

FIREFIGHTER FATALITIES IN THE UNITED STATES – 2005

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Abstract

In 2005, a total of 87 on-duty firefighter deaths occurred in the U.S. The 87 on-duty deaths represent the lowest total since 1993, and the third lowest death toll since NFPA began tracking these deaths in 1977. Responding and returning from alarms accounted for the largest shares of firefighter deaths, with 26 deaths. Fire ground operations accounted for 25 deaths. This continues the trend that deaths on the fire ground account for less than one third of the deaths each year. Stress and overexertion, which usually results in heart attacks or other sudden cardiac events, continued to be the leading cause of fatal injury. Of the 47 stress-related deaths in 2005, 40 (46%) were classified as sudden cardiac deaths (usually heart attacks).

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

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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 victims include members of local career and volunteer fire departments, seasonal and full-time 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.

The term *on-duty* refers to being at the scene of an alarm, whether a fire or non-fire incident; while responding to or returning from an alarm; while 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 an 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 are tied to a specific incident or on-duty activity.

Fatal injuries and illnesses are included even in cases where death is considerably delayed. When the onset of the condition and the death occur in different years, the incident is counted in the year of the condition's onset. The NFPA recognizes that a comprehensive study of firefighter on-duty 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 the limitations in tracking the exposure of firefighters to toxic environments and substances and the potential long-term effects of such exposures.

2005 Experience

In 2005, a total of 87 on-duty firefighter deaths occurred in the U.S. This is a sharp decrease from the 103 firefighter fatalities that occurred in 2004.¹ Figure 1 shows firefighter deaths for the years 1977 through 2005, excluding the deaths at the World Trade Center in 2001. The 87 on-duty deaths represent the lowest total since 1993, and the third lowest death toll since NFPA began tracking these deaths in 1977.

In 2005, there were three multiple-fatality incidents -- one was a helicopter crash at a prescribed burn that claimed three lives and two were double-fatality fires in apartment buildings.

Analyses in this report will 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 will highlight deaths in intentionally-set fires and in motor vehicle-related incidents.² A special 10-year analysis will look more closely at deaths that occurred during training.

Finally, the study presents summaries of individual incidents that illustrate important problems or concerns in firefighter safety.

Type of Duty

Figure 2 shows the distribution of the 87 deaths by type of duty. Responding to and returning from alarms accounted for the largest share of firefighter deaths, with 26 deaths. Fire ground operations accounted for 25 deaths. This continues the trend that deaths on the fire ground account for less than one third of the deaths each year.

Of the 26 deaths while responding to or returning from alarms, the largest share (13 deaths) were due to sudden cardiac death. Another 10 deaths were due to vehicle collisions or rollovers. Motor vehicle crashes and sudden cardiac death are discussed in more detail later in this report. One firefighter fell from a fire apparatus, one suffered a stroke and one collapsed due to a drug overdose. Twenty-one of the 26 victims were volunteer firefighters and five were career firefighters.³

The 25 fire ground deaths in 2005 represent the lowest number of deaths at the scene of fires since 1977 when NFPA began collecting information on all on-duty fatalities. Of these 25 deaths, 11 were due to sudden cardiac death, five to asphyxiation, four to internal trauma, two to electrocution and one each to burns, crushing injuries and stroke. Sixteen of the victims were municipal volunteer firefighters and nine were municipal career firefighters.

Eleven deaths occurred during training activities. Seven firefighters suffered sudden cardiac death and another firefighter suffered a stroke. One firefighter drowned during SCUBA training, one died of heat stroke during recruit training and one fell off a roof during recruit training. Firefighter deaths during training over the past 10 years are described in detail in a separate section of this report.

Twenty-one firefighters died during the performance of non-emergency-related on-duty activities. Five of them suffered sudden cardiac death and one suffered a fatal stroke while engaged in normal administrative or station activities. Sudden cardiac death or stroke claimed the lives of four other firefighters while they were engaged in activities including a funeral detail, a parade, attendance at a convention, and fire apparatus maintenance. Three firefighters died when their helicopter crashed while they were igniting fires at a prescribed burn. Five other firefighters died as a result of crashes -- one each during a conservation project, while driving to a meeting, while en route to get a vehicle inspection sticker, while en route to pump out a residence, and after a boat parade. One died in her sleep at the station, apparently of a drug overdose (oxycodone). A firefighter was run over while on standby at a race track. A firefighter was shot and killed while dropping off a department vehicle at a state facility for repairs.

Four deaths occurred at non-fire emergencies. Two were the result of sudden cardiac events -- one at an EMS call and the other at a natural gas leak in a dwelling. One firefighter was overcome by hydrogen sulfide fumes while attempting to rescue someone from a manure pit and died two weeks later. One firefighter was struck by a vehicle while directing traffic at a chemical spill at a high school.

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.⁴

Stress and overexertion, which usually results in heart attacks or other sudden cardiac events, continued to be the leading cause of fatal injury, as it has been in almost all of the years of this study. Of the 47 stress-related deaths in 2005, 40 were classified as sudden cardiac deaths (usually heart attacks). In addition to these 40 deaths, there were six deaths due to stroke and one death due to heat stroke.

The second leading cause of fatal injury was struck by an object or contact with an object (25 percent). The 22 firefighters killed included 18 in motor vehicle crashes, three struck by motor vehicles, and one struck by a falling tree limb.

The next leading cause of fatal injury was caught or trapped, resulting in eight deaths. Three firefighters were trapped by fire progress; one of them at a wildland fire. Two firefighters became lost inside fire-involved structures and ran out of air. One firefighter was killed when a roof collapsed. One firefighter became trapped under water and drowned. One firefighter became caught between a manlift and a conveyor belt at a fire in a grain elevator and was crushed.

Four firefighters were killed when they jumped or fell. Two of the four became trapped by a fire on the upper story of an apartment building and were forced to jump. One firefighter, mentioned earlier, fell off the roof during recruit training. One firefighter fell from a fire apparatus while responding to a fire call.

Two firefighters died as a result of accidental overdoses to prescription medication. Two were electrocuted. One was overcome and poisoned by hydrogen sulfide fumes. One firefighter died of a gunshot wound.

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. The largest proportion of deaths (46 percent) fell into the category of sudden cardiac death. All of these deaths in 2005 were attributed to stress or overexertion. The number of such deaths dropped from the recent highs of 47 and 48 deaths in 2003 and 2004 to 40 deaths in 2005. Sudden cardiac death, most often the result of heart attack, is typically the leading nature of injury and usually accounts for close to half of the total deaths. Since NFPA began publishing this study in 1977, the number of deaths annually in this category has dropped by a third; however, over the past 15 years, the number of sudden cardiac deaths has leveled off, with between 40 and 50 occurring each year.

Of the 40 victims of sudden cardiac events in 2005, 13 were reported to have had prior heart problems -- usually prior heart attacks, bypass surgery or angioplasty/stent placement -- and post mortem medical documentation showed that another 14 had severe arteriosclerotic heart

disease. Over the past 25 years, post mortem information or other details on the victims' medical histories have been available for 711 of the 1,216 sudden cardiac death victims. Of those 711 victims, 46.8 percent had suffered prior heart attacks or had undergone bypass surgery or angioplasty/stent placement and another 33.3 percent had severe arteriosclerotic heart disease.

