



INTERNATIONAL ASSOCIATION OF FIRE FIGHTERS
**Division of Occupational Health,
Safety and Medicine**



Fire Fighter Line-of-Duty Death or Injury Investigation Manual





This program was developed by the International Association of Fire Fighters, Division of Occupational Health, Safety and Medicine with the assistance of the IAFF Gene Faughnan Standing Committee on Occupational Safety and Health and the IAFC Safety, Health and Survival Section.

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PREFACE

When a fire fighter makes the ultimate sacrifice, we usually say that he or she died in the line of duty. The fact of the matter is that fire fighters don't die peacefully in the line of duty; they are killed—often abruptly and violently. All too often, the investigation into a fire fighter's death turns out to be incomplete, inaccurate, or inconclusive. In those cases, we never find out what, if anything, went wrong. Because we believe that every fire fighter's death must receive a thorough and unbiased investigation, the IAFF first developed this Fire Fighter Line-of-Duty Death or Serious Injury Investigation Manual in 1997. During this time, we also worked with the US government to create the NIOSH investigation program for fire fighters, a program which we continue to support. We have also assisted many of our affiliates directly or through the provision of advice and materials with fatality investigations. The IAFF continues to ensure all materials are up-to-date and relevant for investigation purposes. In 2006, our membership directed that we work with the International Association of Fire Chiefs (IAFC) to revise our policies and procedures, especially this manual, to ensure that there is labor and management cooperation during any fatality investigation. Accordingly, the IAFF worked together with the IAFC on the revision of the IAFF Line-of-Duty Death and Serious Injury Investigation Manual to ensure such cooperation and to protect the rights of our members during the investigation of an LODD or serious injury incident. The IAFF Division of Occupational Health, Safety and Medicine worked with the IAFF's Gene Faughnan Standing Committee on Occupational Safety and Health and with the IAFC Health, Safety and Survival Section on the complete revision of the original manual.

We owe a comprehensive investigation to every fallen hero, every family member left behind, and the 298,000 members of our Union. Whether the fault for the loss of one of our brothers or sisters lies with inadequate staffing, poor incident command, bad communications, lack of training, equipment failure, or human error—the IAFF is committed to uncovering the truth. This manual is rededicated to the fire fighters who have died in the line of duty. From their deaths we will learn how to prevent further tragedies.

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ADDITIONAL RESOURCES AND REPORTS

Resources:

- DHS, National Incident Management System
- FAA, Aircraft Accident and Incident Notification, Investigation, and Reporting
- IAFF Developing Fire Service Labor-Employee Assistance and CISM Programs
- IAFF Emergency Incident Rehabilitation, United States Fire Administration
- IAFF Fallen Fire Fighter Family Support Guidelines
- IAFF Funeral Protocol
- IAFF Line of Duty Death Notification, Assistance, and Investigation Policy
- IAFF LODD User Notification Guide
- IAFF On Message – Effective Public Relations for IAFF Affiliates
- IAFF Summary of the US Federal Benefits for Public Safety Officers – PSOB and PSOEPA Programs
- IAFF Thermal Stress Protocol
- IAFF Voice Radio Communications Guide for the Fire Service, United States Fire Administration
- IAFF/IAFC Fire Service Joint Labor Management Wellness-Fitness Initiative, Third Edition
- IAFF/IAFC Joint Guide, United States Department of Labor, Occupational Safety and Health Administration, Fire Fighters’ Two-in/Two-out Regulation
- IAFC Line of Duty Death Guide
- Montgomery County Fire & Rescue, MD, Respiratory Protection Program
- NIOSH Fire Fighter SCBA Evaluation Protocol
- OSHA General Duty Clause Summary
- OSHA Title 29 CFR part 1910.120 – HazWoper
- OSHA Title 29 CFR part 1910.132 – Personal Protective Equipment
- OSHA Title 29 CFR part 1910.134 – Respiratory Protection
- OSHA Title 29 CFR part 1910.146 – Confined Space
- OSHA Title 29 CFR part 1910.156 – Fire Brigades
- USFA Firefighter Autopsy Protocol, United States Fire Administration
- USFS, Findings from the Wildland Firefighters Human Factors Workshop

Examples of Completed Fire Fighter Fatality and Serious Injury Investigative Reports:

- Apopka Fire Department, Florida, Final Report; April 23, , 2008
- Baltimore City Fire Department, Independent Investigation, Final Report and Appendices; February 9, 2007
- Boston Fire Department, Board of Inquiry; January 9, 2009
- Buffalo Fire Department, LODD Investigation; December 2, 2009
- Charleston Sofa Super Store Fire Fighter Fatality Report; June 18, 2007
- Colerain Township, Ohio, Preliminary Report; April 4, 2008
- Colerain Township, Ohio, Final Report; April 4, 2008
- Dennison, Texas, State Fire Marshal LODD Report; December 30, 2006
- District of Columbia Fire and EMS, Report from the Reconstruction Committee; May 30, 1999
- Fire Department City of New York, LODD Investigation Report; January 3, 2008
- Los Angeles City Fire Department, Preliminary Report; August 14, 2004
- Los Angeles County Fire Department, Factual Report; August 30, 2009
- Ottawa, Ontario Serious Injuries Report; February 12, 2007
- Phoenix Fire Department, Southwest Supermarket LODD Report; March 14, 2001
- Pittsburgh Fire Department, Bricelyn Street Board of Inquiry; February 14, 1995
- Prince William County Fire Fighter Fatality Report; January 26, 2008
- US Forest Service, South Canyon Fire Investigation; July 6, 1994

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INTRODUCTION

This manual is intended to serve as a guide for the investigation of a fire fighter line-of-duty death (LODD) or serious injury. The manual was produced through a joint effort of the International Association of Fire Fighters (IAFF) and the International Association of Fire Chiefs (IAFC), with the cooperation and assistance of many additional individuals and organizations. Both the IAFF and the IAFC are fully committed to the mission of increasing fire fighter health and safety by preventing occupational injuries and deaths.

Investigating a line-of-duty death or a serious injury is often one of the most difficult and important tasks that a fire department can undertake. Every fire fighter death or serious injury, as well as “close call” or “near miss” incidents, should be thoroughly investigated as part of the mission to improve the safety of the firefighting profession.

The lessons learned from investigating these incidents will help to prevent future deaths and injuries, both within the department that experienced the loss and throughout the fire service. While each investigation is directed toward a particular incident and the fire department or agency that was directly involved in the occurrence, there is a professional responsibility that extends throughout the fire service to share the information and the lessons so others may learn from each unfortunate occurrence.



This manual refers to an LODD Investigation Team, although the incident under investigation may not have resulted in a fatality. The recommended policies and procedures in this manual are intended to be applied by a team that has been assigned to conduct a comprehensive investigation of an incident, whether it resulted in a death or serious injury and involved one or more fire fighters. These same basic procedures may also be used to investigate incidents where there was a potential for death or serious injury, even if the outcome was less severe.



Many of the references in this manual are based on the presumption that the incident under investigation involved a traumatic injury or fatality that occurred during structural firefighting operations. This same basic investigative approach is adaptable to many other types of incidents, such as apparatus collisions, hazardous materials incidents, training mishaps, and deaths caused by heart attacks or strokes during emergency operations. The user should select and adapt the recommended procedures to fit the situation. The material that is included in this manual may also be useful to other investigative bodies and to other types of investigations.

GOALS AND OBJECTIVES

The ultimate goal of an LODD investigation is to identify the actions that should be taken to prevent future occurrences of a similar nature, and to reduce the risk of fire fighter injuries and fatalities in the future. The investigation should first be directed toward determining what happened and why it happened, and then toward the question of what can be done to prevent future deaths and injuries.

The LODD investigation is not intended to address issues of fault, responsibility, or blame that could be associated with the occurrence. The responsibility of the LODD Investigation Team is limited to determining the facts, as accurately as possible, and identifying corrective actions. The investigators should direct their efforts toward obtaining, and clearly documenting, factual information that will provide the best possible understanding of the incident and the circumstances. Any disciplinary actions that could be related to the incident should be addressed through a separate process, generally after the LODD investigation has been completed.

Different parties, each with a legitimate interest, often seek different results from an investigation. The local union may look at an incident as proof that a decision by management or management policy caused the death of a member, while the employer may look for evidence to refute that assertion. The IAFF/IAFC effort to produce this manual is evidence of a joint commitment to ensure that every incident that results in a fire fighter fatality or serious injury will be thoroughly investigated by a team of qualified investigators. The LODD Investigation Team must be dedicated to producing a fair, accurate, and impartial description of the events that transpired, and a set of findings and recommendations that will change future outcomes.

A thorough investigation will address several concerns, including any suggestion that the incident is being “covered-up.” The best way to address rumors, innuendos, and misinformation is to conduct a comprehensive investigation and make the results available to the members of the fire department, the fire service in general, and anyone else who has an interest in the facts. If there are lessons to be learned, or problems to be corrected, it is in the best interest of everyone involved to make the information widely available.

The news media often applies pressure, seeking quick answers and demanding to know who is responsible for an unfortunate situation. It is clearly more important to conduct a thorough and professional investigation and release factual information at an appropriate time, than to prematurely release information that may have to be corrected later. If the investigation is both thorough and impartial, the facts will speak for themselves.

A thorough investigation will often produce information that could become important in subsequent legal actions related to the incident. The LODD Investigation Team should consult with an attorney to determine the most appropriate manner of dealing with this type of information. All of the evidence and documentation that is assembled to conduct the investigation should be organized and retained in a safe location for future reference.

CHAPTER 1

AUTHORITY AND PURPOSE OF THE LODD INVESTIGATION

The type of incident investigation described in this manual is generally conducted internally, under the authority of the Fire Chief or the governing body that oversees the fire department that was directly involved in the incident. These same basic procedures could be used by any team that is assembled to conduct an investigation, whether it is “internal”, “external”, or includes a combination of both internal and external members. The most important factor is to ensure that the investigation is conducted by capable, qualified, and conscientious individuals who have the time and resources, as well as the necessary authorization, to complete the assignment.

The necessary authority must be delegated to the LODD Investigation Team to gather evidence, conduct interviews, obtain information from other sources and agencies, and officially represent the fire department (or the authority having jurisdiction) in relation to the investigation.

Many smaller fire departments would most likely have difficulty conducting a complex investigation without assistance from other agencies. This assistance could be provided by neighboring fire departments or from state, provincial, or regional fire service organizations. Assistance may also be provided by national organizations, including the International Association of Fire Fighters (IAFF), the International Association of Fire Chiefs (IAFC), the National Institute for Occupational Safety and Health (NIOSH) Fire Fighter Fatality Investigation and Prevention Program, and the other agencies and organizations listed in this manual.

Regional investigation teams have been organized in many areas to ensure that a proper investigation is conducted, even if the involved fire department has very limited resources or is severely impacted by the incident. A regional team could have a limited role in performing the immediate information gathering steps at the incident scene or it could be empowered to conduct the full investigation.

In some cases, an LODD investigation will be conducted by an outside agency that has specific authority to investigate fire fighter fatalities, such as a State Fire Marshal’s Office. There may be other reasons to arrange for an investigation to be conducted by an external team, including highly emotional, controversial, and/or technically complex situations.

In many cases, the situation that is being investigated involves legal issues, including the possibility of civil litigation or even criminal charges. It is essential for the LODD Investigation Team to obtain legal guidance in dealing with these concerns; however, these factors should not restrict their ability to conduct a thorough analysis of the incident and identify the lessons to be learned.

PARALLEL INVESTIGATIONS

The “internal” investigation is seldom the only investigation of an incident that involves a fire fighter fatality or serious injury. Depending on the situation and circumstances, there may be multiple investigations of the same incident conducted by different agencies for a variety of purposes.

The investigation process that is described in this manual is intended to produce the most thorough and comprehensive analysis of the incident in relation to the fire department that experienced the loss. This process is intended to consider all of the factors and circumstances that caused or contributed to a fire fighter fatality or serious injury.

Whenever multiple investigations occur in relation to the same incident, it is essential that all of the different agencies understand each other's roles, responsibilities, objectives, and legal authority. Interagency coordination is essential, and should be based on relationships that are established before an incident occurs. At the incident scene a form of unified command structure is often required to manage the investigation process. Liaisons should be established to ensure that the efforts of different agencies are coordinated while the parallel investigations are ongoing.

The parallel investigations could include any of the following:

- An investigation to establish the origin and cause of a fire.
- A criminal investigation directed toward any criminal act associated with the incident.
- A coroner or medical examiner's investigation to officially determine the cause and manner of death.
- A regulatory investigation conducted by a federal, state, or provincial authority having jurisdiction for occupational safety and health.
- An investigation directed toward code compliance issues, regulatory effectiveness, or scientific analysis of the event.
- The law enforcement or transportation authority investigation of an incident involving the operation of a vehicle on a public street or highway.
- An investigation related to loss adjustment, insurance coverage, or civil liability that is not directly associated with the fire fighter injury or fatality.
- Any other type of official investigation by an authorized governmental agency.
- An investigation to formulate recommendations for preventing future fire fighter deaths and injuries.

In situations where multiple investigations are being conducted for different purposes, it is essential to understand the purpose, authority, and responsibilities of each agency, as well as their relationships to each other. Each agency that has an official role to perform should make an effort to cooperate with the other(s), while ensuring that their particular objectives are achieved and legal mandates are fulfilled. In most cases, the different agency representatives are able to organize the process so that all of their investigative activities are coordinated and all of the objectives are accomplished.

There may be legal or practical limitations on the information that may be shared among the different investigative agencies. Whenever possible, the investigators should attempt to exchange and compare information and to identify and resolve inconsistencies. If the information obtained by different investigators is inconsistent, they should go back to their sources and verify the information.

FIRE CAUSE AND ORIGIN

Every fire that results in a serious injury or fatality should be examined by qualified and experienced fire cause and origin investigators. The fire investigators are often part of the fire department and should be familiar with conducting fire scene investigations. These investigators can often be very helpful to an LODD Investigation Team, although their perspective in examining the scene and gathering information may be entirely different. A cooperative working relationship is essential to ensure that both investigative aspects are successfully conducted.

In LODD incidents that may involve criminal acts, it may be wise for the jurisdiction to employ the services of a cause and origin expert that is not employed by the jurisdiction. This independent analysis may be viewed as more objective – the independent investigator is not a part of the jurisdiction's structure and likely has limited ties to the organization, the fire department, or the fire fighters that were injured or killed.

LAW ENFORCEMENT

It is particularly important for the LODD Investigation Team to establish a working relationship with any law enforcement agency that is investigating the same incident. Law enforcement investigators are often involved in examining the same incident scene and interviewing the same witnesses as an LODD Investigation Team, while seeking entirely different types of evidence.

The law enforcement investigation could be directed toward the possibility of arson or some other criminal activity that has a direct relationship to the fire fighter injury or fatality that is being investigated by the LODD Investigation Team. The law enforcement agency could also be investigating some other type of crime with a different relationship to the LODD incident, such as illegal activities that were being carried out on the premises where the incident occurred (e.g., clandestine drug labs or illegal storage sites for hazardous materials).

If the incident involves a fatality, and was caused by arson or resulted from some other criminal act, the law enforcement agency will be conducting a homicide investigation, and the criminal investigators will be particularly concerned with maintaining security of the crime scene and ensuring that it is not contaminated. If they do not understand the purpose and importance of the LODD investigation, they may prevent the LODD Investigation Team from examining the scene until they have completed their work. Evidence that is vitally important to the LODD investigation could be compromised before the team has an opportunity to capture it.

The LODD Investigation Team members must focus their efforts, and develop their report, based solely on the facts that pertain to the fire department's response and involvement in the situation. The cause of the fire is much less of a concern to the LODD Investigation Team than the fire spread through the building and the fire department's on-scene actions.

The law enforcement agency can often provide valuable assistance with scene documentation and evidence preservation, including secure facilities to store items for future examination. This will only occur if the agencies have established a good working relationship and ground rules before the incident occurs. If this relationship has not been established before the incident, the LODD Investigation Team Leader should actively seek out and meet with the responsible law enforcement agency leaders early in the investigation process. The mission of the LODD Investigation Team should be discussed along with coordination and contact information.

The law enforcement investigators often want to interview the same witnesses as the LODD Investigation Team. Coordination is important to ensure that the appropriate investigators have priority interviewing each witness and the two teams do not create avoidable complications for each other.

CORONER OR MEDICAL EXAMINER

It is equally important to establish a working relationship with the local coroner or medical examiner, preferably before a fatality occurs. This individual is legally responsible for determining the cause and manner of death and will generally welcome the technical assistance that can be provided by an experienced LODD Investigation Team.

In many jurisdictions, approval of the coroner or medical examiner is required before a body or any physical evidence may be removed from the scene of a fatal incident. The coroner or medical examiner may want to be present for any scene examination and evidence collection activities. The scene examination is sometimes performed by members of the coroner or medical examiner's office, while in other jurisdictions the responsibility is delegated to a law enforcement agency.

The LODD Investigation Team should always request an autopsy for a deceased fire department member. A recommended protocol for conducting an autopsy for a fire fighter who dies in the line of duty is available from the United States Fire Administration (USFA) and should be provided to the coroner or medical examiner, if they do not already have a copy (included with this manual's CD). The LODD Investigation Team should obtain a copy of the autopsy report, although a physician may be needed to interpret the findings and review other medical records.

OCCUPATIONAL SAFETY AND HEALTH INVESTIGATION

The relationship between a fire department LODD Investigation Team and an agency that enforces occupational safety and health regulations is often complicated. While both agencies are seeking understanding of what happened, the occupational safety and health agency is often investigating the fire department to determine if there were any violations of federal, state, or provincial safety regulations. The discovery of regulatory violations could result in fines or sanctions against the fire department, and in some cases criminal charges could be filed. The occupational safety and health investigators could also be looking for indications of regulatory violations by the property owner or some other party that was involved in the incident.

The LODD Investigation Team should cooperate fully with occupational safety and health investigators, even if there is a concern about the potential outcome of their investigation. The fire department should have nothing to hide and both agencies should share the goal of correcting any problems that are discovered. A cooperative labor/management relationship, with respect to the investigation, will also contribute to a positive relationship with the occupational safety and health agency.

NIOSH INVESTIGATION

The National Institute for Occupational Safety and Health (NIOSH) conducts investigations of fire fighter fatalities under the Fire Fighter Fatality Investigation and Prevention Program (FFFIPP). NIOSH is an agency of the Centers for Disease Control. The FFFIPP is specifically directed toward the investigation analysis and prevention of fire fighter fatalities.

The mission of the FFFIPP is to gather information to learn from tragic events and to disseminate information that will help to prevent future similar events. This mission involves:

- Better defining the characteristics of line-of-duty deaths among fire fighters.
- Developing recommendations for the prevention of deaths and injuries.
- Disseminating prevention strategies to the fire service.

The FFFIPP employs two teams of investigators; one group investigates traumatic fatalities and the other group examines line-of-duty deaths that are attributed to cardiovascular and other medical causes. Individual cases are selected for investigation based on prioritization criteria, available resources, and the willingness of the fire department or authority having jurisdiction to cooperate with the program.

The product of a NIOSH fatality investigation is a report that describes the occurrence and provides recommendations for preventing future deaths and injuries. While each report is based on a particular incident, the findings and recommendations are directed toward the fire service at a national level. The NIOSH reports do not specifically refer to the agency or the individuals who were involved in the incident, and the recommendations are not specifically directed toward the fire department that experienced the loss. The NIOSH investigators do not seek to determine fault or place blame on fire departments or individual fire fighters, the recommendations are intended to be educational.

A NIOSH investigation should not take the place of a thorough investigation that is conducted by a qualified LODD Investigation Team following the procedures described in this manual. The internal investigation should examine every significant factor in relation to the incident, and the recommendations that are presented in the final report should be specifically directed toward the fire department that was involved in the incident. A NIOSH investigation report is directed toward providing information and education to the fire service at a national level.

In situations where a NIOSH investigation is conducted, the local LODD Investigation Team should cooperate and coordinate efforts with the NIOSH investigators. NIOSH involvement brings an additional perspective and valuable resources to an investigation and ensures that the lessons learned are effectively communicated to a national fire service audience.

ADDITIONAL AGENCIES AND SOURCES OF ASSISTANCE

Chapter 14 provides information about other agencies and organizations that could become involved in an investigation or could be requested to provide assistance to an LODD Investigation Team.

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CHAPTER 2

THE INVESTIGATIVE PROCESS

The procedures described in this manual are based on an investigative process model that is designed to gather information, analyze the incident, determine why it resulted in an undesirable outcome, and then identify the actions that need to be taken to prevent a similar occurrence in the future.

An LODD investigation involves four major steps or phases that must be addressed sequentially:

1. Gather information to understand what happened.
2. Analyze the information to develop an understanding of why and how it happened.
3. Identify the actions that would prevent or reduce the risk of a similar occurrence in the future.
4. Develop a comprehensive report that includes all of the facts, analysis, and recommendations.

There is often overlap between the information gathering and the analysis phases of the process; the preliminary analysis usually begins before all of the factual information can be assembled. While the LODD Investigation Team should try to gather as much information as possible before moving too far ahead with the analysis, preliminary theories are often developed as the facts are assembled. The investigators must continue looking for additional information that either reinforces or invalidates the preliminary theories. Several different theories are often considered before the team members are satisfied that they have determined what really happened.

It is difficult to determine when all of the relevant information has been obtained or when all of the facts that can be determined have been assembled. Sometimes new information will become available after the investigation has moved on to subsequent steps in the process. If the new information points the investigators in a different direction, the team must backtrack to ensure that the final conclusions and recommendations are based on validated factual information.

The LODD Investigation Team must be dedicated to getting the job done thoroughly and conscientiously, even if it becomes tiresome, frustrating, and if there is pressure to produce a report by a certain date. The importance of the mission justifies taking all of the time that is required and making every reasonable effort to reach solid conclusions. Team members have an important professional responsibility to complete their assignment to the best of their ability.

The investigative process should lead to conclusions and recommendations that all of the team members are prepared to support and defend. Team members may not necessarily arrive at a point where there is absolute agreement on every detail, but they should all be satisfied that the report provides appropriate conclusions and recommendations based on a factual analysis of the incident. If the team cannot reach this level of consensus, this is a good indication that more effort is required.

In an ideal situation the investigation will produce information that is complete and factual, allowing the team to develop a clear understanding of what happened, why it happened, and how it happened. In the real world there are often facts that cannot be determined for a variety of reasons. The final report should differentiate between information that is known to be factual and that which is believed to be accurate with a degree of uncertainty. When there are factors that cannot be determined, the investigators should identify them as unknowns and provide the best information that is available.

The conclusions and recommendations may have to be based on certain assumptions, presumptions, or alternative possibilities; however the uncertainty must be documented.

MISSION FOCUS

The details of the investigative process will vary, depending on the nature and circumstances of the occurrence. As noted in the Introduction, most of the references in this manual relate to the investigation of a traumatic injury or fatality that occurred during structural fire fighting operations. These same basic principles are adaptable to the investigation of a wildland fire, a vehicle collision, a water rescue or hazmat incident, a training exercise, or any other type of fire department activity. The details of the process and specific techniques will have to be adapted to fit the particular situation and circumstances.

The LODD Investigation Team must remain focused on the essential aspects of the mission:

Determine the Facts:

- What happened?
- How did it happen?
- Why did it happen?

Identify the Actions that will Prevent Future Occurrences:

- Lessons.
- Policies.
- Recommended Changes to Policies/Procedures.

While the process is easily described, weeks or months may be required to conduct a thorough investigation of an incident. The incident itself could be very complicated, and extensive efforts may be required to gather, assemble, and analyze all of the pertinent factual information before the LODD Investigation Team can begin to focus on root causes and corrective actions. Some issues that are brought to light by the investigation could require corrective actions that take months or years to fully implement. Investigators should understand the basic philosophy of the investigative process in order to put the procedures described in this manual in proper context.

ACCIDENT VERSUS INCIDENT

The vast majority of fire fighter fatalities and injuries are predictable and preventable occurrences. In the past, many fire fighter deaths and serious injuries were simply classified as “accidents” and attributed to the risks of fire fighting or bad luck. Many of these deaths and injuries were never thoroughly investigated. Over the years, we have learned that a thorough investigation of every incident is a critical step in the prevention of future occurrences.

The first step toward conducting a successful investigation is replacing the term “accident” with “incident.” The word accident implies that the fire fighter or fire department had no control over the undesirable situation that occurred. An incident is simply an event with negative consequences or implications. Referring to the event as an incident acknowledges that there was a possibility that actions could have been taken to change the outcome. The ultimate goal of the LODD Investigation Team is to identify the changes that could make a difference in the future.

BASIC STEPS IN THE INVESTIGATION PROCESS

The following chapters of this manual describe a sequential series of steps in the investigation process. The 9-step model that is outlined below assumes that the incident under investigation occurs within the context of a fire or some other type of emergency incident.

1. Immediately secure the area.
2. Make notifications.
3. Identify potential witnesses.
4. Document the scene and capture physical evidence.
5. Conduct interviews.
6. Collect records, reports, and documentation.
7. Analyze the information and identify root causes.
8. Develop recommendations.
9. Prepare the report.

INFORMATION GATHERING

The information gathering steps should begin almost immediately after an incident calling for an investigation occurs. The scene should be secured to ensure that physical evidence is retained for detailed examination by the LODD Investigation Team. Witnesses who observed or participated in any aspect of the incident should be identified, including fire department members and anyone else who might be able to provide useful information.

There are several mechanisms for gathering information about the incident:

Step 1: The LODD Investigation Team must carefully examine the scene where the incident occurred, looking for evidence and documenting their observations through photographs, diagrams, notes, and other methods. Physical evidence should be secured and preserved for future examination. Proper methods for securing and preserving physical evidence will be discussed later. If the arrival of the LODD Investigation Team is delayed, the team may be forced to rely on evidence collected at the scene at the time of the incident. If the scene has been released by the fire department, permission for access to the incident scene may be difficult or impossible to secure.

Step 2: The LODD Investigation Team should try to interview every individual who could possibly provide useful information. All fire department members who were involved in the incident should be interviewed. Anyone else who could have been in a position to observe some aspect of the incident, or who might be able to provide background information, should also be interviewed.

Step 3: The information obtained from interviews should be supplemented by photographs, videos, recordings of radio traffic, command worksheets, and any other means that will assist the team in understanding the sequence of events and all of the circumstantial factors. In many cases, valuable photos or video recordings are obtained from neighbors, passers-by, news reporters, security cameras, and dashboard cameras in law enforcement vehicles.

Step 4: The team should also gather all of the background information that could be relevant to the investigation. This could include maintenance, inspection and training records, duty rosters, dispatch records, building plans and permits, pre-fire plan files, maps and aerial photographs, and any other sources of information that could prove to be relevant to the investigation.

Specific procedures, and recommended practices, for gathering and organizing information are presented in the following chapters of this manual. A methodical process is required to collect and organize the information. The LODD Investigation Team should examine the incident from every possible perspective and seek information from every potential source to ensure that nothing is overlooked or misinterpreted. The investigators should always keep in mind that it may be impossible to go back and obtain information that was overlooked during the early stages of the process. If there is information that could possibly turn out to be relevant, the investigators should try to capture it.

ANALYSIS

The analysis phase of the investigation involves two essential steps. The investigators have to first develop a detailed understanding of the incident that occurred, before turning their attention to identifying the causal factors. The second step is to identify all of the direct and contributory factors that either caused the occurrence or failed to prevent it from happening.

FINDINGS AND RECOMMENDATIONS

The development of findings and recommendations can only occur after both parts of the analysis have been completed. The team must process the information in an unbiased manner to ensure that the recommended corrective actions will be directed toward solving the appropriate problems. The ultimate goal of the investigation is to identify the actions that are required to prevent a repetition of the same occurrence, or any set of circumstances, that is likely to result in a similar outcome. The recommendations must be based on a comprehensive understanding of the problems and consideration of all reasonable options to correct them.

INVESTIGATION REPORT

The deliverable product of an LODD investigation is an official report that presents all of the relevant factual information that can be determined in relation to the occurrence. The report should clearly lay out the factors present at the incident, the sequence of events as best as they can be reconstructed, and backup information to support these assertions. The report should clearly identify the actions that would prevent, reduce, or eliminate the risk of a similar occurrence in the future.

The official report is generally delivered in the form of a written document, which should include photographs and diagrams to illustrate key points. The written report is often supplemented by additional material, such as audio and video recordings, that convey important information. An audiovisual presentation of the findings and recommendations is often developed in addition to the written report.

The results of the investigation should be widely disseminated and shared, so that other fire departments and fire fighters can learn the same valuable lessons.

PROJECT COMPLETION

The delivery of the final report is the final step in the mandate that is assigned to an LODD Investigation Team. The real impact of their effort occurs when the fire department implements the changes in policies and operations that will prevent, or significantly reduce, the risk of future tragic occurrences.

The information that was used to develop the report should be preserved and filed as official documentation. Physical evidence, witness statements, reports, photographs, and audio and video recordings of the incident should all be preserved for future reference. If the actual physical evidence cannot be preserved, it should be carefully examined, photographed, and documented for archival purposes.

In many cases, the information gathered by the LODD Investigation Team is considered a public record. Each jurisdiction should have policies in place to determine which documents and records need to be retained and how they are to be preserved. Documents that are required to be retained may include notes, transcripts, recordings, photographs, video and audio recordings, drafts, electronic documents, and electronic mail messages related to the incident and the investigation. LODD Investigation Team members should consider every document related to the investigation to be subject to discovery and review.

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CHAPTER 3

PREPARATION & PLANNING

Every fire department should be prepared for a situation that calls for an incident analysis investigation to be conducted. Advance planning and preparations will help to ensure that an LODD Investigation may be initiated without delay, when and if, it is ever required. Appropriate planning and preparations will also ensure that the investigation will be thorough and unbiased.

Preparation begins with having an absolute commitment that a comprehensive investigation will be conducted if any incident results in a line-of-duty death or a serious injury to a fire department member. Labor and management should be in full agreement that an investigation will be conducted, and the policies and procedures should be established and agreed-upon before the need arises. The authority having jurisdiction over the fire department (municipal government, fire district, or other governing body) should be aware of and support the investigation policy.

The purpose of the investigation should be clearly stated. An LODD Investigation is specifically directed toward determining what happened to cause the occurrence and what needs to be changed to prevent a future occurrence. The fear that an investigation could reveal damaging information must never stand in the way of determining what went wrong and taking steps to prevent a similar occurrence in the future. There is no outcome that could be more undesirable than a line-of-duty death. Professional responsibility outweighs any fear of adverse consequences from the investigation.

LODD INVESTIGATION PLAN

The basic policies and procedures that will be followed to initiate and conduct an LODD Investigation should be established and updated on a periodic basis. The plan will ensure that the fire department is prepared to initiate the investigation process without delay if the situation occurs.

The Fire Department Safety Officer (or Health and Safety Program Manager) is usually responsible for developing the plan and managing the preparations. If the fire department does not have a Safety Officer or Health and Safety Program Manager, the Fire Chief may appoint someone from within the fire department or from outside the fire department to manage the investigation. The Fire Department Safety Officer (or appointed investigation manager) is responsible for:

- Advising management on investigation policy and standard operating procedures.
- Ensuring that training is provided to individuals who may be called-upon to participate in an investigation.
- Maintaining a roster of members who have been trained and have expertise in various areas.
- Developing and maintaining investigation team response kits.
- Ensuring that informational resources and contact people are accessible.

ASSIGNMENT OF THE INVESTIGATION TEAM

An LODD Investigation is often conducted in two phases. The initial phase involves immediate response of trained and qualified individuals to secure the incident scene, preserve evidence, identify witnesses, and obtain preliminary statements. These actions should be initiated immediately upon notification that an incident requiring an LODD Investigation has occurred.

The second phase begins when the team is assigned to conduct the full investigation. The transition from initial response to on-going investigation should occur as soon as possible, allowing for enough time to select the appropriate leader and team members and ensure they are available for the time that will be required to complete the assignment.

A core group of LODD Investigation Team members should be pre-selected and trained to perform both roles. There should be representation of both labor and management within this core group, and the members should provide a wide range of experience and expertise, with a special emphasis on fire fighter safety and health. The method of selecting members for the on-going Investigation Team should also be agreed upon by labor and management.

A comprehensive LODD investigation typically requires a team of at least three to five members to gather and process all of the necessary information and develop the report. The LODD Investigation Team should include members who have the necessary expertise and perspective to examine all of the aspects that are pertinent to the occurrence – the specific requirements will vary depending on the nature and circumstances of the situation.

The recommendation of three to five team members is a guideline. The team has to accomplish numerous tasks and often requires individuals with a range of skills, expertise, and experience. At the same time the team should not be so large that it becomes difficult to manage and coordinate activities. Additional individuals may be called upon to assist the LODD Investigation Team with different aspects of the investigation or to provide special expertise.

The duration of the project will depend on the nature and complexity of the situation. A major investigation often takes several months to complete and usually requires the team members to be released from their regular duties and assigned full-time to work on the project. The team members should be appointed by the Fire Chief, generally with the concurrence of the IAFF local president.

A large fire department may have the internal capability to pre-select and provide training (see Chapter 4) for a sufficient number of members to conduct most LODD investigations internally. Members who have the appropriate skills and qualifications, depending on the nature of the incident, should be assigned to the project for the time that is required to conduct the full investigation.

Smaller fire departments often have to seek outside assistance for certain aspects of an investigation. The plan could involve obtaining the assistance of trained and experienced members from neighboring jurisdictions, or from other agencies and organizations. The LODD Investigation Team could be established as a multi-jurisdictional asset, with members drawn from several different agencies. Several state and/or regional response teams have been established to provide assistance to a fire department that experiences a critical incident. The regional team may be called upon to conduct the immediate on-scene aspects of the investigation or, in some cases, to conduct the full investigation.

It is often advisable to include one or more members from outside the organization on an investigation team. Outside participants can often look at an issue from a different perspective and identify factors that are easily overlooked by team members who are influenced by common experiences or a particular mindset. In addition, outside participants can often provide expertise that may not be available internally, including experience with similar situations or in conducting this type of investigation.

INITIAL INVESTIGATION

The initial steps of an investigation should begin immediately when there is an occurrence at an incident scene that involves a fire fighter fatality or serious injury.

The Incident Safety Officer (or investigation manager) is usually designated to initiate the first steps of an investigation. There are several steps that should be undertaken without delay, before important evidence is lost or contaminated. The plan should provide for the immediate response of additional trained and qualified individuals to the scene to gather evidence, obtain witness statements, and conduct initial interviews.

The response team members should be issued kits or should have immediate access to supplies and equipment that will be needed during the early stages of an investigation. The kits should include cameras, audio recorders, note pads, measuring tapes, gloves, and bags or containers for securing physical evidence.

ASSIGNMENT OF THE FULL LODD INVESTIGATION TEAM

The full LODD Investigation Team should be assembled as promptly as possible after the incident occurs. The time period could range from a few hours to a few days, depending on the circumstances. If possible, all of the team members should be appointed quickly enough to participate in evidence collection at the incident scene and conducting initial witness interviews. The full team should include at least one of the individuals who participated in the immediate on-scene phase of the investigation.

TEAM STRUCTURE

An LODD Investigation Team should be assembled based on the needs of the particular situation. The suggestion of three to five team members is based on a balance between the volume of work that needs to be accomplished, the range of skills that may be required, and the ability to effectively coordinate the work team. Different situations will require individuals with experience in different areas, such as operations, training, strategy and tactics, apparatus maintenance, crash reconstruction, protective clothing, building construction, code enforcement, communications, or many other subject areas. The team could include more than one member with expertise in a particular subject and in many cases one individual can provide the required expertise in more than one area. Consideration should be given to including members of various ranks. This is especially true when an investigation focuses on the actions of company and/or command officers. There may be a perceived bias by of an investigation team comprised solely of officers.

An LODD Investigation Team Leader should always be assigned to manage and direct the investigation. In most cases the leader will have a role in identifying the particular roles that must be filled and selecting qualified individuals to be assigned to the team. The LODD Investigation Team Leader should select an LODD Investigation Coordinator to serve as an assistant and perform important administrative and organizational functions as described in the following sections.

The following illustration provides a generic example of an organizational chart for an LODD Investigation Team. It is not intended to prescribe a structure for any particular investigation.

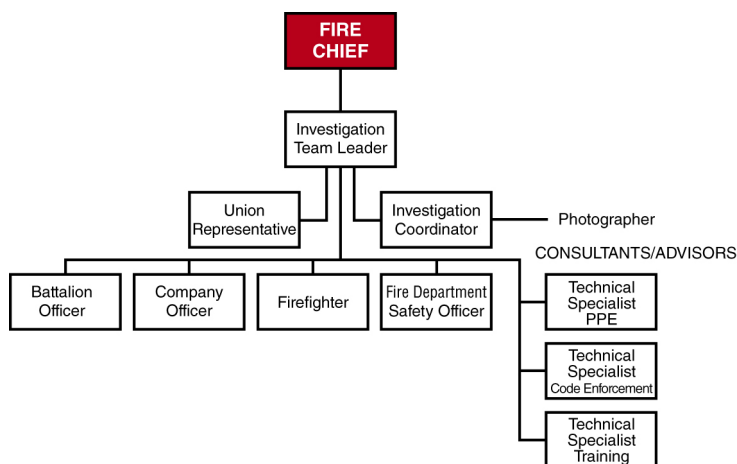


Figure 3.1 Organizational Structure for an LODD Investigation Team

LODD INVESTIGATION TEAM LEADER

The LODD Investigation Team Leader should be appointed by, and report directly to, the Fire Chief or the authority having jurisdiction over the fire department. This selection should be made in consultation with the IAFF local president. When the team's findings and recommendations are produced, they are delivered by the LODD Investigation Team Leader to the Fire Chief or the authority having jurisdiction.

The LODD Investigation Team Leader should have an appropriate rank within the fire department to ensure that his/her authority to conduct the investigation without interference will not be challenged. The appointment of an LODD Investigation Team should automatically include delegation of the functional authority that is required to perform an independent investigation; however assigning a ranking individual as the LODD Investigation Team Leader generally makes it easier to get things done in a paramilitary organization such as a fire department.

There should be no question that the designated LODD Investigation Team Leader is authorized to seek information, interview witnesses, impound evidence, and engage in any other reasonable activity that is required to conduct the investigation. This authorization extends to all of the team members as long as they are performing their assignments under the supervision and with the approval of the LODD Investigation Team Leader.

The LODD Investigation Team Leader provides direction and ensures the continuity of the investigation process. The LODD Investigation Team Leader should have management and supervisory experience to guide the team through the steps of the process from the on-scene investigation to the issuance of a final report. The LODD Investigation Team Leader should also have the ability to balance diverse and competing interests, as well as a strong background in fire department operations.

The LODD Investigation Team Leader's responsibilities include:

- Assume the responsibility for security and control of the incident scene from the Incident Commander.
- Conduct an orientation for the LODD Investigation Team at the incident scene.
- Ensure that the scene is fully examined, documented, and photographed.
- Ensure that physical evidence is properly documented, secured, and preserved.

- Approve the removal of evidence from the incident scene to a secure location.
- Determine the resources and disciplines needed to conduct the investigation and make recommendations for team members – this may involve temporary reassignments from their normal duties.
- Determine and obtain the resources needed to conduct the investigation.
- Conduct an orientation for the LODD Investigation Team at the beginning of each step in the investigation process.
- Provide coordination with other investigating agencies or bodies, including the exchange of information where appropriate.
- Review the progress of team members and re-allocate resources or modify assignments as necessary.
- Approve and direct any scene reconstruction, computer modeling, or technical examination of evidence.
- Coordinate the analysis and the development of conclusions and recommendations.
- Oversee the development and delivery of the final report.

The LODD Investigation Team Leader is also responsible for keeping the Fire Chief, or the appointing authority, informed of the progress of the investigation. A positive labor-management relationship calls for the IAFF local president or a designated representative to be included in the reporting process. Regularly reporting progress does not imply that the Fire Chief and a union official will be informed of every detail of the investigation while it is being conducted. They should be aware of overall progress and any major developments, particularly if the investigation reveals issues that require urgent attention.

The LODD Investigation Team Leader must have the trust of the Fire Chief and the IAFF local president. Equally important, is the trust of fire department members in the LODD Investigation Team Leader and in the LODD investigative process. Information must be provided to fire department members early in the process that explains the purpose of the investigation, asks for cooperation with the LODD Investigation Team, and assures members that the results of the investigation will be made public. This message is best delivered jointly by the Fire Chief and the IAFF local president.

