

Vertical ICFs: *Easy Concrete Exteriors Create New Opportunities for Seasoned Pro*

Builder's Experience



Challenges: "Just being willing to try something new."

Would she do it again? Yes
 "I now build all of my houses with vertical ICFs."

PATH Attributes:

- Affordability
- Energy Efficiency
- Safety and Disaster Mitigation

Builder Tips: "Try the vertical ICFs once and you won't want to go back to stick building or any other wall system."

Builder:
 Deborah Arrington
 Debs Construction, Inc.
 Manakin Sabot, Virginia

Builder Type:
 Small Production Builder

The Technology:
 Vertical Insulated Concrete Forms (Vertical ICFs)

The Project:
 A 5,500-square-foot, one-story, single-family home in Manakin Sabot, Virginia, using vertical ICFs for the outer walls.

"Vertical ICFs: they're easier to build with, they save labor costs, and they result in lower utility bills."

– Deborah Arrington

ARRINGTON'S STORY

After 14 years in the construction industry, Deborah and Dale Arrington were sick of dealing with the challenges of traditional stick-frame building. Fed up with the labor it required and wood's tendency to twist and warp, they resolved to find a new material for constructing outer walls.

"About five years ago, I set about researching other kinds of processes," says Arrington. "We looked at a variety of materials, such as straw bale, monolithic domes, steel framing, and traditional ICFs. Three years ago, we discovered vertical ICFs."

"The ICF concept was intriguing, but we had seen block ICFs used in other projects and we weren't happy with the amount of bracing, gluing, and taping they required," says Arrington. "We chose vertical ICFs because we felt that they'd be easier to use. They require less bracing, no gluing and taping, and we wouldn't have to deal with the issues of blowouts."

By using vertical ICFs, Arrington was able to reduce the construction schedule by two weeks compared to stick-built.



Arrington built her first home with vertical ICFs following the manufacturer's manual.

"The walls are all there with insulation and studs," says Arrington. "You just need to brace them and pour the concrete."

"Vertical ICFs are also much less labor-intensive than wood. Since they are much lighter, they aren't as physically taxing so there is less wear and tear on your workforce. And because they are easy to use, you don't need to hire a lot of skilled labor. All they really require is one lead person who is familiar with the product to oversee the process and instruct the laborers."

Arrington's transition to vertical ICFs was relatively smooth. "The major hurdle was getting over the mindset of having used wood for everything before and then changing over to a completely different material," says Arrington. "But that challenge can be overcome by realizing



After starting out as a traditional stick-frame builder, Deborah Arrington and her husband Dale now build homes exclusively with vertical ICFs. As a small production builder, Debs Construction builds three homes a year, all in the greater Richmond area.

Why they use vertical ICFs:

"Vertical ICFs are much easier to implement than traditional wood-framing methods. In addition to reducing construction timelines, they are also lighter and therefore much less physically taxing to work with."



Vertical ICFs are strong enough to withstand many tons of weight without backfill.

that your new method of building is going to be easier and will create a better product. You just do it.”

LEARNING BY DOING

Arrington has completed five projects using vertical ICFs, but started with her own home.

“Because we didn’t want to use one of our customer’s homes to experiment with a new method of building, we decided to try vertical ICFs on the home we were building for ourselves. The manufacturer sent us a manual with our first order and we learned how to use them from reading that.”

“The manual and its drawings make everything very easy to comprehend. This makes everyone involved—from the engineer and the architect to the subs and inspectors—comfortable with the product because they know how it goes together and how it should look as it’s going up. We also always give a copy to the county inspectors so they have it on file and to the engineer, architects, and draftspersons for their drawings and reports.”

Despite the manual, Arrington did still have to educate some of her subcontractors so they could adjust their practices.

“For example, the HVAC contractor had to recalculate the size of the HVAC system to account for the higher level of insulation that vertical ICFs provide. It was also necessary to plan where the exterior wall openings for the electrical and plumbing devices would be located. But thankfully, getting the subcontractors familiar and comfortable with the changeover only takes one project!”

In the first project, Arrington discovered she had used too much bracing.

“We used two whalers—one on the inside and one on the outside with walkboards above the inside whaler, all the way around the building, plus outside corner

HOW IT WORKS

Vertical ICFs are stay-in-place concrete forms that serve as a functional part of the wall after the concrete is poured. While most ICFs come in blocks, vertical ICFs form the entire height of the wall. Vertical ICFs require less bracing because their monolithic wall sections are sturdier than traditional block ICF walls.

Composed of two polystyrene panels held together by plastic or steel I-beams, each vertical ICF panel is two-and-a-half inches thick, forming a one-foot-wide wall. Like block ICFs, concrete is poured into the space between the polystyrene. When filled with concrete, they form dimensionally straight, energy-efficient walls.

TECHNOLOGY HIGHLIGHTS

This project included the following PATH-profiled technologies:

- Electric tankless water heaters
- Engineered trusses
- PEX Piping
- Universal design principles
- Vertical ICFs

bracing. We have since adapted our method. Now, for most projects, we only use corner bracing on the outside corners; inside, we use scaffolding to walk on as we do the pour. We also reuse the bracing to construct the interior walls of the house, which we typically build out of 2 x 4 studs."

EDUCATION IS KEY

From previous experience, Arrington knew that educating the inspector in advance would be essential.

"We made an appointment with the inspector ahead of time and sat with him for a while to explain the technology," says Arrington. "Since he was from upstate New York where vertical ICFs are used more frequently, he was already familiar with the product. Some other inspectors have required a bit more education, but

they have all come around. These days, we often approach inspectors ahead of time to educate them about the product so the inspection process will go smoothly."

Educating consumers is also key. Arrington makes sure her potential clients see the benefits of the technology first hand. To demonstrate a house built from vertical ICFs, Arrington regularly invites potential customers to tour her own home.

"At least twice a week new customers come look at our home to talk about building their homes from vertical ICFs," says Arrington.

The Partnership for Advancing Technology in Housing (PATH) brings together builders, manufacturers, researchers, government agencies, and other members of the housing industry. PATH partners work to improve the quality and affordability of new and existing homes. The program is administered by the U.S. Department of Housing and Urban Development's Office of Policy Development and Research.

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Arrington used excess vertical ICFs to construct a 16' x 32' in-ground pool.