U.S. FIREFIGHTER INJURIES - 2009

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October 2010

National Fire Protection Association
Fire Analysis and Research Division

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Abstract

NFPA estimates that 78,150 firefighter injuries occurred in the line of duty in 2009. About two-fifths (41.2%) of the all firefighter injuries occurred during fireground operations. An estimated 17,590 occurred during other on duty activities, while 15,455 occurred at nonfire emergency incidents. The leading type of injury received during fireground operations was strain, sprain or muscular pain (48.2%), followed by wound, cut, bleeding, bruise (13.2%). Regionally, the Northeast had the highest fireground injury rate.

Keywords: fire statistics, firefighter injuries, exposures, injury rates, fireground, non-fire emergencies, type of duty, cause of injury, collisions, community size

Acknowledgements

The NFPA thanks the many fire departments that responded to the NFPA Survey for U.S. Fire Experience (2009) for their continuing efforts in providing in a timely manner the data so necessary to make national projections of firefighter injuries.

The authors gratefully thank the many NFPA staff members who worked on this year's survey, including Frank Deely, John Baldi, and John Conlon for editing and keying the survey forms and their follow-up calls to fire departments; and Norma Candeloro for handling the processing of survey forms and typing this report.

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Overview of 2009 Firefighter Injuries

- 78,150 firefighter injuries occurred in the line of duty in 2009, a decrease of 1.9%.

- 32,205 or 41.2% of all firefighter injuries occurred during fireground operations. An estimated 15,455 occurred at nonfire emergency incidents, while 17,590 occurred during other on duty activities.

- The Northeast reported a higher number of fireground injuries per 100 fires than other regions of the country.

- The major types of injuries received during fireground operations were: strain, sprain, muscular pain (48.2%); wound, cut, bleeding, bruise (13.2%); smoke or gas inhalation (6.2%). Strains, sprains, and muscular pain accounted for 58.9% of all nonfireground injuries.

- The leading causes of fireground injuries were overexertion, strain (25.2%) and fall, slip, jump (22.7%).

Background

Firefighters work in varied and complex environments that increase their risk of on-the-job death and injury. A better understanding of how these fatalities, nonfatal injuries, and illnesses occur can help identify corrective actions which, could help minimize the inherent risks.

Each year, the NFPA studies firefighter deaths and injuries to provide national statistics on their frequency, extent, and characteristics. Earlier this year, the NFPA reported 82 firefighters died on duty (see "Firefighter Fatalities in the United States, 2009" July/August *NFPA Journal*).

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This report addresses 2009 firefighter injuries in the United States. The results are based on data collected during the NFPA Survey of Fire Departments for U.S. Fire Experience (2009). An earlier report measured the national fire experience in terms of the number of fires that fire departments attended and the resulting civilian deaths, civilian injuries, and property losses that occurred[1].

This year's report includes among its results:

- An estimate of the total number of 2009 firefighter injuries.
- Estimates of the number of injuries by type of duty.
- An estimate of the number of exposures to infectious diseases.
- Trends in firefighter injuries and rates.
- Fireground injuries by cause.
- Fire department vehicle accidents and resulting firefighter injuries.
- The average number of fires and fireground injuries per department by population of community protected.
- Descriptions of selected incidents that illustrate firefighter safety problems.

Overall Results

Based on survey data reported by fire departments, the NFPA estimates that 78,150 firefighter injuries occurred in the line of duty in 2009. This is a decrease of 1.9% from a year ago. In recent years, the number of firefighter injuries have been considerably lower than they were in the 1980s and 1990s (Figure 1), but this is due in part to additional questions on exposures which allows us to place them in their own categories. Previously some of these exposures may have been included in total injuries under other categories.

The NFPA estimates that there were 11,900 exposures to infectious diseases (e.g., hepatitis, meningitis, HIV, others) in 2009. This amounts to 0.7 exposures per 1,000 emergency medical runs by fire departments in 2009.

The NFPA estimates that there were 23,000 exposures to hazardous conditions (e.g., asbestos, radioactive materials, chemicals, fumes, other) in 2009. This amounts to 22.5 exposures per 1,000 hazardous condition runs in 2009.

An estimated 15,150 injuries or 19.4% of all firefighter injuries resulted in lost time in 2009.

Injuries by Type of Duty

Estimates of firefighter injuries by type of duty are displayed in Figure 2. As in past reports, type of duty is divided into five categories:

- Responding to or returning from an incident (includes fire and nonfire emergencies).