INVESTIGATION COORDINATOR

The LODD Investigation Coordinator serves as an assistant to the LODD Investigation Team Leader. The LODD Investigation Coordinator should have management/administrative skills and experience, should be well-versed in fire department organization and operations, and should fully understand the investigative process. The coordinator's job functions are vital to the efficient operation of the team, especially for large and complex investigations. (The duties of the LODD Investigation Coordinator could be performed by the LODD Investigation Team Leader for a small scale investigation.)

The LODD Investigation Coordinator's job functions include:

- Maintain continual familiarity with the team members' assignments and work progress.
- Advise the LODD Investigation Team Leader of significant aspects of the investigation.
- Maintain a log of all investigation activities.
- Manage the information obtained and assembled by the team members.
- Monitor the preservation and chain-of-custody for evidence.

- Coordinate activities with outside investigating agencies (e.g., law enforcement, coroner's office, OSHA, NIOSH).
- Supervise and/or coordinate the work of outside specialists or experts who are assisting in the investigation.
- Ensure that adequate work areas, transportation, computers, and other resources are available to the team members.

SAFETY SPECIALIST

The safety specialist should be a qualified and experienced safety officer (Health and Safety Officer or Incident Safety Officer) and a member of the fire department's health and safety committee. In many cases this position will be assigned to the Fire Department Safety Officer or to a member of the Health and Safety staff. The safety specialist should have a good working knowledge of applicable federal, state, and provincial occupational safety and health regulations (e.g., OSHA) and fire service standards (e.g., NFPA standards) and should be aware of all ongoing safety policies, procedures, programs, and issues within the department. During the investigation, the safety specialist should share this particular knowledge with the team members and conduct any research that is needed in these areas.

The safety specialist should also have information relating to inspection and testing procedures, as well as sources of technical expertise and assistance. The safety specialist should also function as the safety officer for the LODD Investigation Team, particularly for the on-scene phase of the investigation.

LODD INVESTIGATION TEAM MEMBERS

The core of the LODD Investigation Team is usually assembled by assigning fire department members who have both technical knowledge and experience in areas that are pertinent to the investigation. The particular combination of individuals included on the team will depend on the nature of the incident that is being investigated and the subject areas that must be addressed. Individual team members often have expertise in more than one area and more than one member could be very knowledgeable in the same area(s).

LODD Investigation Team members should be chosen by the Fire Chief in consultation with the IAFF local president and the LODD Investigation Team Leader. The makeup of the team is important and the selections made will telegraph the importance and validity of the team to the members of the fire department and to others concerned with the LODD incident.

Team member responsibilities include:

- Identify and interview witnesses.
- Photograph the incident scene and significant evidence.
- Sketch and measure the incident site and the location of significant elements.
- Construct maps, diagrams, and incident time lines.
- Collect and examine all pertinent documents, records, or logs.
- Collect, identify and secure all pertinent equipment including the SCBA and PPE worn by the victim(s). Failure to properly secure equipment and PPE may adversely affect the investigation and can result in situations where accurately identifying the condition and function of equipment becomes difficult, if not impossible. For example, in cases with multiple victims, each piece of PPE needs to be accurately identified and labeled

to avoid mixing the different articles used by different victims.

- Report progress to the LODD Investigation Team Leader or Coordinator.
- Assist in the analysis of information to determine the causal factors of the incident.
- Assist in developing conclusions, recommending preventive measures, and drafting the report.

TECHNICAL SPECIALISTS AND CONSULTANTS

Individuals with special qualifications are often called upon to assist the LODD Investigation Team as technical specialists or consultants. The LODD Investigation Team Leader should not hesitate to obtain expert assistance when the technical demands of an investigation exceed the capabilities of the team members. Professional expertise could be needed to evaluate medical evidence, examine protective equipment, evaluate the construction of a building, or review apparatus maintenance practices. The assistance could come from a member of the fire department or from someone outside the organization.

Technical specialists and consultants usually perform a limited role within the investigation process, concentrating on a particular aspect of the overall situation and delivering their observations and conclusions to the regular team members. They could be asked to submit a findings report that becomes a part of the official incident documentation. Technical specialists and consultants are often involved for a short period of time, although they could be consulted on multiple occasions during the course of an investigation.

Experienced law enforcement officers can often provide an excellent source of investigation expertise, particularly in regard to collecting and preserving evidence, documenting an incident scene, and conducting interviews. An experienced fire investigator or police detective should be assigned as a technical specialist if these skills are not available within the LODD Investigation Team membership.

Outside experts may be found through local contacts or through national fire service organizations (including the IAFF and the IAFC) and government agencies (such as NIOSH, USFA, and NIST). Universities can often provide highly qualified experts to examine complex problems. The use of technical experts greatly enhances the impartiality of the investigation. It is beneficial to identify experts and develop working relationships in advance.

FACILITIES

The LODD Investigation Team will require a secure facility to use as a base of operations. In many cases this requires commandeering a conference room, or a section of office space, at a fire department facility for the duration of the project. The space should provide work areas for the team members, a private area for conducting interviews, computers, telephones, and space to examine plans, review documents, and post information. The area should be locked and only persons authorized by the LODD Investigation Team Leader should be permitted to enter. A secure location to store physical evidence will also be required for most investigations.

The Fire Chief should ensure that the LODD Investigation Team is provided with unrestricted access to supplies and equipment that are needed to complete their assignment. One or more vehicles may have to be assigned to the team to provide transportation.

BUDGET ALLOCATION

Most fire department budgets do not set aside funds to pay for an LODD Investigation or for associated costs. The Fire Chief will usually have to make arrangements to allocate funds and authorize unanticipated expenditures to cover the cost of the investigation. The justification for such expenditures is generally self-evident.

CHAPTER 4

SELECTION & TRAINING

The selection and training of LODD Investigation Team members is critical to the success of any investigation project. The team that is assembled to conduct an LODD investigation will face a set of challenging tasks that almost invariably have to be accomplished under highly stressful conditions. The qualities of each investigator will influence the dynamics of the team and the success of the investigation.

There is no time to send the LODD Investigation Team members for training after an incident has occurred. Qualified individuals should be identified and selected to participate in a training program before an incident occurs. Ideally, there should be two or more individuals prepared to fill each position on a team, recognizing that circumstances may stand in the way if there is only one trained and qualified person.

Pre-selecting qualified team members and providing them with appropriate training and resources will ensure that a capable team may be assembled quickly when the need arises. The selection process should include input from both labor and management to set a cooperative, goal-oriented tone for the investigation.

QUALITIES OF AN INVESTIGATOR

The highest degrees of professionalism and discretion are required to conduct a comprehensive and unbiased investigation of a complex incident. The team should include a balanced blend of individuals with complementary professional skills. Certain personal attributes describe the qualities of successful investigators:

- *Integrity* – Truth and honesty are the investigator’s best allies. Conclusions based on fact will not be faulted.
- *Communication skills* – Investigators will interact with many people during the investigation. They must be able to effectively convey ideas, questions, and instructions.
- *Sound judgment* – When evidence and testimony are collected, the investigators must be able to distinguish between relevant and irrelevant information, facts and opinions, truth and fiction.
- *Tact and diplomacy* – Internal investigations require a great deal of skill and restraint when determining how to handle the complex personnel issues that arise.
- *Experience* – The LODD Investigation Team should include individuals who have knowledge and practical experience in the areas that will be investigated, as well as members with training and experience in conducting investigations. The combined qualifications of the team members should incorporate the full range of experience that is required. Formal incident investigation training combined with practical experience will produce the most capable investigators. Every completed investigation contributes to an investigator’s skills, as well as an awareness of their own capabilities and limitations. An understanding of those limitations allows an investigator to determine when assistance is needed and whether the situation requires an experienced specialist, a skilled technician, or an outside expert to consult with the team.
- *Motivation* – Investigators must understand that lives and careers may depend on their thoroughness. Investigators must have a strong desire to find the truth.

- *Curiosity* – The investigator must have a driving desire to discover all the facts that can be learned about the incident. The investigator must be able to go beyond easy answers and find the root causes of the incident.
- *Analytical ability and writing skills* – Evidence must be gathered, as well as explained. The investigator must have the ability to visualize possible scenarios and correlate the factual evidence that is uncovered to confirm or eliminate the envisioned possibilities. The written investigation report must be clear and concise.
- *Perseverance* – In order to accomplish the investigation goals, the team member must be capable of dealing with conflicting evidence, special interest pressure, excessive workload, institutional indifference, and many other discouraging factors.
- *Meticulousness* – Every detail must receive attention to discover any possible significance.
- *Empathy* – Evidence and testimony are best gathered and evaluated when the investigator understands the views of the participants and witnesses. People will feel more comfortable if they believe that the investigator can relate to them.
- *Organization* – The management skills of the LODD Investigation Team Leader and all team members facilitate the investigation process. Investigations can generate large quantities of evidence and testimony, so good organizational skills are required to ensure that all evidence is given appropriate consideration. The investigative process requires the team members to always strive to separate facts from rumors, emotions, and opinions. Many investigations are conducted under circumstances where these distractions are powerful, and strong personal feelings may have to be set aside to get the job done properly. Fire department members who are assigned to an LODD Investigation Team may be placed in the difficult position of examining the actions of friends, co-workers, and superior officers. The personal integrity of the team members must be beyond reproach in order to establish and maintain the credibility of their efforts.

INVESTIGATOR TRAINING

Training will help the potential team members prepare for a situation that could occur at any time. The training should focus on the purpose of an investigation, as well as the policies, procedures, and techniques involved in conducting an investigation. The training should include:

- The department's investigation philosophy, policies, and purpose.
- Standard operating procedures for conducting an investigation.
- Investigation team organization and task responsibilities.
- Investigation aids, resources, and equipment available to the team.
- Evidence collection and preservation techniques.
- Chain of custody requirements.
- Witness identification and interviewing techniques.
- Analysis and investigation techniques.
- Sources of outside assistance and technical expertise.
- Elements of a completed LODD Investigation report.
- Media relations.

Representatives of other agencies that are likely to be involved in an investigation should be invited to participate in the training. This should include local law enforcement, fire cause and origin investigators, ATF, OSHA, the coroner or medical examiner, and any other federal, state

or provincial agency that is likely to be involved in an incident that the LODD Investigation Team would be expected to investigate. Training with such agencies will create a mutual understanding of each other's roles and responsibilities and help to avoid interagency conflicts that may arise during an investigation.

In many cases, the representatives of different agencies can provide parts of the training that is required for the fire department LODD Investigation Team members. Many of the skills that are needed to conduct an investigation are easily transferable or adaptable and the agency representatives often have extensive experience as investigators within their particular areas of expertise. Learning about their proven techniques and procedures could help to alleviate many of the stresses and anxieties that often confront investigators when they are assigned to their first real investigation.

INCIDENT SIMULATION

The training program should include a full scale simulation of an incident scene to provide the members with an opportunity to practice the skills that are included in the curriculum. The team members should practice securing a scene, conducting the on-scene examination, documentation and photography techniques, managing physical evidence, and related skills that are rarely employed by most fire fighters. A realistic scenario can be set up by referring to a report of an incident that occurred previously (possibly in another jurisdiction) and recreating it as closely as possible.

The simulation should include interviewing "witnesses", who are given key elements of information, and role play in a manner that could be expected of real witnesses. The performance of the team can be evaluated by reviewing the information that has been collected at the completion of the exercise. All of the team members should participate in the exercise.

Members of other agencies should be invited to observe or participate in the simulation. A full-scale simulation, involving all of the agencies that would participate in a real incident, can provide extremely valuable training for everyone involved.

Simulation suggestions include:

- Select a scenario based on an actual incident.
- Simulate apparatus placement and fireground tactics.
- Create sets of facts for "witnesses" to tell investigators during mock interviews.
- Set-up sample protective clothing and equipment to practice inspection and chain of custody procedures.
- Prepare a sample press release and practice media interviews.
- Draft an outline of a sample LODD Investigation report.

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CHAPTER 5

INITIATING AN INVESTIGATION

Time is of the essence when an incident that calls for an investigation occurs. The preliminary steps of preserving evidence and obtaining witness statements should be initiated immediately. Valuable evidence and information may be lost if the appropriate steps are not taken during the critical period immediately after the occurrence. Pre-designated individuals should be dispatched to begin this process as soon as the possibility of an LODD situation is recognized.

The LODD investigation process should be initiated without delay when a fatality or serious injury occurs at an incident scene. It is often very difficult to focus on the investigation when a fire department member has been killed or seriously injured at an incident scene. Situations of this type always produce high levels of stress, and often prompt emotional reactions among the individuals involved in the incident. Members on the scene are likely to be preoccupied with injured fire fighters and whatever unanticipated situation may have occurred, as well as the incident that was already in progress.

The Incident Commander should initiate the process by ensuring that the immediate area is isolated, secured, and the appropriate individuals are notified to respond. The primary objective at this time is to preserve any physical evidence that could be important to the investigation. Potential witnesses should also be identified.

The Incident Safety Officer (ISO) should be assigned as an interim LODD Investigation Team Leader until additional qualified personnel can be assembled at the scene. The ISO should request additional resources (individuals or companies) as needed to assist in securing the scene until additional LODD Investigation Team members arrive.

The ISO should then begin capturing information, securing physical evidence, and obtaining a list of all the people who were directly involved in the incident, witnessed the incident, or may have useful information about the incident.

The appropriate fire department personnel, including the Fire Chief and senior command officers and pre-designated members of the LODD Investigation Team should be notified immediately.

The Incident Commander and fire department management should assure that immediate family members of the affected personnel are notified as soon as possible, and before any names are released to the news media. The evolution of television news, the internet, and wireless telephones have made the traditional means of family notification less effective. The arrival of a fire department chief officer at the home of an injured or deceased fire department member may no longer be the first notification of the family, but an official notification is usually both proper and desired by the family.

ON-SCENE RESPONSIBILITIES

As quickly as additional team members can respond to the scene, the procedures described in this manual should be initiated. The LODD Investigation Team Leader should assume the responsibility for managing the investigation. (An interim leader could be assigned until the permanent LODD Investigation Team Leader is officially appointed.) The LODD Investigation Team Leader will brief and assign the additional team members and take responsibility for the immediate incident scene. The LODD Investigation Team Leader must also coordinate actions with the Incident Commander.

The full examination of the incident scene (Chapter 6) should not begin until an adequate number of team members have arrived to conduct a thorough examination. The priority, at this stage, is to capture any information that could change or become unavailable before the detailed examination occurs. A series of photographs (and/or video) should be taken at the first opportunity to obtain the earliest possible images of conditions, in case anything is inadvertently moved or conditions change before the detailed scene examination can take place.

The LODD Investigation Team Leader should assign one member to start a log book to document events as they occur. The log should be maintained for the duration of the investigative process.

The team members should attempt to identify all witnesses or potential witnesses who are at the scene. Brief preliminary statements should be obtained, if possible, particularly from anyone who was directly involved in the incident, with the understanding that they will be contacted later for a detailed interview. Obtaining initial statements from witnesses prior to sharing information should be given the highest priority, with rare exceptions. The stress and emotions involved when a fire department member has been killed or seriously injured can be overwhelming and must be taken into consideration. There may be significant pressure to immediately involve behavioral health specialists, counselors and/or the Critical Incident Stress Management (CISM) Team. As a part of the CISM process, fire fighters may speak about the circumstances of the incident or the fire fighter injury or death. If the fire fighter speaks in the presence of other fire fighters that provide witness statements after the CISM, the comments of one fire fighter may impact the recollection of the incident by other fire fighters. The health and well-being of the member must be the primary consideration.

The initial statements may be handwritten by the witness, recorded, or in the form of notes taken by an investigator. It is especially important to ask fire fighters that were on scene to write down their recollections of the incident as soon as possible.

Law enforcement officers and EMS personnel, as well as civilian witnesses (neighbors, passers-by, fire buffs, news reporters) and anyone else who could potentially have information, should be contacted at the scene. Identification information (name, address, cell and home telephone numbers, and e-mail addresses) should be obtained from each witness. The investigator should also ask these individuals if they are aware of any other potential witnesses who might have already left the scene. Witnesses should be asked if they have taken any photographs or video of the incident (cell phone, camera). If these images or video exist, arrangements should be made to obtain them.

If an injured member has been transported to a hospital, one of the team members should respond to that location to begin gathering information and take custody of any physical evidence that went to the hospital. The ambulance that was used to transport the patient should also be checked for physical evidence, particularly items of protective clothing. If the injured fire fighter or other members at the hospital are able to provide preliminary statements, their recorded or written statements should be obtained.

CONDITION OF PROTECTIVE CLOTHING AND EQUIPMENT

Some of the most significant information in many investigations involves the condition of a fire fighter's protective clothing and equipment at the time the incident occurred. This information is often very difficult to obtain, particularly if the fire fighter was injured and removed from the scene for medical treatment. When an injured (or potentially deceased) fire fighter is located, moving the victim to a safe location and initiating lifesaving actions are unquestionably the highest priorities. The issue of recovering the victim's body versus leaving the body in place

for an extended period of time is an emotional and trying experience for those involved. When possible, do not move the victim's body until the scene can be properly documented through photographs and measurements (in some cases, this may include GPS coordinates).

The LODD Investigation Team should be particularly interested in determining whether the protective clothing and equipment performed as expected, or if there is any possibility that it could have malfunctioned. Several factors must be determined and documented to ensure that the investigators will have good and reliable information -- whenever possible.

All fire department members should receive awareness training to emphasize the importance of capturing this information. They should be encouraged to try to capture as much information as possible if they are ever involved in removing an injured fire fighter from an incident.

The critical information includes:

Self-Contained Breathing Apparatus

- Face piece in place?
- Regulator attached to face piece?
- Mainline valve (if equipped) open or closed – mark position?
- Bypass valve open or closed – mark position?
- Low-pressure alarm activated?
- Air pressure remaining in cylinder (do not empty cylinder – mark valve position and close)?

PASS Device

- Turned-on?
- Activated?
- Sounding/lights flashing?
- Position of switches and knobs marked?

Portable Radio

- Turned-on?
- Proper channel?
- Emergency button activated?
- Battery condition?
- Position of switches and/or knobs marked?

The radio should be tested in transmit and receive modes when it is found; then the battery should be removed. No switches or settings should be changed. The radio and battery should be placed in evidence bags or containers.

All items of protective clothing and equipment involved in an incident should be removed from service, secured in a safe location, and turned over to the LODD Investigation Team at the earliest opportunity. The items should be inventoried, for evidence tracking purposes, and retained for subsequent examination and testing.

SUPPLIES AND EQUIPMENT

Each team member responding to the scene will need basic supplies and equipment during the initial stages of an investigation. Kits may be carried in designated vehicles, such as the Safety Officer's response vehicle, or issued to members as a "go bag". The kits may include:

- Log book.
- Note paper.
- Laminated paper (use during inclement weather).
- Graph paper.
- Departmental forms.
- Pens, pencils, color pencils, grease pencils.
- Digital camera.
- Digital audio recorder.
- Tape measure.
- Chain of custody forms/tags.
- Plastic bags for evidence collection.
- Flashlight or handlight.
- Extra batteries for camera, voice recorder, flashlight.
- Gloves (leather, rubber, heavy duty, latex gloves, non-latex or Nitrile).

CHAPTER 6

INCIDENT SCENE EXAMINATION

The first challenge facing the LODD Investigation Team is to determine what happened to cause the death or serious injury of a fire fighter. In many cases the only individual(s) who could explain what happened is(are) unable to testify – for obvious reasons. Careful examination of the incident scene is an essential step in the investigation process.

PRESERVING THE SCENE

When a fatality or serious injury occurs at a fire scene, the Incident Commander should immediately assign fire department members to secure the scene and ensure that no evidence is removed or disturbed. The entire incident scene should be considered valuable evidence, and care should be taken to preserve everything in place until the LODD Investigation Team can conduct a thorough examination, documentation process, and gather physical evidence.

Improper preservation of the scene may result in the contamination, loss, or movement of important physical evidence. Access to the fire scene must be limited to authorized personnel who have an absolute need to enter. Everything that can be left in place should remain undisturbed, including apparatus, hose lines, ladders, tools, and equipment. Fire crews are naturally inclined to gather and store all of the equipment used off of their apparatus during an incident. The Incident Commander needs to get a message to all crews on the scene to leave their equipment in place until ordered to retrieve it.

Scene security should be maintained by fire fighters or police officers assigned to this duty. The responsibility of securing the scene should be transferred to the LODD Investigation Team Leader at the first opportunity; although the security measures established by the Incident Commander are often maintained.

The LODD Investigation Team should retain custody of the incident scene for as long as it takes to conduct the examination. In many cases, this requires assigning a fire company, law enforcement officers, private security guards, or a team member on site at all times for several days. The scene should only be released when the LODD Team Leader is confident that every potentially-valuable fact has been captured and documented.

EXAMINING THE INCIDENT SCENE

Detailed examination of the incident scene is a critical step in the process of determining what and how it happened. The LODD Investigation Team should work toward five major objectives in conducting the incident scene examination:

- Produce maps, diagrams, and photographs of the incident scene.
- Document the locations and positions of items within the incident scene.
- Capture information relating to the condition and status of items as they are located.
- Identify and secure items to be removed from the scene for further examination.
- Obtain additional information relating to the incident scene and items found at the scene.

The detailed examination of the incident scene should not begin until an adequate number and combination of team members have been assembled. The team should include at least one member who is looking for evidence and making observations, a note taker, and a photographer. A well-coordinated team could include two “observers,” a note taker, a photographer, and a specialist in taking measurements and plotting locations as evidence is identified.

Safety for the LODD Investigation Team should also be assured. It is important to leave the incident scene as undisturbed as practical until it has been examined. Some modifications of the scene, such as structural bracing and water removal, may need to take place so that the LODD Investigation Team can operate more safely.

The primary objective of the incident scene examination is to look for evidence that will help the investigators determine what happened. In many cases the LODD Investigation Team begins the scene examination with only a general notion of what happened. Their task is to capture information that will help them figure out:

- What was the situation?
- Did the situation change or evolve?
- Where the fire fighters were located?
- What they were doing?
- What went wrong?

The investigators should be looking for any evidence that will help them determine what was occurring, in terms of fire behavior, structural conditions, and other environmental factors that could have contributed to the sequence of events. They also need to determine, as fully as possible, what each individual who was involved in the incident was doing; where they were; what they saw; what they heard, and why they took certain actions. In addition, they should be looking for evidence that could indicate a problem with the fire fighter’s protective equipment or anything else that could have gone wrong.

The LODD Investigation Team has only one opportunity to examine an undisturbed scene. There may be dozens or hundreds of clues that could potentially be significant in the incident analysis, and it is often impossible during the early stages of an investigation to determine which information will prove to be critical. The investigators have to carefully examine the entire incident scene, trying to capture anything and everything that could possibly turn out to be significant evidence.

Details relating to the locations where apparatus, tools, equipment, and other items are found often provide very significant clues. The condition of an item, whether it is clean or dirty, on top of debris or under it, damaged or undamaged, on or off, can provide valuable information about the environment and the sequence of events.

It may be possible to go back to the scene to have another look as the investigation progresses, but any evidence that is discovered during subsequent visits would be considered “contaminated.” Factors such as room dimensions and building construction do not change; however items inside a building may be moved, or their physical condition could change with time. The detailed scene examination should be conducted at a time when every aspect is as close as possible to the condition when the incident occurred.

INCIDENT SCENE DOCUMENTATION

Incident scene documentation refers to a systematic process of recording the investigator's observations in a manner that captures and preserves valuable information. Methodical documentation of the incident scene allows the investigators to recall observations and confirm details at a later date. The investigators will continually refer back to the information that is obtained during the scene examination as the analysis is performed, various theories are considered, and conclusions are developed and supported.

Documentation methods include written notes, audio notes, photographs, video, sketches, diagrams, and maps. Digital cameras and recording devices, global positioning systems (GPS refers to a technology for determining locations using signals broadcast from a network of satellites). A GPS receiver determines its location (latitude, longitude and elevation) by comparing signals transmitted by GPS satellites that orbit Earth, geographic information systems (GIS integrates hardware, software, and data for capturing, managing, analyzing, and displaying all forms of geographically-referenced information) and optical plotting systems have greatly enhanced the ability to capture and display information. A team member who has been trained in the use of GPS and GIS can be an invaluable asset during the scene examination. If these capabilities are not available within the team, skilled assistance can often be obtained from a law enforcement agency.

The scene examination should be conducted methodically; first photographing, mapping, and diagramming the overall scene, and then working inward to the area(s) of greatest interest. Photographs (and video if possible) of the overall scene should be taken before the investigators begin to closely examine specific items. (Refer to Annex A2)

MAPPING THE INCIDENT SCENE

The goal of mapping (or diagramming) the incident scene is to record the positions of people, tools, apparatus, and elements of the physical environment. Drawings are the most common method of recording locations. The first step is to obtain basic details of the incident site, including roads, buildings, hydrants, and other physical features.

The site plan should provide details such as:

- Apparatus placement.
- Exterior hose line locations and size, note the position of hose line entry into buildings.
- Command post location.
- Building dimensions.
- Location of windows and doors (direction of swing).
- Entry and exit points.
- Changes in elevation.
- Accessible/inaccessible areas.
- Location of utility services - gas meters, electrical service entrances, utility poles, etc.

Photos and videos should be taken to fully document the overall site, including images of all sides of a fire building. Images obtained from an aerial apparatus or aircraft can provide an excellent overview of the scene, showing apparatus positions and clearly indicating exterior damage.

The availability of GIS maps and aerial photographs for many areas allows the investigator to capture basic landmarks on the scene and then transfer the information to a very accurate base map of the area. A portable GPS device can capture the exact digital coordinates of any point, if the necessary satellite signal is available to the receiver. (GPS may not work inside buildings or in locations where the receiver does not have a clear path to satellites.)

If GIS maps and data (or equivalent non-digitized maps) are not available, the investigator may have to obtain sufficient information on the scene to produce a site plan or sketch.

Additional sources of site and building information are the local tax assessor, building department, county recorder, and internet sites such as Google Earth, Microsoft Virtual Earth, and Pictometry. These sources may provide photographs of a building over time so changes in the configuration of the building may be determined.

BUILDING DETAILS

The LODD Investigation Team should also capture information relating to building construction, interior arrangement, and contents. The arrangement of rooms, corridors, stairways, doors, windows, and similar features should be noted and diagrammed. If there are no building plans available, the investigators will have to create one by measuring and recording the details of the building (or at least the part of the building that is pertinent to the investigation) in sufficient detail to produce a plan or sketch.

The level of detail required in the drawings depends on the situation and the judgment of the investigator. As a minimum, the investigator should produce a basic sketch, showing the relative locations of rooms, stairs, windows, doors, and associated damage. A freehand diagram may be made in the field and then enhanced by transferring the dimensions to a drawing program, such as Microsoft VISIO.

In many cases details that are captured at the incident scene will be supplemented by information that can be obtained from other sources, such as building plans that are on file with the property inspection records. Technical details for items found at the incident scene may be researched later.

The scene examination should make note of:

- Building construction.
- Building dimensions.
- Building occupancy.
- Interior arrangement.
- Contents.
- Locations of doors and windows (open/closed & broken/intact).
- Locations of ventilation openings.
- Areas of debris.
- Areas of structural damage.
- Areas damaged by the fire.
- Areas indicating heat and/or smoke damage.
- Indications of the path of fire spread.
- Major features of rooms, including furniture.

- Smoke detectors (including type, location and operability)
- Building documents, including past inspections.
- Incident management structure at the time of the incident.
- Incident manager and location at the time of the incident.
- Adverse environmental conditions (night, wind, rain, snow).
- Construction drawings: drafted drawings with extensive detail showing what was used by contractors to build the structure.
- As-built drawings: drafted drawings showing any field modifications to the construction drawings and reflecting the finished structure.
- Deployment drawings: documenting the location of victims, personnel, apparatus, and equipment.

EVIDENCE LOCATION MAPPING

The LODD Investigation Team should plot the exact locations of all evidence that is identified during the detailed examination of the site. In many cases, location details can be measured and referenced to fixed landmarks, such as distances from walls and doorways. Information that is obtained in the field may be transferred to a detailed building floor plan at a later date.

Optical plotting instruments can be used to produce very accurate diagrams and pinpoint locations inside buildings where GPS devices cannot receive the satellite signals. This data can also be referenced to GPS coordinates by measuring distances from a fixed point where the satellite signal is available. Many law enforcement agencies use these systems to develop interior building plans, and to plot the locations of evidence as it is located.

PHYSICAL EVIDENCE

Physical evidence refers, generally, to anything that can be observed and measured that will contribute to the understanding of something that is significant to an investigation. References to physical evidence in this chapter are primarily related to “things of interest” that are found in the process of conducting a detailed scene examination. Many different types of “things” could qualify as physical evidence in different situations. The LODD Investigation Team should be particularly focused on capturing physical evidence that could contribute to the analysis of what resulted in a fire fighter fatality or injury.

The LODD Investigation Team is responsible for locating, collecting, identifying, storing, examining, and arranging for the testing of any physical evidence that may prove or disprove a particular fact or issue.

The identification of physical evidence should always include:

- Location and position of dead or injured persons.
- Status of protective clothing.
- Status of self-contained breathing apparatus:
 - Face piece on or off.
 - Regulator on or off.
 - Positions of valves.
 - Air remaining in cylinder.

- Status of PASS device.
- Status of portable radio.
- Locations of apparatus.
- Positions of interior hose lines:
Hose size, length, dry or charged.
Nozzle type; open or closed, location.
- Locations of tools and equipment.
- Locations of pieces broken off from equipment or tools.
- Scratches, gouges, dents, or breakage related to fire fighter activity.
- Any other items that appear to be significant.

While looking for the items listed above, the investigators should also consider what could be missing from the incident scene that should be there. The fact that an item is not found at the incident scene can be as significant as the information that is derived from finding it. If parts of tools, equipment, or protective clothing are missing, they may indicate a factor that requires attention.

Each item should be photographed as it is found, before moving it or even turning it over to look at a different side. After ensuring that the “as found” information has been captured, the item can be moved to examine and photograph the opposite side. After an item is removed, the location where it was found should be photographed again to capture whatever was under it or behind it.

Physical evidence that is significant (or could be significant) to the investigation should be preserved and secured for further examination and testing. Any items that are taken from the scene should be identified and tracked as evidence, using the procedures that are used to track evidence for a criminal case. The investigators must be thoroughly familiar with chain of custody procedures and accepted methods of processing physical evidence. (Refer to Annex A3)

All items of protective clothing and equipment should be secured and preserved for further examination. (Refer to Annex A4 and Annex A5)

MAINTAINING CUSTODY OF THE INCIDENT SCENE

The LODD Investigation Team should maintain custody of the incident scene for as long as necessary to conduct their detailed examination. In many cases there is pressure to allow other investigators to examine the scene, or to release the scene to the property owner before the LODD Investigation Team has completely finished their work. Questions of incident scene custody involve complicated legal issues. An attorney should be consulted in the development of policies and procedures and the LODD Investigation Team Leader should obtain legal advice if this question arises in the course of conducting an investigation.

ADDITIONAL READING

Modern Accident Investigation and Analysis, 2nd. Ed., Ted S. Ferry, John Wiley and Sons, 1988. Chapter 1: The Need for Investigation; Chapter 3: Getting Underway with the Investigation.

NFPA 921: Guide for Fire and Explosion Investigations, National Fire Protection Association, 2008.

Professional Accident Investigation: Investigative Methods and Techniques, Raymond Kuhlman, Institute Press, 1977. Chapter 8: Diagrams, Maps and Sketches.

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CHAPTER 7

INTERVIEWING WITNESSES

Interviewing witnesses is a vital part of every investigation. The LODD Investigation Team should interview all of the witnesses who could possibly provide valuable information. Good interview techniques will often bring out information that the witnesses themselves do not recognize as important.

Witnesses should be informed that the LODD Investigation Team is trying to make a factual determination of what happened, and that the overall goal of the investigation is future accident prevention. The investigator should establish trust with each witness, stressing that the goal is not to establish blame for anything that happened. Keeping the interview as informal as possible will help establish a cooperative, relaxed environment. This includes the uniform worn by the investigator. Some interviewees have reported feeling intimidated by investigators wearing their full-dress uniforms. The information obtained in interviews conducted by an LODD Investigation Team should never be used for disciplinary purposes, and in most cases would not be admissible in any civil or criminal actions (see Witness Rights, page 48).

Witnesses should always be interviewed in a voluntary cooperative manner. The process should be open, honest, and non-judgmental of the interviewee. The goal is simply to obtain information about the incident in question. Interviews should be conducted as informally as possible, with the interviewer (or interviewers) and interviewee regarded as equals.

The interviewer(s) should never use the types of confrontational interrogation techniques that are used by some law enforcement officers dealing with criminal suspects, or lawyers confronting hostile witnesses. Devious questions, attempting to trick, trap, or antagonize the witness, will only create adversarial interactions, making the interviewee uncomfortable and less likely to share information.

The interview process consists of:

- Identifying witnesses.
- Planning the interview.
- Establishing communication.
- Obtaining initial information.
- Expanding information in selected areas.
- Evaluating witness credibility and testimony.
- Conducting follow-up interviews when necessary.

WITNESSES: PEOPLE WITH INFORMATION

Witnesses are individuals who have information that could be useful in determining what happened at the incident and why it happened. They may contribute two types of information to the investigation.

Direct information deals with events that took place immediately prior to or during the incident. Witnesses with direct information must have either personally observed or participated in the incident.

Sources of direct information include:

- Fire department members who were at the scene of the incident.
- Dispatchers who processed the alarm or handled the incident.
- Law enforcement officers that were at the scene of the incident.
- EMS responders that were at the scene and may have treated injured fire fighters.
- Building owners/occupants.
- Civilian witnesses.
- Neighbors.
- Passers-by.
- Fire buffs.
- News media personnel.

Indirect information relates to the general circumstances surrounding the incident, or technical knowledge that helps to explain aspects of the incident. This type of information is often useful in understanding the circumstances surrounding and contributing to the incident. Sources of indirect information include:

- Co-workers.
- Maintenance staff.
- Training instructors.
- Family and friends.
- Family/department physicians.
- Medical examiners.
- Technical specialists (engineers, metallurgists, NIOSH, etc.).

Additional indirect information is often obtained from sources such as building plans and permit files, maintenance records, inspection logs, medical records, training documents, and the technical specifications for equipment. In many cases, a witness can provide or explain information that is obtained from these sources.

PRELIMINARY (INITIAL) STATEMENTS

Investigators should try to obtain preliminary statements from the witnesses who are most likely to have important information as soon as possible after the incident occurs. A preliminary statement, whether it is oral or written, is simply the witness' narrative description of the incident. Preliminary statements often provide an initial orientation for the investigators as they begin to assemble information.

Time is a very significant factor in obtaining reliable information from witnesses. In most cases, the accuracy of information tends to decrease with the passage of time between the incident and the interview, particularly if the witnesses have time to discuss the events among themselves or are exposed to information from other sources.

A preliminary statement is intended to capture basic details while the information is still fresh, particularly if there are numerous witnesses and it will take time to schedule full interviews. The preliminary statement may be recorded or handwritten by the witness. The witness should be encouraged to include all details relevant to the incident, including any drawings, diagrams,

or sketches which help explain what happened. Often, the little details that seem to have no significance may help piece together the larger puzzle.

An initial statement should always be followed by an interview. Each witness should be given the opportunity to speak about the incident and clarify issues. The preliminary information may be used to structure questions or to refresh the witness' memory during the subsequent interview, particularly if the later testimony appears to be inconsistent with the statement that was obtained earlier.

CANVASSING FOR WITNESSES

The LODD Investigation Team should make an effort to identify and make contact with every individual who could be a direct witness and might possibly have valuable information. Every fire fighter and any other individual who is known to have been in the area should be contacted, even if the preliminary contact only confirms that the person did not see anything and does not need to be interviewed.

The investigators should conduct a door-to-door canvass of the neighborhood, asking neighbors and other people in the area if they were in a position to see anything. In many cases this canvassing will produce valuable photographs or videos of the incident in addition to eye witness accounts.

The investigators should also examine any photos and videos of the scene, attempting to identify anyone else who was present – particularly anyone who appears to have a camera. These images can be shown during the canvass to ask if the neighbors recognize any unidentified witness.

It may be helpful to work with the local media to run a story about the desire of the LODD Investigation Team to speak with anyone that has information about the fire, including photographs and video. Be prepared for unusual information that may be of no use to the investigation.

The investigators should ensure that all fire department members are aware that they are interested and willing to interview anyone who has information that could be useful.

PREPARING FOR THE INTERVIEW

Once a witness has been identified, the investigator should plan the interview. It is generally advisable to meet with the witnesses most directly involved in the incident first, since they should have the most information, and the quality of information tends to diminish with the passage of time. Later witnesses are often able to provide additional insight, fill in details, or corroborate statements or observations.

The interviewer should be familiar with the incident scene before beginning the interview process, so as to understand the witness' references or descriptions. Diagrams and photographs are often useful in orienting the witness and making reference to particular locations.

Prior to any interview, the investigator should compile a list of facts and questions about the incident. The interviewer should also have any available photographs, radio transcripts, and other information that might be needed during the interview, as well as a digital audio recorder, pens, and paper.

The interviewer should contact the witness by telephone, introduce themselves, and explain the goals of the investigation. The interviewer should also select a time and place for the interview that is convenient and conducive to effective communication. The investigators should be flexible

in arranging the times and locations for interviews. Sometimes “home turf” is the best place to conduct an interview – at the firehouse or the witness’ office. In other cases it makes more sense to set-up a fixed location for interviews and have the witnesses come to that location. In these cases, a “neutral” location will help to put the witnesses at ease.

The interview area should be private and quiet, eliminating all possible distractions or interruptions. The interviewer should close any doors to the room and possibly draw the window blinds to prevent distractions. Telephone calls should not be allowed to interrupt an interview unless they are extremely urgent, or pertinent to the interview. Having coffee and water available will help to create a more cooperative atmosphere.

The interviewer(s) should anticipate emotional reactions from certain witnesses, particularly if they were close to the victim or possibly feel a sense of responsibility for what happened. In some cases, a friend or counselor should be available to provide emotional support, or to sit in with the witness during the interview. The interviewer(s) should also anticipate anger or hostility from certain witnesses and make efforts to maintain a calm atmosphere.

Most interviews should be conducted either “one-on-one” or “two-on-one”. Teams of two interviewers working together, one asking questions while the other takes notes, are usually more efficient than a solo interviewer. It is usually not a good idea to conduct an interview with more than one witness present. An exception could be made to interview all of the members of a company together, if their involvement in the incident was peripheral, and the primary objective is to confirm that they do not have any significant information to provide to the investigators.

In some cases, a witness is entitled to have a union representative present during an interview. This varies with different labor/management relationships and contracts, as well as applicable labor laws, ground rules should be established during the planning process. Also refer to the section “Witness Rights” at the end of this chapter.

BEGINNING THE INTERVIEW

It is important to establish a professional relationship from the outset of an interview. The investigators should introduce themselves and anyone else who is present. Identification should be shown if the investigators are not already known to the witness.

Avoid rushing into the questioning part of the interview. Always begin by stating the goal of obtaining facts about the incident, and answering any questions that the witness may have about the investigation process. Ensure that the witness is comfortable and ready before beginning the formal interview.

Interviews should be recorded or documented through detailed notes taken by the interviewer. When recording an interview, the first step should have the witness state his or her name, date of birth, and other identifying information and express consent to having the interview recorded.

OBTAINING INITIAL INFORMATION

Witnesses should be questioned in an open-ended manner to obtain all the pertinent information they can provide. It is usually good to begin the interview with questions that are non-threatening, and easy for the witness to answer. For example, the investigator could start by asking the witness to provide his or her name, job title, work shift, and a summary of their experience and training. These initial, mundane questions, allow both the interviewer(s) and the witness to get comfortable with the process.

Asking the witness to begin by telling the story of what happened in narrative form is usually a good technique. This approach will often produce information that the interviewers did not previously know about. The witness should be asked to relate, in their own words, what they saw, did, or heard before, during, and after the incident.

The investigator(s) should focus on being good listeners and note takers while the witness tells the story of what happened from a personal perspective. The events may be related out of chronological sequence because the witness could often jump backward and forward in chronological time as they recall specific events and details. Do not interrupt during this part of the interview unless the witness becomes lost or confused and needs help getting back on track. Later in the interview, the investigator(s) can focus on clarifying the chronological sequence of events and filling-in information gaps by asking pointed questions.

Some witnesses will have a difficult time putting their observations into words. A sketch or diagram can be helpful in drawing out witness testimony, or in helping the interviewer(s) understand statements. Other witnesses may have very little to say and require encouragement to tell their story.

