

Precast Offers Appealing Options For Homeowners

Components from foundation and façade walls to garage slabs offer advantages in economics, durability and aesthetics for single-family homes

Last year's single-family housing starts registered the highest total in more than 20 years, and 2000's pace isn't far behind. With such continuing demand available, developers and homebuyers are looking for ways to create new homes that are aesthetically pleasing, cost-effective and quick to produce. Precast concrete components are offering designers a variety of new solutions, being used for everything from foundation walls to garage floors to entire façades.

Single-family housing starts experienced a banner year in 1999, according to market reports, rising well above expectations. Starts reached 1.340 million, a nearly 5-percent increase over the previous year, according to the National Association of Home Builders Economics department. Starts in 2000 are expected to fall off slightly, by about 5.6 percent to 1.267 million units, NAHB predicts. (See the chart on page 21 for more details.)

The robust 1999 market was a boon nationwide, according to the analysis in "Construction Outlook 2000" produced by Robert A. Murray, vice president of economic affairs for the McGraw-Hill Construction Information Group. "The superlative performance by single-family housing during 1998-1999 was geographically wide-spread, including all 50 states," the report said.

Although precast concrete's impact on the single-family housing market has been small to date, that may change in the future, says William R. Von Der Ahe, president of Affordable Construction Concepts LLC in Chicago.



Affordable Concepts Inc. has expanded on its use of precast concrete wall panels for single-family homes with a new development featuring row houses. The houses feature a demising wall between units but otherwise feature the same design as some of the company's other single-family units.

"Typically, specifiers don't think that precast concrete lends itself to the residential market," he says. "In the past, they've tended to create concrete designs that were boxes — plain-faced designs that gave no feel for the neighborhood and its traditional look."

The developer has worked with a Chicago-area precaster and architectural firm to change that image. The concept for the homes originated with precaster Prestress Engineering Corp. in Prairie Grove, Ill., which sought new options for using its soundwall forms. "I had seen new developments in the city that resembled suburban-type construction, and it looked out of

place," explains Chris Newkirk, president of PEC and leader of PCI's Single-Family Housing marketing group. The two joined with Piekarz Associates Inc. in Chicago to create a format that would provide an economical single-family home with strong aesthetic characteristics.

Wall Panels Clad Home

The homes are created with 18 precast concrete panels measuring 20 feet wide and 10 feet tall that actually are a horizontal variation on the panels designed to produce highway soundwalls. Using existing forms with brick-like form liners keeps the design economical,

speeds construction and offers high life-safety needs. “The shell can be erected in one day,” Newkirk points out. “That’s a big plus for inner-city construction where navigation is a key consideration.” The panels, although not as large as typical architectural precast panels, use the same bolted connections to secure them.

Not only does the use of precast panels save labor cost and allow interior trades to begin work earlier, it avoids having material sitting at the site for long periods, which can be a security risk with wood-frame homes. The precast concrete façade also requires little maintenance while providing a weather-tight envelope that resists moisture penetration better than real brick. The homes are more resistant to wind and insect damage and are more durable than vinyl siding, adding structural stability, acoustic control and protection from damage and abuse. The inorganic composition also provides fire resistance, especially if hollowcore precast slabs are used for flooring to isolate each level.

The team began by building four single-family, scattered-site housing units in 1998. They include three floors of living space with the panels set on footings in the foundation, providing a basement level, too. The exterior finish resembles brick with limestone-appearing pediments and accents. The design has proven to be “extremely competitive” in upscale markets that feature similar types of brick construction, says Von Der Ahe. It also provides an appealing option in more-affordable markets due to the advantages it offers in lower long-term maintenance costs and its durability.

Affordable now has expanded on that idea by creating a series of townhomes with 32 living units on Chicago’s South side. The design, also by Piekarz Associates, resembles the original plan except the homes share a common demising wall. The wall was designed to offer a four-hour fire rating by combining furred-out drywall interior walls on either side sandwiching the precast panel.

The homes also feature two design elements that provide distinction in the row-house format. First, every other home is set back slightly, presenting a modified articulated exterior that keeps each unit separated. To achieve that, the panels on the front and back walls were mitered to fit together at an angle and provide the articulation. The accent coursing also matched this design. In

addition, the homes alternate gabled and flat cornices, delineating each residence further.

The homes are designed as three-story residences, with a basement apartment and a two-story residence above, creating 32 housing units in all. With those structures completed now, the construc-

‘We see a lot of potential for this type of precast concrete housing.’

tion team is looking at options for back-to-back townhome designs. That design offers great potential for the ends of

streets, with the demising wall at the back of each structure. The company also has entered a partnership with a stick builder, with the two of them selling homes in a 100-unit development in whatever ratio buyers are interested between the concrete and wood options.

