

Firefighter Safety: An Update

The beat goes on regarding firefighter safety and staffing. According to two booklets published in 1994 by the International Association of Firefighters (IAFF), AFL-CIO, CLC, firefighters, much like lemmings, apparently are rushing headlong toward their own deaths and disabilities. One of these publications, *Safe Firefighter Staffing: Critical Considerations*, states that firefighting is one of the most dangerous jobs, while the other, the *1993 Death and Injury Survey*, finds that firefighting is the most dangerous occupation in North America.

The publications go on to report such findings as that firefighters are five times more likely to be injured on the job than are employees in the private sector and that their injuries are more severe. The organization's argument also includes the statement that the numbers of job-related fatalities are almost twice those for workers in the private sector.

The report on the death and injury survey states that more than 40 percent of all professional firefighters had duty-connected injuries in 1993. Using the National Fire Protection Association (NFPA) estimate of 259,650 career firefighters employed in the United States and the IAFF estimate that 40 percent of them (103,860) suffered line-of-duty injuries in 1993, the number of IAFF injuries was more than the 101,500 firefighter injuries, career and volunteer, reported by NFPA for 1993 in the *NFPA Journal* (November/December 1994).

If the difference between the IAFF estimate (103,860) and the NFPA estimate of 101,500 is an acceptable mar-

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gin of error, and if the IAFF claim is correct that 40 percent of professional firefighters were injured in 1993, then it appears that 795,400 volunteer firefighters in America did not have any injuries in 1993. Clearly, one of the two sets of figures is grossly in error. Before looking more in detail at firefighter deaths and injuries for 1993, let us go back to a report of firefighter deaths in 1991.

An Earlier Report

In the January 1993 issue of *Public Management*, my article provided a comparison between the rate of career firefighters' on-duty deaths in 1991 and the rate for other occupations. It reported 35 such deaths from a pool of 253,000 firefighters employed. For comparison purposes, it was computed that the 35 deaths resulted in a rate of 13.8 on-duty deaths for each 100,000 employees. When compared with such other occupations as agriculture, mining, construction, and transportation, it was shown that the firefighter on-duty death rate was only one-third or one-half that of these common occupations, as was also the case in 1993 (see Figure 1).

The *PM* article also addressed the staffing-safety issue as it related to the total of 22 fireground deaths reported in 1991. Bear in mind that eight of these workers died of heart attack or stroke. These deaths were discounted, regarding staffing, because 900,000 Americans die annually from heart attack or stroke, or one in 277 people. The eight firefighters' deaths represented only one death per 30,000 firefighters employed—not even close to the 1-in-277 rate for the general population. Thus, the relationship between staffing and these type of deaths seemed insignificant.

None of the remaining 14 career firefighter deaths in 1991 occurred when fewer than four firefighters and officers were present at the

Figure 1: Occupations and Death Rates

Occupation	Death Rate per 100,000 Employees	
	1991	1993
Agriculture	44.0	35.0
Mining	43.0	33.0
Construction	31.0	22.0
Transportation and Public Utilities	22.0	20.0
General Government	Not Available	11.0
Fire fighting (NFPA)	13.8	9.2

Source: National Safety Council, *Accident Facts* (1994).

scene. That a minimum of four firefighters should be present at a structure fire before making entry was a major issue in 1991, as it is today. In spite of a more than three-to-one membership vote against this minimum staffing level, the NFPA Standards Council turned its back on the members' vote and adopted the standard as a Tentative Interim Amendment in 1993.

Fire labor organizations, as well as some chiefs, argue, "The more on the fireground or truck, the safer the firefighter." The analysis for 1991, however, clearly showed that increased staffing had no positive effect on fireground safety. In fact, NFPA and National Safety Council

(NSC) statistics revealed a reduction of on-duty firefighter deaths from 20.6 per 100,000 employed for the years 1984 through 1987 to 14.66 for 1988 through 1991—in spite of a continuing effort to downsize by communities (see Figure 2 for the death and rate reductions).

Not only has the total number of firefighter deaths been reduced, but also deaths on the fireground or scene of emergency are a reduced threat. Figure 3 provides an overview of this improvement.