There may be periods of silence during an interview. Some witnesses need time to think or organize their thoughts, while others are simply uncomfortable and need a little encouragement or reassurance. Witnesses will often begin talking to fill these awkward periods of silence because they think the investigator(s) expect(s) more information; often these moments will cause a witness to express the small details that may be critical to understanding what happened at the incident.

The interviewer should always look the witness in the eyes and listen to what he or she is saying. Analyze the statement as it is given to develop follow-up questions and make note of questions that should be directed to other witnesses based on what the current witness is stating.

EXPANDING INFORMATION

The investigator should only begin to ask questions after the witness has finished telling everything he or she remembers, or considers important. Follow-up questions should be asked to clarify details and seek information that the witness did not cover in the personal narrative, and to sort out the chronological sequence of events.

The questioning should be guided by notes taken during the first part of the interview, and facts the investigator(s) may have obtained from conducting the incident scene examination. It is appropriate to ask questions based on information obtained from other witnesses. It is also helpful, in many cases, to show the witness photos or videos, play recordings of radio traffic, or use other media to help the witness recall details or explain what was happening at that time.

When questioning witnesses, the investigator(s) should always try to remain neutral, objective, and professional regardless of the witness's personality and behavior. Witnesses will be more forthcoming if they feel the investigators are non-judgmental.

Ask questions that are open ended. For example, investigators should ask "Where was Fire Fighter Smith?" rather than, "Was Fire Fighter Smith on the first floor?" If the questions can be answered with a yes or no, the witness will usually answer with only one word.

Always be straightforward and honest with the witness. Remember, the goal is to obtain information, not to trick or trap the witness.

When listening to the witness, pay close attention to differentiate between facts and speculation. Try to clarify what the witness directly observed from information that came from another source. The investigators must fully understand the meaning of each statement made by the witness before ending the interview.

In some cases follow-up interviews may be necessary to clarify details or corroborate information that is obtained from other witnesses. The list of witnesses may grow as different avenues of the investigation are pursued.

CONTROL QUESTIONS

Control questions are often used to gauge the credibility or accuracy of information provided by a witness. Some witnesses have exceptional powers of observation and recollection, while others have difficulty recalling basic facts. Some control questions include:

- Time, date, and location of the incident.
- Environmental conditions such as weather, lighting, or surrounding structures.
- What was happening when the alarm was received.
- Order of apparatus arrival.
- Apparatus placement at the scene.
- Identity of the incident commander and/or safety officer.
- Identity of other fire fighters or witnesses at the incident.
- When the witness first realized that something was wrong.

Emotional impacts often cause witnesses to believe that they observed something when in truth their statements are based on imagination or assumptions. This often occurs in relation to the victim of an incident. Control questions may reveal that the witness vividly remembers that the victim was wearing an SCBA when he dove out of a window, while the investigators have already confirmed that the victim was not wearing an SCBA and was dragged outside through a doorway. This information does not prove that the witness is being untruthful, but more often indicates that the witness is confused and upset.

Additional control questions may be asked of all witnesses to determine whether they can provide any information about a key point. These questions may spark memories that have not yet been dealt with in the interview process. All witnesses should also be asked if anything was moved, adjusted, turned on/off, or removed from the incident scene. This question is particularly important regarding the personal protective equipment of the injured fire fighters.

CLOSING THE INTERVIEW

Once the investigator(s) believe that they have obtained all the information that the witness can provide, they should begin to close the interview. The witness should be asked if there are any questions that haven't yet been asked or if there is other important information that should be discussed.

One of the best ways to conclude an interview is to ask the witness what could be done to prevent a similar incident. This question invites the witness to offer opinions and may provide valid suggestions that should be included in the final report and recommendations.

At the conclusion of the interview, the witness should always be asked if there are any questions for the investigator(s). The witness should also be told how to reach the investigator(s) in the event he or she recalls something else of importance.

FOLLOW-UP INTERVIEWS

Follow-up interviews are often needed to clarify questions, resolve conflicting testimony, fill-in gaps in information, or to deal with factors that were not known when the original interview was conducted. A follow-up interview should be conducted in a manner similar to the initial interview and may be considered as a continuation.

Investigators should be open and honest with the witness wherever possible. Let the witness know that there are missing or conflicting pieces of information and that the investigators are simply trying to find out what happened. The interviewer(s) should be careful not to imply that the witness was lying or provided wrong answers during the initial interview. The investigator(s) should never ask leading questions that could cause the witness to reverse testimony or lie about details to please the investigator(s) and end the interview. The investigator(s) should not expect that a witness will provide identical responses each time the testimony is repeated.

RECORDING INTERVIEWS

A digital audio recorder is a valuable interview tool. A modern recording device can capture many hours of interviews in the form of digital files that may be easily copied and stored. The recording allows the investigators to go back at any time and listen to exactly what a witness said during an interview.

Recordings can supplement good notes, but cannot replace note taking. In addition, recording can sometimes make witnesses nervous or anxious. The interview should begin by having the witness state their name, address, employer, company, and rank. Then, ask the witness to state that they are aware that the interview is being recorded.

ANALYZING WITNESS TESTIMONY

Analyzing witness testimony is one of the most important and challenging aspects of an investigation. Once the investigators have interviewed all of the witnesses, they must determine what information is credible and what is not. There will almost always be contradictory testimony and inaccuracies. The LODD Investigation Team often has to deal with a series of complicating factors in the process of accurately determining all of the facts relating to the incident.

When interviewing witnesses and analyzing their testimony, investigators have to consider the psychological stresses to which the person has been subjected. A fire fighter may have been injured, or had personal life or welfare threatened, or witnessed the death of a friend or co-worker. Witnesses who experienced severe stress are likely to remember fewer details of the incident or to be confused between what they observed and what they think they observed. Perceptions of time are likely to be greatly shortened or lengthened as the witness recounts the incident.

The interviewer(s) have to be observant, watching for indications of post traumatic stress, including drug or alcohol abuse that could be influencing the witness. The witness may be experiencing other health issues that have an impact on memory, vision, or perceptions.

The investigators must also be aware of factors such as feelings of guilt or responsibility relating to the incident. The witness could be trying to evade responsibility or divert attention from a

particular area or subject. A witness could also be influenced by loyalty to another individual or to the organization, or could be trying to cover up an error or misdeed. Sometimes the factor that is causing the problem is unrelated to the incident that is under investigation.

The length of time between the incident and the interview is a very significant factor. Over time details are forgotten and witnesses are often subjected to a variety of influences. The witnesses may have had opportunities to discuss the incident with each other, so that their recollections have become a blend of different versions. They may have been exposed to news reports presenting various theories, or they could have been interviewed by other investigators who planted ideas by asking leading questions. The witnesses may not realize that they have been influenced and their recollections have evolved; most people have a natural tendency to rationalize or to make assumptions when there are gaps in their understanding.

One method to evaluate witness accuracy is to compare the answers provided by different witnesses to the same questions. The differences may be attributable to variations in technical knowledge, different points of observation, and several other factors.

FACTORS AFFECTING WITNESS TESTIMONY¹

The accuracy of an investigation is often adversely impacted by delays in conducting interviews of witnesses with direct information. This is one of several reasons why investigation responsibilities should be assigned and investigators should be trained before an incident occurs. The investigators should make every effort to interview these witnesses as soon as possible after the incident occurs.

Investigators need to be aware of circumstances that may influence the testimony of witnesses.

- **Background and Experience:** Witness reliability is influenced by background and experience. Less experienced witnesses tend to have difficulty recalling specific details, either because they failed to recognize something unusual or did not understand the significance of their observations. Less experienced witnesses may still have valuable information or observations.
- **Perception:** People tend to be especially perceptive in areas that personally affect them. Fire fighters tend to be aware of their interactions with other company members, their company officer, and their partner. At a major incident, fire fighters may have very little idea what anyone else was doing. Company officers will probably remember interactions with other company officers or the Incident Commander.

It is especially important to differentiate between what was seen and heard by the witness and what is assumed. It is not unusual for witnesses to “fill in the blanks” based on rumors or observations reported by others, especially when the witnesses have had time to discuss their observations with each other. The factors influencing testimony are particularly important among fire fighters because of the close working and living conditions associated with the job. The witness may be convinced he or she knows that something happened in a certain way, when he or she only observed a fragment of the event.

- **Emotions and excitement** tend to increase distortion and exaggeration in descriptions of the incident, particularly if the victim is known to the witness.
- **Exaggeration:** When a witness repeats observations several times there is a tendency to exaggerate the details. The more times the observations are expressed, the more the description becomes a story rather than an observation.

- **Transposition:** A common mistake is the reporting of accurate observations, but in an improper sequence. One good method of detecting transposition is to review the witness' initial statement and event sequencing with the witness before the conclusion of the interview.
- **Omissions:** Another common mistake by witnesses is the omission of details. Information may be omitted because the witness has poor recall, does not consider the details to be important, or was not asked a certain question. Sometimes a witness will purposely omit details for a specific reason. The interviewer should make note of missing information and attempt to fill in the gaps by asking specific questions.
- **Form Limitations:** Witnesses who are asked to complete a questionnaire form as a written statement tend to answer only the questions listed on the form. They also tend to utilize only the space allocated on the form for their answer. This often leads the witness to omit important information.
- **Individual Versus Group Witness Interviews:** Witnesses can easily be influenced by the testimony of others during group interviews. In order to answer their own questions, witnesses may "fill in the blanks" with information or details they hear from others.
- **Amnesia:** Witnesses with the most immediate involvement in the incident may suffer amnesia from traumatic experiences. Critical incident stress can result in difficulty recalling any events associated with the trauma.
- **Interviewer Influence:** Witnesses are greatly influenced by both the investigator's personality and the interview environment. An investigator with a domineering personality can intimidate a witness into forgetting or intentionally omitting information. Investigators can also have a tendency to act as if they know everything. This personality trait can induce a witness to omit information that contradicts the investigator's preconceived notions. Conversely, a timid investigator may lead the witness to feel that his or her information is unimportant.

INTERVIEW TIPS AND TECHNIQUES

Always be courteous when dealing with a witness. Be patient if a witness's details are vague. Nobody has total recall of stressful events. Expect that each witness will have areas of the incident that they have no knowledge of or are unclear about.

- Make sure the witness understands the purpose of the interview.
- Have questions ready before starting the interview.
- Use terminology that is familiar to the witness.
- Make sure that the witness is comfortable in the interview setting, offer water or tissues as needed.
- Avoid arguing with the witness.
- If the witness goes off track, gently try to steer the interview back to the issues at hand.
- Ask simple questions. Always keep the questions direct and to a single issue. Ask one question at a time. Asking a long question that is really a series of short questions will confuse the witness. If investigators need to know about several aspects of a single event they should ask the first question, wait for an answer; then ask the second question and wait for an answer, etc.

THE TEN COMMANDMENTS FOR INTERVIEWING WITNESSES²

1. Stop talking during the interviewee's narrative account: You can't listen if you're talking.
2. Put the witness at ease: Help him/her feel free to talk. Be hospitable.
3. Show the witness that you want to listen: Look directly at the witness. Respond occasionally with a nod or vocalized assent. Listen to understand, rather than formulating your next question.
4. Remove distractions: Don't doodle, tap, or shuffle papers. Shut the door if necessary to remove outside interference.
5. Empathize with the person being interviewed: Try to put yourself in the witness' place. Try to see it from the speaker's point of view.
6. Be patient: Don't interrupt. Allow each witness plenty of time. Everyone is not able to speak his/her thoughts concisely.
7. Hold your emotions: Giving in to emotions may mislead or distract the witness.
8. Avoid arguments and criticism: Arguments and criticism puts the witness on the defensive. He/she may "clam up" or respond with anger.
9. Ask follow-up questions after narrative is complete: This encourages the witness along and shows you are listening. It also helps the interviewee to focus his/her attention and comments.
10. Stop talking: This is the first and last commandment because all of the others depend on it. You can't do a good job of listening while you are talking.

WITNESS RIGHTS

The LODD Investigation Team must be careful to avoid violating an employee's legal rights while conducting interviews. A summary of these legal rights is provided for both Canada and the United States, however the LODD Investigation Team should consult with an attorney to become familiar with the most recent case law.

Canada

An employer must have a reasonable basis for any suspicions before it can demand an explanation from an employee being investigated for wrongdoing. Even where there is such a reasonable basis, arbitral caselaw suggests that there are no disciplinary consequences for failing to answer an employer's questions about suspicious circumstances. Failure to answer questions, however, can lead to an adverse inference against the employee. The case law makes no distinctions between conduct which could result in criminal charges and other allegations of improper conduct. The right to remain silent, as described above, does not apply to employees who are witnesses to possible criminal conduct or other wrongdoing by other employees.

The right to have a union representative attend a disciplinary interview is governed by the collective agreement. Typically, absent collective agreement language providing such a right, it is unlikely the employee in question can demand union representation at a disciplinary interview.

The Canadian Charter of Rights and Freedoms, which applies to municipalities in their capacity as employers, provides very little protection in the context of witness interviews.

Section 11(c) of Charter states: “any person charged with an offence has the right not to be compelled to be a witness in proceedings against that person in respect of the offence”. This provision applies only to those proceedings that involve “the most serious offences known to our law” – those involving punitive sanctions (criminal, quasi-criminal and regulatory offences).

Workplace disciplinary offences are subject to the more flexible criteria of “fundamental justice” set out in section 7 of the Charter. Section 7 of the Charter states that “everyone has the right to life, liberty and security of the person and the right not to be deprived thereof except in accordance with the principles of fundamental justice”. Section 7 is not confined to the criminal law context. For it to apply, however, potential disciplinary consequences would have to involve the deprivation of life, liberty or security. The concepts of “liberty” and “security” have been narrowly defined and will not likely apply in the disciplinary context. “Liberty” is affected where the state places restrictions which “affect important and fundamental life choices”. “Security of the person” is affected by “serious state-imposed psychological stress” as well as “state interference with bodily integrity”. In addition, the state action in question “must have had a serious and profound effect on the [individual’s] psychological integrity”.

United States

The interviewers (and interviewees) must be aware of both Garrity Rights and Weingarten Rights.

Garrity Rights

Criminal investigations raise constitutional issues that investigators must be aware of when interviewing public employees, primarily their right against self-incrimination. This right is rooted in the Fifth Amendment to the United States Constitution, which states “No person shall be held to answer for a capital, or otherwise infamous crime . . . nor shall [he] be compelled in any criminal case to be a witness against himself.” In the case, *Garrity v. New Jersey*, 385 U.S. 493 (1967), the United States Supreme Court held that the Fifth Amendment protects public sector employees from being forced by their employers to incriminate themselves in the employment setting.

The case involved several police officers who were suspected of fixing traffic tickets. During the investigation, each officer was told before being interviewed that: (1) any statements he made might be used against him in a criminal proceeding, (2) he could refuse to answer any questions if his answers would tend to incriminate him, but (3) if he refused to answer any questions he would be terminated. The officers all chose to answer the questions. Their statements were later used against them in criminal proceedings, and all of the officers were convicted of conspiring to obstruct the administration of traffic laws. The officers appealed, and ultimately the U.S. Supreme Court reversed their convictions. In so doing, the court held that statements obtained from a public employee in the course of an investigatory interview under threat of termination from public employment are not voluntarily given; the statements are coerced. Therefore, the court held, statements made under such circumstances cannot be used as evidence against the employee in subsequent criminal proceedings.

There are several important issues to note about Garrity rights.

- Garrity rights only arise where the witness being interviewed is a public employee, the interview is being conducted by his or her employer, the investigation is of a criminal nature, and the employer forces the employee to answer questions under threat of job loss or discipline. If any of these four requirements are missing, Garrity rights do not apply.

- An employee witness can be forced to answer an investigator's questions if the investigator assures the witness that his or her statements will not be used against the witness in a subsequent criminal proceeding. This is known as "Garrity immunity." If a witness who has been granted Garrity immunity still refuses to answer questions, the employer may impose discipline for insubordination.
- Garrity immunity does not provide a witness blanket immunity from prosecution; it only prohibits the employer from using a witness's statements made during an interview as evidence against the witness in a criminal proceeding. The witness can be prosecuted for committing a crime if evidence of the crime(s) is discovered by other means (e.g., through the testimony of other witnesses, surveillance videotapes, etc.).
- Garrity immunity does not prohibit an employer from using statements made by an employee-witness as the basis for disciplining the employee administratively. Consequently, while statements made by an employee with Garrity immunity cannot be the basis for a prosecution, those statements can be the basis on which the employer disciplines the employee.

Weingarten Rights

An employee who is granted Garrity immunity during an interview can still assert Weingarten rights when available. Under Weingarten, an employee has a right to union representation whenever the employee reasonably believes that the interview could lead to disciplinary action. *NLRB v. Weingarten*, 420 U.S. 251 (1975). These rights apply to employees working in collective bargaining environments in both the public and private sector. However, employees in non-collective bargaining environments can have Weingarten-type rights established under state law or a department policy. Therefore, it is essential that every investigator knows whether he or she is working in a jurisdiction that recognizes Weingarten rights. If an investigator is unsure whether Weingarten applies to their situation, then it is probably better to assume it does rather than violate an employee's rights.

The employee must assert his or her Weingarten rights by requesting that a union representative be present during the questioning. Once the employee has done that, the investigator has three options: (1) stop questioning until the representative arrives, (2) call off the interview, or (3) ask the employee to waive his or her right to a representative.

Once the union representative arrives, the investigator must inform the union representative of the subject of the interview and allow the representative to talk privately with the employee prior to beginning the interview. Also, the investigator must permit the union representative to participate actively during the interview, including allowing him or her to interrupt the interview to clarify questions or object to confusing or intimidating tactics.

CONCLUSION

Obtaining accurate information is the result of proper interviewing techniques. The comfort of the witness, and how questions are asked, will directly affect the amount of useful information received. Once the witness has finished the narrative statement, expand information with specific questions. Getting the testimony is only half the job. Carefully analyzing the witness' statements is a long and difficult task. Remember, the goal of the investigation is to find out what happened, why it happened, and how to prevent it from happening again.

ADDITIONAL READING

Aircraft Accident Investigation, On-Scene Investigation Management, Federal Aviation Administration, Volume 1, Chapter 6, 2nd. Ed.: Interviewing Witnesses.

Modern Accident Investigation and Analysis, 2nd. Ed., Ted S. Ferry, John Wiley and Sons, 1988. Chapter 3: Getting the Investigation Underway.

Professional Accident Investigation: Investigative Methods and Techniques, Raymond Kuhlman, Institute Press, 1977. Chapter 7: Witness Interviews.

SAMPLE WITNESS INTERVIEW QUESTIONS

The following is not an exhaustive list of witness questions. Questioning should be guided by a preview of the incident scene and an understanding of the events. Consult other chapters for more detailed questions on selected topics.

Witness Identification

- What is your legal name?
- Do you have a nickname or other name by which co-workers call you?
- For fire fighters, what is your:
District (Division)?
Company?
Shift (Group)?
- For all:
Home address?
Mailing address?
Email address?
Home telephone number?
Cell phone number?
Business address?
- Do you have any physical problems which affect how you hear or see things?
- What is your education level?
- Do you have any professional knowledge or training related to fire fighting?
- What are your work/shift hours?
- What is your job title at work?
- What are your work duties?
- Who is your supervisor?
- How long have you been working at your job?

Time and Place of Incident

- What time did the incident occur (day, hour, minute)?
- What was the weather like?

- What was your order of arrival?
- Please describe the visibility at the fireground.
- Please describe the fireground.
- Please describe the area around the fireground.
- Were there any environmental factors that contributed to, or complicated, the incident?
- How would you describe the building design and construction?
- What portion of the building was involved in the fire when you arrived?
- Did anything block your view of operations?

Incident Description

- In detail, describe what you saw and heard at the fireground; from when you first arrived until the end of the incident.
- Could you draw a diagram of the fireground?
- When did you first know something was wrong?
- What attracted your attention to _____?
- During the incident, where were you standing?
- What work tasks did you do during the incident?
- What commands were you given during the incident?
- Who gave them to you?
- Were you properly trained and equipped to carry out those commands?
- Who else was at the fireground?

Interactions with Other Witnesses or Interviewers

- Have you spoken with anybody else about the incident?
- Any notes or records of the conversation?
- Tell me about the conversation:
 - Dates and/or times?
 - Circumstances surrounding the conversation?
 - Information given or received?
 - Other people who were involved in, or heard the conversation?
 - The general substance of each person's remarks?
- Have you given any other verbal statements about this incident?
 - To whom?
 - When did you make the statement?
 - Was anybody else there while you were making the statement?
 - Were there any notes or records made of the statement?
- Have you prepared any written statements about the incident?
 - Who asked you to prepare the statement?
 - To whom did you give the statement?
 - Do you have a copy of the statement?

- Have you made any maps, sketches, diagrams, or taken any photos of the fireground?
Do you know of anybody else who did?

When a Tool or Piece of Equipment Has Failed

- Were you aware that the _____ was not functioning properly at the time of the incident?
- Who else knew about this?
- Did you, or anyone else, take any action when you noticed the defect?
- Were any of the observations or actions documented in logs or work orders?
- Has the _____ ever failed before?
- Please tell me about the other times _____ failed.
- What corrective actions were taken last time?
- Were there any warning signs this time?
- When was the last time any maintenance or inspection was done on _____?
- How often was the _____ typically used?
- What did you typically do with the _____?

Maintenance, Inspection, and Testing

- Who is responsible for maintenance?
- Does this equipment receive regular maintenance?
- Are there any procedures for maintenance?
- What do you do if something is broken or not properly maintained?
- Are maintenance records kept?

Departmental Standard Operating Procedures

- When was the last training on SOPs?
- What departmental SOPs applied to the incident?
- Please describe the SOPs.
- Are SOPs generally followed?
- When have the SOPs not been followed?
- Please compare what actually happens in the field to what the SOPs say.

END NOTES

1 Federal Aviation Administration, Aircraft Accident Investigation, On-scene Investigation Management, Volume 1, Chapter 6, 2nd. Ed., 1995, p. 5.

2 Federal Aviation Administration, Aircraft Accident Investigation, On-scene Investigation Management, Volume 1, Chapter 6, 2nd. Ed., 1995, p. 11.

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CHAPTER 8

DOCUMENTS, EVIDENCE & RESEARCH

DOCUMENTS AND RECORDS

Most LODD investigations involve the collection and management of large quantities of documentary evidence. The growing collection usually includes many different kinds of documents that are obtained from a wide range of sources, both internal and external to the fire department. In addition to the documents collected, it may be helpful to review emails pertaining to the incident and/or a policy or SOP that was critical to the incident. There have been instances where officers have sent emails “clarifying” how personnel under their command would comply with a new policy or SOP.

The strategy that is employed in most investigations is to obtain copies of everything that could possibly provide useful information, and then determine what is pertinent through a comprehensive review process.

The types of documents that are likely to be obtained include:

- Policies, programs, and management directives.
- Standard operating procedures.
- Transcripts of radio and telephone traffic.
- Audio recordings of radio and telephone traffic.
- Radio system transmission records (System Watch).
- Training records.
- Professional qualifications standards.
- Maintenance procedures and records.
- Operating instructions.
- Personnel files.
- Medical records.
- Accident and injury reports.
- Autopsy reports.
- Duty rosters.
- Log books.
- Incident reports.
- Tactical worksheets.
- Laws, codes, and regulations.
- Code enforcement inspection records.
- Building plans.
- Material safety data sheets (MSDSs).
- Maps and diagrams.
- Pre-fire plans.

The investigators usually start with a list of reports and documents that they anticipate will provide significant information. This list usually grows quickly as the team members discover and obtain copies of additional documents. The process of going through all of the information requires patience, perseverance, and organizational skills.

In addition to hard copy documents, the investigation files usually include photographs, audio and video recordings, sketches, diagrams, and similar items. An LODD Investigation Team should operate with a policy of trying to obtain copies of any images that could include useful information. There could be hundreds of photographs, and hours of video, of a major incident taken by team members and other officials, news media, fire buffs, neighbors, and passers-by, as well as images from security and surveillance systems. The investigators should track down all of the potential sources and request copies; most individuals and organizations are willing to provide copies if they understand the purpose of the investigation. In some cases, a photo or video will be turned over to the investigators with restrictions on reproduction or use for any other purpose.

MANAGING FILES

All of the documents and files that are collected during an investigation have to be managed to ensure that the information is not lost and, more importantly, that it can be found when details have to be referenced. The LODD Investigation Team Coordinator is responsible for establishing a tracking system to manage all of the documents and exhibits and ensuring that there is a secure area to store them.

Digital imaging and recording processes have greatly simplified the procedures involved in managing investigation files. Many documents and images can be obtained and stored in the form of electronic files. The majority of items that are obtained as hard copies may be scanned or photographed to create digital copies. In most cases, all of the files relating to an investigation may be copied onto a CD or DVD, and each member of the team may be provided with a personal copy.

All hard copy items should be retained in a secure location for the duration of the investigation. Upon completion, items may be returned to their sources or destroyed, while the digital images are retained as permanent files.

RESEARCH

The research aspect of an LODD investigation incorporates two primary objectives. The first task should be to assemble and analyze as much existing information as possible in relation to the subjects that are pertinent to the investigation. The second task, which is necessary in some situations, involves research activities that are specifically formulated to support an investigation. The search for existing information often provides the information that is needed, so there may be no need for new research.

Internet Research

One of the LODD Investigation Team members should be assigned to search the Internet for reports and documents that relate to any of the factors that are pertinent to an investigation. Information that could be invaluable to the team may be easily accessible from a wide variety of sources. Investigators should look for any information that could potentially be helpful in understanding the incident that occurred or in identifying measures that could have prevented the occurrence.

The list of desired information should include all laws, regulations, standards, recommended practices, training materials, and model programs relating to the activities involved in the investigation. The reference information is most often used to determine the accepted standard for some aspect of an investigation. It is used to compare departmental policies and procedures with nationally-accepted standards and to determine whether recommended maintenance procedures were followed. The information may also be used to determine if there is a “better” way of doing something, or a “best practice” that could have changed the outcome of the incident under investigation.

Additional efforts should be directed toward locating reports of any similar occurrences and the recommendations that were produced from previous investigations. While circumstances may vary, the root causes of many fire fighter injuries and fatalities turn out to be closely related. The investigators may find that they are looking at issues that are not new, and often reach conclusions and produce recommendations that have been seen before.

Impressive quantities of research information are available via the Internet from thousands of different sources. There may be reports of similar incidents that occurred previously, or research projects that have been conducted on the same or closely-related topics. Technical data on fire apparatus and equipment, policies and procedures from other fire departments, training programs, consensus standards, and a virtually unlimited range of similar information is available to be downloaded immediately at no cost.

The research specialist should look for any subject matter that could be related to the investigation and provide a copy, or the appropriate links, to the team member who is dealing with that particular aspect of the investigation. Some good starting points for Internet research include:

- International Association of Fire Fighters (IAFF): www.iaff.org
- International Association of Fire Chiefs (IAFC): www.iafc.org
- IAFC Safety, Health and Survival Section: www.iafcsafety.org
- Department of Homeland Security (DHS) Responder Knowledge Base: www.rkb.us
- NIOSH National Personal Protective Technology Laboratory: www.cdc.gov/niosh/npptl
- United States Fire Administration (USFA): www.usfa.dhs.gov
- National Institute of Standards and Technology (NIST) Building and Fire Research Laboratory: www.fire.nist.gov
- National Fire Protection Association: www.nfpa.org
- National Firefighter Near-Miss Reporting System: www.firefighternearmiss.com
- Safety Equipment Institute (SEI): www.seinet.org
- Underwriters Laboratories (UL): www.uluniversity.us/home.aspx
- National Research Council of Canada (NRCC): www.nrc-cnrc.gc.ca
- Canadian Standards Association (CSA) www.csa.ca
- Canadian General Standards Board (CGSB): www.tpsgc-pwgsc.gc.ca/ongc

These websites will provide additional links to a wide spectrum of additional sources of information.

Networking is an additional, and very useful, method of seeking pertinent information. Professional contacts, fire service organizations, and the exchange of expertise and experience among fire departments can often lead to valuable sources of information. In many cases, these discoveries are produced by simply asking “do you know anything about...” or “do you know

who might be able to provide information about ...” This simple process frequently produces valuable results.

Information that is obtained from exterior sources, particularly via the internet, should not be automatically accepted as factual. The internet is a prolific source of bad information, as well as good information. The source of the information must be considered and anything questionable should be either validated or corrected.

Internet searches cannot completely replace more traditional methods, including reference books. Some types of documents are not available on the internet and a thorough investigation requires taking the time, and making the effort, to locate the needed information.

Scientific Research

Sometimes the circumstances of an occurrence require some form of research or experiment to determine what happened or what went wrong. These situations sometimes require the LODD Investigation Team to reconstruct the situation as closely as possible, or to conduct a simulation of the occurrence. In some cases a computer model can be used to simulate the incident, while others require laboratory analysis to develop an understanding of the situation that occurred.

When the decision is made to conduct this type of research, it is essential to do it scientifically, accurately, and safely. The tendency to conduct loosely-structured experiments often leads to misleading or inconclusive results. The research objectives must be clearly understood and the process must be structured to focus on those specific points. If the situation justifies the effort and expense, the investigators have the responsibility to ensure that the research is conducted professionally. National organizations, including the IAFF and the IAFC, should be contacted for assistance.

In situations where there is a need for complex research, organizations that are involved in the fire fighter safety mission may be able to make arrangements to have the work performed by qualified research organizations, such as NIOSH, NIST, NRCC, or academic research institutions.

PHYSICAL EVIDENCE

Chapter 6 refers to the collection of physical evidence from the incident scene for further examination and analysis. Anything that is removed from the incident scene should be photographed in place before it is moved, and the physical location should be documented. The items should be packaged and labeled using the same procedures that are used to manage evidence in a criminal investigation, and the chain of custody should be tracked for the duration of the investigation.

The LODD Investigation Team Coordinator is responsible for making arrangements to store the physical evidence in a safe and secure location. If the items are hazardous or contaminated, special arrangements will have to be made for safe storage and preservation. Law Enforcement evidence storage facilities are often used to store physical evidence. They have the expertise to store evidence in a manner that will preserve it for future examination.

Items of evidence that are wet or contaminated with a corrosive chemical will usually degrade somewhat while in storage. Law enforcement evidence storage facilities have techniques to dry and manage the condition of evidence.

The investigators will also have to determine when and how the items will be examined and/or tested. Anytime there is a serious injury or death involving the use of protective equipment, the manufacturer, the certifying agency, and NIOSH should be notified. Annex A4 and Annex A5 of this manual provides specific guidance relating to the processing of protective clothing and equipment, including respirators, especially SCBA.

Arrangements should be made to have items such as portable radios and PASS devices examined and tested by qualified individuals. These items should be stored until the arrangements have been made to conduct the examination. All steps should be photographed and/or video recorded, and the findings should be documented in a written report.

In cases where additional parties are interested in the examination, such as the manufacturer of the equipment, arrangements should be made to have representatives present when the items are examined. There is only one opportunity to examine an item in undisturbed condition (or in the same condition as it was found). All of the parties that have a valid reason to witness the examination should be present.

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CHAPTER 9

RECONSTRUCTING THE SEQUENCE OF EVENTS

Emergency incidents are often extremely complicated events. They usually involve several individuals and teams or companies performing a variety of tasks simultaneously. All of these actions are interrelated in one manner or another, although the individual participants are often unaware of exactly where others are located and what they are doing at any point in time. In addition, it is often very difficult to understand the impact of any single action because of the distance in both time and space between the event and the final outcome.

Time line sequencing is a very useful analytical technique to identify and describe the events that occurred at an incident and then determine which events were critical in relation to the outcome. The LODD Investigation Team has to develop a time line that reconstructs the sequence of events before the analysis can be performed.

DEVELOPING AN INCIDENT TIME LINE

The concept of developing an incident time line is logical and relatively simple; however the process is often very challenging. The information gathering steps of an investigation often produce dozens or hundreds of different facts and observations, coming from a wide variety of sources. Some of these elements can be directly associated with a recorded time, while others can only be placed in sequence in relation to other events. The investigators have to sort out all of the bits and pieces of information, and determine what happened where and when as closely as possible.

The first step is to identify events that have a recorded “time stamp”, and arrange them in sequential order to produce an outline of the incident. This information is usually obtained from dispatch records, radio and telephone recordings, and similar sources that include specific time references. It is important, even at this stage, to check the synchronization of the clocks that are used to record these times. The investigators must never assume that each independent source is working with the correct time; it is not unusual to find discrepancies of several minutes from one source to another, depending on how the time was recorded (computer generated, taken from the clock on the wall, or from the dispatcher’s wristwatch) and when that device was last synchronized with a standard time source.

The investigators can often identify gross discrepancies between the clocks that are associated with different sources of information by checking the sequence of events. If the radio time indicates that units arrived on the scene before the call was dispatched, or if the call appears to have been answered at the Fire Department Communications Center before it was transferred from the 9-1-1 Public Safety Answering (Access) Point (PSAP) there is obviously a synchronization problem. This situation can usually be resolved by determining which source has the most accurate time, and then calculating adjustment factors for the other sources based on a known event.

Even if the sequence of events appears to be logical, the synchronization of clocks should be verified by checking each source against a standard time reference and comparing the recorded times for simultaneous events. It is possible that the clocks may have been reset between the time of the incident and the investigation, so the times that were actually recorded at the time of the event should be used to determine the differential factors. The differential factors should then be used to adjust recorded times to a common basis.

The next step is to place events that cannot be directly associated with a “time stamp” in chronological order (the order in which they occurred). This information often comes from witness narrative statements and may be associated with some other event or placed in sequence between events (e.g., “We did X before Y and after W” or “We were doing A when the evacuation call went out over the radio.”). Even if it is impossible to attach a specific time to an individual event, it is usually possible to bracket the event between other events.

INCIDENT TIME SEQUENCE CHART (MATRIX)

A sequential time line for the incident can be assembled in the form of a chart on a wall or a file in a computer. Rows in the matrix represent individual fire fighters or companies, while columns represent time increments down to a minute or a fraction of a minute, depending on the nature of the situation. Stick-on notes are used to record events or observations, and may be moved to different boxes in the matrix as their sequence is determined with increasing precision.

A spreadsheet or database program may be employed to develop a very similar time sequence matrix using a computer. Instead of attaching stick-on notes to a wall chart, the information is entered into the appropriate box in the matrix. An electronic matrix file can be easily stored, copied, and transported.

The assembled matrix provides a detailed description of the sequence of events at an incident, as well as the relationships between events that may have occurred simultaneously in different locations and involving different individuals. Some events may be known to have occurred at a specific time, while others may have occurred within a range of time.

INTEGRATING PHOTOS, VIDEOS & AUDIO RECORDINGS INTO THE MATRIX

Additional sources of information, particularly photographs, videos, and audio recordings, can be very helpful in the development of a time sequence matrix and can also be tracked and catalogued within the matrix. Almost all digital recording devices automatically time stamp each file or image as it is created. Even if the time is not displayed on the image, the time stamp is generally encoded in the file header.

Time stamps on digital devices are referenced to the setting of the internal clock in the camera or recording device, which may not be accurate; however, the recorded times can usually be adjusted to match the time base that is used in the matrix. In many cases the investigators will be able to synchronize these time sources by finding photographs that were taken by different cameras that show the same event. Similar information may be obtained by listening for radio traffic in the background audio track of a video recording. The time differentials from different sources can often be narrowed down to a few seconds.

Digital cameras, even the least expensive and simple, embed a great deal of information about the photograph within the photograph’s file. Not all photograph viewing software is capable of displaying this information. A free, or shareware, program that can display this information is IrfanView (www.irfanview.com). This software can be downloaded for free, and is compatible with Microsoft Windows. IrfanView and its plug-ins (also free) must be downloaded to be able to read the photo’s embedded information.

The recorded images and audio may then be used in witness interviews to help refresh an individual’s memory, or expand on the understanding of “who – what – where – when.” If a witness can look at a photograph and associate it with a specific event, the time of the event may be determined from the image time stamp.

When a database or spreadsheet program is used to create the time sequence matrix, the digital image files and audio files may be hot linked to a box in the matrix. Clicking on the box that represents a particular fire company and time would then show a photograph of that occurrence or play a recording of the radio traffic associated with it.

INCIDENT SEQUENCE ANALYSIS

The incident time sequence matrix allows the investigators to visualize the overall sequence of events and relate different occurrences and observations to each other. A process called incident sequence analysis is used to subdivide this information into sequences of interrelated events and determine how one event impacted on subsequent events.

The analysis involves working backward along each sequence of related events to get back to the factors that set the stage for an undesirable outcome. These factors may have occurred moments before the ultimate occurrence, or years back in the history of the fire department or the premises where the incident occurred. The LODD Investigation Team has to systematically and conscientiously follow every path back to the elements that may be identified as “causal factors.”

A similar process is used to determine how different sequences of events contributed to the final outcome. Deaths and injuries often result from the convergence of multiple sequences of events. The unfortunate outcome might not have occurred if all of the different chains of events had not come together at the same place and time. The individual chains often lead back to causal factors that are (or appear to be) unrelated to each other. While some of the causal factors may be determined to be more or less significant in relation to the occurrence that is under investigation, it is important to explore and evaluate every possibility.

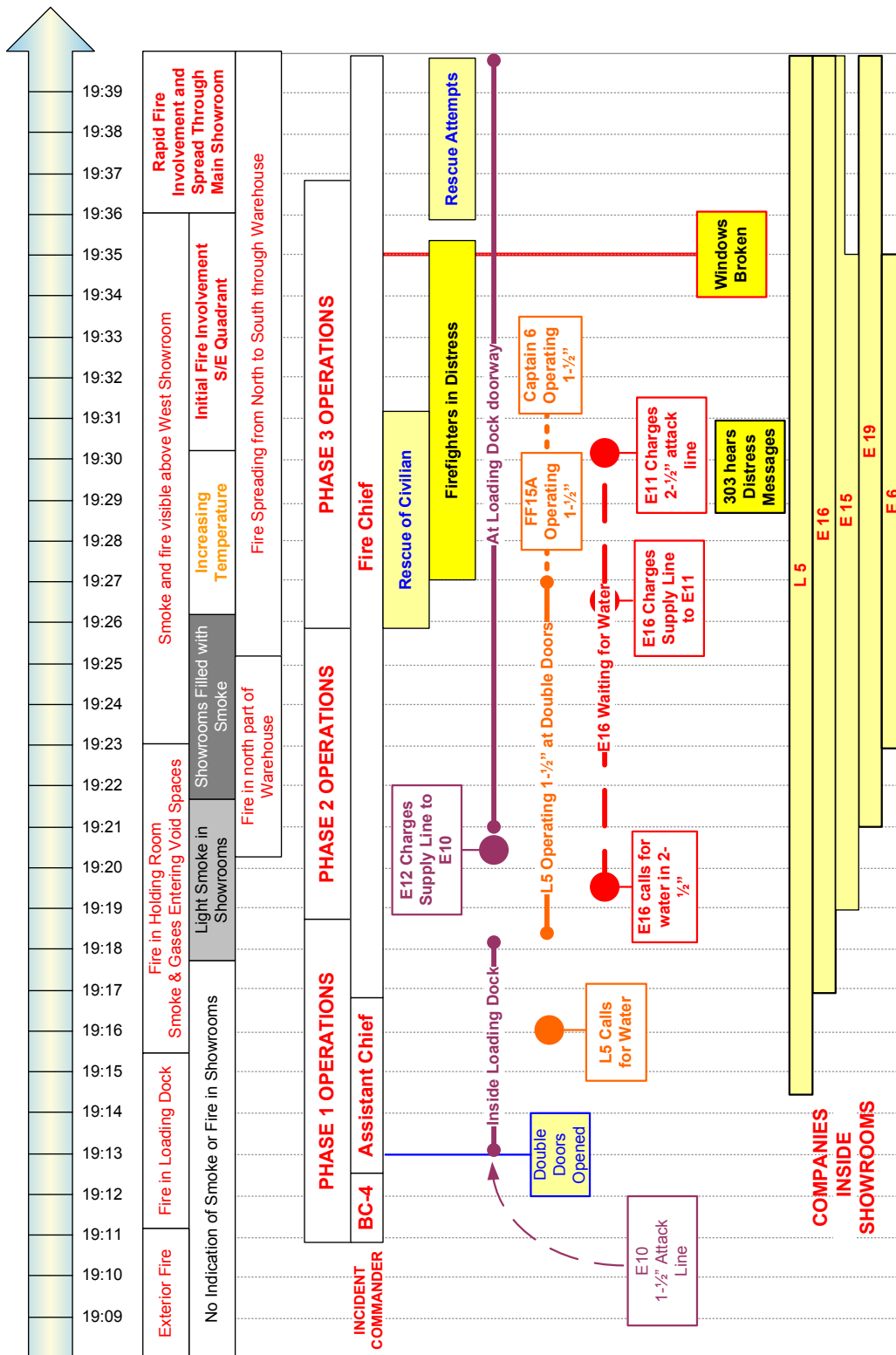


Figure 9.1 Time Line Summary from Charleston Report

CHAPTER 10

SYSTEMS ANALYSIS

The analysis phase is a pivotal step in the investigation process. The initial challenge facing the LODD Investigation Team is to obtain, organize, and analyze all of the available information to develop a detailed understanding of the incident. Documenting exactly what happened in detailed time-sequential order is only the first step. The LODD Investigation Team has to work backward from determining what happened to understanding how it happened, and ultimately identifying why it happened.

