



Hilton Boston-Logan
Airport

Precast Housing Makes For Good Neighbors

Fire safety, noise abatement and quick erection have developers and architects incorporating more precast concrete components into their housing designs

The emotional needs that accompany housing designs make these structures unique among building types. Special care must be taken whether designing for transient residents in apartments, hotels or dormitories, for the elderly in long-term care facilities or simply looking to maximize space in a single-family home. In each case, precast concrete components offer key benefits to produce an attractive, cost-effective design.

Precast concrete's inherent noncombustible composition makes it an ideal material when fire safety is a concern. Its ability to contain a blaze and withstand high heat gives residents more time to evacuate and firefighters more time to react. Precast's density also offers a high level of acoustic and vibration control that achieves more privacy and dampens noise from neighbors' activities.

Hollowcore floor and ceiling components provide for fast erection, helping to generate revenue faster and reduce interim financing. They offer long spans that eliminate the need for intermediate columns, saving cost and enhancing design flexibility. And they feature a shallow depth of section, which cuts material costs and allows buildings to meet code restrictions on overall allowable building heights.

These components offer benefits to all types of housing, from the largest apartment and hotel projects to individual custom-designed homes. Some of the most recent designs incorporating these materials are shown on the following pages. They include:

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Attractive Precast Panels Buffer Airport Noise

Precast concrete panels provide highly articulated cladding that is cost-effective while dampening noise at airport hotel

Architect
Cambridge Seven Associates Inc.
Cambridge, Mass.

Engineer
Weidlinger Associates Inc.
Cambridge, Mass.

Owner
Hilton Hotels Corp.
Beverly Hills, Calif.

General Contractor
Beacon Skanska Construction Co.
East Boston, Mass.

Precasters
Beton Prefabriques Du Lac Inc.
Alma, Quebec, Canada
and
Northeast Concrete Products LLC
Plainsville, Mass.

Designers at Cambridge Seven Associates Inc. considered other cladding systems, such as metal panels and glass, for the 10-story, 410,000-square-foot Hilton Hotel at Boston's Logan Airport. But they realized that precast concrete architectural panels would provide the best solution. The system not only created a pleasing look but added acoustical control that dampened noise from nearby jets.

Airport officials, who also manage the hotel, wanted a building with a modern expression but with a different look from neighboring buildings, according to Gary Johnson, principal in charge of the design for the Cambridge, Mass.-based architectural firm. "We decided on precast concrete mainly because of its cost-effectiveness and ability to buffer the sound of planes and vehicular traffic." But aesthetics also were important, he adds. "A major advantage to using precast was the variety of façade concepts that were possible. Panels can be virtually any color, texture, shape, and size."

TEXTURES, REVEALS DOMINATE

The architects designed a façade with an arresting pattern, using texture, color, variations in finish and deep reveals. The panel system was designed to reflect the module of the hotel rooms and the building's structural system. Two 9'4" by 26-foot panels cover four guest rooms. Casting diagonal ribs on portions of each panel face created texture.

Beton Prefabriques Du Lac Inc. (BPDL), the architectural precaster, used a four-step process to create the panels' bush-hammered ribbed pattern. First, they made a wood mold detailing the ribs. Then a



The precast panels were designed to reflect the module of the hotel rooms and the building's structural system. Individual panels contain both ribbed and smooth sections and two colors. Photos: ©Steve Rosenthal



The architects designed an eye-arresting pattern for the architectural precast on the Hilton Hotel at Boston's Logan International Airport. They selected precast for its noise protection and cost-effectiveness, as well as for its aesthetic qualities.



"A major advantage in using precast is the variety of exterior façade concepts that are possible. Panels can be virtually any color, texture, shape, and size."

—Gary Johnson, principal,
Cambridge Seven Associates
Inc.

master mold was made in concrete with an exposed aggregate, for which only selected round pieces were used to achieve the bush-hammered effect. Onto this mold were poured polyurethane mats, which were ready to receive the colored concrete. Separated by reveals, ribbed sections are combined with smooth areas, and the whole panel finally received an acid-etched finish. The project required 50 different polyurethane mats.

The panels were cast in two integral colors, as well as two finishes. A brick-red color is the building's dominant color, accented by a buff tone. Due to the angles at which the sun hits the building, it often appears as though there is a third color. "This was our first use of this pattern in a large application, so we conducted a number of studies examining how the sun struck the building during different times of the day," Johnson says.

The panels were alternated during installation, with the diagonal direction of the ribs and the colors varying from panel to panel in relationship to the fenestration and other architectural elements. As a result, sunlight moving across the façade creates rich and varied patterns throughout the day.

