

U.S. FIREFIGHTER INJURIES - 2006

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Abstract

NFPA estimates that 83,400 firefighter injuries occurred in the line of duty in 2006, an increase of 4.1% from the year before. Over half (53.0%) of the all firefighter injuries occurred during fireground operations. An estimated 13,690 occurring during other on duty activities, while 13,090 occurred at non-fire emergency incidents. The leading type of injury received during fireground operations was strain, sprain or muscular pain (46.7%), followed by wound, cut , bleeding, bruise (17.3%). Regionally, the Northeast had the highest fireground injury rate, more than twice the rate for the rest of the country.

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

Acknowledgements

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Overview of 2006 Firefighter Injuries

- 83,400 firefighter injuries occurred in the line of duty in 2006, an increase of 4.1% from the year before.
- 44,210 or 53.0% of all firefighter injuries occurred during fireground operations. An estimated 13,690 occurred during other on duty activities, while 13,090 occurred at nonfire emergency incidents.
- Regionally, the Northeast had the highest fireground injury rate with 5.0 injuries occurring per 100 fires; this was more than twice the rate for the rest of the country.
- The major types of injuries received during fireground operations were: strain, sprain, muscular pain (46.7%); wound, cut, bleeding, bruise (17.3%); burns (5.9%); smoke or gas inhalation (5.6%). Strains, sprains, and muscular pain accounted for 56.7% of all nonfireground injuries.

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 fatal accidents, 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 89 firefighters died on duty (See, "2006 Firefighter Fatalities ", NFPA Journal July/August).

This report addresses 2006 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 (2006). 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 occurred¹.

This year's report includes among its results:

- An estimate of the total number of 2006 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 83,400 firefighter injuries occurred in the line of duty in 2006. This is an increase of 4.1% and the highest it's been since 2000. In recent years, the number of firefighter injuries have been considerably lower than they were in the 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 11,890 exposures to infectious diseases (e.g., hepatitis, meningitis, HIV, others) in 2006. This amounts to 0.8 exposures per 1,000 emergency medical runs by fire departments in 2006.

The NFPA estimates that there were 23,580 exposures to hazardous conditions (e.g., asbestos, radioactive materials, chemicals, fumes, other) in 2006. This amounts to 22.5 exposures per 1,000 hazardous condition runs in 2006.

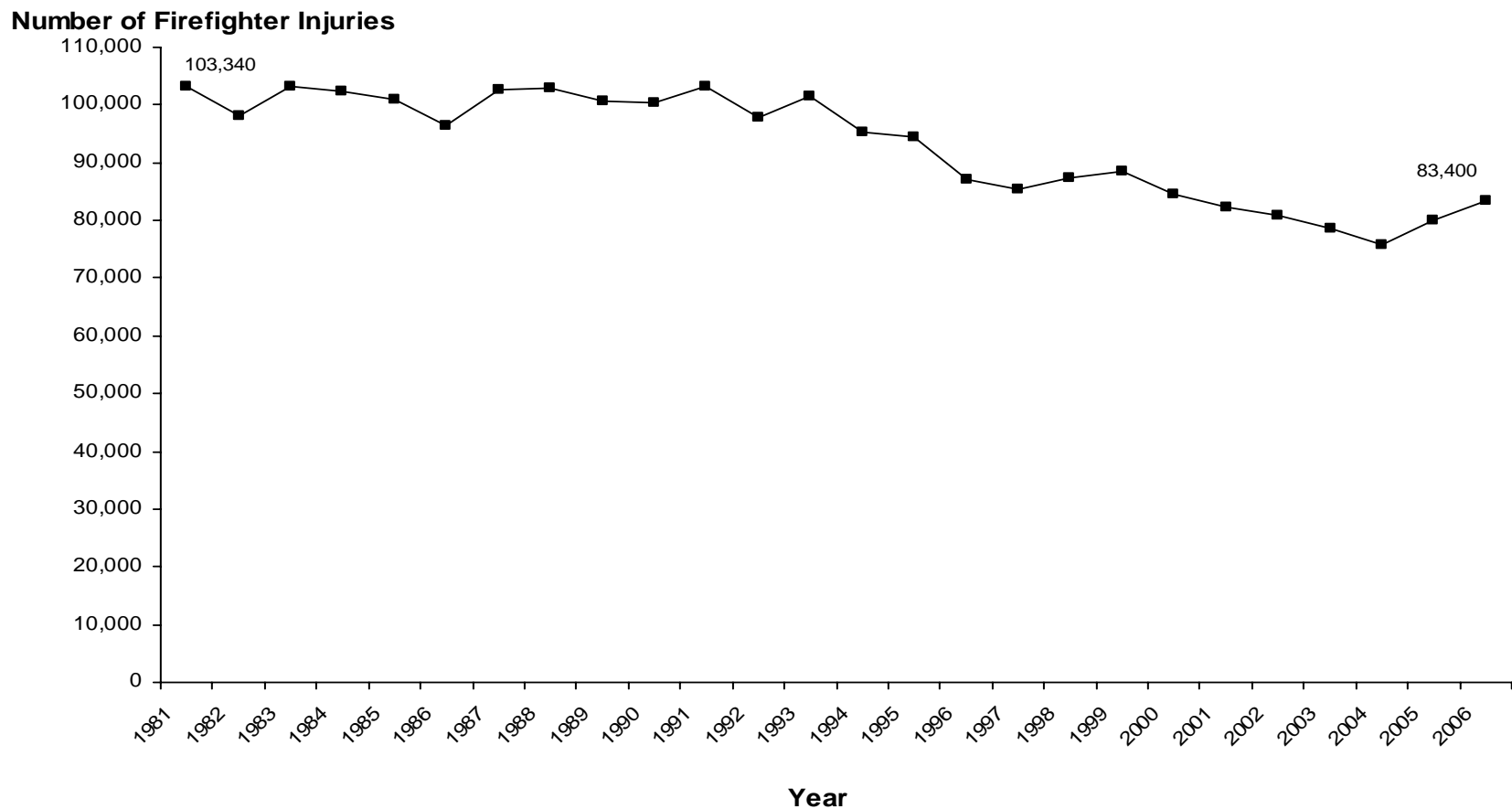
An estimated 15,950 injuries or 19.1% of all firefighter injuries resulted in lost time in 2006.

