

WILDFIRE



In most areas of the United States, the greatest threat to homes and commercial structures is not hurricanes and tornadoes, but wildfire.

The U.S. Fire Administration (<http://www.usfa.dhs.gov>) reports that fire kills more Americans than all natural disasters combined—averaging more than 3,700 people—plus another 20,000 injured—every year in the last decade. Direct property loss due to fires in 2006 is estimated at \$11.3 billion.

Fortunately, homes and buildings made from insulating concrete forms (ICFs) offer exceptional protection from the flames.

“Of all construction materials, concrete is one of the most resistant to heat and fire,” reports the Portland Cement Association. “Experience shows that concrete structures are more likely to remain standing through fire than are structures of other materials. Unlike wood, concrete does not burn. Unlike steel, it does not soften and bend.”

Laboratory tests have shown that while wood frame walls exposed to flames

will collapse in an hour or less, ICF walls can withstand the intense heat for four hours or more. Field evidence supports this conclusion.

Why ICFs Work

Insulating concrete forms resist fires in several ways.

The most obvious is their structural concrete core that will not weaken, warp, twist, or burn regardless of the fire’s heat.

In so-called “fire-wall” tests, ICF walls are subjected to continuous gas flames and temperatures of up to 2000°F for as long as 4 hours. All of the leading ICF brands took the heat without any sign of weakening. In contrast, wood frame walls typically collapse in an hour or less. Note that these tests were performed on monolithic, or “flat-wall” ICFs, with no breaks in the concrete layer. Screen-grid ICFs have fire ratings of two hours or less.

The concrete core also prevents fire by slowing the conduction of heat from one side of the wall to the other. In PCA fire tests, ICF wall segments did not allow enough heat through to start a fire on the cool side of the

wall for 2-4 hours.

Contrary to popular belief, the foam used in ICFs will not burn. It will melt if exposed to high heat, but it will not contribute any fuel to the fire. In fact, it is virtually “self-extinguishing,” thanks to a flame retardant all of the leading ICF manufacturers add to the EPS foam.

The PCA conducted a flame spread test, and found that ICF foam is five times better than wood. They used the “Steiner Tunnel Test” to compare the two materials. In the test, technicians lined a tunnel with the test material, ran a fire at one end, then measured how far the flames spread. “The flames travel about one-fifth as far down a tunnel lined with ICF foams as they spread down a tunnel lined with wood,” the PCA report states.

The PCA also reports that smoke created by melting EPS is ‘no more toxic’ than burning wood, based on a review of existing studies conducted by The Southwest Research Institute. Studies by Reward Wall Systems report “less than half the toxins” of burning pine.

Case Study #1 Reno, Nevada

Bill Rentsch owns Rentsch Construction and normally builds wood frame houses, but for his own home, situated in a hilly area south of Reno, he wanted to try something new.

Rentsch and his wife Cindy had been living in their new home less than a year when a fast-moving wildfire swept through the area.

Fueled by tinder-dry brush and pushed along by winds that gusted to 40 miles an hour, the whole area was soon engulfed in flames.

“My mother got through to the house just before the firefighters closed the road,” said Daniel Rentsch, architectural designer of the home, and son of the owners. “The flames got within 20 feet of the house, and the heat of the fire was so intense it broke one window. But... it didn’t suffer even smoke damage.”

Most of the neighbors were not so lucky. Fifteen homes in the neighborhood burned to the ground, leaving only the chimneys

to mark the sites of what were once stick-built homes.

The Rentsch’s had built with ICFs, using an 8-inch core for the walkout basement and 6-inch core

for the rest of the house. The fire-resistance and tightness of the exterior walls saved the home—and all their personal belongings inside.

“Building with ICFs is starting to catch on in Reno,” Daniel said, “because it is cold here, and ICFs provide good insulation. The cost of using ICFs wasn’t a lot more than it would have been if we built from wood. We have a lot of large windows, and to get the size openings we wanted with wood, and still meet the seismic standard for this seismic zone, it would cost nearly the same.”



Case Study #2 Colorado

ICF Home Survives Wildfire

Raging wildfires in the mountains of Colorado made national news this summer. For a few weeks in September, every evening would bring word of new evacuations and more graphic images of firefighters standing helplessly as dozens of homes were consumed by flames.

But KUSA-TV found one homeowner who stood fast, saving his home and belongings with little more than a garden hose. The secret of his confidence is that the home was built with insulating concrete forms. Knowing the ICF walls would not fuel the fire, and that the tile roof was similarly

fireproof, Peter Brady and his son made their defense with little more than a shovel and a \$6 hose nozzle.

“All 360-degrees around his home is completely blackened and charred,” says reporter Aristeia Brady. “Most of his neighbor’s homes didn’t make it.”

Brady’s did, though, thanks to the ICF walls. In the news report, he says he would have felt comfortable in a worst-case scenario simply holing up inside.

The entire segment can be viewed here <http://www.9news.com/video/default.aspx?bctid=609540860001>.



Case Study #3 Las Vegas, Nevada

ICFs Save New American Home

Every year, a high-tech “home of the future” is built in advance of the annual International Builders Show. The exterior walls of the 2012 home were built with ICFs, a decision that saved the house from burning to the ground just hours before it’s grand opening.