In 2005, the other major categories were internal trauma (21 deaths), asphyxiation (six deaths), strokes (six deaths) and crushing injuries (four deaths). The remaining deaths included two drownings, two drug overdoses, two electrocutions and one each due to burns, gunshot, hydrogen sulfide poisoning, and heat stroke.

Ages of Firefighters

The firefighters who died in 2005 ranged in age from 18 to 74, with a median age of 48 years. Figure 5 shows the distribution of firefighter deaths by age and cause of death (sudden cardiac death versus other causes).

Sudden cardiac death accounts for a higher proportion of the deaths among older firefighters, as might be expected. Sixty percent of the firefighters over age 40 who died in 2005 died of heart attacks or other cardiac events.

Figure 6 shows death rates by age, using career and volunteer firefighter fatality data for the five-year period from 2001 through 2005 and estimates of the number of career and volunteer firefighters in each age group from the NFPA's 2003 profile of fire departments (the mid-year in the range).⁵

The lowest death rates were for firefighters in their 20s. Their death rate was a little more than half the all-age average. Firefighters in the 30s had a death rate approximately two-thirds the all-age average. The rate for firefighters in their fifties was almost twice the average and for firefighters age 60 and over, it was four times the average. Firefighters age 50 and over accounted for two-fifths of all firefighter deaths over the five-year period although they account for fewer than one-fifth of all firefighters.

Fire Ground Deaths

Figure 7 shows the distribution of the 25 fire ground deaths by fixed property use. Almost all of the 18 structure fire deaths occurred in residential properties. Fires in one- and two-family dwellings killed 11 firefighters and fires in two apartment buildings killed 2 firefighters each. There were also two deaths in fires in vacant buildings, and one death at a

grain elevator fire. None of the structures involved in fatal fires in 2005 were reported to have had sprinklers installed.

In addition, there were five deaths on wildland fires and one death each at a hay fire and a vehicle 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 2000 through 2004 (the 2005 results are not yet available) and from the updated firefighter fatality data for the corresponding years. The results are shown in Figure 8.

This figure illustrates that, although more firefighter deaths occur at residential structure fires than at fires in any other type of structure, fires in vacant buildings and some nonresidential structures, such as mercantile and public assembly properties, are more hazardous to firefighters, on average. There were 6.9 fire ground deaths per 100,000 nonresidential structure fires from 2000 through 2004, compared to 3.8 deaths per 100,000 residential structure fires. The highest death rates over the five-year period occurred in stores and offices. The low rate in health care/correctional and educational buildings may reflect the fact that these occupancies are among the most regulated 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 reflects the small number of fatalities that have occurred in such structures in recent years.

Vehicle-Related Incidents

In 2005, 18 firefighters died in vehicle crashes. In addition to those deaths, three others were fatally struck by vehicles and one firefighter fell from the jump seat of an engine.

Ten of the 18 firefighters killed in crashes were responding to or returning from incidents when the crashes occurred. All were single-fatality crashes.

Three of these 10 victims were driving water tenders:

- One firefighter, responding on mutual aid to a grass fire driving a semi-trailer tanker, went off the road on a curve, and the vehicle rolled. Factors in the crash included low tire pressure, no trailer brakes, driver inattention and speed too fast for conditions. He was not wearing a seatbelt and was ejected.

- One firefighter responding to a structure fire lost control of his vehicle, which then left the road, striking trees and a fence. He died of smoke inhalation in the resulting post-crash fire. He was not wearing a seatbelt.
- A firefighter driving to a dwelling fire was killed when the vehicle left the road and overturned. He was ejected from the cab.

Another three were driving or riding in pumpers:

- One firefighter driving from an EMS call to the scene of a motor vehicle crash crossed the road and struck a tree. He was wearing a seatbelt and speed was not a factor in the crash.
- A firefighter driving a pumper to a medical call collided with a tractor trailer at an intersection. Both drivers were faulted in the crash -- the tractor trailer driver did not yield to the responding fire apparatus and the victim, who was wearing his seatbelt, did not ensure that the intersection was clear.
- A company officer riding in the front passenger seat while responding to a gas leak was partially ejected when the apparatus veered to avoid striking an 18-wheel truck at an intersection. The apparatus struck another vehicle stopped at a stop sign at that intersection and overturned. Neither the victim nor the driver was wearing a seatbelt. Speed was a factor in this crash.

Two of the crashes while responding to alarms involved personal vehicles:

- A firefighter driving to the fire station in response to a report of smoke failed to negotiate a curve, overcorrected and overturned. The victim was wearing his seatbelt.
- Another firefighter lost control of his vehicle while responding to the scene of a motor vehicle crash, and crossed two lanes of traffic into the path of another vehicle responding to the same incident. No other details on the crash are available.

In the other fatal crashes while firefighters were responding to or returning from emergency calls:

- While returning from a cancelled rescue call, a firefighter driving a rescue vehicle went off the road and struck trees. There were no skid marks on the road. No other details are available.

- Reduced visibility in smoke apparently caused the driver of a brush truck responding to a grass fire to crash head-on with another fire apparatus responding to the same fire. No other details on this crash are available.

There was one fatal aircraft crash in 2005, which resulted in three deaths:

- A contract helicopter pilot and two forestry employees were killed when their aircraft crashed while they were igniting a prescribed burn. The cause of the crash has not been reported and the final NTSB report on this crash has not been released yet.

The remaining fatal crashes occurred while firefighters were engaged in a variety of on-duty activities:

- A member of a state forestry fire crew was killed when his ATV rolled over while the crew was working on a conservation project. Although few details on the incident are available, shadows from the late afternoon sun were mentioned as a possible factor in the incident.
- A firefighter driving a converted tender to get a vehicle safety inspection sticker was ejected from the vehicle and fatally injured after a tire blew and the truck went off the road and overturned.
- A firefighter riding as a passenger in the jumpseat of a pumper on its way to pump out a residence was ejected when the vehicle lost traction on the wet roadway, went down an embankment, struck trees and overturned. Neither the victim nor the driver was wearing a seatbelt.
- A fire chief driving to a meeting was struck head on by a robbery suspect fleeing police. The chief's fire department vehicle overturned after the impact. The victim, who was wearing his seatbelt, had no opportunity to avoid being struck by the speeding vehicle.
- A firefighter in a fire department boat returning to its dock after escorting a holiday boat parade drowned after the fire department boat struck another boat. The victim, who was wearing a personal flotation device, struck her head and was thrown from the boat, landing unconscious and facedown in the water.

Of the 13 deaths in road vehicles mentioned above, five of the victims were not wearing seatbelts and four were wearing seatbelts. Seatbelt use was not reported in the other four crashes. Excessive speed was a factor in at least three of the 13 crashes.

