

**FIREFIGHTER FATALITIES  
IN THE UNITED STATES-2012**

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**June 2013**



**National Fire Protection Association  
Fire Analysis and Research Division**

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## **Abstract**

In 2012, a total of 64 on-duty firefighter deaths occurred in the U.S. Stress, exertion, and other medical-related issues, which usually result in heart attacks or other sudden cardiac events, continued to account for the largest number of fatalities. Almost half of the deaths resulted from overexertion, stress and related medical issues. Of the 31 deaths in this category, 27 were classified as sudden cardiac deaths (usually heart attacks) three were due to strokes and one due to heat stroke.

Keywords: Firefighter fatality, statistics, heart attack, sudden cardiac death

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## 2012 Experience

In 2012, a total of 64 on-duty firefighter deaths occurred in the U.S. For the past four years, the annual total has been well below 100, dropping the annual average over the past 10 years to 88 deaths. This is the second consecutive year that the total has been below 65 deaths. [Figure 1](#) shows firefighter deaths for the years 1977 through 2012, excluding the 340 firefighter deaths at the World Trade Center in 2001.<sup>1</sup>

Of the 64 firefighters who died while on duty in 2012, 30 were volunteer firefighters (lowest number ever), 23 were career firefighters (second lowest number ever), four were members of the military, three were federal contractors, two were employees of federal land management agencies and two were prison inmates.<sup>2</sup>

In 2012, there was one four-fatality incident and three double-fatality incidents. Four members of the air National Guard died when their aircraft crashed while operating on a wildland fire. Two contract pilots were killed when their aircraft crashed while operating at another wildland fire. Two firefighters were killed when a wall collapsed during interior operations at a structure fire; and two firefighters were shot and killed when they responded to a structure fire. More details will be presented throughout this report.

Analyses in this report examine the types of duty associated with firefighter deaths, the cause and nature of fatal injuries to firefighters, and the ages of the firefighters who died. They highlight deaths in intentionally-set fires and in motor vehicle-related incidents.<sup>3</sup> Finally, the study presents summaries of individual incidents that illustrate important concerns in firefighter safety.

## Introduction

Each year, NFPA collects data on all firefighter fatalities in the U.S. that resulted from injuries or illnesses that occurred while the victims were on-duty. The term *on-duty* refers to:

- being at the scene of an alarm, whether a fire or non-fire incident (including EMS calls);
- responding to or returning from an alarm;
- participating in other fire department duties such as training, maintenance, public education, inspection, investigation, court testimony or fund raising; and
- being on call or stand-by for assignment at a location other than at the firefighter's home or place of business.

On-duty fatalities include any injury sustained in the line of duty that proves fatal, any illness that was incurred as a result of actions while on duty that proves fatal, and fatal mishaps involving non-

emergency occupational hazards that occur while on duty. The types of injuries included in the first category are mainly those that occur at a fire or other emergency incident scene, in training, or in crashes while responding to or returning from alarms. Illnesses (including heart attacks) are included when the exposure or onset of symptoms occurred during a specific incident or on-duty activity.

The type of firefighters included in this study can be:

- members of local career and volunteer fire departments;
- seasonal, full-time and contract employees of state and federal agencies who have fire suppression responsibilities as part of their job description;
- prison inmates serving on firefighting crews;
- military personnel performing assigned fire suppression activities;
- civilian firefighters working at military installations; and
- members of industrial fire brigades.

Fatal injuries and illnesses are included even in cases where death is considerably delayed. When the injury and the death occur in different years, the incident is counted in the year of the injury.

The NFPA recognizes that a comprehensive study of on-duty firefighter fatalities would include chronic illnesses (such as cancer or heart disease) that prove fatal and that arise from occupational factors. In practice, there is no mechanism for identifying fatalities that are due to illnesses that develop over long periods of time. This creates an incomplete picture when comparing occupational illnesses to other factors as causes of firefighter deaths. This is recognized as a gap the size of which cannot be identified at this time because of limitations in tracking the exposure of firefighters to toxic environments and substances and the potential long-term effects of such exposures.

The NFPA also recognizes that other organizations report numbers of duty-related firefighter fatalities using different, more expansive, definitions that include deaths that occurred when the victims were off-duty. (See, for example, the [USFA](#) and [National Fallen Firefighters Memorial](#) websites.\*) Readers comparing reported losses should carefully consider the definitions and inclusion criteria used in any study.

## **Type of Duty**

[Figure 2](#) shows the distribution of the 64 deaths by type of duty. The largest share of deaths occurred while firefighters were operating on the fire ground (21 deaths). This is the lowest number of fire ground deaths since this study began in 1977 and accounts for just under one-third of the on-duty deaths in 2012. There has been an average of 29 fire ground deaths over the past 10 years (2003 through

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\* USFA link is [usfa.dhs.gov/fireservice/fatalities/index.shtm](http://usfa.dhs.gov/fireservice/fatalities/index.shtm), National Fallen Firefighters' Memorial link is [www.firehero.org/](http://www.firehero.org/)

2012), which is a tremendous improvement over the average of 69 deaths per year in the first 10 years of this study (1977 through 1986).

Twelve of the 21 fire ground deaths occurred at 11 structure fires. There were eight deaths at four wildland fires and one at a vehicle fire. Eight of the 21 fire ground victims were volunteer firefighters, five were career firefighters, four were military firefighters and four were employees or contractors with federal land management agencies. The average number of career firefighter deaths on the fire ground over the past 10 years is 11 deaths per year, while the average for volunteer firefighters is 13 deaths per year. An additional four deaths of state or federal wildland management agency personnel, on average, occur on wildland fires each year.

Nineteen firefighters died while responding to or returning from emergency calls. It is important to note that deaths in this category are not necessarily the result of crashes. Eight deaths occurred in collisions or rollovers, seven were due to sudden cardiac events or a stroke, two were shot on arrival at a structure fire, and in separate incidents, two firefighters were struck by falling trees while responding to or returning to the fire station. All crashes and sudden cardiac deaths are discussed in more detail later. Sixteen of the victims were volunteer firefighters, two were career firefighters and one was an employee of a federal land management agency. The number of deaths while responding to or returning from calls has averaged about 25 deaths per year over the past 10 years, so although this total for 2012 is not as low as in 2011, it still is lower than average and the percentage of deaths while responding or returning is consistent with the average share of the deaths in this category (29%) over the past 10 years.

Eight deaths occurred during training activities. Sudden cardiac death claimed five of the eight firefighters – two during training hikes, two during ladder training and one while working out at the station. One firefighter became overheated during smoke diver training and died. One firefighter fell from an aerial ladder during training. One firefighter drowned during dive training.

Four firefighters died at non-fire emergencies, all at the scene of motor vehicle crashes. Two were struck by vehicles and two suffered sudden cardiac deaths.

The remaining 12 firefighters died while involved in a variety of non-emergency-related on-duty activities. Eight of the victims were engaged in normal administrative or station duties (six fatalities were due to sudden cardiac death, one to stroke and one to long-term illness), two firefighters were involved in fatal motor vehicle crashes while on official fire department assignments, one collapsed while on a break during an out-of-town fire investigation and another collapsed while delivering water to an area where potable water is not available.

## Cause of Fatal Injury or Illness

Figure 3 shows the distribution of deaths by cause of fatal injury or illness. The term *cause* refers to the action, lack of action, or circumstances that resulted directly in the fatal injury.<sup>4</sup>

Half of the deaths resulted from overexertion, stress and medical issues. Of the 32 deaths in these categories, 27 were classified as sudden cardiac deaths (usually heart attacks), three were due to strokes and one due to heat stroke. One firefighter died while on duty as a result of a long-term illness. See the section below for more detail on sudden cardiac deaths.

The second leading cause of fatal injury was being struck by an object or coming into contact with an object. The 24 firefighters killed included 16 in motor vehicle crashes, three struck by motor vehicles, three struck by falling trees and two who were shot to death. The deaths involving motor vehicles are discussed in more detail in a separate section of this report.

The next leading cause of fatal injury was being caught or trapped, resulting in six deaths. Four firefighters were killed in three separate structure fires when roofs or walls collapsed. Rapid fire progress in a structure fire resulted in the death of one of the six firefighters. One firefighter drowned during dive training.

Two firefighters were killed in falls. One firefighter fell from an aerial ladder during training and the other fell from the back step of a tanker when it skidded on an icy road. (In that second incident, the driver of the apparatus drove away while the victim was still on the back step after filling a dump tank at a structure fire.)

## Nature of Fatal Injury or Illness

The term *nature* refers to the medical process by which death occurred and is often referred to as *cause of death* on death certificates and in autopsy reports.

Figure 4 shows the distribution of deaths by nature of fatal injury or illness. Two-fifths of the fatalities, 27 deaths, were due to sudden cardiac death.

The other major categories of fatal injuries were internal trauma and crushing (24 deaths), asphyxiation or smoke inhalation (four deaths), strokes (three deaths) and gunshot (two deaths). There was one death each due to drowning, burns, heat stroke and long-term illness. (That victim died while on-duty but it was not established that the cause of the illness was job-related.)

## Sudden Cardiac Deaths

In 2012, the 27 sudden cardiac deaths with onset while the victim was on-duty is the lowest since this study began in 1977, and the fifth consecutive year where the deaths in this category has declined.

The number of deaths in this category has fallen significantly since the early years of this study. From 1977 through 1986, an average of 60 on-duty firefighters a year suffered sudden cardiac deaths (44.7 percent of the on-duty deaths during that period). These are cases where the onset of symptoms occurred while the victim was on-duty and death occurred immediately or shortly thereafter. The average number of deaths fell to 44 a year in the 1990s and to 37 in the past decade. In spite of this reduction, sudden cardiac death still accounted for 42 percent of the on-duty deaths in the last five years. Overall, sudden cardiac death is the number one cause of on-duty firefighter fatalities in the U.S. and almost always accounts for the largest share of deaths in any given year.