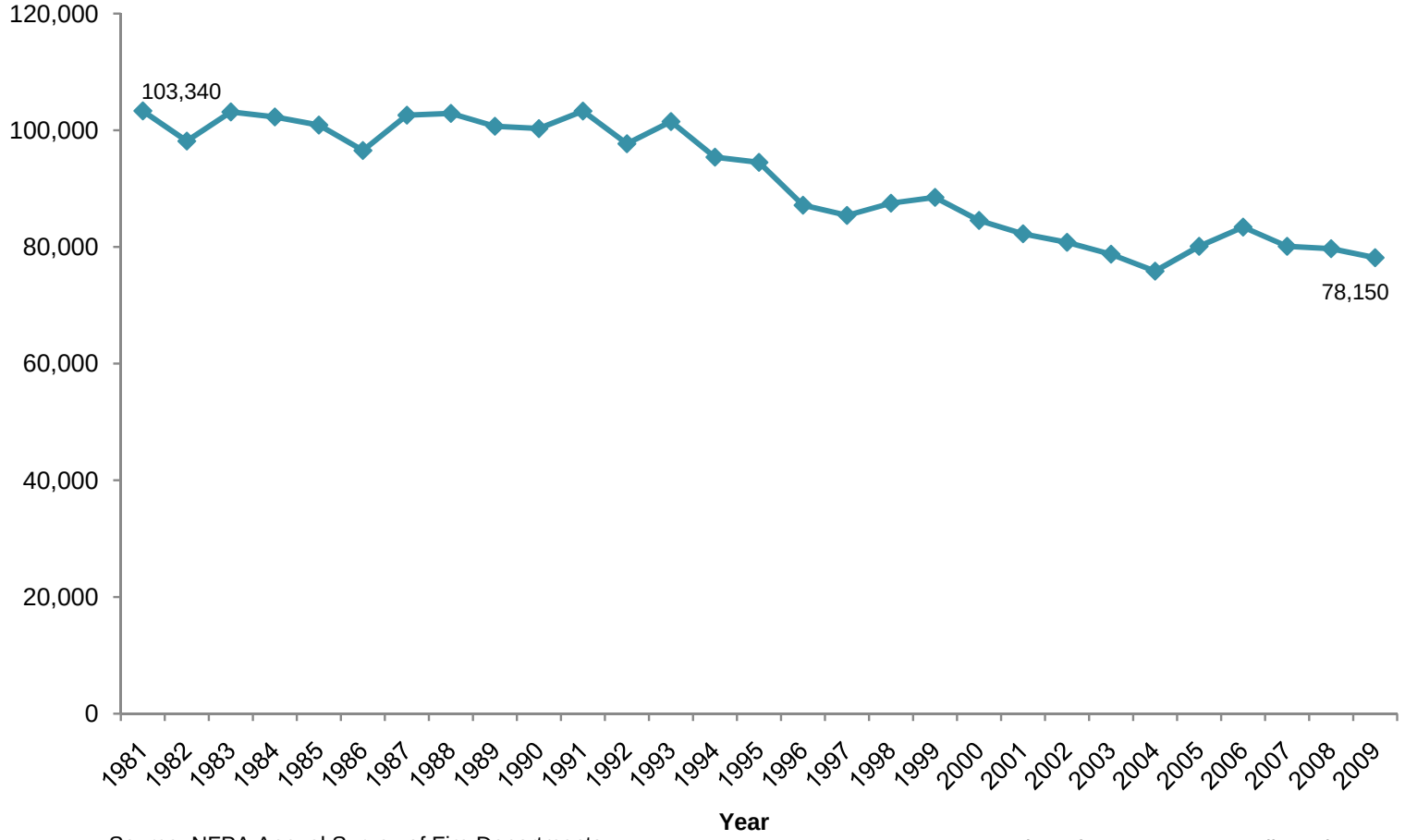
- Fireground (includes structure fires, vehicle fires, brush fires, etc.), and refers to all activities from the moment of arrival at the scene to departure time (e.g., setup, extinguishment, overhaul).

- Nonfire emergency (includes rescue calls, hazardous calls, such as spills, and natural disaster calls).

- Training

- Other on-duty activities (e.g., inspection or maintenance duties).

Figure 1
Total Firefighter Injuries by Year (1981-2009)



Source: NFPA Annual Survey of Fire Departments for U.S. Fire Experience (1981-2009)

From 1994 on, number of exposures was collected separately

Results by type of duty indicate not surprisingly that the largest share of injuries occurs during fireground operations: 32,205 or 41.2% of all firefighter injuries in 2009 and, the lowest it's been for the 1981 to 2009 period. Table 1 displays firefighter injuries at the fireground and injury rates for the 1981-2009 period. Injuries at the fireground decreased from their high of 67,500 in 1981 to a low of 32,205 in 2009 for a decrease of 53.3%. The number of fires also declined steadily for an overall decrease of 52.3%. The rate of injuries per 1000 fires has not shown any consistent trend up or down for the period (Figure 2). These results suggest that even though the number of fires and fireground injuries declined similarly during the period, the injury rate did not, and when there is a fire, the fireground injury rate risk has not changed much for the period.

Overall for the 1981 to 2009 period, the number of injuries at nonfire emergencies increased from 9,600 in 1981 to 15,320 in 2009 for an overall increase of 66%. For the same period, the number of nonfire emergencies increased a substantial 220% due in large part to an increase in the number of medical aid incidents. When the injury rate per 1000 nonfire emergencies is examined, the rate has declined during the period from 1.24 in 1981 to 0.62 in 2009 (Figure 3), because the number of nonfire emergencies increased at a higher rate than the number of injuries at nonfire emergencies.

Nature of Fireground Injuries

Estimates of 2009 firefighter injuries by nature of injury and type of duty are displayed in Table 2. Table 2 indicates that the major types of injuries that occur during fireground operations are strain, sprain (48.2%); wound, cut, bleeding, bruise (13.2%); smoke or gas inhalation (6.2%); burns (7.1%); thermal stress (5.8%).

Results were fairly consistent during all non-fireground activities, with strains, sprains, and muscular pain accounting for 58.9% of all non-fireground injuries, and wound, cut, bleeding, bruise accounting for 16.2%.

Causes of Fireground Injuries

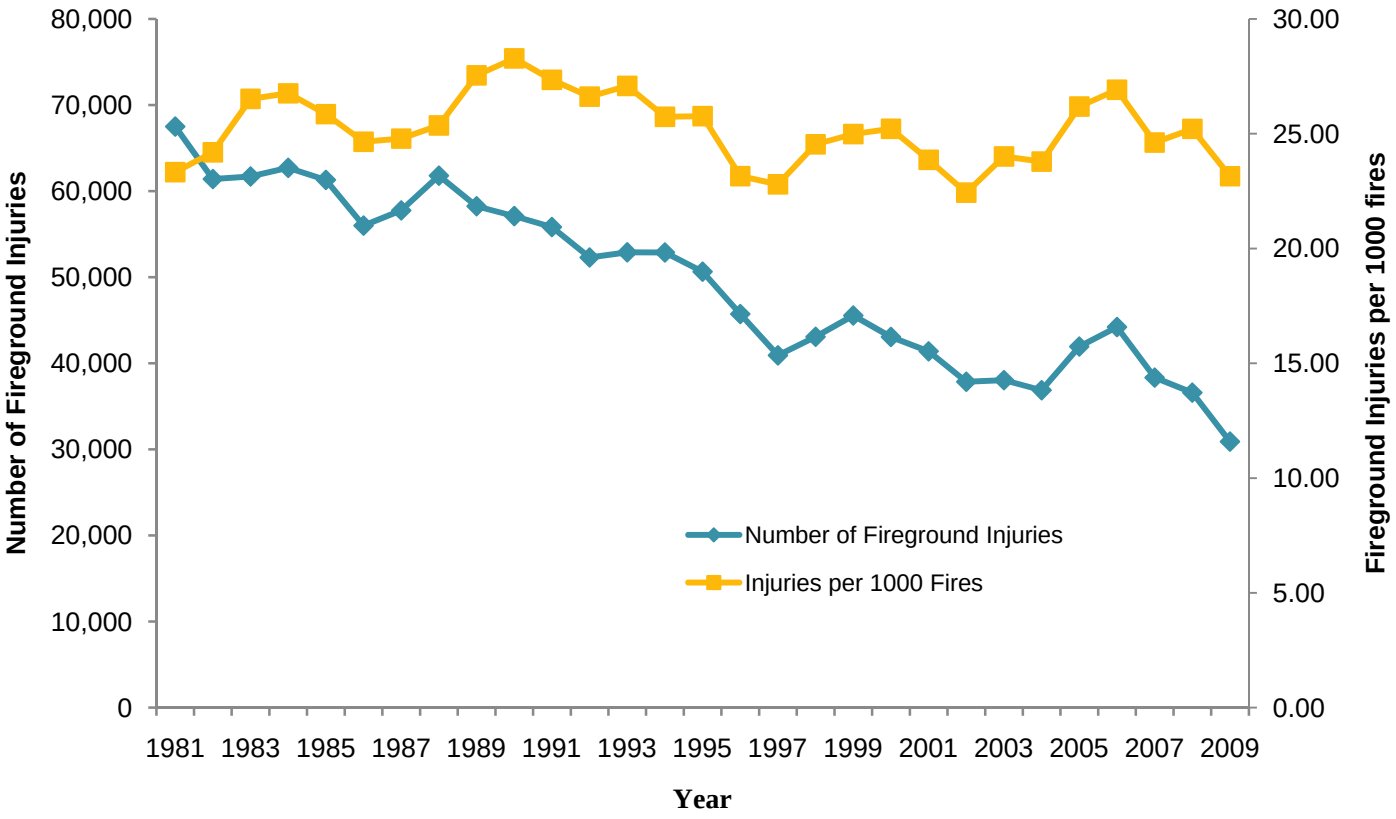
Because fireground injuries are of particular concern their causes were examined (see Figure 4). The definition of cause here refers to the initial circumstance leading to the injury. Overexertion, strain (25.2%) and fall, jump, slip (22.7%) were the leading causes of fireground injuries. Other major causes were contact with object (11.4%); and exposure to fire products (12.9%).