Three firefighters were struck by vehicles and killed. The first was directing traffic at a chemical spill at a high school when he was struck by a drunk driver. He was wearing his reflective safety vest and using a flashlight when he was struck. The other two firefighters were struck by driverless vehicles. The first was working as a safety officer at a racetrack. He was run over on the track by a service vehicle that he was trying to stop as it was rolling backwards toward a crowd of spectators. (A crash had occurred moments before on the track, and the driver of the service vehicle had left his vehicle's engine running while he spoke to one of the race drivers stopped on the track. The race car driver backed into the service vehicle while trying to get out of its way, causing it to begin rolling.) The other firefighter, who was driving a vehicle shuttling water to the scene of a structure fire, had arrived with his fourth load of water. When he got out of his truck to wait to unload the water tank, the truck rolled forward into a ditch, pinning him underneath.

And, finally, a firefighter fell from the back seat of a responding ladder truck striking his head on the pavement. The victim was preparing to don his SCBA and was not wearing his seatbelt when the door opened while the vehicle was making a right turn at an intersection.

Other Findings

Two firefighters died at intentionally-set structure fires. From 1996 through 2005, 66 firefighters (6.6 percent of all on-duty deaths) died in connection with intentionally set fires. The share of these deaths annually has been dropping fairly steadily since 1985, which is, in part, a reflection of the decline in intentionally-set fires over the same period.

Four firefighters died as a result of false alarms in 2005. Over the past 10 years, 36 firefighter deaths have resulted from false calls, whether malicious or alarm malfunctions.

Of the 87 firefighters who died while on duty in 2005, 79 were members of local, municipal career and volunteer fire departments, five were employees of state land management agencies, two were employees of federal land management agencies and one was a contractor to a federal agency.

The distribution of deaths of career and volunteer firefighters from local, municipal fire departments is shown in Figure 9. Firefighter fatalities among career firefighters reached their lowest level in 1993, then rose between 1993 and 1999. Overall, there has been a general downward trend since 1985, but the number of on-duty deaths among career firefighters has fluctuated between 25 and 29 over the past six years. For volunteer firefighters, there tends to be a great deal of fluctuation from year to year, but there has been a downward trend since 1999. Over the past 10 years, there have been an average of 59 volunteer firefighter deaths and 29 career firefighter deaths annually. A comparison of the fatality experience of the 79 career and volunteer firefighters killed in 2005 is shown in Table 1.

Conclusions

The sharp drop in the total number of on-duty deaths that occurred in 2005, a 16 percent decrease from 2004, is encouraging, but it is premature to cite one year's experience as a trend. There is a great deal of variability from year to year in the number of deaths within various categories. It could be that the low total in 2005 resulted from the coincidental occurrences of several of these periodic lows. The number of deaths of volunteer firefighters, career firefighters, and among wildland agency employees are all down from 2004, but the number of deaths in each category is within ranges reported in recent years. Deaths at the fire ground were at the lowest level reported since we began this study in 1977. Deaths related to wildland fires (either on the fire ground and responding to or returning from wildland fires) -- were at their lowest level since 1997. At the lowest level since 1996 was the number of firefighters struck and killed by vehicles. Any of these variables could change next year, but the 2005 findings are encouraging and give the fire service something to build on.

As we report each year, the largest share of on-duty firefighter fatalities are the result of sudden cardiac death -- usually heart attacks. The risk factors for heart disease are well-known and *NFPA 1582, Standard on Comprehensive Occupational Medical Program for Fire Departments*, outlines procedures for fire departments to follow in screening candidate firefighters and handling health problems that might arise during an individual's fire service career. Additional information on developing a wellness-fitness program can be found in the Fire Service Joint Labor Management Wellness-Fitness Initiative developed by the IAFC and IAFF.

The National Volunteer Fire Council (NVFC) recently launched the Heart-Healthy Firefighter Program, which is intended to lower the incidence of cardiac-related problems in the fire service by educating firefighters and their families about nutrition, fitness and heart disease prevention. As part of that program, they have screened over 10,000 firefighters, both career and volunteer, at trade shows around the country and report disturbingly high incidence of high cholesterol, high blood pressure and obesity. The results of the screening were: six percent had Stage 2 hypertension; 24 percent had Stage 1 hypertension and 47 percent were prehypertensive. At three of the four trade shows, the average cholesterol level of those tested was close to or above 200 mg/dl. Screenings in 2006 will focus on blood pressure, cholesterol and glucose. This program, which is described fully on their website -- www.healthy-firefighter.org -- has been credited by many firefighters as the key to understanding their personal level of risk, and moving them to adopt a more heart-healthy lifestyle.

Deaths in crashes continue to account for a significant portion of the annual fatalities. In road crashes, failure to wear a seatbelt is an all-too-frequently reported factor in the deaths. Speed too fast for conditions is often cited as well. The IAFF and USFA have formed a partnership to develop an awareness program that will focus on safety while responding in emergency apparatus. However, attention must also be paid to the high proportion of deaths that involve personally-owned vehicles.

Deaths during training activities are the focus of the 10-year analysis that accompanies this article. Eleven firefighters have died during training activities in each of the past four years. These deaths are particularly distressing, since the purpose of training is to develop the skills, knowledge and abilities that firefighters need to protect themselves and their fellow firefighters when doing their job.

In 2005, NFPA and the National Institute for Occupational Safety and Health (NIOSH) National Personal Protective Technology Laboratory (NPPTL) entered into a Memorandum of Understanding (MOU) that focuses on emergency responder safety and protective clothing and equipment. In addition, NFPA joined several other fire service organizations in co-sponsoring the first annual National Firefighter Safety Stand Down where fire departments across the country were encouraged to devote the day to a focus on safety. This event is an important step in raising awareness across the fire service as to the steps fire departments and individual firefighters can take to reduce the risk of death and injury.

NFPA maintains standards that address a wide range of safety issues.

For road safety:

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 1915, Standard Fire Apparatus Preventative Maintenance Program, details a program to ensure that fire apparatus are serviced and maintained to keep them in safe operating condition.

For health issues in the fire service:

NFPA 1500, Standard on Fire Department Occupational Safety and Health Program, requires the establishment of a firefighter health and fitness program based on *NFPA 1583, Standard on Health-Related Fitness Programs for Fire Fighters*, and requires that firefighters to meet the medical requirements of *NFPA 1582, Standard on Comprehensive Occupational Medical Program for Fire Departments*.

To maintain the low level of on-duty fatalities that occurred in 2005, it is essential that efforts continue to reduce the incidence of heart disease among firefighters, especially by reducing the risk factors for heart disease. Safe practices at the scene of fires, safe driving practices and careful planning and execution of training activities will contribute to establishing a positive trend in on-duty firefighter safety.

References

- 1.The NFPA's files for firefighter on-duty fatal injuries are updated continually for all years.
- 2.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.
- 3.For this report, the term *volunteer* refers to any firefighter whose principle 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.

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 2003," NFPA Fire Analysis and Research Division, Quincy, Massachusetts, January 2005, unpublished. The analysis shown here assumes that the number of firefighters adequately estimates exposure and that the age distribution of career and volunteer firefighters is similar.