For 20 of the 27 victims of sudden cardiac events in 2012, post mortem medical documentation was available and showed that 14 were hypertensive, 11 had arteriosclerotic heart disease, eight were obese, five had coronary artery disease, five were diabetic, and eight were reported to have had a history of cardiac problems -- such as prior heart attacks, bypass surgery or angioplasty/stent placement. Some of the victims had more than one condition. Other risk factors were represented among the victims of sudden cardiac death, including high cholesterol, smoking and family history. Medical documentation was not available for the other seven firefighters.

NFPA has several standards that focus on the health risks to firefighters. For example, [NFPA 1582, \*Comprehensive Occupational Medical Program for Fire Departments\*](#), outlines for fire departments the medical requirements that must be met by candidate firefighters and incumbent fire department members. [NFPA 1500, \*Fire Department Occupational Safety and Health Program\*](#), calls for fire departments to establish a firefighter health and fitness program that meets [NFPA 1583, \*Health-Related Fitness Programs for Fire Fighters\*](#), and requires that firefighters meet the medical requirements of NFPA 1582.

Information on developing a wellness-fitness program is available from other organizations, for example, the [IAFC/IAFF Fire Service Joint Labor-Management Wellness-Fitness Initiative](#)<sup>†</sup> and the [National Volunteer Fire Council's Heart-Healthy Firefighter Program](#).<sup>‡</sup> The Heart-Healthy Firefighter Program was launched in 2003 to address heart attack prevention for all firefighters and EMS personnel, through fitness, nutrition and health awareness.

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<sup>†</sup> [http://www.iafc.org/files/healthWell\\_WFI3rdEdition.pdf](http://www.iafc.org/files/healthWell_WFI3rdEdition.pdf)

<sup>‡</sup> <http://www.healthy-firefighter.org/>



## **Ages of Firefighters**

The firefighters who died in 2012 ranged in age from 17 to 79, with a median age of 49 years. [Figure 5](#) shows the distribution of firefighter deaths by age and whether the cause of death was sudden cardiac death or not.

Sudden cardiac death accounts for a higher proportion of the deaths among older firefighters, as might be expected. Almost 60 percent of the firefighters over age 40 who died in 2012, and all of the victims over age 60, died of heart attacks or other cardiac events. The youngest victim of sudden cardiac death was aged 24.

[Figure 6](#) shows death rates by age, using combined career and volunteer firefighter fatality data for the five-year period from 2008 through 2012 and estimates of the number of career and volunteer firefighters in each age group from NFPA's 2010 profile of fire departments (the mid-year in the range).<sup>5</sup>

The lowest death rates were for firefighters in their 20s and 30s. Their death rate was about half the all-age average. The rate for firefighters aged 60 and over was almost four times the average. Firefighters aged 50 and over accounted for almost half of all firefighter deaths over the five-year period, although they represent only one-fifth of all career and volunteer firefighters in the U.S.

## **Fire Ground Deaths**

Of the 21 fire ground fatalities, nine were due to internal trauma or crushing, six to sudden cardiac death, four to asphyxiation or smoke inhalation, one to inhalation injuries in superheated conditions and one to stroke. Twelve of the deaths occurred at 11 structure fires, eight occurred on four wildland fires and one while directing traffic at a vehicle fire. This is the lowest number of deaths at structure fires ever.

[Figure 7](#) shows the distribution of the 21 fire ground deaths by fixed property use. Six of the eight victims at wildland fires were killed in two aircraft crashes. One wildland firefighter was struck by a falling snag (part of a dead tree) and a contracted tree faller suffered a fatal cardiac event. The firefighter who was directing traffic at a motor vehicle fire suffered a stroke.

Six of the 12 firefighter deaths at structure fires occurred in residential properties. Five were killed in fires in one- and two-family dwellings and one died at a fire in an apartment building. Three of the six firefighters suffered sudden cardiac death at the fire scene – one while directing operations, one who was the driver of the rescue company that served as the rapid intervention crew and the third on arrival at the apartment building fire. One firefighter was killed when he fell from the rear step of a tanker that was involved in water shuttle operations for a dwelling fire. One firefighter suffered fatal inhalation injuries when he was caught by rapid flame spread upstairs at a dwelling fire. And one firefighter was struck and

killed by a fire department vehicle that was backing up at the fire scene.

Two firefighters were killed when the wall of a burning vacant warehouse collapsed onto the exposed structure where they were operating. Both died of mechanical asphyxia.

Two firefighters were killed in separate roof collapses; one when the bowstring truss roof of a movie theater collapsed during a fire and the other when the roof of a restaurant collapsed.

Sudden cardiac death claimed the lives of two firefighters - one at a chemical plant and the other at a warehouse fire.

That warehouse was the only structure that had an automatic suppression system. The wet pipe sprinkler system operated, with seven heads opening. The system was effective in controlling, but did not extinguish, the fire.

To put the hazards of firefighting in various types of structures into perspective, the authors examined the number of fire ground deaths per 100,000 structure fires by property use. Estimates of the structure fire experience in each type of property were obtained from the NFPA's annual fire loss studies from 2007 through 2011 (the 2012 results are not yet available) and from the updated firefighter fatality data for the corresponding years. The results are shown in [Figure 8](#). Fires in vacant structures are included in the category for the intended use of the structure; for example, deaths in vacant houses are included in the residential fire category.

This figure illustrates that, although many more firefighter deaths occur at residential structure fires than at fires in any other type of structure, fires in some nonresidential structures, such as mercantile, public assembly and manufacturing properties, are more hazardous to firefighters, on average. There were 9.3 fire ground deaths per 100,000 nonresidential structure fires from 2007 through 2011, compared to 3.4 deaths per 100,000 residential structure fires. The highest death rates over the five-year period occurred in stores and offices. This is a reflection, in part, of the nine deaths that occurred at a single store fire in 2007. The low rate in health care and correctional properties over that five-year period may reflect the fact that these occupancies are among the most regulated, most-protected and most-frequently inspected and that their occupants are among the most likely to call the fire department to report fires while the fires are still in their early stages. The low rate in that five-year period for storage properties, which includes garages at dwellings, reflects the relatively small number of fatalities that have occurred in such structures in recent years. In contrast, the similar rate in educational properties is a result of a single fatality over the five-year period in a type of property that has a very low occurrence of reported fires.

From 2003 through 2012, there were 19 deaths in 16 fires in vacant buildings and buildings under demolition or renovation.

## **Vehicle-Related Deaths**

In 2012, 20 firefighters died in 16 vehicle-related incidents, including 16 firefighters who died in 12 vehicle crashes. Three other firefighters were struck and killed by vehicles, and one firefighter fell from the back step of a tanker, as described earlier.

Seven of the 16 firefighters who died in crashes were killed in separate crashes while responding to incidents and one was killed while returning from an incident. Five of these eight were passengers in the vehicle, while the other three were drivers. Three were responding to the scene of motor vehicle crashes, three were responding to wildland fires, one was responding to a structure fire and one was returning from a call concerning a CO detector activation.

- A firefighter responding to a crash scene in his private vehicle was killed when he made a U-turn on a dark, wet highway in order to cross over to the median to reach the crash scene. A tractor-trailer struck his vehicle as it crossed the highway. The victim was not wearing a seatbelt. The inattention of the victim and the improper turn on the highway were factors in the crash.
- A firefighter responding to a structure fire crashed into a tree on a dark road while enroute to the fire station in his private vehicle. The victim was not wearing a seatbelt and was ejected. Speed was a factor in the crash.
- A firefighter riding as a passenger in a fire apparatus enroute to a wildland fire was killed when the driver became distracted and the vehicle drifted and then overturned when the driver overcorrected. The victim was wearing a seatbelt. Driver inexperience and distraction were factors in the crash.
- A firefighter riding as a passenger in a fire apparatus enroute to a motor vehicle crash was killed when the vehicle went off the road on a curve, struck trees and overturned. The victim was not wearing a seatbelt and was ejected.
- A firefighter riding as a passenger in a private vehicle enroute to a woods fire died when the vehicle, speeding on a curve, spun, struck a pole and overturned, crushing the passenger side of the vehicle. The victim was wearing a seatbelt.
- A firefighter driving a tanker/tender to a grass fire was killed in a crash. He was not wearing a seatbelt and was ejected. No other details are available.
- A firefighter riding as a passenger in a private vehicle enroute to the scene of a motor vehicle crash died when the vehicle overturned after the driver tried to avoid another vehicle. The victim was not wearing a seatbelt and was ejected.

- One firefighter returning from a call as passenger in a fire apparatus was killed when the vehicle left the road, overturned, struck a utility pole and ended up in a ditch. The road was dark and wet. The victim was wearing a seatbelt.

Six firefighters were killed in two aircraft crashes while operating on wildland fires. Four firefighters were killed in one of the incidents when their aircraft flew into a microburst and then crashed while they were dropping retardant on the fire. The other two firefighters were also in an aircraft dropping fire retardant on a fire when their aircraft struck mountainous terrain.

Two firefighters died in crashes while involved in official fire department business. One was driving his fire department vehicle to a meeting when his vehicle was struck by another vehicle that lost control on a highway. He was wearing a seatbelt. The other victim was returning from a meeting on his motorcycle when he struck a car that pulled out into the road in front of him.

Of the 10 deaths in road vehicles mentioned above, five of the victims were not wearing seatbelts (four were ejected and one was not) and four were wearing seatbelts and were not ejected. The tenth victim was riding a motorcycle. Factors reported in the crashes included excessive speed, driver inattention, weather conditions, driver inexperience and failure to maintain control of the vehicle.

Three firefighters were struck and killed by vehicles.

- One of the three had stepped out of the responding apparatus, walked behind it as it was being repositioned and was struck by the apparatus.
- Another firefighter was operating at a motor vehicle crash on an icy highway when a passing vehicle lost control and struck him.
- The third victim was killed at the scene of a motor vehicle crash when another driver deliberately struck him and two other emergency responders. The victim was wearing a high-visibility vest, was standing close to traffic and was not protected by the positioning of the emergency apparatus.