Table 1
Firefighter Injuries at the Fireground and at Nonfire Emergencies, 1981-2009

	At the Fireground		At Nonfire Emergencies	
Year	**Injuries**	**Injuries per 1,000 Fires**	**Injuries**	**Injuries per 1,000 Incidents**
1981	67,500	23.3	9,600	1.24
1982	61,400	24.2	9,385	1.17
1983	61,700	26.5	11,105	1.29
1984	62,700	26.8	10,600	1.21
1985	61,300	25.9	12,500	1.38
1986	55,900	24.7	12,545	1.30
1987	57,755	24.8	13,940	1.41
1988	61,790	25.4	12,325	1.13
1989	58,250	27.5	12,580	1.11
1990	57,100	28.3	14,200	1.28
1991	55,830	27.3	15,065	1.20
1992	52,290	26.6	18,140	1.43
1993	52,885	27.1	16,675	1.25
1994	52,875	25.7	11,810	0.84
1995	50,640	25.8	13,500	0.94
1996	45,725	23.1	12,630	0.81
1997	40,920	22.8	14,880	0.92
1998	43,080	24.5	13,960	0.82
1999	45,500	25.0	13,565	0.76
2000	43,065	25.2	13,660	0.73
2001	41,395	23.9	14,140	0.73
2002	37,860	22.4	15,095	0.77
2003	38,045	24.0	14,550	0.70
2004	36,880	22.1	13,150	0.62
2005	41,950	26.2	12,250	0.56
2006	44,210	26.9	13,090	0.57
2007	38,340	24.6	15,435	0.65
2008	36,595	25.2	15,745	0.66
2009	32,205	23.4	15,455	0.62

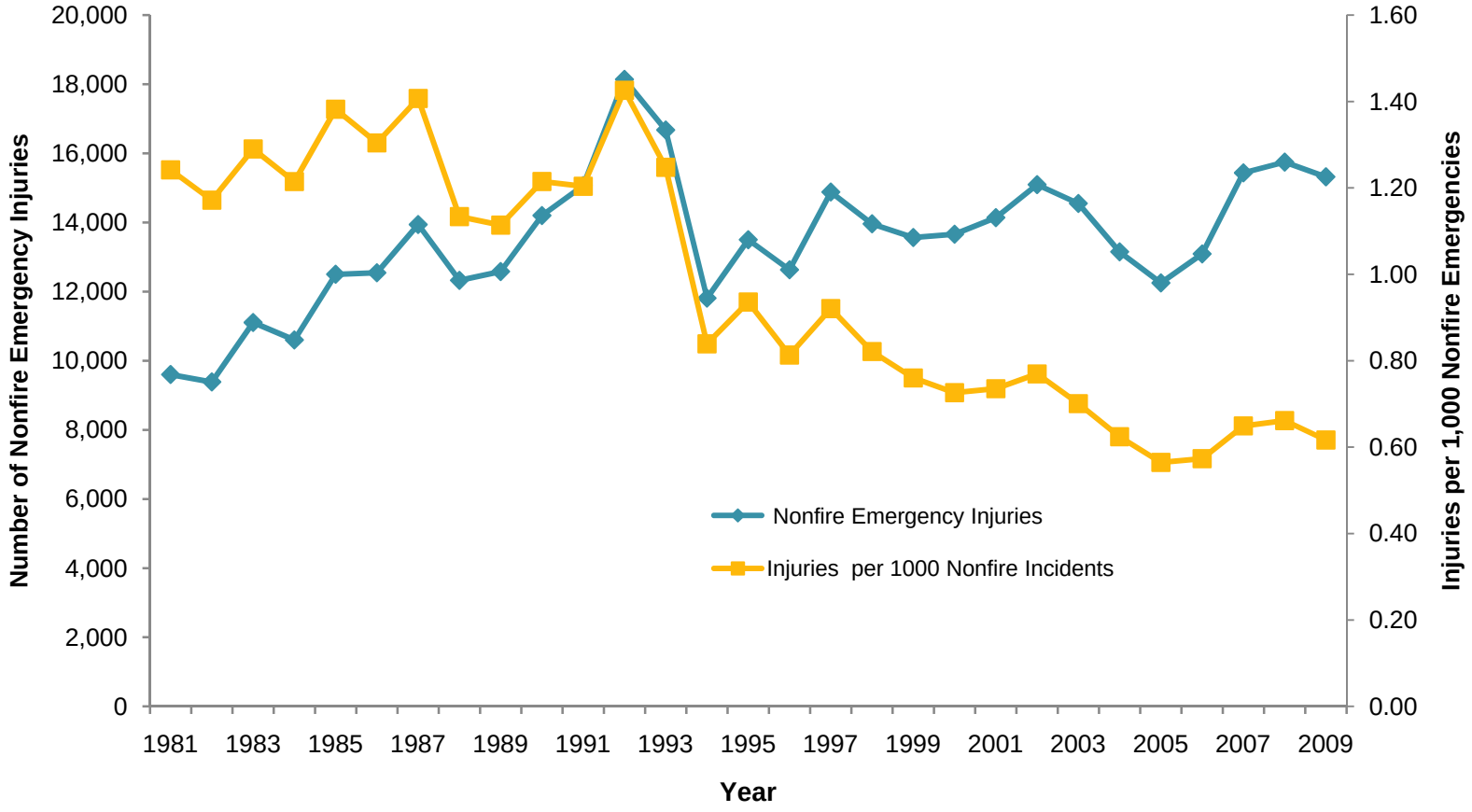
Source: NFPA Survey of Fire Departments for U.S. Fire Experience (1981-2009)

