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focus

spring 13

Half-Day Seminars

PCI Midwest is pleased to announce that three brand-new half-day seminars have been released this month. The seminars, Lateral Loads and Precast Concrete Design, Total Precast Concrete Design and Designing Precast Concrete Parking Structures, are each AIA HSW approved for 3.5 hours and also carry 3.5 PDH. The seminars are being presented in a small-group setting throughout the Midwest.



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.

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

Farmers Mutual Insurance Headquarters

In 1891 an insurance company was begun by 22 farmers who were displeased with the high premiums they were paying to east coast insurers whom they weren't even sure could be relied on. Since that day, Farmers Mutual Insurance Company has spent its entire history in downtown Lincoln, NE. They are now deepening their roots in the downtown corridor with a new \$17,000,000 headquarters. The 65,000 SF three story office building incorporates a 'green roof' and has an attached parking garage.

The building's design and construction faced a number of hurdles. Seeing as how Farmers Mutual is a property and casualty insurance company, it only made sense to use a framing and flooring system that was inherently fire resistant. Minimizing the floor-to-floor height was also an issue because of the building's proximity to the State Capitol which has height restrictions on the surrounding buildings.

The solution proposed by the designers at Davis Design Inc. was to use an innovative precast concrete moment frame comprised of a shallow beam-to-column continuity connection that provided lateral load resistance without the need for shear walls. This design also eliminated the need for column corbels so it further helped to provide a barrier free space. This building was the first in the United States to use this technology which was developed by The University of Nebraska in conjunction with Concrete Industries, Inc. and funded by The Charles Pankow Foundation.

At the heart of the system is a shallow beam that has an open trough or tub at its end by the column. The column has a corresponding opening cast into it such that once the frame is erected workers can come back and install continuous reinforcing steel in the beam tubs and through the column. They then cast the beam tub and column opening full of concrete. Temporary steel angle haunches are then removed. This connection mimics the continuity achieved by cast-in-place concrete construction. The system also allows for the complete erection of the precast frame before the cast-in-place floor topping operations begin.



TD Ameritrade Parking Garage

This 750 stall parking structure is entirely comprised of precast concrete and features precast spandrels, columns, beams, and double tees along with stair tower panels. The precast concrete system was chosen for the project based on the ability to fit into a concurrent construction schedule with the accompanying 14-story office building, site logistics, and compelling aesthetics inherent to precast concrete.

Lateral forces are resisted utilizing cantilevered column groupings, centralized in each quadrant. This arrangement eliminated the shear walls at the lower level which improved visibility and maximized the

area for parking. The columns are also designed to resist loading from wind turbines bolted to their tops. The cantilevered column option was offered by the precaster after securing the project at cost savings to the owner, in addition to the aforementioned benefits. In addition to the live loads mandated by the building code, the design criteria also included a requirement for increased live loads to account for snow storage areas on the upper level in extreme snow events.

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Architect: **HOK, St. Louis, MO** • Structural Engineer: **HOK, St. Louis, MO** • Contractor: **Kiewit Building Group, Omaha, NE** • Owner: **TD Ameritrade, Omaha, NE** • Location: **Omaha, NE**

Villas of Lilydale

Perched atop a bluff overlooking the beautiful Mississippi River, the Villas of Lilydale residence now being built in Lilydale, Minnesota will offer attractive and convenient independent living to senior residents in the Twin Cities area. The Villas will feature 47 units of senior living apartments.

The Villas of Lilydale is the second senior residence to be constructed on a site formerly occupied by the Lilydale Tennis Club. The first building, Lilydale Senior Living, includes both independent and assisted living apartments, along with many amenities such as a billiard room, library, theater and community room. Both buildings have been designed by KAAS Wilson Architects. The general contractor is Stonebridge Construction.

The 87,542 square foot residence features four floors – including an occupied attic – atop a heated garage made with hollowcore concrete plank. This arrangement makes it

easy for residents to access their vehicles without needing to walk over icy surfaces.

Hollowcore was chosen for structural reasons and to provide effective firewall protection. The hollowcore also provides a sound barrier between the garage and the living space above. The precast materials include a total of 17,400 square feet of 8” and 12” hollowcore plank, 16” by 16” precast columns, and 605 linear feet of precast tee beams, all which met budget for the project.