Credits

A study made possible by the cooperation and assistance of the United States fire service, the Public Safety Officers' Benefits Program of the Department of Justice, the United States Fire Administration, the National Institute for Occupational Safety and Health, the Forest Service of the U.S. Department of Agriculture, and the Bureau of Indian Affairs and the Bureau of Land Management of the U.S. Department of the Interior. The authors would also like to thank Thomas Hales, MD, MPH, of NIOSH, Carl E. Peterson of NFPA's Public Fire Protection Division and Joseph Molis of NFPA's Fire Analysis and Research Division for their assistance on the study.

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 and local 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-on-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.

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 increases as a result. The enactment of the USA PATRIOT bill in 2001 increased the benefit to \$250,000. The current benefit is \$283,385, tax free.

A decedent's spouse and minor children usually are the eligible beneficiaries. As a result of the 2002 Mychal Judge Act, when there is no spouse or eligible children, the PSOB Act now provides the benefits to the individual(s) designated on the officer's most recently executed life insurance policy. Parents become eligible for the death benefit if they are named on the last executed policy or if there is no legitimate claim submitted by a life insurance policy beneficiary and the officer was not married and there are no eligible children.

Line of duty disability: 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 benefit. Students may apply for PSOEA funds for up to 45 months of full-time classes. As of October 1, 2005, the maximum benefit a student may receive is \$827 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 Program, Bureau of Justice Assistance, Office of Justice Programs, U.S. Department of Justice, 810 7th Street, N.W., Washington DC 20531. The telephone number is (888) 744-6513 and the email address is ASKPSOB@usdoj.gov.

Table 1
Comparison of On-Duty Deaths Between
Career and Volunteer Municipal Firefighters, 2005*

	Career Firefighters		Volunteer Firefighters	
	Number of Deaths	Percent of Deaths	Number of Deaths	Percent of Deaths
Type of duty				
Operating at fire ground	9	36 %	16	30%
Responding to or returning from alarm	5	20	21	39
Training	3	12	7	13
Operating at non-fire emergencies	1	4	3	6
Other on-duty	7	28	7	13
TOTALS	25	100 %	54	100 %
Cause of fatal injury				
Stress	11	44 %	33	61%
Struck by or contact with object	5	20	15	28
Caught or trapped	4	16	4	7
Fell	3	12	1	2
Other	2	8	1	2
TOTALS	25	100 %	54	100 %
Nature of fatal injury				
Sudden cardiac death	9	36 %	29	54%
Internal trauma	6	24	10	19
Stroke	2	8	4	7
Asphyxiation	3	12	3	6
Crushing	2	8	2	4
Drowning	0	0	2	4
Electrocution	1	4	1	2
Drug overdose	1	4	1	2
Heat Stroke	1	4	0	0
Burns	0	0	1	2
Poisoning	0	0	1	2
TOTALS	25	100 %	54	100 %
Rank				
Firefighter	13	52 %	37	69%
Company officer	9	36	7	13
Chief officer	3	12	10	19
TOTALS	25	100 %	54	100 %

Table 1
Comparison of On-Duty Deaths Between
Career and Volunteer Municipal Firefighters, 2005* (Continued)

	Career Firefighters		Volunteer Firefighters	
	Number of Deaths	Percent of Deaths	Number of Deaths	Percent of Deaths
Ages of Firefighters				
All deaths				
20 and under	0	0 %	3	6%
21 to 25	2	8	2	4
26 to 30	1	4	1	2
31 to 35	4	16	2	4
36 to 40	6	24	3	6
41 to 45	3	12	6	11
46 to 50	4	16	9	17
51 to 55	3	12	10	19
56 to 60	1	4	6	11
Over 60	1	4	12	22
TOTALS	25	100 %	54	100 %
Ages of Firefighters				
Sudden cardiac deaths only				
36 to 40	0	0%	2	7%
41 to 45	3	33	3	10
46 to 50	3	33	7	24
51 to 55	2	22	7	24
56 to 60	1	11	3	10
over 60	0	0	7	24
TOTALS	9	100 %	29	100 %
Fire ground deaths by fixed property use				
Dwellings and apartments	5	56%	10	63%
Wildland	1	11	4	25
Vacant Structure	2	22	0	0
Storage	1	11	0	0
Agriculture	0	0	1	6
Road/highway	0	0	1	6
TOTALS	9	100 %	16	100 %

Table 1
Comparison of On-Duty Deaths Between
Career and Volunteer Municipal Firefighters, 2005* (Continued)

	Career Firefighters		Volunteer Firefighters	
	Number of Deaths	Percent of Deaths	Number of Deaths	Percent of Deaths
Years of service				
5 or less	5	20 %	15	28%
6 to 10	4	16	8	15
11 to 15	4	16	2	4
16 to 20	6	24	8	15
21 to 25	3	12	1	2
26 to 30	1	4	8	15
over 30	2	8	10	19
Not reported	0	0	2	4
TOTALS	25	100 %	54	100 %
Attributes of fire ground deaths**				
Intentional fires	1		1	
Search and rescue operations	4		2	
Motor vehicle crashes	3		10	
False alarms	1		3	

* This table does not include the eight victims who were contractors for or employees of state or federal wildland agencies.

