



## Trends in Wildland Fire Entrapment Fatalities...Revisited

By James R. Cook

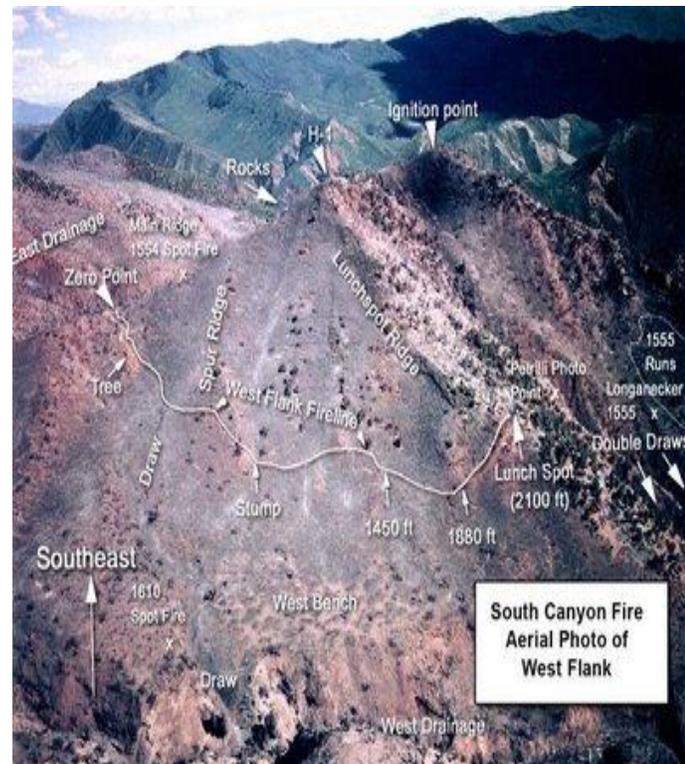
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*Wildland firefighters today are spending more hours fighting fires than ever before, and they are engaging fires of historic magnitude. The risk environment associated with wildland fire is being re-defined, and firefighters too have begun to redefine their own culture as a professional endeavor. This exercise of redefinition is not new.*

*With the upcoming 10-year anniversary of South Canyon Fire and the impacts from the Thirtymile and Cramer Fires still fresh, the interest in lessons learned from the past will be intense, and scrutiny of the safety and effectiveness of wildland firefighting agencies will continue to increase. Part of this process requires we examine our hard won lessons in a different light.*

These were the opening words of a briefing paper that I wrote in 2004 for my employing agency, the U.S. Forest Service. The basis for that briefing paper was a comparison of fire entrapment fatalities in relation to significant organizational changes within the wildland fire service from 1933 through 2003. The discussion demonstrated during that period of time, for all wildland firefighting agencies combined, the average number of firefighter entrapment fatalities decreased from about six each year to about two each year. This premise came under criticism from some in the research field for not being a true statistical analysis. The subject will probably never lend itself to a valid statistical analysis for several reasons. First, the reporting bias that exists between the current work environment and how accidents were reported in the 1930s or 1940s and even into the 1970s, suggests that many historical events have never been documented. In addition, with so many varied wildland fire response organizations involved now, the current level of exposure in terms of total person-hours worked on the fireground certainly exceeds what it was 70 or 80 years ago...and even today it would be difficult to put a firm number on what that true exposure level would look like.



So, while the wildland fire work environment continues to increase in complexity, this author argues that there is a steady, downward trend in the overall frequency of fire entrapment fatalities. Because organizational change and its effects are slow to manifest themselves, a longer view is important...and it has importance because it articulates that progress on firefighter entrapment is being made in the very hazardous, high risk / high consequence work environment on wildland fires.

What follows is a brief timeline of some significant organizational changes in the wildland fire service along with the annual entrapment fatality numbers. The format is the same as was outlined in the original briefing paper, however, it now includes updated information from 1926 to 2012, courtesy of the National Wildfire Coordination Group (NWCG) Lessons Learned Center. The timeline delineates six distinct time periods that span more than 85 years. These periods of time are not equal in duration, rather they are defined by key events that significantly changed how the wildland fire service operated at a national level. As the 20-year anniversary of the South Canyon Fire approaches, wildland firefighters should be inspired to continue improvement efforts by seeing that training and operational changes made over the years have made a difference.



