PCI MIDWEST focus

www.PCIMidwest.org winter 14

Precast is Resilient for Residential Projects

Precast concrete is being used more to help residential projects meet their high performance goals. Precast concrete is a high performance material that integrates easily with other systems and inherently provides the versatility, efficiency, and resiliency needed to meet the multi-hazard requirements and long-term demands of high performance structures.

Precast provides many benefits for housing projects from versatility in aesthetics, to excellent thermal performance which saves owners money and helps the environment. Precast concrete construction's thermal benefits and low maintenance will also help keep life cycle costs low. Precast concrete structures can be constructed quickly, so tight schedules can be met. It also provides the best protection against severe storms, such as hurricanes and tornados, as well as passive fire protection, and security. Precast systems are also barrier or face-sealed systems, which means there are no cavities between walls for moisture to collect and mold to grow. Precast helps create a more comfortable, durable and safe living environment.

From any perspective, precast concrete provides an excellent alternative to traditional construction methods.

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Hotel Sorella

Started in 2006, the 'Plaza Vista' development, located in the historic Country Club Plaza area, was originally envisioned as a hotel with a connecting link to the headquarters of a major advertising agency. Precast concrete was the material of choice from day one. At that time the plan was for entire square block to be a cohesive development with a single reddish precast color and finish throughout. When the overall project was faced with major challenges/ changes, well into construction, the modular flexibility and adaptability of a precast concrete cladding solution eventually helped save the day.

The 'on hold' project was revived years later, when a new developer took ownership of the site and a law firm took an interest in locating their headquarters next door. However, everything was contingent on major changes to the original design. The modular nature of precast allowed these design changes late it the game. Some previously installed precast pieces had to be removed to complete the new design. Those pieces were hauled off, ground up, and recycled. New pieces were brought out to complete the hotel. Through special care and detailing, the precast match was incredible, especially considering that the Phase I pieces had been installed and were in place for years, prior to final completion.

Owner: **Van Trust Real Estate, Kansas City, MO** · General Contractor: **JE Dunn Construction, Kansas City, MO** · Architect: **Gould Evans Architects with Draw Architecture and Urban Design, Kansas City, MO** · Engineer: **Bob D Campbell and Associates, Kansas City, MO** · Photographer: **Jacia Phillips Photography** · Location: **Kansas City, MO**

The precast concrete façade panels provided the design team with a product that not only offered an economical solution to a challenging project, but also provided an extremely attractive material that is rich in appearance and texture. There were 625 pieces (48,300 square feet) of non-insulated precast cladding on the Hotel side, An acid-wash finish brought out each panel's color and distinct use of aggregates.

ENTERPRISE PRECAST CONCRETE INC.

www.enterpriseprecast.com

Freedoms Path

The construction of Freedom's Path, a total precast building, was officially launched on May 22, 2014 with a ground-breaking ceremony. Freedom's Path, which will be located on the site of the Hines VA Hospital, will provide veterans a safe and supportive living environment close to the services they need from the hospital itself. Developed by Freedom's Path Hines Limited Partnership, Freedom's Path is the first of a two-phase development to transform vacant land on the Hines VA Medical Campus into accessible, sustainable and healthy space for Veterans to regain their strength. The first phase of Freedom's Path will contain a total of 72 units – 36 studio apartments, 28 one-bedrooms and eight two-bedroom apartments with a focus on those at risk for homelessness and disabled households.

Owner: **Hines Veterans Residences Limited Partnership** · General Contractor: **Core Construction, Morton, IL** · Architect: **VOA Associates Incorporated, Orlando, FL** · Engineer: **Paul J. Ford and Company Structural Engineers, Orlando FL** · Location: **Hines, IL**

The facility was constructed using structural wall panels with inlayed brick and Hollowcore floors.

MPC Midwest Precast Concrete

www.mpcent.com

Samaritan Bethany in Rochester

Owner: **Samaritan Bethany** · Architect: **Horty Elving** · General Contractor: **Alvin E. Benike, Inc.** · Structural Engineer: **Innovative Structural Solutions** · Location: **Rochester, MN**

As the leadership team at Samaritan Bethany shifted their model of living for their residents many design and construction factors came to light. From a construction standpoint building code requires a fire rated structure, precast provided the ideal solution and solved some associated inherent design issues, and offered considerable energy efficiency with its natural thermal mass.

This design-build senior housing project allowed Samaritan Bethany to consolidate their living options in one location with a six story addition. With the usual budget constraints a project can present, a total precast structure quickly became the preferred building system for many reasons. This project presented a very quick construction schedule and a tight site with a tie-in to an existing facility at the top of the list.

To expedite this complex project Wells Concrete teamed with Ericksen Roed & Associates Structural Engineers for precast engineering services. In the pre-construction phase Wells was heavily involved in considerable preliminary pricing and value engineering requiring various solutions, and extensive sample coordination with varying color and finish options to keep the project on budget. It was in this phase that the Wells team proposed a vertical and horizontal panel orientation to aide in the aesthetics, consistency and window configuration the owner desired while maximizing the budget.

Precast Products Used:

- Structural columns and beams
- Hollowcore floor/ceiling slabs
- Precast stairs
- Insulated architectural wall panels
- Cornice panels

WELLS CONCRETE

www.wellsconcrete.com

Precast Storm Shelters Provide Safe Haven for Soldiers

Owner: **Iowa National Guard** · Location: **Johnston, Iowa**

Precast concrete storm shelters provide cost-effective options for places like military bases, mobile home parks and schools. Precast concrete storm shelters can be easily customized to meet the size requirements at each site and pre-built structures assemble in one day to meet quick construction needs. Storm shelters can be buried in a berm or a side hill to meet site constraints and can easily be relocated as the site changes.

