Rachel J. Detwiler

Higher Ground

Not to manage homelessness, but to end it

Come into the Higher Ground homeless shelter in downtown Minneapolis, Minn., and your first reaction will be surprise. Operated by Catholic Charities with support from the Minnesota Housing Finance Agency, Hennepin County, and the City of Minneapolis, it's not dark or institutional but full of light, color, and great views. If you didn't know it is a homeless shelter, you might think you were in a European-style youth hostel or even, on the higher floors, a modern condominium complex. It is thoughtfully designed to serve the needs of its clients, whether a safe, warm place to sleep for a few nights; a meal; a secure place to charge a smart phone or laptop; a mailbox with a permanent address; job-search counseling; health care; Hennepin County social services; a computer to search for job opportunities; or long-term housing. The design is clearly in keeping with Catholic Charities' aim "not to manage homelessness, but to end it."[1]

The seven-story building allows clients to move up, literally, as they progress toward greater independence. The first floor provides dinner, breakfast, health care, and emergency shelter for up to 171 homeless men. The bunk beds are longer than the mattresses to provide a shelf at the end for storing one's belongings close by. Each bunk has an electrical outlet for charging phones and laptops. The communal washroom has extra sinks to accommodate washing faces, brushing teeth, and shaving, not just washing hands. The shower stalls can be locked from inside and afford privacy for dressing and undressing. Throughout, the design intentionally fosters dignity and hope.

The second floor has 80 pay-for-stay beds, with somewhat more space and a modicum of privacy for the residents, who pay $7 per night or $42 per week for a reserved bed with clean sheets and a locker. The money is held in trust for each client until there is enough to pay rent and a deposit for permanent housing. As on the first floor, dinner and breakfast are served daily. According to Daniel Lauer-Schumacher, client advocate II at Higher Ground, these residents typically work 20 to

The Higher Ground homeless shelter is located on the edge of downtown Minneapolis, Minn. The first floor exterior features thin brick precast concrete cladding, except for a small area with concrete masonry units on two walls. The upper floors are clad in precast concrete sandwich wall panels with as many as three colors of concrete in one panel. **Photograph by Brandon Stengel. Courtesy of Hanson Structural Precast.**

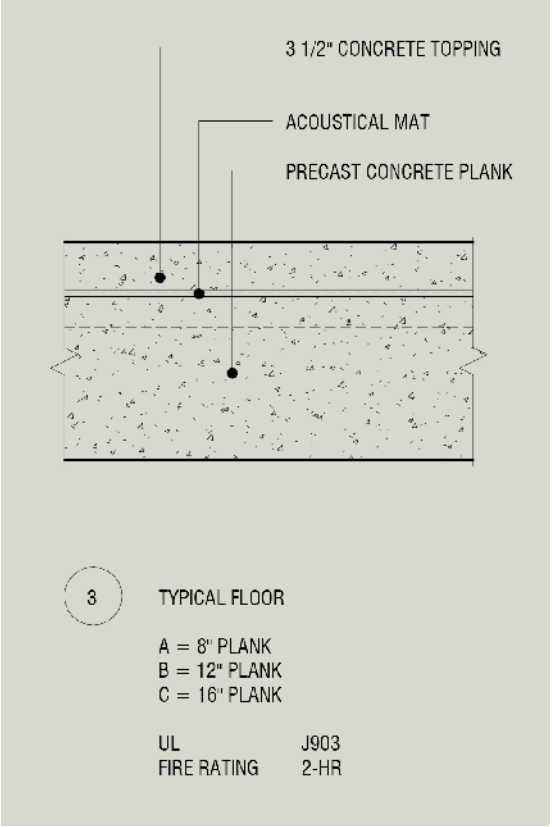
The second floor of the Higher Ground homeless shelter offers 80 pay-to-stay beds. Residents pay $42 per week for a bed with clean sheets, a locker, and use of the computer lab. Concrete masonry half walls provide more privacy than is available in the first-floor emergency shelter. Photograph by Brandon Stengel. Courtesy of Hanson Structural Precast.

30 hours a week, and the conditions here are more conducive to getting a good night's sleep to be ready to work the next day. Everyone must pass a breathalyzer test to be admitted; anyone registering a blood alcohol content of 0.01% or more is not allowed in even if he's already paid for the week. (On the first floor, clients may come in intoxicated but must sleep on a mat on the floor.) The second floor opens at 4 p.m., a full hour before the first floor, allowing residents more time to use the computer lab that is available to them. Renting a space by the week allows residents to store their belongings safely in a locker rather than carry them all to their workplaces each day.

