Strong Homes Survive the Storm
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Contributors

Greg Boulos co-founded Urban Homesteaders LLC, a Pittsburgh-based consulting company, which enables home and small business owners to achieve a higher degree of self-sufficiency in the urban ecosystem.

Stephen Collette B.B.E.C. is principal of Your Healthy House, an indoor environmental testing and building consulting firm (www.yourhealthyhouse.ca).

Julie E. Gabrielli has been practicing architecture for 20 years. Her work focuses on sustainable design, as well as strategic sustainability for businesses and institutions, from mission clarification to cultural and physical environments. This work explores and redefines our context, our future, and our legacy as part of the natural world.
Solid Safety and $avings

A concrete home can meet all your criteria, even the invisibles. Before you turn to the next story, new concrete homes aren’t the dull grey, hideous monolithic block homes of 50 years ago. They are beautiful, because they can be finished any number of ways — brick, siding, faux stone, whatever. And underneath the finish is a strong, cozy and quiet home that will last well beyond your lifetime, and requires much less maintenance.

Safety is a major benefit of all these systems. In our previous issue, we reported on a “Fortified... for safer living” home and the tests that prove the superior safety performance of concrete walls. As Brian Bock of Dukane Precast stresses, it’s hardest to fortify wood, and this was clearly demonstrated during Dukane’s experiments. Even the steel-framed masonry walls didn’t hold up like concrete walls.

Concrete wall systems include insulating concrete forms (ICFs), precast double wall panels and Carribault wall panels. Integral to each of these systems is the monolithic concrete wall, which can be anywhere from 4 to 12 inches thick. This thickness lends thermal mass and unmatched durability, and the large, unbroken area of each panel cuts down dramatically on drafts and thermal bridging. However, these aren’t the benefits that homeowners brag about the most.

Almost three years ago, Gene Becker of ICF Direct built a home for Mike and Caroline Landgraf in Greenville, Wis. Mrs. Landgraf says, “When people walked by, they asked what it was, because it looked like some sort of strange igloo or something. But now you can’t tell what it was built out of;” because it’s faced with stone and siding. She happily touted the beauty of her home, as well as its safety, quietness and energy efficiency.

“Oktoberfest is a big deal in Appleton, Wis.,” Landgraf says. One year the Landgrafs had a pre-Oktoberfest party with about 25 people around the bonfire out back. Apparently the music was a bit too loud for her neighbors, because early the next morning they started blasting Cher music. “But,” she chuckles, “we just closed the windows and couldn’t hear a thing.” They aren’t even bothered by the small airport nearby, except when their windows are open.

Landgraf finds that her favorite feature is the energy efficiency. “We mainly heat our house with a pellet stove, and I like it warm, so all year round the thermostat is set to 75 degrees. But, early in January we ran out of pellets and never got around to getting more, so we ended up using our furnace for heat the entire month. I was really worried about what the bill would be when it came, but when it got here, it was only $22 more than the previous month.”

Studies performed by the Portland Cement Association (PCA) explain that the heavy concrete provides thermal mass, which evens out swings in temperature over time by absorbing heat and cold slowly. The absorptive capacity of a typical ICF house is over 11 BTU/sq ft degree F, as compared to a typical wood-framed house’s absorptive capacity of just over 2 BTU/sq ft degree F. Since a BTU is a unit of energy content, this means that concrete homes
store approximately 5 times more energy for later release than wood framed homes. In terms of comfort, this means less quick temperature changes because of changes in the outdoor air temperature, and less cycling on and off of furnaces and air conditioners.

Becker thinks that untrained builders and contractors don’t take the energy efficiency of concrete walls into account when they bid on building concrete homes. “They’re bad at subtracting,” he chuckles. So, builders often unintentionally mislead homeowners into thinking that concrete homes are prohibitively more expensive by not factoring in the savings from using a much smaller heating, ventilation and air conditioning (HVAC) unit into their bids.

Concrete homes are more airtight because the walls are one large slab with fewer gaps for air to penetrate, and the foam insulation will never settle or lose its efficiency. PCA’s studies have found that air infiltration is the number one source of energy loss in homes, followed by walls and windows. However, according to PCA’s studies, ICF homes allow just over 15% of the air in a home to be exchanged with outside air every hour, while typical wood framed homes allow more than 45% of the heated or cooled air to leak out every hour.

Indoor air quality is a big concern these days, with people spending 90% of their time indoors and allergies on the rise. It is recommended that approximately 33% of a building’s air should be changed every hour to stay healthy. Becker uses a simple on-demand ventilation system in his homes that opens a cloth damper in the ventilation unit when there’s more atmospheric pressure outside the building than inside, called negative pressure. This provides enough filtered, fresh air when needed, according to Becker.

Becker says moisture isn’t a problem in his ICF homes either. He uses humidistatically controlled ventilation in the bathrooms, which turns on the vents only when too much humidity builds up. Between the two ventilation methods, he says his homes don’t have problems with condensation on the windows. He also doesn’t report any problems with mold in his homes.

Energy savings is one of the biggest concerns for homeowners. And once a builder understands how to take concrete’s inherent properties into account when designing a home, an energy efficient home won’t cost much more. “I can compete with any builder dollar for dollar if you’re building an Energy Star home,” says Becker. To make sure a concrete home doesn’t cost more than it has to, the builder should find a crew that already knows how to build with ICFs. The builder should also research forms to find the one that best fits his requirements.
Greater Des Moines Habitat for Humanity built their first ICF home last year to experiment with the new building process. They recognize its ecological and energy-saving benefits, but ICFs "walk a fine line between adding value that will pay off in the long run for the homeowner versus making the home affordable now," according to Mark Elliott, their director of development.

While building with ICFs did add cost, Greater Des Moines found that using ICFs for the entire structure saved on the cost of pouring the basement, which was previously done by a subcontractor. Elliott also mentioned that the volunteers learned how to use the ICFs very quickly, although initially they weren't sure about this new building method. "They looked like a bunch of grownups playing with giant Legos," laughed Elliott. In the end, the family who received the house didn't laugh at the appreciable savings on their energy and insurance costs, they cheered!

Habitat for Humanity of Westchester, New York, also built their first concrete homes last year and are planning on building four more this year. Jim Killoran, their executive director, said they were especially happy to be using the Altus Group's CarbonCast wall panels because Yonkers has one of the highest incidences of fire destroying homes in the United States. Don Clem, senior architect with Steven Winter Associates, recommended the precast panels to Killoran, who is always looking for efficient ways to build and provide protection for his homeowners. With heartbreaking events like a family losing everything to fire, Clem felt that concrete was the perfect solution. The homes also meet New York's Energy Smart standards for efficiency.

Concrete homes work in all conditions, whether you live on the coast dreading the next hurricane, in hot, drought-stricken areas constantly watching for forest fires, or the northern states with frigid winters.

Concrete homes don't have to cost much more to build, and by designing your home intelligently, you can get the most home for your money and a confident sense of security.

Resources
Dukane Precast, www.dukanePrecast.com
Oldcastle Precast, www.oldcastleprecast.com
Altus Group, www.altusPrecast.com
ICF Direct, www.icfDirect.net
Greater Des Moines Habitat for Humanity, www.gdmhabitat.org
Habitat for Humanity of Westchester County, www.habitatwc.org

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