NFPA publishes several standards related to road and vehicle safety issues and a new standard is currently being developed.

- [NFPA 1002, Standard on Fire Apparatus Driver/Operator Professional Qualifications](#), identifies the minimum job performance requirements for firefighters who drive and operate fire apparatus, in both emergency and nonemergency situations.
- [NFPA 1451, Standard for a Fire Service Vehicle Operations Training Program](#), provides for the development of a written vehicle operations training program, including the organizational procedures for training, vehicle maintenance, and identifying equipment deficiencies.

- [NFPA 1911, Standard for the Inspection, Testing, Maintenance and Retirement of In-Service Automotive Fire Apparatus](#), details a program to ensure that fire apparatus are serviced and maintained to keep them in safe operating condition.
- [NFPA 1901, Standard for Automotive Fire Apparatus](#), addresses vehicle stability to prevent rollovers, and gives manufacturers options on how to provide it. New vehicles will have their maximum speed limited, based on their weight, and will have vehicle data recorders to monitor, among other things, acceleration and deceleration, and seatbelt use.
- [NFPA 1906, Standard for Wildland Fire Apparatus](#), establishes minimum design, performance and testing requirements for new vehicles over 10,000 lb gross vehicle weight rating that are specifically designed for wildland fire suppression. [NFPA 1091, Standard on Traffic Control Incident Management](#), which is currently under development, will identify the minimum job performance requirements necessary to perform temporary traffic control duties at emergency incidents on or near an active roadway. Its first edition will be published in 2015.

The provisions of [NFPA 1500, Standard on Fire Department Occupational Safety and Health Program](#), include requirements that operators successfully complete an approved driver training program, possess a valid driver's license for the class of vehicle, and operate the vehicle in compliance with applicable traffic laws. All vehicle occupants must be seated in approved riding positions and secured with seatbelts before drivers move the apparatus, and drivers must obey all traffic signals and signs and all laws and rules of the road, coming to a complete stop when encountering red traffic lights, stop signs, stopped school buses with flashing warning lights, blind intersections and other intersection hazards, and unguarded railroad grade crossings. Passengers are required to be seated and belted securely and must not release or loosen seatbelts for any reason while the vehicle is in motion.

In related efforts, the USFA has formed partnerships with the IAFF, NVFC and IAFC to focus attention on safety while responding in emergency apparatus. Details can be found on [USFA's website](#).<sup>§</sup>

The focus of vehicle safety programs should not be exclusively on fire department apparatus, since, over the years, private vehicles have been the vehicles most frequently involved in road crashes. [NFPA 1500, Standard on Fire Department Occupational Safety and Health Program](#), includes a requirement that when members are authorized to respond to incidents or to fire stations in private vehicles, the fire department must establish specific rules, regulations, and procedures relating to the

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<sup>§</sup> [http://www.usfa.fema.gov/fireservice/firefighter\\_health\\_safety/safety/vehicle\\_safety/index.shtm](http://www.usfa.fema.gov/fireservice/firefighter_health_safety/safety/vehicle_safety/index.shtm)

operation of private vehicles in an emergency mode. [NFPA 1451, Standard for a Fire Service Vehicle Operations Training Program](#), also requires training for those using privately-owned vehicles.

Requirements are also in effect for emergency personnel operating on roadways. The 2009 version of the Federal Highway Administration’s Manual of Uniform Traffic Control Devices (MUTCD) requires anyone working on a roadway to wear an ANSI 107-compliant high-visibility vest. An exemption was created for firefighters and others engaged on roadways that allows them to wear NFPA-compliant personal protective clothing (turn-out gear) when directly exposed to flames, heat and hazardous material. NFPA 1500 requires firefighters working on traffic assignments where they are endangered by motor vehicle traffic to wear clothing with fluorescent and retroreflective material and use fire apparatus in a blocking position to protect firefighters. The 2009 edition of NFPA 1901 requires that ANSI 207-compliant breakaway high-visibility vests be carried on all new fire apparatus, and MUTCD 2009 allows emergency responders to use them in lieu of ANSI 107-compliant apparel. Advice on compliance with the updated Federal rules can be found at: [MUTCD](#).\*\* NFPA 1901 also requires reflective striping for improved visibility on new apparatus and a reflective chevron on the rear of fire apparatus. Advice on how to improve visibility of existing apparatus can be found at: [video](#).††

### **Career/Volunteer Comparison**

[Figure 9](#) compares the number of deaths of career firefighters and volunteer firefighters from local fire departments since the study was first done in 1977. The 30 deaths of volunteer firefighters in 2012 is the lowest number reported in this study, for the second consecutive year, and maintains the general downward trend seen since 1999. The number of on-duty deaths of volunteer firefighters in 2012 is approximately half the average number reported just 10 years ago. . The trend for career firefighters has been relatively flat over the past 10 years, although the trend has been downward since 2009. This is the third consecutive year that the total for career firefighters has been 25 or lower. The high number for career firefighters in 2007 is due to a single nine-fatality incident.

A breakdown of the fatality experience of the 53 career and volunteer firefighters killed in 2012 is shown in [Table 1](#).

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\*\* [http://www.respondersafety.com/Articles/2009\\_Edition\\_of\\_the\\_Manual\\_on\\_Uniformed\\_Traffic\\_Control\\_Devices\\_MUTCD\\_Released\\_December\\_16\\_2009.aspx](http://www.respondersafety.com/Articles/2009_Edition_of_the_Manual_on_Uniformed_Traffic_Control_Devices_MUTCD_Released_December_16_2009.aspx)

†† <http://www.respondersafety.com/MarkedAndSeen.aspx>

## **Other Findings**

Four firefighters were killed in connection with intentionally-set fires in 2012; two at the scene of fires and two while responding to a fire. All were structure fires. From 2003 through 2012, 44 firefighters (5.0 percent of all on-duty deaths) died in connection with intentionally-set fires. The number of these deaths annually has been dropping since 1985.

In 2012, there was one death that resulted from a false alarm. Over the past 10 years, 23 firefighter deaths have resulted from false calls, including malicious false alarms and alarm malfunctions.

## **Summary**

There were 64 on-duty firefighter deaths in 2012; for the fourth consecutive year, the total has been lower than 100 deaths. The total number of deaths has been below 100 for six of the last 10 years. The annual average has dropped to 88 deaths per year (based on the past 10 years). The years 2011 and 2012 have been by far the two lowest years on record, and the years 2009 through 2012 include four of the six lowest years on record.

Overall, the number of on-duty cardiac-related deaths has been gradually decreasing since 1977, although not as rapidly as the total number of on-duty deaths. While still claiming the largest share of deaths almost every year, and 42 percent of the on-duty deaths in 2012, this marked the fifth consecutive year of decrease, and the first time that the total has been below 30 on-duty cardiac deaths in a year.

There were many more road vehicle crash deaths in 2012 than in 2011 (10 vs four), but the number of crash deaths continues to be lower than the 10-year average. Over the past 10 years, the number of deaths in road vehicle crashes has averaged less than 14 a year, ranging from the low of four in 2011 to a high of 25 in 2003 and 2007. For the fourth consecutive year, and the fifth year over the past 10 years, the total number of road vehicle crash deaths has been 10 or lower. Since, historically, crashes have been the number two cause of on-duty firefighter deaths, with most of the crashes involving road vehicles, this is a very important and positive trend.

The 21 deaths on the fire ground in 2012 is the lowest total since 1977, and the number of deaths at structure fires was also the lowest ever, at 12 deaths in 2012. Although this is an encouraging result, given the slight increase in the number of structure fires over the past couple of years, it bears watching, as recent analyses have shown that traumatic deaths in recent years while operating inside structures have been occurring at rates higher than reported in the 1970s and 1980s. (The rates for fire ground deaths in 2012 will be calculated when the number of structure fires in 2012 is reported in September.)

This NFPA study focuses on the fire deaths that are directly associated with specific on-duty activities, and does not track the effects of long-term exposure to toxic products that might occur during

an individual's time in the fire service. However, NIOSH has undertaken a multi-year study to examine the cancer risk of firefighters, using health records of approximately 30,000 current and retired career firefighters from suburban and large city fire departments. Results should be released in 2014. More information about the project is available on the [USFA](#) and [NIOSH](#) websites.<sup>‡‡</sup>

## References

1. The NFPA's files for firefighter on-duty fatal injuries are updated continually for all years.
2. For this report, the term *volunteer* refers to any firefighter whose principal occupation is not that of a full-time, paid member of a fire department. The term *career* refers to any firefighter whose occupation is that of a full-time, paid fire department member.
3. For this report, the term *motor vehicle-related incident* refers to motor vehicle collisions (including aircraft and boats) and rollovers, as well as to incidents such as falls from or struck by vehicles where the involvement of the vehicle played an integral role in the death.
4. The categories for cause of injury and nature of injury are based on the 1981 edition of NFPA 901, *Uniform Coding for Fire Protection*.
5. Michael J. Karter, Jr., "[U.S. Fire Department Profile Through 2010](#)," NFPA Fire Analysis and Research Division, Quincy, Massachusetts, October 2011.

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<sup>‡‡</sup> [http://www.usfa.dhs.gov/fireservice/research/safety/niosh\\_cancer\\_study.shtm](http://www.usfa.dhs.gov/fireservice/research/safety/niosh_cancer_study.shtm) and <http://www.cdc.gov/niosh/firefighters/cii07.html>



## **U.S. Department of Justice Death, Disability and Educational Benefits for Public Safety Officers and Survivors**

**Line of duty deaths:** The Public Safety Officers' Benefits (PSOB) Act, signed into law in 1976, provides a federal death benefit to the survivors of the nation's federal, state, local and tribal law enforcement officers, firefighters, and rescue and ambulance squad members, both career and volunteer, whose deaths are the direct and proximate result of a traumatic injury sustained in the line of duty. The Act was amended in 2000 to include FEMA employees performing official, hazardous duties related to a declared major disaster or emergency. Effective December 15, 2003, public safety officers are covered for line-of-duty deaths that are a direct and proximate result of a heart attack or stroke, as defined in the Hometown Heroes Survivors' Benefits Act of 2003. The Dale Long PSOB Improvements Act of 2012 expands the Hometown Heroes Act to include vascular ruptures.

