cities. Plaza Lofts will have one underground level, seven above-ground stories, and 299 parking spaces. It will provide much-needed residential options to the downtown area, Wurl said.

"This is an upscale loft project that will enliven downtown," he said. "We think it will be very much in demand."