Mann Gulch Fire

# FOREST BLAZE

ecora

Brush Fire Develops  
into Conflagration  
That Devours All  
Caught in Its Path

Volunteers Flee  
Into Ravine Trap

Scores Hurt, 33 Bodies  
Taken from Flames  
Near Los Angeles

Los Angeles, Oct. 3—(UP)—  
At least 52 men were burned  
to death and 100 more injured  
today in a canyon fire that  
enveloped Griffith Park Mu-  
nicipal Playgrounds, on the  
northern edge of the city.

Most of the victims, fire  
fighting volunteers from a  
nearby unemployed camp,  
were trapped in a steep ravine  
when they were caught be-  
tween the main fire and a

Griffith Park Fire, 1933

1926 – 1956 The year 1926 was chosen for the baseline as this was the year reporting data for wildland firefighting fatalities begins to show any continuity. The early 1930s mark the advent of organized, wildland fire suppression crews through the Civilian Conservation Corps (CCC). The years 1926 to 1956 were characterized by firefighting efforts primarily staffed with CCC crews, pick-up civilian laborers, or inmates supervised by agency fire overhead. This same period saw the beginning of the Smokejumper project in 1940 and first Hotshot crews in 1948.



1957 – 1966 Key event is a series of large tragedy fires culminating with the 1956 Inaja Fire and the follow-up *Report of the Task Force to Recommend Action to Reduce the Chances of Men Being Killed by Burning While Fighting Fire, 1957*. Two significant changes resulted from this report. The “10 Standard Firefighting Orders” and “13 Situations That Shout Watch Out” were established...and the first formal fire behavior and fire generalship courses were developed. Wildland firefighting was characterized by an increase in dedicated agency initial attack resources, the advent of effective aviation assets, and start of the Interregional Crew concept in 1961.





up



1967 – 1979 Key event is the 1966 Loop Fire and the follow-  
*Report of the Fire Safety Review Team – A Plan to Further Reduce the Chances of Men Being Burned While Fighting Fires, 1967.* Among the many recommendations from this report were three significant changes: the “Downhill Line Construction Checklist” was adopted; emphasis was placed on using portable weather equipment including belt weather kits for crews on the fireline; and there was direction to develop more effective fire shelters and fire resistant clothing. The Boise Interagency Fire Center went into service as participation of non-federal agencies increased. In 1972, the interagency FIRESCOPE initiative began in California, and in 1974, NWCG was chartered nationally.

1980 – 1994 Key event is a rash of multi-fatality fires in the late 1970s and the follow-up *Report of the Task Force on Study of Fatal and Near Fatal Wildland Fire Accidents, 1980*. More significant changes were the result: development of the national S-course training system; requirements for all firefighters to wear fire resistant clothing and carry fire shelters; and a national radio cache system was established. This time period saw the evolution from fire control to fire management. Interagency cooperation improved with the Incident Command System becoming a national standard along with the national mobilization system and national incident management team concept. The wildland / urban interface became a top priority in fire management decisions at all levels. The firefighting rules of engagement continued to grow with the publication of the *Fatal and Near-*

*Fatal Forest Fires – The Common Denominators* research paper and revision of existing tools into the “10 Fire Orders” and “18 Watch Out Situations.”



1995 – 2003 Key event is the 1994 South Canyon Fire and the follow-up *Interagency Management Report Team, 1995* and *TriData Wildland Firefighter Safety Awareness Study, 1998*. Many significant recommendations were offered in these reports that helped wildland fire agencies to become better funded and more professionally staffed. Equally important was the 1995 Human Factors Workshop that generated an awareness of the need to better prepare firefighters for the leadership and decision-making demands of the fireground, and eventually evolved into a formal leadership development program for wildland firefighters. Forest health emerged as the primary issue affecting fire management efforts. The firefighting rules of engagement were questioned and debated, with one of the outcomes being the acceptance of the L.C.E.S. and Risk Management concepts alongside the 10 Fire Orders and the 18 Watch Outs.