A 1988 amendment increased the amount of the benefit from \$50,000 to \$100,000 and included an annual cost-of-living escalator. On October 1 of each year, the benefit changes as a result. The enactment of the USA PATRIOT bill in 2001 increased the benefit to \$250,000. The current benefit is \$328,612.73, tax free.

A decedent's spouse and minor children usually are the eligible beneficiaries. Generally, in cases in which the public safety officer had no surviving spouse or eligible children, the death benefit is to be awarded to either the individual most recently designated as beneficiary for PSOB benefits with the officer's public safety agency, organization, or unit, or, if there is no designation of beneficiary of PSOB benefits on file, then to the individual designated as beneficiary under the most recently executed life insurance policy on file with the agency at the time of death. (*See* 42 U.S.C. § 3796(a)(4) for specific details.) If no individuals qualify under 42 U.S.C. § 3796(a)(4), then the benefit is paid to the public safety officer's surviving parents; if the officer is not survived by a parent, the benefit may be paid to the officer's children who would be eligible to receive it but for their age (i.e., adult children).

**Line of duty disabilities:** In 1990, Congress amended the PSOB benefits program to include permanent and total disabilities that occur on or after November 29, 1990. The amendment covers public safety officers who are permanently unable to perform any gainful employment in the future. PSOB is intended for those few, tragic cases where an officer survives a catastrophic, line of duty injury. Only then, in the presence of the program's statutory and regulatory qualifying criteria, will PSOB's disability benefit be awarded. The bill's supporters anticipated that few PSOB disability claims would be eligible annually.

**Public Safety Officers' Educational Assistance Program (PSOEA):** An additional benefit, signed into law in October 1996 and amended in 1998, provides an educational assistance allowance to the spouse and children of public safety officers whose deaths or permanent and total disabilities qualify under the PSOB Act. This benefit is provided directly to dependents who attend a program of education at an eligible education institution and are the children or spouses of covered public safety officers. It is retroactive to January 1, 1978, for beneficiaries who have received or are eligible to receive the PSOB death benefit. Students may apply for PSOEA funds for up to 45 months of full-time classes. As of October 1, 2011, the maximum benefit a student may receive is \$987 per month of full-time attendance.

**Further benefits information:** To initiate a claim for death benefits, to receive additional information on filing a disability claim or to receive additional information about coverage, call, email, or write the Public Safety Officers' Benefits Office, Bureau of Justice Assistance, Office of Justice Programs, U.S. Department of Justice, 810 7<sup>th</sup> Street, N.W., Washington DC 20531. The telephone number is (888) 744-6513 and the email address is [ASKPSOB@usdoj.gov](mailto:ASKPSOB@usdoj.gov). PSOB death claims can be filed online as well at: <https://www.psob.gov>. Please note that the PSOB Office "Call Center" is available to take calls Monday through Friday from 7:00 AM until 5:00 PM ET.

**Table 1  
Comparison of On-Duty Deaths Between  
Career and Volunteer Firefighters, 2012\***

|   | <b>Career Firefighters</b> |                          | <b>Volunteer Firefighters</b> |                          |
|---|----------------------------|--------------------------|-------------------------------|--------------------------|
|   | <b>Number of Deaths</b>    | <b>Percent of Deaths</b> | <b>Number of Deaths</b>       | <b>Percent of Deaths</b> |
| <b>Type of duty</b>                       |                            |                          |                               |                          |
| Operating at fire ground                  | 5                          | 22%                      | 8                             | 27%                      |
| Responding to or returning from alarms    | 2                          | 9%                       | 16                            | 53%                      |
| Training                                  | 4                          | 17%                      | 3                             | 10%                      |
| Operating at non-fire emergencies         | 2                          | 9%                       | 2                             | 7%                       |
| Other on-duty                             | 10                         | 45%                      | 1                             | 3%                       |
| <b>Totals</b>                             | <b>23</b>                  | <b>100%</b>              | <b>30</b>                     | <b>100%</b>              |
| <b>Cause of fatal injury</b>              |                            |                          |                               |                          |
| Overexertion/stress/other related         | 15                         | 65%                      | 14                            | 47%                      |
| Caught or trapped                         | 3                          | 13%                      | 3                             | 10%                      |
| Struck by or contact with object          | 4                          | 17%                      | 12                            | 40%                      |
| Fell                                      | 1                          | 4%                       | 1                             | 3%                       |
| <b>Totals</b>                             | <b>23</b>                  | <b>100%</b>              | <b>30</b>                     | <b>100%</b>              |
| <b>Nature of fatal injury</b>             |                            |                          |                               |                          |
| Sudden cardiac death                      | 13                         | 57%                      | 12                            | 40%                      |
| Internal trauma/crushing                  | 5                          | 22%                      | 11                            | 37%                      |
| Asphyxiation (including smoke inhalation) | 2                          | 9%                       | 2                             | 7%                       |
| Burns                                     | 1                          | 4%                       | 0                             | 0%                       |
| Stroke                                    | 2                          | 9%                       | 1                             | 3%                       |
| Drowning                                  | 0                          | 0%                       | 1                             | 3%                       |
| Gunshot                                   | 0                          | 0%                       | 2                             | 7%                       |
| Heat stroke                               | 0                          | 0%                       | 1                             | 3%                       |
| <b>Totals</b>                             | <b>23</b>                  | <b>100%</b>              | <b>30</b>                     | <b>100%</b>              |
| <b>Rank</b>                               |                            |                          |                               |                          |
| Firefighter                               | 9                          | 39%                      | 17                            | 57%                      |
| Company officer                           | 10                         | 43%                      | 8                             | 27%                      |
| Chief officer                             | 4                          | 17%                      | 5                             | 17%                      |
| <b>Totals</b>                             | <b>23</b>                  | <b>100%</b>              | <b>30</b>                     | <b>100%</b>              |

**Table 1**  
**Comparison of On-Duty Deaths Between**  
**Career and Volunteer Firefighters, 2012\* (Continued)**

|   | Career Firefighters |                   | Volunteer Firefighters |                   |
|---|---------------------|-------------------|------------------------|-------------------|
|   | Number of Deaths    | Percent of Deaths | Number of Deaths       | Percent of Deaths |
| <b>Ages of Firefighters</b>                     |                     |                   |                        |                   |
| <b>All Deaths</b>                               |                     |                   |                        |                   |
| 20 and under                                    | 0                   | 0%                | 5                      | 17%               |
| 21 to 25  | 1                   | 4%                | 2                      | 7%                |
| 26 to 30  | 0                   | 0%                | 2                      | 7%                |
| 31 to 35  | 2                   | 9%                | 1                      | 3%                |
| 36 to 40  | 0                   | 0%                | 1                      | 3%                |
| 41 to 45  | 0                   | 0%                | 3                      | 10%               |
| 46 to 50  | 9                   | 39%               | 2                      | 7%                |
| 51 to 55  | 5                   | 22%               | 4                      | 13%               |
| 56 to 60  | 4                   | 17%               | 3                      | 7%                |
| 61 to 65  | 1                   | 4%                | 4                      | 13%               |
| Over 70   | 1                   | 4%                | 4                      | 13%               |
| Totals  | 23                  | 100%              | 30                     | 100%              |
| <b>Ages of Firefighters</b>                     |                     |                   |                        |                   |
| <b>Sudden cardiac deaths only</b>               |                     |                   |                        |                   |
| 21 to 25  | 0                   | 0%                | 1                      | 8%                |
| 41 to 45  | 0                   | 0%                | 1                      | 8%                |
| 46 to 50  | 7                   | 54%               | 0                      | 0%                |
| 51 to 55  | 3                   | 23%               | 0                      | 0%                |
| 56 to 60  | 1                   | 8%                | 2                      | 17%               |
| 61 to 65  | 1                   | 8%                | 4                      | 33%               |
| Over 65   | 1                   | 8%                | 4                      | 33%               |
| Totals  | 13                  | 100%              | 12                     | 100%              |
| <b>Fire ground deaths by fixes property use</b> |                     |                   |                        |                   |
| Dwellings and apartments                        | 2                   | 40%               | 4                      | 50%               |
| Storage   | 1                   | 20%               | 0                      | 0%                |
| Vacant warehouse                                | 2                   | 40%               | 0                      | 0%                |
| Restaurant                                      | 0                   | 0%                | 1                      | 13%               |
| Theater   | 0                   | 0%                | 1                      | 13%               |
| Manufacturing                                   | 0                   | 0%                | 1                      | 13%               |
| Vehicle fire                                    | 0                   | 0%                | 1                      | 13%               |
| Totals  | 5                   | 100%              | 8                      | 100%              |