To rebut those who argue that citizens are at a higher risk because of crew downsizing, civilian fire deaths also were analyzed. The NSC reported that 2.8 citizens per 100,000

Figure 2: Career Firefighter On-Duty Deaths

Year	U.S. Firefighters Employed	Deaths	Deaths per 100,000 Employed
1983	226,600	54	23.8
1984	231,600	43	18.6
1985	238,500	54	22.6
1986	237,750	51	21.5
1987	243,200	48	19.7
1988	252,500	43	17.0
1989	250,600	42	16.8
1990	253,000	25	9.9
1991	261,800	35	13.4
1992	253,000	26	10.3
1993	259,650	24	9.2

Source: National Fire Protection Association.

Figure 3: Career Firefighter Fireground Deaths

Year	Deaths	Firefighters Employed	Deaths per 100,000 Employed
1987	24	243,200	9.87
1988	25	252,500	9.90
1989	13	250,600	5.19
1990	13	253,000	5.14
1991	22	261,800	8.40
1992	15	253,000	5.93
1993	12	259,650	4.62

Source: National Fire Protection Association.

population died in fires in 1975, and only 1.7 in 1990. This 15-year span saw the same gradual decline in citizen risk as had existed since 1920, when 8.7 per 100,000 citizens died because of fire (see Figure 4).

The research results presented in the *PM* article clearly showed that firefighters and citizens still were becoming safer and that there was no safety advantage in increased staffing. What has happened since that research and report? Have the claims of labor and fire chiefs that the presence of four or more firefighters on every truck or at every scene reduces firefighter deaths and injuries proven accurate? Hardly.

Figure 4: U.S. Civilian Fire Deaths per 100,000 Population

Year	Deaths
1920	8.7
1930	6.6
1940	5.7
1950	4.2
1960	4.3
1970	3.3
1980	2.6
1990	1.7
1993	1.6

Source: National Safety Council, *Accident Facts* (1994).

The following information is an update on firefighters safety as it relates to staffing. This article includes firefighter injuries as well as deaths as factors in judging the claim of the "most hazardous occupation in North America."

First, look again at Figure 1 for its comparison of occupational death rates. Figure 5 shows figures from the Bureau of Labor Statistics for 1993, as reported in the May 24, 1995, issue of *The Link*, a publication of the Alliance for Fire and Emergency Management. These federal figures, coupled with those provided by NSC and NFPA, establish beyond a shadow of a doubt that firefighting is not the most hazardous or even one of the most hazardous occupations.

Now, take a closer look at the number of firefighter deaths reported in 1993, as shown in Figure 2. In 1993, there were 24 on-duty deaths among career firefighters; 12 of these resulted from fireground activity, while nine of those 12 occurred at a structure fire, where minimum staffing might have been an issue.

Five of the nine fireground deaths occurred outside (*not* inside) the building. In each of the nine instances, more firefighters than required by the standard ("There must be four before I go through the door") were on the scene when the injury occurred (see Figure 6).

To get a more thorough look at

career firefighters' activities when the 24 on-duty deaths occurred in 1993, see Figure 7. It reveals that more of the deaths occurred during nonemergency activities than at structure fires.

Figures Confirm the Facts

The above information leaves no question that the career firefighter's fireground has become safer. The claim of a correlation between firefighter safety and minimum staffing is further exposed as fallacy when one considers fireground death rates by regions of the United States.

Figure 8 shows that the Northeast, where staffing is generally highest, has the highest firefighter death rate. The western region, certainly affected by the higher staffing levels in some California communities, has the second highest firefighter death rates. The South, which typically has lower staffing, has the lowest firefighter death rates.

Comparing the five most populous states and considering their geographical locations will underline the inferences that can be made from Figure 8. Figure 9 shows that the

Figure 5: Occupational Fatality Rates per 100,000 Employees (1993)

Fishermen	155.0
Loggers	133.0
Pilots	103.0
Structural Metal Workers	76.0
Taxicab Drivers	50.0
Electrical Installers	38.0
Farm Operators	36.0
Construction Workers	33.0
Truck Drivers	26.0
Drivers (Sales)	23.0
Farm Workers	21.0
Firefighters (NFPA)	9.2

Source: U.S. Bureau of Labor Statistics.