#### STORM KING 14



KATHI BECK



TAMMI BICKETT



SCOTT BLECHA



LEVI BRINKLEY



TERRI HAGEN



BONNIE HOLBY



ROB JOHNSON



JON KELSO



JIM THRASH



RICHARD TYLER



DOUG DUNBAR



ROBERT BROWNING



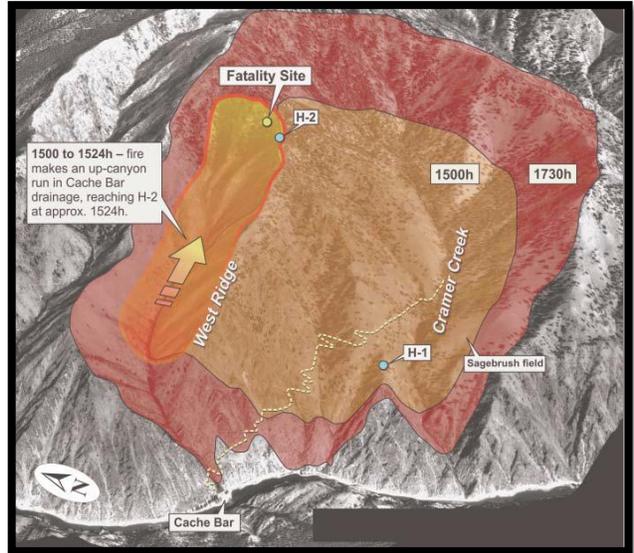
ROGER ROTH



DON MACKEY

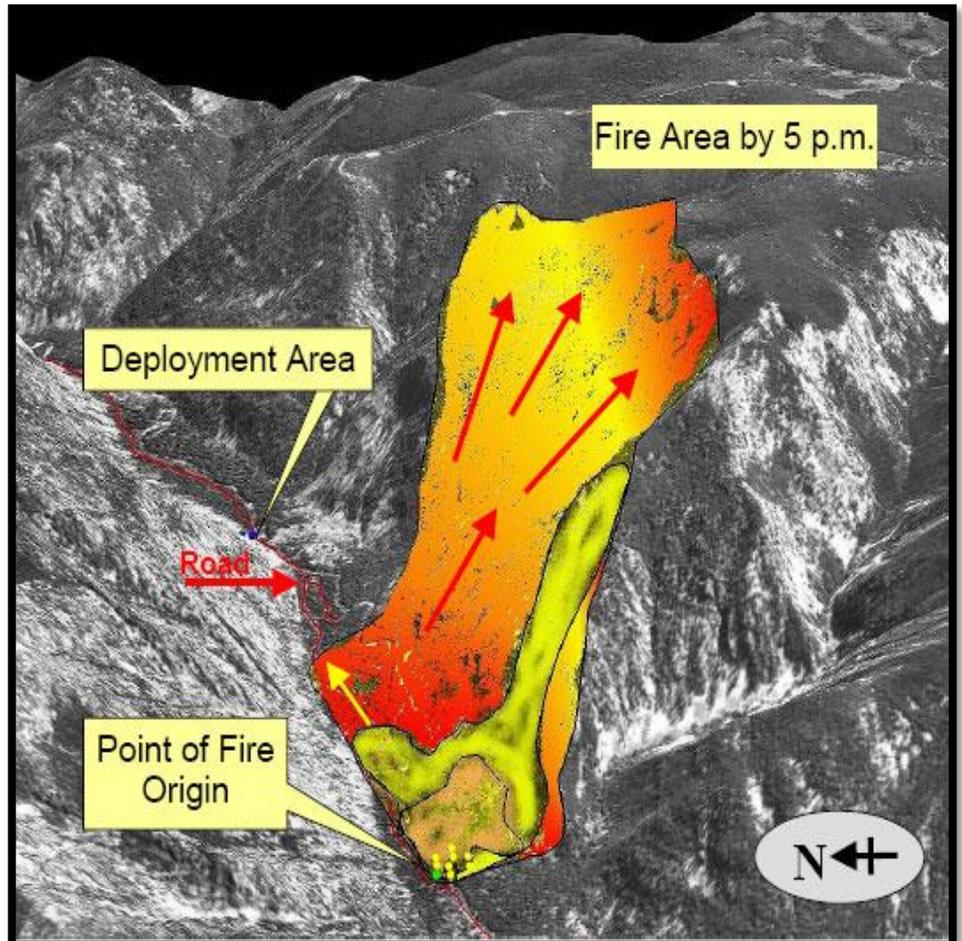


Cramer Fire Fatality Site



Cramer Fire Spread Map

2004 – 2012 Key event is the quick succession of the Cerro Grande, Thirty-Mile, and Cramer fires from 2000 to 2003. The resulting reports and intense political scrutiny of wildland fire agencies caused constant policy and procedural changes. One of the most notable safety advances is the increased willingness by many in the wildland fire service to learn from our past actions by using staff rides and the facilitated learning analysis (FLAs) along with initiatives such as the Lessons Learned Center, the Annual Refresher Training, and the SAFENET system. Also significant are the efforts by some wildland fire agencies to improve EMT