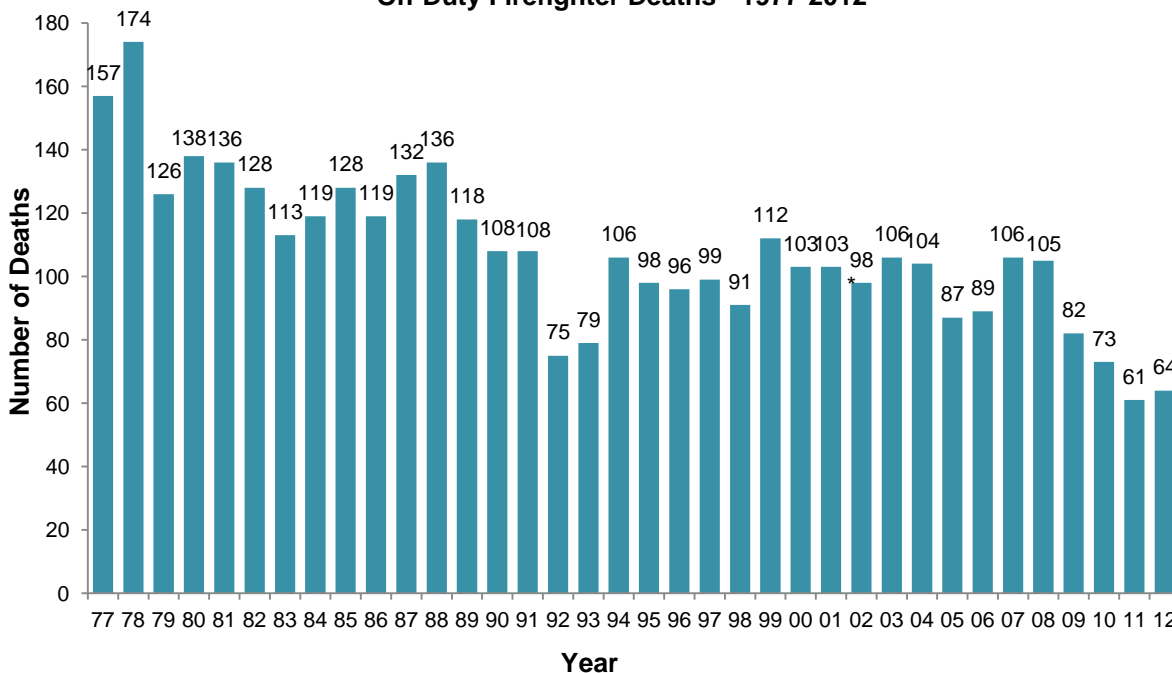
**Table 1**  
**Comparison of On-Duty Deaths Between**  
**Career and Volunteer Firefighters, 2012\* (Continued)**

|   | <b>Career Firefighters</b> |                          | <b>Volunteer Firefighters</b> |                          |
|---|----------------------------|--------------------------|-------------------------------|--------------------------|
|   | <b>Number of Deaths</b>    | <b>Percent Of Deaths</b> | <b>Number of Deaths</b>       | <b>Percent of Deaths</b> |
| <b>Years of service</b>                   |                            |                          |                               |                          |
| 5 or less                                 | 3                          | 13%                      | 10                            | 33%                      |
| 6 to 10                                   | 1                          | 4%                       | 4                             | 13%                      |
| 11 to 15                                  | 0                          | 0%                       | 2                             | 7%                       |
| 16 to 20                                  | 6                          | 26%                      | 2                             | 7%                       |
| 21 to 25                                  | 6                          | 26%                      | 2                             | 7%                       |
| 26 to 30                                  | 2                          | 9%                       | 1                             | 3%                       |
| Over 30                                   | 5                          | 22%                      | 9                             | 30%                      |
| Totals                                    | 23                         | 100%                     | 30                            | 100%                     |
| <b>Attributes of fire ground deaths**</b> |                            |                          |                               |                          |
| Intentionally-set fires                   | 0                          |                          | 2                             |                          |
| Search and rescue operations              | 0                          |                          | 0                             |                          |
| <b>Motor vehicle crashes</b>              |                            |                          |                               |                          |
|   | 2                          |                          | 7                             |                          |
| <b>False alarms</b>                       |                            |                          |                               |                          |
|   | 0                          |                          | 1                             |                          |

\* This table does not include the 11 victims who were members of the military, employees or contractors with federal land management agencies, or members of prison inmate crews.

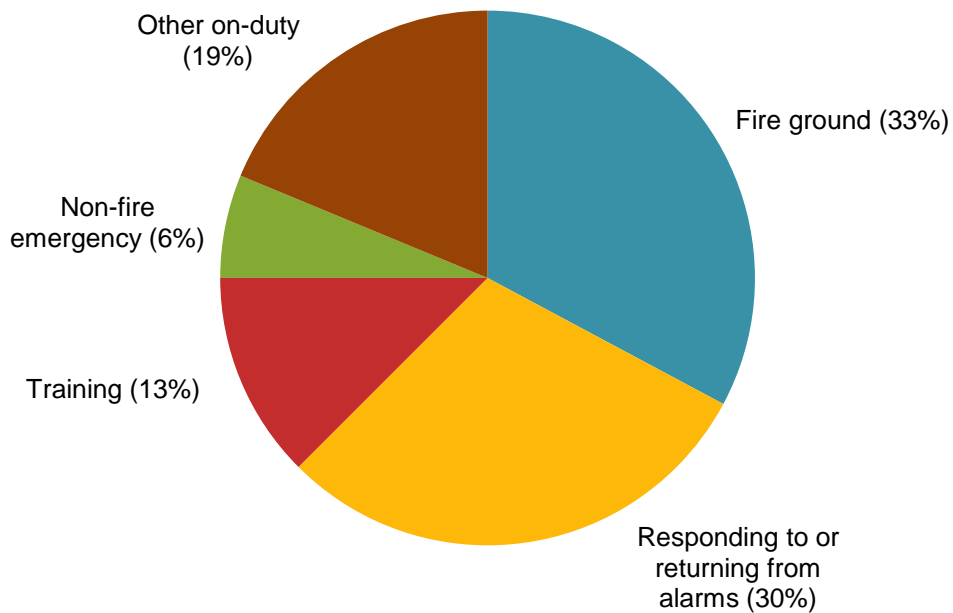
\*\* Because these attributes are not mutually exclusive, totals and percentages are not shown.

**Figure 1**  
**On-Duty Firefighter Deaths - 1977-2012**

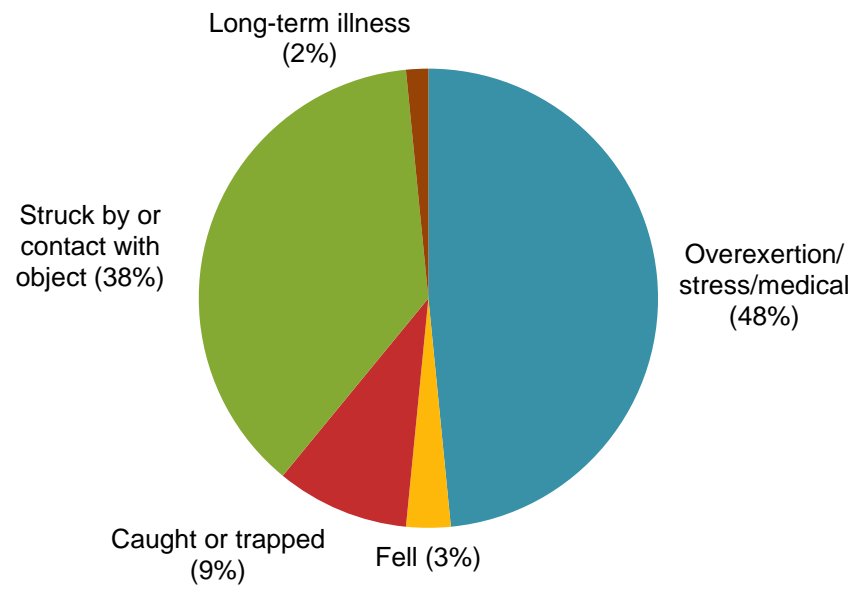


\* excluding the 340 firefighter deaths at the World Trade Center

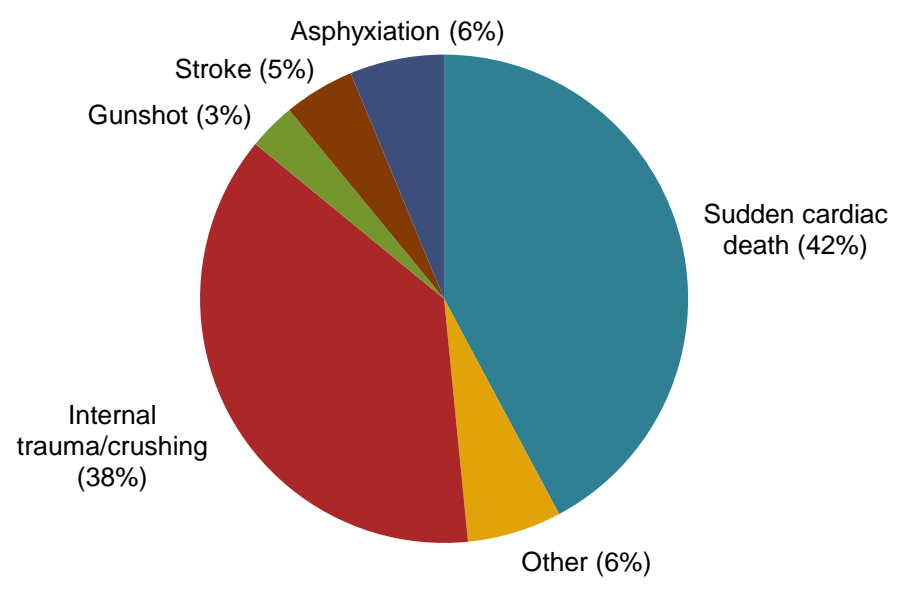
**Figure 2**  
**Firefighter Deaths by Nature of Injury -- 2012**



