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Solarcrete system helps revitalize a neighborhood

BY JENNIFER G. PROKOPY

A project in Chicago's West Garfield Park featuring the Solarcrete system has helped to revitalize the neighborhood, bringing much-needed daycare, employment assistance, computer training, retail, financial services and office space — and uniting it with a renovated "El" station linking the community to the rest of the city. The Bethel Center provides the neighborhood with an anchor around which a more sustainable community can be crafted. Concrete is a core component of the structure, which strives for Leadership in Energy and Environmental Design (LEED) Gold certification.

Transit-oriented development

The project was created by Bethel New Life Inc., a community-directed non-profit organization that grew out of Bethel Lutheran Church in the 1970s, and has since been an innovator and motivator in the west side neighborhood. Planning began almost 10 years ago, when the Chicago Transit Authority threatened to shut down the Green Line serving the area. Protests led the city to save the line, and Bethel New Life started planning the building — which fit well with the organization's sustainable goals.

Aligning the project with the El station was key, Mary Nelson, CEO of Bethel New Life, said. In this community, only about 35 percent of residents have cars, so public transit is a way of life for most. "We see this building, at this transit stop, as an anchor.

"We've built at least 50 new housing units within walking distance as a part of the transit- oriented development. This new building is just the first step, a wonderful stepping stone to revitalizing the area."

Concrete brings big benefits

Farr Associates of Chicago planned and designed the project. The firm practices "socially and environmentally responsible architecture, planning, and preservation," and its principals are actively involved in numerous planning committees to promote this mission.

Bethel Center, says principal Kevin Pierce, goes "beyond the transit-oriented aspect of environmentalism," offering services rooted in environmental justice and social equity. Nelson says it shows how "a transit stop can be a major asset in a community, providing economic viability."

Designed on a tight site, the two-story building has a third-story portion that acts as a lobby for the bridge from the El platform. A steel structure forms

the building's shape, but the rest of the structure is all about concrete.

The building is constructed on a brownfield site, anchored by a foundation that incorporates 25 percent fly ash replacement in the slab and footings.

Solarcrete system

The walls are manufactured using the Solarcrete system (solarcrete.com). Seven-inch-thick slabs of foam are wrapped with a reinforcing steel cage; the pre-manufactured slabs are shipped to the worksite and attached to the building frame. The slabs are then covered with shotcrete (specified at 4,000 psi) in a layer about 2 inches thick, on either side of the wall, and screeded off to create a smooth, level surface.

Because the shotcrete and steel frame will experience independent thermal movement, the shotcrete is separated from the frame. The two concrete sides of each Solarcrete wall are joined with nylon ties, in a perpendicular two-foot grid across the face of the wall, and the units are finished with a layer of synthetic stucco. The resulting walls offer a thermal value of R-25.

Bethel Center also uses a precast concrete plank floor and roof system. Utility conduit was installed before the planks were finished off with a two-inch topping slab, hiding utilities and keeping the ceilings uncluttered.

"The undersides of the planks are the finished ceilings — painted a clean white to get great reflective daylighting," Pierce said.

The long plank design lent itself to a design that includes holes for 4-foot by 10-foot skylight wells, one per 20-foot bay. This easy, inexpensive approach means every top-floor space enjoys daylighting, and helps reduce the energy used by light fixtures.

Safety, comfort and energy

A green roofs was installed at Bethel Center. The presence of daycare required a class 1 fire rating, but a concrete roof eliminated the need for a costly sprinkler system and also met the city's strength criteria (100 pounds per square foot) for green roofs.

When it comes to comfort, Bethel Center has it, says Pierce. The thermal mass of concrete helps keep temperatures even and consistent, and blocks noise from busy adjacent Pulaski Road and the El train. Stairs in the building are pans filled with concrete.

The structure provides its inhabitants with a quiet setting for work and play, one that stays cool in the summer and warm in the winter. In fact, energy modeling (performed according to the Chicago Energy Conservation Code's total building energy model) shows that the Center exceeds requirements by 50 percent, with projected annual energy savings of $12,000.

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