This sequential process is essential in the effort to identify the root causes of the past occurrence, and then to determine the actions that are necessary to prevent similar outcomes in the future. The root causes could be simple or complex, and they may be traceable back to situations that occurred many years before the incident.

The fire department response to an emergency often involves a complex system of people, tools, and environmental factors interacting in a specific manner to accomplish a series of tasks. All of those tasks are directly or indirectly related to providing emergency services to a community. When a fire fighter is killed or injured, some aspects of the system have failed to work properly. To fully understand the interactions, investigators must understand and consider each element of the system, as illustrated in Figure 10.1.

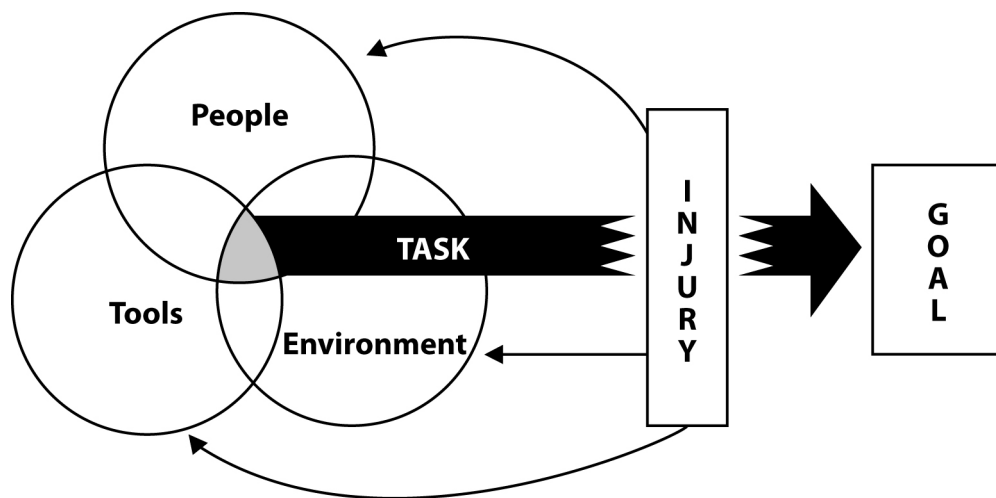


Figure 10.1 System Interaction Diagram

Most fire department operations involve the interaction of three fundamental system elements.

1. **People** – This refers to the human element, and includes every person involved in the occurrence, whether directly or remotely. The human element within a fire department includes everyone who performs a function that impacts on the situation, whether it is establishing a policy, delivering training, maintaining a piece of equipment, conducting a code enforcement inspection, or connecting a hose to a fire hydrant. Factors such as training, comprehension, physical abilities, communications skills, and decision making are all included within this broad category.
2. **Tools** – This covers a wide spectrum, including personal protective equipment, hose lines, water, power tools, and fire apparatus. The analysis of tools should consider their selection, use, performance, design, and maintenance in relation to established standards.

3. Environment – This refers to all of the factors and circumstances that are present when the incident occurs. Fire fighters often work in very dangerous environments, where they are exposed to risks that include fire, toxic atmospheres, hazardous materials, damaged and deteriorating structures, and extreme weather conditions.

The interactions that occur among the components of a system impact on the system as a whole. Fatalities and injuries generally occur because some combination of factors placed unanticipated stress on the system. These factors often include human actions, physical conditions, and functional limitations within the system.

A successful investigation has to develop an understanding of these interactions and their relationship to the incident that occurred. If an SCBA is identified as a key factor in an investigation, is the problem related to a design flaw, a maintenance problem, a user-training deficiency, or an unanticipated use situation? Investigators have to examine the role of each system element in the analysis of an incident.

ROOT CAUSE ASSESSMENT

Incidents occur because a series of individual circumstances, decisions, and actions occurred in a manner that resulted in a specific chain of events. The chain of events often involves several different people (fire fighters, company officers, chiefs, incident commanders, training officers) making multiple decisions (fireground strategy and tactics, training content, maintenance schedules) and taking many different actions. While the incident itself may appear to be relatively simple, the analysis usually requires the LODD Investigation Team to explore several different avenues to get back to the root causes.

Identifying the root causes requires the Investigation Team to determine the specific factors that either produced or failed to prevent the undesirable outcome. The root causes are the factors that would have to be different in order to produce a more positive outcome for the incident or possibly to prevent the incident from ever occurring.

Gordon Graham is often quoted as emphasizing the notion that “If it is PREDICTABLE, it is PREVENTABLE!” – referring to a wide spectrum of undesirable outcomes. The LODD Investigation Team is charged with examining an incident that has already occurred, and identifying the actions that will make it preventable in the future. The fact that the situation has already occurred (at least once) makes it predictable in relation to the future, even if the problem was never recognized in the past. The ultimate goal of an LODD Investigation Team is to prevent undesirable outcomes in the future.

Some of the root causal factors may be very immediate in relation to the incident, while others may have occurred over a long period of time. Examples include:

- How does rookie training impact on an incident that occurs years later at the scene of a fire?
- How does a building code change that was implemented ten years ago impact on fire fighter safety today?
- How does the fire department culture and approach to risk management impact the actions of fire fighters and command officers at an incident?
- What is the relationship between design specifications for a 20-year old vehicle and a roll-over crash that occurs today?

The investigation should examine the entire chain of events leading up to the incident in order to determine the critical links and identify all of the problems and deficiencies that must be corrected.

LEGAL CONCERNS AND INTERESTED PARTIES

One of the issues that must be considered in many LODD Investigations involves the legal relationships among various parties. The LODD Investigation Team should not be constrained from conducting a full investigation by any concern over the information that may be revealed. In some cases, problems are encountered in efforts to obtain information, particularly if the parties that have the information are concerned about potential liability. In other cases there may be legal concerns relating to the release of information.

The LODD Investigation Team Leader should have direct access to an attorney to discuss any legal issues and concerns that arise during the course of an investigation. Legal issues are often unavoidable when a thorough investigation is conducted, however they should be identified and understood in the proper context. The draft report should be reviewed by an attorney to ensure that the content will not create unanticipated legal problems.

As noted in Chapter 1 of this report, the fire department is often not the only organization that has an interest in fully investigating an incident that results in a fatality or serious injury. Several other individuals and organizations may become involved for a variety of reasons; however, the fire department that experienced the loss should have the most compelling interest in ensuring that the incident is fully and impartially investigated.

Most LODD and serious injury incidents will also be investigated by a federal, state, or provincial agency that enforces occupational safety and health regulations. These agencies are required to determine if there were any violations of applicable laws and regulations that could have caused or contributed to the occurrence. In these situations the agency is usually investigating the fire department, and may have the power to levy fines or order corrective actions if a death or serious injury resulted from unsafe practices or working conditions. In many cases, the regulatory agency will concur with the findings of the fire department's LODD investigation, if it is thorough and transparent. In many cases, the regulatory agency will exercise its authority by setting a time for implementation of the recommendations that were produced by the LODD Investigation Team.

Some incidents may involve the possibility of civil claims, or even criminal negligence charges, against the fire department or a particular individual within the department. While this occurrence is rare, the potential does exist in many jurisdictions.

Many LODD incidents result in civil litigation, often involving claims against a third party (e.g. the property owner; the person who caused the fire, or a protective equipment supplier) that are filed by an injured fire fighter or the by the survivors of a deceased fire fighter. There is often litigation relating to the property loss, or other aspects of an incident, that is unrelated to the LODD investigation.

Fire fighter health and safety may not be the primary goal of every individual and organization that has an interest in the outcome of an LODD investigation. Additional parties (and/or their insurers) often have a significant financial interest in the occurrence that is under investigation:

- The municipality's risk manager may be trying to limit the employer's potential financial liability.

- The municipality's workers' compensation insurer could be looking for findings of negligence as a reason to deny coverage.
- An apparatus or equipment manufacturer may be seeking to protect its reputation or avoid financial liability, if there are suggestions that their product may have failed in a way that caused or contributed to the incident.
- The owner of the property where the incident occurred could be concerned with potential liability.
- The surviving family members may be pursuing civil actions against parties that have responsibility for the death of a fire fighter.

The information that is produced during an investigation, including the final report and all of the documentation that is collected in the process of developing it, may be subject to legal discovery and the LODD Investigation Team members may be called upon to testify at some point in the future. These factors should all be recognized, and legal assistance should be obtained to advise the team on proper procedures; however none of these issues should stand in the way of conducting a thorough and impartial LODD Investigation directed toward fire fighter health and safety.

CHAPTER 11

FINDINGS AND RECOMMENDATIONS

Once the root causes of an incident have been fully analyzed and identified, the LODD Investigation Team must move on to the next logical step of identifying the changes and corrective actions that are needed to prevent future occurrences of a similar nature. The recommendations could be as simple as enforcing an existing policy or making fire fighters aware of a previously unrecognized hazard, or they could involve major training (or retraining) initiatives, changes in standard operating procedures, obtaining new apparatus or equipment, or adopting changes to the fire code or building code.

The LODD Investigation Team is expected to determine the changes that are needed; however the Team's responsibility does not include implementation of the recommendations. The mandate is to produce and deliver the information to the individuals who have the authority and the responsibility to make changes. The recommendations should be realistic and feasible, even if they will require time and funding to accomplish. Knowing what needs to be accomplished is the first essential step toward getting it done.

The LODD Investigation Team should provide some sense of priority for the recommendations that come from their work. These recommendations will guide the implementation of the report's recommendations, and assist the fire department and the authority having jurisdiction with decisions on funding and other priorities.

The LODD Investigation Team should never be satisfied with partial solutions or cosmetic changes that will give the appearance that something has been done to address the problem. A thorough investigation often identifies multiple areas where action is needed to change future outcomes. The team members have to keep in mind that their efforts are directed toward protecting the health and safety of fire fighters, and make recommendations based on what needs to be done to prevent future incidents, regardless of the cost or complexity.

URGENT RECOMMENDATIONS

Sometimes an LODD Investigation will reveal problems or situations that are so urgent that it is inappropriate to wait until the full investigation is completed before taking action. The recognition of an urgent issue could occur within hours after the incident occurs or at any point during the investigation. The LODD Investigation Team Leader should be keeping the Fire Chief and the local union president informed of progress while the process is ongoing, and would be expected to bring urgent issues to their attention as soon as they are discovered.

A problem that is identified and addressed before the investigation is completed should still be included in the findings and recommendations that are listed in the final report. The report should note that the problem was identified and corrective action was taken at a particular point during the investigation.

SOURCES OF BIAS

It is often very difficult for an LODD Investigation Team to stay on course and avoid distractions, particularly at the stage of producing findings and recommendations. The issues that are involved in an investigation are often controversial, and there is often a temptation to use the incident to make a point or support an agenda, even if it has no valid relationship to the situation that occurred. There may be pressure to write the findings and recommendations in a manner to

direct blame toward a particular individual or a certain policy. There may also be pressure to omit certain details, or engage in a cover-up, to protect personal or organizational reputations.

The LODD Investigation Team must resist such biases and external influences and deal with the facts of the situation. While emotional reactions are natural when a fatality or serious injury occurs, the investigators have to focus on finding facts and developing solid recommendations that are based on those facts.

The process must not be influenced by questions of whether the conclusions support or fail to support a particular agenda, whether they will please or displease an individual or organization, or if they will protect the fire department's reputation. Independence and impartiality are essential components of an effective investigation.

BLAME AND DISCIPLINARY ACTIONS

The goal of an LODD investigation is not to place blame or recommend disciplinary actions, but rather to identify the factors that contributed to the incident and the corrective actions that are required to prevent future incidents of a similar nature. It is often difficult to avoid these issues, particularly when the news media are preoccupied with finding fault and rumors are spreading rapidly through the fire department.

The LODD Investigation Team should never be involved in any aspect of a disciplinary process and must steer clear of placing blame for the incident. Other mechanisms are available to consider questions of blame and responsibility, if appropriate, after the facts have been determined.

The LODD investigation must avoid distractions to focus on fact finding and delivering a report that is accurate, comprehensive, and unbiased. The corrective recommendations should address deficiencies in policy, procedures, performance, or numerous other areas.

CHAPTER 12

FINAL REPORT

The preparation and delivery of the official investigation report is the final phase of the investigative process. The document that is delivered to complete the LODD Investigation Team's mandate should be comprehensive and understandable to the various audiences that need to understand what happened and learn the appropriate lessons.

This formal written report should detail the situation and chain of events that occurred, provide vital facts and information, identify all significant factors related the incident, and clearly state the steps that will prevent a similar incident from occurring. The printed report should include photographs, diagrams, tables, and exhibits to illustrate key points. Depending on the length of the report, an executive summary and presentation of the key findings and recommendations should be included. The executive summary should convey the essential information to individuals who may not have the time to read the complete document.

The written report is often supplemented by an audiovisual (AV) presentation of the report. While a written report is intended to present all of the information and cover a wide spectrum, a well-produced AV presentation, using a combination of words and graphics, is usually the most effective manner to deliver the essential messages to a particular audience. An LODD Investigation Report almost invariably generates broad interest, and the AV presentation may be fine tuned to the needs of different audiences.

The written report should be backed-up by an organized compilation of all of the materials that were used to produce it. The permanent archival file should include copies of all materials that were obtained or produced during the investigation. This requirement can usually be accomplished by producing electronic files and storing them on a hard disk, CD, or DVD. Hard copy materials should be scanned to eliminate the need for long term storage, if the local document retention laws permit. Any physical evidence should be retained in a secure location until a final determination is made that it is no longer needed.

REPORT FORMAT

The final written report should be effective as a stand-alone presentation of the incident, the investigation and the findings, and the recommendations. The document should be structured so that a reader who has no prior knowledge of the incident (or of fire service operations) will be able to understand what happened, how it happened, and why it happened, along with the findings and recommendations produced by the Investigation Team. Several examples of completed reports are available to be downloaded from the Internet, and should be consulted for guidance when selecting a format. A number of model fire fighter fatality investigative reports are included with this report's supplemental materials.

The written report is an official document that will generate tremendous interest when it is released. The final draft should be professionally edited and reviewed by an attorney before it is printed. All of the members of the LODD Investigation Team should review the document in its final form before it is delivered.

The written report should be delivered to the Fire Chief, the local union president, and selected key individuals before it is seen by anyone else. These key individuals should have an opportunity to review the document and discuss the findings and recommendations with the LODD Investigation Team members. The primary purpose of allowing them to review a copy

prior to public release is a courtesy, allowing them to be prepared for questions from the news media and public officials. They will usually appreciate the opportunity to be prepared, even if they are only able to state that they have briefly reviewed the report and will provide their detailed comments at a later time.

In some cases, the fire department management team (or a joint labor/management team) will want to develop a preliminary plan to implement the recommendations before the final report is released. This option should be determined locally.

PRESENTATION TO SURVIVING FAMILY MEMBERS

The surviving family members of a fire fighter who died in the line of duty should be invited to review the report and discuss it with the members of the LODD Investigation Team before it is released. The family members will usually appreciate this personal presentation and access to the team, even if it occurs immediately prior to the public release. It is better for the family to receive the news personally, than to learn about it on a news broadcast or from someone who saw it first. The surviving family members should also be invited to meet with the team members after they have had an opportunity to thoroughly review the written report and develop additional questions.

MEMBERS INVOLVED IN THE INCIDENT

Fire department members who were personally involved in the incident should be the first internal group to obtain a copy of the report. The LODD Investigation Team should discuss this presentation with counsellors who are involved in providing Critical Incident Stress Management services to plan this presentation.

INTERNAL RELEASE

Copies of the printed report should be delivered to every fire station and fire department facility at the same time that it is released to the public. The full document should be mandatory reading for every member of the department. In addition, every member should attend an AV presentation of the report to emphasize and reinforce the messages.

EXTERNAL RELEASE

It is almost always appropriate to hold a press conference to announce the release of an LODD Investigation Report. The report will become an official public document at the time it is released, and the news media will want to ask questions and conduct interviews. The press conference should present all of the significant information in a format that is easily understandable to the general public, avoiding jargon and complex technical explanations.

Copies of the final report should also be sent to other agencies and organizations that were involved in the incident, assisted with the investigation, or had a particular interest in fire fighter safety, including the IAFF and the IAFC. The final report should also be posted on the fire department website to provide easy access to the information for any interested fire service members. The national fire service media will usually publicize the posting of a new LODD Investigation report within hours after it is released.

CHAPTER 13

PUBLIC RELATIONS

Public and media relations are important concerns during most LODD investigations. The Investigation Team often has to deal with complex issues and sensitive information, along with the emotional stress resulting from the incident. The integrity of the investigation must be protected, and the rights of individuals and family members must always be respected. At the same time, there are often demands for information to be released quickly. This comes from the fire department and family members, as well as the news media. Balancing these various interests requires careful consideration and experience.

Transparency is the most effective strategy to establish and maintain credibility. The media will tend to dwell on conflict and focus on any provocative or controversial aspects of a story. The official response should be that the LODD Investigation Team has been established to determine the facts, and the results of the investigation will be released as soon as the process is completed.

The mission of the news media is to obtain information and report it to the public, so widespread media coverage of a fire fighter death or serious injury is inevitable. If there is no reliable factual information to report, the news reports are likely to focus on rumors and speculation. The news media may create unrealistic pressure for the immediate release of findings from the investigation, often seeking information about “who is to blame” or “who is responsible?” If there is no information coming from official sources, the media will often report whatever they hear from any unofficial source. Inaccurate information that is reported by the media may compromise the reputation and integrity of the organization, as well as damage individual careers and reputations.

Fire department members often obtain more information about an incident, and a subsequent investigation, from the news media than from official sources within the organization or their IAFF affiliate. Inaccurate information can plant suspicions that often make it more difficult to implement the lessons that should be learned from the incident.

Effective media relations will help protect against the dissemination of inaccurate statements or false conclusions, as well as add credibility to the results of the investigation when they are ready to be released. The official fire department policy should be to refrain from making any comment on rumors, speculation, and accusations unless there is confirmed factual information that can be released without compromising the investigation. Any further information will be released when the investigation has been completed.

INITIAL NOTIFICATION OF DEATH OR INJURY

Receiving the news of a death or injury is a traumatic experience. The family of a fire fighter who is killed or seriously injured should be personally notified by an official representative of the fire department or a designated notification team. Names should never be released to the media until all of the immediate family members have been notified. The family should make the determination that everyone who needs to be informed personally has been notified before the name is released by the fire department.

The notification team members should be carefully selected. The Fire Chief should personally make the notification or assign a senior officer as the official representative of the department. The president, or a designated representative of the IAFF affiliate, should also be present when

family members are notified. If possible, they should be accompanied by a fire department chaplain or a coworker who is personally familiar to the family. The fire department and the local affiliate should be prepared to provide continual support to the family from the time of notification and ensure that the family always receives the most recent and accurate information personally before it is released to the media. The IAFF's notification policies, funeral protocols and family support program are all available on the IAFF website.

However, IAFF local affiliates should immediately notify the IAFF of any line-of-duty death. The IAFF provides immediate assistance with notifications and funeral planning and experienced members will be assigned to assist the local.

The LODD Investigation Team members should not be involved in the notification process or in making funeral arrangements, because there are usually important aspects of the investigation that require their attention during this period. The investigative process should be initiated as soon as possible after the occurrence.

PRESS CONFERENCES

When a line-of-duty death or serious injury occurs, the news media will react very quickly to obtain and report any information that is available. The prompt and wide release of accurate information should prevent the spread of erroneous information and rumors. The fire department and the IAFF affiliate should organize a joint press conference to provide all of the information that can be released about the incident and the involved member(s). The press conference should be conducted as soon as the essential details can be assembled. Family members and key individuals and organizations should be officially notified before any names or detailed information is released.

The basic plan for conducting an investigation should be announced at the press conference. There should be no question that a thorough, impartial, and professional investigation will be conducted. Additional details, including the names and qualifications of the LODD Investigation Team members, should be released promptly when the information becomes available.

A second press conference should be planned for the release of the LODD Investigation Report. The report will become a public document when it is officially completed and delivered. All of the information that is contained in the report immediately becomes available to the news media, and the LODD Investigation Team should be prepared to respond to questions at a press conference and during the days following its release.

LODD INVESTIGATION TEAM MEDIA CONTACT

The fire department Public Information Officer (PIO) should be the primary outlet for official information and contact for media inquiries related to the investigation. One member of the LODD Investigation Team should be designated as a liaison to work with the PIO. Any media inquiries should be referred to the designated team member, and any information that is released should come from the same source.

The LODD Investigation Team has to make the determination whether any information can be released during the investigation process, prior to the release of the final report. The LODD Investigation Team Leader should consult with an attorney before releasing any potentially-sensitive information. In most cases, the best policy is to emphasize that the investigation is ongoing and the findings will be released when the process has been completed.

The relationship between the LODD Investigation Team and the media has a second dimension. The news media can often assist in the investigation by supplying photographs and videos of the incident and the names of witnesses. This type of cooperation is more likely to occur when there is a sense of confidence and trust that the LODD Investigation Team is conducting a thorough and conscientious investigation, and with the knowledge that the results will be released to the media upon completion. The media may want to report on the fact that the team is at work, without releasing any details of the investigation itself.

The LODD Investigation Team Leader should represent the team at press conferences, public events, and interviews. Any information that is released by the LODD Investigation Team Leader should be considered authoritative and official, while the other team members should refrain from making any public statements.

NEWS MEDIA RELATIONS

In most communities there are a variety of media outlets, and media from other markets are often interested in a line-of-duty death. The media is the community's source of information. It is important to become familiar with the local media outlets and reporters. Make sure you have a media contact list of reporter's names, phone numbers, and email addresses. The IAFF Communications and Media Division can assist with media relations.

Deadlines are critical to every newspaper, television news station, and radio news operation. As much as possible, provide the media with the information on who, what, when, and where. Be cautious with your words, as they could be used in the story. Give only descriptions, and do not speculate regarding causal factors of the incident. It is always best to explain to the media that the investigation is intended to find out the why and how of an incident.

Television is considered the dominant news medium in most urban areas. More importantly, television offers a form of direct communication that is visually powerful. When developing material for television, keep sentences short and simple, with a clear, local angle, and a strong visual component. Be sure to inform television news departments of scheduled events well ahead of time, and hold events early in the day whenever possible. Remember that television news must be condensed into a few "sound bites" and a strong visual image or two. Always plan what will be said before getting in front of the camera.

The internet has increasingly become the most rapid and expedient outlet for breaking news. Online media does not have to wait for the next edition of the newspaper or news broadcast to publish a story.

Newspapers and other print media are considered permanent records of events. A good newspaper reporter has the ability to write a profile or background story giving great detail and history that no television or radio special can attempt to match.

Radio is the most underrated medium because it has no pictures or written words. When talking with radio reporters, keep sentences short, using only one or two main points. The usual time limit for statements made during a radio news broadcast is 15 or 20 seconds.

NEWS RELEASE

Much of the news that is printed or broadcasted originates with news releases. General guidelines for writing a news release include:

- Identify the release in the upper left hand corner with the fire department name and/or local number and affiliation. Be sure to include the contact person's name, address, and phone number. Also make sure that it includes the release date.
- Limit the news release to one page; keep it short and concise.
- Information should appear in order of importance (with relatively less important background information last). This allows an editor to easily cut the story as needed without losing important facts.
- Always use short paragraphs. Always include a headline at the top of the news release.
- Accuracy is important. Make sure that every name is complete and spelled correctly, and that facts and figures have been checked.

News releases can be emailed or faxed to the local media and/or handed out at a press conference.

PRESS CONFERENCE

A press conference saves time by providing identical information to several media at once. Notify every community news outlet of the press conference. Information about the press conference should be directed to the assignment editor or the news director. Be sure to provide the date, time, location, and topic of the press conference.

- Prepare a press kit for distribution at the press conference. This kit should include any news releases, text of any prepared statements made at the press conference, a fact sheet about the fire department and/or IAFF affiliate, and biographies of the fallen fire fighters.
- Identify reserved areas for reporters and camera operators. The reserved areas give the media a privileged view of the activity.
- Reporters should be asked to identify and register themselves.

It is a good idea to have other fire department personnel and/or union officials attend the press conference to provide additional expert information and moral support.

INTERVIEWS

If a reporter requests an interview or a comment, the media spokesperson is not obligated to respond immediately. Take the time to check facts or prepare a statement. Make sure that investigators who do consent to participate in an interview are prepared. Under stress, people tend to have one of three reactions: fight, fright, or flight. The best way to avoid stress is to be prepared.

The following are guidelines for participating in an interview:

DO:

- Prepare two or three key pieces of information that investigators want to communicate.
- Anticipate questions by the interviewer.

- Anticipate negative questions and prepare positive answers.
- Always tell the truth.
- Remain in control. Be conscious of topics of discussion that are off limits.
- Be friendly and polite, and always speak and act in a calm and controlled manner.
- Be accurate. All names, facts, and figures must be correct.
- Use technical references that can be understood in lay terms.

DON'T:

- Get trapped into drawing conclusions.
- Be defensive about the investigation or fire department performance.
- Be afraid to say: "I don't know" if, in fact, you don't know.
- Get emotional or lose self-control with the media.
- Lie under any circumstances.

No one can know all the facts all the time, particularly in the early stages of an investigation. Don't be afraid to say that investigators are unsure of an answer, but let the reporter know that you will provide the information as soon as it is known. Don't risk credibility by trying to guess or speculate. Some examples of phrases that are responsive to a reporter's questions, but still protective of undetermined facts include:

- "It's too early to tell."
- "We still have a lot more work to do before we can put everything in perspective."
- "We are only at the beginning of the investigation process."
- "I am not at liberty to discuss that issue right now because..."

Premature conclusions can only damage the investigation. Witnesses who have not yet been interviewed may hear or see these statements and be influenced by them.

ADDITIONAL READING

On Message: Effective Public and Media Relations for IAFF Affiliates (available online at www.iaff.org and included with the supplemental materials with this manual).

Public Information Officer, International Fire Service Training Association, www.ifstafpp.org

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CHAPTER 14

SOURCES OF OUTSIDE ASSISTANCE

Fire departments who are developing policies for serious injury or LODD, or those that have just suffered one, have a variety of outside resources available to them to assist them through this process. This section summarizes some of these available organizations and the resources they can provide.

INTERNATIONAL ASSOCIATION OF FIRE FIGHTERS

International Association of Fire Fighters, AFL-CIO, CLC
Division of Occupational Health, Safety and Medicine
1750 New York Avenue, NW
Washington DC 20006
(202) 737-8484
(202) 737-8418 (FAX)
www.iaff.org

The International Association of Fire Fighters, headquartered in Washington, DC, represents more than 297,000 full-time professional fire fighters and paramedics who protect 85 percent of the nation's population. More than 3,100 affiliates and their members protect communities in every state in the United States and in Canada. In addition to city and county fire fighters and emergency medical personnel, the IAFF represents state employees, federal workers, and fire and emergency medical workers employed at certain industrial facilities.

The purpose of the IAFF's Division of Occupational Health, Safety, and Medicine is to develop knowledge within the fire service so fire fighters, paramedics, and EMTs can recognize and control the safety and health hazards associated with the profession. To assist in the achievement of that goal, the Division offers a comprehensive array of services and programs to ensure the health and safety of the fire fighter and emergency medical provider is properly and adequately addressed, including the following pertaining to investigations of serious injuries and fatalities:

- The identification of the health, safety, and medical needs and hazards confronting fire fighters through policies established by Convention and/or IAFF Executive Board; directives from the IAFF General President; computerized surveys; and, communications/correspondence with state/provincial associations and local affiliates throughout the United States and Canada.
- The maintenance of technical information and data, and the dissemination of information to IAFF affiliates, upon request, for specific safety and health related material.
- The capability to provide extensive technical assistance to local affiliates, upon its request. Such technical assistance may involve coordination with government agencies to conduct health hazard evaluations or provide technical field assistance. The evaluations objectively document safety and health hazards confronting fire fighters through correspondence, on-site visits, medical assessments, evaluation of protective clothing and equipment, and evaluation of fire department equipment. The IAFF Occupational Health, Safety, and Medicine Division also provides technical assistance to principal officers, other IAFF departments, IAFF state/provincial associations, and local affiliates on issues pertaining to health, safety, and medicine, such as staffing, protective clothing and equipment, medical and physical assessments, fire environment, right-to-know, fire gas toxicity, and fire fighter safety and health standards. Technical assistance also

includes in-house reviews, including review of departmental policies and/or procedures that have, or could, affect the health and safety of fire fighters.

- The administration of the Occupational Medical Residency Program. This program, initiated through convention action and in conjunction with Johns Hopkins University, provides a full time occupational medicine physician position within the Division on a rotational basis. The resident physician provides the Division with technical medical assistance, assists with the development of educational materials, lobbies for presumptive legislation for federal, state, and provincial governments, assists IAFF members with their medical assessments after exposures, and consults in incident investigations.
- The Division assists families of IAFF members with all benefit activities under the Public Safety Officers Benefits (PSOB) regulations, and directs the activities of the IAFF PSOB Coordinator. The Division handles all assistance to locals, correspondence and alerts to Vice Presidents, and affiliates relating to line-of-duty deaths. The PSOB Coordinator, at the request of the Vice President, and upon approval of the IAFF General President, assists locals and families with PSOB claims. The IAFF also has established a Task Force that will immediately provide a detail to a jurisdiction after any multiple fire fighter fatality event to assist the local affiliate and fire department with experienced advice and personnel to address all logistical needs.

Upon receipt of information about a line-of-duty death, and upon the request of the District Vice President, the Office of the IAFF General President determines and assigns appropriate IAFF assistance. The IAFF has specific policies for line-of-duty death notification, funerals, and incident investigations.

The Division is also responsible for the oversight of the IAFF Fallen Fire Fighter Memorial in Colorado Springs and all of its operations and maintenance activities, as well as the Annual Memorial Service held each September.

INTERNATIONAL ASSOCIATION OF FIRE CHIEFS

International Association of Fire Chiefs
4025 Fair Ridge Drive
Suite 300
Fairfax, VA 22033-2868
(703) 273-0911
(703) 273-9363 (FAX)
www.iafc.org

The International Association of Fire Chiefs represents the leadership of over 1.2 million fire fighters and emergency responders. IAFC members are experts in firefighting, emergency medical services, terrorism response, hazardous materials spills, natural disasters, search and rescue, and public safety legislation. Since 1873, the IAFC has provided a forum for its members to exchange ideas and uncover the latest products and services available to first responders.

The Safety, Health and Survival (SHS) Section was established in 2005 to provide a specific component within the IAFC to concentrate on policies and issues relating to the health and safety of fire fighters.

NATIONAL INSTITUTE FOR OCCUPATIONAL HEALTH AND SAFETY

National Institute for Occupational Safety and Health
395 E Street, SW, Suite 9200
Patriots Plaza Building
Washington, DC 20201
(202) 245-0625
(202) 245-0664 (FAX)
www.cdc.gov/niosh

The National Institute for Occupational Safety and Health (NIOSH) was established within the U.S. Department of Health and Human Services (DHHS) by the Occupational Safety and Health Act of 1970 to conduct research and to recommend new occupational safety and health standards. These recommendations are transmitted to the U.S. Department of Labor, which is responsible for the final setting, promulgation, and enforcement of the standards.

In fiscal year 1998, Congress recognized the need for further efforts to address the continuing national problem of occupational fire fighter fatalities and funded NIOSH to implement a fire fighter safety initiative.

The NIOSH Fire Fighter Fatality Investigation and Prevention Program (FFFIPP) conducts investigations of fire fighter line-of-duty-deaths to formulate recommendations for preventing future deaths and injuries. The program does not seek to determine fault or place blame on fire departments or individual fire fighters, but to learn from these tragic events and prevent future similar events. Investigations are prioritized using a decision flow chart available on the FFFIPP website (www.cdc.gov/niosh/fire/). Investigation priorities will change depending on fatality data. The FFFIPP uses the Fatality Assessment and Control Evaluation (FACE) model to conduct investigations of fireground and non-fireground fatal injuries resulting from a variety of circumstances, such as motor vehicle incidents, burns, falls, structural collapse, diving incidents and electrocutions. NIOSH also conducts investigations of selected non-fatal injury events. Each investigation results in a report summarizing the incident, and includes recommendations for preventing future similar events.

NIOSH has an interest in situations where self-contained breathing apparatus (SCBA) may have been a factor in a fatality. Any time breathing apparatus performance is suspected as a possible cause for a fatality, or where an SCBA has not been performing as it should be, the fire department can contact NIOSH and request to have the apparatus examined.

The NIOSH National Personal Protective Technology Laboratory (NPPTL) was created with the mission to prevent work-related illness and injury by ensuring the development, certification, deployment, and use of personal protective equipment and fully integrated intelligent ensembles. This is accomplished through the advancement and application of personal protective technology standards. Through its respirator certification and evaluation program, the Technology Evaluation Branch of NPPTL is responsible for ensuring the development, certification, deployment, and use of personal protective equipment. The NPPTL Technology Evaluation Branch:

- Administers the Department of Health and Human Services 42 CFR, Part 84 respirator approval program, including processing respirator approval applications (i.e., certifying performance, quality, reliability, and efficacy of respiratory protection devices in accordance with Federal regulations and NIOSH policy).
- Evaluates and maintains official records on NIOSH-approved respirators.

- Evaluates quality control plans, including in-plant manufacturing-site quality system audits, and monitors the quality and performance of certified respirators.
- Evaluates personal protective technologies and equipment.
- Investigates field problems associated with NIOSH-certified respirators and other PPE.
- Recommends NIOSH activities to address product non-conformance such as NIOSH approval rescission, product recalls or retrofits, and public notification of potentially unsafe PPE products.
- Provides technical assistance on the selection, use, maintenance, and operation of respiratory protective equipment and other PPE.
- Conducts PPT failure investigations and analyses, and recommends criteria to improve PPE.
- Recommends user guidelines, including cautions, limitations, and restrictions of use.

Additionally, at the request of a fire department, NIOSH may elect to investigate incidents that may have major significance for fire fighter safety, or where chemical exposure or other significant occupational hazards may be a problem through the NIOSH Health Hazard Evaluation (HHE) Program. IAFF Local affiliates should contact the IAFF Division of Occupational Health, Safety and Medicine for assistance in requesting a NIOSH HHE investigation.

- NIOSH Fire Fighter Fatality Investigation and Prevention Program (FFFIPP) investigations are handled by the Division of Safety Research, Surveillance and Field Investigations Branch, 1095 Willowdale Road, Morgantown, WV 26505, (304) 285-5916 or www.cdc.gov/niosh/fire/.
- Questions related to SCBA evaluations should be directed to the NPPTL, Technology Evaluation Branch, 626 Cochran Mill Road, Pittsburgh, PA 15236, (412) 386-4000.
- Health Hazard Evaluation (HHE) investigations are handled by the Division of Surveillance, Hazard Evaluations and Field Studies, Hazard Evaluation and Technical Assistance Branch, 4676 Columbia Parkway, Cincinnati, OH 45226, 1-800-232-4636 or www.cdc.gov/niosh/hhe/Request.html.
- For information on hazardous materials, contact the NIOSH hotline at 1-800-CDC-INFO.

NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST)

National Institute of Standards and Technology
Building and Fire Research Laboratory
100 Bureau Drive, Stop 8661
Gaithersburg, MD 20899-8661
(301) 975-5900
www.fire.nist.gov

The Building and Fire Research Laboratory (BFRL) studies building materials, computer-integrated construction practices, fire science and fire safety engineering, and structural, mechanical, and environmental engineering. Products of the laboratory's research include measurements and test methods, performance criteria, and technical data that support innovations by industry and are incorporated into building and fire standards and codes.

The BFRL mission is to promote U.S. innovation and competitiveness by anticipating and meeting the measurement science, standards, and technology needs of the U.S. building and fire safety industries in ways that enhance economic security and improve the quality of life.

The BRFL Fire Fighting Technology Group enables advances in fire fighter safety, fireground operations, and effectiveness of the fire service. It also develops and applies technology, measurements and standards, and improves the understanding of the behavior, prevention and control of fires to enhance fire fighting operations and equipment, fire suppression, fire investigations, and disaster response.

The Fire Fighting Technology Group has been instrumental in developing computer models of a number of fire fighter fatality incidents to allow investigators to develop a better understanding of the development and spread of these fires.

PUBLIC SAFETY OFFICERS' BENEFITS PROGRAM

Public Safety Officers' Benefits Program
United States Department of Justice
Bureau of Justice Assistance
Office of Justice Programs
810 Seventh Street NW, Fourth Floor
Washington, DC 20531
(202) 307-0635
(888) 744-6513 (toll-free)
(202) 616-0314 (FAX)
www.psob.gov

Enacted in 1976, the Public Safety Officers' Benefits (PSOB) Program:

- Assists in the recruitment and retention of qualified public safety officers.
- Establishes the value communities place on contributions from those who are willing to serve their communities in dangerous circumstances.
- Offers peace of mind to men and women who are seeking careers in public safety.

The PSOB Program provides death and education benefits to survivors of fallen law enforcement officers, fire fighters, and other first responders, as well as disability benefits to officers catastrophically injured in the line of duty.

The PSOB Office is responsible for reviewing nearly 700 death, disability, and education claims submitted annually. The PSOB Office also collaborates with national fire fighter, law enforcement, and first responder groups to provide a wide range of PSOB training and technical assistance resources, through conferences, seminars, and printed materials such as the PSOB Information Kit, to offer vital information and support to survivors and agencies of America's fallen public safety officers. The PSOB program provides the following benefits :

Death

PSOB provides a one-time benefit to eligible survivors of public safety officers whose deaths were the direct and proximate result of an injury sustained in the line of duty on or after September 29, 1976. For the current death benefit amount, visit the PSOB web site at www.psob.gov.

Disability

PSOB provides a one-time benefit to eligible public safety officers who were permanently and totally disabled as a result of a catastrophic injury sustained in the line of duty on or after November 29, 1990. Injuries must permanently prevent officers from performing any gainful work in the future. For the current disability benefit amount, visit www.psob.gov.

Education

PSOB provides support for higher education to eligible spouses and children of public safety officers who died in the line of duty on or after January 1, 1978, or were catastrophically disabled in the line of duty on or after October 3, 1996. For the current maximum educational assistance amount per month, visit www.psob.gov.

Hometown Heroes

On December 15, 2003, the Hometown Heroes Survivors Benefits Act expanded the circumstances under which public safety officer deaths resulting from heart attacks and strokes may be covered by the program. If a public safety officer dies as a direct and proximate result of a heart attack or stroke, that officer shall be presumed to have died as the direct and proximate result of a personal injury sustained in the line of duty unless such presumption is not overcome by competent medical evidence to the contrary. The law requires that the officer, while on duty engaged in a situation, and such engagement involved non-routine stressful or strenuous physical law enforcement, fire suppression, rescue, hazardous material response, emergency medical services, prison security, disaster relief, or other emergency response activity or participated in a training exercise, and such participation involved non-routine stressful or strenuous physical activity.

US DEPARTMENT OF TRANSPORTATION (DOT)

U.S. Department of Transportation
1200 New Jersey Ave, SE
Washington, DC 20590
(202) 366-4000
www.dot.gov

The U.S. Department of Transportation has an interest in three types of incidents. The first is apparatus (vehicle) incidents, where vehicle design or maintenance defects may be a factor. The second is hazardous materials transportation incidents. The third is incidents involving compressed air cylinders. IAFF local affiliates may request the assistance of the IAFF Occupational Health and Safety Department in contacting the USFA or the DOT. In more serious cases, DOT investigation teams may arrive on scene of their own accord. The DOT has investigative authority, and fire department investigation teams should cooperate with them.