Additionally, most of Logan Airport is built on fill, so 14-inch prestressed piling was used to stabilize the foundation. Northeast Concrete Products LCC of Plainville, Mass. supplied approximately 16 miles of spliced piles, each with a capacity of 130 tons.

PANELS DAMPEN NOISE

The 8-inch-thick precast panels serve as an excellent noise buffer. Formed to accept aluminum window frames, the panels embrace the frames and were caulked on both the inside and outside for better noise protection. The architects specified a specially colored caulk to match the precast panels, which keeps the sealant invisible, helping conceal the joints between panels. This allowed the pattern of deep reveals to stand out.

The precaster produced 20 samples and a full-scale mockup of four full panels, measuring 52 by 18 feet. "We took our client up to

Canada to see the mock-up, and they approved it right away," Johnson says. "The precaster did a terrific job in quality control." The hotel was clad in approximately 764 panels covering a total of 134,000 square feet.

The panels were erected efficiently, saving time and money when compared to other façade treatments. Located in the middle of the airport complex where new roads were under construction, the hotel's site was extremely tight. To prevent traffic delays around the airport, the precast had to be delivered during the very early morning hours.

Trucking the panels to the site presented a special challenge to the precasters, according to Guy Bouchard, vice president and chief engineer at BPD. Because the panels were large and included two window openings in each, they were fragile. To prevent breakage, the precaster had to design special racks to hold the panels on the trailers. The process worked well, resulting in no delivery delays or panels that were rejected because of poor quality, Bouchard reports. There also was no damage during erection, and every piece fit into its location, Johnson adds. ■

— Anne Patterson

THE JUDGES SAID...

"This building appeals due to its innovative use of pattern, texture and color to achieve a very pleasing façade. It features very clean detailing. The striation going in two directions is challenging from a manufacturing standpoint and created some production complexity. The lighting effect must be striking. This is a hotel we wouldn't mind staying at."

Efficiency, Low Maintenance Spur Precast Home Foundations

More designers across the country are realizing that the benefits that precast concrete components offer to larger structures can be adapted and exploited in single-family homes, too. One such was a recent two-story home created by V.O.V. Architecture in Des Moines, Iowa.

The 1.5-acre site offered ideal views of the surrounding landscape and the nearby State Capitol. The homeowners' goal was to create a design that offered simplicity, low maintenance and energy efficiency. To achieve that, designer Jerry Vande Krol used precast concrete wall



Single-family homes, such as this two-story design in Des Moines, Iowa, can take advantage of insulated precast concrete wall panels to create a home that is well insulated.

panels and hollowcore slabs along with fir timbers band-sawed into posts, beams, joists and splined floor/ceiling boards.

The patented precast concrete system was developed by Superior Walls of America Ltd. in New Holland, Pa. "I chose concrete for these components for a number of reasons," says Vande Krol. "Foremost, they provided a dry, warm basement and offered energy efficiency. They minimize air infiltration due to the few joints, they offer an R-24 insulating value, and the concrete's thermal mass keeps temperatures even."

Dry, durable, insulated foundations that erect quickly are gaining popularity

He also noted the panels provide structural integrity, a durable finish, termite protection and tight tolerances. The 8-foot-tall lower panels are backed with Dow Styrofoam-brand insulation and are set by crane onto a bed of gravel. Then the 10-foot-tall upper panels are lowered onto the bottom panels and set with a heavy bead of Bostik sealant.

The family loved the finished design, Vande Krol reports. "They were coming from an 80-year-old stucco home that required a lot of maintenance, so this new design was very much what they had in mind." ■

—Craig A. Shutt

Hollowcore Makes Splash With New Homeowners

A Minnesota family wanted to include an indoor swimming pool in their new home, but they were concerned about moisture buildup and humidity that would infiltrate the main living area. The answer came in installing hollowcore plank on the garage floor, which opened up the space below and allowed an in-ground pool to be installed.

The pool is part of a 4,000-square-foot home beautifully designed as a Craftsman-style lodge with post-and-beam construction. The home is located in a pine forest on a sunny knoll that slopes away from the home's front. This allowed the designers to lay hollowcore plank at grade level in the front and level out the garage. The plank sits on cast-in-place walls that create the 24- by 24-foot pool room.



Precast concrete hollowcore plank were used to span the garage floor at this rustic home in Minnesota, creating a column-free room beneath, where the family installed an in-ground pool.