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

Figure 1
On-Duty Firefighter Deaths - 1977-2005

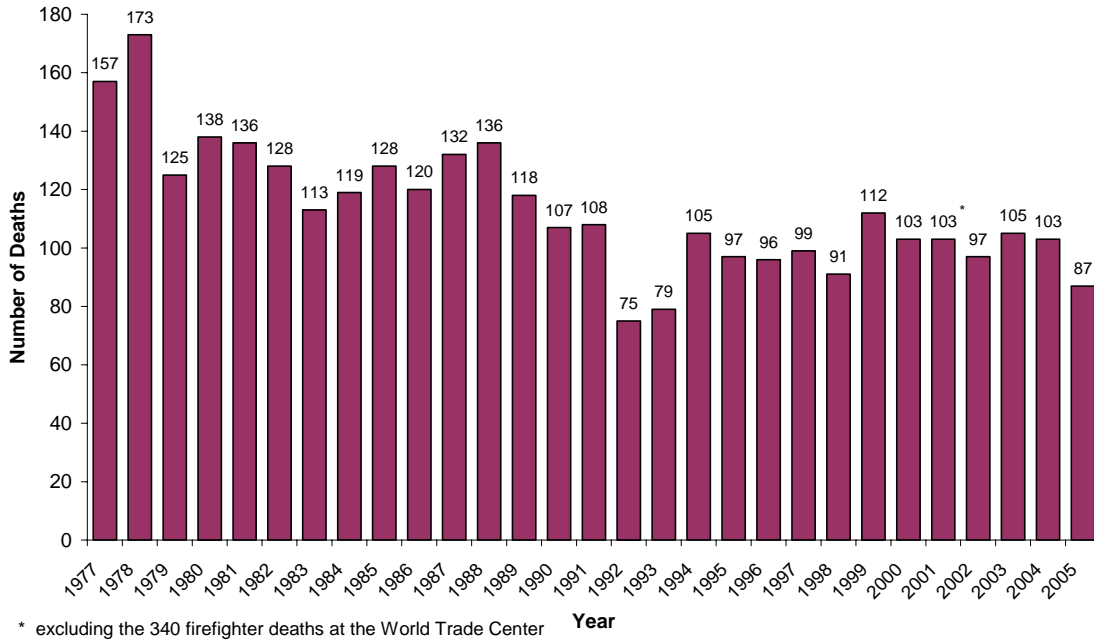


Figure 2
Firefighter Deaths by Type of Duty - 2005

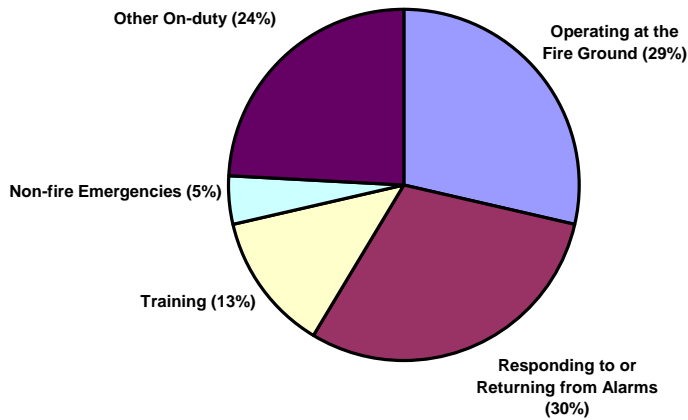


Figure 3
Firefighter Deaths by Cause of Injury -- 2005

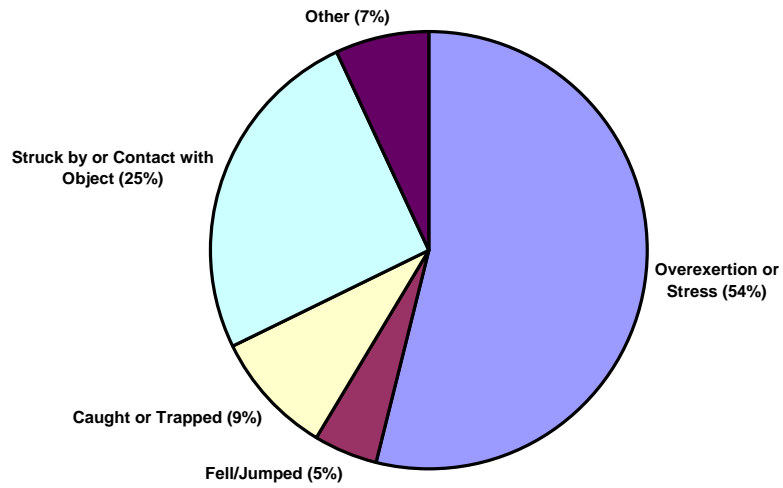


Figure 4
Firefighter Deaths by Nature of Injury -- 2005

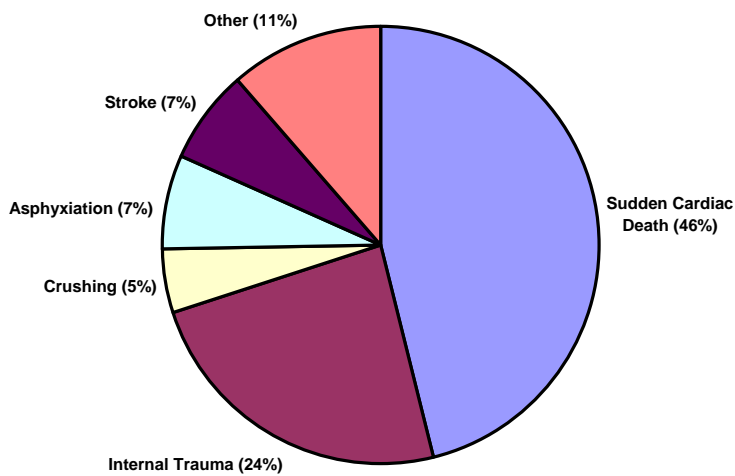


Figure 5
On-Duty Firefighter Deaths
by Age and Cause of Death -- 2005

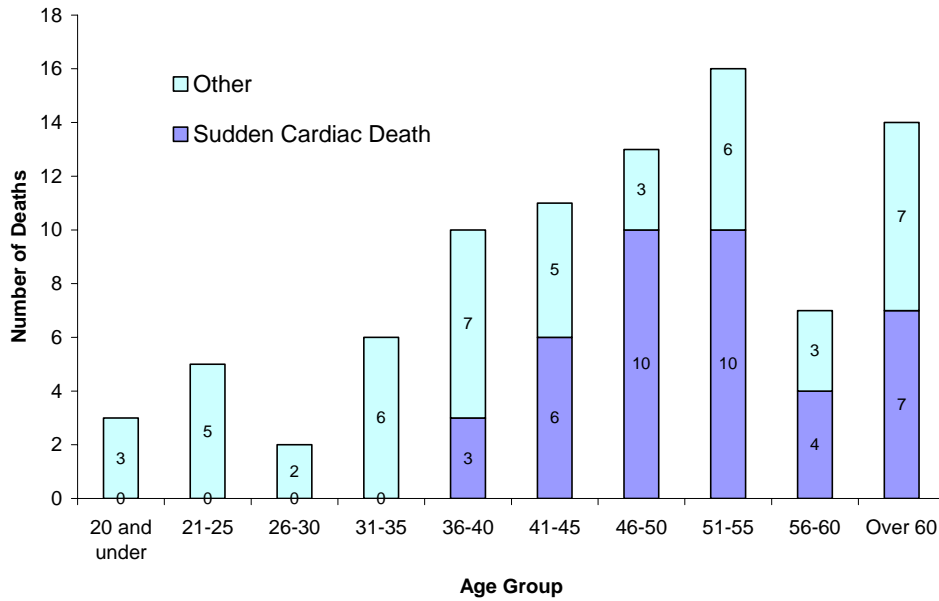
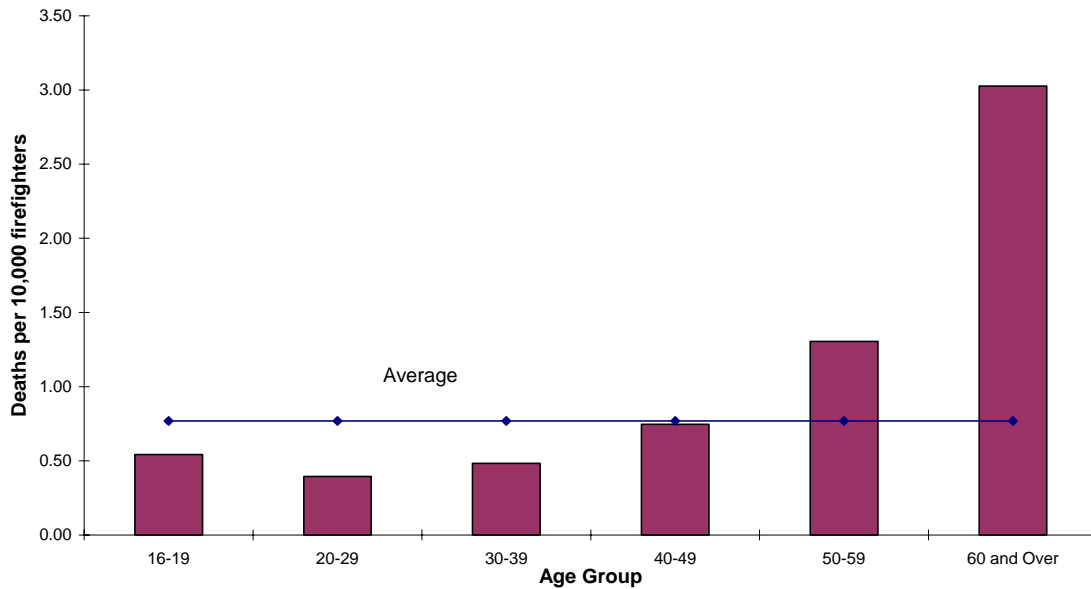
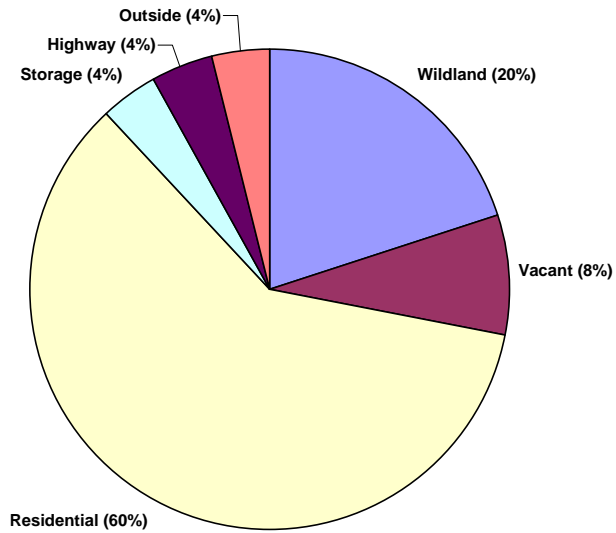


