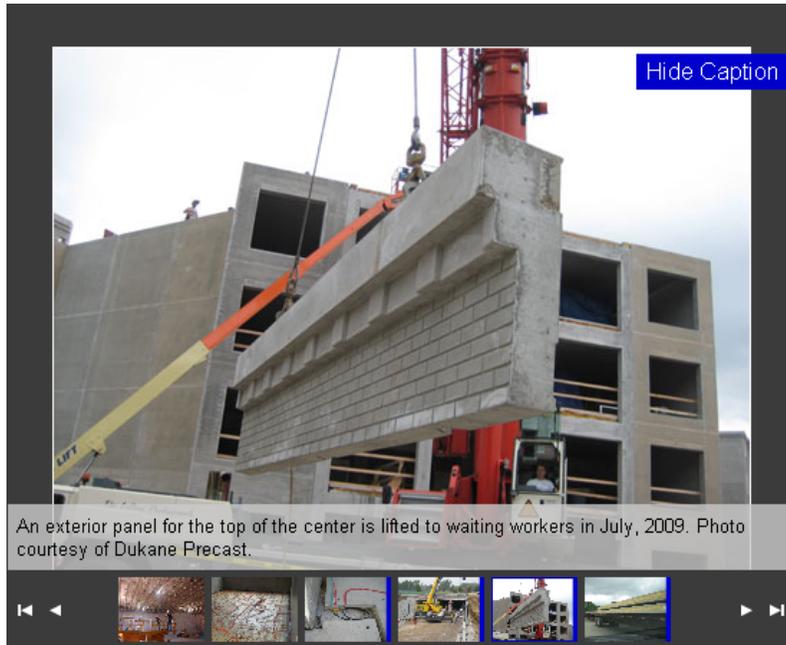


## Building for the Future

Precast double walls help make college center eligible for leed certification.



An exterior panel for the top of the center is lifted to waiting workers in July, 2009. Photo courtesy of Dukane Precast.

The North Central College Residence Hall and Recreation Center construction project is unlike any other in the U.S. The innovative precast, prestressed double-wall system not only makes the project environmentally friendly, but also groundbreaking in its efficiency and design.

The small college (2700 enrollment) expects the project to be certified as LEED Silver or Gold. Precast concrete, provided by Dukane Precast, which, like the college is in the west Chicago suburb of Naperville, contributed a great deal to the building's sustainable construction. The project earns LEED points because the precast process uses recycled materials, produces less waste, requires less energy for production than other methods, and is produced locally.

"This process has very little waste because literally you are putting these concrete walls together like a puzzle, and they have all been custom made," says Brian Bock, Dukane's vice president of marketing and sales. "There was very little onsite construction waste."

The center was the concept of Dukane co-owner and CEO Dick Wehrli. The four story, 198,000-square-foot building combines a state-of-the-art recreation center and student housing. Architect Tom Buchar of Tom Buchar & Associates Inc. is the architect. The recreation center is 62,000 square feet and includes a 200-meter indoor track. The track is surrounded by 159 dorm rooms.

It was important for the college to maintain as much open space as possible, says North Central's spokesman. Wehrli's concept and the precast double wall panels allow the college to combine its two needs: a new recreation center and more student housing, into one energy-efficient building.

"The building's energy efficiency is a direct result of precast concrete because of the thermal mass of concrete and because the insulating foam is in the proper location. And that location is in the center of the wall," says Bock.

Dukane's double-wall panel system is an innovative design based on European construction practices that Wehrli studied in trips across the Atlantic. The system produces two reinforced concrete wall panels that are joined to make a double wall with a layer of insulating foam between them, similar to the old fashioned sandwich wall panel. But unlike the sandwich panel, the double wall provides a smooth finish on both the interior and exterior. "When the wall was manufactured, it was meant to be as smooth as drywall," says Bock.

Along with its environmental benefits, the double wall system also helped the college save on building supplies such as additional insulation and drywall.

### Precast dorms

Because the insulation is built into the precast, there was no need for the building to have inner drywall, except for one wall dividing the hallway and the dorm rooms. Three of the four walls and the ceiling and floor in the dorm rooms are precast concrete; once painted the walls feel and look like drywall. Except for the inner-hallway drywall, the entire building is concrete. In addition to the precast panels provided by Dukane, the first floor is poured-in concrete and the retaining wall is concrete block.

The center will be heated and cooled with a geothermal system. Water is stored underground and then flows through the floors of the building, using the natural temperature of the earth. The building will be one of the largest in the Midwest to be heated and cooled in this manner. Dukane provided precast water retention storage tanks for the system and inlaid the radiant tubing used in the geothermal process into the precast floors at its manufacturing plant.

The concrete walls act as a heating or cooling "sink." Their thermal mass will prevent any wild fluctuations in building temperature. "We've done radiant tubing on about 25% of our projects," says Bock. "We encourage energy-efficient systems."

LEED certification takes into account how many materials were provided locally. More than 60% of the concrete mixture for the project was, by volume, recycled materials. All of the concrete products were manufactured within 20 miles of the jobsite.

The 1500 precast panels were installed between November 2008 and July 2009. Naperville Ready Mix and Eagle Concrete of Batavia, Ill., poured the building's foundation. The center should be completed this fall. "The beauty of our precast is we're easily able to marry the durability and sustainability of concrete with all of the innovation in energy efficiency," Bock says. "Concrete provides durability. This is literally a structure that's built to last for centuries."