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A Better Home for the Future

Insurance cost factors attending traditional wood-frame homes are compelling builders to consider more robust solutions, especially in the face of their properties' potential exposure to high winds, flooding and wildfires. While underwriting and government agency officials grapple with challenges for individual homeowners and communities, there is growing discussion as to the future of residential construction and single-family home durability.

Some home builders look to improve upon a wall specification that has been used in other parts of the world throughout history, namely concrete. Cast-in-place or precast concrete walls and structural elements greatly outperform wood framing. Unlike wood, concrete is not vulnerable to insects, moisture, mold, fire, or wind—all of which can result in structural damage and pose safety risks.

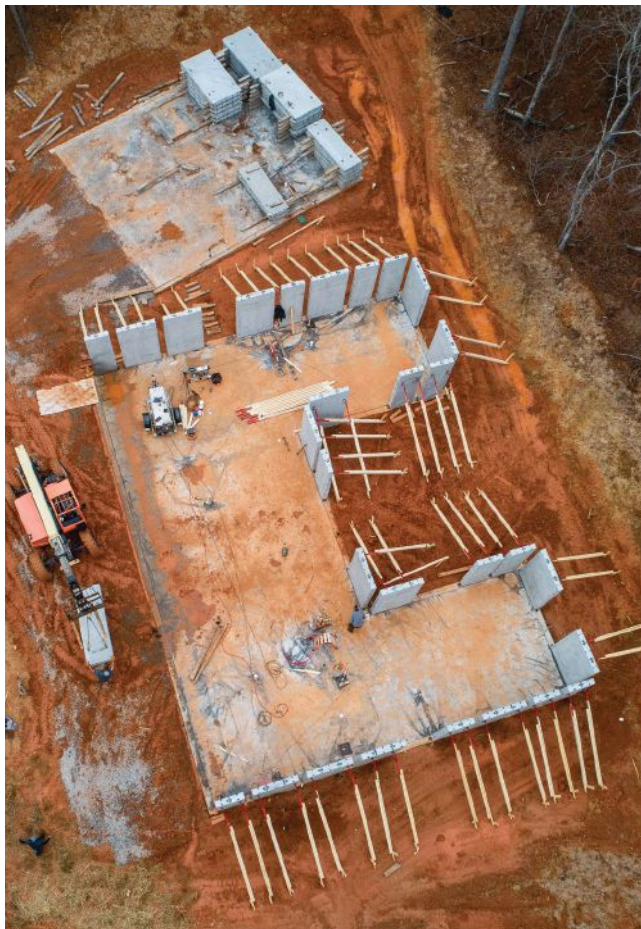
DRIVING DOWN COSTS

"What we are seeing in the concrete industry today is incredible. Things we thought would be too expensive just five years ago we're doing every day now," says Master Builders Solutions Precast Specialist Mark Sinicrope, who has recently applied knowledge from 40-plus years in structural concrete to help Texas-based Nonquit Homes with a mix design suiting tilt-up, prestressed concrete panels. The firm is applying to perimeter single-family home walls the load-bearing, sandwich panel design most often associated with larger scale commercial buildings.

Unencumbered by precast producer lead times, Nonquit Homes has successfully tested its site-fabricated, insulated prestressed panel building method. "In construction, it is all about how fast you can go," observes Sinicrope. "Let's say I wanted to put up a parking garage today. We could have it up in two or three weeks, but it might take a year or more because we have to wait for someone to actually produce the concrete elements and ship them to the jobsite."

Nonquit Homes leverages slab on grade surfaces, ready mixed concrete deliveries, on-site formwork, and portable tensioning devices to stage precast, prestressed panel casting and storage. Panels are scaled for handling by forklift, an economical alternative to more conventional crane picks. "I can see an entire house going up with just three or four people on hand to tilt up the panels and set them in place," says Nonquit Homes' Terrell Wiggins, who along with engineer Alonso Forcado completed the firm's first precast sandwich wall panel home in a development outside Atlanta. "Plus, you're not sitting there waiting on the framer or struggling to schedule all the different trades required to build the actual house. For a builder, that is huge."

Depending on the size, a typical wood-framed home can take six months to a year to complete. Once a builder perfects Nonquit Homes' concrete panel onsite casting and setting method, however, the construction window stands to narrow considerably. "Like with anything else, it just takes one person to figure out a way to make it profitable and everybody will jump in," Sinicrope affirms. "When it comes to concrete homes, I think we've finally reached that point."



Nonquit Homes schedules wall panel fabrication, stressing and staging after main home and garage slabs can bear crew, formwork and forklift loads.



DURABILITY, ENERGY EFFICIENCY

While escalating property insurance rates highlight the need for more durable housing, code officials and government agencies see the effects of climate change increasing the urgency to evolve home building practice. According to National Oceanic and Atmospheric Administration, there were 60 weather and climate-related disasters in the U.S. from 2020 to 2022, with losses exceeding \$1 billion per year. For comparison, between 1980 and 2019 the average number of major events per year was eight.

Concrete homes built to Nonquit Homes specifications can withstand the high wind loads at the heart of tornado- or hurricane-rooted damage and destruction. "Today, precast can hold up to a 200 mile per hour wind load, depending on how it's designed," Mark Sinicrope affirms. It is often not just the straight-line wind that causes significant damage during a wind event, he adds, as shrapnel from other structures is also a major concern. The Precast/Prestressed Concrete

Institute helped put that to rest by enlisting an engineering laboratory to prove concrete panel durability and integrity, especially as measured against a frame house with brick veneer.

"Investigators fired two-by-fours out of an air cannon at 150 mph at the concrete sandwich panel and the lumber shattered into toothpicks, without any damage to the panels," notes Terrell Wiggins. "However, the same test blew a massive hole straight through the wood-framed brick wall."

Along with robust characteristics, concrete home designs offer energy efficiency. While concrete is very dense and therefore airtight, it is not considered a good insulator. By incorporating a thick layer of insulation, however, concrete sandwich panels' energy performance can exceed that of walls on a traditional wood-framed home. As Nonquit Homes crews have demonstrated, moreover, adding the insulation during the wall panel casting process further reduces construction time and labor costs.



Traditional concrete homes typically offered limited architectural design options. Nonquit Homes' premier installation, combining painted precast concrete panels with siding and manufactured veneer stone accents, shows how the industry has come a long way.

