Energy easy concrete houses

North, South sides get low-cost innovation

BY SANDRA GUY
Staff Reporter

High heating costs have combined with a desperate need for affordable housing to drive a new concept in Chicago home building — precast concrete.

A Naperville company has pioneered an ecologically friendly way to make the precast concrete, which is 50 percent stronger than conventional concrete and 30 to 50 percent more energy efficient than federal standards require.

The precast concrete also blocks noise, can protect against destructive tornado-strength winds, and is more fire-resistant than conventional building materials. The resulting walls are finished on both sides, and the floors already have the tubing installed for hookup to radiant heat systems.

The speedy manufacturing process and the ability to install the panels by crane shave 25 to 30 percent off of a project’s building cycle timetable, said Brian Bock, vice president of sales and marketing for Dukane Precast Inc., the Naperville company whose leaders toured Europe to learn the basics of the innovative precast technique.

The precast concrete is also proving an easy way for developers to incorporate parking garages in their multi-unit

Clifton F. Crawford, president of Crawford Development Partners of Evanston, is using precast concrete in Woodlawn.

—Keith Hale/Sun-Times

Here's the Woodland Precast building before the exterior has been finished.

Afterward, with a faux brick finish, it is hard to tell from the real thing.
CONCRETE: Fast building, low carrying

buildings, alleviating the need for residents to park on the street or in an outside lot.

Clifton F. Crawford, president of Crawford Development Partners of Evanston, is using the precast concrete in a 28-unit condo development he's building in the Woodlawn community on Chicago's South Side.

Crawford, who describes his mission as developing "quality, affordable, energy-efficient contemporary housing" on the South Side, was won over by the competitive advantages he enjoys by using precast concrete.

"We're able to erect a six-flat of 10,000 square feet in a week or so, depending on the weather," said Crawford, who left a 20-year career as a Fortune 100 sales and marketing executive to build affordable housing.

"The speed at which we can build gives us a competitive advantage because we have lower carrying costs or interest expense," he said.

Crawford also touts the material's energy efficiency and the highly finished look, which makes precast concrete difficult to discern from dry-wall.

"Our interior/exterior walls come finished," he said. "And since the precast panels come from the factory insulated, we don't have to stud insulate, wallboard, tape, mud or sand. This provides a significant savings in time and money."

"Last year, we had a model unit on the third floor. It stayed between 64 and 68 degrees, and we never turned on the heat," Crawford said, noting that concrete is a heat conductor.

"In the summer, we had a model on the first floor and it stayed between 72 and 76 degrees. We only turned on the air conditioner to reduce humidity."

The precast concrete also hasn't interfered with Crawford's goal of making the condos stylish. He has installed hardwood floors, a stone fireplace in the great room and sleek, contemporary fixtures.

Crawford has sold seven of the Woodlawn building's 16 units. Each is 1,550 square feet, with 3 bedrooms and 2 bathrooms. The units are selling in the $260,000 range.

Precast concrete has found its way into pricey yuppie neighborhoods, too. The material was used to build a 16-condo, nine-story development at 550 W. Wellington in the Lake View neighborhood. The units sold for $700,000 to $1 million each.

"I used to build projects for the Portland Cement Association, and we built projects for Habitat for Humanity. I think it's fantastic we can build affordable housing with the same durable, energy-efficient material as in a much higher priced development," Bock said. "The city and the homeowners are better off."

The Portland Cement Association is a trade association based in Skokie that represents cement and concrete manufacturers nationwide.

Indeed, precast concrete's ability to halve electric bills could ensure that a low-income family remains in their home, Bock said, especially since so much affordable housing is substandard.

An estimated 50,000 affordable housing units are needed in the Chicago area. Of 1.05 million households in Chicago, nearly 30 percent (307,185) are burdened by their housing costs, according to a study by the Nathalie P. Voorhees Center for Neighborhood and Community Improvement, a unit of the University of Illinois at Chicago's College of Urban Planning and Public Affairs. Specifically, more than 72 percent, or 181,030 extremely low-income households earning below 30 percent of the area median income are burdened by housing costs, which is defined as paying more than 30 percent of their income on housing, according to the study.

The median home price in the Chicago metropolitan region at the end of 2005 was $261,000, according to the National Association of Realtors.

Since the late 1990s, about 900 living units have been built in the Chicago region with precast concrete from Dukane Precast and Prestress Engineering Corp., a north-west suburban Prairie Grove-based company that makes solid concrete panels with finishes that mimic brick, or that use brick or form liners to provide exterior surface treatments, according to figures compiled by Prestress Engineering.

The number of precast concrete residential building projects started rapidly growing just last year.

"It's the new thing. First, there is a lot of hesitancy. Once people have an opportunity to touch and feel and see it in place, they are more apt to be open to it," Bock said. "Success breeds success."

The Chicago region desperately needs affordable, quality housing because despite the city's best efforts, low-rent apartment buildings are increasingly being converted into high-priced condos, said Robert Gecht, president and chairman of Albany Bank & Trust Co. in the Northwest Side neighborhood of Albany Park.

"You lose some element of diversity and character in communities" when lower- and lower-middle-class families are forced out, he said, citing Old Town and Albany Park as examples.

Prestress Engineering operates a plant in Blackstone, Ill., about 35 miles southwest of Joliet.

Dukane Precast operates precast concrete manufacturing plants in Naperville and Aurora, and has nearly completed a third in Plainfield.

Dukane Precast uses superior strength concrete that uses waste slag from northwest Indiana's steel mill production. Through its production process, Dukane
costs

drives water into the slag, which lessens the amount of water needed to make the concrete. If the slag weren’t used in precast concrete, it would instead be shipped to landfills.

Precast concrete has its drawbacks, of course. Homeowners must either stick paintings on the wall with self-adhesive hooks or, if the artwork is particularly heavy, drill into the walls to install a hanging mount. Wood trim is made possible by a step in the production process that leaves wood-nailing boards called wood bucks around doors and windows. Trim is then nailed into the bucks onsite. The base molding is glued directly to the concrete. Old-fashioned picture rails could also be installed in this way.

The material also makes construction more expensive for smaller, individual housing units. Precast concrete can cost about 10 percent more for a single-family home because of the multimillion-dollar investment required in the manufacturing plants. But it turns into a money saver with a four-story-and-above multi-unit project, Bock said.

The exterior of a building must be painted, though the process is so sophisticated, it can be difficult to tell faux brick from the real thing.

Exterior surfaces of the walls can be produced with a variety of finishes, such as brick, stucco, simulated limestone and wood-grained plank siding.

Bock believes precast concrete technology offers the kind of cutting-edge solutions that will increasingly drive construction, including the need for energy-efficiency and eco-friendly materials.

The manufacturing process is highly automated, using robots in critical roles.

The process produces two reinforced concrete wall panels that are joined to make a double wall, much like two slices of sandwich bread. The filling is a bio-based foam that is made with soybean or castor oil instead of a strictly petroleum-based product.

The double-wall panels, or sandwiches, are used for walls and floors.

The manufacturing process is highly automated. Robots lay out the dimensions of the walls and floors, and plot out door and window spacings based upon the architect’s drawings.

Radiant floor tubing is often installed into the floor panels at the plant. Electrical and cable-TV conduit is installed in the wall panels following architectural layout.

Dukane Precast’s plant in Naperville, built four years ago, was the first such precast concrete manufacturing facility in North America. There are about 300 such plants worldwide.

“We have the most up-to-date technologies, and we’ve made about 30 significant refinements to the process since we brought it over from Europe,” Bock said.
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