Figure 6
On-Duty Death Rates per 10,000 Career and Volunteer Firefighters
2001-2005*



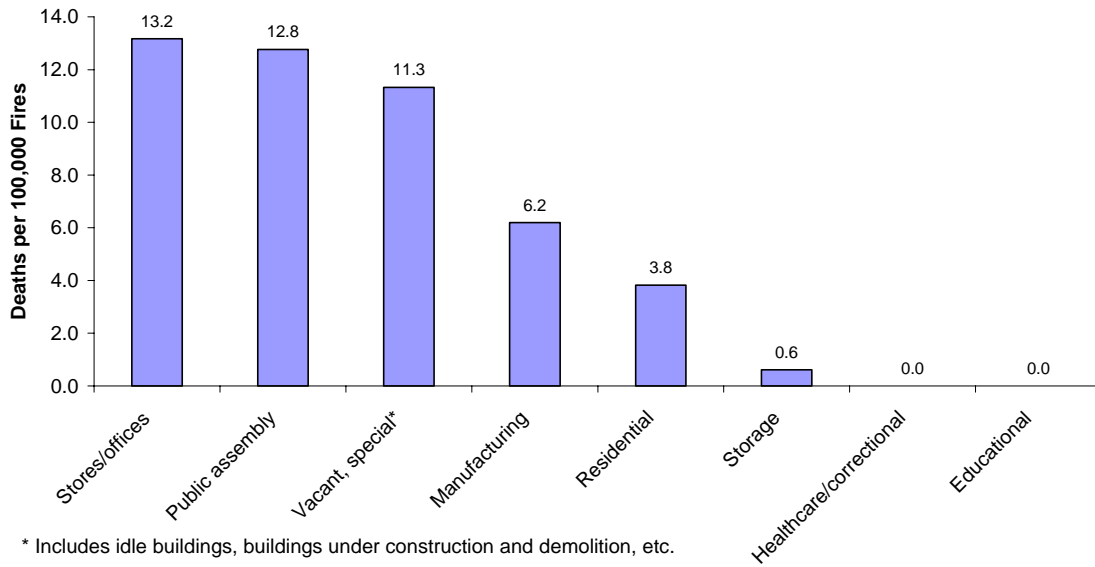
* excluding the 340 firefighter deaths at the World Trade Center in 2001

Figure 7
Fire Ground Deaths by Fixed Property Use -- 2005*



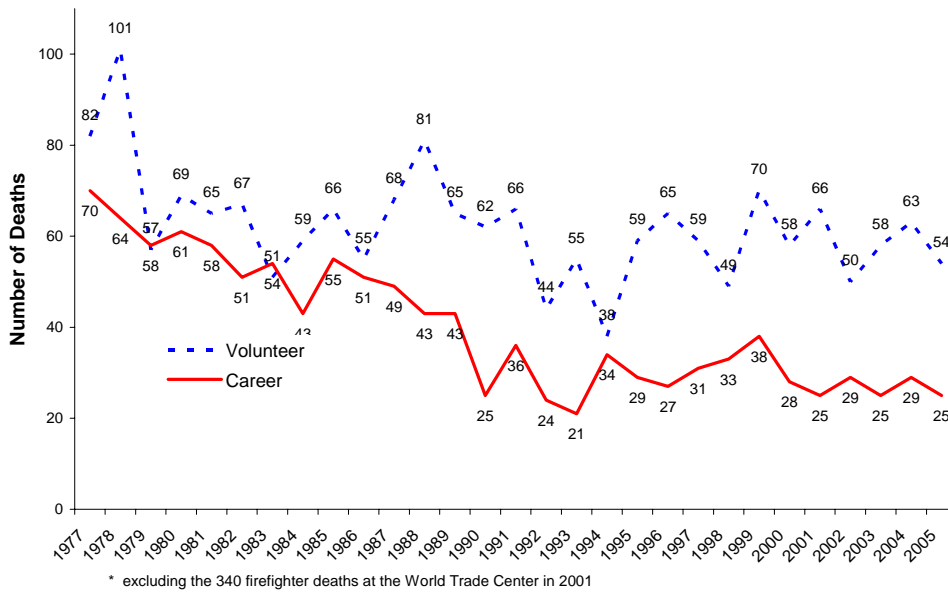
* There were 25 deaths on the fire ground in 2005.

Figure 8
On-Duty Fire Ground Deaths per 100,000 Structure Fires 2000-2004 (excluding the World Trade Center deaths in 2001)



* Includes idle buildings, buildings under construction and demolition, etc.