Nine precast concrete storm shelters were recently installed at Camp Dodge, an Iowa National Guard Base in Johnston, Iowa. The shelters were strategically placed around the training areas of the base providing safe haven for soldiers during emergency weather situations.

Cretex Concrete Products, Inc.

www.cretexconcreteproducts.com

Apartments Wrap Around a Central Precast Parking Ramp

The building plan has been called the Texas donut, but the design also works well in Minnesota. The concept involves constructing a standard, multi-level parking ramp at the center, then building apartment units along all four outer walls of the garage.

Located in Maple Grove, Minnesota, Skye at Arbor Lakes consists of a rectangular, total precast concrete parking structure completely surrounded by a wood-framed, four-story apartment complex.

The enclosed, climate-controlled parking ramp has a capacity of 460 cars with one subterranean level and four levels of supported parking, plus a roof. This structure is surrounded by 263 rental apartment units on four levels. The apartments total 295,000 ft2 while the garage provides 24,200 ft2 on the below ground level and 32,657 ft2 on levels one to four for a total of 154,828 ft2.

Utilizing the donut design provides apartment residents with close access to their cars while keeping the parking hidden from the street. Even better, the layout allows residents to park on the same level as their rental unit.

"Apartment developments in Minnesota are commonly built with a single level of underground parking below three-to-five levels of stick-framed apartments," says Gary Pooley of Wells Concrete. "When you return from shopping you have to take your groceries to an elevator and then up to the level of your apartment. At the Skye at Arbor Lakes, you can park on the same level as your apartment."

The roofed parking ramp is also a novelty in Minnesota, according to Pooley. More typically, parking projects are designed to use the top level for additional parking without a roof. Having a roof allowed the parking ramp to be climate controlled – a big advantage in Minnesota.

Owner: **LeCesse Development Corp., Altamonte Springs, FL** · Architect & Engineer: **Humphreys & Partners Architect, L.P., Maitland, FL** · Contractor: **Stonebridge Construction Inc., Apple Valley, MN** · Location: **Maple Grove, MN**

Precast components

The precast concrete ramp was built first on a cast-in-place concrete foundation, resulting in a stark rectangular box with no window openings. Precast components included 20 beams, 6 columns, 220 double tees, 2 solid slabs, 2 spandrels, 16 stairs, 14 stitch walls, 165 wall panels, and 10 planks. The double tees span 60 feet. Strand and rebar reinforcement in the precast concrete utilized recycled steel and the mix included 20% fly ash replacement for the concrete.

Stick-framed apartments were then erected, built slab on grade, around the perimeter of the parking ramp. The perimeter walls of the garage are 10-inch solid precast concrete panels that, along with a one- to two-inch gap between the precast and the stick framing of apartments, meets the fire separation requirements.

Single entry and exit doors to the parking ramp are placed next to each other on the structure's south elevation. The grade-level apartments are missing in that section. Residents drive underneath upper level apartments to enter the parking structure. A precast spandrel is set horizontally over the vehicle entry area. Traffic circulation is handled by a two bay ramp design with two-way traffic.

The HVAC system for the parking garage is within the garage itself. Ventilation is handled mechanically by units within the garage. The vertical vent system includes large ducts leading to the roof through four-foot-diameter, round holes in the precast double tees at each end of the ramp next to stair towers.

Precast erection, completed at the end of 2013, took slightly over two months and was actually completed before the final plans for the project were finished. Wells Concrete, explains Pooley, had recently completed a similar project with the same design/build team. "This," he says, "allowed us to do our garage drawings and start construction while the architect was still in design."

WELLS CONCRETE

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Learn & Earn Half Day Seminars

Learn precast and earn continuing education credits!

NEW! Lateral Loads and Precast Concrete Design - Part II. This half-day seminar is dedicated to the design of precast and prestressed concrete buildings for lateral loads generated by wind and earthquake ground motion provisions. The seminar provides an overview of lateral force resisting systems for precast and prestressed concrete structures. The seminar includes the calculation of member forces for a typical five-story office building located in the Midwest. Design procedures and calculations for typical members in the building are presented.

Lateral Loads and Precast Concrete Design – Part I. This half-day seminar is dedicated to the design of precast and prestressed concrete buildings for lateral loads generated by wind and earthquake ground motions. The seminar provides an overview of lateral load determination for precast concrete buildings, including both architectural and structural precast concrete. The seminar includes a brief history of wind and seismic lateral loads in building codes in the United States in conformance with IBC 2009, ASCE 7-05, and ACI 318-08. Numerical examples are presented for a typical five-story office building located in the Midwest.

Total Precast Concrete Design. Learn the advantages of a total precast building system during this half-day seminar. Strategies such as increased efficiency and shorter construction schedules of "dual use" structural and exterior cladding systems will be presented, as well as guidelines for the design and detailing of architecturally finished exterior walls, concrete tees, hollowcore plank, and precast concrete stairs. Integration of HVAC systems, building code requirements, and total precast's potential contribution toward LEED certification will also be discussed.

Designing Precast Concrete Parking Structures. Learn how to design and detail precast concrete parking structures during this half-day seminar. Advantages such as decreased construction time, efficiencies of combining a variety of exterior finishes with exposed structural members, and precast concrete's potential contribution toward LEED certification will be discussed. Integration of HVAC systems, building code requirements, long-term durability, ramp and vehicle circulation types, safety, and maintenance issues will also be presented.

Continuing education credits are available for these presentations. All Half Day Seminars are 3.5 hours long and are approved for AIA HSW 3.5 LU. A certificate for 3.5 PDH is also available. Contact PCI Midwest at 952-806-9997 or e-mail mike@pcimidwest.org for more information on how you can participate.

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