Figure 6: Firefighter Deaths at Structure Fires (1993)

Community	Date	Cause of Death	Number of FF and Officers On Scene
Newport News, VA	01-08-93	Cardiac Arrest	18
Albany, NY	01-29-93	Cardiac Arrest	18
New London, CT	02-01-93	Cardiac Arrest	15
White Plains, NY	02-24-93	Trapped on Upper Floor	50
Monmouth, IL	03-06-93	Crushed by Wall	12
Jersey City, NJ	03-20-93	Electrocuted	68
San Francisco, CA	08-14-93	Burns from rapid fire spread	30
Pawtucket, RI	08-22-93	Burns to lungs	5
Dunmore, PA	08-23-93	Cardiac Arrest	6

Source: U.S. Fire Administration, *1993 Fire Fighter Fatalities* (1994).

northeastern states, typically with higher staffing levels, have the highest firefighter death rates, while the two states in the South, with lower staffing levels, have the lowest firefighter death rates.

There seems to be no doubt that states with higher staffing levels average higher rates of firefighter deaths.

Regions of the United States where staffing levels are lower have lower firefighter death rates.

What about firefighter injuries? Two recent surveys have indicated that the more firefighters are on the truck, the greater their risk. An analysis of firefighter injuries in Ottawa, Ontario, completed in 1993, re-

Figure 8: Fireground Death Rates per 100,000 Fires by Region (1991-1993)

Region	Three-Year Average
Northeast	3.33
Northcentral	1.93
South	1.42
West	2.02

Source: U.S. Fire Administration, *1993 Fire Fighter Fatalities* (1994).

vealed telling information on firefighter injuries. An auditor examined the correlation between staffing levels and injuries at every major fire, with special attention to those fires at which injuries occurred.

It was found that, in 1992, the Ottawa Fire Department responded to 116 second- and third-alarm fires. Thirty firefighters suffered injuries at 20 of these fires. In 18 of the 20 fires, or 90 percent of the fires at which injuries occurred, the first responding engine was staffed with four people. In only two cases, or 10 percent of cases, was the engine staffed with three people. This was in spite of the fact that in 46 percent of all the fires where a two-apparatus station responded, the first arriving pumper was staffed with three firefighters, and in 88 percent of all cases, aeri- als were staffed by three firefighters. No injuries were incurred by any member of an aerial crew while performing aerial crew functions during the initial attack on the fire.

The Ottawa study, *Staffing for Safety: Fire Fighters Arbitration*, by J. Potter and R. Jacobsen, concluded with the following statement:

In summary, no evidence exists to support the supposition that injuries are more likely when the first responding pumper or aerial at a working, second- or third-alarm fire is

Figure 7: On-Duty Firefighter Deaths (1993): Type of Activity at Time of Death

State Where Death Occurred	Structure Fire (NFPA 1500)	Other Fire	Other Emergency	Nonemergency Activities
California	1	2	1	1
Colorado				1
Connecticut	1			
Florida				1
Illinois	1			1
Massachusetts			1	
New Jersey	1			2
New Mexico		1		
New York	2			1
Ohio				1
Oregon				1
Pennsylvania	1			1
Rhode Island	1			
Virginia	1			
Total	9	3	2	10

Source: U.S. Fire Administration, *1993 Fire Fighter Fatalities* (1994).

Figure 9: Firefighter Deaths (1991-1993)

State	Population in 1990	Average per Year
California	29,760,000	6.6
New York	17,990,000	11.0
Texas	16,990,000	3.3
Florida	13,679,000	2.0
Pennsylvania	12,048,000	10.0

Sources: U.S. Fire Administration, *1993 Fire Fighter Fatalities* (1994); *Statistical Abstract of the United States for 1993*.

staffed with [fewer] than four firefighters. In fact, the opposite is true. The evidence clearly shows that injuries to pumper crews occurred when pumpers were staffed with four firefighters and that injuries did not occur in those cases when pumpers were staffed with three firefighters. The absence of any injuries to a member of a three-person aerial

crew, in which the number of firefighters on the aerial might have been a factor, verifies that staffing of aerials with three firefighters is not an unsafe practice.

Figure 10 provides an overview of all Ottawa Fire Department injuries sustained during 1992.