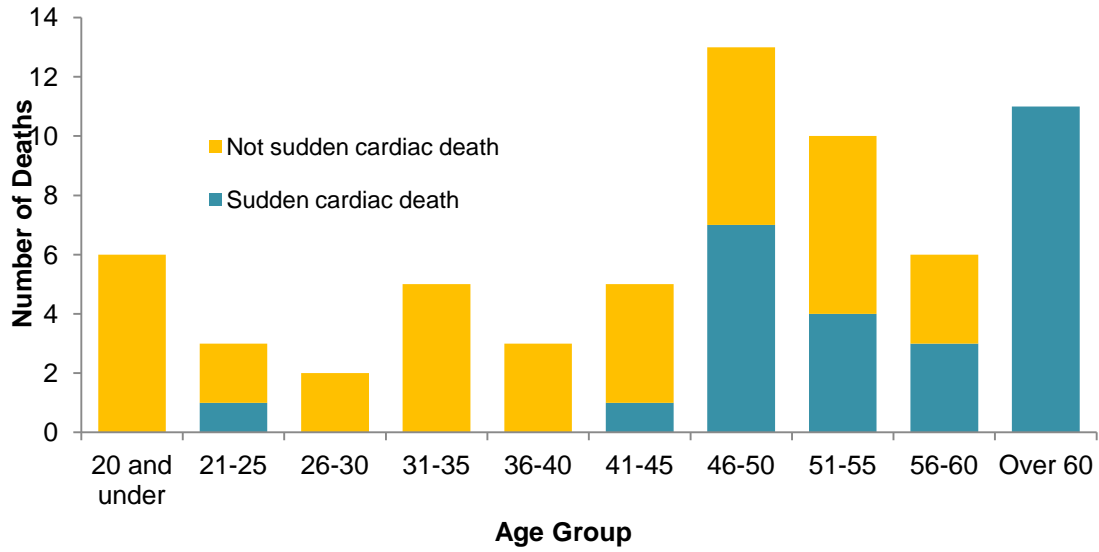
**Figure 3**  
**Firefighter Deaths by Cause of Injury -- 2012**



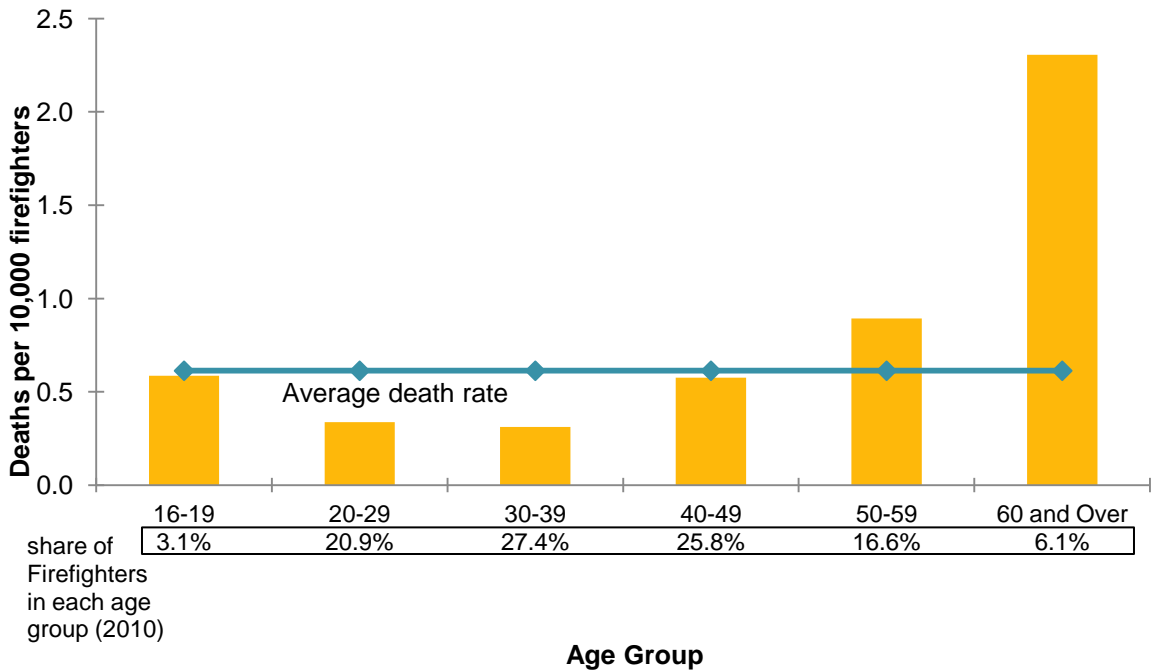
**Figure 4**  
**Firefighter Deaths by Nature of Injury -- 2012**



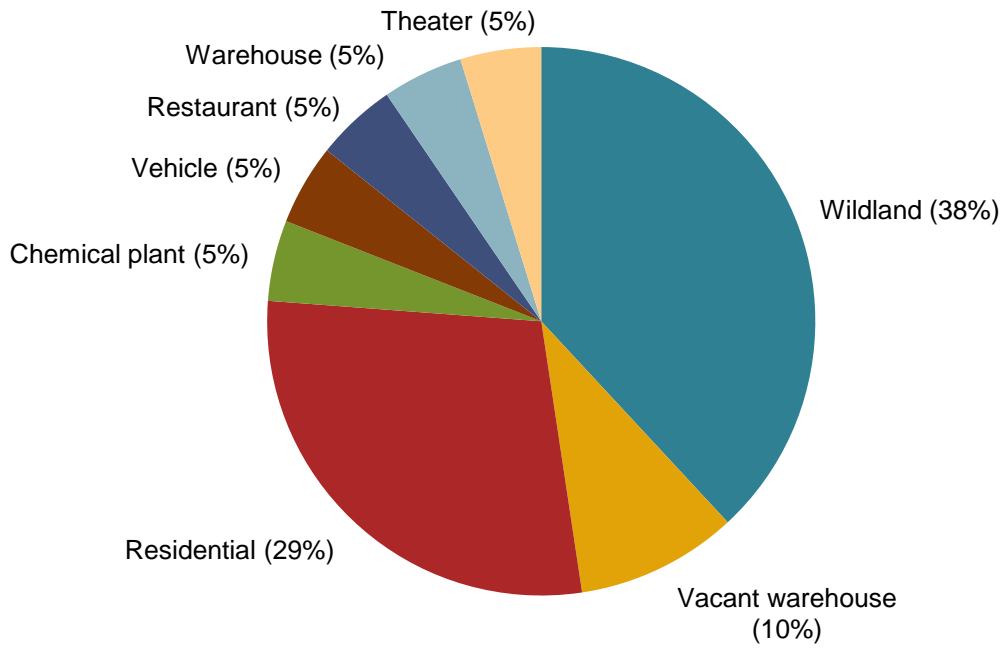
**Figure 5**  
**Firefighter Deaths by Age and Cause of Death -- 2012**