TRANSPORTATION SAFETY INSTITUTE

Transportation Safety Institute
Research and Innovative Technology Administration (RITA)
U.S. Department of Transportation (US DOT)
1200 New Jersey Avenue, SE
Washington, DC 20590
(800) 853-1351
www.tsi.dot.gov

The Transportation Safety Institute (TSI), established in 1971 to assist the DOT administration accomplish their mission essential training requirements, is a federal cost-recovery agency that develops and conducts worldwide safety, security, and environmental training, products, and/or services for both public and private sectors. The Research and Innovative Technology Administration (RITA) is the Institute's parent organization within the Department of Transportation (DOT). The Institute offers premier transit, aviation, pipeline, motor carrier, highway safety, hazardous material, and risk management training nationally and internationally.

NATIONAL TRANSPORTATION SAFETY BOARD

National Transportation Safety Board
 490 L'Enfant Plaza East, SW 6th Floor
 Washington, DC 20594
 (202) 314-6000
www.nts.gov

The National Transportation Safety Board was established in 1967 as an independent U.S. federal agency, located within the DOT to promote transportation safety by conducting independent incident investigations, and by formulating safety improvement regulations. As of April 1, 1975, the NTSB was established as an independent agency (49 USC 1902 § 303) and was removed from under the jurisdiction of the DOT.

The NTSB has no regulatory or enforcement powers but is required by law to do the following:

- Investigate and determine the facts, conditions, and circumstances and the cause or probable cause, if any:
- Aircraft accident which is within the scope of the functions, powers, and duties transferred from the Civil Aeronautics Board under section 6(d) of the Department of Transportation Act (49 USC 1655(d)).
- Highway accident, including railroad grade crossing accidents that the NTSB selects in cooperation with the state.
- Railroad accident in which there is a fatality, substantial property damage, or which involves a passenger train.
- Pipeline accident in which there is a fatality or subsequent property damage.
- Major marine casualty, except one involving only public vessels occurring on the navigable waters or territorial seas of the United States, or involving a vessel of the United States, in accordance with regulations prescribed jointly by the Board and the Secretary of Transportation in which the Coast Guard operates.
- Release of hazardous materials in all forms of transportation.
- Other accidents which occur in connection with the transportation of people or property which, in the judgment of the Board, is catastrophic, involves problems of a recurring character, or would otherwise carry out the policies contained in the Department of Transportation Act.
- Report in writing on the facts, conditions, and circumstances of each accident investigated, and make such reports available to the public at reasonable cost.
- Issue periodic reports to the Congress, federal, state, and local agencies concerned with transportation safety, and other interested persons. Reports should recommend and advocate meaningful responses to reduce the likelihood of reoccurrence of transportation accidents, and propose corrective steps to make the transportation of persons as safe and free from risk of injury as is possible, including steps to minimize human injuries from transportation accidents.
- Initiate and conduct special studies and special investigations on matters pertaining to safety in transportation, including human injury avoidance.
- Assess and reassess techniques and methods of incident investigation, and publish recommended procedures for accident investigations.
- Establish requirements binding on persons reporting:

- Accidents and aviation incidents subject to the Board's investigatory jurisdiction under this subsection.
- Accidents and Aviation incidents involving public aircraft other than aircraft of the Armed Forces and the Intelligent Agencies.
- Evaluate, assess the effectiveness, and publish the findings of the Board with respect to the transportation safety consciousness and efficacy in preventing accidents of other government agencies.
- Evaluate the adequacy of safeguards and procedures concerning the transportation of hazardous materials, and the performance of other government agencies charged with assuring the safe transportation of such materials.

Any employee of the Board, upon presenting appropriate credentials and a written notice of inspection authority, is authorized to enter any property where a transportation accident has occurred or inspect wreckage from any such accident. NTSB employees may do whatever is necessary for a proper investigation, including examination or testing of any vessel, vehicle, rolling stock, track, pipeline component, or any part of any such item. Any examination or testing must be conducted in a manner so as not to interfere with, or obstruct unnecessarily, the transportation services provided by the owner or operator of the vessel, vehicle, rolling stock, track, or pipeline component, and must preserve, to the maximum extent feasible, any evidence relating to the transportation accidents, consistent with the needs of the investigation and with the cooperation of the owner or operator.

NTSB employees may inspect, at reasonable times, records, files, papers, processes, controls, and facilities relevant to the investigation of accidents. The Board has sole authority to determine the manner in which testing will be carried out under this paragraph, including determining the persons who will conduct and witness the test, and the type of test to be conducted.

UNITED STATES FIRE ADMINISTRATION

United States Fire Administration
16825 South Seton Avenue
Emmitsburg, MD 21727
(800) 238-3358 (General Information)
(800) 638-1821 (Research Library)
www.usfa.fema.gov

The USFA and the National Fire Academy are organized under the Federal Emergency Management Agency (FEMA). The USFA requests that they be informed of all fire fighter line-of-duty deaths and be sent a copy of any investigation report. In addition, the USFA provides notice to the fire service of fire fighter fatalities and maintains an online database of fire fighter fatalities.

The USFA has in the past, when deemed appropriate, contracted with private investigation firms to prepare reports that may be of interest on a national level. The USFA does not have any investigative authority. Their primary interest is to collect and distribute information relevant to fire fighter safety and health that may be of interest to the fire service at large.

NATIONAL FIRE PROTECTION ASSOCIATION

National Fire Protection Association
 1 Batterymarch Park
 Quincy, MA 02269-9101
 (617) 770-3000
 (617) 770-0700 (FAX)
www.nfpa.org

The National Fire Protection Association, a leading authority on fire, electrical, and building safety, is a nonprofit organization that develops consensus standards concerning fire protection and the fire service. The mission of the NFPA, established in 1896, is to reduce the worldwide burden of fire and other hazards on quality of life by providing and advocating consensus codes and standards, research, training, and education. As a component of their mission to reduce the burden of fire and related hazards on society, NFPA annually collects data on fire fighter fatalities in the United States that result from injury or illnesses that occur while on duty.

Currently, NFPA develops and publishes more than 300 consensus codes and standards intended to minimize the possibility and effects of fire and other risks. Nearly a third of the documents relate directly or indirectly to fire service issues. NFPA may send investigators to report on major incidents; however, their investigations are usually limited to fire causation.

NFPA has no investigative authority and operates at the invitation of the authority having jurisdiction. Contact the NFPA to purchase copies of codes and standards. The following are NFPA standards which may be of use to investigators:

- NFPA 10, Portable Fire Extinguishers
- NFPA 101, Life Safety Code
- NFPA 400, Hazardous Materials Code
- NFPA 402, Guide for Aircraft Rescue and Fire-Fighting Operations
- NFPA 403, Aircraft Rescue and Fire-Fighting Services at Airports
- NFPA 405, Recurring Proficiency of Airport Fire Fighters
- NFPA 472, Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents
- NFPA 473, Competencies for EMS Personnel Responding to Hazardous Materials/Weapons of Mass Destruction Incidents
- NFPA 704, Standard System for the Identification of the Hazards of Materials for Emergency Response
- NFPA 921, Guide for Fire and Explosion Investigations
- NFPA 1000, Fire Service Professional Qualifications Accreditation and Certification Systems
- NFPA 1001, Fire Fighter Professional Qualifications
- NFPA 1002, Fire Apparatus Driver/Operator Professional Qualifications
- NFPA 1003, Airport Fire Fighter Professional Qualifications
- NFPA 1005, Professional Qualifications for Marine Fire Fighting for Land-Based Fire Fighters
- NFPA 1006, Technical Rescuer Professional Qualifications

- NFPA 1021, Fire Officer Professional Qualifications
- NFPA 1026, Incident Management Personnel Professional Qualifications
- NFPA 1031, Professional Qualifications for Fire Inspector and Plan Examiner
- NFPA 1033, Professional Qualifications for Fire Investigator
- NFPA 1035, Professional Qualifications for Public Fire and Life Safety Educator
- NFPA 1037, Professional Qualifications for Fire Marshal
- NFPA 1041, Fire Service Instructor Professional Qualifications
- NFPA 1051, Wildland Fire Fighter Professional Qualifications
- NFPA 1061, Professional Qualifications for Public Safety Telecommunicator
- NFPA 1071, Emergency Vehicle Technician Professional Qualifications
- NFPA 1081, Industrial Fire Brigade Member Professional Qualifications
- NFPA 1201, Providing Emergency Services to the Public
- NFPA 1221, Installation, Maintenance, and Use of Emergency Services Communication Systems
- NFPA 1250, Recommended Practice in Emergency Service Organization Risk Management
- NFPA 1402, Guide to Building Fire Service Training Centers
- NFPA 1403, Live Fire Training Evolutions
- NFPA 1404, Fire Service Respiratory Protection Training
- NFPA 1405, Guide for Land-Based Fire Fighters Who Respond to Marine Vessel Fires
- NFPA 1407, Fire Service Rapid Intervention Crews
- NFPA 1410, Training for Initial Emergency Scene Operations
- NFPA 1451, Fire Service Vehicle Operations Training Program
- NFPA 1500, Fire Department Occupational Safety and Health Program
- NFPA 1521, Fire Department Safety Officer
- NFPA 1561, Emergency Services Incident Management System
- NFPA 1581, Fire Department Infection Control Program
- NFPA 1582, Comprehensive Occupational Medical Program for Fire Departments
- NFPA 1583, Health-Related Fitness Programs for Fire Department Members
- NFPA 1584, Rehabilitation Process for Members During Emergency Operations and Training Exercises
- NFPA 1620, Recommended Practice for Pre-Incident Planning
- NFPA 1670, Operations and Training for Technical Search and Rescue Incidents
- NFPA 1710, Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments
- NFPA 1801, Thermal Imagers for the Fire Service
- NFPA 1851, Selection, Care, and Maintenance of Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting
- NFPA 1852, Selection, Care, and Maintenance of Open-Circuit Self-Contained Breathing Apparatus (SCBA)
- NFPA 1901, Automotive Fire Apparatus
- NFPA 1906, Wildland Fire Apparatus
- NFPA 1911, Inspection, Maintenance, Testing, and Retirement of In-Service Automotive

Fire Apparatus

- NFPA 1912, Fire Apparatus Refurbishing
- NFPA 1925, Marine Fire-Fighting Vessels
- NFPA 1931, Manufacturer's Design of Fire Department Ground Ladders
- NFPA 1932, Use, Maintenance, and Service Testing of In-Service Fire Department Ground Ladders
- NFPA 1936, Powered Rescue Tools
- NFPA 1951, Protective Ensembles for Technical Rescue Incidents
- NFPA 1952, Surface Water Operations Protective Clothing and Equipment
- NFPA 1961, Fire Hose
- NFPA 1962, Inspection, Care, and Use of Fire Hose, Couplings, and Nozzles and the Service Testing of Fire Hose
- NFPA 1964, Spray Nozzles
- NFPA 1965, Fire Hose Appliances
- NFPA 1975, Station/Work Uniforms for Emergency Services
- NFPA 1971, Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting
- NFPA 1977, Protective Clothing and Equipment for Wildland Fire Fighting
- NFPA 1981, Open-Circuit Self-Contained Breathing Apparatus (SCBA) for Emergency Services
- NFPA 1982, Personal Alert Safety Systems (PASS)
- NFPA 1983, Life Safety Rope and Equipment for Emergency Services
- NFPA 1984, Respirators for Wildland Fire Fighting Operations
- NFPA 1989, Breathing Air Quality for Emergency Services Respiratory Protection
- NFPA 1991, Vapor-Protective Ensembles for Hazardous Materials Emergencies
- NFPA 1992, Liquid Splash-Protective Ensembles and Clothing for Hazardous Materials Emergencies
- NFPA 1994, Protective Ensembles for First Responders to CBRN Terrorism Incidents
- NFPA 1999, Protective Clothing for Emergency Medical Operations
- NFPA 5000, Building Construction and Safety Code

US CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD

US Chemical Safety and Hazard Investigation Board
2175 K Street NW Suite 400
Washington, DC 20037
202-261-7600
202-261-7650 (fax)
www.csb.gov

The Chemical Safety Board and Hazard Investigation Board (CSB) is an independent federal agency charged with investigating industrial chemical accidents. Headquartered in Washington, DC, the agency's board members are appointed by the President and confirmed by the Senate.

The CSB conducts root cause investigations of chemical accidents at fixed industrial facilities. Root causes are usually deficiencies in safety management systems, but can be any factor that would

have prevented the accident if that factor had not occurred. Other accident causes often involve equipment failures, human errors, unforeseen chemical reactions or other hazards. The agency does not issue fines or citations, but does make recommendations to plants, regulatory agencies such as the Occupational Safety and Health Administration (OSHA) and the Environmental Protection Agency (EPA), industry organizations, and labor groups. Congress designed the CSB to be non-regulatory and independent of other agencies so that its investigations might, where appropriate, review the effectiveness of regulations and regulatory enforcement.

The CSB investigative staff includes chemical and mechanical engineers, industrial safety experts, and other specialists with experience in the private and public sectors. Many investigators have years of chemical industry experience.

After a CSB team reaches a chemical incident site, investigators begin their work by conducting detailed interviews of witnesses such as plant employees, managers, and neighbors. Chemical samples and equipment obtained from accident sites are sent to independent laboratories for testing. Company safety records, inventories, and operating procedures are examined as investigators seek an understanding of the circumstances of the accident.

Over a course of several months, investigators sift through evidence, consult with Board members, and review regulations and industry practices before drafting key findings, root causes and recommendations. During the process, investigators may confer with plant managers, workers, labor groups, and other government authorities. The investigative process generally takes six to twelve months to complete, and a draft report is then submitted to the Board for consideration. Reports may be adopted through a written vote of the Board or in a formal public meeting near the incident site or in Washington, DC.

In addition to investigations of specific accidents, the Board is authorized to conduct investigations of more general chemical accident hazards, whether or not an accident has already occurred. In 2002, the Board's first hazard investigation on reactive chemicals reviewed more than 150 serious accidents involving uncontrolled chemical reactions in industry. This investigation led to new recommendations to OSHA and EPA for regulatory changes.

Both accident investigations and hazard investigations lead to new safety recommendations, which are the Board's principal tool for achieving positive change. Recommendations are issued to government agencies, companies, trade associations, labor unions, and other groups. Implementation of each safety recommendation is tracked and monitored by CSB staff. When recommended actions have been completed satisfactorily, the recommendation may be closed by a Board vote.

While some recommendations may be adopted immediately, others require extensive effort and advocacy to achieve implementation. Board members and staff work to promote safety actions based on CSB recommendations. In many cases, the lessons from CSB investigations are applicable to many organizations beyond the company investigated. Many CSB recommendations have been implemented in industry, leading to safer plants, workers, and communities.

ASSOCIATION OF OCCUPATIONAL AND ENVIRONMENTAL CLINICS

Association of Occupational and Environmental Clinics
1010 Vermont Avenue, NW, Suite 513
Washington, DC 20005
(202) 347-4976
(202) 347-4950 (FAX)
www.aoec.org

The Association of Occupational and Environmental Clinics (AOEC) is a network of U.S. medical clinics dedicated to research, education, prevention, and treatment of occupational and environmental diseases. A main goal of AOEC is to facilitate the prevention and treatment of occupational and environmental illnesses and injuries through collaborative reporting and investigation of health problems. AOEC can provide the names of occupational medicine physicians who may be contracted to aid in the investigation.

AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

Agency for Toxic Substances and Disease Registry
Division of Toxicology and Environmental Medicine
4770 Buford Highway NE
Atlanta, GA 30341
(800) 232-4636
www.atsdr.cdc.gov

The Agency for Toxic Substances and Disease Registry (ATSDR), based in Atlanta, Georgia, is a federal public health agency of the U.S. Department of Health and Human Services. ATSDR serves the public by using the best science, taking responsive public health actions, and providing trusted health information to prevent harmful exposures and diseases related to toxic substances.

ATSDR's mission, as an agency of the U.S. Department of Health and Human Services, is to prevent exposure and adverse health effects from exposure to hazardous substances associated with hazardous waste sites and accidental chemical releases. ATSDR provides public health assessments of waste sites, health consultations concerning specific hazardous substances, health surveillance, response to emergency releases of hazardous substances, and information development and dissemination. ATSDR is an excellent resource for determining the health effects of hazardous materials.

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ANNEX A1: MAPPING & DIAGRAMMING

While conducting a scene examination it is often very useful to develop a rough sketch to capture spatial information, such as the basic layout and dimensions of a building, apparatus placement, hose lines, or the locations of items within the building. This type of sketch is usually drawn in the field and the information is converted to a more accurate scaled drawing or diagram at a later stage in the investigation.

The sketch provides a rough visual depiction of information that would be much more difficult to record in any other format, particularly during the limited time that may be available to examine an undisturbed scene. Photographs and/or video recordings can often capture more detailed visual images. Figure A1.1 through Figure A1.5 show several samples of completed diagrams from actual fire fighter LODD incidents.

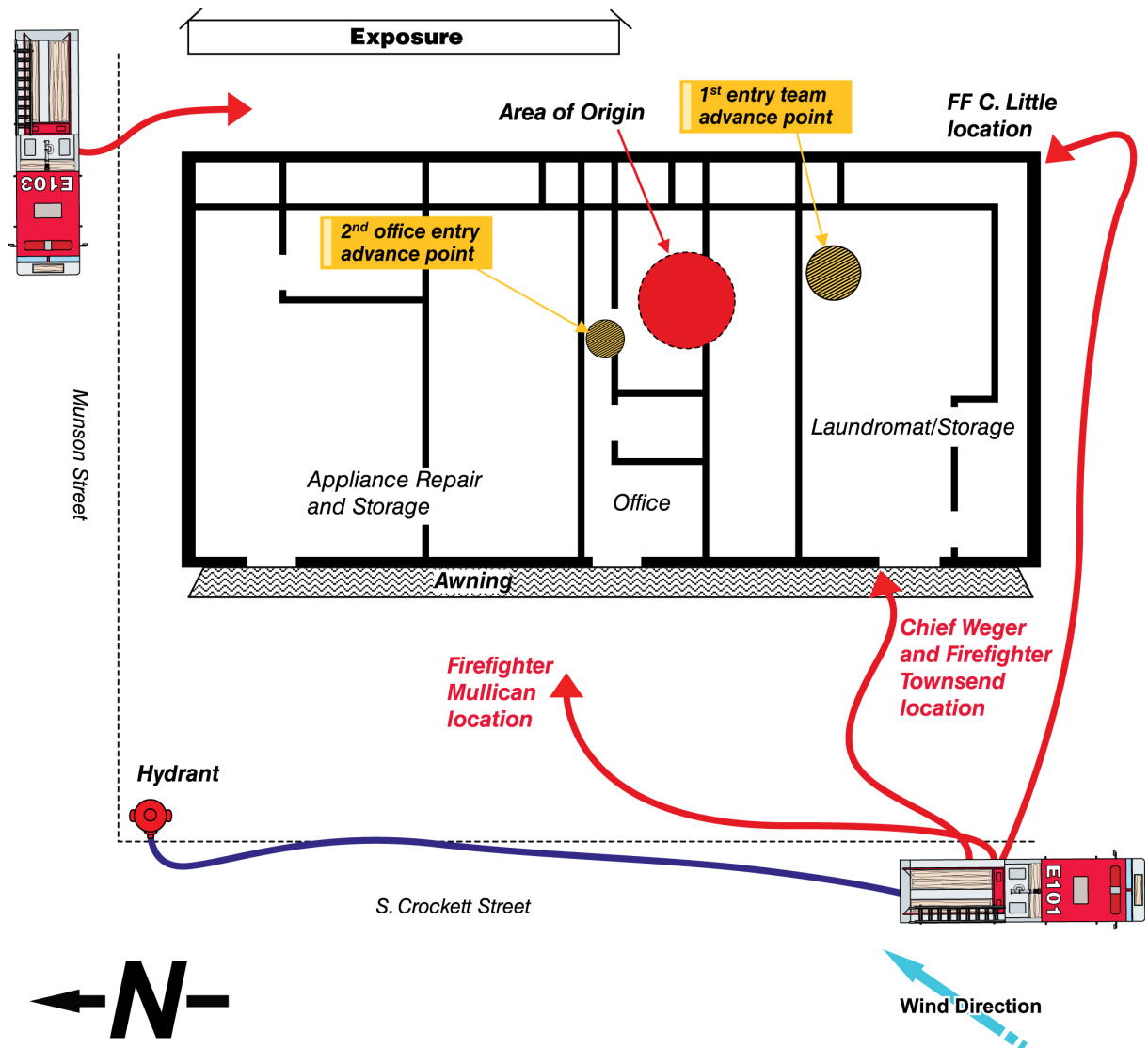


Figure A1.1 LODD Incident Diagram from Dennison, TX Report

Apparatus Placement Of Training Division & Standby Equipment

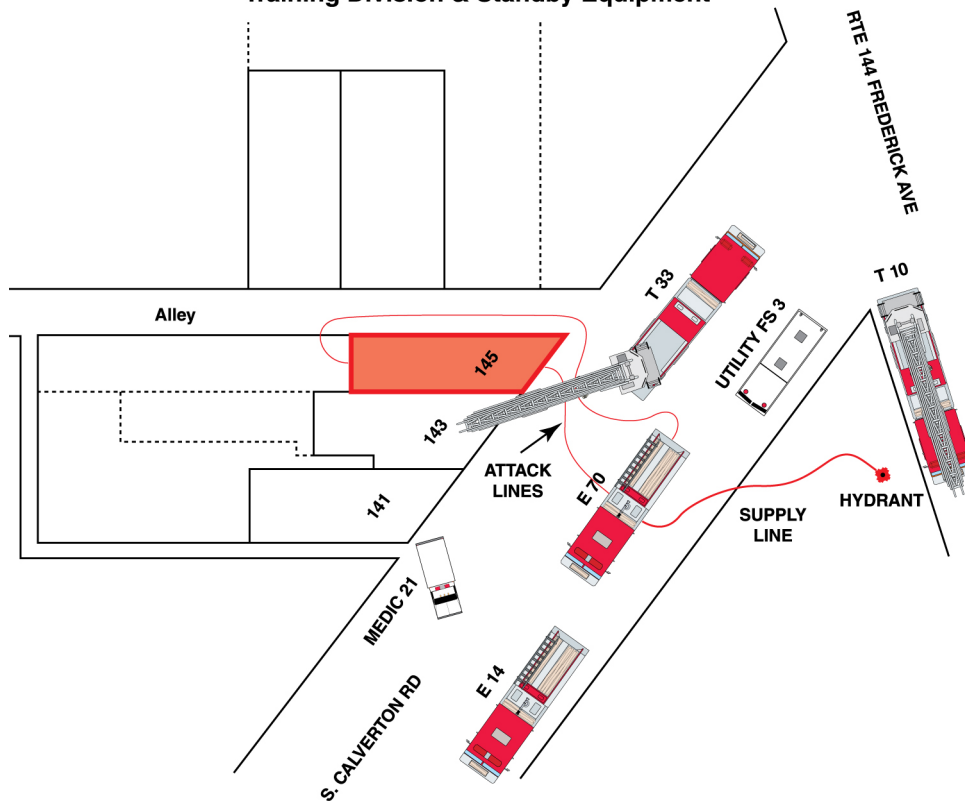


Figure A1.2 LODD Incident Diagram from Baltimore, MD Report

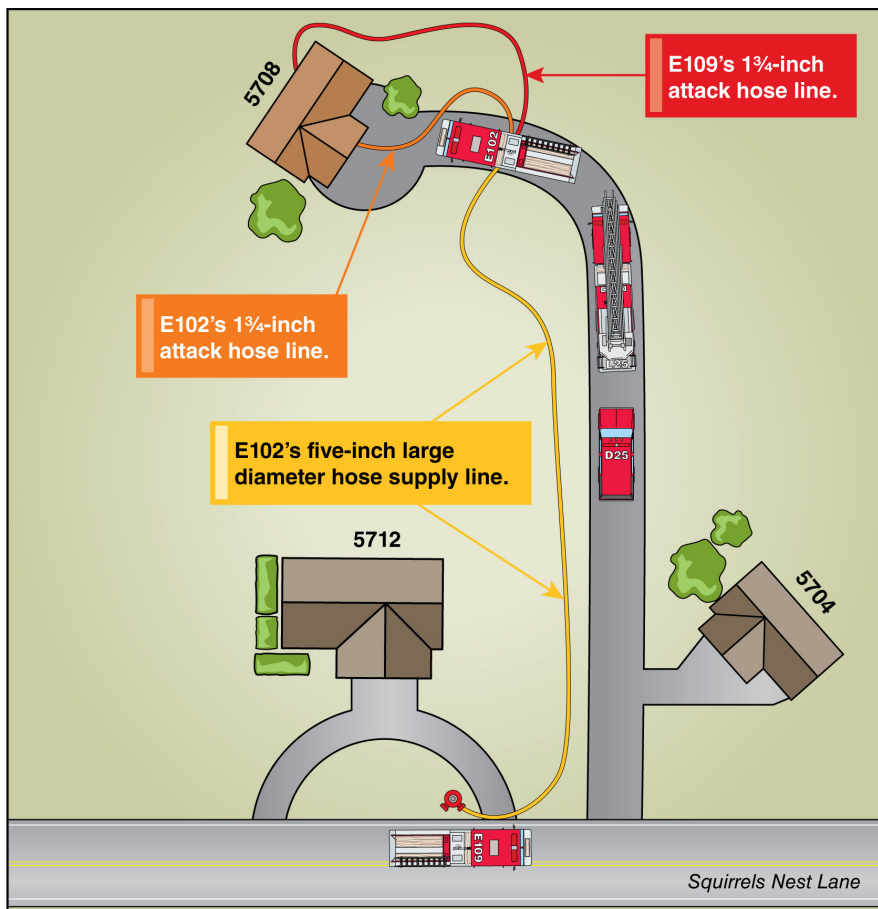


Figure A1.3 LODD Incident Diagram from Colerain, OH Report

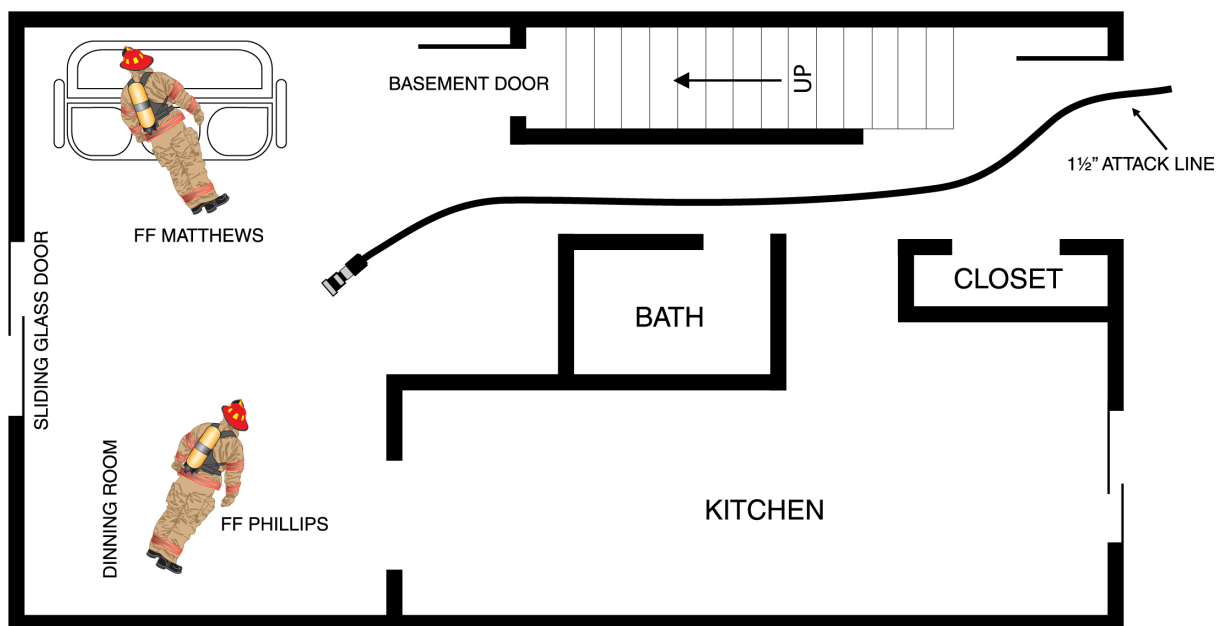
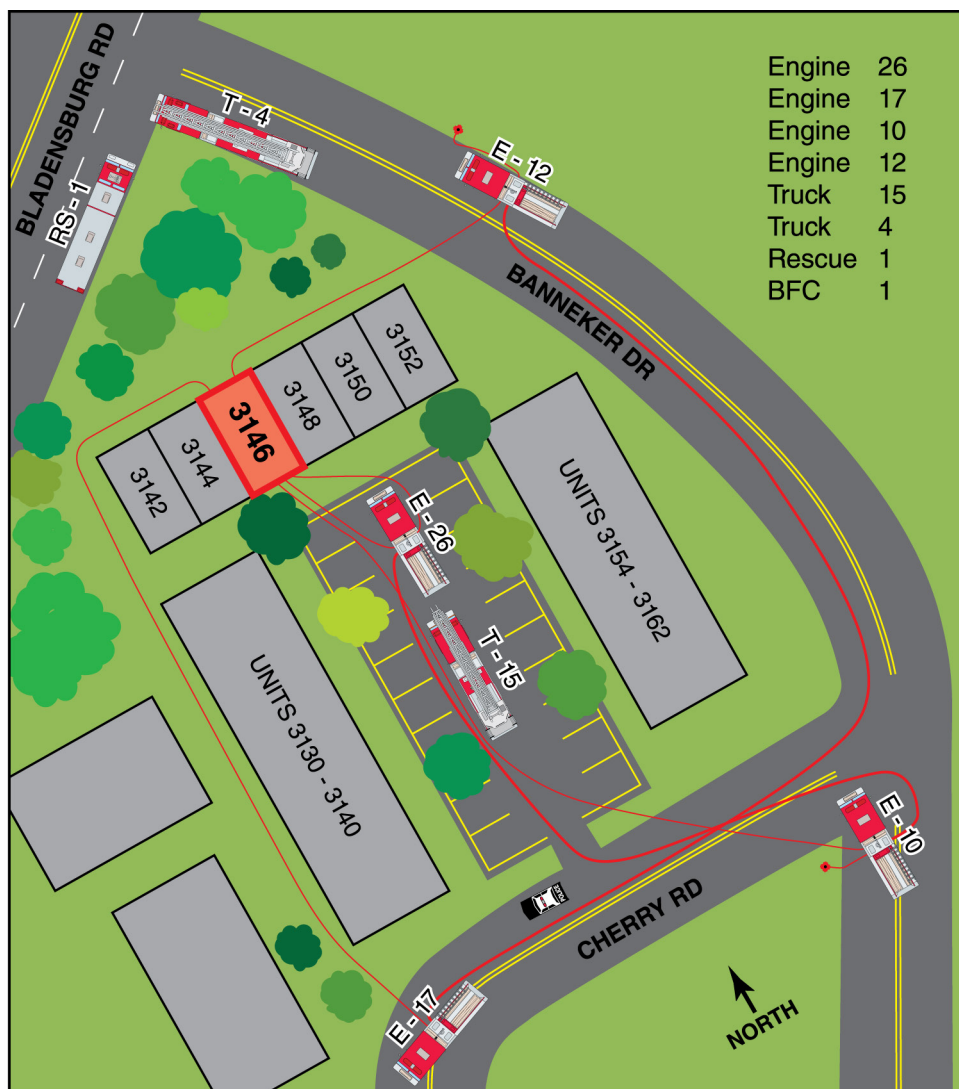


Figure A1.4 LODD Incident Diagrams from Washington, DC Report

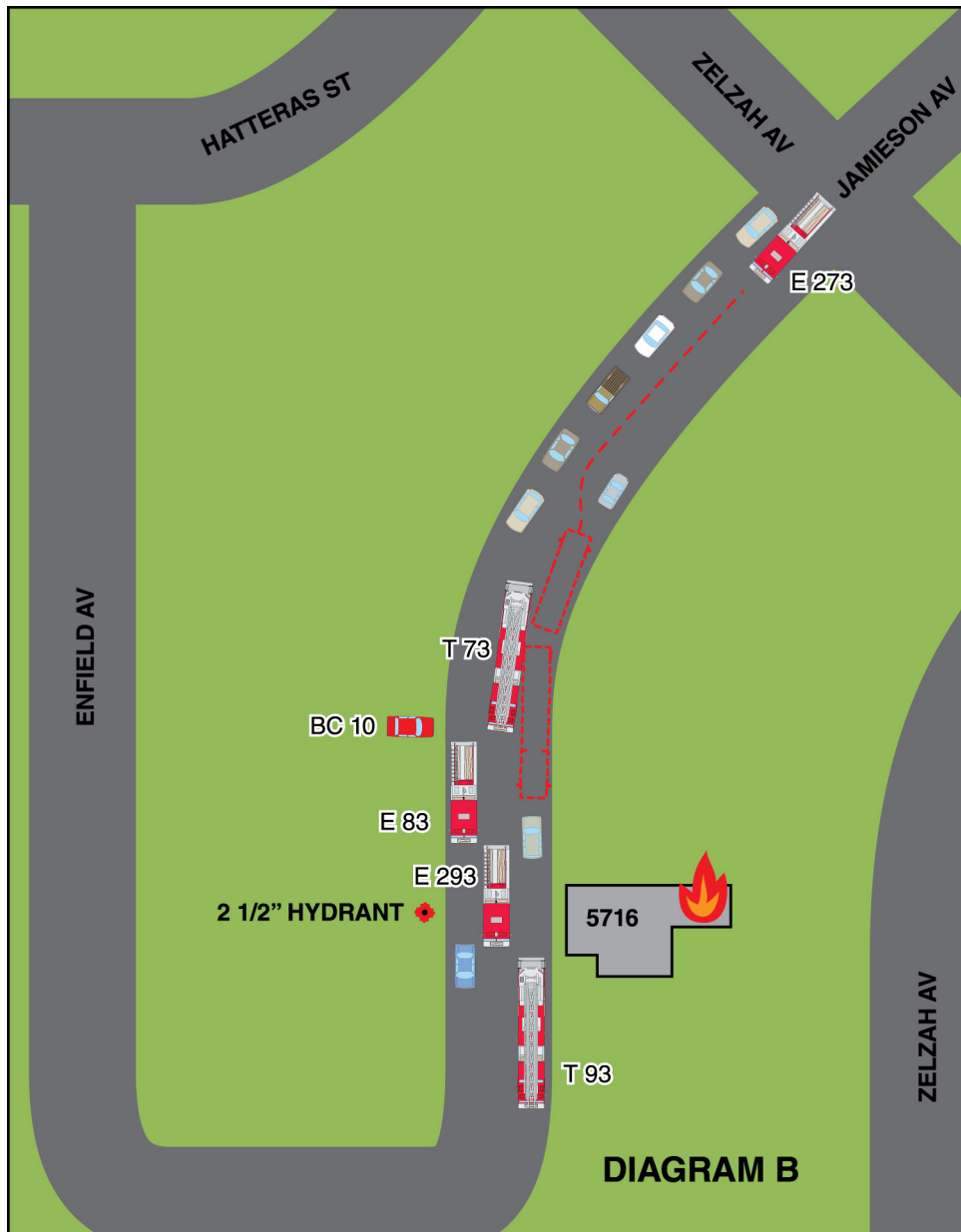


Figure A1.5 LODD Incident Diagram from Los Angeles City, CA Report

ANNEX A2: INCIDENT SCENE PHOTOGRAPHY

While photography itself has undergone a revolution from film to digital photographs, in the last decade the importance of incident photography cannot be overstated. This section discusses basic concepts and techniques for photographs that are taken by or for the LODD Investigation Team. The use and value of photographs taken by others during the incident is discussed in Chapter 9.

Photographs and video are the most efficient reminders of what the investigator saw while at the scene. These visual aids provide an incontrovertible record of the incident and any factors which may be important in describing the events that occurred. They are a supplement to interviews, physical evidence, and written documentation.

Patterns and items that were overlooked at the time the photographs or videos were taken may become evident at later viewings. They also substantiate reports and statements of the investigator and provide an effective means to illustrate the condition of the scene in the final report prepared by the LODD Investigation Team.

PHOTOGRAPHY COMPOSITION AND TECHNIQUE¹

A series of photographs and video should be taken to make a visual record of the structure, contents remaining at the scene, and anything related to fire fighting activities.

Fire Suppression Photographs

Fire suppression activities pertinent to the investigation include the operation of automatic systems, as well as the activities of the responding fire services, whenever possible. All aspects pertinent to these, such as hydrant locations, engine company positions, hose lays, attack line locations, and so forth, play a role in the eventual outcome of the fire. Therefore, all components of those systems should be photographed.

Exterior Photographs

A series of exterior shots should be taken to establish the location of a fire scene. These shots could include street signs or access streets, numerical addresses, or landmarks that can be readily identified. Surrounding areas that would represent remote evidence, such as fire protection and exposure damage, should also be photographed. Exterior photographs should also be taken of all sides and corners of a structure to reveal all structural members and their relationships with each other (Figure Annex B.1).

Structural Photographs

Structural photographs document the damage to the structure after heat and flame exposure. Structural photos can expose burn patterns to track the evolution of the fire and can assist in understanding the fire's origin.

A recommended procedure is to include, as much as possible, of all exterior angles and views of the structure. Oblique corner shots can give reference points for orientation. Photographs should show all angles necessary for a full explanation of a condition.

Photographs should be taken of structural failures such as windows, roofs, or walls. Such failures

can change the route of fire travel and can play a significant role in the eventual outcome of the fire. Code violations or structural deficiencies should also be photographed because fire travel patterns may have resulted from those deficiencies.

Interior Photographs

Interior photographs are equally important. Lighting conditions will likely change from the exterior, calling for the need to adjust technique, but the concerns (tracking and documenting fire travel backward toward the fire origin) are the same. All significant ventilation points accessed or created by the fire should be photographed, as well as all significant smoke, heat, and burn patterns.

Rooms within the immediate area of the fire origin should be photographed, even if there is no damage. If warranted, closets and cabinet interiors should also be documented. In small buildings, this documentation could involve all rooms; but in large buildings, it may not be necessary to photograph all rooms unless there is a need to document the presence, absence, or condition of contents.

All heat-producing appliances or equipment, such as furnaces, in the immediate area of the origin, or connected to the area of origin, should be photographed to document their role, if any, in the fire cause.

All furniture or other contents within the area of origin should be photographed as found, and again after reconstruction. Protected areas left by any furnishings or other contents should also be photographed.

The position of doors and windows during a fire is important, so photographs should be taken that would document where they are located.

Interior fire protection devices such as detectors, sprinklers, extinguishers used, door closers, or dampers should be photographed.

Clocks may indicate the time power was discontinued or the time in which fire or heat physically stopped their movement.

Utility and Appliance Photographs

The utility (gas, electric) entrances and controls both inside and outside a structure should be photographed. Photos should include gas and electric meters, gas regulators, and their location relative to the structure. The electric utility pole(s) near the structure that is equipped with the transformer serving the structure, and the electrical services coming into the structure, as well as the fuse or circuit breaker panels should also be photographed. If there are gas appliances in the fire area of origin, the position of all controls on the gas appliances should be photographed. When photographing electrical circuit breaker panels, the position of all circuit breaker handles and the panel's schedule indicating what electrical equipment is supplied by each breaker, when available, should be photographed. Likewise, all electrical cords and convenience outlets pertinent to the fire's location should be photographed.

Evidence Photographs

Items of evidentiary value should be photographed at the scene and can be re-photographed at the investigator's office or laboratory if a more detailed view is needed. During the excavation of the debris strata, articles in the debris may or may not be recognized as evidence. If photographs

are taken in an archaeological manner, the location and position of evidence that can be of vital importance will be documented permanently. Photographs orient the articles of evidence in their original location, as well as show their condition when found. Evidence is essential in any court case, and photographs of evidence stand strong with proper identification. In an evidentiary photograph, a ruler can be used to identify relative size of the evidence. Other items can also be used to identify the size of evidence as long as the item is readily identifiable and of constant size (e.g., a penny). A photograph should be taken of the evidence without the ruler or marker prior to taking a photograph with the marker.

Victim Photographs

The locations of fire fighters and other building occupants should be documented, and any evidence of actions taken or performed by those occupants should be photographed. This documentation should include marks on walls, the beds civilian victims were occupying, or protected areas where a body was located. If there is a death involved, the body should be photographed. Surviving victims injuries and their clothing worn should also be photographed.

The area underneath the position where the fire fighter was found should also be photographed. The condition of the floor or items underneath the deceased fire fighter could yield clues about the timing of the fire fighter's death or incapacitation.

