

Design-assist, BIM key to cancer center's successful construction

When Gate Precast was selected for the precast concrete work at the Baptist MD Anderson Cancer Center's new 330,000 ft² (31,000 m²) addition in Jacksonville, Fla., it ended up being two separate projects: the hospital building itself, which used 30,000 ft² (3000 m²) of precast concrete cladding, and the hospital's hybrid parking structure. The parking structure was 137,000 ft² (12,700 m²) of precast concrete, with only one cast-in-place bay, and used an additional 6000 ft² (560 m²) of precast concrete cladding panels.

"We have enjoyed a wonderful working relationship with HKS and have collaborated with them on a number of healthcare projects," says Brian Griffis, southeast regional sales and marketing manager for Gate Precast. "For the MD Anderson project, the project team elected to contract with us early in a design-assist format due to the complexity of the facade systems."

One of the keys to the success of both projects, but especially the hospital building itself, was that a lot of time and attention were focused on the preproduction process. The hospital structure features a wide variety of architectural precast concrete panels. In fact, eight types of taper panels, two patterns of formliner panels, and numerous flat panels with 1.5 in. (38 mm) reveals were selected to clad the building.

"The variety of precast work made design-assist invaluable," says Brandi R. Combs, contract manager and senior project manager for Gate Precast. "When you're putting that many different products on a building, the designers typically have concerns about waterproofing, exposed connections, etc."

There were two main areas of interest for the designers, one being the large tapered sections on the tower itself and the other being the diamond-patterned facade for the Hope Wall, which shapes the view of the project from the southwest corner. "The Hope Wall forms a portion of the landscape for the project," Griffis says. "The designers for HKS, Rupert Brown and Matthew Houchin, made it clear that they wanted very sharp details on these panels."

"Through design-assist and BIM modeling, we were able to tweak the designs and meet their needs for all of the precast work," Combs says. "We met once a week with the architect, engineer, and some of the other subcontractors, and we coordinated with each other for several months. We were able to show the architect and engineer how to bring their ideas and designs to life, how to make them work, and how to save



Gate Precast coordinated extensively with the architect, engineer, and other subcontractors for the Jacksonville, Fla., Baptist MD Anderson Cancer Center's new addition to turn the designers' vision into reality. Courtesy of Gate Precast Marketing.

money at the same time. As a result, we addressed all of the design issues before we even went into production."

Work on the parking structure also progressed smoothly. "The garage project involved 443 precast pieces," Griffis says. "The challenge here was coordination of the precast concrete with the small cast-in-place portion of the structure, but we were able to do so successfully."

—William Atkinson

Students' precast concrete solar house a green marvel

In preparation for the Solar Decathlon 2017, a competitive event sponsored by the U.S. Department of Energy in which students from a number of universities around the world compete to design and build full-sized solar-powered houses, the team from Washington University (WashU) in St. Louis, Mo., opted to design and build its solar-powered house out of precast concrete.

Dubbed the CRETE house, the structure is 995 ft² (92.4 m²) and, since the Solar Decathlon, it is expected to serve as a long-term residence for scientists at Tyson Research Center at WashU. The house does not contain a traditional

heating, ventilating, and air-conditioning system. Rather, capitalizing on concrete's thermal mass, the house is primarily warmed and cooled by water coils embedded in the precast concrete panels. The thermal mass in the hydraulic system radiates a uniform, comfortable temperature year-round.

Team WashU worked with and received significant support for the project from PCI, including funding, and a wide range of products and services from several PCI members. Gate Precast of Ashland City, Tenn., provided sandwich wall panels; Dukane Precast Inc. of Naperville, Ill., provided sandwich floor panels; St. Louis Prestress of Glen Carbon, Ill., provided footings and roof panels; Lombard Architectural Precast of Alsip, Ill., provided kitchen countertops; Weiser Concrete of Roxana, Ill., provided gutters; Rocky Mountain Prestress and EnCon Design of Denver, Colo., assisted with erection of the house at the Solar Decathlon; LafargeHolcim, based in Zurich, Switzerland, provided the Ductal ultra-high-performance concrete used on the outer wythe of the wall panels; and U.S. Formliner of Athens, Ga., provided all materials for the wall panel formliners.

The Ductal mixture allowed the panels to be thinner and about 30% lighter than standard precast concrete. The precast concrete wall panels have 5 in. (130 mm) of foam insulation between the inner and outer precast concrete wythes, which included 1.25 in. (31.8 mm) of Ductal on the outside face.

"We knew it was going to be a challenge to enter the contest with a precast house, but with the support of PCI and its members, we were confident we would be able to make it happen," says Pablo Moyano Fernandez, assistant professor in

architecture at WashU. "It actually ended up being a two-and-a-half-year process, and it was wonderful to see companies that are normally competitors with each other work together for a common purpose."

Team WashU students designed and documented all components of the house and then sent them to the precast concrete companies to be manufactured. "The PCI members donated the material and labor. We did have to pay for the transportation and erection on campus, but they gave us very good prices on these," he says.

The main challenge with the project was the fact that the house had to be assembled in St. Louis, then disassembled, transported to Denver for the Solar Decathlon, reassembled there, then disassembled again, transported back to St. Louis after the event, and then reassembled at Tyson Research Center in Eureka, Mo. "Again, though, with everyone's help, we were able to get all of this done," he says.

"Overall, it was a good learning experience for everyone," Moyano says. "In addition, it is a very environmentally sustainable house. Not only does it create its own energy, but it collects rainwater for irrigation and it is designed and built to stand up to extreme weather conditions, including tornados and hurricanes, and blasts, force protection, and acoustic mitigation. In sum, the project has been very successful in promoting the many benefits of precast for residential construction in general."

—William Atkinson **■**

Washington University in St. Louis, Mo., submitted the CRETE house as its entry to the Solar Decathlon 2017 in Denver, Colo. Multiple PCI members assisted with the creation of this energy-efficient, solar-powered precast concrete home. Courtesy of Richard J. Nolde.