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).

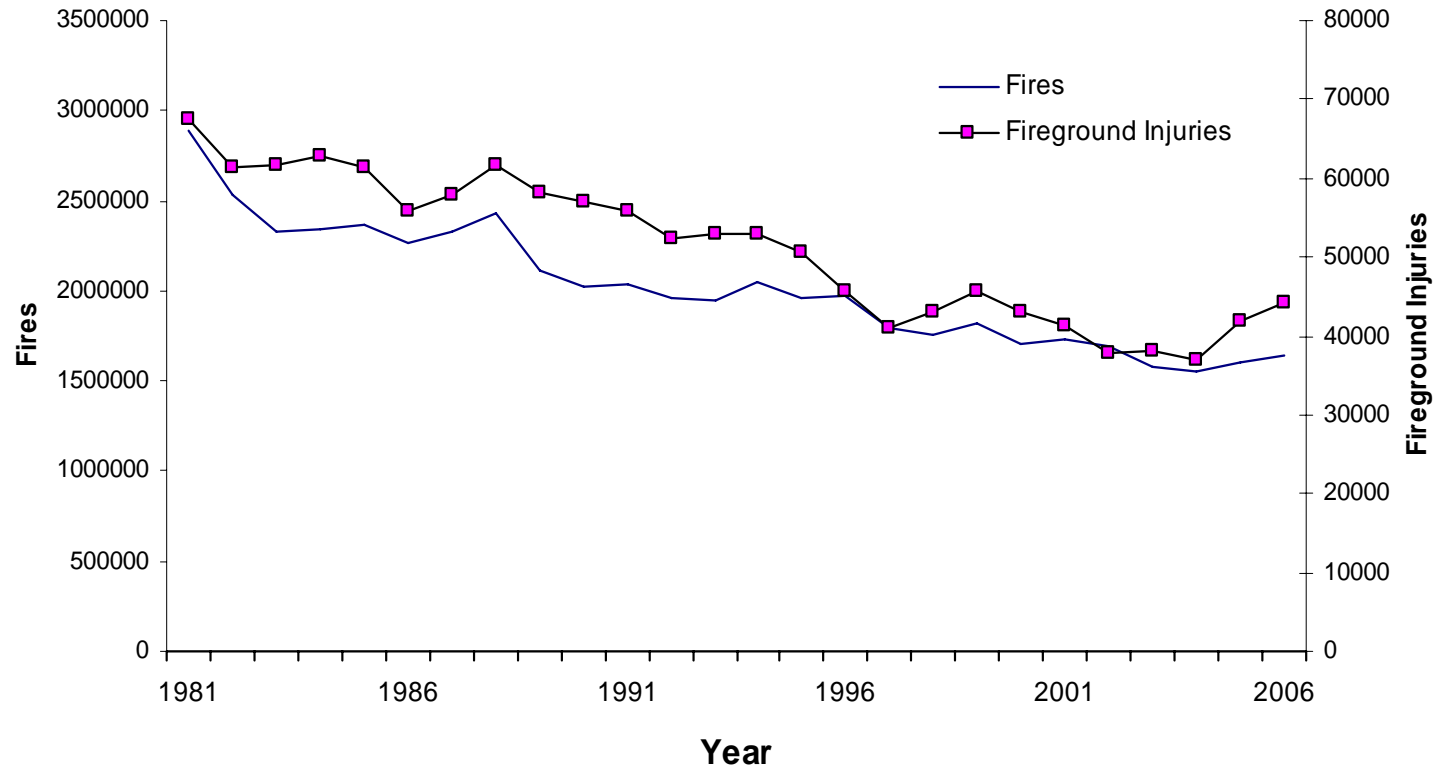
Figure 1
Total Firefighter Injuries by Year (1981-2006)