“We see a lot of potential for this type of precast concrete housing,” says Von Der Ahe. The homes offer many advantages in speed, aesthetics, acoustics, fire resistance, maintenance, constructability, durability and other areas, he notes. The key will be explaining the advantages to homebuyers and overcoming their natural tendency to favor traditional materials. But buyers are becoming more sophisticated about building materials, especially with the volatility of lumber prices and the focus on sustainable growth issues for forests.



The panels feature brick-like textures on front and back, while the sides are painted and textured to fit with the typical style of these homes in the neighborhood.



The precast panels produced by Prestress Engineering Corp. are trucked to the site as one unit. The 18 pieces required to assemble them can be erected in one day.

The ability to create a durable home without using up these resources can make a compelling case for some homeowners.

Foundation Wall Use Expands

Insulated precast panels also are finding a welcome market as foundation walls, and that may expand into actual façades as well. The foundation process features precast walls with an insulating board on the back (interior) side. The walls serve as basement and foundation walls, explains Robert R. Finger, director of marketing for Superior Walls of America in New Holland, Pa. The precast panels are cast with 5,000 psi concrete compared to 2,000 to 2,400 for cinder blocks, offering more long-term



Insulated precast wall panels are being used in many states as foundation walls. The precaster who franchises this concept now is looking to use the panels as façades in key coastal states where durability is a prime consideration.

durability. The panels are lifted into place quickly at the site and set on a bed of crushed stone then bolted together. The use of 10- by 16-foot monolithic panels, Dow Styrofoam brand insulation and joint caulk eliminates many entry points for water seepage, a key concern for homeowners.

Costs vary by region but average about \$45 per linear foot, Finger says, with a typical basement costing about \$9,000. The complete foundation can be installed in four hours, speeding construction and making the home ready for occupancy faster, which also can save money. The panels offer wind resistance up to 200 mph. Insulated walls also are more energy efficient and cut drafts, he notes. They come already insulated, saving labor on the installation costs as well.

The company franchises the concept to other firms around the country, with about 95 percent of the work focusing on basements, Finger says. Now, however, he is looking to expand the concept to clad complete homes. “We see a lot of potential for use above grade, especially in coastal areas where salt water and harsh weather — including hurricanes — are a primary concern.” The company particularly hopes to target opportunities in Florida and Texas, two huge markets but both unfamiliar with the product because homes there tend not to have basements. The panels can be stacked 2 1/2 stories in their current engineering process, and they can be re-engineered if demand exists to go higher.

Although the concept is relatively easy to produce, few precasters have focused on this type of work because the projects are so small, limiting the revenue. “The



The insulated precast wall panels are lifted into place with a crane, producing a fast foundation wall that speeds construction. Its monolithic design also eliminates more opportunities for water seepage.

profit margins are sufficient, but the size of the jobs aren’t large enough to cover the overhead for large precasting companies,” he explains. “But home buyers are becoming more sophisticated about building materials and what they want in their home. And as consumers become more educated about the benefits these homes offer in life safety, low maintenance and other intangibles, they are open to the concept.” The company already has created full homes in Maryland, New York, Pennsylvania and Michigan, which begin to show the possibilities and expand the markets.

Precast Offers AESTHETIC VALUE

Precast concrete offers a variety of aesthetic options that can meet the needs of single-family homebuyers in many markets and neighborhoods. The panels produced by Prestress Engineering Corp. for use in its homes in Chicago create a distinctive design that fits well in the brick-lined neighborhoods. Limestone-like accents and close attention to joint detailing give the homes a dignified presence, while gabled and flat-roofed options ensure the design fits surrounding rooflines.

Foundation panels that extend upward to create the home’s façade, as produced by Superior Walls, offer a range of aesthetic options. The concrete face can be finished in a variety of ways beyond a simple trowel-brushed finish, says Rob Finger. The company can cast in brick ledges to support masonry, and it also can eliminate the webbing needed when manufactured stone is applied. Some areas also use exposed or colored aggregates. Stucco also can be applied, providing options for almost any neighborhood style.

Precast Slabs Add Space

Another type of precast concrete component also is gaining popularity with home builders and home buyers. Hollowcore slabs are being used for garage floors, creating under-floor storage space or full rooms. Molin Concrete Products Co. in Lino Lakes, Minn., for instance, installed slabs in about 350 homes last year, and it anticipates doing as many as 500 this year, says Roxann Ostendorf, residential sales manager.

