

Precast Concrete Assists Designs As Senior Housing Begins Boom

Precast's advantages in fire-resistance, acoustic control, durability and economy provide inherent design benefits as large demographic segment enters senior years

With the baby boom generation quickly reaching its golden years, the average age of the nation's population is edging upward. That is bringing a need for more senior living, both as retirement centers catering to this population's needs and assisted-living quarters that provide more medical and physical assistance. And to meet that need, more designers are turning to precast concrete components, especially hollowcore slabs.

Market To Explode

Baby boomers, whose generation began in 1946, will reach the early retirement age of 55 in 2001. But the first noticeable increase in the senior population will come in 2007, according to projections by the U.S. Census Bureau. At that time, Americans aged 65 and older will make up 12.8 percent of the populace (37.38 million). Although that increase is only two-tenths of a percentage point, it marks the beginning of a spiral that won't quit until 2035 when it reaches 20.5 percent — a whopping 74,774,000 seniors. A century ago, in 1900, the population of the entire nation was only 76,212,168. (For more details, see the chart on page 27.)

What's to be done with all these boomers? One answer will be construction of more senior accommodations that provide low-maintenance, easy living for those who no longer want to cut grass or shovel snow, as well as assisted-living centers for those with more specialized medical needs. (For more on assisted-living centers, see the Healthcare feature on page 30.)



Marriott Senior Assisted Living division has created Brighton Gardens, a series of assisted-living centers in several regions across the country, including North Carolina, South Carolina and Virginia. The centers feature floors and ceilings made of hollowcore precast that offer fire resistance, durability, speed and narrow profiles.

“The retirement and assisted-living market is going to explode in 10 or 15 years,” says John Saccoman, vice president-sales and marketing for Molin Concrete Products Co. in Lino Lakes, Minn., and the Team Leader for PCI's Retirement Housing market group. “Retiring baby boomers will create a huge wave of demand.”

The types of accommodations will have to include luxury condominiums and rental apartments, as well as moderate assisted-care centers and nursing facilities. In some cases, several levels of care will be housed in the same facility. “As people age, they can come to require increasing amounts of care, but they won't want to move their residence,” Saccoman points out. “Developers and designers are creating facilities that allow residents to change the degree of care they receive just by moving to a different part of the same

building.”

This trend means many seniors will be on the move and will be looking for new accommodations as they shift from large, empty homes to other types of housing. “Seniors want different qualities in their housing once their children are gone and they pass the age where they enjoy physical activities so much,” Saccoman says. “They're looking for low maintenance, security and companionship with someone their age.”

Molin Concrete Products has seen the variety of components it casts, including precast walls, floors, beams, columns and related materials, be specified more often for retirement and assisted-living structures, Saccoman reports. About 30 percent of the company's business comes from these projects, and the precaster recently underwent a \$5-million expansion to handle the demand. “And

we're going to need to spend another \$10 million to meet the needs of this market in the future."

Indeed, owners, architects and contractors around the country indicate that precast concrete components are a popular element for these accommodations. Adolfson & Peterson Construction of Minneapolis, for example, uses a large amount of precast in building what it calls continuous-care retirement centers (CCRCs) around the country. The firm has offices in Denver, Phoenix, Dallas and Wausau, Wis., in addition to Minneapolis, and is building facilities in all but Dallas.

The designs feature campus-type accommodations mainly for both independent living and assisted-living, explains Harlan Hallquist, vice president of Adolfson & Peterson Construction. They also include what he calls "congregate service" facilities, where minimal services are available. "They offer the beginning services of assisted living," he says. "They're designed for use by people who are still active but want to be attached to a system where they can get help if they need it." They graduate from that point to various levels of assisted-living with services of nursing homes and medical facilities to Alzheimer and dementia units.

Income Mix Is Changing

There is a different mix today than there was four or five years ago, he notes. "Previously, we targeted the high-end, upper-income types. Now there is more demand by lower-income people for independent-living facilities. There is going to be increased demand, especially for low-income and even subsidized rental property. Most of it will be for independent living, as opposed to skilled-care facilities. As people get older they begin to realize that they need increasing amounts of care. They don't move in with a son or daughter anymore."

The advantages precast concrete offers to these centers are varied depending on the location, function and applications of the materials. They include fire resistance, acoustic control, speed of erection even in winter, long-term durability, low maintenance, flexibility of design, aesthetic variety and a range of cost savings, especially through the use of hollowcore slabs as ceiling/floor components. The slabs' shallow cross-section eliminates the need for suspended ceilings and plenums, which cut floor-to-floor heights, helping



Hollowcore helped the Marriott meet restrictions on building height, providing a tall floor-to-ceiling room space on each level. Mechanical and electrical needs were run through the cores in the slabs to facilitate using the plank as a combined ceiling/floor.

to meet any zoning height restrictions and cutting material costs for façade and wall heights.

Marriott A Major User

These advantages have made precast concrete a popular choice for many owners, designers and contractors working on these projects. For example, a major user of precast concrete components has been the Marriott Senior Living division of Marriott Hotels in Washington, D.C. The company has built a number of retirement facilities using a format that takes full advantage of the benefits offered by precast concrete hollowcore slabs. The result is a design that meets tight building restrictions, provides speedy construction and aids in other design elements as well.