Source: NFPA Annual Survey of Fire Departments for U.S. Fire Experience (1981-2006)

From 1994 on, number of exposures was collected separately

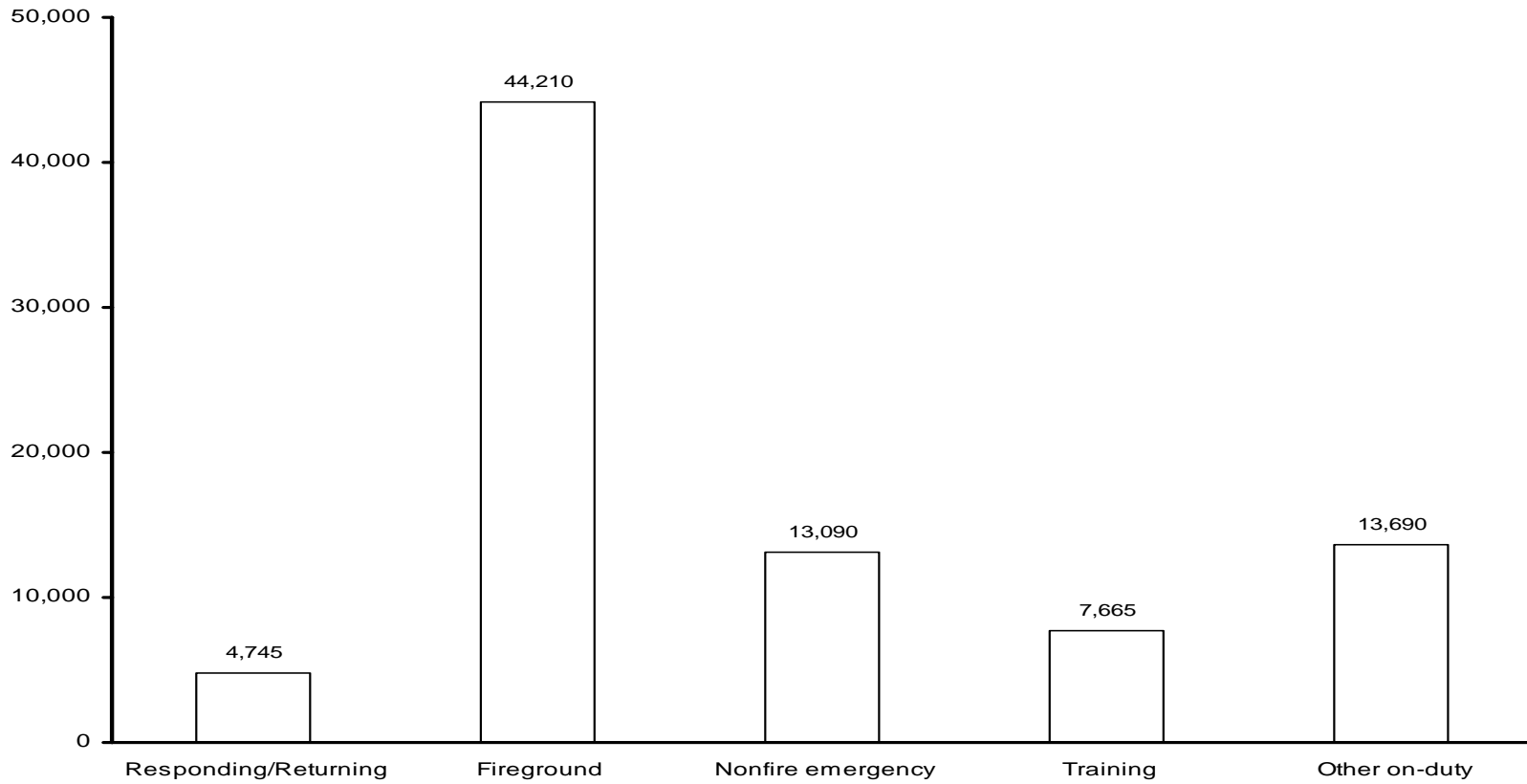
Figure 2
The Decrease in Fireground Injuries
is Similar to the Decrease in Fires