Figure 2.
The Number of Injuries at the Fireground and Fireground Injuries per 1,000 Fires



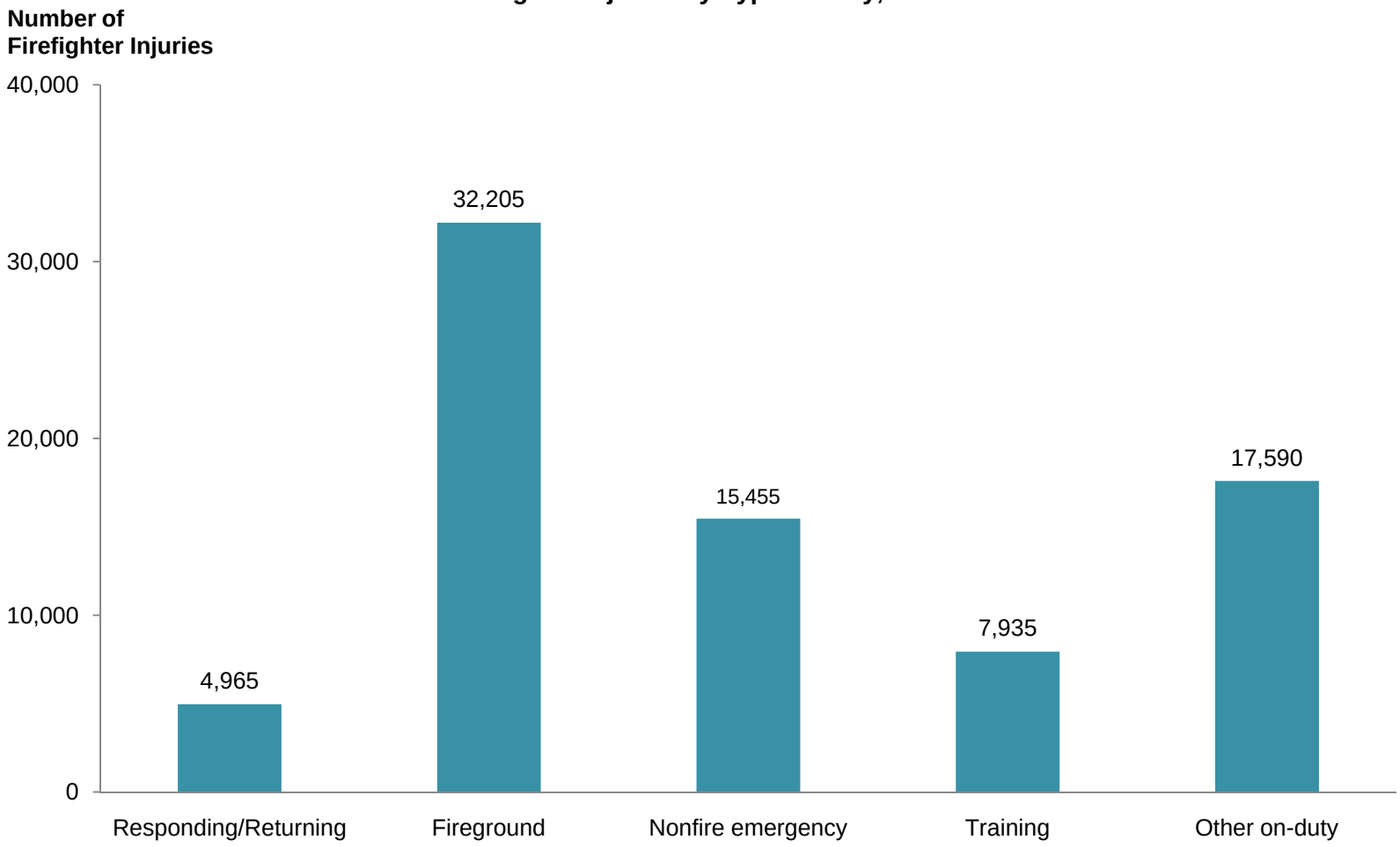
Source: NFPA Annual Survey of Fire Departments for U.S. Experience (1981-2009)

Figure 3.
The Number of Injuries at Nonfire Emergencies and Injuries per 1,000 Nonfire Emergencies



Source: NFPA Annual Survey of Fire Departments for U.S. Experience (1981-2009)

