

UNC Uses Cooling Tubes in Precast Concrete Home

CHARLOTTE, NORTH CAROLINA



Photo: Clarke Snell.

Students at the University of North Carolina at Charlotte incorporated heating/cooling tubes and geopolymer concrete into the precast concrete panels it used to clad its competition home in the U.S. Department of Energy's Solar Decathlon. The material was designed to emphasize the students' focus on "several new renewable technologies."

"It's innovative and novel," says project manager UNC Charlotte Assistant Professor of Architecture Mona Azarbayjani. The school is competing for the second time in the competition, after collaborating with DOE in the first Solar Decathlon in 2002. The DOE event invites 20 universities to design, build, and operate solar-powered homes that are "cost-effective, energy-efficient, and attractive." The winning team, DOE says, blends "affordability, consumer appeal, and design excellence with optimal energy production and maximum efficiency."

The home, called "Urban Eden," was designed to serve as urban infill in a market with a similar climate to Charlotte. Precast concrete panels were used to clad the building both as an energy-saving technique and to provide an effective sound barrier to city noises, the student group says. Although not part of the project's criteria, the panels also will provide an inherent resistance to fire and to mold growth due to their inorganic composition, as well as other benefits for homeowners.

The insulated precast concrete panels contain an array of small-diameter plastic "capillary" tubes that enhance the concrete's capability for storing and radiating heat. In the summer, the concrete absorbs ambient heat from the interior space, which is transferred through the tubes to copper-fin heat exchangers above the roof at night.

"The combination of the large surface areas of the interior wythe of concrete and the embedded tubes creates a very efficient transfer medium for heat," the group says. The pipes cool down, and the water recirculates through the walls, cooling the concrete via passive cooling.

The group also is using geopolymers to produce concrete binders that contain no Portland cement, reducing the concrete's carbon footprint. The geopolymers consist of a fly-ash mixture that decreases carbon emissions by as much as 90%. Although the concrete has to be heated to be cured, the panels were produced in typical precast forms by Metromont Corp.

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Finrock Completes \$60-Million UCF Student Housing

ORLANDO, FLORIDA



Finrock Industries recently completed a \$60-million precast concrete facility that is raising the bar on student housing standards near the University of Central Florida (UCF) campus. The 600-student dormitory offers two- and four-bedroom units. Each unit has its own kitchen and laundry area, and each bedroom has a private bathroom, extra storage, and large closet.

Constructed entirely of precast concrete, the building also has an access-controlled parking structure with a direct entrance to each residential floor. Designed, manufactured, and constructed by Finrock, the project was completed in less than 12 months. Although privately funded, the building is being managed by the UCF housing office.

The University of Florida's new dormitory features upscale designs for 600 students in a total-precast concrete structure.

SDSU Architectural Selected for PCI Studio

BROOKINGS, SOUTH DAKOTA



– Brian Rex

South Dakota State University (SDSU), in partnership with the SDSU Foundation, has been awarded a competitive grant from the Precast/Prestressed Concrete Institute (PCI) Foundation to create a precast/prestressed concrete studio for the university's Departments of Architecture and Construction Management.

The grant enables the shared study of precast building technologies in both departments. The Architecture, Math, and Engineering building now under construction on the SDSU campus will connect students in these programs with a shared workshop. Central to the new studio is the active engagement with regional PCI industry partners, specifically Gage Brothers in Sioux Falls, S. Dak. The grant will deepen the relationship between Gage Brothers and SDSU through plant tours, guest lectures, and other collaborations.

"The PCI Trustees were impressed with a number of things about the SDSU proposal," says Thomas J. D'Arcy, PCI Foundation chairman. "The first was that it was a partnership between a school of architecture and a school of construction management. We have been working to

develop programs on the construction management side and were pleased to see it come about here.

"The second part of the proposal that we liked was the 'hands-on' approach to learning that SDSU takes. The trustees applauded the effort that the school takes to provide students with a unique learning experience that may include getting their hands dirty."

The program, "Building Concrete Community," began this fall, with each incoming class of students partnering with a South Dakota town to study during their years at SDSU. During this time, students will interact with rural communities and ultimately design and construct a small civic project, such as a park structure, band shell, or other community-identified need.

"We also liked the thoughtfulness and care that Professor Brian Rex took in creating the program," D'Arcy says. "It is important for us that the faculty embraces an integrated approach to the study of design and construction. That will mean allowing the local industry to be on hand to provide insight and guidance, and the industry as a whole will learn from the work at SDSU as it is shared at industry meetings."

In support of the Studio and growing programs, Gage Brothers also pledged \$200,000 of gift-in-kind support over the next four years, including tours, plant visits, teaching, and scholarship support.

"Our support made perfect sense to us as a company," said Tom Kelley, president of Gage Brothers. "We are proud to have been involved in numerous building projects at SDSU. This studio will allow additional interaction with our team and the students on an ongoing basis, as well as help educate the future architects and construction managers on the benefits of utilizing precast concrete."

The PCI Foundation provides grants for educational and research initiatives focused on state-of-the-art innovative approaches to the integrated use of precast concrete design, fabrication, and construction. It is an independent 501(c)(3) and has provided support for programs at accredited schools of architecture, engineering, and construction management in the United States. The PCI Foundation began sponsoring learning studios at schools of engineering and architecture in 2007.

High Concrete Names Seroky New President

DENVER, PENNSYLVANIA



– John J. Seroky

High Concrete Group LLC has named John J. Seroky to serve as the company's president.

Prior to joining the company, Seroky served as a general manager of Otis Elevator's U.S. Southern Region, based in Atlanta, Ga. Seroky holds an MBA from the Hough Graduate School of Business at the University of Florida with a focus on finance, economics, and marketing.

Manual-Review Team Seeks Engineer Participantst

CHICAGO, ILLINOIS

PCI's Industry Handbook Committee is looking for candidates to serve on the Blue Ribbon Review Team for the eighth edition of the *PCI Design Handbook: Precast and Prestressed Concrete* to be published in the first quarter of 2015.

Engineers with experience in the design of precast/prestressed concrete structures who are interested in assisting the committee are encouraged to send their qualifications to Helmuth Wilden at hwilden@roadrunner.com no later than December 31.

The procedure consists of reviewing material created by the committee in advance of a two- or three-day meeting in the Chicago area in March or April 2014 to provide input to the committee.

Submit your headline news for consideration in a future issue of *Ascent* to Brian Miller at bmiller@pci.org.