Source: NFPA Annual Survey of Fire Departments
 for U.S. Fire Experience (1981-2006)

Number of
Firefighter Injuries

Figure 3.
Firefighter Injuries by Type of Duty, 2006



Results by type of duty indicate not surprisingly that the largest share of injuries occur during fireground operations: 44,210 or 53.0% of all firefighter injuries in 2006 and the highest it's been since 1999. Table 1 displays firefighter injuries at the fireground and injury rates for the 1981-2006 period. Injuries at the fireground decreased from their high of 67,500 in 1981 to a low of 36,880 in 2004 for a decrease of 45.4%. The rate of injuries per 1,000 fires has generally decreased during the period except for 2005-06. This is because the number of fire incidents also decreased a considerable 46.4% for the 1981 to 2004 period (See Figure 2).

In addition to injuries at the fireground, an estimated 13,690 or 16.4% occurred during other on-duty activities, while 13,090 or 15.7% occurred at nonfire emergencies.

Nature of Fireground Injuries

Estimates of 2006 firefighter injuries by nature of injury and type of duty are displayed in Table 2. The nature of injury cause categories are based with modifications on NFPA 901, *Uniform Coding for Fire Protection*. Table 2 indicates that the four major types of injuries that occur during fireground operations are strain, sprain (46.7%); wound, cut, bleeding, bruise (17.3%); burns (6.9%); smoke or gas inhalation (5.6%); thermal stress (5.1%).

Results were fairly consistent during all non-fireground activities, with strains, sprains, and muscular pain accounting for 56.7% of all non-fireground injuries, and wound, cut, bleeding, bruise accounting for 17.8%.

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. The cause categories included on the survey were also based on NFPA 901, *Uniform Coding for Fire Protection*. Overexertion, strain (25.5%), fall, slip, jump (23.9%), were the leading causes of fireground injuries. Other major causes were contact with object (10.8%); and exposure to fire products (8.1%), and struck by (8.0%).

Table 1
Firefighter Injuries at the Fireground, and
at Nonfire Emergencies, 1981-2006

Year	At the Fireground		At Nonfire Emergencies	
	Injuries	Injuries per 1000 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

Source: NFPA Survey of Fire Departments
for U.S. Fire Experience (1981-2006)