The range of benefits can be seen in the seven centers built in North Carolina, South Carolina and Virginia. Called Brighton Gardens, the centers were designed by Ray Troxell Associates Inc. in Winston-Salem, N.C., with five of them built by general contractor Clancy & Theys Construction Co., Wilmington, N.C. Each center is about 72,000 square feet over three floors. They feature precast, prestressed hollowcore slabs on each floor including the roof, supported by a creative connection system that allowed the designers to specify extruded planks with grouted connections and retain a quick, cost-effective schedule.

Plank was specified foremost to meet local building codes that limited the overall height of the project to 35 feet,

The Growing Senior Population (Age 65 and Older)

Year (in millions)	U.S. Population (in millions)	Senior Population	% of Total
2000	275.3	34.8	12.6%
2005	287.7	36.4	12.6
2007*	292.6	37.4	12.8
2010	299.9	39.7	13.2
2015	312.3	46.0	14.7
2020	324.9	53.7	16.5
2025	337.8	62.6	18.5
2030	351.1	70.3	20.0
2035	364.3	74.8	20.5
2040**	377.4	77.2	20.5
2045	390.4	79.1	20.2
2050	403.7	82.0	20.3

*Growth cycle begins as baby boomers retire **Growth levels off and starts decline
Source: U.S. Census Bureau

The percentage of seniors in the total U.S. population is rising steadily and will continue to do so for many decades, bringing a need for more senior-housing and assisted-living facilities nationwide.

explains designer Ray Troxell. “We needed to keep the floor-to-floor dimension as tight as possible,” he says. “We elected not to use cast-in-place concrete and decided to use the hollowcore because the format and costs were more beneficial.”

Hollowcore helped keep floor-to-floor dimension as tight as possible.

Another benefit came from hollowcore’s concrete composition, which makes it fire resistant. “Fire safety certainly was an advantage, because the plank came with a two-hour fire rating, which alleviated the need to add anything where that rating was required,” Troxell says.

Precast Offers ECONOMY

The use of precast concrete in building retirement communities saves time and money, according to John Saccoman, team leader for Retirement Facilities for the Precast/Prestressed Concrete Institute. That economy will grow in importance as the market for these facilities expands to encompass more middle-class and low-income residents.

“Precast slabs in particular can be installed in days, saving time — and time is money,” says Saccoman, who is vice president-sales and marketing for Molin Concrete Products Co. in Lino Lakes, Minn. “Slabs also save space, because one slab becomes the ceiling for one story and the floor for the next, eliminating the need for drop ceilings.”

Precast’s inherent noncombustible composition also means no additional fire-proofing sprays or layers must be used to coat the components, saving more labor and materials. In the event of a fire, precast construction allows slower and non-ambulatory residents additional time to exit the building. The result of these attributes is an economical building that enhances life safety, making it more attractive to market as seniors chart their living options.



San Francisco Towers is a life care community utilizing the light weight and aesthetic range of glass fiber reinforced concrete (GFRC) in a high seismic zone.

But the biggest advantage came in being able to use the plank as both the ceiling of the lower unit and the floor of the upper unit. The components were finished with a textured spray paint but otherwise were left exposed, without the need for a hung ceiling. This made it easier to maintain the tight floor-to-floor height requirement. Wiring and mechanical services were run through the cored centers of the planks, helping to facilitate these requirements while also hiding them from view. The roof level had faux-mansards added to the front to add interest, but otherwise was constructed similar to the other levels.

Unique Connections Devised

The project used extruded precast slabs, and precaster Gate Concrete Products Co. in Oxford, N.C., worked closely with project manager Chip Overman at Clancy & Theys to create a cost-effective erection process. They devised a unique connection system that used grouted reinforcing steel to tie the precast plank together and then tie the plank to the structural steel. “This approach eliminated the need for multiple, time-consuming and expensive weld connections in the field,” explains Overman.

The system has proven so successful that it was used on seven of the eight projects designed by Troxell for Marriott. On one, load-bearing metal studs were used with metal-deck flooring and a concrete topping. “Marriott officials wanted to try a different system to see if there were any advantages or cost savings,” Troxell says. “We found that there were no advantages, and the system was

slower to construct. So we returned to the hollowcore system.”

Designers also worked closely with precasters in early stages of design to ensure any field cutting of slabs would not cut more than one set of strands in a slab, Troxell notes. The strands were placed 6³/₄ inches on-center, and field-cutting was able to place most fittings requiring a new opening around these reinforcements. For large openings, headers were added at the plant, ensuring stability. “It took quite a bit of engineering by the manufacturer to ensure the openings were placed correctly and the strands weren’t interrupted,” he says. “We planned as much as possible in advance to avoid having to cut into the planks.”

The final project in the series, in Greenville, S.C., opened in January, with all of them meeting budget and timetable. “We found the use of precast concrete to be an efficient and cost-effective alternative to conventional cast-in-place concrete floor slabs,” Overman says. ■

— Donald P. Merwin