Large rustic home uses hollowcore plank to span garage floor, creating clear spans beneath that allow construction of indoor swimming pool



"We decided on hollowcore because it offered strength, so no columns would be needed in the room," explains Katherine Hillbrand of Sala Architects Inc. in Stillwater, Minn., the architect for the project. "It also provided the perfect moisture barrier and won't corrode over time due to the water and chlorine." The 2-foot-wide planks were produced by Molin Concrete Products Co. in Lino Lakes, Minn.

"I see hollowcore plank being used more and more for this type of home construction, especially as homeowners become more environmentally aware," notes Hillbrand. "Wood resources are becoming scarce, so homeowners are looking for other options. As a result, I think the use of precast concrete is really coming of age." ■

—Craig A. Shutt

Hollowcore Helps Condos Add Space, Fire Resistance

Designers of the Diamond View Condominiums in Wildwood Crest, N.J., specified precast concrete hollowcore plank to provide fire resistance, sound attenuation and quick construction for two adjacent 28-unit condominium buildings. But they also received additional space for tenants by cantilevering the plank over the structure's edge to create monolithic balconies and walkways.

New Jersey condos feature precast concrete cantilevered balconies and walkways designed in cost-effective style to appeal to residents

The buildings feature a first floor of parking space with four floors of condos above, with each unit offering about 1,600 square feet of space. Each condo includes a hollowcore slab floor and ceiling, with the slabs cantilevered and extended beyond the wall to create a

balcony across the front. Hollowcore also serves as the roof for the first-floor parking structure.

"Hollowcore slabs are a very proven material in this area, with hundreds of housing developments and motels using them as a structural element," says architect Kevin Young of Kevin C. Young, Architect, in Wildwood Crest, N.J. "They're easy to work with and are fast to erect in any kind of weather." Strescon Industries Inc. in Morrisville, Pa., produced the hollowcore components.

The plank is supported on masonry walls, with the ground-level parking supported by precast columns and beams that serve as transfer beams to support the upper floors. "This is a fairly large structure for this neighborhood," explains Young. "We wanted to break up the size and create some individuality for the units to give them more of a residential feel."

— Craig A. Shutt



The Diamond View condominiums in Wildwood Crest, N.J., feature cantilevered balconies and walkways made of hollowcore plank, which also serves as flooring and ceiling elements. The second of the two 28-unit buildings will begin construction in September. Photo: ©Martin Photography

Precast Structure, Plank Opens Condos Interiors

Many designers are specifying precast concrete hollowcore plank and structural components for multifamily housing projects because of the benefits they offer in fire resistance and acoustical control. At the Glen Lakes project on the north side of Chicago, flexibility of design added to these advantages to make the components key ingredients for the building's success.

Hollowcore plank and beams provide flexibility in laying out floor plans for new Chicago condominium complex

The five-story, 44-unit building features precast structural columns supporting the precast slabs and a masonry façade. In all, 70,500 square feet of 6-inch solid and 8- and 10-inch hollowcore plank were used, along with 123 linear feet of 32- and 40-inch concrete beams.

"We wanted to provide long spans on each floor, and the only way to achieve that was with the hollowcore plank," explains Irene Amenides, principal with the architectural firm Andrian-Zemenides Inc. in Chicago. "We provided 39-foot spans, and we couldn't have done that with cast-in-place floors."

The units were designed in a modular fashion as large, open spaces so each could be laid out with a distinctive floor plan, she notes. "The

long spans gave us the freedom to design however we wanted because there were no bearing walls to accommodate in the floor space." The inherent inorganic composition of the beams and plank also provided a fire-resistant shell and added to the acoustical control of the building.

Spancrete of Illinois in Crystal Lake, Ill., provided the precast concrete components for the project, which was completed in six months. Dunning Development LLC in Chicago served as general contractor.

— Craig A. Shutt



Hollowcore plank spanning 39 feet offered freedom to design without worrying about bearing walls inside the 44 units in the Glen Lakes condominium project on Chicago's north side.

Hollowcore Creates 'Homey' Dormitory

The new 215-student residence hall at Dominican College in Orangeburg, N.Y., typifies the new type of university housing being built around the country. It also makes use of precast concrete hollowcore plank, which many designers are finding ideal for this type of structure.

The facility, designed by Einhorn Yaffee Prescott Inc. in Albany, N.Y., offers not only space for student residences, but also includes common spaces for communal living in a more home-like environment, as well as additional function space for large academic groups. This allows the university to hold conferences when school is not in session, adding function that not only improves the building's revenue-generating status but provides more options for student gatherings during the school year.

Residence hall at Dominican College features new types of spaces that expand function and livability, with precast floors adding value

Oldcastle Precast Inc. in South Bethlehem, N.Y., supplied the precast concrete components for the 62,300-square-foot residence. M.G. McLaren PC in West Nyack, N.Y., served as the engineer of record, while Fred L. Holt Inc. in Pearl River, N.Y., was the general contractor.

