PCI MIDWEST focus

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winter 13

Precast Concrete Does the Heavy Lifting in the Middle of Winter

Precast components have the distinct advantage of being able to be erected all year round in virtually any weather, even during the usually harsh Minnesota winter. The developers, designers and contractor of the Dock Street Apartments in Minneapolis were counting on that.

(Continued next page)

For additional information about how you can participate in one of these seminars, contact PCI Midwest's Executive Director Mike Johnsrud via e-mail: mike@pcimidwest.org

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(Continued from front page)

Consisting of 185 rental units atop ground-level retail space and two levels of underground parking, the project was scheduled to start construction in the fall of 2012 with work running thru the winter and well into 2013. Accordingly, the in-ground parking and first-floor levels of the structure were specified for structural precast concrete construction to be erected in the depths of winter. These levels would then serve as a base on which the top floor apartments could be stick framed as spring approached

The Dock Street apartment structure is the first phase of North Loop Green, a seven-acre redevelopment project adjacent to the new Minnesota Twins' Target Field baseball stadium and designed to tie the area to the cities Warehouse District. Future plans for the multi-phase development include up to 500 additional residential units, 600,000 ft^2 of office space, and possible retail and hospitality facilities. Phase II calls for a 16-story, 200-unit apartment tower.

The initial six-story residential rental building includes two-levels of underground parking with 190 spaces, 3,209 ft^2 of retail space on the ground floor, and five levels of apartments above the retail. Amenities include rooftop sun deck, fitness center, swimming pool, outdoor courtyards, lounge, and Internet café. Residents also have a direct connection to the Cedar Lake Bike and Pedestrian Trails and access to the famous Minneapolis covered pedestrian skyway is within 200 feet.

The subterranean parking and first floor retail level of the Dock Street Apartments consists of precast concrete beams, columns and hollow-core planks. Garage-level walls are masonry block. Atop this three-level base are five stick-framed apartment floors. The hollow-core above the retail space provides the required fire-rated separation for the residential units.

Architect: **Elness Swenson Graham Architects, Minneapolis, MN** · Engineer: **Meyer Borgman Johnson, Minneapolis, MN** · Contractor: **Frana Companies, Hopkins, MN** · Owner: **Hines Interests Ltd., Minneapolis, MN** · Location: **Minneapolis, MN**

Precast components utilized consist of 4,802 lineal ft of beams (189 pieces), 1,959 lineal ft of columns (89 pieces), and 98,416 ft^2 of hollow-core plank (1,110 pieces). The job included 8 in., 12 in., and 16 in. deep planks with typical spans of 27 ft. The majority of the reinforcing in the Hanson precast components consists of recycled steel. Beams and columns utilize 20% fly ash in the mix.

Construction of the structure began in September, 2012. Precast components were manufactured in November, 2012, in the Hanson Structural Precast Maple Grove, Minn., plant. The components were fully cured before setting, with the aggregate first steam heated and non- chloride accelerator used as an accelerant. Hanson also raised the temperature of the water to 1,800° F prior to putting it into the mix and used the Sure Cure electric curing system from Products Engineering to monitor the temperature of the concrete while it was in the forms.

At the construction site, the hole was dug for the two-level underground garage prior to frost and sheet piling was used to shore up the sides while the foundation was poured. As precast erection began, grout mixed with heated water was placed under the precast columns where they connect to the foundation. These connections were then wrapped with insulation blankets.

Adding the garage's masonry block walls required tenting and heating but weather conditions had no impact on precast installation. In fact, erection of the precast components took place from mid-December to mid-February without a delay. Frozen ground actually made precast erection easier by eliminating concerns about mud or poor soil conditions. The project is just now being completed.

Thanks to the use of precast concrete, developer Hines Interests Ltd. can be assured that the project will be completed and occupied on time.

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Precast Makes for a Classic Approach to School Construction

Owner: **Charter School Development Corp., Hanover, MD** · Architect: **Rivera Architects Inc., St. Paul, MN** · Structural Engineer: **BKBM Engineers, Brooklyn Center, MN** · Specialty Precast Engineer: **Ericksen Roed & Associates (ERA), Minneapolis, MN** · Civil Engineer: **Rehder & Associates** · Contractor: **RJM Construction, Minneapolis, MN** · Location: **St. Paul, MN**

Nova Classical Academy is a Minnesota Charter school that follows a classical model of education based on the trivium of grammar, logic or dialectica, and rhetoric. Designed by Rivera Architects and built by RJM Construction with precast concrete components from Hanson Structural Precast, the 92.600 ft2 structure was designed to accommodate the school's full K-12 program, with some 900 students, in one location. With a tight schedule and erection planned for winter months Precast was an optimal solution.

A major challenge for the project was the construction schedule. "With educational buildings, the schedule is always a challenge," says Deborah Rathman, AIA LEED AP, principal in Rivera Architects Inc. "One of our solutions for this was the use of precast. Hanson was part of the team from the beginning, working with the designers and structural engineers. Early on they knew what panel design would be utilized. We could pre-order the components and their production could be controlled. The panels were shipped and installation went really fast. This allowed us to order other materials early on so that once the precast was up we were ready to finish off quickly."