and medevac protocols. Another driver of change is the evolution of how large incidents are managed... both at the strategic level, with the latitude to engage large wildfires with less than full suppression alternatives, and at the political level, with the focus on cost containment as well as all-hazard response expectations. At the tactical level, the firefighting rules of engagement continue to evolve with the widespread acceptance of the Incident Response Pocket Guide



Thirty-Mile Fire Spread Map

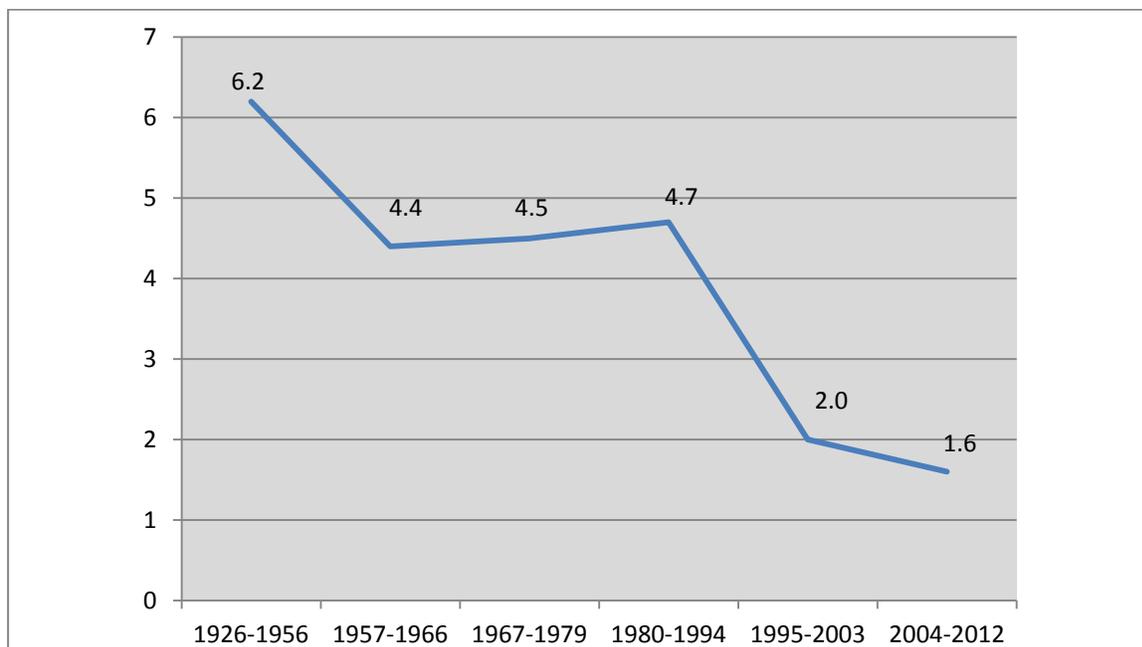
The following graph illustrates the trend in wildland firefighter entrapment fatalities from 1926 to 2012. It should be noted that fire entrapment is only one of four major fatality mechanisms in the wildland fire environment and has accounted for only 11% of all fatalities on the fireground since 1995 (295 total fireground fatalities with 32 by burnover/entrapment) and 38% since 1926 (1030 total fireground fatalities with 392 by burnover/entrapment).