Table 2. Firefighter Injuries by Nature of Injury and Type of Duty, 2006

Nature of Injury	Responding to or Returning from an Incident		Fireground		Nonfire Emergency		Training		Other on-duty		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Burns (Fire or Chemical)	155	3.3	3,070	6.9	100	0.8	245	3.2	180	1.3	3,750	4.5
Smoke or Gas Inhalation	110	2.3	2,475	5.6	120	0.9	40	0.5	80	0.6	2,825	3.4
Other Respiratory Distress	40	0.8	1,280	2.9	125	1.0	60	0.8	120	0.9	1,625	2.0
Burns and Smoke Inhalation	40	0.8	575	1.3	10	0.1	30	0.4	75	0.6	730	0.9
Wound, Cut, Bleeding Bruise	895	18.9	7,640	17.3	2,140	16.4	1,375	17.9	2,575	18.8	14,625	17.5
Dislocation, Fracture	175	3.7	1,065	2.4	210	1.6	300	3.9	410	3.0	2,160	2.6
Heart Attack or Stroke	35	0.7	350	0.8	155	1.2	100	1.3	360	2.6	1,000	1.2
Strain, Sprain Muscular Pain	2,650	55.9	20,655	46.7	7,855	60.0	4,760	62.1	6,975	51.0	42,895	51.4
Thermal Stress (frostbite, heat exhaustion)	235	5.0	2,280	5.1	190	1.5	205	2.7	190	1.4	3,100	3.7
Other	410	8.6	4,820	10.9	2,185	16.7	550	7.2	2,725	19.9	10,690	12.8
	4,745		44,210		13,090		7,665		13,690		83,400	

Source: NFPA Survey of Fire Departments for U.S. Fire Experience, 2006

Note: If a firefighter sustained multiple injuries for the same incident, only the nature of the single most serious injury was tabulated.

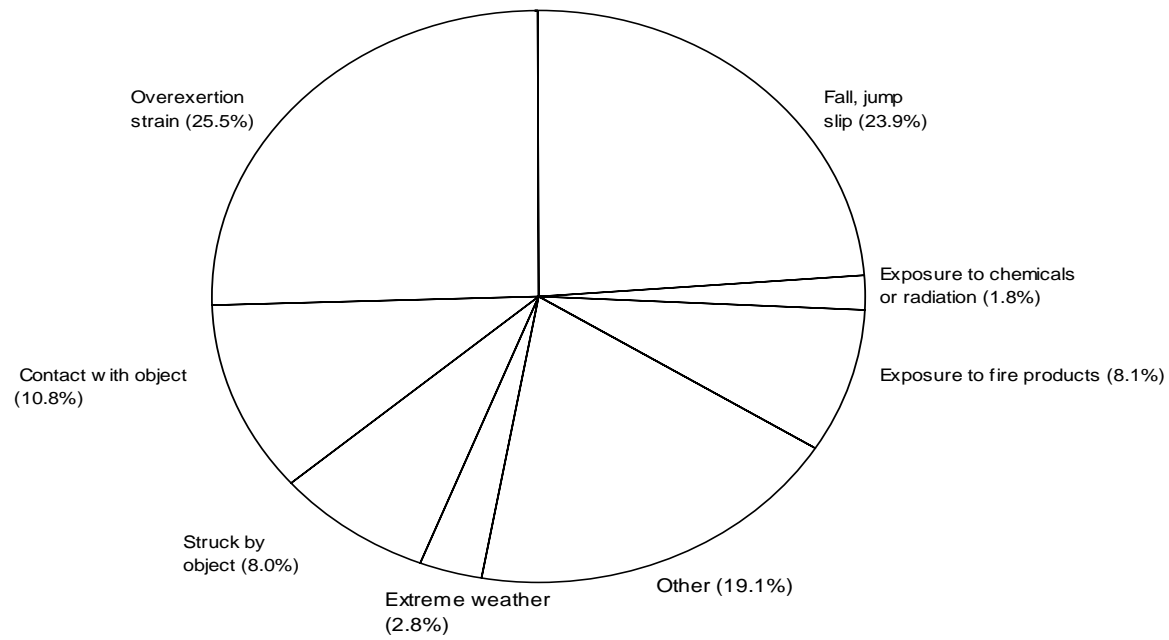
Fire Department Vehicle Collisions

The NFPA reported earlier that 19 firefighters died in motor vehicle collisions in 2006. (See “2006 Firefighter Fatalities” July/August NFPA Journal).

In 2006, there were an estimated 16,020 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 24.5 million incidents in 2006 so that the number of collisions represents about one tenth of 1 percent of total responses. However, these collisions resulted in 1,250 firefighter injuries or 1.5% of all firefighter injuries.

Also, 1,070 collisions involving firefighters’ personal vehicles occurred in 2006 while departments were responding to or returning from incidents. These collisions resulted in an estimated 210 injuries.