Gary Pooley, Hanson Structural Precast sales manager agrees: "From the time we were brought on board, the schedule called for the entire project to be ready for students within 11 months. We were able to do that because of the great team effort between the architect, engineer, general contractor, and us. That made it a fun project." Precast erection started on January 3 and finished on February 16. Total construction took just 10 months.

The facility consists of a 3-story academic or classroom section, a 2-story central common area, and a third section with gymnasium/ auditorium, and music area. The 3-story classroom section is a total precast concrete structure with precast columns, beams, insulated wall panels, and precast plank floors and roof. The gymnasium/theater wing is constructed with clear-span steel roof joists. The common area utilizes steel columns, beams, and roof joists. Precast hollow-core plank is used to create the mezzanine area. Precast concrete wall panels cover the exterior on both building sections.

Precast components utilized on the school include 263 precast wall panels totaling 65,757 ft2, 565 precast planks totaling 71,051 ft2, 54 precast beams or 1,160 lineal ft, and 14 precast columns or 583 lineal ft.

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Victoria Park Apartments Under Construction in New St. Paul Neighborhood

Project name: **Victoria Park Apartments Phase 1 & 2** · Location: **St. Paul, MN** · Contractor: **Stonebridge Construction**

Construction is under way on the Victoria Park Apartments, a new four story apartment complex overlooking the Mississippi River in St. Paul, MN. The project is one of a number of new housing developments springing up near Victoria Park, a 36-acre parcel of land that the city acquired from Exxon Mobil in 2009 and is developing as a park after completion of environmental cleanup. The master plan for the area is as a mixed-use urban neighborhood.

The contractor, Stonebridge Construction of Apple Valley, MN, plans to ultimately include three buildings in the Victoria Park project. The first building, which is currently under construction, measures 135,750 square feet. It contains 215 apartments and an underground parking garage with room for 182 vehicles.

Approximately 740 lineal feet of precast columns, 2,800 lineal feet of precast inverted tee beams, and 85,000 square feet of 12" solid slab planks from County Materials are an integral part of the first structure. The precast is an especially important element in the design of the floor deck between the parking garage and the residential part of the building. In addition to its structural strength, the solid plank will help to protect residents from automobile noise as well as providing an effective fire barrier.

According to project supervisor Jeff Pierce, construction on the project is being conducted in two phases, due to the need for replacement of a storm sewer. The phases of construction were determined according to what could be done before and after the spring thaw. Phase One began on March 11, 2013. Commencement of Phase 2 began in mid May. The building is scheduled for completion early in 2014, with construction on the other two buildings to follow.

COUNTY MATERIALS CORPORATION

www.countymaterials.com

West Fargo Fire Department – South Fire Station

When the West Fargo Fire Department needed a new fire station they began the process considering the traditional brick and block system. However there were some other factors that weighed in on this decision, beating the brutal North Dakota winters and the necessary durability and austerity a fire station inherently expects.

While the design team understood the speed of construction with precast they may not have been fully aware of the impact of such a fast enclosure for winter construction. Having the structure enclosed to finish through the winter was extremely cost effective and helpful to the remaining logistics of construction. In the end the cost of the project and the cost of a precast system was much more cost effective than a cavity wall.

As the fire department board moved through the design process a production tour further helped the owner team understand the composition of a precast wall as well as how a 'brick wall' was achieved with precast.

Fire Chief Roy Schatschneider of the West Fargo Fire Department said the following of his newly constructed fire hall: "The precast solution provided by Wells Concrete has been a complete success. The design process, and the guided tour of the manufacturing facility we received while our project was actually being produced, allowed for greater understanding and confidence in the quality and care that went into our building. The speed of installation was very impressive and remarked upon by both citizens and city officials of West Fargo…overall, the community is very pleased with the precast solution."

Owner: **West Fargo Fire Department** · Architect/Engineer: **Lightowler Johnson Associates** · General Contractor: **Roers' Construction** · Location: **West Fargo, ND**

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Retail and Multipurpose Development Making a Comeback in the Midwest

Park Place is an upscale retail, restaurant, residential and office development. In this phase two precast buildings ('Building J' and then 'Building F') were designed and built one right after the other. In addition to thin brick, these highly upscale buildings feature exposed precast cladding panels, produced with form liners and an acid etch finish. The project also incorporates precast medallions, bump-outs and cornice work.

Project: **Park Place (Buildings J and F)** · Architect / Structural Engineer: **Opus AE Group, L.L.C.** · Contractor: **Opus Design Build, L.L.C.** · Photography: **Dirk McClure / Enterprise Precast Concrete, Inc** · Location: **Leawood, KS**

BUILDING J – Upscale office building: Constructed first out of the two precast buildings in this phase, "Building J" was sited at the terminus of one of the main pedestrian retail streets, creating a strong focal point opportunity. This created the only free-standing building linked to the shopping district. Next, this building was envisioned to capture and continue the high level of detailing and ornamentation that had been established with the buildings already constructed within this development. This detailing included traditional laid-up masonry, cast stone accents, stucco and decorative metalwork.