Project designer Douglas B. Hyde specified 8-inch hollowcore plank with concrete block walls and a hand-laid brick exterior wall. The combination allowed the building to be closed in quickly, saving construction costs. It also provided a fire-resistant material without the need for additional coatings. And concrete's durability helps resist the high-impact nature of student living while helping to dampen noise and vibration between floors.

The plank serves as both the ceiling of the lower units (with a textured-paint finish) and the flooring for the residences above. This combination helped cut the overall height of the building, saving considerable building materials. ■

— Craig A. Shutt



The new residence hall at Dominican College in upstate New York provides students with a living, as well as a learning environment. Precast concrete hollowcore plank provided quick erection time and fire-resistant flooring.

Hollowcore Adds Safety To Four Villanova Dorms



628 students at Villanova University now live safe and sound in four dorms using precast slabs.

Precast concrete hollowcore components in the four new student dormitories at Villanova University in Villanova, Pa., should ease the minds of safety-conscious parents and college administrators. This was especially a concern in light of recent fires that claimed the lives of students on other college campuses.

The facilities consist of one four-story and three three-story buildings that house 628 students. Scheduled for completion later this year, the four buildings include 2,752 pieces of concrete plank in thicknesses ranging from six to eight inches and in four-foot widths manufactured by Nitterhouse Concrete Products Inc. of Chambersburg, Pa.

Fire and sound resistance qualities mean safety and privacy for 628 students

"The fire and sound resistance qualities of hollowcore plank make it an excellent choice for a college dormitory," says William O'Donnell, project design coordinator and a partner in the Philadelphia engineering firm of O'Donnell & Naccarato Inc. "The concrete plank also ensured we could maintain an 8'8" floor-to-floor height, which allowed us to build three-story structures while staying within height limitations required by codes."

The four buildings, designed by The Hillier Group in Princeton, N.J., include 300,000 square feet of hollowcore plank. Scott Scungio, project executive with the general contracting firm of R.M. Shoemaker Co. in West Conshohocken, Pa., cited speed and ease of erection as additional reasons why hollowcore worked so well with the project.

"The mobility of the system allowed us to construct these four buildings in a fluid sequence," Scungio says. "We were able to keep all trades active and minimize remobilization costs. We actually were able to construct two buildings in the time it would normally take to construct one without doubling the manpower." ■

— Wayne A. Endicott

Moment-Frame System Protects Healthcare Facility

The Emerson House Residential Care Facility in Portland, Ore., features a precast concrete moment-frame structure that gives the facility the seismic control it requires for this region while meeting economic and aesthetic goals for its design.

The 30,000-square-foot, three-story Alzheimer's care facility was built on a fast-track basis because the owner, Kinsel Ameri & Co., had growing demand for the specialized services such a center could provide. Additionally, the tight 100- by 150-foot city site precluded a cast-in-place solution, according to Ted Chillless of Chillless Nielsen Architects, the design architect.

Precast concrete connection system provides seismic control for residential-care facility in seismically active Northwest

Because of the city's high seismic zone, KPFF Consulting Engineers recommended the moment-frame design. The system allows the structure to emulate a cast-in-place concrete frame, with the building's force-resisting capacity dependent upon the column bases, the beam-to-column-frame interface or a combination of both. The beam-to-column connection is of paramount importance and required a special joint with special grout. "The moment frame is a great system," says Chillless.

Precaster Morse Bros. Inc. in Harrisburg, Ore., produced 24 columns, 78 beams, and 224 8-inch-deep by 4-foot-wide hollowcore slabs for the project, which also were used for roof members. The columns were heavily reinforced with steel reinforcing rods. During the casting process, a key challenge came in installing the grout tubes in the columns, because of the large number of steel reinforcement bars. Even so, the precaster erected the framing system in 12 days in the middle of the winter in freezing rain. ■

—Anne Patterson



Morse Bros. Inc. Prestressed Concrete Group erected the precast frame on Emerson House, including beams, columns and hollowcore floor and roof slabs, in just 12 days. Photo: Bob Pool Photography

Hollowcore Aids Assisted-Living Complex



Hollowcore plank plus precast stairs and landings provide a variety of benefits to the 14-story Senior Quarters at Riverdale assisted-living facility in the Bronx, N.Y. In addition to fire resistance and acoustical control, the plank saved at least \$8 per square foot over cast-in-place concrete.

Assisted-living housing facilities are growing in importance as our population ages and elderly residents look to find quarters where their specialized medical needs can be met within a residential ambience. In many of these cases, precast concrete components, especially hollowcore plank, are helping owners and designers meet residents' needs and provide enhanced benefits.