Lauer-Schumacher described an innovative feature of the building that is attracting interest from hotels and homeless shelters around the country: a hot box designed to kill bedbugs. This room, which is large enough to accommodate pieces of furniture, can be heated to 160°F (71°C), hot enough to kill bedbugs. If someone comes in wearing infested clothing, he is given clean clothes and takes a shower. His own clothes are treated in the hot box for two hours. The Minnesota winter offers an alternative: putting the infested clothing in a bag outdoors overnight at temperatures below 20°F (-7°C) will also kill bedbugs.

Floors three through six contain a total of 74 single-room-occupancy supportive housing units, each with a microwave oven, sink, and small refrigerator. Laundry facilities are also available. According to Lauer-Schumacher, the fourth floor is reserved for clients with mental, physical, or emotional disabilities. This facility allows clients such as schizophrenics who need medical treatment and monitoring to be

Single-room-occupancy apartments on the third through sixth floors of the Higher Ground homeless shelter provide permanent housing for residents. Each unit has a sink, microwave oven, and small refrigerator. Laundry facilities are also available to residents. Photograph by Brandon Stengel. Courtesy of Hanson Structural Precast.



The floors of the Higher Ground homeless shelter comprise precast concrete hollow-core units with an acoustical mat to reduce sound transmission and a colored concrete cast-in-place topping. All floors meet the requirements for a two-hour fire rating. Diagram by Cermak Rhoades Architects.

removed from the general homeless population and provided with the appropriate support. These units are designated as permanent housing, though in practice the residents may stay a few years and then move to other housing.

The seventh floor has 11 affordable efficiency apartments, each with its own kitchen and bathroom. This is the only housing at Higher Ground that accommodates women.

Colors inside and out

One way the architect, Todd Rhoades, vice president of Cermak Rhoades Architects, kept Higher Ground from looking like a big institutional box was through the use of color. Outside, precast concrete panels employ as many as three colors. Steve Servaty, assistant production manager at Hanson Structural Precast, says that they first blocked out the lightest-colored areas using Styrofoam. The warm white concrete was placed first in a layer $2^1/_2$ to 3 in. (63 to 75 mm) thick and allowed to become stiff enough to remain stable. Then the Styrofoam was removed, the forms cleaned, and the Styrofoam placed to block out the areas for the light gray concrete, which was also placed in a layer $2^1/_2$ to 3 in. thick. The process was then repeated for the gold-colored concrete, which was placed to full depth. The layers were then vibrated to integrate them.

Close examination shows the remarkable evenness of color within each panel, as well as close color matching from one panel to the next. Gary Pooley, Hanson's sales manager, explains that they have learned from experience which materials are consistent and work well together. Hanson uses white cement without fly ash, carefully selected aggregates, and a liquid color system with five or six colors to obtain consistent color. Computerized records allow them to replicate the colors as needed. Hanson's craftspeople work closely with the architect to manage expectations and come to agreement on matters such as the depth of acid etching. Cement paste and aggregate are not the same color, so a light etch that exposes more fine aggregate in some locations than in others will result in uneven color. Hanson obtains the most consistent results by getting most of the color from the aggregate. By making a series of mockups, the craftspeople are able to demonstrate the options available.

Inside the building, each floor has its own color scheme. Although all surfaces lend themselves to easy cleaning, the warm, inviting colors make it anything but institutional. The upper floors are of hollow-core units topped with an acoustical mat to reduce sound transmission and then polished, cast-in-place colored concrete. The hollow-core ceilings and wall panels are painted, saving on drywall and other finishes. The nonbearing interior walls are of concrete masonry units; they are also painted with no additional finishes. According to Rhoades, the warmest colors are on the seventh floor. The colors and quality of craftsmanship would not be out of place in a modern, high-end condominium complex.

Why precast concrete

Pooley reports that the project was not originally designed for precast concrete. Early in the design development, a total–precast concrete structural system was not among the options under consideration. However, one of the proposed systems included hollow-core units supported by steel for the floors and roof. The contractor contacted Pooley before bidding the job and invited him to a design meeting with the architect and engineer. At this meeting, Hanson learned of their desire for a column-free interior that would promote security and be durable. Hanson suggested a total–precast concrete system to meet the

design criteria. At the following design meeting, Hanson's proposal gained the support of the design team because it provided the flexibility needed.

To qualify for financing from the Minnesota Housing Finance Agency, the building had to meet the requirements set forth in the *Minnesota Overlay to the Green Communities Criteria*.[2] Rhoades says that the stringent requirements for energy efficiency were easily met using precast concrete insulated wall panels.

Pooley says the selling process was not only about price. The small, urban site with a railroad track along one side gave precast concrete an advantage. The ability of 12 in. (300 mm) hollow-core units to span the 42 ft (12.8 m) width of the building lent flexibility to the floor plans and allowed for a lot of open space on the first two floors. The design evolved with the pricing as Hanson collaborated with Cermak Rhoades and Ericksen Roed Associates, the specialty precast concrete engineer. Rhoades adds that this kind of project could never have been done as a traditional bid job because everyone needed to be involved in the design. The requirements of each floor are different because the programs associated with them are different, so flexibility was important.

