

Investigations of Wildfire and the Growing Natural Hazard

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The wildfire problems of the United States continue to plague homeowners, firefighters, and insurers. In fact, the drought of the western U.S. is going into its 10th year, and its effects are showing increasingly. Georgia experienced its largest wildfire in history in April of 2007. A large, stubborn wildfire tied up federal resources in the Lake Superior region for several weeks in 2006. The state of California in particular continues to be plagued with high-loss fires. During the large Oakland fire several decades ago, one home was being consumed every 45 seconds.

In 2006, there were over 96,385 reported wildfires in the U.S., resulting in 9.9 million acres consumed. Suppression costs run the government over 1.6 billion dollars. Where does this leave the insurance industry? The impact on the insurance industry continues to rise at an exponential pace.

Wildfire investigations have become more sophisticated over the last few decades. Former texts referred to areas of interest as "areas of confusion," which caused the court system to play havoc with investigators. Currently, field tests and scientific analysis have resulted in more accurate wildfire origin and cause determination. NFPA 921, considered an authoritative guide in fire investigation, even has a newly expanded and accurate chapter solely dedicated to wildfires.

A significant amount of data may be needed to perform a thorough investigation. Weather criteria such as wind speed and direction, relative humidity, and ambient temperature all have an impact in determining both origin and cause. Topography analysis is important. Aspect, slope, chimneys, and canyons play into origin determination. Fuel

analysis also plays a significant role. Did the fire occur in fine flashy fuels, dead fuels, or diseased fuels? What was the fuel type and fuel moisture at the time of the fire? This information will greatly assist an investigator when determining if an ignition source had the potential to start a fire.

A wildfire scene examination typically begins with witness and firefighter interviews. An experienced investigator will then circle the fire or, if possible, the general area of origin several times. The investiga-

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tor should travel first in a clockwise circuit followed by a counter-clockwise circuit. Experienced investigators will look for macro patterns, which include larger burn patterns on heavy fuels, telephone poles, staining on rocks, needle freeze, char patterns, and bevel patterns on some heavy fuels.

Investigators also will track the movement of the fire, which will help them perceive where the specific area of origin of the wildfire is. Areas where the fire advanced are determined based on pattern analysis and marked with red flags. The flank, or sides, of the fire are noted and marked with yellow flags. Finally, areas where the fire backed or slowly crept back against the wind or topography are marked with blue flags. Spot fires, or fires which result from flying embers, cause the investigator to

re-evaluate the patterns to determine if they are in the correct area.

Once a specific area of origin is determined using macro pattern analysis, the experienced investigator will use micro pattern analysis. Micro patterns may include shadowing on pine cones, curled grass, and slight staining on smaller fuels. The investigator will also mark these micro patterns with flags. A grid is used to begin the search for the specific cause of the fire within the area of origin. String lines placed about 12 inches apart are set up in a parallel pattern, and each area in the grid is carefully searched visually, then with a magnet.

Some of the possible causes of wildfires include lightning, flares, catalytic converter heating, carbon flakes from exhaust, sparks from railroad trains, or friction as seen in heavy equipment, cigarettes, holdover fires, escaped campfires, electrical power lines, and welding operations. Wildfire investigation can be daunting for investigators trained in structural fire origin and cause. Wildfires are investigated from the area of most damage to that of the least, opposite of the methodology used in structure fires. Thus, a fire investigator with specific training must be retained. An investigator with additional wildfire suppression experience can be invaluable to understanding the fundamentals of wildfire behavior. Investigating wildfires and investigating structural fires are two vastly different fields. It is important to choose a firm and investigators with specific wildfire behavior knowledge and training. ■

Jeff Berino has over 26 years in the fire service, and over 24 years of fire investigation experience. For more information, contact him at Professional Investigative Engineers, 866-552-5246, or jberino@callpie.com.

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