

# *TerranearPMC Safety Share*

## **Week of July 8, 2013 – A Dangerous job**

Last week, 19 of the 20-member elite firefighting squad, the Granite Mountain Hotshots, died while fighting what is now being called the Yarnell Hill Fire, located near Prescott, Arizona. The team was a group of seasoned professionals. Without warning, a wind shift occurred which caused the fire to become erratic, resulting in the fire reversing itself and placing the squad in imminent danger. As a last-ditch effort, members of the Granite Mountain Hotshots used their personal shelters to protect them; however, the fire proved to be too much for these protective devices – even though they are designed for such a situation.

Last week's tragedy raised questions of whether the Hotshot crew should have been pulled out much earlier and whether all the usual precautions would have made any difference at all in the face of triple-digit temperatures, erratic winds and tinderbox conditions that caused the fire to explode.

Dick Mangan, a retired U.S. Forest Service safety official and consultant, said the crew members might have taken too many risks because they were on familiar ground and were trying to protect a community they knew well.

One contractor, Neptune Aviation Services, had three aerial tankers making drops on the fire earlier in the day. But at the time the firefighters died, the planes had been grounded because of treacherous conditions. According to Neptune Aviation Services, "It wasn't safe for them to be in the air at that time...there were severe winds, erratic winds and thunderstorms in the area."

Meanwhile, government dispatch logs show at least two other planes were flying over the fire at the time, one large tanker and one small one. There was also at least one firefighting helicopter in the air early Sunday afternoon.

A wildfire, also known by such names as a wildland fire, forest fire, vegetation fire, grass fire, peat fire, bushfire (in Australia), or hill fire, is an uncontrolled fire often occurring in wildland areas, but which can also consume houses or agricultural resources. Wildfires often begin unnoticed, but they spread quickly igniting brush, trees and homes.

Common causes of wildfires include lightning, human carelessness, arson, volcano eruption, and pyroclastic clouds from active volcanoes. Heat waves, droughts, and cyclical climate changes such as El Niño can also have a dramatic effect on the risk of wildfires, **although, more than four out of every five wildfires are caused by people.**

While an investigation is currently being conducted, officials have already noted similarities to an event that occurred almost twenty years ago on Colorado's Storm King Mountain in 1994, where 14 firefighters perished. In this event, a rapid change in weather sent winds raging, creating 100-foot tongues of flame. Firefighters were unable to escape, as a wall of fire raced up

a hillside. The ensuing investigation resulted in reforms which were designed to prevent another disaster from happening again; that is, mass entrapment of an entire firefighting crew.

All fire fighters are trained with emphasis on their safety which includes preventing *entrapment* or a situation where escape from the fire is impossible. Prevention of this situation is reinforced with a list of 10 *fire orders* and 18 *watch out situations* for firefighters to be aware of: all designed to warn of potentially dangerous situations and to take safety precautions. Apparently, the lone survivor of the Granite Mountain Hotshots was assigned as a “watch out” and therefore, was out of the immediate danger area where his fire fighting brothers died.

As a last resort, many wildland firefighters carry a fire shelter. In an un-escapable situation, the shelter is designed to provide limited protection from radiant and convective heat, as well as superheated air. Entrapment within a fire shelter is called a *burnover*. It is designed to reflect radiant heat, protect against convective heat, and trap breathable air (most firefighters' deaths are from inhaling hot gases) in an attempt to save the firefighter's life. First required in the United States in 1977, fire shelters are constructed layers of aluminum foil, woven silica, and fiberglass. When deployed, its maximum dimensions are 86 in. x 15.5 in. x 31 in. and has a shape like a mound. Firefighters are supposed to step into the shelters, lie face down on the ground and pull the fire-resistant fabric completely over themselves. The shelter is designed to reflect heat and trap cool, breathable air inside for a few minutes while a wildfire burns over a person. But its success depends on firefighters being in a cleared area away from fuels and not in the direct path of a raging inferno of heat and hot gases. The glue holding the layers of the shelter together begins to come apart at about 500 degrees, well above the 300 degrees that would almost immediately kill a person.

According to Prescott Fire Capt. Jeff Knotek, “Personal fire shelters can protect you, but only for a short amount of time. If the fire quickly burns over you, you’ll probably survive that, but if it burns intensely for any amount of time while you’re in that thing, there’s nothing that’s going to save you from that.”

In Australia, firefighters rarely carry fireshelters, (commonly referred to as "Shake 'N' Bake" shelters) as their training is focused on locating natural shelters or the use of hand tools to create protection.

The job of a fire fighter is dangerous. Yet, one cannot simply accept that the loss of life is part of the job. Although the investigation process has yet to reconstruct the actual events and thereby, understand the critical factors and to learn how to apply appropriate preventative measures, it seems that this tragedy was the result of numerous conditions that all unfolded in such a manner that when placed together, the Granite Mountain Hotshots were faced with insurmountable odds. There were dry land conditions and low relative humidity as well as strong winds that were subject to severe directional change. Reports indicate that the conditions did warrant the fire fighters to pull back, but for some reason, the potential hazardous situation was not appreciated or understood. According to the Arizona State Forestry, "That's what caused the deaths.”

**Fire fighting is one of the most essential services of an organized society**