Figure 4.
Firefighter Injuries by Type of Duty, 2009



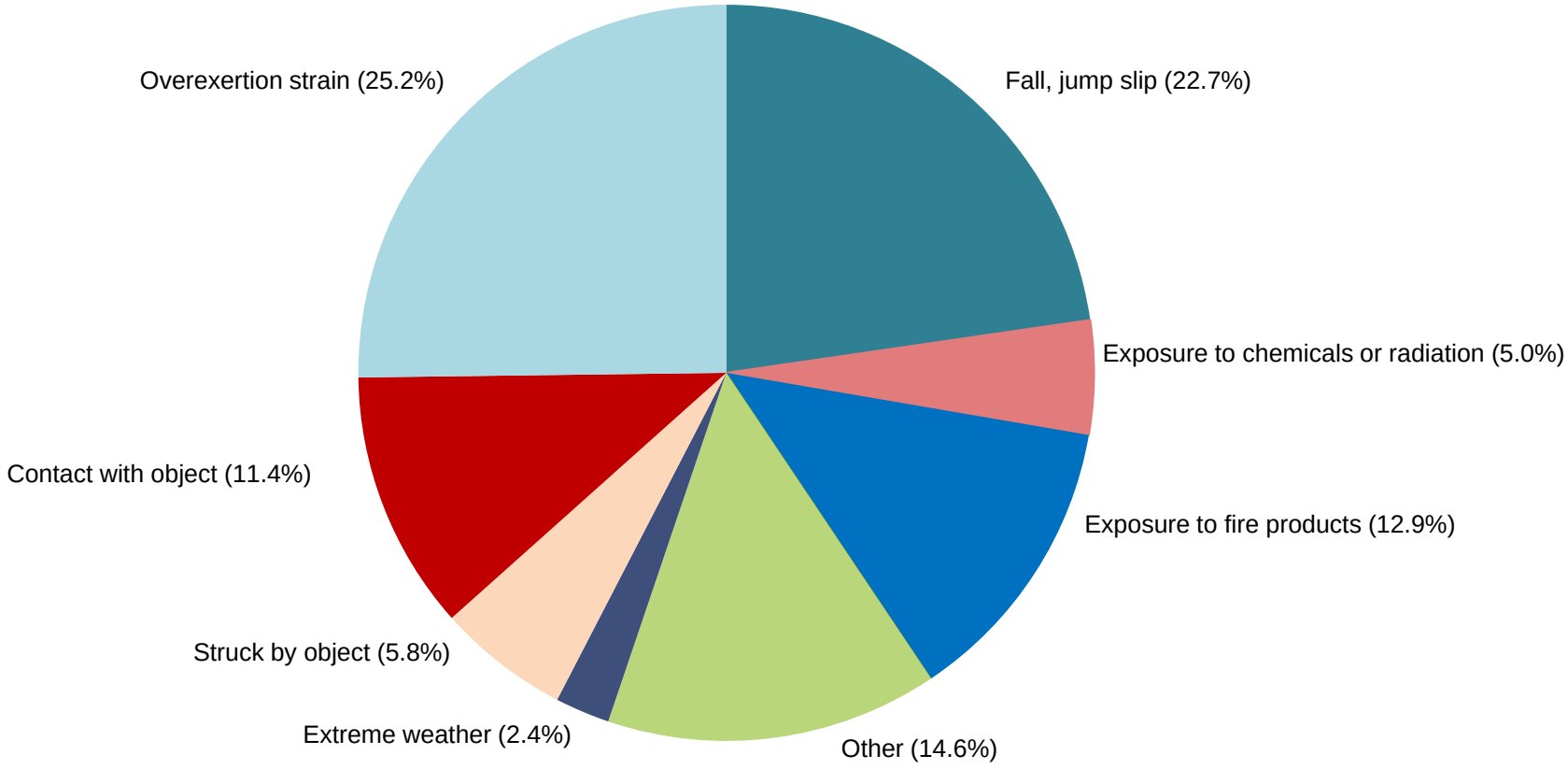
Source: NFPA Annual Survey of Fire Departments for U.S. Fire Experience (2009)

Table 2. Firefighter Injuries by Nature of Injury and Type of Duty, 2009

	Responding to or Returning from an Incident		Fireground		Nonfire Emergency		Training		Other on-duty		Total	
Nature of Injury	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**
Burns (Fire or Chemical)	95	1.9	2,280	7.1	25	0.2	230	2.9	335	1.9	2,965	3.8
Smoke or Gas Inhalation	50	1.0	1,985	6.2	130	0.8	65	0.8	110	0.6	2,340	3.0
Other Respiratory Distress	45	0.9	450	1.4	195	1.3	100	1.3	125	0.7	915	1.2
Burns and Smoke Inhalation	5	0.1	445	1.4	5	0.0	70	0.9	40	0.2	565	0.7
Wound, Cut, Bleeding Bruise	765	15.4	4,250	13.2	2,130	13.8	1,140	14.4	3,400	19.3	11,685	15.0
Dislocation, Fracture	150	3.0	755	2.4	270	1.8	430	5.4	345	2.0	1,950	2.5
Heart Attack or Stroke	25	0.5	375	1.2	130	0.8	130	1.6	480	2.7	1,140	1.5
Strain, Sprain Muscular Pain	3,280	66.1	15,525	48.2	9,490	61.4	4,775	60.2	9,515	54.1	42,585	54.5
Thermal Stress (frostbite, heat exhaustion)	95	1.9	1,865	5.8	50	0.3	345	4.4	175	1.0	2,530	3.2
Other	455	9.2	4,275	13.3	3,030	19.6	650	8.2	3,065	17.4	11,475	14.7
	4,965		32,205		15,455		7,935		17,590		78,150	

Source: NFPA Survey of Fire Departments for U.S. Fire Experience, 2009
Note: If a firefighter sustained multiple injuries for the percent incident, only the nature of the single most serious injury was tabulated.

Figure 5.
Fireground Injuries by Cause, 2009



Source: NFPA Annual Survey of Fire Departments for U.S. Fire Experience (2009)

Fire Department Vehicle Collisions

The NFPA reported earlier that 14 firefighters died in motor vehicle collisions in 2009. (See "Firefighter Fatalities in the United States, 2009" July/August *NFPA Journal*).

In 2009, there were an estimated 15,100 collisions involving fire department emergency vehicles, where departments were responding to or returning from incidents (see Table 3). To put this number in perspective however, fire departments responded to over 26.2 million incidents in 2009 so that the number of collisions represents about one tenth of 1 percent of total responses. However, these collisions resulted in 820 firefighter injuries or 1.0% of all firefighter injuries.

Also, 870 collisions involving firefighters' personal vehicles occurred in 2009 while departments were responding to or returning from incidents. Thes1e collisions resulted in an estimated 100 injuries.