**Figure 4.
Fireground Injuries by Cause, 2006**



Source: NFPA Annual Survey of Fire Departments
for U.S. Fire Experience (2006)

Table 3
Fire Department Vehicle Collisions and
Resulting Firefighter Injuries
While Responding to or Returning From Incidents, 1990-2006

Year	Involving Fire Department Emergency Vehicles		Involving Firefighters' Personal Vehicles	
	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

Source: NFPA Survey of Fire Departments
for U.S. Fire Experience (1990-2006)

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 2005 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 149.4 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 little from a high of 4.7 for departments that protect communities 500,000 to 999,999 to a low of 1.4 for departments that protect communities of less than 2,500 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 3.2 injuries per 100 fires or 77% 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 500,000 to 999,999 having the highest rate with 12.7 injuries per 100 firefighters. As community size decreases, the rate drops quite steadily to a low of 1.0 for departments protecting less than 2,500 people. That is a more than a twelve-to-one difference in risk of injury between communities of 500,000 to 999,999, 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 500,000 to 999,999 has, on average, more than 50 times as many firefighters than a department protecting a population of less than 2,500, the larger department attends more than 220 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, 2006

Population of Community Protected	Average Number of Fires	Average Number of Fireground Injuries	Number of Fireground Injuries Per 100 Fires	Number of Fireground Injuries Per 100 Firefighters
500,000 to 999,999	3,204.9	149.4	4.7	12.7
250,000 to 499,999	1,499.3	42.2	2.8	8.9
100,000 to 249,999	610.6	15.8	2.6	7.6
50,000 to 99,999	257.0	7.1	2.8	6.5
25,000 to 49,999	145.1	3.6	2.5	6.7
10,000 to 24,999	74.5	1.6	2.1	4.1
5,000 to 9,999	41.6	0.7	1.7	2.3
2,500 to 4,999	27.3	0.4	1.5	1.8
Under 2,500	14.5	0.2	1.4	1.0

Source: NFPA Survey of Fire Departments
for U.S. Fire Experience, 2006

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 country³. 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 substantially higher number of fireground injuries 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, 2006

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			Northcentral			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 3
500,000 to 999,999	*	*	*	*	*	*	3,279.0	49.8	1.5	2,704.6	51.2	1.9
250,000 to 499,999	*	*	*	2,134.2	102.3	4.8	1,243.3	18.0	1.4	1,215.2	17.2	1.4
100,000 to 249,999	660.2	21.2	3.2	544.7	27.4	5.0	827.6	15.3	1.8	414.6	7.9	1.9
50,000 to 99,999	312.0	15.1	4.8	198.7	7.9	4.0	333.6	5.8	1.7	208.4	3.7	1.7
25,999 to 49,999	138.9	4.7	3.2	113.3	4.4	3.9	171.2	2.6	1.5	184.6	2.1	1.1
10,000 to 24,999	63.2	3.0	4.7	61.5	1.2	2.0	98.9	1.4	1.4	79.6	1.6	2.0
5,000 to 9,999	30.9	1.0	3.2	32.9	0.6	1.8	61.2	0.5	0.8	56.6	0.9	1.6
2,500 to 4,999	22.9	0.3	1.3	24.1	0.5	2.1	33.5	0.2	0.6	33.6	0.4	1.2
Under 2,500	12.3	0.2	1.6	12.9	0.2	1.6	21.2	0.5	2.4	14.0	0.2	1.4
Overall Regional Rate	54.5	2.7	5.0	44.2	1.3	2.9	72.1	1.3	1.8	78.4	1.4	1.8

Source: NFPA Survey of Fire Departments for U.S. Fire Experience, 2006

*Insufficient data

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 education 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 100,000 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 100,000 population, stratifying the sample by community size permits greater precision in the estimates. Survey returns in recent years have ranged from 2,560 to 3,500 departments annually. 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 8.3% 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., "2006 Fire Loss in the United States", *NFPA Journal*, Vol. 101, No. 5 (November 2007).
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 (2005), the NFPA is very confident that the actual number of firefighter injuries falls within the range of 76,400 to 90,400.
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.
 - Northcentral: 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)

Training

A company officer with 11 years experience suffered a fractured skull after he fell during a training session.

The 32-year-old instructor was briefing students on the training activity when the railing he was leaning against collapsed and he fell seven feet (2.1 meters) to the pavement below.

The victim was wearing a partial protective ensemble consisting of his protective coat and pants, helmet, and gloves. He returned to work five months after suffering two skull fractures and a shoulder injury.

Responding Returning

An engine company responding to an emergency medical call crashed and injured four firefighters and seriously injured the company officer.