Figure 9
Firefighter Deaths - Local Career vs. Local Volunteer
1977 - 2005*



SELECTED FIREFIGHTER FATALITY INCIDENTS

Caught or trapped by fire

At 7:06 a.m. on January 20, the fire department received a 911 call reporting a smoke condition in a split-level, wood-frame house, the ground floor of which covered 1,800 square feet (167 square meters). Finish work was underway on a new addition to the structure.

The alarm was delayed for 15 or 20 minutes because the fire damaged the single-family home's telephone wires, and when the owner tried to call 911 on his cell phone, the call did not go through. He then went to a neighbors' house but could not wake them. Finally, he called someone else he knew, and that person called 911.

The captain on the first-arriving engine company initially reported that conditions were normal and that he would investigate. When the owner, whom he met outside the house, informed him that there was smoke in the building, the captain and the firefighter who responded with him donned self-contained breathing apparatus and stretched a 1¾ inch (45-milimeter) hose line to a door in the garage that led into the house. On opening the door, they saw dense smoke.

The captain reported the change in conditions and requested that the second-responding captain assume command on arrival. When the second captain and three other firefighters arrived, the first two men, both dressed in full protective clothing, entered the house with the hose line, via the garage door. They first went to the basement, where they neither saw nor heard any sign of fire. They then searched the first level until the firefighter's low-air alarm sounded. At that point, the captain and the firefighter went to the front door, which other firefighters had opened, and the firefighter left the house. The captain ordered another firefighter to accompany him to the second level to continue the search. They did not take a hose line with them.

The two men became trapped on the second level when the fire broke through the floor and became free burning, increasing to the amount of heat and smoke. At this time, the captain's low-air alarm sounded, and he and the firefighter became disoriented. The captain sent a 'Mayday' over his radio, and the two began buddy breathing. On the second attempt at buddy breathing, however, the fire captain fumbled with the regulator, then fell to the floor.

The firefighter proceeded along the wall until he felt a window and broke it, Then he went back to where he thought he had left the fire captain. When he failed to find the other man, the firefighter followed the sound of a positive-pressure fan to the stairway and left the house.

The fire captain's body was found in the bathroom on the second level. He was taken to the hospital where he was pronounced dead of smoke inhalation.

Investigators determined that the cause of the fire was the spontaneous combustion of oil-soaked rags in the basement of the new addition. A door between the old basement and the new was closed, preventing firefighters from seeing the initial fire area.

Electrocution

At 2:20 a.m. on February 13, fire companies were dispatched to a fire at a two-story, wood-frame house that covered 6,525 square feet (606 square meters) of ground floor area. When they arrived six minutes later, they found the second story of the single-family house almost completely involved and a number of civilians trying to control the blaze. By this time, the fire was burning through the roof and impinging on an electrical service drop attached to the house, so firefighters contacted the power company. A structure behind the house was also becoming an exposure problem.

The incident commander immediately requested a second alarm and assigned two engine companies to operate hand-lines in a defensive mode at the rear of the house to protect the exposed structure and help extinguish the fire in the house.

At some point during the operation, the electrical service drop burned through and caught on a tree limb from which it hung down onto the driveway. Firefighters attached yellow caution tape to an adjacent fence and placed the tape on the driveway to indicate that the wire was hanging above that area.

When the captain of an engine company operating behind the house started walking up the driveway to check on a member of his company, other firefighters tried to warn him about the power line. However, he did not acknowledge these warnings and walked into the energized power line, which knocked him to the ground. A member of a truck company who saw the captain fall grabbed a flat-head axe and moved the power line off the injured man.

Firefighters and EMS personnel immediately administered medical aid to the fire captain and transported him to the hospital, where he was pronounced dead from electrocution. The firefighter who rescued him suffered electrical burns to his stomach and severe cramping in his arms when the power line energized him.

Investigators later determined that the million-dollar fire started when candles or incense came in contact with some material on an altar on the second level of the house.

Roof collapse

On February 19, a first-alarm assignment was dispatched to a fire at a one-story, single-family house at 6:00 a.m. The wood-frame structure, which covered 1,800 square feet (167 square meters) of ground floor area, had been abandoned for approximately a year due to the owner's death, and its contents had been vandalized and scattered about the interior. Vagrants were using the house for illicit drug activities.

Because the alarm was received before the change of shift, the response included firefighters from two shifts. When firefighters arrived, the first engine company reported fire and smoke showing at the rear of the house. Three members of this company, including the captain, entered the building through the front door in what was termed a fast attack, while a ladder company was directed inside to perform search and rescue operations and a second engine company advanced a hose line for back-up. All three members of the first engine company were dressed in full

Roof collapse (continued)

protective ensembles with self-contained breathing apparatus that had integrated personal alert safety systems. They were also equipped with a second personal alert safety system designed to electronically signal monitoring equipment outside the building.

Even though visibility deteriorated the further in they went, and furniture and household items cluttering the interior made advancing the hose line difficult, the three firefighters advanced a 1¾-inch (45-milimeter) hose line into the house and found the fire in a room at the rear.

The captain, who had dropped his radio shortly after he entered the house and could not retrieve it, was operating the nozzle when he heard a rumbling noise. He yelled for everyone to leave the building as the roof collapsed, trapping him. At the same time, a fireball burst through the house, burning five firefighters.

All the firefighters were able to leave the building except the captain, whose body was found lying under 2 to 3 feet (0.6 to 0.9 meters) of debris. Neither of his personal alert safety devices was sounding, and his self-contained breathing apparatus and other protective equipment were too badly damaged by heat and flames to be evaluated or tested. The medical examiner listed the cause of death as smoke inhalation and burns. The five firefighters who were burned when the roof collapsed were treated at the hospital.

Helicopter crash

On March 10, a contract helicopter supporting a prescribed burn crashed into the heavily wooded terrain of a national forest, killing its pilot and two wildland firefighters. The burn was ignited using plastic spheres filled with potassium permanganate, which was injected with ethylene glycol as the spheres were dispersed from a cabin-mounted dispenser machine. The chemicals in the sphere react and ignite when the sphere is on the ground.

After 45 minutes of aerial ignition work, the plastic sphere dispenser jammed, and the helicopter returned to base where the problem was corrected. Seven minutes after the pilot resumed his mission, ground personnel heard one of the firefighters say, “Mayday, mayday, mayday, we are going down.” No other communications were heard from the helicopter. The wreckage was found a short time later and recovery operations were started immediately.

The National Transportation Safety Board is investigating the cause of the crash, and the nature of the deaths has yet to be reported.

Fall from ladder during training

At 1:00 p.m. on April 2, a newly appointed firefighter sustained fatal injuries while participating in a ladder exercise at a state fire school. The exercise consisted of ascending a ladder on one side of a 20-foot-high (6-meter) building and descending another ladder on the opposite side of the building.

Fall from ladder during training (continued)

The 18-year-old firefighter, who was dressed in a full protective ensemble including self-contained breathing apparatus, was on the roof when he ran out of air. He disconnected the regulator from his face piece, which had fogged up, reducing his visibility. As he got on the ladder to get down off the roof, his foot slipped, and he started to fall. An instructor standing nearby tried to grab him, but he missed, and the young man continued to fall, landing on his head.