Table 3
Fire Department Vehicle Collisions and
Resulting Firefighter Injuries
While Responding to or Returning From Incidents, 1990-2009

	Involving Fire Department Emergency Vehicles		Involving Fire Fighters' Personal Vehicles	
Year	**Collisions**	**Firefighter Injuries**	**Collisions**	**Firefighter Injuries**
1990	11,325	1,300	950	175
1991	12,125	1,075	1,375	125
1992	11,500	1,050	1,575	150
1993	12,250	900	1,675	200
1994	13,755	1,035	1,610	285
1995	14,670	950	1,690	190
1996	14,200	910	1,400	240
1997	14,950	1,350	1,300	180
1998	14,650	1,050	1,350	315
1999	15,450	875	1,080	90
2000	15,300	990	1,160	170
2001	14,900	960	1,325	140
2002	15,550	1,040	1,030	210
2003	15,900	850	980	85
2004	15,420	980	1,150	220
2005	15,885	1,120	1,080	125
2006	16,020	1,250	1,070	210
2007	14,650	915	665	120
2008	14,950	670	1,000	70
2009	15,100	820	870	100

Source: NFPA Survey of Fire Departments for U.S. Fire Experience (1990-2009)

Average Fires and Fireground Injuries per Department by Population Protected

The average number of fires and fireground injuries per department by population of community protected in 2009 are displayed in Table 4. These tabulations show (1) that the number of fires a fire department responds to is directly related to the population protected, and (2) that the number of fireground injuries incurred by a department is directly related to its exposure to fire, i.e., and the number of fires attended by the department. The second point is clearly demonstrated when we examine the range of the statistic: from a high of 83.9 for departments that protect communities of 500,000 to 999,999 to a low of 0.2 for departments that protect communities of less than 2,500.

A useful way to look at firefighter injury experience and to obtain a reading on the relative risk that departments face is to examine the number of fireground injuries that occur for every 100 fires attended. This takes into account relative fire experience and allows more direct comparison between departments protecting communities of different sizes. The number of fireground injuries per 100 fires is displayed in column 4 of Table 4. The overall range of rates varied less from a high of 3.3 for departments that protect communities 250,000 to 499,999 to a low of 1.3 for departments that protect communities of 5,000 to 9,999 population. Thus, the wide range noted in average fireground injuries by population protected narrows when relative fire experience is taken into account. The overall injury rate for departments protecting communities of 50,000 population or more was 2.7 injuries per 100 fires or 40% higher than the injury rate for departments protecting communities of less than 50,000 population.

The risk of fireground injury per 100 firefighters by size of community protected was also calculated and is displayed in column 5 of Table 4. Larger departments generally had the highest rates with departments protecting communities of 250,000 to 499,999 having the highest rate with 7.8 injuries per 100 firefighters. As community size decreases, the rate drops quite steadily to a low of 0.8 for departments protecting less than 2,500 people. That is a more than a nine-to-one difference in risk of injury between communities of 250,000 to 499,999, and the smallest communities (less than 2,500).

An explanation for this difference is that although a department protecting a community with a population of 250,000 to 499,999 has, on average, more than 24 times as many firefighters than a department protecting a population of less than 2,500, the larger department attends more than 95 times as many fires, and as a result, it incurs considerably more fireground injuries.

Table 4
Average Number of Fires, Fireground Injuries and Injury Rates by Population of Community Protected, 2009

Population of Community Protected	Average Number of Fires	Average Number of Fireground Injuries	Number of Fire-ground Injuries Per 100 Fires	Number of Fire-ground Injuries Per 100 Firefighters
500,000 to 999,999	2,688.5	83.9	3.1	7.3
250,000 to 499,999	1,054.8	34.9	3.3	7.8
100,000 to 249,999	485.9	9.0	1.8	4.3
50,000 to 99,999	221.7	4.7	2.1	4.4
25,000 to 49,999	116.6	2.4	2.1	3.9
10,000 to 24,999	63.0	1.1	1.7	2.7
5,000 to 9,999	37.2	0.5	1.3	1.5
2,500 to 4,999	22.1	0.3	1.4	1.2
Under 2,500	11.0	0.2	1.8	0.8

Source: NFPA Survey of Fire Departments for U.S. Fire Experience, 2009

Average Fires and Fireground Injuries by Population Protected and Region

Table 5 displays the average number of fires and fireground injuries per department by population of community protected and region of the country[3]. As in the nationwide results in Table 4, the results of each region of the country indicate that the number of fires a fire department responds to is directly related to the population protected, and the number of fireground injuries incurred by a department is directly related to the number of fires attended. The Northeast reported a higher number of fireground injuries per 100 fires for most community sizes where all departments reported sufficient data by region.

Table 5
Average Number of Fires and Fireground Injuries per Department and Injuries per 100 Fires, by Population of Community Protected, and Region, 2009

Column 1: Average Reported Number of Fires
Column 2: Average Reported Number of Fireground Injuries
Column 3: Number of Fireground Injuries per 100 Fires

Population of Community Protected	Northeast			Midwest			South			West		
	Column 1	Column 2	Column 3	Column 1	Column 2	Column 3	Column 1	Column 2	Column 3	Column 1	Column 2	Column
250,000 or more	4,340.3	304.0	7.0	1,650.0	99.8	6.1	2,040.9	44.6	2.2	1,832.3	39.6	2.2
100,000 to 249,999	698.5	22.7	3.2	433.6	8.5	2.0	593.8	7.0	1.2	355.6	9.2	2.6
50,000 to 99,999	266.1	8.8	3.3	171.2	5.0	2.9	294.8	4.8	1.6	183.7	2.3	1.3
25,999 to 49,999	132.3	4.7	3.6	97.6	2.5	2.6	150.8	1.6	1.1	105.3	1.5	1.4
10,000 to 24,999	54.4	1.4	2.6	53.2	1.0	1.9	84.3	1.0	1.2	58.6	1.4	2.4
5,000 to 9,999	31.9	0.6	1.9	32.3	0.5	1.5	48.5	0.5	1.0	41.0	0.4	1.0
2,500 to 4,999	17.6	0.3	1.7	21.6	0.3	1.4	27.1	0.5	1.8	22.1	0.2	1.0
Under 2,500	9.3	0.2	2.2	10.2	0.1	1.0	17.3	0.2	1.2	7.5	0.1	1.3
Overall Regional Rate	38.3	1.1	2.9	36.8	0.8	2.2	56.2	0.8	1.4	57.7	1.0	1.7

Note that the results above do not include New York City. With New York the overall fireground injury rate for the Northeast would be 5.3.