Such a project is Senior Quarters at Riverdale in the Bronx, N.Y. Structural engineer Neil Wexler of New York City designed the structural system for the 14-floor, 206-unit facility to feature precast hollowcore plank for floor and ceiling units, as well as using precast stairs and landings. Compared with cast-in-place concrete floors, the hollowcore provided savings of \$8 to \$9 per square foot, he says.

Bronx facility uses hollowcore plank and precast stairs and landings to create housing that is fire-resistant and economical

The hollowcore plank saved labor costs as well, notes Dumitru Alupulai of Architects Design Group in New York City. Precast's inherent noncombustible composition meant there was no need to add fire wrapping as required for steel decks, he explains. It also added the desired sound-barrier ratings without the need for additional sound proofing via acoustical tile. "The bottom of the hollowcore plank creates a nice ceiling finish without the need for drywall. It can just be painted," he says. The precast floors also were faster to erect and are more dimensionally stable than cast-in-place concrete, he adds.

Oldcastle Precast Inc. in South Bethlehem, N.Y., provided 128,000 square feet of 8-inch-thick hollowcore plank and 54 precast stairs and landings for the assisted-living project. ■

— Anne Patterson

Hollowcore Saves Time, Cost For Senior Housing

When completed this fall, Homewood Residence in Westover Hills, Texas, will provide senior citizens with tidy studio apartments in a neighborhood of upscale apartment buildings. The project is meeting its schedule and budget restraints thanks in part to the use of precast concrete hollowcore plank, which serves as floor and ceiling components.

Designed by Earl Swensson Associates in Nashville, Tenn., the Homewood Residence offers a blend of assisted-living services and traditional residential housing. The three-story building, which



The Homewood Residence's 50 studio apartments feature hollowcore floor/ceiling units, which saved time and cost for the Westover Hills, Texas, project. The plank features a 2-inch layer of concrete on the flooring side and an acoustic spray and paint on the ceiling side.

contains about 50,000 square feet of space, will provide its senior occupants with everything they need — including meals on the table. The 50 one-room apartments do not have kitchens, with all meals taken in a large dining room on the second floor of the three-story building. Other amenities include a laundry and beauty shop on the first floor.

Precast concrete plank saved materials and sped erection on Texas project, helping to meet budget for retirement facility

Some 13,000 square feet of precast concrete slabs make up the ceiling of the first floor and the floor of the second, according to James Stini, project manager for the precaster, Gate Concrete Products Co. of Pearland, Texas. The first floor is built of concrete block into the side of a hill; the second is at ground level at the top of the hill.

Precast, says Stini, “allowed construction of the floor in just two days because it’s not as labor-intensive as other types of construction. Another advantage is the ceiling/floor system, in which the precast slab serves as both.” The slab’s inherent inorganic composition also provides fire resistance, and it offers more acoustic control between floors than other materials could. ■

— Donald P. Merwin

Precast Saves Materials, Enhances Fire Rating

With fire safety and building height paramount considerations, the designers for the Lester Senior Housing project in Whippany, N.J., turned to precast concrete hollowcore plank for a variety of reasons in constructing the project.

Hollowcore flooring installed in senior housing project adds fire resistance, acoustical benefits for owner, residents

“We are using precast concrete to decrease the height of the structure,” said Lawrence Dalziel of NK Architects in Morristown, N.J., the project’s architect. “It saved about eight to 10 inches per floor.” That, in turn, not only allows the project to meet height restrictions but saves building materials that otherwise would have been needed to enclose that added height.

In addition, the precast slabs receive “an automatic fire rating” from Underwriters Laboratories (UL), an important feature in senior housing, he says. The flooring also provides strong acoustical control by damping noise between floors, and it cut vibrations by providing a sturdy, durable surface that is less responsive to impact and jostling than wood or steel flooring would be.

The 189,000-square-foot building features six stories with a total of 181 units. There are 120 senior independent-living apartments of one and two bedrooms, 60 assisted-living units and one superintendent’s apartment.



Hollowcore plank was specified for floor and ceiling elements in the new Lester Senior Housing facility in Whippany, N.J., due to its economics and fire resistance. The project is to be completed this fall.

A total of 195,902 square feet of hollowcore plank was installed in the facility, including all floors and the roof, as well as 3,000 square feet over the basement. Strescon Industries Inc. in Morrisville, Pa., is providing the precast concrete components. Century 21 Construction Group is serving as general contractor, with Thor Engineering as the engineer of record. The facility will be ready for occupancy late this year. ■

— Don P. Merwin