The Villas of Lilydale project is currently under construction. According to architect Mindy Michaels, the project is “rolling smoothly,” and is scheduled for completion by August or September of 2013.

www.countymaterials.com



Project Name: **Villas of Lilydale II** • Location: **Lilydale, MN** • Architect: **KAAS Wilson Architects, Minneapolis, MN** • Engineer: **Darg, Bolgreen, & Menk, Golden Valley, MN** • Contractor: **Stonebridge Companies, Apple Valley, MN**

US Hwy 41, Brown County, WI.

The US Hwy 41 project ranks as one of Wisconsin's largest ever highway improvements. The project in Brown County will replace 16 interchanges and construction of numerous roundabouts. The refurbished US Hwy 41 will be designated as an interstate corridor once completed. Well over \$200 million in construction contracts will have been let from the Wisconsin Department of Transportation from 2010 to a completion date in 2017.

Since 2010, the precaster has supplied over 1500 ten-foot wide prestress panels for numerous interchanges and retaining walls. Panels have numerous architectural and aesthetic designs in keeping with the Community Sensitive Design team envisioned that gives Brown County its special visual character. The Community Sensitive Design team is a group of 30 citizens who worked with designer and

the Wisconsin Department of Transportation to provide architectural details that are native to Brown County.

The prestress panels are placed on poured in place footings and are tied back using a buried precast blocks and tie rods. Moment slabs and poured in place coping are then poured on top of panels.

Panels design requirements of wind loads of 40 lbs per sq. ft. and a suction load of 20 lbs. per sq. ft. In addition to the above loads inserts and connection assemblies for the loads indicated on plans and a horizontal force to at least equal to at least 20% of the dead load of the panels.

www.crestprecastconcrete.com



Owner: **Wisconsin Dept. of Transportation** • Engineer: **HNTB Corp.** • Design Team: **Community Sensitive Design** • Contractor: **Lunda Construction, Black River Falls, WI.** • Location: **Brown County, WI**

Sanford Field House

Designed for the modern athlete, the Sanford Filedhouse provides local athletes with 62,000 square feet of professional grade Field Turf® and exceptional amenities including state-of-the-art training facilities, physical therapy & rehabilitation specialists, access to sports medicine, and performance training programs.

Located on the northern edge of Sioux Falls, the Sanford Fieldhouse is the first of four sports facilities at the 162 acre Sanford Sports Complex. The exterior design pays homage to the ancient Colosseum in Rome with its towering pillars and embedded images of skilled Roman athletes.

The owner selected precast to help achieve this vision. Insulated wall panels with multiple finishes created a

prominent and powerful impression for the exterior facade. For the columns and entablatures, architectural precast cladding was attached to the wall panels, adding additional depth and detail. This fast-track job consisted of over 300 pieces and was awarded in February 2012 with a grand opening to the public in September 2012.

Future building plans for the Sanford Sports Complex include facilities that will have up to four indoor sheets of ice, three indoor soccer fields, thirteen youth football fields, nine indoor basketball courts, and seven indoor tennis courts.

www.gagebrothers.com



Location : **Sioux Falls, SD** • Owner: **Sanford Health** • Architect: **Fiegen Architecture/JLG Architects** • Structural Engineer: **SEA, Inc.** • Contractor: **Fiegen Construction**

The Station on Washington

Precast installation was recently completed at The Station on Washington in Minneapolis, MN. This mixed-use property located at the core of the University of Minnesota campus will feature retail at the street level as well as five levels of housing above. It is conveniently located on the Central Corridor Light Rail Line.

The precaster was invited to assist during the early stages of the project and provide input on the project's structural design. Some of the design challenges for this project included identifying and sizing key structural elements for the project - namely resisting the lateral wind loads that the project would encounter. With an "open" design at the retail level, there were few walls available to help transfer the wind lateral loads to the footings. The precast components of this project provided a solution by transferring the wind

loads from the wood framing above through the precast to the foundation.

Once the design group arrived at a final design, shop drawings were able to start right away because the precaster had been involved from the beginning with proposing design solutions. This synergy saved time and money for the project and helped contribute to a shorter schedule for the project.

41,000 sf of hollow core plank was used in the project along with 1,350 lf of prestressed beams and 1,100 lf of precast columns. 19,300 sf of precast wall panels were also used.

www.molin.com



Photo: Erik Molin, Molin Concrete Products Co.

Architect: **Opus AE Group, LLC in collaboration with Elness, Swenson, Graham Architects, LLC** · Engineer: **Opus AE Group, LLC** · General Contractor: **Opus Design/Build, LLC** · Location: **Minneapolis, MN**

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

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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 towards 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 towards 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 866-MWPRECAST or e-mail Mike@PCIMidwest.org

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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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