A more encompassing analysis of

firefighter injuries was done as a result of a survey reported by *Firehouse* magazine in its June 1994 issue. The average of all the listed cities providing staffing levels, number of structure fires, and number of injuries for 1993 reversed the union's allegation that more is safer. The cities that reported engines and ladders with staffing of three (in several cities, two) had an average injury rate that was lower than did those with staffing levels of four or five. The lack of bias with which the fire departments completed the forms, without identifying labor or management benefit, added to the analysis' validity. Figure 11 is a compilation of all the reporting communities' reports.

Staffing of three on engines was reported by 34 fire departments, while 29 departments reported three on ladders. Local governments with engine and ladder staffing of four totaled 32 and 36 respectively; six communities reported five on engines and five or six on ladders.

Results of the *Firehouse* survey reinforced the premise that firefighter risk is affected significantly by the region of the United States in which an incident occurs. The top 10 fire departments with staffing of four included seven from the Northeast, two from the West, and one from the South. Three of the 10 departments with staffing of four had a higher injury rate than any fire department with staffing of three.

The 10 fire departments with the highest injury rate and with staffing of four had an injury-per-structure-fire rate of 0.4503, while the 10 departments with staffing of three had an injury rate of 25 percent less, at 0.3320.

Another indication of the relative risk of death and injury to firefighters can be seen from workers' compensation rates. Figure 12, a partial listing of such rates for municipal employees in Texas, places firefighters in the lowest one-third in risk or cost as compared with all

Figure 10: Ottawa Fire Department On-Duty Injuries (1992)

Serious Fires		Fire Station		Training Center	
No medical aid	14	No medical aid	14	No medical aid	1
Medical aid only	7	Medical aid only	6	Medical aid only	5
Medical aid (lost time)	10	Medical aid (lost time)	11	Medical aid (lost time)	2
Totals	31		31*		8

*Five of these injuries were incurred while cooking.

Figure 11: Firefighter Injuries at Structure Fires, by Staffing Level

Staffing	Engine	Truck
3	0.1275	0.1318
4	0.1859	0.1718
5	0.2580	0.2583

Source: "The National Run Survey," *Firehouse* (June 1994).

other municipal employees.

Without question, the research provided in this article brings us to several conclusions: Firefighters' job-related danger is less than that of several common occupations; firefighters are less and less at risk of occupational death; firefighter death rates are regionally affected; increased staffing does not increase firefighter safety but may increase risk; and, last but of no less concern,

the citizens whom firefighters are charged to protect also are becoming safe.

Why must fire personnel continue to make claims that theirs is the "most dangerous occupation in North America"? Why do they seem to delight in making such comments? I am not sure, but maybe it is because they hope to elicit sympathy from society. Maybe it is to try to convince all levels of government to add to their numbers. Or perhaps it is an effort to increase membership in their labor organizations.

Whatever the reason or reasons, firefighters need to forget this D-Day mentality and adopt a Desert Storm approach to combating the enemy. Bombard the fire threat with prevention measures and early detection. Continue the tremendous improvement in firefighter fitness, training, and knowledge. Accept the profession's successes at reducing the threat of fire to citizens and firefighters alike as banners that can be waved on high. We should hold our heads up with pride that, although we work in a hostile environment, unlike lemmings we do not rush headlong to our deaths but continue to make our workplaces safer. 

Joe Erwin retired as fire chief of Hurst, Texas, in August 1995.

Figure 12: Workers' Compensation Rates (1995-1996)

Rank	Occupation Description	Rate
1	Domestic	\$36.27
2	Concrete Construction	26.11
3	Carpentry	22.40
4	Sewer Construction	20.98
5	Carpentry/Building Maintenance	19.37
6	Welding/Cutting	18.71
8	Street and Road Repair	18.69
15	Painting	14.48
22	Landscape	12.25
30	Plumbing	10.20
40	Building Operations	8.40
43	Sign Manufacturing	7.61
45	Ambulance Services	7.33
47	Police	7.32
51	Cooking	6.97
55	Automobile Garage	6.35
60	Printing	4.42
62	Firefighting	4.03
69	Gas Distribution	3.05
73	Electric Distribution	1.84
84	Clerical/Office	0.50

Source: Texas Municipal League, *Risk Pool* (June 15, 1995).