BUILDING F – A mixed-use office and retail building within the "new urbanism" development concept: Constructed immediately after Building J, Building F was sited as a continuation of a mixed use building along one of the main pedestrian retail streets, creating the need to relate to existing building architecture. Next, this building was envisioned to capture and continue the high level of detailing and ornamentation that had been established with the buildings already constructed within the Park Place development.

For both buildings, precast concrete also allowed for wider ground-floor openings where needed in the façade for flexibility in storefront design for the future retail tenants. The west façade was on a "zero lot line" condition, and the use of precast panels allowed this condition to be constructed within a minimum amount of time relative to a more traditional, scaffolding approach necessary with metal studs and laid-up masonry units.

There were some key design challenges. With a client program that required a highly efficient floor plan layout, the skin of the building had to be articulated in such a way as to provide strong visual interest and texture. For Building J, this was achieved through the use of four colors of brick, different brick patterns, and highly articulated exposed precast. For Building F, the building had to be articulated in such a way as to provide strong visual interest and texture. This was achieved by breaking the façade into three differentiated façade styles. Each of these three facades is distinct through the selection of brick, precast finishes, and applied and integrated detailing.

Precast also helped to meet the high performance goals of the project. The project's schedule was tight and the building's appearance was required to be of a highly articulated nature. To construct the building in a more "traditional" manner (using metal studwork, miscellaneous metal supports, traditional laid-up masonry and cast stone elements) would have made meeting these goals an expensive undertaking. Precast concrete allowed the design building team to work creatively with the precaster to integrate masonry, detailed metalwork, and dimensional exposed concrete. This integration of materials onto precast panels allowed a savings in schedule, labor, and cost, while providing a high level of quality. This technique also provided a highly durable building enclosure with much less maintenance over a more traditional masonry skin. The ability to install in cold weather construction was key to the success of Building F.

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Gretna High School Addition

The Gretna School District, located just southwest of Omaha, is one of the fastest growing school districts in Nebraska. This two-story addition to the existing facility was completed and opened for students in the fall of 2013. The addition doubles the school's capacity from 800 students to potentially 1,600 students. Various materials were used in the construction including 38,000 square feet of load bearing high performance insulated precast wall panels. The wall system included 3" thick insulation for an approximate R-value of 16.2.

The panel finish included a deep sandblast finish that exposed the course aggregates as well as areas of acid etch to provide a smooth texture and added color variation within the panel. Three different types of thin brick were inlayed in the precast to create even more color variations. Radius insulated wall panels with built in seating that alternates between exterior and interior provided challenging form construction. This space is a favorite area for students as this area displays the heritage of Gretna. This project is an excellent example of the varying finish and forming opportunities of architectural precast concrete.

Owner: **Gretna Public Schools** • Architect: **DLR Group** • Contractor: **Prairie Construction Company** • Location: **Gretna, NE**

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About PCI Midwest

PCI Midwest serves Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, South Dakota and Western Wisconsin. Formerly the Midwest Precast Association, the organization was first incorporated in 2003. Its mission is to promote the use of precast/prestressed concrete, to further educate the construction industry about precast/prestressed concrete, and to expand and nurture relationships between industry-related individuals and companies.

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Learn & Earn Box Lunches

Learn precast and earn continuing education credits! Here's a sampling of what's on the menu:

Total Precast Structures. What is a total Precast concrete structure? How can a total Precast structure benefit a project? What components are used to construct a total Precast structure?

Precast Stadium Design & Construction. Participants will learn the basics of designing athletic stadiums using precast/prestressed concrete.

Precast Concrete Design for Schools. Participants will learn the basics of designing school buildings using precast/prestressed concrete.

Architectural Precast Concrete. Participants will learn about the color, form and texture of architectural precast concrete as well as the design flexibility and economy of using precast concrete.

Insulated Concrete "Sandwich" Wall Panels. Learn the construction techniques and architectural applications for Insulated Concrete "Sandwich" Wall Panels.

Hollow-Core Design and Construction. Participants will learn the basics of hollow-core concrete floors and walls including: fire safety, acoustic properties, maintenance needs, speed of construction, and environmental properties (indoor and outdoor).

Environmental Advantages of Thin Brick in Construction. This program explores the many different brick wall systems available to architects today.

Precast/Prestressed Parking Garage Design. Participants will learn the basics of precast concrete parking structures including personal safety issues (lighting), fire safety properties, and the environmental benefits of precast concrete.

The Basics of Precast/Prestressed Concrete (Precast 101). Attendees will learn what precast, prestressed concrete products are, how they are manufactured (including the structural theory of prestressing), examples of architectural and structural precast solutions, quality assurance procedures and the industry certification program (PCI) of plants, people and performance.

HALF DAY SEMINARS

Lateral Loads and Precast Concrete Design. 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. To schedule a Lunch & Learn Box Lunch presentation at your office, contact PCI Midwest at 952-806-9997 or e-mail Mike@PCIMidwest.org

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