

Session: F3.0
Title: Fire Fighters

Moderator: Linda Frederick

F3.1

Title: A Profile of Thermal Imaging Camera Ownership in the United States Fire Service

Authors: Proudfoot SL, Fahy RF

Background

While structure fires have steadily decreased over 20 years, the rate of firefighter fatalities inside burning buildings has increased from 1.8 to 3 deaths per 100,000 fires. Most of these deaths occurred when firefighters became disoriented, were caught in a collapse, or were overtaken by rapid fire spread. Thermal imaging cameras (TICs) allow firefighters to "see" in obscured-vision conditions. TICs detect heat energy rather than light, translating heat signatures into recognizable images. Fire service-related applications include search-and-rescue, and locating hidden fire behind walls and ceilings.

Methods

The National Fire Protection Association (NFPA) added a question to its Annual Fire Service Survey (FSS) in 2001 to get a nationwide count of TICs. Preliminary data from the survey were analyzed to determine characteristics of departments based on TIC ownership. Data from the United States Fire Administration's (USFA) Needs Assessment were also incorporated.

Results

With two-thirds of the FSS cycle completed, 23.9% of departments have answered the TIC question; of those, 35.5% have at least one TIC. Career fire departments own 49.9% of the TICs, while volunteers own 50.1%. Career departments comprise 11.5% of all departments, while volunteers make up 88.5%.

The USFA reports that while 24.4% of the nation's fire departments now own TICs, 43.9% have no plans to purchase a TIC. The remaining 31.7% plan to obtain TICs within five years.

Conclusions

The data show an even distribution of TICs between career and volunteer departments; however, with the total number of career departments being a fraction of the number of volunteer departments, a much higher proportion of career departments own TICs. Career departments generally protect larger populations and respond to more structure fires. Additional applied research is needed regarding TIC utilization in the fire service, together with specification standards and standard operating procedures.

F3.2

Title: U.S. Firefighter Fatalities at Structure Fires

Author: Fahy RF

Since 1977, the number of U.S. firefighter deaths annually at structure fires has dropped 59 percent, a finding often credited to improvements in protective clothing and equipment, fire ground procedures and training. Over the same period, however, the number of structure fires has declined by 54 percent. It is important to determine to what degree the decrease in deaths may have been driven by the drop in the number of fires.

A comparison of the decline in both measures shows that the trends track fairly closely, indicating that the drop in deaths may have been, to a great degree, a result of the reduction in the number of fires. So, then, are firefighters just as likely to die today as they were 25 years ago?

A review of the data shows that the rate of heart attack deaths at structure fires (inside and outside) has been dropping since the early 1980s, as has the rate of non-heart-attack deaths outside at structure fires. One area showing marked increases over the period is the rate of traumatic injury deaths while operating inside structures. In the late 1970s, traumatic deaths inside structures occurred at a rate of 1.8 deaths per 100,000 structure fires and by the late 1990s had risen to almost 3 deaths per 100,000 structure fires. Almost all non-heart-attack deaths inside at structure fires were the result of smoke inhalation, burns and crushing or internal trauma. The major causes of these injuries were lost inside, structural collapse and fire progress (including backdraft and flashover). Although individually there were no consistent trends when looking at cause of injury, together there was a clear upward trend.

In order to reduce the number of firefighter deaths inside structure fires, it is crucially important to understand how they are happening and why they are increasing.

F3.3

Title: Firefighter Fatalities 1998-2001: Overview with an Emphasis on Structure-Related Traumatic Fatalities

Authors: Hodous TK, Castillo DN, Braddee R, Pizatella, TJ

This presentation reviews the causes of all firefighter line-of-duty-deaths from 1998 through 2001, and presents National Institute for Occupational Safety and Health (NIOSH) recommendations and discussion specifically regarding the subgroup of fire fighter fatalities related to structural fires. There were 410 line-of-duty deaths among US firefighters during 1998-2001, plus an additional 343 who died at the World Trade Center disaster on September 11, 2001. The 410 fatalities included 191 medical (non-traumatic) deaths (47%), 75 motor vehicle-related

fatalities (18%); and 144 other traumatic fatalities (35%). The latter group included 68 fatalities that were associated with structures, typically involving collapses, trapped firefighters, or rapid fire progression. Despite modern equipment and training, this group of fatalities has not decreased over recent years. Additional efforts are needed to help firefighters determine when an interior attack must be abandoned before catastrophic conditions develop.