Medical aid was immediately administered, and he was transported to the hospital, where he died the following day of head and spinal injuries.

Backdraft

Two firefighters died in a fire on April 18 in a two-story, wood-frame townhouse, the ground floor of which covered a 600 square feet (55 square meters). The fire started in an unfinished attic that was being used for storage. Access to the attic was through a small, makeshift door in the master bedroom.

The initial 911 call, received at 3 p.m., was for a fire in a residential building, and firefighters were advised that there could be children in the building. Two engines and an aerial ladder were dispatched.

Two firefighters from the first-arriving engine company, dressed in full protective ensembles with self-contained breathing apparatus, entered the building with a charged 1¾-inch (45-milimeter) hose line to search for the children. They made it to the second level, which was full of smoke, then went back outside to get a thermal imaging camera. Returning to the second level, one of the firefighters opened the attic door, allowing air into the area, and a backdraft occurred. The force of the backdraft sent flames downstairs and out the front entrance, igniting combustibles along the way.

There were no communications from the two firefighters after the backdraft, and the flames and intense heat blocked attempts to rescue the men. Their bodies were recovered after the second level was ventilated, and the flames were knocked down. Autopsies revealed that both had died of smoke inhalation.

Investigators determined that the fire began when electrical wiring improperly installed in the attic on top of a wooden ceiling joist short-circuited and ignited nearby combustibles. The wiring had been subjected to physical damage by wood planks and items stored on top of them.

Heart attack

On April 16, a 49-year-old firefighter suffered a heart attack after participating in a pump operator training session. When the session ended, she went into the fire station to help with a fund-raiser the fire department was holding and collapsed. On-scene firefighters used the department's automatic external defibrillator and performed cardiopulmonary resuscitation in an effort to revive her before the ambulance arrived to take her to the hospital. She died two days later.

Heart attack during residential fire

On April 16 at 2:00 a.m., a 54-year-old firefighter reported a fire in his single-family home and evacuated his family. He then drove to the fire station and returned with the fire engine. During pumping operations, he had a heart attack and collapsed. He was transported to the hospital, where he died later in the day.

Aneurysm

Fire companies responded to an alarm of fire at a children's day care center on April 20 at 11:00 a.m. After an investigation, however, they determined that there was no fire and that someone had intentionally pulled a pull station. All companies were ordered to return to their quarters.

During the return trip, the driver of one of the pumpers lost consciousness, and the uncontrolled apparatus jumped the curb onto the sidewalk. The fire lieutenant sitting in the passenger seat climbed over the console and used the emergency brake to stop the apparatus before any damage was done. Then he and the other firefighters in the company removed the driver and began CPR. The unconscious man was transported to the hospital, where he was pronounced dead a short time later.

The cause of death was listed as a saccular aneurysm with rupture of the basilar artery.

Heat stroke during training

At 4:00 p.m. on May 19, a 22-year-old firefighter recruit participating in a 3-mile (4.8-kilometer) run at the fire department's training academy collapsed after running 2½ miles (4 kilometers). The firefighter, who was 6 feet 4 inches tall (1.8 meters) and weighed 305 pounds (138 kilograms), was taken to the fire academy's offices in a private vehicle and medical aid was initiated. He was then transported to the hospital and diagnosed with profound heat stroke, with a body temperature as high as 108°F (42°C). He was transferred to the hospital's intensive care unit, where he died nine days later from multi-system organ failure.

Heart attack during physical training

During the morning of May 31, a 58-year-old firefighter participated in ladder drills and public education programs demonstrating firefighter techniques. In the afternoon, he went to the gym at the fire station to perform his physical fitness training in accordance with the recommended practices the fire department had adopted for diet and physical conditioning.

At 2:30 p.m., another firefighter entered the gym and discovered him lying face up near a rowing machine that he had been using. The firefighter called 911 for an ambulance and summoned the other firefighters in the station to the gym, where they immediately tried to revive the stricken man using an automatic external defibrillator and cardiopulmonary resuscitation.

The ambulance arrived minutes later and transported the firefighter to the hospital, where he was pronounced dead of a heart attack.

Fall from apparatus

On April 23, the fire department received an alarm of a fire in single-family house at 10 p.m., and a chief officer, two engine companies, and an aerial ladder company were dispatched to the scene.

In the aerial ladder apparatus were the driver, an officer seated in the front passenger seat, and two firefighters seated in rear-facing seats in an enclosed cab. During the response, the firefighter riding behind the driver stood up to don his self-contained breathing apparatus and fell out of the apparatus when the cab door opened as the truck made a right-hand turn at an intersection.

Through his rear view mirror, the driver saw the door open and the firefighter fall. At the same time, the firefighter sitting behind the lieutenant called out that his colleague had fallen and hit the back of his head when he landed. The driver stopped the apparatus immediately, and the crew went to help the unconscious firefighter while the officer requested an ambulance and the police. Hearing the radio call, the chief officer and one of the engine companies returned to the site of the incident to help.

The firefighter was rushed to the hospital and into emergency surgery, but he never regained consciousness. His condition continued to deteriorate after the surgery, and he died two days later of blunt force trauma to the head.

The fire department, the state fire marshal's office, and a private engineering company investigated the incident. Their report noted that four things contributed to the firefighter's death: he was standing instead of sitting and wearing his seat belt; the officer did not ensure that all the firefighters were seated with their seat belts fastened before leaving the station; the seatbelt monitoring system was not functioning and at least one seat sensor had been disabled; and the door's latching mechanism malfunctioned, due to corrosion and internal friction. Testing showed that the cab door did not always latch properly, and maintenance records revealed that the problem had been reported in the past.

Struck by Falling Limb

On July 14, a brush truck and an engine company dispatched to a brush fire at 1:45 a.m. found the top of a hollow tree on fire. Using its deck gun, the engine company directed 1,000 gallons (3,785 liters) of water onto the tree. When the water was depleted, five firefighters went to investigate and determined that the fire was still burning.

As three of the five were walking back to the apparatus, they heard a cracking sound and turned to see the other two firefighters running in different directions. One of the men, dressed in full protective ensemble, was knocked down and pinned to the ground by a large falling limb. The firefighters pulled the limb from the fallen man, who was unconscious but breathing, and called an ambulance, which took the injured man to a hospital, where he died of multiple traumatic injuries.

Investigators later determined that the fire was caused by a lightning strike.

Drowning

At 8:00 p.m. on December 10, three firefighters returning the fire department's 10-foot (3-meter) rescue boat to a launch site after escorting an annual boat parade were involved in a head-on collision with another boat at a sharp bend in the river. One of the firefighters, who was wearing a jumpsuit, boots, and a personal floatation device, hit her head as she was ejected from the boat and was recovered from the water unconscious, floating face down.

The 19-year-old, who had been a firefighter for just a year, was flown to a medical center, where she died five days later after life support was removed. Three others were injured in the crash. Both drivers had broken ribs, and the third firefighter in the rescue boat suffered a ruptured spleen.