Witness Viewpoint Photographs

During an investigation, if witnesses surface and give testimony as to what they observed from a certain vantage point, a photograph should be taken from the most identical view available. This photograph will orient all persons involved with the investigation, as well as a jury, to the direction of the witnesses' observations, and could support or refute the possibility of their testimony being truthful.

Aerial Photographs

Views from a high vantage point, which can be an aerial fire apparatus, adjacent building or hill, airplane, or helicopter, can often reveal fire spread patterns. Aerial photography can be expensive, and a number of special problems exist that can affect the quality of the results. It is suggested that the investigator seek the advice or assistance of an experienced aerial photographer when such photographs are desired.

Law enforcement helicopters can often be employed for aerial photography.

THE PHOTOGRAPH LOG

Investigations can be difficult to manage without sufficient organization. There may be a great deal of time between when photographs are taken and when they are analyzed. Additional confusion or uncertainty might occur when people other than the investigator view the photographs. The best method for organization of photographs and video is to maintain a photo log including:

- Picture number.
- Picture file name (if digital).
- When the picture was taken.
- Who took it.

- Conditions the picture was taken in (film, light, lens).
- Position from which the picture was taken.
- What the picture shows.

WHEN SHOULD PICTURES BE TAKEN?

Photographs should be taken as soon as practical, as the scene may become altered, disturbed, or even destroyed. Some reasons why time is important include:

- The building is in danger of imminent collapse or the structure must be demolished for safety reasons.
- The condition of the building contents creates an environmental hazard that needs immediate attention.
- Evidence must be documented when discovered, and as layers of debris are removed.

PHOTOGRAPHY TIPS

Certain photography tips can assist investigators at the incident scene and later when photographs are used in the investigation report:

- Upon arrival at a fire scene photograph a written “title sheet” that shows identifying information (i.e., location, date, or situational information).
- Label the film canister or the camera data card after use to prevent confusion or loss.
- Do not combine multiple incidents on one data card or roll of film. Complete each fire scene and remove the data card or the last roll of film from the camera before leaving the scene.
- Carry extra batteries, especially in cold weather when they can be drained quickly.

PROCESSING OF FILM AND PROOF SHEETS

The purchase and processing of photo film is not very expensive, however, the printing and enlargement of pictures can be very expensive. Not all pictures taken of the incident scene will be wanted or needed by the investigators. One way to save money and provide a good record of the film roll is to ask for a proof sheet of the roll of prints. Many photo labs will also offer digital copies of developed film at a nominal cost.

Proof pictures are small replicas of the entire roll. One 24 exposure roll of film will fit onto one 8” x 10” sheet of paper. If the proof sheet is printed properly, the print in the upper left will be the roll identification picture. Proof pictures contain enough detail to match-up with the photo log and determine which ones are of value. Important pictures can then be enlarged as needed. When enlarged, photos should be cropped to include only the valuable information.

Digital photos can also be somewhat expensive to print, especially in larger formats. Most photo management software allows the viewing and printing of small images grouped with many per page.

NEWS MEDIA

News papers, television stations, and photographers usually respond to fires and emergencies in their area of coverage. Video camera operators and photographers are trained, professional observers. An immediate request to the local news media should be made for copies of any still photographs or videos taken at the emergency scene. Furthermore, reporters will often identify and interview witnesses who may have left before the Investigation Team arrived on the scene. They will often provide notes, video tapes, and still photographs to investigators. If a spirit of cooperation does not exist between the fire department and the local news media, legal counsel should be consulted for avenues to impound such evidence.

CONCLUSION

Photography is a valuable aid to the investigator. Photographs provide records of indescribable detail and serve as an important supplement to the investigator's notes. Documentary photography is a skill that takes practice before the investigation ever commences. When an investigator fully understands how to use the cameras, lenses, and flash, quality pictures are assured.

ADDITIONAL READING

Aircraft Accident Investigation, On-Scene Investigation Management, Federal Aviation Administration, Volume 1, Chapter 5, 3rd. Ed.: Accident Photography.

Modern Accident Investigation and Analysis, 2nd. Ed., Ted S. Ferry, John Wiley and Sons, 1988. Chapter 3: Getting the Investigation Underway.

NFPA 921: Guide for Fire and Explosion Investigations, 2008 Ed., National Fire Protection Association, 2008. Chapter 15: Documentation of the Investigation.

Professional Accident Investigation: Investigative Methods and Techniques, Raymond Kuhlman, Institute Press, 1977. Chapter 9: Photography in Investigation.

END NOTE

¹NFPA 921: Guide for Fire and Explosion Investigations, 2008 Ed., National Fire Protection Association, 2008. Chapter 15: Documentation of the Investigation.

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ANNEX A3: PHYSICAL EVIDENCE

The LODD Investigation Team is responsible for identifying and taking custody of any physical evidence related to an investigation, and must take every reasonable precaution to preserve and protect it. The handling and movement of physical evidence should be avoided until it has been properly documented. Contamination of physical evidence, caused by improper methods of collection, storage, or shipment, will reduce its evidentiary value.

The location of physical evidence should be thoroughly documented before it is moved. Diagramming and photography should always be completed before the physical evidence is moved or disturbed. The investigator must log all evidence removed and who removed it.

LODD Investigative Team members are not usually evidence collection experts. A member of the team may have expertise, or the team could consult with an expert. Local law enforcement agencies are an excellent source of expertise.

EVIDENCE COLLECTION

The method of collection of the physical evidence is determined by many factors, including the following:

- Physical state - whether physical evidence is a solid, liquid, or gas.
- Physical characteristics - size, shape, and weight of the physical evidence.
- Fragility - how easily physical evidence is broken, damaged, or altered.
- Volatility - how easily physical evidence may evaporate.

Evidence containers may be envelopes, paper bags, plastic bags, glass containers, or metal cans. Investigators may also use containers specifically designed for certain types of physical evidence. The selection of an appropriate evidence container should be guided by the policies and procedures of the laboratory that will examine or test the physical evidence, and the use to which the evidence will be subjected. Investigators must ensure that evidence containers are new and uncontaminated.

All evidence must be marked or labeled for identification at the time of collection. Recommended identification includes the name of the investigator, the date, time, and location of collection, an identification name or number, and a description of the evidence. This information can be written directly on the container, or on a tag or label that is then securely fastened to the container.

When collecting physical evidence for examination and testing, it is often necessary to also collect comparison samples. For example, a section of a fire fighter's protective clothing may have been severely burned, while another section may be in good condition. Comparison tests may reveal the condition of the garment at the time of the fire.

CHAIN OF CUSTODY FOR PHYSICAL EVIDENCE

Physical evidence should be stored in a secure location. Access to the storage area must be limited to minimize the number of individuals in the chain of custody. The written chain of custody must log individuals handling the evidence, the date and time of such handling, and the reason for which the evidence was handled. When it is necessary to transfer custody of evidence from one person to another, the receiver should sign a form.

LABORATORY TESTING AND EXAMINATION

Physical evidence may be examined and tested to identify its chemical composition, establish its physical properties, determine its conformity or lack of conformity to certain standards, establish its operation or malfunction, or determine its design sufficiency or deficiency. The investigator should consult with the laboratory or testing facility to determine what specific services are provided.

A wide variety of standardized tests are available depending on the physical evidence and the issue being examined or tested. Such tests should be performed following procedures that have been established by a recognized, standard setting, body. Laboratory conformance to standardized procedures ensures that the results are valid and comparable to results from other laboratories or testing facilities.

Whenever possible, physical evidence should be hand delivered for examination and testing. Hand delivery minimizes the potential for evidence becoming damaged, misplaced, or stolen. If the evidence is shipped to a laboratory or testing facility the investigator should take every precaution to preserve its integrity. A “Letter of Transmittal” should be placed in a sealed envelope and attached to the package. The letter should include the name, address, and telephone number of the investigator, as well as a detailed listing of the contents. The scope of the examination and desired testing procedures should also be included in the letter.

EVIDENCE DISPOSITION

Evidence should never be destroyed or discarded unless proper authorization is received. Circumstances may require that evidence be retained for many years. If the incident results in a criminal or civil action, the evidence will be kept until the case is closed.

During trials, evidence submitted (such as reports, photographs, diagrams, and items of physical evidence) becomes part of the court record and is kept by the courts. Once all appeals have been exhausted, the investigator may petition the court to either destroy or distribute all of the evidence as appropriate. A written record of authorization to dispose of the evidence should be kept.

ANNEX A4: DOCUMENTING THE CONDITION OF PROTECTIVE CLOTHING & EQUIPMENT

In some cases, performance of protective clothing and equipment will be a factor in the incident outcome. The condition of all protective clothing and equipment must be properly documented as part of the investigation. The impounded equipment should be examined at the scene if possible, and again after it has been secured. While at the scene, it is important to note the condition of the equipment, in addition to its operational status. Closer examination of equipment may be done following impoundment.

Each item of protective clothing and equipment should be carefully examined. Clothing and equipment should always be photographed. Begin the series of photographs with an overview picture of the item (both front and back). Additional pictures should be taken of every significant component or feature of the clothing and equipment. Particular attention should be given to valves, knobs, buttons, and hoses. Areas of damage or scarring should also be photographed. Schematic drawings of protective clothing and equipment should indicate location and extent of the damage. Investigators should take detailed and descriptive notes of all observations. It is just as important to note that something was functional or in good condition as it is to note failure or damage. Most performance tests of clothing destroy the item. Therefore, it is important to properly document the condition of the clothing and equipment through a detailed written description and photographs or video before any testing is conducted.

SELF-CONTAINED BREATHING APPARATUS

Evaluation of the SCBA is critical to the investigation. Do not make any adjustments to the SCBA unless absolutely necessary. The positions of straps and knobs should be photographed, and then marked with an indelible marker or grease pencil. Valves should not be opened or shut under any circumstances. If the investigators wish to test breathing air, an SCBA that was filled from the same source at approximately the same time should be used. Several observations should be made at the incident scene:

- Was the victim wearing the SCBA?
- If not, where was the SCBA found in relation to the victim?
- Was the face piece intact and in place on the victim?
- Was there pressure remaining in the air cylinder?
- If so, what were the gauge readings?
- Did all gauge readings agree?
- Were valves and regulators in their proper positions?
- Were support straps and apparatus in their proper configuration and were they attached as would be expected for normal use?
- Was there any visible damage to the SCBA (tank, hoses, straps, regulators, mask)?
- Were there any signs of icing on the regulator (or freeze burns on the face or respiratory tract of the fire fighter)?
- Was any recent maintenance done on the unit?
- What maintenance records are available on the unit?
- What were the qualifications of the technician completing the necessary repairs or modifications?
- Were there any reported problems with this specific unit or with the model?

- Did the SCBA meet the NIOSH 42 CFR Part 84 and NFPA 1981 Standard in effect at the time of its manufacture? If investigators have any concerns that the SCBA may have been a factor in the death or injury of fire fighters, then the SCBA should be sent to the National Institute for Occupational Safety and Health (NIOSH), National Personal Protective Technology Laboratory in Pittsburgh, Pennsylvania. Upon written request, NIOSH investigators will conduct an independent inspection and evaluation of the SCBA.

PASS DEVICE

Each member of the fire department who is involved in fire suppression activities is required to have, and activate, a personal alert safety system (PASS) before entering a hazard area. Investigators should include the following in their observations:

- Was the victim wearing a PASS device when he/she entered the hazard area?
- Was it turned on?
- Is the device capable of being activated with a single gloved hand?
- Was it functioning when the victim was found?
- How did the audible alert signal strength compare with a new PASS device with a new battery?
- Was the victim carrying any other communications equipment (e.g. radio)?
- Was there any visible damage to the PASS device?
- Where was it found in relation to the victim?
- Was the PASS functional immediately after the incident?
- When were the batteries last changed?
- When was it last tested?
- Was any recent maintenance done on the unit?
- Did a certified technician complete the necessary repairs or modifications?
- Were there any previously reported problems with this specific unit or with the model?
- Did the PASS device meet the NFPA 1982 Standard in effect at the time of its manufacture?

PROTECTIVE CLOTHING

Before beginning the inspection of protective clothing, it is important to note the presence and position of the clothing. The following questions, after such documentation, should be addressed:

- What items of protective clothing was the fire fighter wearing (e.g., turnout coat, turnout pants, helmet, gloves, boots, hood, goggles/face shield)?
- Were all items of protective clothing properly donned?
- Had the protective clothing been removed?
 - Purposely, by fire fighter?
 - Accidentally? (e.g., knocked off)
 - If so, where was the garment found in relation to the fire fighter's body?
- Were any items of protective clothing removed during rescue efforts?
- Were any rips, cuts, or tears made during rescue efforts?
- Did protective clothing meet the appropriate NFPA standard at the time it was manufactured?

- Every item of protective clothing should be inspected for the following types of wear or damage.
 - Cleanliness, or lack thereof, indicates smoke or chemical exposure.
 - Char, heat damage, and burned areas indicate exposure to excessive heat and/or flame.
 - Areas of damage may cause loss of fabric strength or protective properties. It is particularly important to check all layers of the protective garment.

The garment should also be checked for worn or abraded areas, rips, tears, cuts, and fraying. All seams should be checked for broken or missing stitching, which is indicative of seam failure. Signs of discoloration or dye loss may also indicate heat or chemical exposure.

Reflective trim should be inspected with a flash light to ensure that it has not lost its reflective properties.

If injuries have occurred, it is especially important to match injury areas on the victim with the areas of the clothing under which the injuries occurred. Important areas for examination include the following.

- Any gaps in the liner system under the outer shell.
- Types of reinforcements over any injury area.
- Overall integrity of clothing when worn.

It is also important to ascertain the configuration of clothing as worn (e.g., fastening of closures, position of collar, ear covers, etc.) and whether parts of the ensemble were worn when wet (including if the clothing was wet from an earlier response).

If possible, it is useful to have the injured fire fighter don clothing in the manner worn during the injury, if possible. The sizing of protective clothing and equipment should also be noted in the investigation of PPE performance.

Investigation of possible clothing failures must account for differences in clothing performance that occur through wear. It may be useful to compare clothing performance with new or unused items.

PPE ASSESSMENT

Investigation of personal protective clothing and equipment (PPE) should include the following assessments:

Helmet Inspection

- Helmet Outer Shell:
 - Bubbling of shell material?
 - Delamination of material or soft spots?
 - Dents, cracks, nicks, gouges, or flaking?
 - Loss of surface gloss?

- Helmet Inner Shell and Impact Liner:
 - Warping?
 - Wear (excessive or unusual)?
 - Broken or missing components?
 - Improper installation/attachment of components?
- Suspension System:
 - Cracked or missing suspension system components?
 - Torn head band or size adjustment slots?
 - Stripped size adjustment ratchet knob?
 - Signs of excessive wear?
- Crown Straps and Ear Covers:
 - Improper installation and fit?
 - Signs of wear, damage, and excessive heat?
 - Chin straps, fasteners, slides, and closures for damage?
- Faceshield/Goggles:
 - Signs of wear, damage, and excessive heat?
 - Deformation, scratches obscuring vision?
 - Fasteners, straps, and closures for damage?

Hood Inspection

- Hood Integrity:
 - Signs of shrinkage?
 - Loss of elasticity?
 - Seam integrity?
 - Signs of wear, damage, and charring?

Structural Fire Protective Clothing Inspection

- Outer Shell:
 - Signs of wear, damage, excessive heat, discoloration, or char on fabric?
 - Seam integrity?
 - Reinforcement integrity?
 - Closure system integrity?
 - Condition of hardware?
 - Damage to pockets?
- Moisture Barrier and Thermal Liner:
 - Delamination of seams or seals?
 - Seam integrity/quilt stitching?

- Attachment system to the outer shell?
- Signs of wear, damage, excessive heat, discoloration, or char on fabric?
- Reflective Trim:
 - Signs of wear, damage, excessive heat, melt, discoloration, or char on trim?
 - Seam/stitching integrity?
 - Loss of reflectivity or fluorescence?
- Protective Wristlets:
 - Shrinkage?
 - Loss of elasticity?
 - Seam integrity?
 - Thumb hole elongation?
- Suspenders:
 - Shrinkage?
 - Loss of elasticity?
 - Seam integrity?
 - Condition of hardware?

Glove Inspection

- Glove Integrity:
 - Shrinkage?
 - Loss of elasticity/flexibility?
 - Seam integrity?
 - Liner pullout?
 - Signs of wear, damage, excessive heat, discoloration, or char on leather/ fabric?

Footwear Inspection

- Rubber:
 - Loss of elasticity?
 - Delamination of seam seals?
 - Material damage?
 - Steel toe or shank damage?
 - Sole tread wear?
 - Waterproofness?
- Leather:
 - Seam integrity?
 - Material damage (rips, tears, holes)?

- Steel toe or shank damage?
- Sole tread wear?
- Waterproofness?
- Closure system?

Station/Work Uniform Inspection

- Uniform Integrity:
 - Seam integrity?
 - Material damage (rips, tears, holes)?
 - Closure system?
 - Signs of wear, damage, excessive heat, discoloration, or char on fabric?

EXPERT EVALUATION OF PROTECTIVE CLOTHING AND EQUIPMENT

The use of protective clothing and equipment experts may be required. On occasion, certain garments and equipment may need to be sent out to testing labs for verification that it meets the current set of applicable certification standards. Other reasons for testing would be to determine whether the item in question was operating properly, and if not, whether it contributed to the incident.

Once the items have been impounded by the Investigation Team and their condition documented, outside assistance should be requested. All issues involving the SCBA testing should be handled by NIOSH. Other protective clothing and equipment testing may be conducted by independent testing laboratories. Impounded items should be transferred to the testing laboratory following strict chain of custody procedures. The testing laboratory should be asked to compare the item performance at the time of the incident with the performance requirements of the appropriate NFPA standard. The testing laboratory's report should be summarized in the body of the investigation report and also attached as an appendix to the report.

The NIOSH Fire Fighter Fatality Investigation and Prevention Program (FFFIPP) uses a standard protocol for shipping and receiving SCBA that is to be examined as part of an injury or fatality investigation. Please see the "Resources" section of the CD to see the full text of this protocol.

The following article provides sound advice on this issue.

What to Do with PPE When There's an Accident

By: Jeffrey O. Stull

As well as fire fighter protective clothing and equipment is designed to protect against a myriad of hazards, it does happen when a fire fighter becomes injured or worse, a fatality happens. During these times, there are a number of very important procedures for the fire department to undertake, particularly to preserve the benefits and care afforded to the affected fire fighter or his or her survivors. An area that is often overlooked might be the preservation of the gear that was worn by the fire fighter during the time of the accident. Proper care and handling of this gear fulfills a number of needs. First, an examination of the gear taken into account the circumstances of the accident can afford information to allow the department to avoid future accidents. Second, it can be possible to find problems with the gear that might have arisen for a number of reasons. Third, the gear could become the

subject of future litigation and the fire department is obliged to correctly maintain the gear as evidence.

Once the gear is removed from the fire fighter, proper chain of custody of the gear must begin. Chain of custody is a way for the department to provide a history for who has possession of the gear and how it handled while it is in the department's possession following the accident. Each department should designate specific individuals with this responsibility. It is important to realize that the first consideration is often to get the gear off of the individual so that medical care can begin. In many cases, emergency medical service personnel may have to cut certain clothing items off of the fire fighter's body to expedite medical care. Therefore, when the fire department first assumes custody of the gear, a complete record should be made of each item, including the manufacturer, style/model name, serial number, and any other identifying information. It is also useful to take photographs of the gear to show its condition at the start of custody. The gear is then properly stored in a secure area where access to the gear is maintained. Any access of the gear for any purpose should be documented including the individual's involved and what is done with the gear (e.g., examination, testing).

Proper storage of gear in custody is a must. Oftentimes clothing and equipment items can be charred or otherwise damaged and become fragile, making frequent handling undesirable as pieces come off items. Consequently, boxes to store PPE should be large enough to minimize folding or compression of each item. While it may seem convenient to put all clothing and equipment pieces in individual garbage bags, this practice should also be avoided since moisture inside on textiles and leather can lead to gear becoming moldy and unintended damage of the clothing or equipment. The best practice is to line an appropriately sized box with plastic but not seal the box so that there is still some air exchange.

Generally gear involved in an accident should not be cleaned. Cleaning the gear might cause damage to the gear but more importantly is likely to affect the appearance of the gear from its condition following the accident. The only possible exception is contamination of the gear with hazardous substances. In these cases, the department must weigh the considerations for personnel safety in examining or handling the gear versus preserving the original state of the gear following the accident.

It is important that affected gear be examined by persons knowledgeable in fire fighter PPE. This can include members from the department, but also include personnel outside the department, such as manufacturer representatives and special experts. Manufacturers can offer insight specific to their products and can also draw on past experience in examining gear from other departments where accidents or problems might have occurred. Similarly, special experts in the area of PPE can offer observations that help the department understand the exposure conditions and how the gear held up to these hazards. Generally, outside individuals depending on the circumstances will want to photograph the gear as well. To accommodate this purpose, it is best to have a large table available where the gear can be carefully removed and positioned for photography.

Oftentimes, the issue arises for testing gear that is involved in an accident. Most tests are destructive in nature, requiring a sample of the item to be removed and some action done on the sample that renders it changed from the original condition. If the department is to consider testing of the gear, it must be aware of any pending litigation before such testing is undertaken. More importantly, there must be a clear intent for conducting the testing for the prospect of learning information from the test(s). While tests can produce useful information, departments should realize that the tests sometimes do not yield results that help in understanding if the clothing performed adequately. For example, a thermal protective performance (TPP) test

might be sought to determine if the clothing offered adequate thermal insulation. The fact is that in many cases, TPP generally increases from wear and laundering compared to the materials in a new and unused condition and thus in of itself not explain a burn injury.

The National Institute for Occupational Safety and Health (NIOSH) conducts investigations of fire fighter fatalities and serious accidents and these investigations can include reviews of the protective clothing and equipment involved. Nevertheless, there is no current formal mechanism for independent investigations of PPE. It is also possible to notify the certification organization following an accident. Generally, the certification organization can affirm whether the product was certified to the relevant standard but may not conduct an investigation of its own unless there are widespread problems for a particular product. The leading certification organizations for fire fighter protective clothing and equipment are Underwriters' Laboratory (www.ul.com) and the Safety Equipment Institute (www.seinet.org)

Departments should consider retaining clothing from an accident or injury for at least two years, or whatever period exists for the statute of limitations within their respective locality. Proper care and handling of PPE following an accident is a good way to understand how well the clothing and equipment performs and whether the gear is implicated or not.

Manufacturer's technical experts may have useful information and should be invited to examine the item in the presence of Investigation Team members. The manufacturer's written comments should be requested for inclusion in the report. At no time should a manufacturer's representative be given custody of an impounded item, or be left alone with impounded items.

ADDITIONAL READING

Minimum Standards on Structural Fire Fighting Protective Clothing and Equipment: A Guide for Fire Service Education and Procurement, 1993, United States Fire Administration publication FA-137.

NFPA 1971, Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting, National Fire Protection Association.

NFPA 1981, Open-Circuit Self-Contained Breathing Apparatus (SCBA) for Emergency Services, National Fire Protection Association.

NFPA 1982, Personal Alert Safety Systems (PASS), National Fire Protection Association.

NFPA 1851, Selection, Care and Maintenance of Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting, National Fire Protection Association.

ANNEX A5: SELF-CONTAINED BREATHING APPARATUS PROGRAM EVALUATION

The use of self-contained breathing apparatus (SCBA) by fire fighters is mandatory, since the fire environment is always assumed to be immediately dangerous to life or health (IDLH). There is no way to predict the concentrations of toxic materials or percentage of oxygen in air that exists in fire environments, during overhaul (salvage) operations, or under other emergency conditions involving spills or releases of chemicals or other toxic materials. The use of SCBA protects against immediate, as well as long-term, health effects resulting from exposure to various hazards. The SCBA is a vital piece of protective equipment that must be utilized at all times during any fire fighting or overhaul operations inside, and, frequently, outside a structure.

The policies and procedures of a fire department's respiratory protection program must provide a means of evaluating fire fighter knowledge and use of respiratory protection equipment. Ongoing training in respiratory protection must be conducted to adequately protect fire fighter health and safety. The fire department is responsible for establishing an effective program that provides fire fighters with training in the use and limitations of respiratory protection equipment and related equipment.

Before conducting any evaluation of a fire department's respiratory protection program, investigators must obtain a copy of the manufacturer's recommendations for safe use and maintenance of the SCBA used by the fire department and a copy of the fire department's written respiratory protection program.

NIOSH has an interest in situations where an SCBA may have been a factor in a fatality. Any time that breathing apparatus performance is suspected as a possible cause for a fatality, or where an SCBA has not been performing as it should be, the fire department can contact NIOSH and request to have the apparatus examined at no cost to the department. Questions related to SCBA evaluations should be directed to the NIOSH National Personal Protective Technology Laboratory, Technology Evaluation Branch, 626 Cochran's Mill Road, Pittsburgh, PA 15236, (412) 386-5132.

AUDITING POINTS

Respiratory Protection Program Administration

1. Has the fire department adopted and maintained a respiratory protection program?
2. Does the fire department have established and enforced written standard operating procedures for the use of respiratory protection equipment?

Utilization policies must include the following:

- When respiratory protection equipment is to be used.
 - When to exit the IDLH environment due to low air supply.
 - Procedures for insuring proper face piece fit.
 - The cleaning of respiratory protection equipment components.
3. Does the fire department conduct an ongoing respiratory protection training program?

4. Is the respiratory protection training program standardized across the department and conducted according to written standard operating procedures?
5. Do the fire department's written training policies for its respiratory protection program include, at a minimum, the following?
 - Identification of the various types of respiratory protection equipment provided.
 - The establishment and maintenance of proper face piece fit.
 - Proper cleaning and maintenance procedures for SCBA.
 - Identification of the factors that affect duration of the air supply.
 - Determination of the point of no return for each fire fighter.
 - The use of respiratory protection equipment in hazardous atmospheres.
6. Has the fire department established written standard operating procedures for the inspection, maintenance, repair, and testing of respiratory protection equipment in accordance with NFPA 1500, Standard on Fire Department Occupational Safety and Health Program, and the manufacturer's recommendations?
7. Are SCBA cleaned and sanitized after each use in accordance with the standard operating procedures of the fire department?
8. Are all SCBA inspected, maintained, and tested in accordance with the standard operating procedures of the fire department?
9. Is there a method of tracking and ensuring the inspection and maintenance of all SCBA?
10. Are sufficient SCBA available at each incident to provide one unit for each fire fighter who might be exposed to respiratory hazards?
11. Are there sufficient reserve SCBA provided to maintain the required number in service when maintenance or repairs are being conducted?
12. Is there an adequate reserve air supply provided by the use of reserve cylinders, an on-scene refill capability, or both?
13. Are SCBA secured on apparatus and stored in a manner that protects the regulator openings and face piece from contamination by road dirt, dust, or weather conditions?
14. Are all SCBA stored in a ready-for-use condition and protected from damage or exposure to rough handling, excessive heat or cold, moisture, or other elements?
15. Do SCBA with open-circuit designs meet the requirements of NFPA 1981, Standard on Open-Circuit Self-Contained Breathing Apparatus for Fire Fighters?
16. Does the fire department maintain a complete inventory record of all SCBA identified individually by serial number or inventory number?
17. Is an individual record of each SCBA regulator and harness assembly maintained? This record should include the inventory or serial number, date of purchase, date of manufacture, date placed in service, location, maintenance and repairs, replacement parts, upgrading, and test performance.

18. Is a record maintained for each SCBA cylinder? This record should include the inventory or serial number, date of purchase, date of manufacture, date placed in service, location, hydrostatic test pressure and dates, and inspection and repairs. Hydrostatic test dates must appear on each cylinder according to the manufacturer's instructions and applicable government regulations.
19. Is a record maintained for each SCBA face piece? This record should include the inventory or serial number, date of purchase, location, maintenance and repairs, replacement parts, upgrading, and test performance.
20. Prior to being placed in service, are all SCBA inspected and tested by factory certified personnel? Documentation of testing must be maintained by the fire department. Testing must include the following:
 - All major components are inspected for compatibility, completeness of assembly, and signs of damage.
 - All components are tested for proper function and performance. Testing must include manipulation of all adjustable components such as slides, buckles, control valves, and levers. Furthermore, the face piece, regulator mechanism, alarm, and cylinder valve must be tested on the manufacturer's test equipment for compliance with specifications.
21. Does the department require that respiratory protection be used by all fire fighters who are exposed to respiratory hazards, or who might be exposed to such hazards without warning? Members operating in areas that might be subject to these hazards where there is sufficient warning to don respiratory protection equipment must have respiratory protection equipment readily available for use.
22. Does the fire department require that respiratory protection equipment be used by all fire fighters operating in confined spaces, below ground level, or where the possibility of a contaminated or oxygen-deficient atmosphere exists until it can be established by monitoring and continuous sampling that the atmosphere is not contaminated or oxygen deficient?
23. Is respiratory protection equipment always worn and used in accordance with the manufacturer's requirements?
24. Are fire fighters using respiratory protection monitored for indications of fatigue or other factors that can result in unsafe conditions or adverse health effects?
25. Do fire fighters using SCBA always operate in teams of two or more, and are they able to communicate with each other through visual, audible, or physical (tethering) means to coordinate their activities? For additional requirements, see the staffing section of the incident management chapter.
26. Does the fire department prohibit the use of unapproved devices, or approved devices that have been modified in a manner that voids their approval?

SCBA Training

1. Is all training related to the use, maintenance, and care of respiratory protection equipment provided by instructors meeting the objectives of Instructor I of NFPA 1041, Standard for Fire Service Instructor Professional Qualifications, or instructors that have been trained and certified by a SCBA manufacturer or authorized distributor?

2. Is the training in compliance with NFPA 1404: Standard for Fire Service Respiratory Protection Training?
3. Are records of all respiratory protection training maintained, including training of personnel involved in maintenance of such equipment?
4. Has the fire department established minimum performance standards for donning respiratory protection equipment?
5. Prior to initial training, have fire fighters been examined and certified by a physician as being medically and physically fit?
6. If the physician certifying fire fighters for respiratory protection equipment use is not the fire department physician, is the examination report reviewed by the fire department physician?
7. Are all fire fighters who might be required to use respiratory protection equipment medically certified by a physician on an annual basis? For more information, see the medical requirements chapter.
8. Is the face piece seal verified for each fire fighter by quantitative, as well as qualitative, fit testing on an annual basis and any time that new types of SCBAs are issued? Each new fire fighter must be tested before being permitted to use an SCBA in a hazardous atmosphere. Only fire fighters with a properly fitting face piece may be permitted by the fire department to function in a hazardous atmosphere with SCBA.
9. Do records of SCBA fitting tests include at least the following information?
 - Name of the fire fighter tested.
 - Type of fitting test performed.
 - Specific make and model of face pieces tested.
 - Results of the tests.
10. Is facial hair that interferes with the face piece seal prohibited for fire fighters required to use respiratory protection equipment?
11. If eyeglasses are worn, does the fire fighter use frames that do not pass through the seal area of the face piece?
12. Are fire fighters required to wear respiratory protection equipment in conjunction with specialized protection equipment (e.g., proximity suits or totally encapsulated suits) evaluated for physical and emotional stresses associated with these specialized applications?
13. Are all fire fighters who are permitted to use SCBA required, at least annually, to successfully demonstrate their ability to meet the performance standards set by the fire department?
14. Do all fire fighters meet fire department training and performance standards prior to actual emergency operations during which they might be expected to wear respiratory protection equipment?

SCBA Safety

1. Are there written standard operating procedures for the safe operation of respiratory protection equipment during training and on the emergency scene?
2. Does the SCBA training program provide fire fighters with training in the safe operation of SCBA, the uses and limitations of SCBA equipment, and the individual limitations of fire fighters who might be required to use SCBA?
3. Are fire fighters required to demonstrate proper knowledge of safety procedures and practices through a standardized evaluation process that is established and documented by the fire department?
4. Does the fire department periodically evaluate its fire fighters' use and operation of SCBA under simulated emergency incidents?
5. Are all fire fighters who might be required to wear SCBA evaluated at least annually on their knowledge of SCBA equipment operation, safety, organizational policies and procedures, and face piece seal?
6. Are fire fighters evaluated on their ability to identify the following?
 - Hazardous environments that might require the use of respiratory protection.
 - The primary gases produced by combustion.
 - The primary characteristics of gases that might be present or generated by processes other than combustion.
 - Toxic gases that might be unique to the particular fire department because of local manufacturing or industrial processes.
 - Shipping labels of hazardous materials.
7. Are fire fighters trained to handle problems that can be encountered during the use of SCBA related to the following:
 - Low temperatures.
 - High temperatures.
 - Rapid temperature changes.
 - Communications.
 - Confined spaces.
 - Vision.
 - Face piece-to-face sealing problems.
 - Absorption through or irritation of the skin.
 - Effects of ionizing radiation on the skin and the entire body.
 - Punctured or ruptured eardrums.
 - Use near water.
 - Overhaul.

8. Does the fire department's training program evaluate the following training objectives?
 - Identify the components of face pieces, regulators, harnesses, and cylinders used by the fire department.
 - Demonstrate the operation of the SCBA used by the fire department.
 - Describe the operation of the SCBA used by the fire department.
 - Describe the potential incompatibility of different makes and models of SCBA.
 - Describe the operational principles of warning devices required on SCBA.
 - Identify the limitations of SCBA used by the fire department.
 - Describe the limitations of SCBA to protecting the body from absorption of toxic chemicals through the skin.
 - Describe the procedures to be used if submerged in water while wearing SCBA.
 - Demonstrate the possible means of communications when wearing SCBA.
 - Demonstrate proper techniques for donning and doffing all types of SCBA used by the fire department while wearing the full protective clothing used by the fire department.
 - Demonstrate that a proper face seal has been achieved.
 - Demonstrate knowledge of the components of respiratory protection.
 - Demonstrate the use of all types of SCBA utilized by the fire department under conditions of obscured visibility.
 - Demonstrate the emergency operations for SCBA failure.
 - Demonstrate emergency techniques using SCBA to assist other fire fighters, conserve air, and show restrictions in use of bypass valves.
 - Demonstrate the use of SCBA in limited or confined spaces.
 - Demonstrate the proper procedure for conducting routine and post-incident inspections of a SCBA.
 - Demonstrate a thorough examination and test of the SCBA.
 - Demonstrate the proper procedure for reporting a defective SCBA.
9. Is annual SCBA training provided to each fire fighter that is required to use a SCBA? This training must include re-evaluation of the individual for the required face piece seal.
10. Is training provided on SCBA air management per NFPA 1404 Standard for Fire Service Respiratory Protection Training?
11. Does this training include information on how the fire fighter is to manage their SCBA air supply including exiting the IDLH atmosphere before consumption of the reserve air-supply begins, understanding the low-air alarm is notification the fire fighter is consuming the reserve air supply, and activation of the low-air alarm is an immediate action item for the fire fighter and crew?

SCBA In-Service Inspection

1. When fire apparatus is in daily use, are daily routine inspections of all respiratory protection equipment and reserve cylinders on the apparatus conducted? If fire apparatus is not in daily use, routine inspections must be conducted at least

weekly. All inspections must meet the requirements of the manufacturer of the specific respiratory protection equipment, and records of the inspection must be maintained.

2. Are monthly inspections of respiratory protection equipment conducted, including a check of the entire unit for deteriorated components, air tightness of cylinders and valves, gauge comparison, reducing valve and bypass valve operation, and a check of the regulator, exhalation valve, and low-air alarm? After a satisfactory inspection, the SCBA should be cleaned and returned to service.
3. Does the fire department require inspection of respiratory protection equipment by the user before and after each use?

SCBA Maintenance Program

1. Are all maintenance and repairs on SCBA conducted in accordance with manufacturer's instructions by qualified personnel?
2. Does the annual SCBA inspection and servicing include at least the following procedures, and any additional manufacturer's recommendations?
 - Disassembling the SCBA into major components.
 - Flow testing the regulator.
 - Disassembling and cleaning the regulator.
 - Replacement of worn parts, or those recommended by the manufacturer, in the regulator assemblies.
 - Disassembling the low-air alarm, and cleaning and replacement of components as necessary.
 - Cleaning components of the face piece and harness assembly, and replacement of components as needed or scheduled.
 - Reassembling the entire SCBA and testing for proper operation of all components.
 - Proper recording of all performed maintenance on the forms provided, and return of the SCBA to service.
3. Is each fire fighter trained in the fire department's cleaning and sanitizing procedure?
4. Are fire fighters required to clean and sanitize each SCBA after each use upon their return to the fire station?
5. Does the SCBA maintenance program comply with all requirements of NFPA 1852 Standard on the Selection, Care and Maintenance of Open-Circuit Self-Contained Breathing Apparatus (SCBA)?

Preventative Maintenance Program

1. Has the fire department established a preventive maintenance program for all SCBA used in the organization in order to prevent SCBA malfunctions and failures of equipment during use?

2. Is the SCBA maintenance program conducted by qualified fire department fire fighters or by another organization using qualified personnel? Qualified personnel must be trained and certified by the manufacturer or by an authorized distributor.

Air Quality Control

Does the air for SCBA, taken from a compressor, cascade system, or other storage system, meet the testing and air quality requirements of NFPA 1989, Standard on Breathing Air Quality for Emergency Services Respiratory Protection?

1. If the fire department purchases compressed breathing air in a vendor supplied cylinder, does the fire department require the vendor to provide certification and documentation that the breathing air has been tested and certified to NFPA 1989, and that it meets the requirements addressed in audit point 1?
2. Are records maintained for each air quality test? If the required air quality is not being met, the use of the system must immediately be discontinued until repairs are made and the air quality is verified by testing.
3. Are any air cylinders that contain air suspected of not meeting air quality standards immediately emptied and purged?
4. Does the fire department maintain all SCBA air cylinders at no less than 90% of the rated pressure stamped on the cylinder?
5. Are cylinders filled to less than 90% of their rated pressure segregated from full cylinders until they are refilled?
6. Are written policies established to ensure that air is obtained only from a source that meets the quality requirements?
7. Is refilling conducted by qualified personnel using proper equipment and following manufacturer's instructions?
8. Are the proper operating procedures and safety precautions posted in a conspicuous location at the fill station?
9. Are the personnel assigned to operate fill station equipment required to visually inspect all cylinders before filling?
10. Are cylinders that do not meet manufacturer's requirements due to defects or damage, or that have not met hydrostatic test requirements, left unfilled and removed from service?
11. If a breathing air compressor system (mobile or fixed) is used, is it located in an area where the air is free from contamination?
12. Does the fire department have the ability to support emergency scene operations of extended duration by providing a reserve supply of air for SCBA?

13. Are mobile breathing air compressor systems equipped with monitoring equipment, to detect carbon monoxide contamination, and an automatic shutdown device that activates when the level of carbon monoxide exceeds the limits contained in NFPA 1989 (5 ppm)?
14. Is the equipment used to produce compressed air for SCBA inspected and maintained in accordance with the manufacturer's instructions?
15. Are all filters and other components of air purification systems inspected and replaced in accordance with the manufacturer's instructions?
16. Are records maintained for each air compressor, fill station, cascade cylinder, purification system, and related equipment used to produce and store air? The record must indicate the date of purchase, location, inspection, maintenance, and testing of the device.

Program Evaluation Requirements

1. Does the fire department review the organization's respiratory protection program annually for the purpose of determining the need to upgrade or change various aspects of the program?
2. Is an annual review of the respiratory protection program policies and procedures conducted to ensure they are being followed and to make necessary adjustments for the effective operation of the program?
3. Are any problem areas involving use, equipment, inspection, maintenance, and repair schedules addressed on a timely basis?
4. Are the levels of responsibility for the SCBA program established and maintained to ensure that proper assignments are made, and that all fire fighters of the program know exactly which duties they are to perform?
5. Are any failures encountered in the respiratory protection program dealing with use, training, or equipment investigated, and is corrective action taken to prevent the recurrence of an additional failure of a similar or related nature?

ADDITIONAL READING

NFPA 1404, Fire Service Respiratory Protection Training, National Fire Protection Association.

NFPA 1500, Fire Department Occupational Safety and Health Program, National Fire Protection Association.

NFPA 1852, Selection, Care, and Maintenance of Open-Circuit Self-Contained Breathing Apparatus (SCBA, National Fire Protection Association.

NFPA 1989, Standard on Breathing Air Quality for Emergency Services Respiratory Protection, National Fire Protection Association.

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ANNEX A6: MEDICAL ASPECTS OF THE INVESTIGATION

There are obviously many hazards associated with fire fighting – smoke, toxic chemicals, noise, heat, fire, and diesel exhaust – to name a few. These hazards, in addition to the hazards created by wearing protective clothing, may create or worsen adverse health conditions in fire fighters. Consider the following example.

