

Virginia concrete home features ICF walls, masonry floor system

Contributed by EUGENE MORGAN

Concrete evidence of the good life — that's the vision behind Jay McNeely's new 3,400 square foot concrete home located in the Blue Ridge Mountains of central Virginia.

For McNeely, part owner of a company that manufactures and distributes concrete, having a new home built for his family meant the perfect opportunity to demonstrate the potential for concrete in every home. In the McNeely home, concrete can be found not only in the walls, but also under every floor finish, at the fireplace and, as one might expect, on patios, sidewalks and driveways.

Perhaps most unique about the home is its combination of insulating concrete form (ICF) walls and a concrete masonry floor system. This combination gives the home a solid, quiet feeling that visitors are quick to notice, McNeely says. The ICFs for the home were manufactured by Canada-based Formtech, while the masonry floor system is the product of the Block Joist Co., based in Richmond, Va.

More than 4,000 visitors had the chance to tour the home in the area's Parade of Homes last fall. Stamped concrete can be seen on the front and back porches, as well as in the mudroom and on the garage walkway. Decorative concrete also graces the kitchen, which has an integrally colored concrete floor with a slick finish.

The home's living area includes two bedrooms and one bathroom upstairs, with a great room, two additional bedrooms and bathrooms, a foyer, a playroom, a mudroom/washroom, and a kitchen on the main level. The home is also equipped with a basement that has two utility rooms and a bathroom.

The concrete masonry floor separates the basement from the main level. "If you're in the basement, you don't hear anything that's going on above you — and vice versa; if you're on the first floor or the second floor, you don't hear anything that's going on in the basement," McNeely says.

Visitors who toured the house during the Parade of Homes did not find the presence of concrete overpowering, McNeely says. "I heard this a lot: 'It looks like any other house, except you have wide window sills,'" McNeely said. The exterior of the home features Hardiplank faux wood siding, while most of the floors inside have a red oak finish.

The Parade of Homes was an opportunity for McNeely's firm, Allied Concrete Co., to demonstrate the benefits of concrete to potential home buyers in the central Virginia area. Based in Charlottesville, Va., Allied Concrete manufactures and distributes a range of concrete products, including ready mix, ICFs, concrete siding, and stamped and colored concrete.

Allied has supplied concrete and Formtech ICFs for more than 35 structures built recently in central Virginia. The company has also supplied the Block Joist concrete masonry system for several homes, but the McNeely residence was the first project in which the Block Joist system was used with ICF walls.

What are the advantages of such an approach? One obvious benefit of the concrete floor is its strength, McNeely says. "Its load bearing capacities are through the roof. You can put whatever you want on top. You don't have to worry about reinforcement underneath for a large bathtub, for instance, or even a small fireplace."

Having a concrete floor also increases the energy efficiency of the home. For the McNeelys, that means an average electric bill of \$65 per month for their 3,400 square foot home. The Block Joist floor system also increases the home's resistance to fire and termites and, of course, it reduces the amount of wood required to build the home.

Perhaps the most apparent benefit of the floor is the unique feeling it creates in the home. "There's no squeaky floor," McNeely says. "You can't hear yourself walk in the house."

The Block Joist floor system was designed to be both economical and easy to install, says the system's inventor, Pat Ellison. Installers simply place standard 8-inch hollow concrete masonry units between open web steel bar joists that are 7 inches deep. The masonry units can be 8x8x16 blocks or 8x8x24 blocks. The 8x8x16 blocks support more load per square foot, but the 8x8x24 blocks are more economical because they require fewer steel joists to be used, Ellison says. The McNeely home used 8x8x24 blocks.

After the concrete masonry units are placed between the steel joists, workers plug the end blocks and joists with expanding polyurethane foam. Then the blocks are grouted in place with a simple mixture of masonry sand and portland cement. Gloves, a spirit level, a pinch bar, a wide squeegee and a 5-gallon bucket are the only tools needed by the workers constructing the slab.

The McNeely home was built by Matt Robb Construction, which had plenty of experience building ICF walls but had never used its own personnel to construct a Block Joist floor. Nonetheless, it took only three days for a three-man crew to place joists and blocks over the 1,700 square feet of floor space. The better part of a fourth day was spent preparing the blocks for grouting, and then the grouting was completed halfway through the fifth day.

Block Joist is a simple alternative to traditional methods for constructing concrete floors and roofs, Ellison says. "The Block Joist system uses standard blocks, it doesn't require pouring concrete, it doesn't require any shoring, it doesn't require any vibrating, and the workers can work safely on top of the slab they are building," he says. "It uses materials of known quality, and it just works."

Including the McNeely home, Allied Concrete has been involved with more than a dozen Block Joist projects in the central Virginia area. "The system is definitely easy for anyone to install," McNeely says. Many of these projects have been porches, decks and garage floors — areas where concrete has very clear advantages over wood.

The Block Joist system, however, can also be used to build concrete ceilings, making it ideal for safe rooms. Based on specifications from the Federal Emergency Management Agency, safe rooms are equipped with concrete walls, a concrete floor and a concrete roof in order to provide a shelter from tornadoes and other storms.

Safe rooms are typically built as part of a new home, but the Block Joist system's ease of installation makes it much more practical to add a safe room to an existing home. With the Block Joist system, there is no need to set up forming for a cast-in-place roof and no need to provide both a grout mix for the walls and a concrete mix for the roof. The process of constructing a safe room using concrete masonry walls and the Block Joist system is described by the National Concrete Masonry Association (NCMA) in its recent publication, "Concrete Masonry Tornado Safe Rooms for Existing Single Family Residences."