



Common Denominators for Wildland Firefighter Fatalities

In the mid-1970s, fire researcher Carl Wilson identified four common denominators of fire behavior that caused fatalities and near-misses on wildland fires. These four common denominators have been cited for decades in fire safety training, in the “Fireline Handbook” (PMS No. 410–1), and in the “Incident Response Pocket Guide” (PMS No. 461).

Based on my analysis of 310 fire fatalities during wildland fire operations from 1990 to 2006, I believe that it is time to consider some 21st-century common denominators to help reduce wildland firefighter fatalities.



21st-Century Common Denominators for Wildland Firefighter Fatalities

As the major causes of firefighter fatalities shift, additional factors need to be considered:

1. Firefighters are most likely to die in an aircraft accident. Before every flight, fire managers must ask, “Is this flight essential?” and “Is everyone onboard essential to the mission?”
2. Firefighters are nearly as likely to die in a vehicle accident as in an aircraft accident. Driving too fast for the conditions, failure to wear seat belts, rushing to a fire, and driving home while exhausted from firefighting kills firefighters.
3. Firefighters can reduce their risk of dying from heart attacks on the job by staying fit, maintaining their body weight, and having regular medical checkups.
4. Unexpected events such as falling snags, rolling rocks, downed power lines, and lightning strikes cause more than 8 percent of fatalities during wildland fire fighting operations. Firefighters and fire managers can reduce fatalities by learning to expect these unexpected events.

More than 20 percent of fatalities during wildland firefighting operations continue to occur in burnovers. Carl Wilson’s original common denominators are just as important in the 21st century as they were in the 20th.



Carl Wilson’s Common Denominators of Fire Behavior on Tragedy Fires

There are four major common denominators of fire behavior on fatal and near-fatal fires. Such fires often occur:

1. On relatively small fires or deceptively quiet areas of large fires.
2. In relatively light fuels, such as grass, herbs, and light brush.
3. When there is an unexpected shift in wind direction or wind speed.
4. When fire responds to topographic conditions and runs uphill. Alignment of topography and wind during the burning period should always be considered a trigger point to re-evaluate strategy and tactics.



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About the Author

Dick Mangan founded Blackbull Wildfire Services after retiring from MTDC in 2000. Dick came to MTDC in 1989 as the Fire and Aviation Program Leader. He served as an advisor to the National Wildfire Coordinating Group's Safety and Health and Fire Equipment Working Teams and was chair of the National Fire Protection Association's Technical Committee on Wildland Fire Protective Clothing and Equipment (NFPA 1977) from 1995 to 2000. In the wildland fire suppression world, Dick is qualified as an operations section chief, safety officer, and planning section chief. He has been involved in suppression operations across the United States and has been chief investigator, team member, and technical expert on wildland fire entrapment and fatality investigations. He has written and spoken widely on fire safety and equipment issues not only in the United States, but also in Australia, Spain, and Siberia. He is a member of the International Association of Wildland Fire, the National Fire Protection Association, and the National Association of Fire Investigators. In April 2001 he was awarded the GEICO Insurance Public Service Award for Fire Safety. He served on the board of the International Association of Wildland Fire from 2001 to 2006 and was president from 2004 to 2006.



Fire season 2001

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Mangan, Richard. 2007. Wildland firefighter fatalities in the United States: 1990–2006. NWCG PMS 841. Boise, ID: National Wildfire Coordinating Group, Safety and Health Working Team, National Interagency Fire Center. 28 p.

This report updates the 1999 report, “Wildland Fire Fatalities in the United States: 1990–1998” (9951–2808–MTDC). From 1990 to 2006, 310 persons died during wildland fire operations. The number of fatalities each year increased 26 percent from the initial period (1990 to 1998, 15.2 fatalities per year) to the most recent period (1999 to 2006, 21.6 fatalities per year). Burnovers were the leading cause of death during the initial period. During the most recent period, the leading causes of death were aircraft accidents, vehicle accidents, and heart attacks. Mangan proposes four new “21st-Century Common Denominators of Wildland Firefighter Fatalities” to supplement the original four “Common Denominators of Fire Behavior on Tragedy Fires” identified during the 1970s by fire researcher Carl Wilson.

Keywords: accident prevention, accidents, aircraft, burnovers, common denominators, contractors, deaths, entrapments, fatalities, fire fighters, fire fighting, firefighting, fire shelters, fitness, heart attacks, safety at work, vehicles, volunteers, wildfires, wildland fires

The NWCG “SafetyGram” and “Historical Wildland Firefighter Fatality” reports are available on the Internet at:

<http://www.nwcg.gov/teams/shwt/safetygram2.htm>



Electronic copies of MTDC’s documents, including “Wildland Firefighter Fatalities in the United States: 1990–2006” (0751–2814–MTDC), are available on the Internet at:

<http://www.fs.fed.us/eng/t-d.php>

Forest Service and Bureau of Land Management employees can search a more complete collection of MTDC’s documents, videos, and CDs on their internal computer networks at:

<http://fsweb.mtdc.wo.fs.fed.us/search/>