Source: NFPA Survey of Fire Departments for U.S. Fire Experience, 2009

Improving Firefighter Safety

As the statistics in this report and previous reports attest, fire fighting presents great risks of personal injury to firefighters. Moreover, because of the kind of work performed and the hazards of the incident scene environment, it is unlikely that all firefighter injuries can be eliminated. A risk management system and the application of existing technology, however, can offer options to reduce present injury levels and bring about corresponding reductions that are recommended by NFPA that could be taken at the local level. The reference to the appropriate *NFPA Standard* is shown with the example in parenthesis:

- Commitment on the part of top fire service management to reducing injuries
  (NFPA 1500, Standard on Fire Department Occupational Safety and Health Program, Section 4.3)

- Establishment of a safety committee headed by a safety officer to recommend a safety policy and the means of implementing it.
  (NFPA 1500, Section 4.5).

- Develop and implement an investigation procedure that includes all accidents, near misses, injuries, fatalities, occupational illnesses, and exposures involving members.
  (NFPA 1500, 4.4.4 and 4.4.5)

- Provision of appropriate protective equipment and a mandate to use it.
  (NFPA 1500, Section 7.1 through 7.8)

- Development and enforcement of a program on the use and maintenance of SCBA.
  (NFPA 1500, Section 7.9 through 7.14)

- Development and enforcement of policies on safe practices for drivers and passengers of fire apparatus.
  (NFPA 1500, Section 6.2 and 6.3)

- Development of procedures to ensure response of sufficient personnel for both fire fighting and overhaul *duties*.
  (NFPA 1500, 4.1.2; NFPA 1710, Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments; and NFPA 1720, Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Volunteer Fire Departments)

- Implementation of regular medical examinations and a physical fitness program. *(NFPA 1500, Section 10.1 through 10.3; NFPA 1582, Standard on Comprehensive Occupational Medical Program for Fire Departments; and NFPA 1583, Standard on Health-Related Fitness Programs for Firefighters)*

- Adoption and implementation of an incident management system. *(NFPA 1500, Section 8.1; and NFPA 1561, Standard on Emergency Services Incident Management System)*

- Training and education for all members related to emergency operations *(NFPA 1500, Chapter 5)*

- Implementation of programs for the installation of private fire protection systems, so that fires are discovered at an earlier stage, exposing the firefighter to a less hostile environment *(NFPA 1, Uniform Fire Code™; NFPA 101®, Life Safety Code®; NFPA 5000® , Building Construction and Safety Code®)*

- Increased efforts in the area of fire safety educaion programs, so that citizens are made aware of measures to prevent fires and of correct reactions to the fire situation *(NFPA 1201, Standard for Providing Emergency Services to the Public, Chapter 6)*

Efforts need to be made to recognize that firefighter injuries can be reduced. By addressing the priorities listed above Fire Service organizations can make significant strides towards reducing the number and impact of such injuries.

Definition of Terms

Fire: Any instance of uncontrolled burning. Excludes combustion explosions and fires out on arrival (whether authorized or not), overpressure rupture without combustion; mutual aid responses, smoke scares, and hazardous materials responses, e.g., flammable gas, liquid, or chemical spills without fire.

Incident: The movement of a piece of fire service apparatus or equipment in response to an alarm.

Injury: Physical damage suffered by a person that requires (or should require) treatment by a practitioner of medicine (physician, nurse, paramedic, EMT) within one year of the incident (regardless of whether treatment was actually received), or that results in at least one day of restricted activity immediately following the incident.

Description of NFPA Survey and Data Collection Method

The NFPA annually surveys a sample of departments in the United States to make national projections of the fire problem. The sample is stratified by the size of the community protected by the fire department. All U.S. fire departments that protect communities of 50,000 or more are included in the sample, because they constitute a small number of departments with a large share of the total population protected. For departments that protect less than 50,000 population, stratifying the sample by community size permits greater precision in the estimates. A total of 2,730 departments responded to the 2009 fire experience survey. The national projections are made by weighting sample results according to the proportion of total U.S. population accounted for by communities of each size. Around any estimate based on a sample survey, there is a confidence interval that measures the statistical certainty (or uncertainty) of the estimate. We are very confident that the actual number of total firefighter injuries falls within 6.3% of the estimate.

The results in this report are based on injuries that occurred during incidents attended by public fire departments. No adjustments were made for injuries that occurred during fires attended solely by private fire brigades, e.g., industrial or military installations.

Data collection for the selected incident summaries was enhanced by a form that was sent to departments requesting information. The form included questions on type of protective equipment worn, age and rank of firefighters injured, and description of circumstances that led to injury.

Footnotes

1. Michael J. Karter, Jr., "U.S. Fire Loss in 2009", *NFPA Journal*, Vol. 104, No. 5 (September 2010).

2. Around any estimate based on a sample survey, there is a confidence interval that measures the statistical certainty (or uncertainty) of the estimate. Based on data reported by fire departments responding to the NFPA Survey for U.S. Fire Experience (2009), the NFPA is very confident that the actual number of firefighter injuries falls within the range of 73,150 to 83,150.

3. The four regions as defined by the U.S. Census Bureau include the following 50 states and the District of Columbia:

Northeast:	Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont.
Midwest:	Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin.
South:	Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia and West Virginia.
West:	Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming

SELECTED INDIVIDUAL INCIDENTS

These Incidents were Selected to Illustrate Typical Firefighter Safety Problems

Structure Fire

A 58-year-old firefighter was injured as the result of a fire in a single-family home that began when it was struck by lightning. The victim, who was wearing a full protective ensemble, performed overhaul operations using his self-contained breathing apparatus for approximately 15 minutes. After completing his assignment, he began rolling hose and picking up equipment at the scene. Overall, he wore his full protective ensemble for approximately 30 minutes on a warm, humid day.

Following the fire, he drove the three-person engine back to the station. After parking it inside the station, he complained of not feeling well and collapsed in cardiac arrest on the apparatus floor less than an hour after clearing the fire scene.

Members of the station immediately began resuscitation efforts, and an advanced life support ambulance took him to the hospital, where he was revived. He remained hospitalized for 12 days. The department indicates he left the fire service six months after the incident.

Apparatus Crash

Two firefighters were injured when their apparatus overturned while they were responding to a reported building fire. The ladder truck, carrying three firefighters and an officer, was out of the fire station performing routine activities when they were dispatched.

After getting the call, the driver immediately pulled the truck to the side of the road so all four members could don their protective clothing according to department policy. He then continued the response.

As the apparatus approached an intersection, the driver attempted a left-hand turn at a high rate of speed and rolled the 75,000-pound (34,019-kilogram), three-axle, tractor-drawn ladder truck onto its roof.