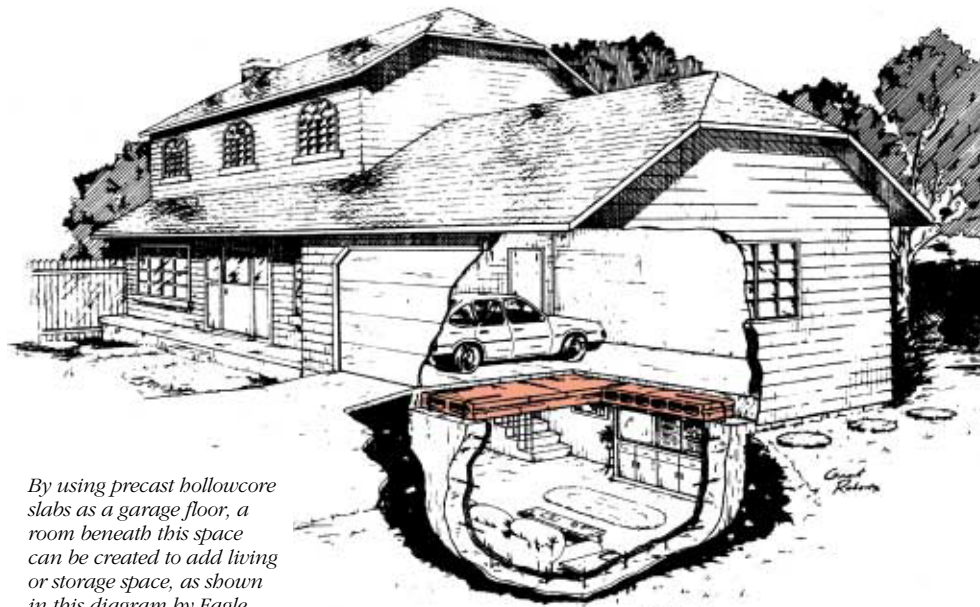
“Home lots are getting smaller, and buyers are looking to add new rooms and storage space wherever they can,” she explains. “This is a very economical way to find space in a home design.” Typically, slabs spanning up to 30 feet in length are used to cover a room built with block walls or poured concrete under the garage floor. A concrete topping is poured on top of the slabs to handle auto traffic.

The long spans are a distinct advantage, notes Jim McGuire, precast specialist with Eagle Precast Co. in Salt Lake City, which also supplies these products.

The spans eliminate the need for any mid-room supporting beams or columns, which would limit the functionality of the space. Cast-in-place concrete in this situation could span only about 13 feet. “Until recently we weren’t aggressively marketing this application for the panels, and we’ve been doing about 80 per year,” he says. The homes have run the gamut from “bare-bones” styles to custom, high-end residences, he notes.

The cost fits easier into the high-end home, but its impact on the low-end structure can be dramatic — a 1,100-square-foot home with a 20- by 20-foot garage can quickly add a new room beneath the garage and add nearly 40 percent more square footage. Homes on sloping lots benefit most, he adds, because the added cost of backfilling the lot makes the hollowcore slab less expensive overall. Cast-in-place floors also are more labor-intensive. “Developers who have worked with us rarely go back to cast-in-place floors again,” he says. “They’re too busy to want to mess with those systems.”

Typical installations run between \$4,500 and \$10,000, with the average at about \$6,500 — a number he expects will drop about \$1,000 as volume picks up. McGuire expects volume will pick



By using precast hollowcore slabs as a garage floor, a room beneath this space can be created to add living or storage space, as shown in this diagram by Eagle Precast.

up, too, as he has produced a television ad to expose home buyers and builders to the concept. He also sends out mailers and promotes through home shows. Molin, too, has been advertising at Parade of Homes events, with brochures offered through model homes for some developers.

“We believe that about one-quarter of all the new homes built with basements would use hollowcore slabs if they knew about them,” McGuire says. “When you consider that there are about 20,000 housing starts per year in our market, you can do the math and see the great potential. That will only come about through education. It will be a costly process to get the word out, but these options are something homeowners should know about and must consider.”

— Craig A. Shutt

Single-Family Housing Starts 1997-2001 (in 000)

Year	Starts	% Change
1997	1,136	-1.6
1998	1,278	+12.4
1999	1,340	+4.9
2000*	1,267	-5.5
2001*	1,169	-7.7

Source: National Association of Home Builders Economics Department; March 2000, * indicates forecast.



(Above) A room can be added under a new home by spanning the space with precast concrete hollowcore slabs.

(Below) The wide-open space provided by 30-foot-long hollowcore slabs provides great flexibility in how the new room can be used.



(Left) Only a few hollowcore slabs are required to span a new room under the garage, completing the process quickly.