Precast and poured-in-place pair up in Midwest

Text by Carole McMichael | Photography courtesy of Best Way Foundations

John Hess and his brother Dan are co-owners of Best Way Foundations in Belleville, Illinois. They grew up with concrete construction, having a father and uncle who ran a construction equipment business and were dealers for Western Forms and Wall Ties & Forms. In the early 1990s, the brothers started their own business for poured-in-place foundations.

"We were the first ones in the St. Louis area to offer foundations with aluminum forms," John Hess says. "When my father decided he wanted some income properties, but out of concrete, we began building concrete homes. He chose concrete because it is a long-lasting product. No house is indestructible, but concrete ones come close. You also get the energy efficiency, the quietness, and the strength of concrete."

From those homes, the brothers' business evolved as they built homes for friends and family. Now, they have built approximately 25, each project leading to the next through word of mouth. "We didn't have to do any advertising," Hess says. "People whose homes we built saw how good they were, and we have an established business that is known in the area. Clients who came to us had heard of concrete and understood the value of it. They would want to know the cost and that is when we would give them the good news—we are competitive with brick and frame."

Hess built the concrete homes in St. Louis using two combined concrete systems: precast above grade with a poured-in-place basement. The precast walls were formed in the Hess' company shop and then delivered to the job site and put in place. The wall panels were up to 20 feet long and 9 feet high. The crew made casting beds, horizontal flat surfaces with side rails around them—the beds were elevated to be at a more comfortable working height. Once the beds were set at the correct dimensions, they put down the 4-inch rigid Styrofoam insulation with the nailers in the insulation. The nailers can be either wood or metal strips. Anchors pass through those strips and protrude through the back of the insulation and up into the concrete. When the concrete was poured, they were bonded together. The nailers receive the drywall on the inside.

According to numbers Hess got from the Portland Cement Association, a precast wall with framing and fiberglass insulation is equivalent to an R-40 wall. Theoretically, walls in well-insulated frame houses can achieve a high R rating, but in frame building, the fiberglass stops at the face of each stud. It is not continuous. The 2-by-4 stud has an R-Value of 4, R-16 in the wall.

"With frame," Hess says, "you have a hit and miss situation. But with concrete you have continuous insulation

all the way and no air infiltration to worry about. That was another selling point compared with brick and frame."

Brick is the look

Among high-end housing styles in the area, brick-and-frame construction is frequently the client's preference. So, the Hess brothers chose the unique effect of building concrete houses with a brick exterior—or rather a brick-look exterior. Concrete with the appearance of brick is created using a poured-in-place system with the brick-patterned aluminum forms (where the face sheet is stamped out to look like brick) or by stamping the pattern in a precast system.

"The poured-in-place is faster, especially if you have the forms and a boom truck," Hess says. "You are kind of set up for that; and it looks fine, but I like precast better. With the stamped brick in precast, your mortar joints end up a natural mortar color and your bricks are colored whatever color you want. That makes it very authentic looking. The finished wall panel with 6 inches of concrete including the brick effect and 4 inches of rigid insulation produces a final thickness of a little more than 10 inches.

"People look at our concrete houses as brick homes," Hess says. "They do look like brick. They fool even some of our contractor customers. I feel that concrete is really good for the upper-end customer especially. They are going to pay for brick and frame anyway and we give them that look."

The Hess house

Hess planned to build a home for a piece of property that has been in his family for years. He designed the home himself and wanted to build it without structural wood, so it is a precast concrete and steel house. The floors, the interior walls, and the roof structure are all steel. The mostly wooded lot is 5 acres with a 2-acre lake, stocked with bluegill and catfish. The primary view from the house faces the lake. Hess's design motivation for this "last home" was to build the nicest, most durable home possible.

The house, traditional in style, is 6,000 square feet with a finished lower level and two upper floors. It has an open floor plan that includes a dining room, living room, office, media room, and a top-of-the-line kitchen. There are four bedrooms: three upstairs and one on the lower level that functions almost as its own separate living space for the family's oldest daughter. The lower level also includes a family room, an exercise room, a kitchenette, bath, and dressing room.

Hardwood or carpeting covers the upper floors. On the lower level, Hess used a wood floor that floats on top of the slab. The home lacks a designated safe room; Hess considers the entire house to be a safe room. The house has all casement windows, which are 6 and 7 feet tall. They are set to the outside to create the deep sill inside. Because he was building with precast panels, Hess had no need to adjust the design dimensions for the walls or openings to accommodate standard forms. He could cast panels to the precise measurements he desired.

