

9

Thoroughly investigate all firefighter fatalities, injuries, and near-misses.

Executive Summary

How many firefighters are killed in the U.S. each year? Just over 100. We THINK that there were more than 80,100 firefighters injured on the job in 2005. This is a National Fire Protection Association (NFPA) estimate based upon a survey of a sampling of U.S. fire departments that is utilized to develop a national projection. The NFPA believes that their estimate is accurate to +/- 6.5%.¹ This is a projection, not an actual number – we're really not sure how many firefighters were injured in 2005. We don't truly know how many actual injuries there were, and we certainly have no idea how many near-miss (or near-hit) incidents occurred. Since the fire service doesn't know how many incidents have occurred, we really can't gauge how effective any of our safety initiatives are. We take an educated guess...and we continue to get hurt and killed.

And we continue to have incidents where firefighters ALMOST got hurt, but haven't captured the lessons and passed along the education to others. Incidents adversely affect our ability to do our job. Since we haven't conducted detailed investigations of all deaths, injuries, and near-misses, we don't fully understand their root causes and therefore have not developed action plans for correction to prevent future incidents. We don't know the scope of the problem, and we certainly don't know the whys and the hows of the incidents that have occurred. What has happened, can and does happen...again. It hurts us, kills us, and affects our ability to do our jobs successfully. Initiative #9 asks us to learn from our mistakes—the only way to do this is to thoroughly investigate every near-miss, significant injury or fatality.

Introduction

Firefighting is a job. Although many would argue that this job is different than

many others, there are many similarities to most other jobs and job-related problems. Occupational safety experts agree that understanding problems related to the job is the best way to solve the problem. We think we understand firefighter deaths, injuries, and near-misses, but we only really have a grasp on the details and causes of some firefighter deaths. Certain significant fires, which may involve firefighter injuries or deaths, are investigated by the NFPA. The National Institute for Occupational Safety and Health's (NIOSH) Fire Fighter Fatality Investigation and Prevention Program in a typical recent year investigated approximately 20% of the firefighter fatalities. The stated goals of the NIOSH program are:

- Better define the magnitude and characteristics of line-of-duty deaths among fire fighters
- Develop recommendations for the prevention of deaths and injuries
- Disseminate prevention strategies to the fire service²

The NIOSH program occasionally investigates incidents involving serious injuries. However, neither the NIOSH nor the NFPA program conducts comprehensive investigations of all fatalities, injuries, and near miss incidents.

The main difference between a near miss incident and a fatality is luck. If you are a firefighter – think about it. How many times were there situations in your career that if something different occurred, you could have been seriously injured or killed? The NFPA statistical estimates show that for every firefighter fatality, there are about 8,000 firefighter injuries. General safety principles as well as good common sense tell us that there are likely tens of thousands of additional near miss incidents for every fatality. Each one of these situations is an opportunity to understand a problem in our job, correct it, and thus make our job safer. We are missing so many of these opportunities.

If our goal is to truly reduce firefighter fatalities and injuries, investigating workrelated fatalities, injuries and illnesses, and even many near miss incidents in a timely and effective fashion is essential. In many cases, conducting these investigations is mandated by insurance requirements or various local, state, and federal government regulations. More importantly to our central theme, conducting these investigations provides firefighters with information that may be used to identify workplace hazards and take appropriate corrective actions. Conducting comprehensive and effective incident investigations also provides information that may be trended over time to analyze the effectiveness of existing safety program elements and to help identify new programs and/or systems and processes needed to reduce workplace hazards.

