

Healthcare Facilities Stay In The Pink With Precast

Precast concrete components help architects and builders meet safety requirements and economics for booming healthcare market

As baby boomers grow older, their need for specialized medical care on a regular basis grows, too. While that's always been true of senior citizens, the massive size of the boomer demographic will require many more facilities to handle the demand, especially in the assisted-living category. Facility administrators and designers are turning their attention to this growing need — and they're using precast concrete components to help them achieve their requirements.

Assisted-living centers are defined as those facilities that provide daily meals, personal and other supportive services, healthcare and 24-hour oversight, according to the American Association of Homes & Services for the Aging (AAHSA) in Washington, D.C. It reports that more than 1 million seniors reside in an estimated 11,800 assisted-living facilities nationwide. That number will continue to grow as our nation's population ages. (For more on that change, see the Senior Housing on page 26.)

"Assisted-living centers bridge the gap between living independently and living in a nursing home," says a spokeswoman for AAHSA. Assisted-living facilities accounted for 75 percent of new senior housing in 1998, when 50,667 such centers were constructed, the group says. (Although many such facilities are called assisted-living centers, the category actually includes a large number that offer housing options for those who require no assistance at all at present and simply prefer a lifestyle that requires less work and a proximity



Because of seismic conditions in the Pacific Northwest, the Emerson House Residential Care Facility in Portland, Ore., was constructed with a precast modified moment-frame system. The system expedited construction on the tight urban site during rainy winter months.
Photo: Bob Boll Photography

to help, should it be needed. Overall, AAHSA says another 10 percent of new construction in 1998 was facilities strictly devoted to retirement communities and independent-living apartments.)

There are four basic types of service, AAHSA reports. These are: all-inclusive, in which all services are included; basic/enhanced with certain services offered and others available on a per-use fee basis; fee-for-service, in which services are charged as provided; and service level, in which residents receive services on an individual-need basis and are charged accordingly.

Because so many of these facilities have patients who are bed-ridden or require special equipment to move, life safety is of paramount importance. "Safety is always a major concern with healthcare facilities," says architect

Dumitru Alupulai of Architects Design Group in New York City. Precast concrete components help designers meet that need because of their inorganic make-up, which provides fire resistance without the need for additional applications. "Hollowcore plank systems provide us with the required fire separation between floors."

Fire resistance is further enhanced with a hollowcore roof system (see sidebar) and with precast walls between living units. "With precast walls and floors, you can achieve compartmentalization, preventing the fire from spreading from unit to unit," says John Jones, sales manager with Oldcastle

The façade at Prospect Heights features red thin-brick insets on precast concrete architectural wall panels.
Photo: Norman McGrath



Moment Frame Solves Seismic Concerns

The precast moment-frame structural system on the Emerson House Residential Care Facility in Portland, Ore., uses similar concepts but a different method of construction than those features in the PRESSS research program now being developed for code recommendations by PCI and other organizations. (For more on that work, see the case history on page 40.)

Emerson House's precast concrete moment-resisting frame allows the structure to emulate the construction of a cast-in-place concrete frame, according to precaster Bob Knorr of Morse Bros. "The building's force-resisting capacity is dependent upon the column bases, the beam-to-column-frame interface and/or a combination of both," says Knorr. "The beam-to-column connection is of paramount importance and required a special joint with special grout." (See detail drawings at right)

Precast Co. in South Bethlehem, N.Y., and team leader for PCI's Healthcare market group. "Assisted-living facilities are a growing market, and hollowcore is being used widely for these projects. It gives a building the two-hour fire rating between floors required for a healthcare facility."

Precast floors and walls also are sound resistant, an important characteristic in nursing and assisted-living homes, Jones adds. The material is durable and weather-resistant, leaving no need to paint it, he points out. An additional benefit is precast's durability, which can withstand natural disasters such as high winds, hurricanes and earthquakes.

Moment-Frame Design

Emerson House Residential Care Facility in Portland, Ore., which features a precast concrete moment-frame structure, is a case in point. The 30,000-square-foot, three-story Alzheimer's care facility was built on a fast-track basis because the owner, Kinsel Ameri and 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.

Because the city lies in a high seismic zone, strong seismic methods of construction were essential. KPFF Consulting Engineers, the project engineers, recommended the structural system, says Chillless. Typical precast structural systems use shearwalls, with floor and roof diaphragms to resist lateral and rotational forces imposed on the building, explains Bob Knorr, engineering and marketing coordinator with Morse Bros. Inc. Prestressed Concrete Group in Harrisburg, Ore.