This iteration of the New American Home resembles the classic “White Box” look of the 1960s and 70s while using ultra-durable and efficient ICFs.

On the night before the official opening the builder held a catered celebratory event, during which the catering truck, which was parked just a few feet from the side of the home, suddenly exploded into flames.

Fortunately, the four-hour fire-rated wall withstood the blaze and was left undamaged, as were the paintings hanging on the other side of the ICF wall which were on loan from a museum and valued at over one million dollars.

The relieved builder said, “ICF’s saved my house from burning!”

In this aerial photo of a fire-devastated San Diego suburb, it’s easy to see the three houses on the street made of ICFs.



Photo by Sean Hafferty/San Diego Union-Tribune

Case Study #5 San Deigo

Five miles away in Rancho Bernardo, Lorraine Aledort waited out the fire in her ICF home. After years of construction, she and her husband had moved in just weeks before the fire.

In addition to the ICF walls, Aledort incorporated a number of other fire-resistant building techniques. These include a concrete tile roof, aluminum frame windows, interior fire sprinklers, and large wooden beams that resist fire better than smaller ones.

“My subs (subcontractors) called me the queen of overkill,” said Aledort.

But the measures work. Surrounded by charred vegetation and ruined homes, the Aledort residence stands out like an oasis in a fire-scarred desert.

“It was comforting to know that the home itself was going to be fire-resistant.” she says.



Business Protection

Tony Ellsworth, owner of Ellsworth Bikes in Ramona, California, credits ICFs with saving his business from intense wildfires last fall. The walls of his high-end bicycle manufacturing facility are made from ICFs instead of traditional wood studs and sheet rock.

The Witch Creek Fire, which tore through the San Diego region last October, is likely the worst natural disaster to ever hit that area. It forced more than half a million people from their homes and destroyed more than 2,000 residences.

“In an event like that, the fire departments’ primary concern is saving lives,” says Ellsworth. “To expect a fire truck to be sitting there on the curb just to protect your house is not always realistic.”

Ellsworth’s neighborhood was hit hard. “The flames came right up to the doorstep and completely surrounded the home. Then the winds changed, and the fire came back again,” says Ellsworth. Forced to evacuate during the worst of the fires, he was shocked by the devastation he returned to.

“It brought tears to my eyes,” he says. “I was seeing house after house that had been completely leveled, and then there, on top of an absolutely charred hill, was my home and warehouse, virtually unscathed.”

Case Study #6 Oregon

Accidental Fires

Of course, not all dangerous fires start outside the residence. Neal and Linda Anderson had a fire break out in their home just three months after they moved in. Built on a remote area of the Oregon coast, hot ashes smoldering in a garage trash can triggered the blaze, eventually spreading into the attic before it triggered a smoke detector.

The family and neighbors stood in the driveway and watched it burn for 35 minutes before the volunteer fire department arrived with a truck large enough to tackle the blaze.

Built from ICFs, the home was not fire-proof, but it did resist the flames far better than an ordinary house would.

Any other house would have burned to the ground. When there is a fire in this remote of an area...by the time the fire department gets to the scene, the frame houses are gone. But in this case, the plastic flowers in front of the house didn’t even melt.”

Despite significant damage to the interior, Linda Anderson says, “We were able to save all our furniture, clothing, jewelry and photographs.”

I’m so grateful for these walls,” she continued. “I built them the first time for their energy efficiency. I wasn’t even thinking about fire. There is no doubt in my mind that they saved our house, and may have saved our lives.”

Built in a rural region of the Oregon Coast, a fire in the Anderson residence garage burned for 35 minutes before the fire department arrived, yet the damage was contained to the garage, and no personal belongings were lost.



ARSON



Defeating a Firebomb

The Habitat for Humanity home in Kansas City, Kansas had just been completed when the fire department received an urgent 911 call.

An arsonist had thrown a gasoline firebomb at the home, just days before the new owners were set to move in. Luckily, the exterior walls were built from Arxx ICF and sheathed in fiber-cement siding.

When firefighters arrived, they found that the fire had spread 12 to 15 feet along the front porch of the house, but as there was nothing else flammable, it was easily extinguished.

Dennis Cranor, the arson investigator for the local fire department, says that the damage was minimal compared to what would have happened with a wood frame house.

The local ABC news affiliate reported, "If the house had been wood, it would have been a total loss."



Damage was limited to the plastic porch soffit, which had melted, and the front door, which the firefighters had kicked in to gain entry to the unoccupied house. There was no significant damage to the interior. "There was also some soot on the siding, but that wiped off pretty easily," says Kelly Willoughby, executive director of Heartland Habitat for Humanity. Willoughby says repairs cost less than \$500.

Since the arson attempt, Heartland has constructed more than a dozen other ICF homes. Many of them have achieved a five-star energy rating. Habitat homes are built for low-income families and Willoughby says they appreciate the lower energy bills.

"We are very proud of the quality of our ICF homes and continue to build as many as possible," she says.

For more information on Habitat for Humanity and ICFs, see the story on page 36 of this issue.



Member, ICF Builder Group