The United States Occupational Safety and Health Administration (OSHA) discusses accidents generically: *Accidents are usually complex. An accident may have 10 or more events that can be causes. A detailed analysis of an accident will normally reveal three cause levels: basic, indirect, and direct. At the lowest level, an accident results only when a person or object receives an amount of energy or hazardous material that cannot be absorbed safely. This energy or hazardous material is the DIRECT CAUSE of the accident. The direct cause is usually the result of one or more unsafe acts or unsafe conditions, or both. Unsafe acts and conditions*

are the INDIRECT CAUSES or symptoms. In turn, indirect causes are usually traceable to poor management policies and decisions, or to personal or environmental factors. These are the BASIC CAUSES. In spite of their complexity, most accidents are preventable by eliminating one or more causes. Accident investigations determine not only what happened, but also how and why. The information gained from these investigations can prevent recurrence of similar or perhaps more disastrous accidents. Accident investigators are interested in each event as well as in the sequence of events that led to an accident. The accident type is also important to the investigator. The recurrence of accidents of a particular type or those with common causes shows areas needing special accident prevention emphasis (OSHA Accident Prevention Training for Small Businesses <http://www.osha.gov/SLTC/smallbusiness/sec6.html>).

In the overwhelming majority of firefighter deaths, we understand the direct causes. In some or even many cases, we may understand the indirect causes (symptoms), but in most cases, we haven't identified and taken action on the basic causes of these fatalities – management safety policy and decisions, personal factors, and environmental factors. For firefighter injuries, we certainly have less of an understanding of basic and indirect causes, and for near-miss incidents, there isn't much information on basic and indirect causes and thus little opportunity to learn from previous situations to minimize future injuries and deaths.

There is rarely, if ever, a single cause to an incident. A firefighter with a hand injury due to failure to wear gloves may have numerous, deeper causes for this behavior. Does the fire department have a requirement to wear gloves—was the policy widely available and was the individual trained to the policy? If so, was this requirement routinely enforced? Did the firefighter have adequate gloves? Were they comfortable? Were they damaged or contaminated on a previous call? Could the firefighter adequately accomplish the task while wearing the gloves? Or, did the firefighter just willfully ignore his training? These issues and others can be flushed out and appropriately rectified through an appropriate incident investigation.

To reduce or eliminate future incidents, effective investigations must be consistently conducted of incidents involving firefighters. To conduct incident investigations effectively, they must occur and be documented in a timely and appropriate manner. The complexity of the investigation should be dependent on the severity of the injury or illness and/or the event or exposure that caused it. In the case of the most significant situations, the expertise of the NIOSH Fire Fighter Fatality Investigation group and the NFPA can be sought. However, for all other incidents, it will be up to the fire department to conduct incident investigations.

The level of detail sought, the methods of documentation (reports, pictures, drawings, etc), and the size and make-up of the investigation team should be determined by the severity of the injury/illness, the number of firefighters effected, and the causative event or exposure.

Incident investigations can involve various members of the fire department.

Firefighters must provide timely and accurate information concerning the events surrounding the incident to their supervision or others involved in the incident investigation process. First line supervision must ensure that incidents are reported in a timely manner, consistent with the nature of the incident, and that appropriate medical assistance is sought. First line supervision must also ensure that incident investigations are initiated, utilizing established injury/illness investigation forms and procedures to structure, guide, and document the incident investigation process, including involving support personnel in the investigation as necessary. Support personnel may include the fire department medical director/physician, who may provide the investigation team with appropriate medical information needed to effectively investigate each incident or participate in the investigation as needed. Support personnel may also include the department safety officer who can provide technical assistance to the investigation, as well as share “best practice” incident investigation techniques.

Fire department management must develop and implement specific incident investigation processes to ensure the consistent investigation and documentation of all incidents. Management must also ensure that appropriate personnel are made available and held accountable to participate as needed in incident investigations. Most importantly, fire department management must train firefighters and supervision to properly utilize incident investigation processes to conduct investigations and determine specific causal factors.

Each firefighter fatality, injury, and near-miss investigation must be properly documented. The investigation must include a “causal factor” that has been identified for the direct, indirect, and basic cause(s) that led to the incident occurring. Once the causal factor(s) is determined, the investigation must include a plan of corrective action that has clearly defined responsibilities and targeted completion dates. The corrective actions must be followed-up until completion, and shared with whatever organizations are necessary to facilitate the identified changes. To accomplish this as easily as possible with existing resources, it will be important to leverage systems that are already available to firefighters.

