And the Award Goes to...
2011 PCI Design Award Winners Inside
- Insulating Systems
- Quality Assurance and Certification—Keys to a Successful Project

AIA Education Program Inside
page 42

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MID CENTRAL EDITION
Owner: North Central College, Naperville, Ill.
Engineer: Architectural Consulting Engineers, Oak Park, Ill.
Contractor: Mustang Construction, Naperville, Ill.
Precaster: Dukane Precast Inc., Naperville, Ill. (www.dukaneprecision.com)
Project Size: 201,000 ft² (18,700 m²)
Project Cost: $24 million

To maximize efficiency while minimizing material costs, the North Central College Residence Hall/Recreation Center in Naperville, Ill., combined a residence hall and recreational facility by enclosing the latter inside the former. In the process, the project achieved silver LEED certification, becoming the first in the nation of this type of structure. It consists of a four-story, 265-bed residence hall wrapped around a 62,000 ft² (5800 m²) field house.

The field house features 50-ft-tall (15 m) precast concrete walls and 180-ft-span (55 m) roof trusses, which allow for an open-spaced 200 m (220 yd) indoor track, activity courts, and a suspended walking track. The surrounding residence hall was constructed with precast concrete sandwich wall panels along with precast concrete columns, beams, stairs, and water-retention storage tanks.

Precast concrete contributed to the LEED certification in a variety of ways, including the use of recycled materials such as slag cement, fly ash, and recycled steel. Recycled slag aggregate was used in all of the flooring and walls to lighten footing loads, decrease wall thickness, and achieve the necessary fire ratings. Energy efficiency was improved through the concrete's thermal mass and high R-value insulating foam and the local manufacture of the concrete components.

Additional energy-efficient features include efficient windows, radiant heat, high-efficiency air-conditioning, heat-recovery ventilators, domestic hot-water waste-heat recovery, a white membrane roof to reduce the heat-island effect, low-flow plumbing fixtures, and extensive use of recycled and low-VOC-emitting materials.

The project also includes one of the largest geothermal installations in the Midwest, consisting of sixty 650-ft-deep (200 m) geothermal wells and underground precast concrete double-wall storm-water retention tanks.

This innovative approach shows the potential for using precast concrete to combine two normally separate structures into one building that aids sustainable-design and energy-efficiency goals. For more on this project, see the Summer 2011 issue of Ascent from PCI.

Judges’ Comments

"What stood out most was the use of materials in more than one way, such as built-in insulation and radiant tubing built into the wall systems. That is where manufacturing is going, to eliminate labor and time from the site and put more of the construction into the manufacturing environment. The precast concrete also contributed a lot to the building’s sustainability. The sandwich wall panel’s capability to be both structural and insulating provided a creative solution. The design’s goal of making the building multifunctional ensured it was used throughout the day, creating a very sustainable solution."