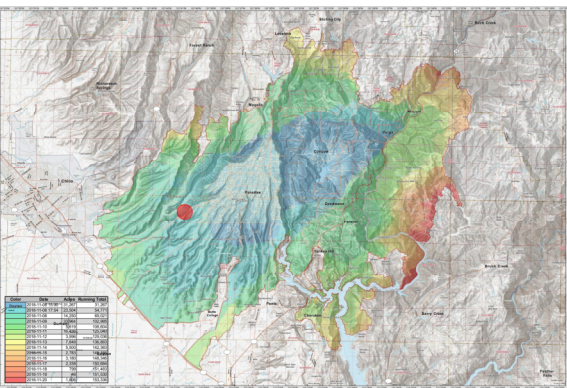




A Case Study on How Insulated Concrete Forms Can Prevent Structure Loss During Wildfires

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Fire Progression Map Camp Fire Incident, Red Circle Indicates Approximate Location of Home. (Cal Fire, 2019)

ICFs are a building material with unique thermal insulating and non-combustible properties that have shown great potential at protecting a structure during a wildfire. To prove the hypothesis that ICFs can effectively prevent structure damage or loss during a wildfire, an analytical case study on an ICF home that survived the Camp Fire was conducted. The goal was to understand how ICFs unique thermal insulating and non-combustible properties protect structures from wildfires and how this assembly system can be a lot more effective than a traditional frame structure. Additional objectives for the project included highlighting the growing threat of wildfires to promote innovative solutions like ICFs, analyzing wildfire characteristics, examining the factors that cause a structure to ignite, and exploring all the aspects that make a structure fire resistant. Qualitative research was conducted through semi-structured personal interviews with experts in the ICF industry, Cal Fire, and project team members. The results of the interviews were analyzed which proved the hypothesis and showed a correlation between ICF wall assemblies and the structures ability to survive the Camp Fire. The paper also summaries the need for future research to provide further evidence for ICFs' effectiveness at protecting structures from wildfires.

Key Words: Insulated Concrete Forms, Wildfires, Fire Resilient Structures, Non-combustible, Wildland Urban Interface

Project Details:

- Project Completion: 2016
- Cost: Roughly the same as a similar wood framed design
- 6" ICF Logix Blocks
- Stucco Exterior Façade
- Thermoplastic polyolefin (TPO) roofing membrane

Other Factors that Protected the Home:

- Defensible space around the perimeter
- Non-combustible landscaping and hardscaping
- Limited screened openings and vents in the roof
- Landscape sprinkler irrigation system was turned on
- Metal retaining wall blocked embers
- Fire-rated glazing

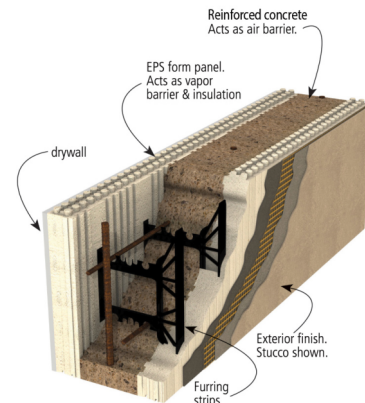
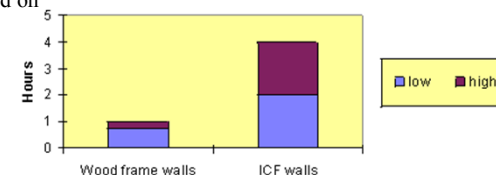


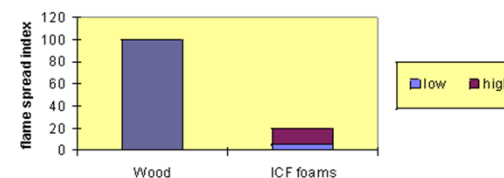
Diagram of ICF Cutaway (ICF Panels, 2018)

Fire Ratings

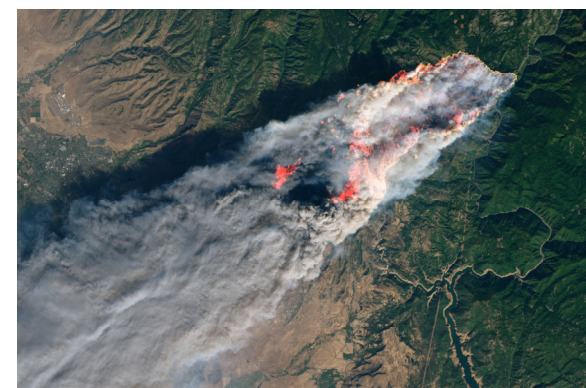


ASTM E-119 Test Results Comparing Wood Frame Walls to ICF Walls from Leading Manufacturers (PCA, 2006)

Flame Spread



ASTM E-84 Test Results Comparing the SPI of Wood to ICF Foams from Leading Manufacturers (PCA, 2006)



Natural-color image of Camp Fire at 10:45 a.m. on morning of November 8th, 2018 Taken from Satellite Landsat 8 (Stevens, 2018)



Logix ICF Home on Cliffhanger Lane that Survived the Camp Fire (Lennox, 2019)