Precast concrete facilitates construction

Precast concrete afforded additional benefits during construction. Each floor took approximately a week to erect. Rhoades said it was the fastest construction he had ever seen. The precast concrete stairs installed as each floor was constructed allowed the other trades to operate without having to erect scaffolding; overlaying the stairs with plywood for protection was all that was necessary to provide access.

The tight site, complete with a railroad track along one edge, forced a modification to the construction planning. Because the railroad would not permit crane loads to be suspended over its track and OSHA would not permit other trades to be present in the limited area while the precast concrete elements were being erected, the work was scheduled in two shifts. Erection of the precast concrete elements did not begin until the second shift, after the other trades had left the site for the day. Pooley says that necessity became a tremendous benefit. With the other trades out of the way and minimal traffic on Glenwood Avenue

The community room on the seventh floor of the Higher Ground homeless shelter, with its dramatic views of downtown Minneapolis, Minn., provides a place for residents to relax and spend time together. **Photograph by Brandon Stengel. Courtesy of Hanson Structural Precast.**

An efficiency apartment on the seventh floor of the Higher Ground homeless shelter has kitchen facilities and its own bathroom. The ceilings are formed by painted hollow-core units; no additional finishes were necessary. Residents can use their Catholic Charities cards to buy fresh food in season at the nearby Minneapolis Farmer's Market. They get the best deals on produce shortly before the market closes for the day. **Photograph by Brandon Stengel. Courtesy of Hanson Structural Precast.**

Thermographic evaluation of building envelopes

Thermographic evaluation uses infrared camera technology to identify the source of air infiltration, thermal bridging, and inadequate thermal insulation in building envelopes. It is also an effective tool in forensic investigations to identify the source of water infiltration through the building envelope. Infrared cameras detect subtle differences in the surface temperatures of materials. In the hands of an experienced thermographer, infrared scans can locate the source of air infiltration, water penetration, or thermal bridging. Blower door fans can be used in conjunction with thermographic inspections to create pressure differentials between the interior and exterior of a building. This will amplify any building-envelope deficiencies, making them more readily detectable. Over the past decade, new test protocols for measuring the air leakage rate of occupied buildings have been developed, led by the U.S. Army Corps of Engineers (USACE). The USACE test protocols[4] reference ASTM E779[5] for measuring air infiltration using a blower door and ASTM C1060[6] for thermographic inspection of insulation in envelope cavities of frame buildings. Use of thermographic inspection techniques in high-performance insulated precast concrete panel buildings such as the Higher Ground shelter requires an understanding of the ways that insulated precast concrete panels perform under varying environmental conditions. Precast concrete is an efficient heat sump, which, when coupled with insulation extending to the edges of the panels, can create an efficient wall assembly. Thermographic evaluations of precast concrete buildings focus primarily on panel joints and wall fenestration to identify air infiltration as well as heat loss through panel edges that can be caused by nonthermally broken concrete sections.

This thermographic image of the Higher Ground homeless shelter, taken in mid-August 2013, shows that the insulated precast concrete walls are consistent, with no apparent air leaks. Lauer-Schumacher reports that even during a series of 90°F (32°C) days, the interior remained comfortable. **Courtesy of Braun Intertec Corporation, Minneapolis, Minn.**

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at night, erection was efficient. When necessary, they continued working on the third shift. Now he would schedule erection to begin on the second shift even when it was not required.

Structural details

According to Rhoades, the site is located on the original course of the Mississippi River. To keep the utilities from sinking into the silt and clay without going to the expense of an access floor below the first floor, the engineer decided to suspend the conduit from underneath the structural slab on grade.

ER-POST[3] (Prestressed Open Space Truss) trusses, originally developed by Mike DeSutter, president of Ericksen Roed, were used to support the second and third floors, leaving a lot of open space on the first floor. The prestressed, precast concrete trusses support two floors at once. The trusses are located along the column lines of the second floor, minimizing the amount of structural support needed on the first floor. The open space maximizes the space available for beds and allows for clear sight lines for the security of the shelter clients.

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Abstract

The Higher Ground homeless shelter in Minneapolis, Minn., is designed to help clients get off the streets for good. High-performance precast concrete insulated panels provided rapid, economical erection on a small urban site. ER-POST precast concrete trusses afford clear sight lines for the necessary security on the first and second floors. Thermographic imaging of the exterior demonstrates the energy efficiency of the precast concrete building envelope. Although the interiors are designed for durability and easy, low-cost maintenance, they also provide a pleasant, uplifting environment for clients and staff.

Keywords

Building envelope, ER-POST truss, high performance, hollow-core unit, infrared.

Reader comments

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