**Figure 6**  
**On-Duty Death Rates per 10,000 Career and Volunteer Firefighters 2008-2012**

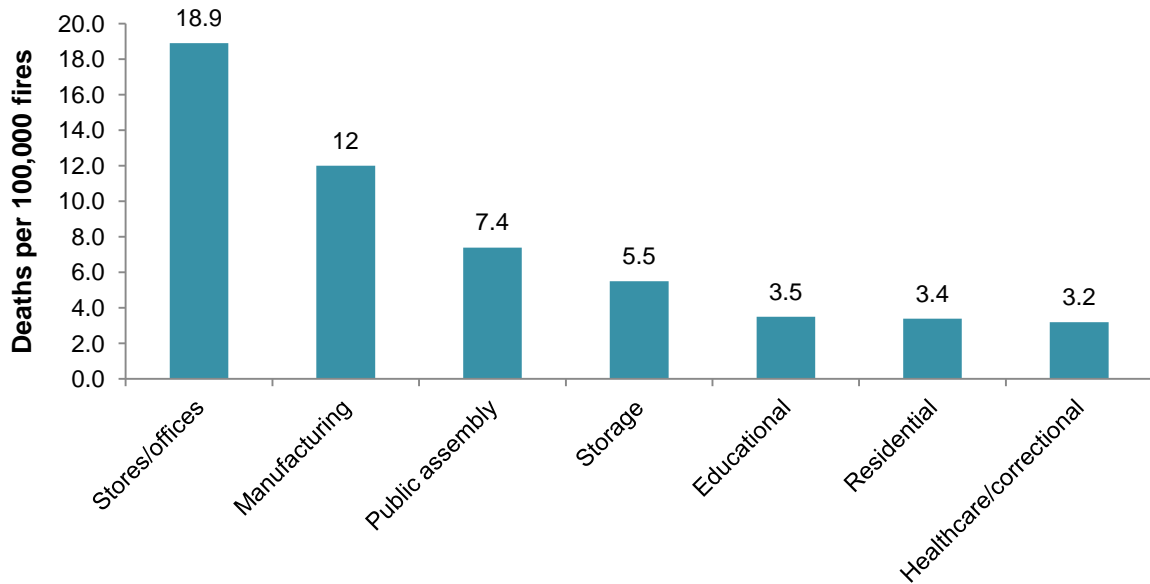


**Figure 7  
Fire Ground Deaths by Fixed Property Use -- 2012\***



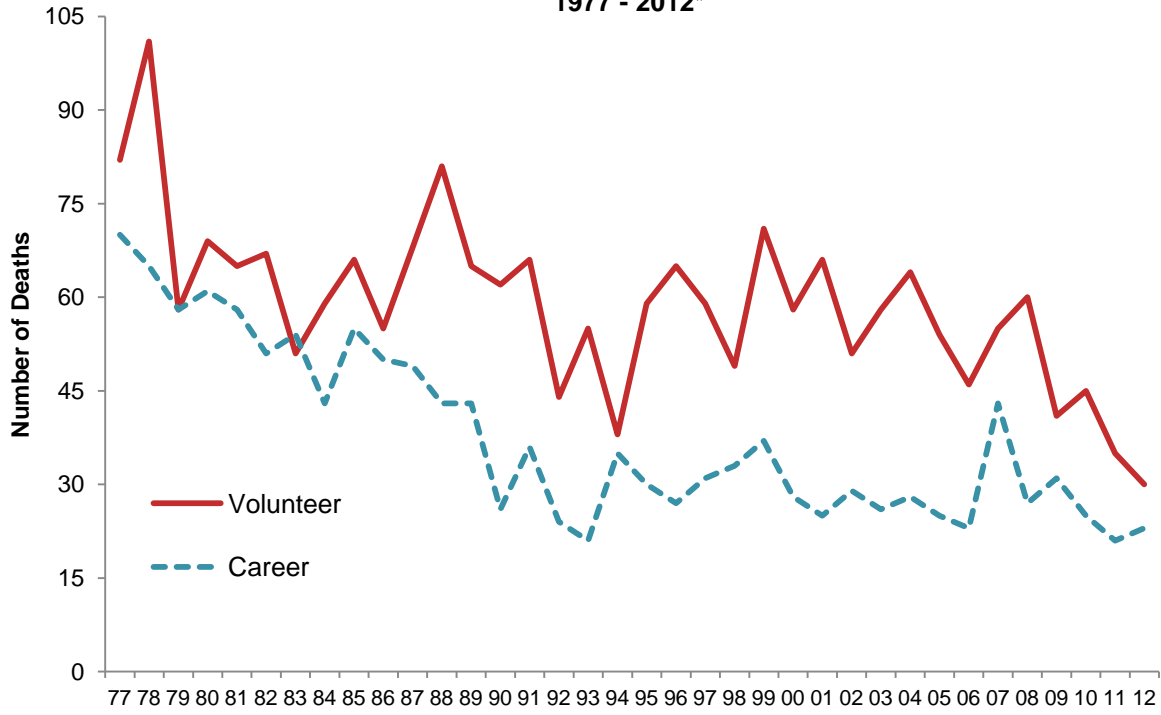
\* There were 21 deaths on the fire ground in 2012.

**Figure 8  
On-Duty Fire Ground Deaths  
per 100,000 Structure Fires 2007-2011**





**Figure 9  
Career and Volunteer Firefighter Deaths  
1977 - 2012\***



\* excluding the 340 firefighter deaths at the World Trade Center in 2001

## 2012 Selected Firefighter Fatality Incidents

### Aerial Ladder Training

On January 6, at 4 pm, a 49-year-old firefighter with 29 years of service died during a training session. The drill was conducted at the rear of the fire station during his regular work shift. It involved a 105-foot (45 meter) aerial ladder that was fully extended at a 65-degree angle. The firefighters were dressed in either station or exercise attire during the session. The victim was wearing his station duty trousers, uniform polo shirt, sunglasses, ball cap and steel toed work boots. The work boots had moderate tread wear on the heel and toe surfaces. He also wore a ladder safety belt. None of the participants wore helmets.

The training required the four crew members to climb, one at a time, to the top of the ladder. They were to connect to the rung of the ladder with the hook of their safety belt, release their hands, and lean back, then reverse the sequence and climb down. The victim had just released the hook on his safety belt on his second time performing this drill and was starting down when he fell.

The officer and two other firefighters, who witnessed the fall, began resuscitation efforts immediately and called other firefighters in the station for assistance. The victim was transported to the hospital and shortly after that was pronounced dead from multiple blunt force trauma injuries.

An investigation did not find anything wrong with the aerial ladder or the reason for the fall.

NIOSH investigated this incident and offers recommendations on its website at [www.cdc.gov/niosh/fire/reports/face201201.html](http://www.cdc.gov/niosh/fire/reports/face201201.html)

### Unsupervised Physical Training

On January 18, a 50-year-old firefighter with 20 years of service was working a 24-hour shift. He was the fire apparatus operator (FAO) and had responded to a call earlier in the day. Later in the afternoon he went to the weight room to begin his unsupervised exercise program that included use of the treadmill, a stationary bike, lifting weights and jumping rope. Two firefighters entered the exercise room two hours later, spoke to him and left. At that time he did not complain of not feeling well or exhibit signs of medical problems.

Two and one half hours later, a firefighter entered the exercise room and found the FAO lying on the floor unresponsive, not breathing and without a pulse. He notified the officer and dispatch, who notified a medic unit. Oxygen equipment and an automated external defibrillator (AED) were brought from the station as cardiopulmonary resuscitation (CPR) was begun. The AED was connected and a no shock was advised. As the firefighters continued with CPR it became obvious that livor mortis was present and CPR was discontinued. The medic unit arrived and confirmed the FAO's death. He was not transported to the hospital.

Ischemic heart disease due to hypertensive and kidney disease and an old myocardial infarction was listed as the cause of death on the death certificate and autopsy report.

The FAO's risk factors for coronary artery disease included hypercholesterolemia (high blood cholesterol), hypertension (high blood pressure), diabetes mellitus and obesity that had been diagnosed. He had been prescribed medication to reduce and manage these conditions. He had annual medical evaluations, including one two months prior to his death that cleared him for firefighting activities.

NIOSH investigated this incident and offers recommendations on its website at [www.cdc.gov/niosh/fire/reports/face201203.html](http://www.cdc.gov/niosh/fire/reports/face201203.html)

## **Thrown from Apparatus**

Early on February 13, with the outside temperature at 27° F (-3° C), a 21-year-old firefighter was thrown from a department tanker as it traveled to refill its 1500-gallon (5678-liter) tank during a water shuttling process. The victim, who had less than a year's service, acted as a spotter and successfully guided the driver of the tanker back to the dump tank at the fire scene. He then climbed up on the tailboard and opened the dump valve and filled the dump tank. The driver stayed in his seat, observed the tank-empty light flash and left the fire scene to go to the water source and refill the tank, unaware that the victim had remained on the tailboard.

Another tanker returning to the fire scene from the water source had accidentally dropped approximately 1500 gallons (5678 liters) of water on the roadway. The driver reported the water drop to their dispatcher. The driver of the first tanker was using the same road, but didn't hear the warning and hit black ice that formed from the accidental drop. He lost control of the vehicle, which spun 360 degrees a number of times before going off the road and striking an embankment and traffic sign. The driver, who was also the victim's father, sustained non-life threatening injuries, and was able to radio for help and crawl out the passenger side door of the vehicle. The victim was found unresponsive on the roadway. He was transported to the hospital where he died later that morning from blunt trauma to the chest, abdomen and extremities.

NIOSH investigated this incident and offers recommendations on its website at [www.cdc.gov/niosh/fire/reports/face201206.html](http://www.cdc.gov/niosh/fire/reports/face201206.html)

## **Single Vehicle Crash**

On February 22, at 8:00 pm, a pumper staffed by a 24-year-old fire lieutenant and an 18-year-old firefighter responded to a single-family dwelling to investigate a report of carbon monoxide in the building. After determining that the building was safe, they started their return trip back to the station. The two-lane, asphalt road was wet from falling rain. The lieutenant was driving and the firefighter was sitting on the passenger seat. Both men were using their lap and upper torso restraint-type seatbelts

Along a straight section of unlit road, the pumper ran off the right side of the road onto the soft shoulder. It continued down a ditch and rolled over half way onto its passenger side, coming to a stop after hitting a utility pole. Substantial damage to the cab trapped the firefighter. The lieutenant sustained non-life threatening injuries and was transported to the hospital where he was treated and later released. The firefighter was pronounced dead at the crash site. The cause of death was blunt force trauma to the head. An investigation did not identify any factors that led to the crash.

## **Roof Collapse**

On March 4, a fire lieutenant was killed and two firefighters were injured when the roof of the fire building they were working in collapsed, trapping them inside.

At 12:15p.m., a police officer on patrol reported a fire in a downtown motion picture theatre. The officer was also the chief of the victim's fire department. He evacuated the exposures and returned to the front of the building and verified with the owners, who were on scene, that no one was inside the theatre.

The theatre, a one-story structure with an attic space was of ordinary construction, measured 50' by 100' (15 by 30 meters) and was built in 1948. A bow string truss system supported the roof. Renovation of the theatre in 1996 added a new ceiling 12 to 18 inches (30 to 45 centimeters) below the existing ceiling.

The first fire company arrived at 12:21p.m, reported fire showing from the front of the building, and set-up to work from that location. A responding mutual aid company was instructed to go to the rear of the building and work from there. The fire departments attacked the fire from opposite sides of the building, both establishing their own incident commander, accountability system and fire ground operations. The fire companies in the front of the building initially fought the fire defensively. The 34-year-old fire lieutenant and two firefighters of the mutual-aid company, dressed in full protective clothing including self-contained-breathing apparatus, entered the rear of the building at 12:45p.m. They did not encounter fire and advanced a charged hose line through the theatre to the back of the lobby where they located fire. The roof collapsed sometime prior to 12:57p.m., but no mention of collapse or trapped firefighters was relayed to dispatch.

At the time of the fire, the temperature was in the 20's F (-6.6 to -1.6 C). There were varying amounts of accumulated snow in the area. Photographs taken during the incident reveal that there could have been up to 12 in. (30 centimeters) of snow and ice on the roof. Also during the fire, water was sprayed onto the roof from an elevated master stream.

Additional fire companies and EMS units were called to the scene after the roof collapsed. The two firefighters were removed from under debris in the building and transported to the hospital where they were treated for fractures, contusions, lung inflammation from fighting the fire and smoke inhalation. The fire lieutenant was also removed from under debris and was pronounced dead at the scene from smoke inhalation and thermal burns.

The fire was determined to result from an extension cord that was mechanically damaged when an upholstered chair was placed on it, causing the extension cord to overheat and ignite the chair.

NIOSH investigated this incident and offers recommendations on its website at [www.cdc.gov/niosh/fire/reports/face201208.html](http://www.cdc.gov/niosh/fire/reports/face201208.html)

### **Struck by vehicle**

On March 19, at 10:30 pm, fire and police units were dispatched to a single-vehicle crash. The crash occurred when a driver swerved to avoid crashing into a vehicle that was stopped and partially in her travel lane. Her vehicle crossed the two-lane county highway and slid off the road into a ditch. Before stopping, it struck a natural gas meter and its associated piping, creating a gas leak.