The moment-frame technique uses the columns and beams and their connections to counteract these forces instead. "The moment frame is a great system," says Chillless.

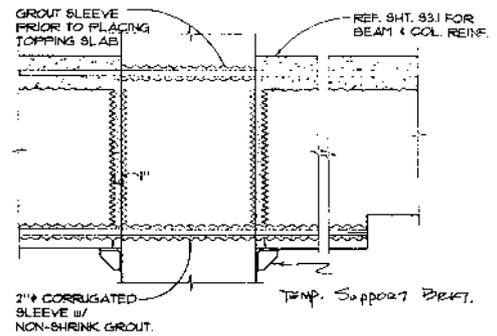
Morse Bros. produced 24 columns, 78 beams, and 224 8-inch-deep by 4-foot wide hollowcore slabs for the project. The columns were heavily reinforced with steel reinforcing rods. "During the casting process, a key challenge came in installing the grout tubes in the columns, because of the large number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

Because the structural components were cast in the plant, winter construction in poor weather conditions was possible, although not easy. "The very tight city site made the field erection more difficult than usual," notes Knorr. Emerson House, completed last year, was one of the precaster's first projects to use this type of construction and is considered a great success. Today, Morse Bros. is bidding on similar projects using the same system.

High-Rise Gains Distinctive Look

In Hackensack, N.J., a high-rise nursing home used precast concrete architectural panels for its façade, providing a cost-effective system that offers a distinctive look. "This approach provided a level of quality control rarely achieved with the uncertainties of field labor and varying weather conditions," says John Arbuckle, marketing director for the architect, Beckhard Richlan & Associates of New York City.

Prospect Heights Care Center, a seven-story, 119,000-square-foot structure, has 210 beds and is sandwiched



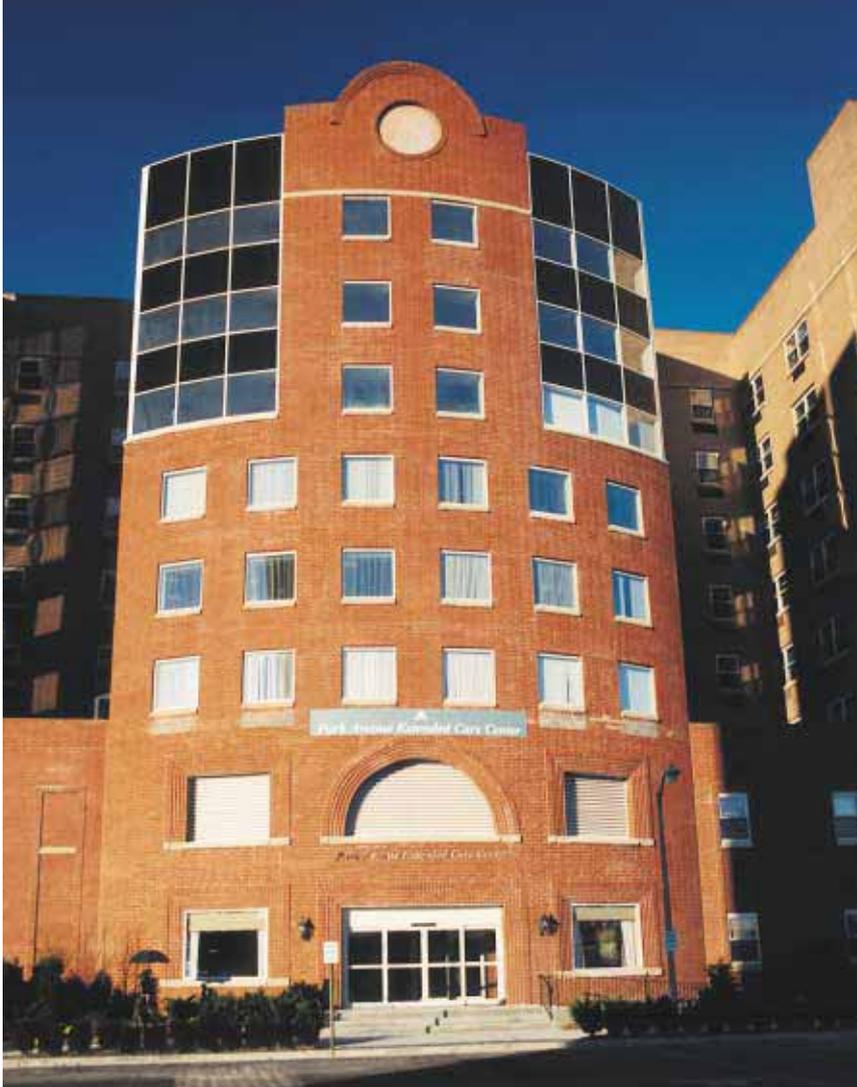
This detail drawing of the Emerson House framing system shows a typical moment-frame precast joint.