"The challenge in building this house had nothing to do with concrete, but with the roof," Hess says. "The roof had a steep gable—12/12 pitch. So we had steel framing with plywood screwed to that for the roof decking and then the architectural shingles. For insulation, we put 2 inches of rigid Styrofoam on the bottom side of the steel structure, and then added blown-in cellulose on top of that to produce a barrier between the drywall and the steel roof framing. I tried to achieve R-40 all around. I would not do that pitch roof in steel again. Being on a steep roof trying to screw plywood into hefty roof rafters—that was tough."

The three-car garage area is a poured-in-place structure with Styrofoam inside the forms. On the exterior, Hess used precast nonstructural panels to provide the brick effect about halfway up to match the house. Concrete is also key to the hardscaping. The first floor of the house is mainly 4 feet above ground. On two sides of the house, Hess built a wraparound concrete porch, pouring a concrete wall that came up to the same height as the first floor. He finished the wall with an exterior stucco product.

Step by step

Hess has created the plans for nearly all the concrete homes they built. Site layout and foundation work is something he does with his business anyway. Preplanning involves meeting with the homeowners on the job to help them decide where to put things and how high to build it. He also does some coordinating with utility subs, with whom he already has connections through his business.

"We have the good clay with some sand mixture," Hess says, "so we didn't have a problem in preparing the soil. We form the footings with our drainpipe system and rock underneath. After we pour them, we set up the Wall Ties forms for the lower level and pour. Rather than pumper trucks, we use a conveyer Telebelt. I like the conveyer better than pumper trucks, because with them you cannot pump rock. In the basement business, you put limestone in around your drains and under the floor. If you use the conveyer, you can place your rock and your concrete as well.

"Next the forms are removed from the walls and you can keep on working from there. That is pretty much standard for basements. We used steel trusses for the flooring system for the main floor level. They make a ledger that bolts onto the concrete wall at the top, so the floor hangs on the bolted ledger system. Then the steel floor joists fit into that ledger system and are secured with the screw that they spec out. Steel framing contractors handled that."

Hess uses a 3,000-psi concrete mix with 3/4-inch limestone aggregate for the pour-in-place. For precast, he uses 4,000-psi mix with pea gravel and plasticizer. This makes the

mix very workable, unlike water, which dilutes the strength of the concrete.

"When you go to lift precast panels the next day," Hess says, "they have to be strong enough that you can grab them at the top and stand them up vertically without breaking. That actually is the greatest stress that the wall panel will every see. In the shop, we used five guys to make the panels and took the same five guys to the job site to erect the panels. To set them, we always used our own boom truck rather than a crane. Actually, on the second story, we used our trackhoe. Using that to raise a panel was a challenge. We will never do that again. In all, we took a little over a year to build the house."

The siren South

While Hess's brother continues to handle building in the Midwest, he is currently setting up a second company called Gulf Coast Poured Concrete Walls. The reason he left his "last home" is the burgeoning market created by Hurricane Katrina.

"The coast needs to be rebuilt," Hess says, "FEMA has recognized that reinforced concrete is the way to go for building. All their recommendations for elevating homes above flood levels call for reinforced concrete. There were only a few houses that survived the storm surge and they were concrete. People down here more than in the Midwest see the value of the strength of concrete. A lot of code and contractors have said the same thing: 'What you have to offer is exactly what we need.'"

Hess also has found that his Southern clients prefer brick exteriors as well. He can construct a poured-in-place home with the brick look for the same price as a brick-and-frame home. The prices are comparable partly because builders don't have to pay organized labor rates, making construction even less expensive than it is in the Midwest.

"I have completed a few projects so far," Hess says. "A big holdup down here was the insurance money and the money homeowners were going to get from the government. It is just now starting to arrive, so the rebuilding is really starting to take off."

When Hess determines where he'll be doing most of his work, Gulf Coast will have a permanent base. Currently, the company is concentrating on building homes with poured-in-place systems instead of precast because precast would require a manufacturing plant. The wide area in need of rebuilding makes a possible location difficult to determine at this point.

"I think the future opportunities down here are tremendous," Hess says. "It was worth the move." CH

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