The fire apparatus was staffed by a fire captain and one firefighter. On arrival, the firefighter driving the engine and the police officer driving his patrol vehicle parked their vehicles, with their emergency lights flashing, a short distance before the crash site, blocking their travel lane to protect themselves. The firefighters, dressed in station uniforms with reflective vests, went to the uninjured victim and were able to walk her away from her vehicle and the leaking gas meter. She went across the street and stayed with a witness who stopped to render assistance. The firefighters then went to see if they could shut off the leaking gas. After they determined that they could not stop the flow of gas, the two firefighters and police officer moved upwind along the shoulder of the roadway. They requested that the gas company speed up their response.

A short time later, a van passed the fire engine and police vehicle by driving in the on-coming traffic lane, increased speed and drove onto the shoulder of the roadway, striking the two firefighters and police officer. The victim of the original crash was the mother of the individual who drove the van. She had telephoned him and told him of the crash. The 56-year-old fire captain was killed instantly. The impact threw him onto the driveway of a single-family dwelling. The other firefighter was thrown approximately 130 feet (39 meters) and was found in the front yard of the single-family dwelling on the other side of the

driveway, severely injured. The police officer was struck and thrown onto the traffic lane closest to the shoulder where they had been standing.

The police officer was able to radio his dispatcher and describe their situation and request assistance. Two ambulances were dispatched. The first arrived and the paramedic performed a rapid patient assessment on the firefighters and police officer. The firefighter, who was severely injured, was stabilized and flown to a Level 1 trauma center. The second ambulance arrived, stabilized the police officer and due to the response time for the second med-flight, transported the police officer by ground.

The Captain died of multiple traumatic injuries as a result of being struck by the van. It was listed as a homicide. The other firefighter and police officer sustained nonfatal traumatic injuries.

NIOSH investigated this incident and offers recommendations on its website at [www.cdc.gov/niosh/fire/reports/face201209.html](http://www.cdc.gov/niosh/fire/reports/face201209.html)

### **Water Delivery**

On March 20, a 79-year-old firefighter with more than 50 years service died while finishing up a water delivery. As part of the fire department's duties, it supplies potable water to areas where water is not available. He had just finished a delivery to a storage tank at a sporting club and was preparing to leave when he sustained a fatal heart attack. Responding EMS and fire personnel administered cardiopulmonary resuscitation (CPR) and transported him to the hospital where he was pronounced dead. Nature of death was cardiopulmonary arrest due to or as a consequence of hypertensive heart disease.

### **Roof collapse**

On April 7, at 4:24a.m., fire companies were dispatched for a fire in a café. Five minutes later, a pumper with a 39-year-old fire chief and two firefighters arrived on scene. They immediately advanced a hose line through the main entrance and into the structure, aggressively attacking the fire.

Conditions deteriorated during the course of fighting the fire. Approximately 40 minutes after the initial alarm, the chief pushed the two firefighters toward the door, saving them as the roof collapsed on him. Several attempts were made to save the chief. During the investigation, the chief's body was recovered and he was pronounced dead on the scene. The cause of death was determined to be smoke inhalation and thermal burns.

### **Aircraft Crash**

On June 1, lightning ignited a wild land fire in steep, rugged terrain dominated by juniper and pinion-pine trees, sagebrush and grasses. The fire would ultimately consume approximately 6,300 acres (2549 Hectares).

Two days later, two contract pilots flying an air tanker were conducting their second retardant drop over the fire. The area of the drop was in a valley 0.4 miles (.6 kilometers) wide. They were following the lead plane that made a right-hand turn and dropped to an elevation of 150 feet (45 meters) on its final approach. Following the lead plane, the tanker crashed into rising terrain that was 700 feet (213 meters) to the left of the lead plane's flight course. Both pilots were killed and the plane was severely damaged from impact and a post-crash fire.

## **Struck by Tree**

On June 29 at 9:45 p.m., a windstorm with 80mph (128kph) winds was blowing through the area. The fire department was dispatched for a fire involving a wooden utility pole with fire extending to surrounding woodland.

A fire lieutenant responding from home to the fire station came upon a small fallen tree blocking the main highway. He got out of his automobile to help civilians move the tree from the travel lane. As they attempted to move the downed tree, other trees fell. One of the trees struck the lieutenant on the head. The 54-year-old lieutenant was transported to the hospital where he died three days later from blunt force trauma injuries to his head.

## **Aircraft crash**

On July 1 at 5:30p.m., a military transport aircraft equipped with a self-contained unit used for aerial firefighting crashed while conducting firefighting operations on a wildland fire on public land. The aircraft had a six-member crew, consisting of two pilots, a navigator, a flight engineer and two loadmasters.

On their third retardant drop, they were diverted to another fire. A lead airplane was also diverted to the same fire.

The lead plane conducted a show-me run on this second fire that allowed the military aircraft pilot to see the drop path, any hazards and an escape route. A third airplane arrived, descending to 7000 feet (2133meters) due to more than moderate turbulence. The third plane crew's responsibilities were to manage air and ground firefighting assets in and around the fire ground. The three planes were warned to give wide berth to a thunder storm southwest of the fire ground. The first drop went exactly as planned.

As the lead plane and the military aircraft positioned for the second and final drop, decisions were made as to how carry it out. Unbeknownst to the crew of the military aircraft, the managing aircraft encountered severe turbulence. As they proceeded, the lead plane encountered turbulence and lost altitude and airspeed. The pilot of the lead plane struggled to maintain control. During this time, the lead plane came within 10 feet (3 meters) of the ground. He radioed that he had to "go around," a term used during misalignments rather than urgent situations. The pilot of the lead plane radioed to the military aircraft to dump its load. There was some chatter on the intercom and the military aircraft impacted with the ground. Four of the crew died in the crash. The two loadmasters survived but sustained significant injuries.

The accident investigation board found evidence that the cause of the crash was the military aircraft crew's inadequate assessment of operational conditions resulting in the military aircraft impacting the ground after flying through a microburst. The board also found that the crews of the lead plane and managing plane failed to communicate critical operational information and conflicting operational guidance concerning thunderstorm avoidance that contributed to the crash.

To see the complete report go to:

[http://wildfirelessons.net/documents/White\\_Draw\\_Fire\\_MAFFS\\_%20Report.pdf](http://wildfirelessons.net/documents/White_Draw_Fire_MAFFS_%20Report.pdf)

## **Drowning**

On August 10, a 46-year-old fire captain participating in an advanced diving instruction class drowned. At 2:15p.m., more than 15 minutes into his second dive, the captain surfaced from approximately 40 feet (12m) of water and indicated that he was having some kind of problem. The captain, a certified diver, lost consciousness and submerged under the water. The diving instructor recovered him from a depth of about

60 feet (18m). He was brought to the surface and a medical helicopter crew pronounced him dead at the scene. Nature of death was drowning.

### **Struck by Tree**

On August 12, a 20-year-old firefighter with 2 years experience was struck and killed by a falling tree at a wildland fire. The tree that struck her was 123 feet (37 meters) tall and had a 40" (101 centimeters) dbh (diameter of tree at breast height). It had struck another tree before striking the victim. She died instantly as a result of blunt force trauma to the head.

The fire started on August 10 and was called in by a logger at 11:30a.m. The fire began in an area of recently harvested trees and deep slash and loggers immediately attempted to extinguish the fire. The fire warden who received the alarm, knowing the fire location was in steep terrain, immediately ordered aircraft and other resources, including four helicopters, two single-engine air tankers, dozers, three water tenders, three engines, a Department of Corrections crew, private company firefighters and logging company employees. The incident became a multi-agency incident with two public and two private agencies responding. One of the private agencies was in charge of the fire. Firefighting continued until early evening when the incident commander withdrew the firefighters for safety reasons.

The fire burned overnight, increasing from 7 to 40 acres (2 to 16 hectares) in size on August 11. After 2:00p.m., the public agencies' crews voiced their safety concerns to the incident commander and left the fireground. Some of the concerns included the need for better radio communications, the need for professional fallers, gaps in the fire line, and the lack of medivac sites and a medical plan. That evening and the following morning, the incident commander began implementing hazard mitigation. The fire grew to 70 acres (28 hectares) by the morning of August 12. Firefighters from one of the public agencies returned to the fireground, their concerns having been mitigated. The other crew was assigned to another fire.

During lunch break, the victim and another firefighter were standing 30 to 40 feet (9 to 12 meters) behind a faller watching him cut down trees. The other firefighter saw the top of a tree on the other side of the creek falling towards them and he yelled out a warning and they started to run. He saw the tree hit another tree and he yelled to change direction. As they ran, the tree struck the victim and just missed the other firefighter.

To see the full report, go to: [wildfirelessons.net/documents/STEEP\\_CORNER\\_FATALITY\\_SAI.pdf](http://wildfirelessons.net/documents/STEEP_CORNER_FATALITY_SAI.pdf)

### **Gunshot**

On December 24, at 5:30 a.m., two firefighters, one a 43-year-old and the other a 19-year-old, were killed and two other firefighters sustained non-life threatening injuries when shot by a 62-year-old mentally-challenged male felon. The shooter intentionally set his vehicle and home on fire, causing the fire companies to respond. The well-armed shooter commenced firing from behind a berm when the fire companies arrived on scene.

The first arriving firefighter drove his own personal vehicle to the scene and was evacuating occupants from adjacent dwellings when shot in the back causing a severe pelvic injury when the bullet lodged in his back, where it remains. A pumper with two firefighters arrived next. The firefighter seating in the passenger seat exited the vehicle and was shot twice once in his left shoulder and also in his right knee. The driver gave a brief size-up then, thinking the shots were coming from the opposite side exited the vehicle from the passenger side also and was fatally shot. The fourth firefighter was fatally shot after

arriving in another department emergency vehicle and was putting on his protective clothing in preparation to connect the pumper to the hydrant.

As a result, other fire personnel were unable to extinguish the fires that eventually extended to and burned seven homes. During the event, the shooter committed suicide by a self-inflicted gunshot wound.