

Fire-resistant homes stand as sentinels in a blackened landscape

# SET IN CONCRETE

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There's a home-building technology used widely elsewhere in the United States that saves money on energy, stands up to natural disasters such as earthquakes, tornadoes and hurricanes and resists termite infestation.

And now that technology — concrete home construction — can claim new supporters for another attribute, a dramatic ability to survive wildfires.

"I swear by that type of construction," said homeowner Pat Callahan a few days after October's Witch Creek fire roared up to the walls of his 3,200-square-foot new concrete house outside Escondido. He, his wife Anne and son Devin had only moved into the custom-built home in March.

Photographs tell the story: Windows that failed in the intense heat are boarded up. But still, the house stands.

Nearby, the story was different. Conventionally built houses were consumed by the fire.

"Everything to the west is gone," said Callahan, who evacuated early on the morning of Oct. 22. "The wind was incredible. We had a lot of smoke damage. The fire melted the vinyl windows."

No home is fireproof, say fire officials and builders. But a concrete design, when employed with other aspects such as creating defensible space outside, sure can provide a protective edge if vulnerable components such as windows and roofing also are made of fire-resistant materials.

"It's not bulletproof," said Dave

Bacon, a former Cleveland National Forest fire chief whose company, Firewise 2000 Inc., consults with builders on fire protection. "You've got all the other issues, with fencing, glass, decking and vegetation clearance."

But all the other issues were just what Lorraine Aledort was thinking of when she built a 5,500-square-foot concrete house, including a concrete-tile roof, on a 16-acre parcel near Ramona.

For Aledort, the October

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## Poured concrete solid alternative in home building

disaster was an unwelcome housewarming after years of research on how to build a house and watching it come to completion.

After more than three years supervising the home's construction, she and her husband, Steve, had moved in just a few weeks before the fire struck.

Today, she can look back and say all the effort paid off.

"My subs (subcontractors) called me the queen of overkill," said Aledort. "I built this place to be a bomb shelter."

Examples of her safety-minded determination beyond the concrete frame include:

- Glued-down concrete roof tiles to resist winds that Aledort estimated rose to 60 to 70 mph during the firestorm.

- Interior fire sprinklers mandated by the local fire district.

- Oversized wood beams on the exterior that can withstand exposure to flames longer than smaller dimensions.

- An emergency power generator.

- A 10,000-gallon water tank to defend the property. That came in handy after the fire as a supply for two nearby horse ranches when Ramona's water was declared unpotable.

Unlike Callahan, "we went with commercial-grade aluminum windows," Aledort said. The windows are thermally broken, meaning a rubber gasket between the two frames keeps heat and cold from transferring through the dual aluminum frames.

Each window has two panes of tempered glass. Each one on the outside is one-quarter-inch thick and the interior glass is one-eighth-inch thick. "They are super strong, and attenuate the noise," she said.

"It paid off," Aledort said of the fire prevention steps.

"The fire came right up to

the area we had cleared," but stopped cold at the thick "free-way-style" ice plant. "It was comforting to know that the home itself was going to be fire-resistant."

Surrounding the house, the vegetation today is scarred and black, but like the Callahan home, the Aledort residence stands out like an island amid the many boulders on the property.

When the North County fires subsided, North County builder George Easton, a specialist in concrete-home construction, raced to find out what happened to the Aledort and the Callahan houses he had helped build and design.

"We wanted to see how they performed," said Easton, a structural engineer and owner of ICF Installers Inc. of Bonsall, a company that does consulting, contracting and engineering work on concrete homes.

What Easton found was a lunarlike, blackened landscape with the houses standing as sentinels. "Both came through with flying colors" was his assessment.

Easton said the process has been well received by building inspectors, an opinion disputed by homeowners Aledort and Callahan.

"It was a nightmare" getting approvals," Aledort said. "My first inspector had a background in concrete and wasn't afraid of it. My second had no clue what he was looking at. I had to educate these people."

Said Callahan: "We were hung up on permitting. For a long time, it seemed like it wasn't going to happen. But once the actual construction started, it moved along."

Manuel Ainsa, a senior structural engineer for the county Department of Planning and Land Use, noted that the county staff is familiar with concrete home construction. It normally doesn't take longer to inspect and permit concrete dwellings than wood-frame homes, he said.

"We have licensed structural engineers on staff," Ainsa added. "We can check anything that walks through the door."

Ainsa said he has found that concrete homes generally are

Easton's concrete homes are constructed using a technique much like assembling Lego blocks. The "blocks" are polystyrene forms, called insulated concrete forms, into which the concrete is poured. The forms then are left in place to serve as insulation and the backing for stucco on the exterior or drywall on the interior.

When finished, the wall of concrete and the remaining forms can provide up to an R-50 energy rating, far above normal requirements for conventional homes, and a big energy-saving benefit.

The Portland Cement Association, a major supporter of the technology, said houses built with insulated concrete form exterior walls require an estimated 44 percent less energy to heat and 32 percent less energy to cool than comparable frame houses.

Aledort's walls, including the 6-inch concrete core, are a foot thick. Added strength, offering a measure of protection from earthquake damage, is provided by reinforcing steel placed in the concrete forms.

of higher quality than wood-frame houses.

The technology has won approvals from national building code agencies.

"All the concrete building systems I'm aware of, to my knowledge, have full national code acceptance," said Paul Tryon, chief executive officer of the Building Industry Association of San Diego.

Concrete homes have found their strongest market in Florida and other states where hurricanes are a constant threat. The houses have been shown to withstand 200 mph winds, as well as wind-driven projectile damage from tornadoes.

In 2006, the overall U.S. concrete home market share was 14.4 percent, down 3.5 percent from 2005, said Craig Schulz, director of market research for the Portland Cement Association. He blamed lagging construction in Florida, where the majority of new homes are built with concrete, for the decline.

Tryon said he believed interest in concrete construction will grow here as a direct result of the two firestorms the county

has seen in recent years.

But old habits die hard. "We have a lot of history with wood, design flexibility and an available work force," he said.

Still, the U.S. is one of the few countries that build homes on the wood-frame model.

A drive to Mexico, where concrete and masonry construction prevails, bares this out.

"It's really only in North America that you see wood as a major residential construction material," said Ken Walsh, the Paul S. Roel, chairman of the construction engineering and management program at San Diego State University.

There are issues raised about concrete relating to installation of plumbing and electrical connections, which Easton and Aledort said are easily solved once subcontractors become familiar with how to run pipe or wire through the form systems. The houses can be built in a wide variety of architectural styles.

As for cost, the Portland Cement Association says the price of a concrete home can be as much as 4 percent higher than a similarly designed wood-frame house. But Aledort, who studied the process and costs involved, said when it was all over, her house was an estimated 20 percent more expensive.

If concrete homes, with all their energy and other benefits relating to natural disasters, are so good, why aren't they more widely seen?

"The problem with concrete homes," said Walsh, "is not the technology. It comes down to the constructability. What the market is lacking is a big player to come along and say here's a solution to deal with the rest of the supply chain."

"They've handled the part of getting code approval. They still have to deal with the practical part of what the inspector does out in the field, when he says, 'I don't have a clue how to inspect this, and just leaves.'"