Conclusion

Conducting an investigation of near-miss, injury, and death incidents involving firefighters is quite similar to conducting a fire cause investigation. Like fire cause investigations, incident investigations need to be conducted systematically, with the level of resources applied based upon the complexity of the incident, and the complexity of the investigation based upon not only the seriousness of the incident, but also on the potential for global implications of the corrective actions proposed by the investigation team.

Accidents are problems that present opportunities for solutions through investigations. Accidents can result from failures of firefighters, civilians, equipment, supplies or surroundings to behave as expected. A successful accident investigation determines not only what happened, but also finds how and why the accident

occurred. This effort can prevent a similar or perhaps more disastrous sequence of events preventing firefighters from being injured or killed in the future. ⁴ The American fire service must implement an effective, consistent incident investigation process and ensure that recommendations developed during this process are shared as appropriate nationwide.

Implementation Strategies/Recommendations

Recommendation # 1: Utilize a panel of safety experts with firefighting and/or industrial safety background to conduct a review/audit of the National Firefighter Near-Miss Reporting System and the National Fire Incident Reporting System (NFIRS) firefighter injury/fatality reporting forms to ensure the forms provide a mechanism to fully develop and capture direct, indirect, and basic cause(s) that led to the injury/fatality to occur. Nationally recognized standards for incident investigation should be utilized. Ensure that these systems/forms are updated to incorporate the recommendations of the panel.

Recommendation # 2: Fully implement the National Firefighter Near-Miss Reporting System and ensure it is utilized nationwide as a standard operating procedure (SOP) for all fire departments. Ensure that Near-Miss reports are structured to identify plans of corrective action that have clearly defined responsibilities and appropriate targeted completion dates. Fire grant award requirements can reference that fire departments receiving grants must have a SOP in place for utilizing this system.

Recommendation # 3: Require fire departments nationwide to report all injuries/deaths using the NFIRS report forms. Ensure that injury/death reports identify plans of corrective action that have clearly defined responsibilities and appropriate targeted completion dates. Fire grant award requirements can reference that fire departments receiving grants must have a SOP in place for utilizing NFIRS report forms for injuries/deaths. Develop an audit system using worker's compensation records or other mechanisms to finance medical costs associated with firefighter injuries/deaths to ensure that all firefighter injuries/deaths are being reported through the NFIRS system.

Recommendation # 4: Train firefighters and fire department supervision nationwide on how to utilize the near-miss, injury, and death investigation system and forms.

Recommendation # 5: Provide a support system to assist fire department supervisors in properly completing investigation forms. The system can utilize safety officers, incident support teams (ISTs), or state fire marshal/academy resources to achieve this.

Recommendation # 6: Develop a system to ensure that direct, indirect, and basic cause(s) of near-misses, injuries, and deaths that have global implications are communicated to fire departments nationwide, and incorporated into codes and

standards through organizations such as the NFPA and the ICC (International Code Congress).

Endnotes and References

¹"Firefighter Injuries for 2005," NFPA Journal, November/December 2006, p. 76-81

²National Institute for Occupational Safety and Health Fire Fighter Fatality Investigation and Prevention Program: Program Description
www.cdc.gov/niosh/fire/implweb.html

³US Occupational Safety and Health webpage Small Business Training program,
www.osha.gov/SLTC/smallbusiness/sec6.html

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http://www.bernardino.colostate.edu/OHSS/OHSSHandouts/ohss_Accident_Investigation.pdf

- Canadian Centre for Occupational Health and Safety OSH Answers, *Accident Investigation* - <http://www.ccohs.ca/oshanswers/hsprograms/investig.html>

- *Root Cause Analysis for Beginners*, James J. Rooney and Lee N. Vanden Heuvel
Quality Progress, July 2004, pp. 45-53,

<http://www.asq.org/pub/qualityprogress/past/0704/qp0704rooney.pdf>

- Example Accident Investigation detailing root cause analysis - Type A Accident Investigation Board Report of the July 28, 1998 Fatality and Multiple Injuries Resulting From Release of Carbon Dioxide,

<http://www.id.doe.gov/foia/ineelai3.pdf>