F3.4

Title: Analysis of Mine Fires and Fire Injuries at U.S. Underground and Surface Mines: 1999-2001

Author: De Rosa MI

Fire and fire injury and fatality data from MSHA accident reports and verbal discussions with mine personnel were analyzed for the period 1990-2001 to arrive at fire incidence and injury risk rates for underground and surface coal and metal/nonmetal mines. The analysis also discusses other variables such as ignition sources, detection and suppression methods, and major types of equipment involved. During this period, 1,041 fires occurred, resulting in 488 injuries and 7 fatalities, and 50,957 lost workdays (included are 6,000 lost workdays for each fire fatality). While there is some overlap of major ignition sources and equipment involved in injuries reported for underground coal mines compared to underground metal/nonmetal mines, the analysis also identifies several major differences in the ignition sources and equipment for the two mining sectors.

For surface operations, the analysis indicates that the ignition sources and equipment involved were essentially the same for both coal and metal/nonmetal mining sectors. The analysis represents an essential tool for assessing fire research and prevention needs for both coal and metal/nonmetal mines.

Session: F4.0

Title: Occupational Injuries: Social and Economic Issues

Moderator: Laura Blanciforti

F4.1

Title: Comparing Costs of Fatalities from Two Fatal Occupational Injury Surveillance Systems in the United States

Authors: Biddle EA, Marsh SM

There are currently two national surveillance systems compiling occupational fatal injury data: the National Institute for Occupational Safety and Health (NIOSH) National Traumatic Occupational Fatalities (NTOF), and the Bureau of Labor Statistics (BLS) Census of Fatal Occupational Injuries (CFOI). Both systems were designed to capture the number and circumstances of all work-related fatal injuries and are used by re-

searchers to illustrate the burden of occupational fatalities. NIOSH developed a model to estimate the costs of fatalities from either system providing researchers another measure of this burden.

Because each system uses a different approach to count fatalities, the annual number of fatal occupational injuries reported varies by system. A comprehensive comparison (Biddle and Marsh, 2002) concluded that using death certificates alone, NTOF identified approximately 84% of the total count obtained by CFOI. Furthermore, counts differed by case and worker characteristics. A contributing factor to the differences was that NTOF reports usual industry and occupation while CFOI reports industry and occupation at the time of injury.

Cost estimates from the NIOSH model are driven by the number of fatalities reported and earnings of the employee at the time of death. Because earnings are dependent on the occupation and industry reported by the fatality surveillance system, costs of fatalities by system also vary. For example, during 1992-1997 CFOI reported 3,091 fatalities in services occupations and the mean cost estimate was \$767,695; NTOF reported 2,473 fatalities in that occupation group but the mean cost estimate was \$770,215. Similarly, the number and mean cost for manufacturing was 4,471 and \$797,372 compared to 4,364 and \$768,149 for CFOI and NTOF respectively.

The surveillance system selected to calculate the counts and costs of occupational fatal injuries will impact the resulting estimates and thus the injury prevention and control program planning, policy analysis, evaluation, and advocacy efforts.

F4.2

Title: Challenges for Workplace Injury Prevention in a Changing Canadian Health Care Sector

Author: Alberg NM

Canadian health care reform strategies in the 1990's concentrated on a transition from in-patient care to community based care. After initial downsizing of acute care beds and reductions in staffing, the resultant mix of patients and caregivers took on a different look. This new picture brought changes in the profiles of workplace injuries for health care providers. The injured workers, although "new" to the job, were still older than "new" workers in other industry sectors.

The difference in the type of care and in the mix of staff between acute care facilities and Personal Care Homes (PCH) has generated two streams of workplace injury. Both frequency and pattern of injury are different when Health Care is dichotomized into acute and long term care facilities. This presents distinct issues for intervention planning by safety and health professionals. The multiplicity of tasks in acute care facilities brings a wide range of safety and health concerns. In contrast, the

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