The body of a missing fire fighter is found trapped beneath debris. His protective clothing is lightly burned, and the face piece and the hose lines of his SCBA are not serviceable. There was no communication from him to indicate any problems.

Without adequate medical evaluation there are several unanswerable questions. Did he die from the entrapment or from a heart attack? Is an apparent heart attack really the result of heat stress or carbon monoxide poisoning? Was his SCBA serviceable at the time of his death? Was he medically fit to do the job? Were there any preexisting health conditions that gave prior warning signs? Would an annual medical evaluation have prevented the death?

In some situations the health of the fire fighter may have influenced the incident's outcome. When investigators believe that a medical issue is involved, a physician must be added to the Investigation Team. Investigating physicians should specialize in occupational medicine, and be familiar with inhalation toxicology and the hazards of protective clothing and equipment.

AUTOPSIES

A complete autopsy should be done for every line-of-duty death. The United States Fire Administration developed the "Firefighter Autopsy Protocol," provided in the supplementary materials with this manual.

Autopsies serve four purposes:

1. To assist the investigation in determining the cause of death.
2. To help determine eligibility for death benefits under the U.S. Public Safety Officer Benefits Program, as well as state, provincial, and local programs.
3. To advance the analysis of causes of fire fighter deaths, thus aiding in the development of improved fire fighter health and safety equipment, procedures, and standards.
4. To address an increasing interest in the study of deaths that could be related to occupational illness among fire fighters, both active and retired.

The United States Fire Administration Autopsy Protocol should be given to the local medical examiner or coroner for their files as soon as possible. It is far easier to provide the document and discuss investigation issues when reviewing this manual or conducting training, rather than during an actual investigation when emotions are high.

OCCUPATIONAL MEDICINE PROGRAMS

The cause of illness is the key difference between work-related and non-work-related health problems. The vast majority of occupational diseases are indistinguishable from non-occupational diseases on x-rays or under the microscope. Since it is well known that fire fighters are exposed to many hazards in the course of their job, fire departments must provide an occupational health program. A good occupational medicine evaluation will be helpful in finding signs and symptoms of disease before they contribute to a tragedy.

The foundation of an occupational health program is the medical evaluation of fire fighters on a regular basis. Federal OSHA places the following legal responsibilities on the employers of fire fighters who wear respirators (including SCBA).

Persons should not be assigned to tasks requiring use of respirators unless it has been determined that they are physically able to perform the work and use the equipment. The local physician shall determine what health and physical conditions are pertinent. The respirator user's medical status should be reviewed periodically (for instance, annually). (29 CFR 1910.134 (b)(10))

The employer shall assure that employees who are expected to do interior structural fire fighting are physically capable of performing duties which may be assigned to them during emergencies. (29 CFR 1910.156 (b)(2))

Fire departments where fire fighters respond to hazardous material incidents have additional legal responsibilities. The medical requirements for hazardous materials responders are contained in the Code of Federal Regulations at 29 CFR 1910.120 (f). Hazardous material responders must be medically evaluated according to the following schedule:

- Prior to assignment.
- At least once every 12 months.
- At the termination of employment or upon reassignment.
- After discovering signs and symptoms of illness and notifying the employer.
- More frequently, if the physician determines medical necessity.

NFPA 1582, Standard on Medical Requirements for Fire Fighters details the health and fitness requirements and evaluations for individuals currently serving as fire fighters. NFPA 1500, Standard on Fire Department Occupational Safety and Health Program requires that an annual medical evaluation be conducted in accordance with NFPA 1582.

IAFF/IAFC FIRE SERVICE JOINT LABOR MANAGEMENT WELLNESS-FITNESS INITIATIVE (WFI)

The International Association of Fire Fighters, in cooperation with the International Association of Fire Chiefs, and ten of North America's fire departments, has developed a comprehensive wellness/fitness program. The WFI should be consulted by fire departments and local unions for guidance in adopting programs addressing the medical, physical, and mental health of fire fighters.

The Initiative has developed a confidential, non punitive physical fitness and wellness program that is evaluative, educational, and rehabilitative. The program addresses fitness, medical evaluation, injury and illness rehabilitation, and behavioral health.

Auditing Points

1. Has the fire department established and implemented a medical evaluation process for candidates and current fire fighters?
2. Does the medical evaluation process include pre-placement medical evaluations, periodic medical evaluations, and return-to-duty medical evaluations?
3. Is there a fire department physician?

4. Is the fire department physician qualified to provide professional expertise in the areas of occupational medicine as they relate to emergency response?
5. Has the fire department physician demonstrated an understanding of the physiological and psychological demands placed on fire fighters, and the environmental conditions under which fire fighters must perform?
6. Did the fire department physician evaluate the personnel to ascertain the presence of any medical conditions and their effect on the person's ability to perform as a fire fighter?
7. If the medical evaluation for this case was conducted by a physician other than the fire department physician, was the evaluation reviewed and approved by the fire department physician?
8. Was the fire fighter certified by the fire department physician as meeting the medical requirements of the fire department prior to entering the training program to become a fire fighter or performing in an emergency operational environment as a fire fighter?
9. Was the fire fighter's ability to continue participating in a training or emergency operational environment as a fire fighter dependent on being annually certified by the fire department physician as meeting the medical requirements of the fire department?
10. When other qualified health care providers are used to perform the components of the annual medical evaluation, does the fire department physician review the data gathered as part of the evaluation?

ADDITIONAL READING

Firefighter Autopsy Protocol, United States Fire Administration, 2008.

NFPA 1500, Fire Department Occupational Safety and Health Program, National Fire Protection Association.

NFPA 1582, Comprehensive Occupational Medical Program for Fire Department, National Fire Protection Association.

NFPA 1583, Health-Related Fitness Programs for Fire Department Members

NFPA 1584, Rehabilitation Process for Members During Emergency Operations and Training Exercises

IAFF/IAFC, The Fire Service Joint Labor Management Wellness-Fitness Initiative (WFI)

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ANNEX B1: REVIEW OF THE FIRE DEPARTMENT ORGANIZATIONAL STRUCTURE & CULTURE

Fire departments are organized to perform a mission that generally includes preventing the outbreak of fires, limiting the extent and severity of fires, providing for the removal or rescue of endangered persons, controlling and extinguishing fires, and performing other emergency response functions including emergency medical services, hazardous materials response, and technical rescue operations. To achieve these objectives, fire departments provide a range of services, including the delivery of fire suppression forces, communications, fire prevention, code enforcement, fire investigations, public education programs, and programs for community involvement.

The scope of operations and the geographic area served by a fire department are generally established through a system of laws, statutes, charters, special acts and local ordinances. A wide range of additional laws and ordinances also apply to the fire department, including occupational safety and health regulations, civil service provisions, and labor regulations that establish permissible work hours for fire department members.

The fire department budget and associated resources are generally set by a public entity through a political process. These political decisions impact directly on the efficiency and operational capabilities of the fire department, and should be based on well-defined service delivery expectations. A wide range of factors influence the level of risk to the community and its residents, including the level of resources provided to the fire department to perform its mission.

The management and operations of the fire department should be separate from the political activities of the governing body (e.g., city council). The management responsibilities include the establishment and exercise of organizational policies to accomplish the mission. Everything that occurs within a fire department should be governed by the fire department's internal management policies (or lack thereof). Every incident investigation should also evaluate the effects of these policies on the situation that occurred, including the consequences of a lack of policies addressing specific issues, or of policies not being followed.

ORGANIZATIONAL CULTURE

Every organization develops internal cultural values and attitudes which support certain behaviors and discourage others. Cultural values and attitudes influence many factors within a fire department, particularly in relation to health and safety. While conducting an LODD investigation it is important to examine the fire department's culture and its impact on fire fighter health and safety.

Organizational culture is very difficult to define and measure, although certain characteristics tend to be easily recognizable. Organizational culture is the product of a particular combination of influences including leadership, traditions, experiences, peer pressure, and discipline. These cultural factors may have a positive or negative impact on health and safety within the organization, by supporting and strengthening certain values or by weakening and compromising others.

Organizational culture has a particularly strong influence within fire departments due to the structure of the organization and the nature of the mission. Fire departments are organized with paramilitary structures, and must be prepared to provide highly capable and reliable services to the community at all times and often under dangerous and unpredictable circumstances. Emergency operations are complex, interdependent, and time-critical, and the consequences

of failure are severe. Fire fighters spend most of their work hours in close quarters and must be team-oriented with trust and respect for each others' abilities.

Cultural values and attitudes directly influence fire fighter behavior, including the ways that fire fighters gather and process information about their surroundings. Individual attitudes and behaviors reflect the cultural values of the team and the department. A positive organizational health and safety culture will cause fire fighters to follow appropriate procedures and focus on performing their duties in a manner that minimizes the risks of death, injury, or occupational illness.

Formal sources of information about the department's culture include policy statements, directives, standard operating procedures, and other documents that are produced through the management structure. The written documents should provide good indications of the formal emphasis that is placed on health and safety. The official organizational reactions (praise, punishment, or indifference) to various actions and situations also contribute directly to the culture.

The informal aspect of health and safety culture is more closely related to the actions and attitudes that are displayed within the organization. Are there significant differences between what fire fighters are trained and expected to do, and what actually happens in the field? Are procedures followed for every incident, both large and small? When official policies are violated, are the actions rewarded, punished, or ignored by management?

Is there an imbalance between the official fire department safety "on paper" policies and the actions that are observed at incident scenes? Is the department so highly oriented toward aggressive interior fire attack that fire fighters fail to adapt to situations calling for defensive strategy? Are the members of the department so highly influenced by cultural factors that no one recognizes the inherent problems?

Fire departments are also very prideful organizations. This pride has many positive aspects but it may also bring with it selective or organizational blindness to short comings or operational problems in the fire department. Tradition plays an important part in operation of the fire service but it can also lead to organizational slowness to change. Many times, people do things a certain way because that is the way they have always done them.

One cultural value that can lead to trouble is the concept of being part of a "family." This familial attitude often results in the behavior "we take care of our own." While in many cases this behavior is admirable, in certain cases it can cover-up the early warning signs of a tragedy. An example is the B-52 bomber that crashed at Fairchild Air Force Base in Spokane, Washington because it was pushed past its operational limits. The base commanders had not grounded the pilot for previous violations because he was "one of our own", and for fear of "ruining his career."1

AUDITING POINTS

1. Does the fire department have a written organization structure that clearly illustrates lines of authority and relationships among individuals in the department?
2. Are there written job descriptions for all fire department positions?
3. Does the department maintain and review personnel records, including medical history, training courses completed, and performance evaluations?

4. Does the Fire Chief have ultimate responsibility for managerial functions and command of all suppression activities by the fire department?
5. Do the line officers have the authority to command suppression activities at the incident scene?
6. Is each company led by a line officer when engaged in fire suppression activities?
7. Does the fire department maintain a training program to ensure that all suppression personnel are capable of safely, effectively, and efficiently performing their duties?
8. Is there a single individual with overall responsibility for the effectiveness of the training program?
9. Does the training officer prepare regular reports that summarize the training activities of the department and include plans for ensuring that all fire fighters receive required training?
10. Has the department issued written standard operating procedures governing the suppression activities of fire fighters?
11. Are these standard operating procedures easily accessible by all fire department personnel?
12. Are standard operating procedures enforced for all incidents?
13. Has the department developed standard response assignments and procedures which are predetermined by the nature and location of the incident?
14. Does the department investigate all fatalities, injuries, and accidents?
15. Are records of the investigations and recommended corrective actions maintained?
16. Does the fire department have a joint labor/management occupational health and safety committee?
17. Are the committee's recommendations given directly to the Fire Chief?
18. Does the Fire Chief respond in writing to the occupational health and safety committee regarding which recommendations have been accepted or rejected?
19. Has the fire department arranged a mutual aid agreement with neighboring fire departments?
20. Does the mutual aid agreement cover how and when the department's authorization to respond is granted, the staffing levels provided, and the equipment or resources available?
21. Has the department ensured compatibility of incident command and accountability systems, communications systems, and training among participating departments?

ADDITIONAL READING

Findings From the Wildland Firefighters Human Factors Workshop, “Cultural Attitudes and Change in High-Stress, High Speed Teams,” David O. Hart, United States Department of Agriculture, 1995. pp. 34-39.

Findings From the Wildland Firefighters Human Factors Workshop, “South Canyon Revisited: Lessons from High Reliability Organizations,” Karl E. Weick, United States Department of Agriculture, 1995. pp. 40-51.

NFPA 1500, Fire Department Occupational Safety and Health Program, National Fire Protection Association.

NFPA 1201, Providing Emergency Services to the Public, National Fire Protection Association.

ANNEX B2: INCIDENT MANAGEMENT

Failure to implement and exercise effective incident management practices has contributed, directly or indirectly, to many fire fighter fatalities. The consequences of operating without effective incident management and personnel accountability systems have been documented in countless accident and fatality investigations. The document “NIOSH ALERT: Request for Assistance in Preventing Injuries and Deaths of Fire Fighters” emphasizes the critical need for structured incident management systems.

An incident management system is intended to provide a standard approach to operations, safety, and accountability at every emergency response event. A fire department must be able to skillfully apply effective command techniques at all incidents in order to support the dual objectives of operational effectiveness and fire fighter safety. If an incident is not managed effectively, the risk to fire fighter safety increases, and the probability of a successful outcome decreases.

The ultimate objective of an LODD investigation is to identify changes that need to be implemented in order to prevent the same occurrence from repeating itself. The Investigation Team must consider incident management from multiple perspectives. The analysis must focus on the effectiveness of the command process in relation to the specific situation that occurred. In situations where incident management is identified as a contributory factor to a fire fighter fatality, the investigators must also identify the particular problem that requires attention.

The problem could be that the fire department has never adopted an effective incident management system. It is also possible that the fire department has an excellent incident management system “on paper”, but does not routinely or consistently apply the system to actual incidents. The weakness could be a lack of training in the application of the system, or a failure to adopt a policy requiring the incident management system to be applied to every incident. The problem could also be that the appropriate procedures had been adopted and the required training had been provided, but for some reason they were not followed at this particular incident.

Incident management systems are designed to be used by trained individuals and applied to a wide range of situations and circumstances. Although different emergency situations require considerable judgment and adaptation, there are several key components of the incident management system which must not be compromised. The following points are considered to be key factors in any incident management system for a fire department:

- The system is documented in written standard operating procedures.
- The system is routinely used to manage all incident scene operations.
- Overall authority and responsibility assigned to the incident commander.
- Structured authority and responsibilities for different command levels and positions.
- Structured hierarchy with a manageable span of control at each level.
- Individuals performing command functions must be trained and qualified.
- Everyone involved in operations at the incident scene has a position within the system.
- Assignments are received and progress is reported in a standard manner.
- Supervisory assignments are based on functions, locations, or, in some cases, both.
- Communications protocols are structured to match the command system.
- There is a structured system for response, and for summoning additional resources.

- The system provides for expansion, escalation, transfer, and transition of command roles and responsibilities.
- The system requires safety and health to be managed as major strategic and operational priorities in all cases.
- The system employs standard tactical approaches that are applied to different situations and circumstances.
- The system leads to the eventual termination of the incident.

The National Incident Management System (NIMS), and the model procedures developed by the National Fire Service Incident Management System Consortium Model Procedures Committee, provide a consistent platform for the establishment of effective and consistent incident management systems. Incident management systems are adaptable to be used in small, routine incidents and may be expanded to meet the needs of escalating and complex incidents. The NIMS provides a core set of doctrine, concepts, principles, terminology, and organization processes to enable efficient and collaborative incident management at all levels. The NIMS integrates existing best practices into a consistent, nationwide approach to domestic incident management that is applicable at all jurisdictional levels and across functional disciplines in an all-hazard context.

RISK EVALUATION

Risk evaluation and risk management are fundamental components of an effective incident management system. The situations that fire fighters encounter, and the activities they are trained to perform, involve known and recognized inherent risk factors. The Incident Commander is responsible for determining the level of risk that is acceptable in each situation, and the incident management system is used to manage these risk factors.

The acceptability of a particular level of risk is directly related to the potential to save lives or property. NFPA 1500 defines the accepted risk management practices for emergency operations:

- When lives are in danger and there is a realistic potential to save a life, it is acceptable to expose fire fighters to certain risks, up to a point.
- Where there is no potential to save lives, the risk to fire department members must be evaluated in relation to their ability to save property of value and the acceptable level of risk is much lower.
- Where there is no ability to save lives or property, there is no justification to expose fire department personnel to any avoidable risks, and defensive fire suppression operations are the appropriate strategy.

One of the fundamental issues that must be considered in most LODD investigations is whether the risk factors were managed appropriately. Was the situation properly evaluated before the strategy and tactics were determined? Was the risk analysis thorough, accurate, and appropriate? Were the actions consistent with the risk analysis?

AUDITING POINTS***Incident Management System Implementation***

1. Fire departments must adopt an incident management system to manage all emergency incidents. Has NIMS been adopted and implemented?
2. Is the incident management system defined and documented in writing? Standard operating procedures must include the requirements for implementing the system, and must describe various options for different situations. These plans should address routine and unusual incidents and should provide standardized procedures that can be applied to incidents of different types, sizes, and complexities.
3. Is the incident management system implemented at all emergency incidents? The system should be used even in routine incidents to increase familiarity with the system, be prepared for escalation, and be cognizant of the risks that exist at all incidents. Interviews with fire fighters can reveal the organizational culture of the fire department.
4. Is the incident management system applied to drills, exercises, and other situations that involve hazards similar to those encountered at actual emergency incidents and to simulated incidents that are conducted for training purposes?
5. Does the fire department provide ongoing training in the incident management system?
6. Is the incident management system's application part of the critique process?

Emergency Incident Communications

1. Do the standard operating procedures of the incident management system include standard protocols and terminology for radio communications?
2. Does the communications system meet the requirements of the fire department for both routine and large scale incidents? A review of past incident reports may reveal previous signs of communication system inadequacy. Communication capabilities must also provide for communications with mutual aid resources.
3. Has the department developed standard terminology to convey key information, including strategic modes of operation, situation reports, and emergency notifications of imminent hazards?
4. Does the routine communications system provide a standardized method to assign priority to emergency messages and imminent hazard notices to all levels of the incident command structure? The emergency notification system should provide a means to rapidly warn all persons who may be in danger when an imminent hazard is identified, or if a change in strategy is made. An emergency message format with distinctive alert tones and definitive instructions should be used to make such notifications.
5. Are there standard operating procedures for the dispatch (alarm) center addressing their responsibilities after a report of an emergency message or lost/trapped fire fighter (e.g., monitoring channels, notifying other agencies)?

6. How has the incident management system integrated operators and dispatchers to provide support to emergency incident operations? Are the operators and dispatchers trained to function effectively within the incident management system?
7. Is the fire department's incident management system compatible with systems utilized by other mutual aid agencies involved in emergency incidents? Does the plan include a guideline to designate an incident commander or to establish a unified command structure?
8. If the incident is under the overall jurisdiction of an agency other than the fire department, does the fire department continue to utilize the incident management system to manage its own operations?

Evaluating the Command Structure

1. Is the incident management system dynamic when used? That is, does the system allow the application of only those elements necessary at a particular incident and allow elements to be activated or deactivated as the needs of the incident change with time? Does the system include a process of escalation as additional resources are utilized?
2. Are there a series of supervisory levels available for implementation to create a customized command structure based upon the nature, scale, and complexity of the incident?
3. Does the incident commander have the authority to determine and implement the appropriate level and elements of the incident management system?
4. Does the command structure for each incident allow an effective supervisory span of control at each level of the organization? An effective span of control is determined by each supervisor's functional ability to monitor the activities of assigned subordinates and to communicate effectively with them.
 - A span of control of between three and seven emergency response personnel is considered desirable in most cases. An effective span of control should be maintained at each level of the command structure, and the organization should be expanded to meet this objective wherever the need is identified. The incident commander should consider activating additional levels within the command structure when activities become highly complex or are conducted over a large geographic area.
5. Are the supervisory assignments defined by function, by location at the scene of the incident, or by a combination of the two? Assignments defined by function are based on performing or supervising a particular function or set of functions. Assignments defined by location are based on supervising all activities within a designated area. The area is defined by standard terminology, or specified by the incident commander at the time of assignment.
6. When an assignment deviates from the standard operating procedures, does the incident commander identify and clarify the parameters of the assignment?

7. Was a safety group or sector established at major incidents and at any high-risk incidents? The safety group is normally assigned to operate under the fire department safety officer or an assigned officer with this responsibility. Depending on the specific situation, this assignment can require one or more members. All members should be familiar with the basic duties and responsibilities of the safety group.

Training

1. Are all personnel involved in the emergency operations trained in the fire department's incident management system? In addition to being familiar with the basic structure of the incident management system, all personnel should be trained to assume initial command of an incident in the absence of a more qualified individual. This applies to situations where an individual may be on the first arriving unit at the scene of an incident, and, therefore, responsible for initiating command at the scene.
2. Are the incident commanders and other supervisory personnel functionally capable of operating within the incident management system at the particular level which they are expected to perform?
3. Does the fire department train fire fighters for self survival if lost/trapped in a structure? Does the system require early notification and predictable actions for rescue?
4. Does the fire department provide training on specific actions that the department and the incident commander must initiate upon the report of a lost/trapped fire fighter?

Personnel Accountability

1. Does the incident management system provide for the accountability of all personnel operating at the incident scene?
2. Are all supervisors required, and able to maintain, a constant awareness of the location and function of all personnel assigned to operate under their supervision?
3. Does the accountability system provide an accurate account of the location and function of each company or unit at the scene of the incident?
4. Are personnel who arrive at the incident scene by means other than fire apparatus identified by a system that accounts for their presence and their assignment at the incident?
5. Does the system include a specific method to identify and track personnel entering and leaving the hazard area?
6. Is there a provision in the incident management system to evacuate personnel from an area where an imminent hazard condition is found to exist, and to account for their safety?
7. Are supervisors required to account for the location of all fire fighters at regular intervals during the incident?

8. Does the accountability system have the ability to rapidly account for all personnel in emergency situations? There should be certain tactical benchmarks that require an automatic roll call. Such as a report of a missing fire fighter, going to a defensive operational mode (withdrawal from the structure), a hazardous event at the incident (wall collapse, flashover), or as needed or at the discretion of the incident commander.
9. Does the fire department have a standardized term and/or tone to announce that a fire fighter is in trouble (Mayday Alert)?
10. Does the fire department require fire fighters to call “Mayday” or another alert anytime they believe they are lost or in trouble?

Rapid Intervention Teams

1. When members are operating in positions, or performing functions, that subject them to immediate danger of injury in the event of equipment failure or other sudden event, a rapid intervention team must be available on scene. Was at least one rapid intervention crew standing by with equipment to provide assistance or rescue?
 - A rapid intervention crew consists of at least two members and is available for rescue of a member or a team if the need arises. Rapid intervention crews must be fully equipped with the appropriate protective clothing, protective equipment, SCBA, and any specialized rescue equipment that might be needed in the operation. The rapid intervention crew must constantly monitor the fireground communications (tactical channel) and be fully aware of company positions and activities. Departments should consider forming a larger rapid intervention group that has the capability of protecting the Rapid Intervention Group.
2. Has the incident commander provided personnel for the immediate rescue of individuals operating at emergency incidents if the need arises?
3. Has the incident commander evaluated the situation and the risks to operating teams, and provided one or more rapid intervention crews to commensurate with the needs of the situation? The composition and structure of a rapid intervention group can be flexible based on the type of incident and the size and complexity of operations.

Emergency Incident Rehabilitation

1. Does the incident management system include procedures for the rest and rehabilitation of personnel operating at the scene? Procedures must include medical evaluation and treatment, food and fluid replenishment, and relief from extreme climatic conditions, according to the circumstances of the incident.
2. Are supervisors required to maintain an awareness of the condition of personnel operating within their span of control, and ensure that adequate measures are taken to provide for their safety and health?
3. Are fire fighters automatically sent to rehabilitation after finishing two 30--minute SCBA bottles or one 60-minute bottle?

Incident Commander Responsibilities

1. Is the incident commander responsible for the overall coordination and direction of all activities at the incident, including overall responsibility for the safety and health of all personnel operating within the incident management system?
 - The incident commander must be responsible for establishing a command structure that meets the needs of the particular situation, determining the overall strategy that will be employed, summoning and assigning adequate resources to deal with the situation, evaluating progress and changing the strategy as appropriate, communicating directions and interpreting progress reports from assigned persons in the command structure, and bringing the incident to a termination.
2. Is the identity of the incident commander clear to all personnel operating at the incident? The Incident commander should initiate an incident worksheet to assist with command and control and accountability.
3. Is the incident commander located at a fixed command post that is visible and accessible to authorized individuals? The fixed command post should be established as early as possible, preferably in a location that provides a view of the incident scene.
4. Do the standard operating procedures require an individual to assume the role of incident commander from the beginning of operations at the scene of each incident?
5. Are procedures governing the circumstances and procedures for the transfer of command included in the incident management system?
6. Is the incident commander responsible for the overall personnel accountability at the incident? The incident commander must initiate an accountability worksheet at the beginning of operations and maintain it until operations are completed.
7. Is the incident commander required to maintain control of access to the incident scene?
8. Is the incident commander authorized to assign supervisory duties, make assignments and provide direction, as demanded by the nature and circumstances of the incident, in order to manage the activities of all personnel and other resources at the incident scene?
9. Are any changes in strategy immediately communicated to all affected supervisors?
10. Is the incident commander responsible for the effective integration of other agencies (e.g., mutual aid, police, EMS) into the command system to ensure an effective unified command structure?

Command Staff Responsibilities

Command staff functions are those elements of the incident management system that operate in direct support of the incident commander, and contribute to the overall management of the incident.

1. Do the standard operating procedures define the roles and responsibilities of personnel assigned to command staff functions?
2. Does the safety officer have the authority to immediately alter, suspend, or terminate those activities judged to be unsafe, and to involve an imminent hazard to personnel?
3. Is the safety officer required to immediately inform the incident commander of any actions taken to correct imminent hazards at an emergency scene?
4. In situations where a safety officer identifies unsafe conditions, operations, or hazards that do not present an imminent danger, is the safety officer required to take appropriate action through the incident commander to mitigate the hazard?
5. Does the incident management system include guidance for the collection, evaluation, dissemination, and use of information at the incident scene? Planning staff must ensure availability of resources, effective deployment of resources, and timely situation status reports.
6. Is the incident management system capable of recording and tracking the assignment of resources for the duration of an incident?
7. Are supervisors assigned to operations functions required to follow an overall strategic plan, as directed by the incident commander, and to work toward the accomplishment of tactical objectives?
8. Are supervisors assigned to operations functions accountable for all resources assigned under their span of control, and for coordination with higher levels of the command structure and with other supervisors at the same level?
9. Is the safety and health of all personnel of primary consideration in all tactical decisions?
10. Does the incident management system provide a system to manage the reserves of personnel and other resources at or near the incident scene?
11. Are risk management principles employed routinely by supervisory personnel at all levels of the incident management system? Risk management principles define the limits of acceptable and unacceptable positions and functions for all personnel at the incident scene.
12. Are supervisors required to report progress, or lack of progress, in meeting objectives, or deviation from established tactical plans? The fire department should establish a standard time interval for progress reports from supervisors. Routine progress reports should be provided at intervals of ten minutes. If conditions change significantly at any time, this information should be transmitted promptly to the higher level supervisor. Any report relating to the safety of personnel should have the highest priority.

13. Do supervisors have the authority and responsibility to take immediate action to correct imminent hazards, and to advise the appropriate supervisor regarding these actions?
14. Do supervisors coordinate their activities with other supervisors?
15. When conflicting orders are received at any level of the incident management system, does the individual receiving the conflicting order inform the individual giving the order that a conflict exists? If the conflicting order is required to be carried out, did the individual giving the conflicting order inform the individual who gave the initial order?

Safety Officer

1. Does the fire department have standard operating procedures that define, within the incident command structure, the activities of the safety officer at the incident scene and the safety officer's functional intervention methods and authority?

Staffing

1. Are fire department operations limited to those that can be safely performed by the personnel available at the scene? The fire department must provide an adequate number of personnel to safely conduct emergency scene operations. No member should commence or perform any fire fighting function or evolution that is not within established safety criteria.
2. When inexperienced members are working at an incident, is direct supervision provided by more experienced officers or members?
3. Do all members operating in hazardous areas at emergency incidents operate in teams of two or more? Team members operating in hazardous areas should be in communication with each other through visual, audible, or physical, (tethering) means, or by other means in order to coordinate their activities. Team members must be in close proximity to each other to provide assistance in case of an emergency.
4. Are at least two additional members assigned to standby outside of the hazardous area where the team is operating? Was the standby team appropriately deployed?
 - The standby team is responsible for maintaining a constant awareness of the number and identity of members operating in the hazardous area, their location and function, and time of entry. The standby members must remain in radio, visual, voice, or signal line communications with the team.
 - One of the two individuals outside the hazard area may be engaged in other activities. Personnel, including the incident commander, cannot be assigned as standby personnel if they would jeopardize the safety and health of any fire fighters working at the incident by abandoning critical tasks to assist or perform rescues.
5. Are the standby team members provided with at least the appropriate full protective clothing, protective equipment, and SCBA?

6. If the standby members rescue, or provide for the rescue, of members of the operating team, do they communicate the situation to the communications center, and order additional personnel to be dispatched if not already underway?
7. Was at least basic life support emergency medical care provided? When members are performing special operations, the highest level of emergency medical care shall be standing by at the scene with medical equipment and transportation capabilities.
8. Is the minimum acceptable staffing level of four members responding on each engine and each ladder company to any type of fire followed?
9. When responding to high-risk areas, are staffing levels of five members with each engine company, and six members with each ladder company followed?
 - Staffing recommendations are the result of critical and objective evaluation of fire company effectiveness, and are based on experience with actual fires and in-depth fire simulations. Numerous fire department staffing studies support these statements. These studies indicate significant reductions in performance and safety when crews have fewer members than the above recommendations. Overall, five-member crews were found to provide the most coordinated approach for search and rescue and fire suppression tasks.

Risk Management

1. Has the incident commander utilized the concept of risk management on the basis of the following principles?
 - Activities that present significant risks to the safety of members shall be limited to situations where there is a potential to save endangered lives.
 - Activities that are routinely employed to protect property shall be recognized as inherent risks to the safety of members, and actions shall be taken to reduce or avoid these risks.
 - No risk to the safety of members shall be acceptable when there is no possibility to save lives or property.
2. Did the incident commander evaluate the risk to members, with respect to the purpose and potential results of their actions in each situation?
3. In situations where the risk to fire department members was excessive, were activities limited to defensive operations?
4. Were risk management principles employed by supervisory personnel at all levels of the incident management system to define the limits of acceptable positions and functions for all members at the incident scene?
5. At special operations and complex incidents, did the incident commander assign qualified personnel with the specific authority and responsibility to evaluate hazards and provide direction with respect to the safety of operations?

ADDITIONAL READING

Emergency Incident Rehabilitation, United States Fire Administration, 2008.

Fire Command, National Fire Protection Association, 2nd Edition, Alan V. Brunacini.

Incident Command System Model Procedures Guide for Incidents Involving Structural Fire Fighting, High Rise, Multi-Casualty, Highway, and Managing Large-Scale Incidents Using NIMS-ICS, 1st Ed., Oklahoma State University, Fire Protection Publications, 2008.

NFPA 1221, Installation, Maintenance, and Use of Emergency Services Communication Systems, National Fire Protection Association.

NFPA 1500, Fire Department Occupational Safety and Health Program, National Fire Protection Association.

NFPA 1561, Emergency Services Incident Management System, National Fire Protection Association.

NFPA 1710, Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments, National Fire Protection Association.

IAFF IAFC Joint Guide, United States Department of Labor, Occupational Safety and Health Administration, Fire Fighters' Two-in/Two-out Regulation

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ANNEX B3: STRATEGY & TACTICS

FIREGROUND TACTICS

The fire department must have defined operational modes based on the Incident Commander's size-up of the situation. The fire department must explicitly state in their standard operating procedures the actions expected of fire fighters for each operational mode in the standard operating procedures. Fire departments should have only two modes of operation: offensive and defensive.

Offensive operations are characterized by an interior attack on the fire. Defensive operations are used when the fire is so fierce that interior operations are precluded, the structure is unsafe for interior operations, or there is insufficient staffing for interior attacks. During defensive operations, fire fighters work to protect exposures and prevent fire spread from outside the structure. Marginal operations occur when conditions on the fireground are changing between offensive and defensive modes. During these operations it is very easy to lose track of fire fighters' locations, and inappropriately mix tactics. Accordingly, marginal operations must be considered as an offensive mode. The Incident Commander must always clearly communicate the operational mode to fire fighters.

There are several questions which the Incident Commander must answer before developing a strategy for fighting the fire. How big is the fire, and what parts of the structure are involved? Has the fire had an impact on the structural integrity of the building? Are there occupants who can be saved by fire fighters? Is there property that can be saved? What ventilation operations are needed to fight the fire? Are there enough resources (personnel and equipment) to fight the fire safely? The answers to these questions, when combined with the risk management principles discussed in the incident management section of this manual, are used to make tactical decisions. The Incident Commander must continually size up the incident to ensure that the tactical approach matches the operational mode.

The size-up process conducted by the Incident Commander is similar to the tactical evaluation by the Investigation Team. Factors to consider include the following:¹

- Fireground safety – The first priority of every operation must be the health and safety of fire fighters. The department must establish certain operational parameters, based upon safety, which may not be violated under any condition. For example, every fire fighter must have appropriate personal protective equipment, fireground accountability must always be maintained, and rehabilitation of fire fighters must be available.
- Operational mode – The operational mode (offensive and defensive) must be appropriate for the current stage of the fire, structural stability, and attainable objectives. The basic strategy must match the operational mode. If the fire fighters are in an offensive mode, then they should be inside the structure attacking the seat of the fire. When defensive operations are underway, no fire fighter should be inside the structure. The operational mode must be clear to all fireground personnel.
- Risk management and task prioritization – Tactical decisions must be made based upon the standard objectives of fire departments: rescue victims, protect exposures, confine the fire, extinguish the fire, and overhaul. Fireground activities must be prioritized to meet these objectives in this order. Tactical decisions must also be appropriate for the risks associated with each action.

- Technical correctness – Once the operational mode has been established and objectives prioritized, the fire fighter's tasks must be performed correctly. The deployment of fire fighters, use of tools, equipment, and apparatus must be evaluated to ensure that they had the intended effect. Assessment of technical correctness also includes evaluation of victim searches, suppression activities, and ventilation activities.
- Staffing and Support – Staffing levels must be appropriate to the size of the fire and the tasks to be completed. Without enough fire fighters, tasks may not be done safely, or at all. Staffing and support will impact all other decisions on the fireground. A reserve of fire fighters should be staged and available in the event the operation is expanded, and so fire fighters can be rotated and rehabilitated.
- Command and Control – The Incident Commander must have information about all critical components of the operations. The Incident Commander must be able to develop a plan of operation, and then implement it effectively.

Investigators must have copies of all fire department standard operating procedures governing fireground activities before evaluating tactics. Investigators should consider the following three questions:

1. Did the fire fighters follow the departmental standard operating procedures correctly?
2. Did the departmental standard operating procedures direct fire fighters to take the proper course of action?
3. Did the Incident Commander give appropriate orders, given the information available at the time?

Remember, the purpose of the investigation is not to place blame. It is easier to critique tactical decisions after the fact. The goal of the investigation must always be to detect and correct operational deficiencies.

AUDITING POINTS

Pre-incident Planning and Standard Operating Procedures

1. Has the department conducted a pre-fire inspection of the incident scene?
2. If not, is the structure unusual enough that the fire department should have inspected it?
3. Was the information from the pre-fire inspection accurate and used by the Incident Commander?
4. Did the fire fighters make an interior attack on an untenable structure (e.g., under construction, being demolished)?

Search and Rescue

1. Did fire fighters place water between the victims and the fire?
2. Does the department have standard search procedures and patterns?
3. Were there any areas of the building that were not searched?

4. When a search for victims is in progress, are all fire fighters at the scene aware of the search and taking appropriate action to support the search?

Apparatus Placement

1. Does the fire department have predetermined apparatus positioning assignments to ensure exposure coverage (e.g., first engine covers the front of the building, second covers the back exposure)?
2. Did apparatus placement follow those predetermined assignments and/or were they in logical tactical positions?
3. If the fire officer or apparatus driver deviated from these assignments, what was the reason?
4. If exposure coverage deviated from the department's standard operating procedures, did the first arriving engine communicate with the incoming crews?
5. Were trucks positioned to make the most efficient use of their capabilities?
6. Once a truck was positioned, were the wheels chocked and outriggers deployed?
7. Was apparatus placed for use on the scene to protect fire fighters, and were emergency lights left on for visibility?

Fire Fighter Assignments and Water Delivery

1. Does the department have standard operating procedures that govern initial fire fighter assignments?
2. Were those assignments followed?
3. If not, what was the reason for the deviation? Did the Incident Commander know about/order the deviation?
4. Do the department standard operating procedures list the tools that fire fighters should carry into the structure?
5. Do engine companies have both attack lines and backup hose lines?
6. Are lengths of hose appropriate for the types of structures the department protects?
7. Is the engine water pump of sufficient capacity to meet the needs of the company?
8. Is the engine's booster tank large enough to meet the needs of the company?
9. Was an adequate water supply secured and were adequate supply lines laid?
10. Does the engine company have a deluge set available for use?
11. Does the engine have at least one pre-connected soft sleeve to allow for fast, efficient hydrant connection?

12. When the engine company responded to the incident, did they follow departmental procedures and provide an appropriate water supply?
13. Were backup lines laid out immediately after the initial attack lines and in the same location as the attack lines?
14. Were the backup lines charged and ready for use?
15. Did the backup lines provide greater water volume and penetration than the initial attack lines?
16. Did fire fighters attempt to gain control of interior stairways and hallways?
17. If an offensive operational mode was used, did fire fighters attempt to control the main body of the fire from the unburned portion of the building?
18. If a defensive mode was used, were all fire fighters outside the structure?
19. Once a water source was established, were attack lines taken to the seat of the fire?
20. Did fire fighters take an elevator directly to the fire floor?
21. If there was no fire fighter control switch in the elevator, did the fire fighters still use the elevator?
22. When making interior attacks, were solid stream nozzles (or fog nozzles adjusted to solid stream setting) utilized?
23. If the fire area was small, did the fire fighters direct the hose stream at the base of the fire?
24. If the fire area was large, did the fire fighters direct the stream at the ceiling above the fire area?
25. Were fire fighters aware of the water load (approximately 8.3 lbs./gal.) on the structure?
26. Was the use of water streams from outside the building coordinated by the Incident Commander to ensure that operations did not compromise the safety of fire fighters inside the structure?
27. If the fire fighters entered a very hot room with no fire, did they leave immediately and check the area below?
28. If fog streams were utilized inside the building, was adequate ventilation provided downstream of the nozzle?
29. At multiple level structures, were fire fighters assigned to suppression activities above the main body of the fire before the fire was under attack?
30. Did fire fighters protect close exposures of the building from radiant heat, and downwind exposures from convection heat?

31. If there were signs of fire in concealed spaces, did fire fighters open up the spaces and inspected for vertical and horizontal fire spread?
32. Were fire fighters assigned to the floor above the fire to check for fire spread from window to window?
33. If the fire was too large to control with hand lines, did fire fighters deploy a heavy stream device to attack the fire?
34. When conducting operations in a standpipe equipped building, did fire fighters always use fire department hose (rather than a pre-installed hose)?
35. Were fire fighters assigned to operate above or below an involved truss roof?

Ventilation

1. Were attack lines charged and ready for use during the ventilation process?
2. Was the fire ventilated directly above the fire area, or above a vertical shaft through which smoke and gases travel?
3. Were fire fighters removed from the roof as soon as ventilation activities were completed? If not, was there another tactical reason to keep them there?
4. Were proper techniques used for ventilation?
5. When using windows for ventilation, were downwind windows opened before upwind windows?
6. Was the fire structure ventilated working from the top of the building to the bottom of the building?
7. If signs of a smoldering fire were encountered (backdraft situation), was the structure ventilated at a high point before the fire was attacked?
8. When size up indicated that fire fighters could be injured during ventilation (high risk of backdraft), did the fire fighters ventilate the windows from a distance with a ladder or water stream?
9. If positive pressure ventilation (PPV) was used, was there an “exit point” for smoke and gases in the fire area to produce effective ventilation?
10. Was PPV effectively monitored, controlled, and coordinated?