The company officer, who was not wearing his seatbelt, suffered a closed head injury and injured his right leg. He returned to full duty nearly a month after the crash. The driver of the tiller was wearing his seatbelt, but he suffered head, face, and arm lacerations. He was hospitalized for several hours and returned to full duty two weeks after the crash. The other two firefighters on the apparatus were unhurt. The driver was wearing his seatbelt, but the fourth firefighter was not.

The reported structure fire call they were responding to turned out to be a pot that had been left on the stove.

Apparatus Crash
One firefighter was injured when the tanker truck he was operating overturned while he was responding to a reported motor vehicle crash.

The crash occurred when the rear passenger wheels dropped off the blacktop surface of a two-lane road that had no shoulder and drove into the soft dirt. As the driver tried to steer the truck back onto the roadway, he overcorrected, turning the tanker into oncoming traffic. The driver made a second correction, steering the truck to the right, but the truck slid sideways and overturned. According to the fire department, his seatbelt prevented him from being ejected.

The driver, who had three years' experience, managed to extricate himself from the wreckage. He was treated for several fractured ribs and a concussion by personnel responding in an apparatus that had been following the tanker. He returned to full firefighting activities six weeks after the crash.

Firefighter Struck by a CSar
Two firefighters were injured while treating a victim at the scene of a car crash when a 16-year-old girl approaching the crash scene ignored warning flares and a police officer on traffic control, and hit one of the cars involved in the original crash. The parked car spun around and struck the two firefighters who were treating the victim on the tailboard of the fire engine. Luckily, the firefighters were able to push their patient out of the way before being hit by the spinning car.

The driver then struck another vehicle before fleeing the scene. Police apprehended her several miles away and accused her of driving under the influence. No other information about her was available.

One of the injured firefighters, a 31-year-old man with five years' experience, suffered bruising to his knee and calf. The second firefighter, a 46-year-old man with almost five years' experience, suffered a bruise to his thigh. Both were cleared to perform firefighting duties the next day.

Both firefighters were wearing proper protective clothing, including turnout coats and pants, boots, helmets, gloves, and reflective vests, which the department partly credits in limiting their injuries. The department did not provide any information about apparatus placement at the scene

Car Fire
An 18-year-old firefighter was hurt at a car fire when he approached the front driver's side corner of the burning vehicle to pry open the hood. Suddenly, one of the pressurized hood struts failed, shot through the front of the vehicle a few inches above the driver's side headlight, and impaled the firefighter's right leg.

At the time of the injury, the firefighter was in a full protective ensemble and using his self-contained breathing apparatus. After being struck, he said he felt a burning sensation and pulled the shaft from his right thigh just above his knee. He was taken to the hospital, where he

remained for a day. Fortunately, the young man was able to return to full firefighting activities 14 weeks after the incident.

Training

One firefighter was injured during a live fire exhibit meant to demonstrate the effectiveness of residential sprinklers. The exhibit involved two mock-up rooms, one with a sprinkler system and one without, that were furnished as a typical college dormitory room and set on fire.

The room without sprinklers was ignited first and reached flashover nearly five minutes after ignition. As the crowd watched the fire intensify, three firefighters handling a charged hose line positioned themselves near the front of the room. Extinguishing the main body of fire as they went, they moved closer and started stepping into the smoldering room, where a piece of burning plastic placed across the top of the mock-up began to melt and drip on them. At first, the crew didn't realize the molten plastic was still burning. They were alerted of the situation and extinguished the plastic 35 seconds after it dripped on them.

Fortunately, only the company officer was injured. He was treated at the hospital overnight with burns to his face and hand, and returned to firefighting activities 27 days later. All three men were wearing a full protective ensemble and using self-contained breathing apparatus, which the department credits with limiting their burns. All the equipment was cleaned, inspected, and returned to service.

Gas Explosion

An engine company and an ambulance arriving at the scene of an early morning car crash found two heavily dented parked cars. The four firefighters from the truck were assessing the scene when bystanders told them that another car involved in the crash had struck a commercial building 200 yards (183 meters) up the street. As they approached the car on foot, they found that the crash had exposed part of a large utility room in the building. When they got closer, they smelled a strong odor of natural gas and saw water leaking from the damaged structure.

The company officer and the apparatus driver headed back to the fire engine, where the driver donned his protective clothing and returned to the crash site with his tools. Joining the other two firefighters, who were already wearing protective coats, pants, and helmets, and had moved closer to the car to check for injured occupants, he placed the forked end of a halligan bar over the gas shut-off valve to close it.

When the three men realized that gas was still flowing freely, they decided the problem was much worse than they originally thought and decided to back away from the building. As soon as the firefighters turned to retreat, an explosion rocked the neighborhood, catapulting the fleeing men.

The driver suffered musculoskeletal injuries to his lower back, right shoulder, right arm, and right knee, but was able to get up and help the company officer, who had not yet reached the

crash site when the gas exploded, tend to a firefighter covered in rubble. The driver is currently awaiting his fourth surgery and has still not been cleared for firefighting duties.
The firefighter trapped under the rubble injured his shoulder and his back, and suffered a concussion. He underwent surgery on his shoulder and is still undergoing treatment for his injuries.

The explosion launched the third firefighter across the street, where the ambulance crew found him unconscious and in respiratory arrest. They immediately rendered advanced life support treatment and successfully resuscitated him at the scene. He had a 2-inch (5.1-centimeter) avulsion on the palm of his hand, and a 3-inch (7.6-centimeter) laceration to the back of his head. He was hospitalized for two days and monitored for a closed head injury.

The driver of the vehicle that caused the crash fled the scene. The police investigating the incident found that the vehicle had been stolen several blocks from the scene.

Structure Fire

A 40-year-old chief officer fractured his tibia when part of the second floor of a house where he was leading fire suppression activities collapsed. The three-alarm fire began in the void between the first and second stories of the house, which covered nearly 4,000 square feet (372 square meters).

Immediately after the collapse, a report of two firefighters down was transmitted, and the incident commander called for a third alarm assignment and a personnel accountability report. Within four minutes, all companies were accounted for. A four-member dedicated rapid intervention team was deployed, but it was not needed because the injured officer managed to extricate himself.

The victim was wearing a complete protective ensemble, including a manual PASS device, which he did not activate. He made a full recovery and resumed firefighting activities 35 days after the incident.

The fire department indicated that the cause of the fire was accidental but did not provide any specific information.