The engine swerved to avoid a vehicle and overturned onto its roof after it went through a red traffic light. The responding engine truck was traveling north approaching an intersection when the operator noticed a vehicle traveling east stopped in the middle of the intersection.

The driver applied the brakes and realized he was not going to stop in time. He instinctively turned the truck to the right to avoid the collision but, he turned the apparatus into a second vehicle traveling west in the left turn lane. The driver steered away to avoid a collision with the second vehicle, which caused the apparatus to flip onto its roof and slide for several yards.

All members, except the company officer were wearing seatbelts and only suffered some cuts and bruises. The company officer fractured a leg and had more severe injuries than those wearing seatbelts.

The victims were not wearing structural fire fighting protective clothing because they were responding to the medical call from a training exercise.

According to the department's investigation, the driver admitted to being at fault. He was going too fast and did not stop for the red light. The driver and company officer were disciplined for their actions.

Non-Fire Emergency

A firefighter with 15 years experience suffered minor injuries when cargo loaded on a tractor trailer struck him at an emergency scene. The 51-year-old was directing traffic to allow a medic unit transporting crash victims cross the road.

The tractor trailer with its oversized load of wooden trusses was passing the firefighter when it hit him. The trusses, overhanging the trailer by 4 feet (1.2 meters), knocked the

victim to the ground. He regained his footing and avoided the trailer's rear axles. The tractor trailer driver stopped the truck after seeing the firefighter go down in a twisting motion.

The victim was treated for a large abrasion on his shoulder and released from the hospital. He returned to work the next scheduled day. The only protective gear worn at the incident was a fluorescent-reflective vest.

Fireground

A company officer, 47, was injured while advancing a hoseline up a ground ladder. After stepping onto the roof, he lost his balance and fell approximately 25 feet (7.6 meters). He suffered only minor injuries.

An occupant of a two-family dwelling called the fire department reporting a fire in a rear bedroom. The family, alerted by smoke detectors, had already evacuated the dwelling when the fire department arrived four minutes later. The fire of undetermined origin caused approximately \$30,000 in damages.

The department report credits the use of his protective helmet in reducing the severity of his injuries. The officer was wearing a full structural firefighter protective ensemble at the time of his injury. He missed two work days and returned to full duty without any complications.

Non-Fire Emergency

Two fire department units responded to a medical call of a person on an interstate who was in respiratory distress. The closest engine company was staffed with a firefighter and a paramedic-level ambulance that was staffed with two firefighters.

The engine company arrived on scene approximately 6 minutes after dispatch and the ambulance arrived 2 minutes later. The ambulance crew reported that the engine company had been struck by a tractor trailer truck and they had a firefighter down. The ambulance crew requested additional resources and began treating the firefighter and the patient suffering respiratory distress.

According to the department's investigative report, the engine arrived on scene and parked in the emergency breakdown lane and put on its emergency lights.

The firefighter, 36, exited the vehicle and was retrieving medical equipment from the driver's side compartment that was behind the pump panel. The firefighter stated he heard a truck and looked up only to see the truck headed for him.

The truck struck the parked apparatus with its right rear wheel, damaged the left rear tailboard, and tore two compartment doors off the fire engine. The right rear wheels of the passing truck and the flying compartment doors struck the firefighter. The victim landed in the road but rolled under the fire apparatus.

The fire engine was also damaged.

The truck driver was looking down, trying to retrieve a pair of glasses. When he looked up, he was heading for the fire engine. He was not hurt in the incident.

The firefighter suffered numerous broken bones and underwent several surgeries. He was hospitalized for more than a month and returned to full duty 11 months after the incident.

Fireground

A firefighter and a company officer were injured when a porch collapsed during a fire at a single-family dwelling.

The collapse occurred five minutes after firefighters arrived on scene, while two members of the three-person crew were stretching a handline onto the porch.

After completing his assessment of the fire conditions, the lieutenant, 32, ordered a handline deployed to extinguish the front porch fire. The firefighter, 25, on the handline extinguished the fire and began moving onto the porch where he was joined the company officer as began forcible entry into the structure.

After completing his task, the lieutenant moved behind the firefighter and noticed the porch roof shift. He immediately tugged on the handline and warned the firefighter but the porch collapsed onto the firefighter.

The roof porch pinned the firefighter and knocked the lieutenant onto the ground.