between tall apartment buildings in a high-rise residential neighborhood. It features a penthouse level for residential-care units and four stories of long-term skilled nursing-care units. Lounges and dining areas are situated at the ends of every living floor. Administrative offices, therapy and exercise facilities, and a commercial kitchen are on the second floor, and the lobby, multipurpose room and other offices are located on ground level.

The façade is sheathed in precast concrete panels with red thin-brick insets that provide an attractive, durable and easily maintained surface, Arbuckle explains. Approximately 59,000 square feet of gullwing spandrels and panels were used on the exterior, with window openings angled at 45 degrees to assure



The use of hollowcore floors instead of cast-in-place concrete at Senior Quarters at Riverdale, a 14-story assisted-living project in the Bronx, N.Y., resulted in a savings of \$8 to \$9 per square foot.



The Park Avenue Extended Care Center in Long Beach, N.Y., benefited from the use of hollowcore slabs, which facilitated sound control and offered fire resistance. The precast floor system also allowed 34-foot clear spans.

privacy by shielding beds from exterior views while providing natural light.

“By using thin-brick insets, which were dictated by the surrounding architecture, we avoided the very costly and time-consuming task of setting brick on site,” explains Donald L. Faust Jr., president of Universal Concrete Products Corp. of Douglassville, Pa. Universal fabricated the pieces while foundation work began and continued as the initial pieces were delivered to the site, speeding the erection.

Hollowcore’s Advantages

Another assisted-living project where precast was utilized to good advantage is the 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, specifying precast hollowcore slabs for floors and precast stairs and landings. Compared with cast-in-place concrete floors, the hollowcore provided savings of \$8 to \$9

per square foot, according to Wexler.

Alupulai, the design architect for Senior Quarters at Riverdale, points out that the hollowcore slabs saved additional labor costs. “Besides providing the required fire rating, the precast floors were faster to erect and achieved the needed sound-barrier rating. Precast also is more dimensionally stable than poured concrete.”

Steel decks don’t provide as good a solution because they require fire wrapping and sound proofing with acoustical tile, he says. “The bottom of the hollowcore plank creates a nice ceiling finish without the need for drywall. It can just be painted.” Oldcastle Precast Co. 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.

The Park Avenue Extended Care Center in Long Beach, N.Y., is another healthcare project where hollowcore slabs proved to be an ideal solution. The

Precast Offers FIRE RESISTANCE

While concrete plank floors are frequently utilized for their fire-resistant qualities, concrete roof construction is often overlooked in favor of a more aesthetically pleasing pitched roof system, according to recent “Viewpoint” column in Building Construction & Design. However, owners would benefit from property insurance savings realized with precast concrete plank roof, which facilitates amazingly short payback periods in offsetting the added initial cost of the roof.

Insurance savings resulting from the installation of a precast roof are related to the roof’s contribution to the building’s increased fire resistance, as well as its barrier-separation capabilities. The insurance industry acknowledges this by applying a more favorable rating to a structure having a concrete roof than one without it. However, if a wood roof is installed on top of a concrete plank roof as an aesthetic feature, the building receives the most favorable rate that is reserved for fire-resistive structures.

10- and 12-inch slabs making up the floor and roof systems of the eight-story structure reduced its floor-to-floor height, reducing the overall height of the building and saving material costs, says Richard Sovinsky, project architect with Ehasz Giacalone Architects in Farmingdale, N.Y. “Hollowcore plank is light, easy and quick to install. It contributed to the speed of construction.”

Precaster Strescon Industries in Langhorne, Pa., supplied 120,000 square feet of hollowcore planking, plus 48 precast stairways for the project. The hollowcore permitted spans of 34 feet, utilizing 10- and 12-inch-deep slabs. The precast floor system also provided excellent sound attenuation and a two-hour fire rating between floors.

Whether used for a complete structural systems, as in the case of Emerson House, or for key structural components, precast concrete is proving to be a favored material for a wide variety of healthcare applications. ■

— Anne Patterson and Don Merwin