

## Development of next-gen fire shelter moves to next stage



*Jay Karlik, RMTD/Courtesy photo*

**Rural/Metro Fire Department Captain Patrick Tulley, firefighter John Lowther (front of hoseline), and firefighter Kurt Freeman (back of hoseline) help test a prototype Sunseeker wildland firefighter shelter in Pima County. A mannequin is under the shelter.**

*Joanna Dodder Nellans, The Daily Courier – PRESCOTT, ARIZONA*

U.S. Forest Service researchers have initially tested approximately 50 materials for the federal government's next-generation emergency shelter for wildland firefighters. Federal officials decided to move up their planned 2015 review of fire shelters to 2014, because of the deaths of 19 of Prescott's Granite Mountain Hotshots on the Yarnell Hill wildfire on June 30, 2013. A state-commissioned report concluded that existing shelters could not have saved the Granite Mountain Hotshots from the 2,000-degree heat and flames they faced.

Forest Service officials say humans can breathe in temperatures of 300 degrees for short periods of time, while tests show they can survive 1,700 degrees in current shelters with some flame contact. Heat from wildfires can reach 1600-2400 degrees. Instructors always remind firefighters that shelters are a last resort. But every firefighter on federal lands must carry one. They have been standard equipment since 1977, and the current third-generation shelter was designed in 2002.

The current shelters consist of woven silica laminated to aluminum foil. An inner layer is fiberglass laminated to aluminum foil. The shelters reflect heat and prevent gases from entering. But firefighters can die from breathing in the heat, too. So the Forest Service research team also is looking at adding a mouthpiece to the shelter kit that could cool air before firefighters breathe it in.

New or improved shelters could be in firefighters' hands as early as 2017, said Tony Petrilli, equipment specialist at the Forest Service's Missoula Technology and Development Center. Anyone was welcome to submit materials or designs they thought would work in a fire shelter. The Forest Service has been screening them for strength, durability, flammability, thermal performance and toxicity.

Among those who submitted materials is David Turbyfill of Prescott, father of fallen Granite Mountain Hotshot Travis Turbyfill. Turbyfill manufactures and welds metal products, so he had no trouble creating a huge burner to blast flames onto the material. He posted the test on You Tube at [youtu.be/Ps-OcG70hps](http://youtu.be/Ps-OcG70hps).

"To me it was, 'Prove the idea that there was a material available that would have made the event of June 30, 2013 a survivable event,'" Turbyfill said.

Turbyfill said he found the carbon infused fabric on the Internet. It was designed to shield kilns and industrial furnaces from flames. One key is to find a material that's also light enough for firefighters to carry alongside a lot of other gear. The current shelter weighs only 4.3 pounds. Other considerations are bulk and cost, currently about \$260. Turbyfill said he compared a 24-inch section of his material with the current federally issued fire shelter and his material weighed less.

Jim Moseley already has created a prototype fire shelter with his materials. His Sunseeker Enterprises based in Marina del Rey, Calif., also produces a fire-resistant wrap for structural beams, as well as a patented spray that aims to protect homes for years from burning embers.

The outer layer of his shelter features a similar, thinner spray. It includes zirconia, Iconel, alumina and ceramic fiber, he said.

His prototype shelter weighs about four pounds more than the current federal shelter, but "four or five pounds is worth a life," he said.

Firefighters from the Rural/Metro Fire Department in Pima County tested his shelter, and it can withstand 2500 degrees for four to five minutes, Moseley said. His design also includes a small container with enough air for 17 breaths.

The shelter is being featured on a Discovery Channel "Forces of Nature" segment about fire this month, Moseley said. A teaser is online at [review.bellmedia.ca/view/416771422](http://review.bellmedia.ca/view/416771422).

Moseley has started a crowdfunding campaign at [gofundme.com/njay](http://gofundme.com/njay) to continue designing fire-resistant products, including an automatic fire shelter deployment system that can pop a shelter out of its case in three seconds.

A former professional trombone player, Moseley said the idea to get involved in creating wildfire-defensible materials came to him during a 2012 tour of a friend's aerospace company, where he saw a material that was used on U.S. space shuttles.