**The other three fatality mechanisms account for the majority of wildland firefighter fatalities:**

- ❖ **Gravity (hazard trees, rolling rocks, and falls)**
- ❖ **Transportation (vehicle and aircraft incidents)**
- ❖ **Medical (heart attack and heat injury)**

**While the fatality mechanism of Entrapment is a lower frequency event based on our recent history, it is also the higher consequence event with the potential to affect larger numbers of firefighters at one time.**

### Entrapment Fatality Averages



Wildland Fire Entrapment Fatalities 1926-2012

Year	Fatalities	Significant Fires	Year	Fatalities	Significant Fires
1926	5	Springville-5	1980	2	
1927	0		1981	4	
1928	0		1982	1	
1929	1		1983	9	Northfield-3
1930	1		1984	12	Rainbow Springs-2
1931	8	Lewis & Clark-8	1985	5	
1932	0		1986	0	
1933	27	Griffith Park-25	1987	2	
1934	2		1988	1	
1935	1	Chatsworth-8	1989	1	
1936	9		1990	10	Dude-6
1937	20	Blackwater-15	1991	3	Point-2
1938	9	Pepper Run-8	1992	0	
1939	9	Rock Creek-5	1993	3	
1940	5		1994	18	South Canyon-14
1941	5		<b>Total</b> <b>1980-1994</b>	71	
1942	0		1995	2	
1943	15	Hauser Creek-11	1996	2	
1944	0		1997	0	
1945	1		1998	1	
1946	0		1999	2	
1947	2		2000	2	
1948	1		2001	5	Thirty-Mile Mile-4
1949	15	Mann Gulch-13	2002	0	
1950	5	Pelitor-4	2003	4	Cramer-2
1951	0		<b>Total</b> <b>1995-2003</b>	18	
1952	3		2004	1	
1953	16	Rattlesnake-15	2005	1	
1954	6	Gap Creek-3, Tunnel-3	2006	7	Esperanza-5
1955	8	Hacienda-5	2007	0	
1956	12	Inaja-11	2008	1	
<b>Total</b> <b>1926-1956</b>	186		2009	0	
1957	0		2010	0	
1958	2		2011	4	Blue Ribbon-2
1959	10	Decker-6	2012	0	
1960	3		<b>Total</b> <b>1995-2003</b>	14	
1961	5		<b>Total</b> <b>1926-2012</b>	392	
1962	4	Timber Lodge-4			
1963	1				
1964	3				
1965	4	Fairview Hollow-3			

**Wildland Fire Entrapment Fatalities 1926-2012**

1966	12	Loop-12			
<b>Total 1957-1966</b>	44				
1967	8				
1968	12	Canyon-8			
1969	0				
1970	0				
1971	7	Romero-4			
1972	1				
1973	1				
1974	0				
1975	2				
1976	4	Battlement Mesa-4			
1977	14	Bass River-4; Honda Canyon-3; Cart Creek-3			
1978	1				
1979	9	Spanish Ranch 4			
<b>Total 1967-1979</b>	59				

**Links to Additional Information and Locations of Significant Fatality Fires:**

[http://www.nifc.gov/safety/safety\\_documents/Fatalities-by-Year.pdf](http://www.nifc.gov/safety/safety_documents/Fatalities-by-Year.pdf)

[http://www.fireleadership.gov/toolbox/staffride/main\\_library.html](http://www.fireleadership.gov/toolbox/staffride/main_library.html)

<http://www.coloradofirecamp.com/honoring-our-fallen/fatality-sites.htm>

**National Wildland Firefighters Association**

<http://www.wffoundation.org/Index.asp>