The apparatus operator saw the collapse and called a mayday situation. The lieutenant got back on his feet and, despite his injuries, helped two other firefighters on scene lift a large section of debris to remove the firefighter from the collapse.

A battalion chief arrived on scene approximately a minute after the collapse and began medical treatment of the injured firefighter.

The firefighter suffered second and third degree burns to his left shoulder, hip, and foot. The third degree burns covered nine percent of his body. He was wearing a full protective ensemble that had to be removed from service and destroyed after the incident. He was hospitalized for two weeks and returned to full duty two months after the incident.

The lieutenant suffered second degree burns to his right arm and a puncture wound to his right hand. He was treated and released from the hospital and returned to full duty.

His complete protective ensemble was damaged and removed from service.

The single-family home was undergoing renovations at the time of the fire. The cause was determined to be unintentional and occurred when a nail nicked a wire during renovation. The home also showed signs of a severe termite infestation that required the removal of several studs connected to the porch, weakening the structure before the fire.

Wildland

A 28-year-old firefighter was seriously injured when dead tree limb fell and struck him in the back. The victim was hospitalized for three days and has not returned to active firefighting duty.

He was one of three firefighters assigned to an engine company operating as a strike team. The company was performing mop-up operations when the injury occurred.

The victim's company was under a tree during a rest period when they heard a crack and saw a large section of the tree fall.

The victim was kneeling and could not get out of the way when the large snag broke away from the tree and fell about 10 feet (3 meters) and struck the firefighter in the back.

The two other firefighters scrambled to safety. Several crews in the vicinity immediately administered basic life support until an advanced life support crew responded.

The injured firefighter was carried to a landing zone where a helicopter flew him 39 minutes to a medical facility.

Wildland

A fire service veteran suffered a career-ending injury while combating a 5-acre (2-hectare) brush fire.

The victim, who had 39 years experience, was assigned to an engine company as part of a strike team. The crew augmented a hoseline that was already in operation.

While hiking on a narrow trail on a steep hillside, the victim, 61, lost his balance many times. To regain his balance, he used a shovel as leverage and accidentally jammed it into his left foot. He kept walking because he believed he only bruised his foot.

Time passed. He realized he was bleeding profusely. The firefighter had severed an artery, cut two tendons, and suffered nerve damage. A medic assigned with the crew immediately bandaged his wound and slowed the bleeding.

The injured firefighter was transported to the hospital. He was hospitalized for four days and underwent two surgical procedures to repair the damage.

Fireground

A partial collapse of a bowstring truss roof injured two firefighters during a warehouse fire.

The warehouse was part of a dry cleaning business. Both firefighters were advancing a 2½-inch handline inside the front doors when the collapse forced heat and smoke upon the victims. Both hastily retreated from the building.

The first firefighter suffered minor burns and returned to full duty. The second burned his hand, wrist, shoulder, and buttocks. He was not hospitalized but missed 11 days of work and was placed on light duty for nearly six months. He made a full recovery.

Both wore full protective structural firefighting protective ensemble. A rapid intervention team of four firefighters was assembled at the time of the collapse but they were not deployed because the injured firefighters escaped on their own.

The department credits their complete protective ensemble for limiting their burn injuries. The report states that the firefighters should not have been inside the building because of the heavy fire conditions, bowstring truss construction, and no one was in the warehouse.

Fireground

A lieutenant, 41, was injured in a fire at a vacant two-story, unsecured mill building. The first floor was the origin of the incendiary fire where several couches and mattresses were ignited.

An officer and three firefighters deployed a handline through the front doors. While crawling on the floor looking for the seat of the fire, the lieutenant fell 12 feet (3.6 meters) into a pit with debris at the bottom.

The officer, a 19-year veteran, injured his back, knee, and wrist. His mask was dislodged and he had having trouble breathing while inside the pit. He tried called for help but was not heard. He extricated himself from the pit by climbing a fixed ladder on the side of the pit and two firefighters helped him out of the building.

The lieutenant returned to full duty three months after the incident but continued physical therapy for his injuries. Nearly a year after the incident, he was still having problems with his wrist and required surgery.

He is currently on injury leave but is expected to make a full recovery and return to full duty.

He was wearing a full protective ensemble. At the time of the fall, the rapid intervention team was not on scene. It is unknown why the dispatchers or anybody on scene heard his mayday transmission.