Aerial and Ladder Operations

1. Was an aerial, or other water stream, used to deliver water through a roof ventilation hole, thus destroying the venting process?
2. Was an aerial, or other water stream, used to deliver water through another ventilation hole resulting in heat, smoke, and gases being pushed back into the building?

3. When the aerial ladder or platform was placed, was consideration given to operational needs, victim rescue, and wind conditions?
4. When raising and lowering the aerial, was consideration given to potential obstructions that could be hit by the aerial (e.g., power lines, trees)?
5. Were adequate numbers of ground ladders deployed as a means of fire fighter egress?
6. When ground ladders were used, were the ladders always braced by a fire fighter, or tied to the building while fire fighters climbed the ladder?

ADDITIONAL READING

Engine Company Fireground Operations, 3rd. Ed., Harold Richman, Steve Persson, National Fire Protection Association, 2007.

Fire Command, National Fire Protection Association, 2nd Edition, Alan V. Brunacini.

Incident Command System Model Procedures Guide for Incidents Involving Structural Fire Fighting, High Rise, Multi-Casualty, Highway, and Managing Large-Scale Incidents Using NIMS-ICS, 1st Ed., Oklahoma State University, Fire Protection Publications, 2008.

Ladder Company Fireground Operations, 3rd. Ed., Harold Richman, Steve Persson, National Fire Protection Association, 2007.

END NOTE

¹ Alan Brunacini, Fire Command

ANNEX B4: TRAINING REVIEW

Training is one of the primary areas that should be addressed in an LODD investigation. The primary objective of an LODD investigation is to determine the steps that should be implemented to prevent a similar occurrence in the future, which often leads directly to the development of new training content or programs. In some cases, training content must be revised to incorporate the findings of an LODD investigation.

The investigation should also focus on the adequacy of training that was provided to the members who were involved in the incident, and how their training impacted on the situation that occurred. In some cases training (or a lack of training) may be a direct causal factor, while in other cases, training may be a link in a complicated chain of events. Many investigations reveal evidence of inadequate training, or differences between training and actual operations. Investigators have the difficult task of determining the significance of these issues to the incident, and the actions that are needed to remedy any problems that are identified.

The full consideration of training often involves looking at the situation from several directions:

- Were the members adequately and appropriately trained for the situation that was encountered?
- Did the members perform in accordance with the training that had been provided?
- Did the training provide the appropriate information and guidance for the situation that was encountered?
- Is there additional training that should be provided as a result of this incident?
- Should existing training programs or content be changed to correct errors, misinterpretations, or inadequacies?

Training provides the foundation that guides the actions and reactions of fire fighters in a wide variety of situations. When responding to emergency incidents, fire fighters must often perform highly skilled and physically demanding tasks under urgent and stressful circumstances. Fire fighters must also make critical decisions in a short amount of time based upon incomplete information. Under extreme stress people tend to rely on the habits and behaviors that are most familiar to them. Training is the key factor that influences the actions of fire fighters in many situations, and directly impacts on their safety and survival.

An appropriate balance between classroom and manipulative skills training is essential to ensure that fire fighters have the required knowledge, as well as the physical ability to perform their duties, when faced with a wide range of situations. Training programs should include all of the topics necessary to develop the knowledge, skills, and abilities to perform safely and effectively, and the training schedule should ensure that the skills are maintained for as long as the fire fighter is involved in performing those functions. Safety and health should be among the highest priorities for all training activities.

TRAINING RECORDS

Training records are a valuable source of information for incident investigators. All fire department members should receive standardized instruction and training before they are authorized to respond to emergency incidents. In many jurisdictions minimum training standards are established by policies, statutes, or regulations, and specific certifications are required for members holding different ranks or performing particular duties.

In many cases the fire department is required to maintain individual training records and to produce them on demand for a regulatory agency. Individual training records provide a “paper trail” that allows an investigation team to determine the structured training that has been provided to each fire fighter over a period of time. A complete chronological training record should be maintained for each member, covering the entire period from the date of entry through retirement, and including all documented training that was obtained previously or from external sources. Training records are often the only evidence that can be used to establish whether an individual has been trained in accordance with mandatory requirements.

The individual files should include copies of any certificates, licenses, and certifications that are related to a fire fighter’s training and qualifications. Expiration dates should be recorded in a manner that identifies recertification requirements that must be satisfied. The training records should also establish whether continual refresher training has been provided to maintain the required capabilities, and deliver new information to all fire fighters on a timely basis.

Most modern training records are maintained as data files, allowing records to be easily cross-referenced by individual or by content. Some training records must be maintained in their original hard-copy form to satisfy mandated standards, such as OSHA minimum training requirement, such as:

- 1910.120 – Hazardous Waste Operations and Emergency Response
- 1910.146 – Permit Required Confined Spaces
- 1910.147 – Control of Hazardous Energy

In addition to records documenting the attendance and participation of individual members in training programs, the fire department should maintain records to document the delivery and content of each training activity, including educational objectives, course outlines, reference materials, and examination questions. If the training is part of a mandatory requirement, the class records should record the participation of each member who is required to attend, as well as test scores and performance evaluations.

Investigators should be able to determine the training that each member has received, when and where it was obtained, whether it met mandatory requirements and recommended standards, and the specific content of the training that was provided. If there are no applicable mandatory training requirements, investigators should look to NFPA standards and other sources to determine the training that is recommended and should be provided.

TRAINING PROGRAM EVALUATION

Training records will often satisfy regulatory and bureaucratic requirements, although they do not necessarily ensure that the individual (or all of the team members) had the appropriate training for the situation they encountered or performed as they had been trained. A thorough incident analysis must evaluate the training program as well as the training records. The knowledge and skills instilled by structured training and education are tempered with experience acquired on the job, as well as attitudes and perceptions. Incident investigations must identify any differences between the training that was provided in the classroom and on the training grounds, and the situation that occurred at an incident scene. If gaps are identified, this could be evidence that the training program is not effective, or the content is out of date.

LODD investigators should focus particular attention on any situation where training could have guided members to take inappropriate action in the situation that occurred. When interviewing

members who were involved in a situation where an injury or fatality occurred, training records should be consulted and questions should be asked to determine if their training was “on target” or “off target.” Thorough fatality investigations have caused widely accepted assumptions to be critically reevaluated and many established training programs to be rewritten.

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ANNEX B5: FIRE DEPARTMENT COMMUNICATIONS

Fire departments must have reliable communications systems to ensure the prompt and effective delivery of public fire services. Reliable communications are necessary to properly manage incidents and maintain ongoing accountability of all fire fighters. Good communications are vital to protecting fire fighter health and safety on the fireground.

Radios are an integral part of fire department communication systems, and are essential for emergency operations. Radios keep fire fighting units in contact with one another, with the on-scene incident commander, and with the communications center to coordinate fireground activities, provide progress reports, request assistance, or return units that are not needed. Radios are also necessary to maintain communication with units that are out of quarters to dispatch them to emergency incidents. When evaluating radio traffic, both the information content being transmitted, and the way in which it is transmitted are important factors.

The greatest demand for effective communication occurs during major emergencies. The ability to meet this demand requires adequate design and planning. Incident Commanders and the command system play a role in managing communications volume during incidents. Use of the incident command system which reduces the span of control and utilizes face to face communications, as well as additional radio channels can keep radio traffic at a manageable level.

Air time on the radio needs to be managed much like air in a SCBA. Enough air time must be held in reserve to allow for unexpected events. Communications for the fire department must include contingency plans for emergency situations. During an emergency there is little time to set up new communication links. The volume of messages to be handled is likely to exceed most estimates, so plans should include measures for handling high volumes of message traffic to prevent system breakdown due to overloading. These plans must be regularly used at emergency incidents. Plans that are only utilized for “the big one” will be unfamiliar to fire fighters when they are needed, and may contribute to confusion at the worst possible time.

The fireground, no matter what size the incident, is an extremely noisy, confusing, and difficult place to manage a fire fighting operation. Proper communications are essential. Fire departments must ensure that a Mayday and/or “emergency traffic” message receives the highest communication status from dispatchers, fireground command, and all operating units. Additionally, the incident commander must be located where he or she can hear and talk on the radio. The incident commander can send an officer closer to the incident, if necessary.

Adequate supervision, training, operating procedures, and systems must ensure that communications center personnel are prepared to meet the unique needs of the fire department. The measure of adequate service is the department’s functional ability to handle emergency situations, as well as the normal daily activities of the department. An incident commander must be in an atmosphere where the messages transmitted by fire fighters in the hazard zone can be heard. Dispatchers are also a part of the fire fighter safety net. Dispatchers are most often in an operating atmosphere that allows them to closely monitor communications for signs of trouble.

EVALUATING MESSAGE CONTENT

Communication during emergency situations is imperfect at best, and is deadly at worst. Emergency responders are required to make critical decisions in a short period of time, often with incomplete information. Effective communication is the only way to safely coordinate the

activities of all responders. Many investigations find that emergency responders talk a lot, but say very little of consequence to the incident. The use of standard communications protocols and order models as a standard day to day practice plays heavily into the communications success rate when unexpected events occur. The following are key elements to successful communications:

1. Use of plain language. Reduces confusion especially when interoperating with other agencies or disciplines.
2. Message Content:
 - Unit being called.
 - Unit calling.
 - Message.
3. Order Model:
 - Sender calls receiver.
 - Receiver acknowledges.
 - Sender transmits message.
 - Acknowledgement by receiving unit, and repeat back of message for positive confirmation. An example would be:
 - SENDER: "Engine 18 from Command."
 - RECEIVER: "Engine 18."
 - SENDER: "Engine 18 from Command, take a hand line in through the front door for search and rescue and fire attack."
 - RECEIVER: "Command from Engine 18, I copy, take a hand line in the front door for search and rescue and fire attack."

The acknowledgment and repeat back allow the sender to correct any miscommunications that occur.

One example of poor communication during a difficult fireground situation is "Help us, we're trapped!" – Who is trapped? How many people are "us?" Which of the emergency response personnel listening should respond? Where are the people trapped? Where is action needed? What action should be taken?

Poor communication leads to poor response from fire fighters. Fire fighters must be trained to call a Mayday if there is a lost or missing member, an SCBA malfunction or large loss of air, a seriously injured or incapacitated member, a member is trapped or entangled, or any time a member is in a life threatening condition that cannot be resolved in thirty seconds.

The fire fighter calling the Mayday should answer the three W's:

1. Who are you?
2. What is the emergency?
3. Where are you?

The L.U.N.A.R. acronym developed by the National Fire Academy helps fire fighters deliver the needed information:

L – Location.

U – Unit.

N – Name.

A – Air.

R – Resources.

An example of a LUNAR message would be:

- “Command this is Engine 21, I am located in the south stairwell, Engine 21 Nozzle, Fire Fighter Jason Smith, I have 2100 pounds of air and need to be cut from wire entanglement”.

Evaluating message content is a critical component of the incident investigation. Do messages convey the following information:

- Who – Who is sending the message? Who should be receiving the message?
- What – What information is being transmitted? What resources are needed?
- When – When did the event take place? When should the listener respond (immediately, later)?
- Where – Where is the message sender located? Where is the location of a team (building floor)? Where should the listener respond?
- Why – Why is the message being transmitted (trapped fire fighters)?

Additional factors to consider:

- Message senders should receive feedback that their information was received accurately, understood, and action taken. Radio codes such as “10-4” and “Roger” are not adequate communications feedback.
- Communications tend to be distorted in proportion to the number of people passing along the message. Did the message pass through more people than necessary?
- Were too many fire fighters speaking on one channel?
- Was environmental noise a factor in miscommunication (sirens, fire noise, yelling, or radio interference)? If so, did the listener ask for information to be repeated?

COMMUNICATIONS FORENSICS

Many fire departments utilize communications management systems that can be used to help reconstruct what happened during an incident. Most dispatch centers keep recordings of all radio traffic, and many communities utilize radio management systems that create electronic records of all radio transmissions.

Most dispatch centers keep recordings of all phone call and radio traffic that occurs within the dispatch center. This information may be recorded on multi-track tape systems or saved digitally on a computer hard drive. In both cases, the time that the recording was made is also available. Dispatch centers usually have a policy on the retention of these recordings. After a specified period of time, tapes may be reused or erased, and digital recordings may be discarded or deleted.

These recordings are most often the basis for a radio transcript of the incident, where all transmissions on the fire scene are transcribed. Care should be taken to determine which radio transmissions become part of the recording. Depending on the system configuration, fire fighters on the emergency scene, or those listening to scanners or other radios, may hear some transmissions that are not a part of the recording, and transmissions may end up on the recording that were never heard by anyone through a portable radio. Care should also be taken to assure that the time stamp associated with the recording is the correct time. The time on the radio and telephone recording system may need to be corrected to be consistent with time stamps gathered from other sources, such as still and video cameras.

Many dispatch systems utilize computer controlled systems to route the flow of radio traffic. These systems may be referred to as trunked radio systems. The following is an excerpt from the report on the deaths of nine Charleston, South Carolina fire fighters in 2007:

Trunked radio systems are repeater-based radio communications systems that are composed of multiple radio frequencies controlled by a central system computer controller. The controller assigns radio frequency pairs to conversations as needed, when needed. Trunked radio systems assign a frequency pair as it is needed rather than permanently dedicating a frequency pair for each “channel”. This reduces the number of radio frequencies needed to operate a system and generally increases the utilization of each frequency. Especially in developed areas, the demand for radio frequencies is high. In non-trunked radio systems, a frequency pair is essentially reserved for the exclusive use of one channel.

For all trunked and many non-trunked fire service radio communication systems, every radio channel on the radio uses two radio frequencies, a pair, to communicate. The user sends information to the radio system on one frequency and the radio system repeats the transmission back to the radios on that channel through another frequency. Trunking assigns frequencies as needed while non-trunked radio systems reserve frequencies for the use of one channel. Trunked radio systems use the term “talkgroup” to replace the term “channel” as the frequency pair assigned to a work group. For example, a talkgroup could be designated for fire dispatch, another for fireground operations, and others for police, utility services, etc. On the Charleston Fire Department standard portable radio, the talk group was selected by the user utilizing a rotating knob on the top of the portable radio. The radio essentially looks the same to the user but channel utilization differs from non-trunked to trunked systems.

In a trunked radio system, when a fire fighter presses the push-to-talk button on a portable radio to transmit on a talkgroup, a request is made to the trunked radio system on the control channel. The control channel essentially listens for radios that want to transmit and then tells all of the radios that are on the same talkgroup as the radio requesting to speak which frequency pair will be used. This action happens instantaneously and is generally barely noticed by the radio user.

Once assigned to a frequency pair, the fire fighter transmits a voice message to the system on one of the two assigned frequencies. The radio system repeats the voice transmission back to all of the other radios on the same talkgroup through the second assigned frequency so that the voice message is heard by all others that have the same talkgroup selected.

Trunked radio systems maintain a computerized log of many radio-related events, such as radios being turned on and off, channel (or talkgroup) changes, emergency feature activations, and a record of each time a radio transmission is made. The log of each radio transmission may contain the identification of the radio being used, the duration of the use, the channel (or talkgroup) used, and other information.

These two pieces of forensic evidence, system recordings and radio management system records, are the key sources of data for reconstructing the content and timing of emergency scene communications.

If the LODD Investigation Team members are not familiar with the sound of specific fire fighter's voices, a member of the local fire department may be helpful in discerning the identity of fire fighters speaking in recordings, and may provide an explanation of local terminology.

AUDITING POINTS

Management Functions

1. Does the department keep complete records of test and alarm and dispatch signals, all circuit interruptions, reports of apparatus failures, and all defective circuit conditions indicated by test or inspection?
2. Does the department prepare an annual review of the communications system operations?
3. Has the department established operational procedures for radio communications? All members must be trained in radio procedures to provide for efficient use of the system. The procedures should support the escalation of operations from small to large.

Dispatch Functions

1. Do the communication center dispatchers know the capabilities and limitations of the communications systems that they operate? They must be familiar with the organization of the fire department, and be aware of the equipment and resources available to the department.
2. Is there a standard operating procedure addressing dispatcher's responsibility when there is a Mayday (report of a lost, trapped, or incapacitated fire fighter)?
3. Is there a Mayday or emergency traffic tone initiated by dispatchers for all tactical channels that is sounded when there is a Mayday, or other emergency on the fireground?
4. Are the dispatchers trained in the department's incident command and emergency scene management procedures?
5. Is the communications center informed of all changes in the availability status of each unit to determine which units are available for dispatch to emergency incidents?
6. Do dispatchers have an accurate indication of the status of all fire companies (e.g., in the station available for response, out of service at a fire, or out of service due to other reasons) readily available to the operators at all times?
7. Do dispatchers send the appropriate units to reported emergency incidents based on written operational procedures? Are the written procedures appropriate?

8. Is the dispatch of apparatus in response to emergency calls recorded? Records should indicate companies and supervisory officers for fires and subsequent alarms, time of acknowledgment by companies, time of arrival at scene, and time back in service.
9. Are all outside devices, radio, telephone, or other means for alerting off-duty fire fighters tested daily?
10. Are tests conducted to simulate failure of normal power sources? Emergency power sources other than batteries should be operated to supply the system for a continuous period of one hour, at least weekly.

Communications Equipment

1. Is the installed communications system functioning properly?
2. Should normal power be lost, is there a backup power supply for all communications equipment?
3. Are there excessive delays in sending messages?
4. Are messages degraded by interference? Radio interference can consist of:
 - Signals generated by electrical devices, such as car ignitions, electric motors, and neon signs.
 - Other radio stations using the same or adjacent frequencies.
 - Background noise picked up by the user's microphone.
 - Faulty radio equipment.
 - Wireless telephone systems.
5. Is the communications system designed and capable of providing emergency service during normal peak loads with nearly the same response speed as during times when message loads are minimal? This has been a point of contention. Many fire departments' design for an average load is not realistic based on the amount of radio traffic in the beginning stages of an incident, versus after the incident has been going for an hour.
6. Is there an alerting system to announce the nature and location of alarms to all responding personnel?
7. Are all radio and telephone messages to the communications center automatically recorded using equipment that also records the time?
8. Has the department provided sufficient radio frequencies to accommodate the operational needs of the fire department? Communication needs assessments are based on the anticipated amount of radio traffic and the demand for simultaneous communication with different individuals and groups during emergency situations.
9. Is fire-portable radio equipment manufactured for the environment in which it will be used, with the size and construction of the unit making it capable of one-handed operation?

10. Are the channel selection knobs on portable radios capable of changing channels while operators are wearing gloves?
11. Does every chief officer, company officer, and fire fighter have a portable radio while assigned to emergency duty?
12. Does the fire department have a selective alerting system by which it can summon designated, on-call personnel at any hour of the day or night?
13. If the department uses radio pocket pagers, do they audibly signal an alert before the battery is incapable of operating the pager?

Fireground Communication

1. Is the first company arriving at the location of the alarm required to give the communications center notice of its arrival and provide a brief description of the visible conditions to the communication center?
2. Are radio calls from the fireground to the communications center answered promptly?
3. Are radio transmissions brief and, when possible, to the point? Radio channels are crowded. Brief phrases should be used whenever possible to condense the messages.
4. If radio dead spots or interference are encountered, is the vehicle moved and the message re-transmitted, when possible? Many vehicles have directional radio patterns, either toward the front or rear, depending on location of the antenna. Changing vehicle direction can sometimes assist in getting a signal to the base station.
5. If radio transmissions are of an emergency nature did the responding unit break in on the conversation and request a clear frequency for emergency traffic?
6. Are words pronounced distinctly and slowly?
7. When transmissions are unclear, incomplete, or vague, does the receiving person request the transmission be repeated?
8. Is the fire department's business communications system separate from the emergency communications system?
9. Is the communications system designed and operated to ensure that emergency communications take priority over non-emergency messages?
10. Has the fire department adopted standard terminology for communication to facilitate message transmission and avoid errors? Standard procedures should define how the person originating a message should be identified (e.g., by unit number or by rank and name).
11. When conditions allow, does the officer in charge report supplementary information to the communications center and provide additional status reports?

12. Does the fire department provide sufficient and separate frequencies to adequately handle dispatch, fireground communication, command officers, interagency and mutual aid communication, and other specialized communications?
13. Do fire departments with mutual aid agreements have the ability to effectively integrate communications?
14. At large incidents, is a communications officer assigned to ensure adequate communication? An assigned communications officer can be particularly important and useful on multi-agency fires and other incidents.
15. At incidents with multiple agencies responding, is common terminology used to ensure that all participating departments and agencies codes convey exactly the same meaning? When integrating incident communications, participants must plan in advance to use integrated radio frequencies for all tactical and support units on an incident. To ensure the best possible use of all participating department and agency radios on major incidents, an Incident Radio Communications Plan should be developed.

ADDITIONAL READING

NFPA 1221, Installation, Maintenance, and Use of Emergency Services Communication Systems, National Fire Protection Association.

NFPA 1500, Fire Department Occupational Safety and Health Program, National Fire Protection Association.

NFPA 1561, Emergency Services Incident Management System, National Fire Protection Association.

Voice Radio Communications Guide for the Fire Service, An IAFF and DHS/FEMA United States Fire Administration Program.

ANNEX C1: OSHA FIRE BRIGADE STANDARD

Subject:	Training
Sub-Heading:	Fire Fighters
Standard:	29 CFR 1910.156 - Fire Brigades
Issuing Body:	U.S. Department of Labor; Occupational Safety and Health Administration
Applicability:	Law applying to public fire departments in all states with OSHA Plans, all U.S. private fire departments, and all U.S. Federal fire departments.

AUDITING POINTS

1. Are fire fighters provided with training commensurate to their duties as required by 29 CFR 1910.156 (c)(1)? (Also see NFPA 1001)
2. Is the training of brigade leaders and trainers sufficient for their roles in the department, and more comprehensive than that provided to the general membership of the fire brigade as required by 29 CFR 1910.156 (c)(1)? (Also see NFPA 600, 4.3.1, NFPA 1021, NFPA 1081)
3. Are individual training records maintained for each member of the Brigade? (NFPA 600, 4.3.15.1)
4. As required in 29 CFR 1910.156 (c)(2), is the frequency and quality of training appropriate for the satisfactory performance of the member's duties?
5. Are fire fighters who perform interior structural fire fighting trained at least quarterly, and all other members trained at least annually?
6. Have the fire fighters been informed of special hazards, as required by 29 CFR 1910.156 (c)(4)?
7. Has the employer developed and made available written standard operating procedures, as required by 29 CFR 1910.156 (c)(4)?
8. Are the standard operating procedures sufficiently detailed to guide employees in appropriate responses to emergencies?
9. Do employees receive training in implementation of the procedures?
10. Are procedures implemented as written?
11. Does the employer have a skills maintenance requirement to insure equipment is in a state of readiness for emergencies? (See NFPA 1001)
12. Does the employer require employees to document that equipment is kept in a state of readiness?

ADDITIONAL READING

Title 29 Code of Federal Regulations part 1910.156 – Fire Brigades.
NFPA 600, Industrial Fire Brigades, National Fire Protection Association.

NFPA 1001, Fire Fighter Professional Qualifications, National Fire Protection Association.

NFPA 1021, Fire Officer Professional Qualifications , National Fire Protection Association.

NFPA 1081, Industrial Fire Brigade Member Professional Qualifications, National Fire Protection Association.

ANNEX C2: OSHA PERSONAL PROTECTIVE EQUIPMENT & RESPIRATORY PROTECTION TRAINING REQUIREMENTS

Subject:	Training
Sub-Heading:	Fire Fighters
Standard:	29 CFR 1910.132 - Personal Protective Equipment, 29 CFR 1910.134 - Respiratory Protection
Issuing Body:	U.S. Department of Labor; Occupational Safety and Health Administration
Applicability:	Law applies to public fire departments in all states with OSHA Plans, all U.S. private fire departments, and all U.S. Federal fire departments.

AUDITING POINTS

1. Has the employer provided training to each employee who is required to use personal protective equipment (PPE)? Each affected employee must be trained to know at least the following.
 - When PPE is necessary.
 - What PPE is necessary.
 - How to properly don, doff, adjust, and wear PPE.
 - The limitations of the PPE.
 - The proper care, maintenance, useful life and disposal of the PPE.
2. Has the employer certified in writing that each employee has demonstrated an understanding of the training for PPE, and the ability to use PPE properly before being allowed to perform work requiring the use of PPE.
3. Has the employer provided for annual retraining for employees? (See NFPA, 1404, 6.2.1)

If circumstances are found to warrant employee retraining, was retraining accomplished? If the employer has reason to believe that any affected employee, who has already been trained, does not have the understanding and skill required, the employer must retrain such an employee. Circumstances where retraining is required include, but are not limited to, the following situations:

- Changes in the workplace render previous training obsolete.
 - Changes in the types of PPE to be used render previous training obsolete.
 - Inadequacies in an affected employee's knowledge or use of assigned PPE indicate that the employee has not retained the requisite understanding or skill.
4. Has the employer verified that each affected employee has received and understood the required training, and issued a written certification that includes the name of each employee trained, the date(s) of training, and the subject of the certification?

5. Did the employee use the provided respiratory protection in accordance with instructions and training received?
6. Were written procedures prepared for the safe use of respirators in dangerous atmospheres that might be encountered in normal operations or in emergencies? Are personnel familiar with these procedures and the available respirators?
7. Has the employer or AHJ provided for a means of evaluating a member's ability to act properly during emergency situations that require the use of respiratory protection equipment? (NFPA 1404, 6.4)
8. Has the employer provided training to the respirator user in its selection, use, and maintenance? Both supervisors and workers must be instructed by competent persons. Training must provide each fire fighter an opportunity to handle the respirator, have it fitted properly, test its face piece-to-face seal, wear it in normal air for a long familiarity period, and, finally, to wear it in a test atmosphere.
9. Has the employer selected SCBAs used by the Authority having Jurisdiction (AHJ) for training that meets the requirements of Section 4.3 of the NFPA 1852, Standard on Selection, Care, and Maintenance of Open-Circuit Self-Contained Breathing?
10. Has the respirator wearer been fit tested? Every respirator wearer must receive fitting instructions, including demonstrations and practice in how the respirator should be worn, how to adjust it, and how to determine proper fit. Respirators may not be worn when conditions prevent a good face seal. Such conditions may be beard growth, sideburns, a skull cap that projects under the face piece, or temple pieces on glasses. Also, the absence of one or both dentures can seriously affect the fit of a face piece. The worker's diligence in observing these factors shall be evaluated by periodic check. To assure proper protection, the face piece fit shall be checked by the wearer each time the respirator is donned.
11. How frequently is respiratory protection refresher training given?
12. Were users trained in the limitations and most common modes of failure of the respiratory protection they utilize?
13. Is there a regular internal inspection to determine the effectiveness of the program?

ADDITIONAL READING

Title 29 Code of Federal Regulations part 1910.132 - Personal Protective Equipment.

Title 29 Code of Federal Regulations part 1910.134 - Respiratory Protection.

NFPA 1404, Fire Service Respiratory Protection Training, National Fire Protection Association.

NFPA 1500, Fire Department Occupational Safety and Health Program, National Fire Protection Association.

NFPA 1851, Selection, Care, and Maintenance of Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting

NFPA 1852, Selection, Care, and Maintenance of Open-Circuit Self-Contained Breathing Apparatus (SCBA), National Fire Protection Association.

NFPA 2112, Flame-Resistant Garments for Protection of Industrial Personnel Against Flash Fire, National Fire Protection Association.

NFPA 2113, Selection, Care, Use, and Maintenance of Flame-Resistant Garments for Protection of Industrial Personnel Against Flash Fire, National Fire Protection Association.

NFPA 1951, Protective Ensembles for Technical Rescue Incident, National Fire Protection Association.

NFPA 1971, Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting, National Fire Protection Association.

NFPA 1981, Open-Circuit Self-Contained Breathing Apparatus (SCBA) for Emergency Services, National Fire Protection Association.

NFPA 1991, Vapor-Protective Ensembles for Hazardous Materials Emergencies, National Fire Protection Association.

NFPA 1994, Protective Ensembles for First Responders to CBRN Terrorism Incidents, National Fire Protection Association.

NFPA 1975, Station/Work Uniforms for Emergency Services

NFPA 1971, Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting

NFPA 1977, Protective Clothing and Equipment for Wildland Fire Fighting

NFPA 1981, Open-Circuit Self-Contained Breathing Apparatus (SCBA) for Emergency Services

NFPA 1982, Personal Alert Safety Systems (PASS)

NFPA 1983, Life Safety Rope and Equipment for Emergency Services

NFPA 1984, Respirators for Wildland Fire Fighting Operations

NFPA 1989, Breathing Air Quality for Emergency Services Respiratory Protection

NFPA 1991, Vapor-Protective Ensembles for Hazardous Materials Emergencies

NFPA 1992, Liquid Splash-Protective Ensembles and Clothing for Hazardous Materials Emergencies

NFPA 1994, Protective Ensembles for First Responders to CBRN Terrorism Incidents

NFPA 1999, Protective Clothing for Emergency Medical Operations

ANNEX C3: NFPA 1001 – FIRE FIGHTER PROFESSIONAL QUALIFICATIONS

Subject:	Training
Sub-Heading:	Fire Fighters
Standard:	NFPA 1001 - Fire Fighter Professional Qualifications
Issuing Body:	National Fire Protection Association
Applicability:	Industry consensus standard of minimum professional practice for fire fighter training

Auditing Points

1. What kind and quality of training documentation is available?
 - Are documents written or maintained in a computer data base?
 - Do documents require instructors to make comments or simply check boxes?
 - Is there a written training curriculum available for evaluation?
 - Does the training require the fire fighter to demonstrate competency?
2. What departmental or company training, if any, was done above and beyond training at the fire academy?
3. Who were the training instructors and evaluators? NFPA 1001, Annex A recommends, where practical, that “evaluators be individuals who were not directly involved as instructors for the requirement being evaluated”.
4. Do the instructors have sufficient training and experience to be qualified instructors?
5. Does the department designate fire fighters as either Fire Fighter I or II based upon the NFPA 1001 standard?
 - NFPA 1001 states that “the fire fighter shall meet all of the objectives for Fire Fighter I before being certified at that level.”
 - Before being certified at the Fire Fighter II level, NFPA requires that the fire fighter shall meet all of the objectives for both Fire Fighter I and Fire Fighter II.
6. Are the duties and expectations of fire fighters commensurate with their training and experience?
7. Have fire fighters successfully completed all the applicable performance requirements for their positions? Consult with the applicable NFPA 1001 requirements for Fire Fighter I or Fire Fighter II.
8. Has the fire fighter been trained in the use of personal protective equipment and is he/she able to identify the function of the following articles of protective equipment?
 - Helmet.
 - Hood.
 - Boots.

- Gloves.
 - Protective coat.
 - Protective trousers.
 - Self-contained breathing apparatus (SCBA).
 - Personal alert safety system (PASS).
 - Eye protection.
9. Has the employer verified that the fire fighters can identify and demonstrate the care, use, inspection, maintenance, and limitations of the protective clothing and equipment assigned or provided for use by the fire department?
 10. Has the employer verified that the fire fighters can demonstrate the donning and doffing of protective equipment?
 11. Has the employer verified that the fire fighters can identify the hazardous environments requiring the use of respiratory protection and the physical requirements of an SCBA wearer?
 12. Have fire fighters been trained in the local incident management system and personnel accountability system? Did the training include elements of the systems, as well as the role of fire fighters within the systems?
 13. Have fire fighters, who may be required to assume or transfer command, demonstrated their ability to operate within the local system?
 14. Have the fire fighters been trained in local radio procedures? Fire fighters should be required to define and demonstrate prescribed fire department radio procedures, including the following:
 - Routine traffic.
 - Emergency traffic.
 - Mayday procedures.
 - Emergency button (E-trigger) activation.
 - Evacuation signals.
 15. Have the fire fighters been trained in the use of all tools and equipment provided to them?
 16. Have the fire fighters been trained in the local water distribution system and other water sources in the local community?
 17. Have the fire fighters been trained in the specifics of the nozzles and hoses owned by the fire department?
 18. Have the fire fighters been trained in, and demonstrated ability to comply with, all fire department fireground standard operating procedures?

ADDITIONAL READING

NFPA 1001, Fire Fighter Professional Qualifications, National Fire Protection Association.

ANNEX C4: NFPA 1002 – FIRE APPARATUS DRIVER/OPERATOR PROFESSIONAL QUALIFICATIONS

Subject:	Training
Sub-Heading:	Fire Department Vehicle Driver
Standard:	NFPA 1002 - Fire Apparatus Driver/Operator Professional Qualifications
Issuing Body:	National Fire Protection Association
Applicability:	Industry consensus standard of minimum professional practice for vehicle driver/operators

AUDITING POINTS

1. Are vehicle drivers/operators licensed to drive the vehicle that they are expected to operate? (Commercial Drivers License requirements vary by state or province.)
2. Do fire department drivers/operators receive periodic medical evaluations, as required? (See, NFPA 1500)
3. Have the drivers/operators been trained, or demonstrated ability, to perform the routine tests, inspections, and servicing functions on the specified systems and components listed below, based on manufacturer's specifications?
 - Battery.
 - Braking system.
 - Coolant system.
 - Electrical system.
 - Fuel.
 - Hydraulic fluids.
 - Lubrication.
 - Oil.
 - Tires.
 - Steering system.
 - Belts.
 - Tools, appliances, and equipment.
4. Has the employer trained employees in the record keeping requirements for the vehicles they drive/operate? Can drivers document the routine tests, inspections, and servicing functions (given maintenance and inspections forms) so that all items are checked for proper operation and deficiencies are reported? Cross check this item with maintenance records and inspection logs to ensure a reliable program of preventive maintenance, and regular equipment inspections.
5. Have the drivers/operators been trained on the specific manufacturer's model of apparatus that they will be driving/operating?
6. Have the drivers/operators successfully completed all of the performance requirements required for the type of vehicle they drive/operate? Consult NFPA 1002 for applicable performance requirements for vehicle drivers.

7. Do training records verify the quality of the training program? How has training and ability been demonstrated and documented? How was the employee's performance documented? Were both deficiencies and the corrective actions noted on training records? What were the qualifications of the test administrator?
8. Are there any previous incident reports that suggest a deficiency in the vehicle driver's training or ability? Were the recommended corrective actions from these incident reports, if any, implemented by the fire department?

ADDITIONAL READING

NFPA 1002, Fire Apparatus Driver/Operator Professional Qualifications, National Fire Protection Association.

NFPA 1500, Fire Department Occupational Safety and Health Program, National Fire Protection Association.

ANNEX C5: NFPA 1003 – AIRPORT FIRE FIGHTER PROFESSIONAL QUALIFICATIONS

Subject:	Training
Sub-Heading:	Fire Fighters
Standard:	NFPA 1003 - Airport Fire Fighter Professional Qualifications
Issuing Body:	National Fire Protection Association
Applicability:	Industry consensus standard of minimum professional practice for airport fire fighter training

AUDITING POINTS

1. For certification as an airport fire fighter, did the candidate meet requirements for:
 - Fire Fighter II defined in NFPA 1001, Standard for Fire Fighter Professional Qualifications.
 - First responder operational level defined in Chapter 5 of NFPA 472, Standard for Professional Competence of Responders to Hazardous Materials Incidents.
 - Requirements for airport fire fighter defined in NFPA 1003, Standard for Airport Fire Fighter Professional Qualifications.
 - The medical requirements of NFPA 1582, Standard on Comprehensive Occupational Medical Program for Fire Departments.
 - The minimum educational requirements established by the authority having jurisdiction.
 - The age requirements established by the authority having jurisdiction.
2. Has the employer verified that the fire fighters have detailed knowledge specific to airport fire fighting. Has the department performed and documented fire fighter training in the airport layout, operations, procedures, equipment, facilities, and related areas? The items listed below are considered to be requisite knowledge for airport fire fighters.
 - Airport familiarization including run-way and taxi-way designations.
 - Frangible gate locations.
 - Airport markings, lights, and signage.
 - Instrument landing system critical areas.
 - Designated isolation areas.
 - Vehicular traffic controls on the airfield.
 - Bridge load limits.
 - Controlled access points.
 - Aircraft traffic patterns and taxi routes.
 - Fuel storage and distribution locations.
 - Airport and immediate local area topographic layout and drainage systems.
 - Aircraft maintenance facilities.
 - Critical rescue and fire-fighting access areas.
 - Drainage systems.
 - Water supplies.
 - Airport facilities.

3. Are fire fighters knowledgeable in the following:
 - Fundamental aircraft fire-fighting techniques, including the approach, positioning, initial attack, and selection, application, and management of the extinguishing agents, as well as the limitations of various sized hand lines.
 - Use of proximity protective personal equipment (PrPPE).
 - Fire behavior.
 - Fire-fighting techniques in oxygen-enriched atmospheres.
 - Reaction of aircraft materials to heat and flame.
 - Critical components and hazards of civil aircraft construction, and systems related to ARFF operations.
 - Special hazards associated with military aircraft systems.
 - A national defense area and limitations within that area.
 - Characteristics of different aircraft fuels.
 - Hazardous areas in and around aircraft.
 - Aircraft fueling systems (hydrant/vehicle).
 - Aircraft egress/ingress (hatches, doors, and evacuation chutes).
 - Hazards associated with aircraft cargo, including dangerous goods.
 - Hazardous areas, including entry control points, crash scene perimeters, and requirements for operations within the hot, warm, and cold zones.
 - Critical stress management policies and procedures.
4. Has the department performed and documented fire fighter training in the airport's incident management system (IMS) protocol, the airport emergency plan, airport and aircraft familiarization, and communications equipment and procedures?
5. Has the department performed and documented fire fighter training in the timely arrival at an incident or accident, and the capability to perform emergency functions? This includes responding to hazardous conditions and performing standby operations. The training must include the following:
 - Response to day and night incidents or accidents on, and adjacent to, the airport in a manner that provides access to the site within the allotted time.
 - Communicate critical incident information regarding an incident or accident on, or adjacent to, an airport so that the information provided is accurate and sufficient.
 - Communicate with applicable air traffic control facilities so that all required clearances are obtained.
 - Perform an airport operation so that unsafe conditions are detected and reduced in accordance with the airport policies and procedures.
6. Have airport fire fighters been trained in the attack, control, and extinguishment of fires involving aircraft, aircraft cargo, airport facilities, and other equipment related to airport operations and property conservation? This includes:
 - The fire behavior of aircraft fuels in spills and pools, physical properties, characteristics of aircraft fuel, agent application rates, densities, and procedures. This sentence is very confusing and doesn't seem to make sense.

- Continual agent application until the fire is extinguished and the fuel source is secured.
 - Attack a fire on the interior of an aircraft while operating as a member of a team and maintaining crew integrity.
 - Attack fires involving parts of the aircraft which have specific tactical requirements (i.e. an engine or auxiliary power unit, wheel assembly fire).
 - Perform aircraft ventilation during fire fighting activities.
 - Replenish extinguishing agents.
 - Preserve the aircraft accident scene so that evidence is identified, protected, and reported according to procedures.
 - Overhaul the accident scene so that all fires are located, exposed, and extinguished, and all property is protected from further damage.
7. Have the airport fire fighters been trained in gaining access to an aircraft and assisting in the evacuation process, performing disentanglement, and initial triage. This includes:
- Gaining access into and out of an aircraft through normal entry points and emergency hatches, shut down and safety the aircraft, does this need to be explained and assist in the evacuation process so that passenger evacuation and rescue can be accomplished.
 - Locating and disentangling entrapped victim(s) from an aircraft so that the victim is freed from entrapment without undue further injury and hazards are managed.
 - Implementing initial victim triage so that each victim is evaluated and correctly categorized according to AHJ protocol.

ADDITIONAL READING

NFPA 1003, Airport Fire Fighter Professional Qualifications, National Fire Protection Association.

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ANNEX C6: NFPA 1021 – FIRE OFFICER PROFESSIONAL QUALIFICATIONS

Subject:	Training
Sub-Heading:	Fire Officer
Standard:	NFPA 1021 - Fire Officer Professional Qualifications
Issuing Body:	National Fire Protection Association
Applicability:	Industry consensus standard of minimum professional practice for job performance as a fire officer

AUDITING POINTS

1. Before being certified as a Fire Officer Level I, did the candidate meet the requirements of Fire Fighter II as defined in NFPA 1001 and the job performance requirements defined in NFPA 1021 standard?
2. Is the fire officer able to distinguish between the types of verbal orders or commands that an officer would use in each of the following situations.
 - During an emergency operation
 - While working in the station
 - During a training session
3. Do fire officers receive training to enable them to recognize symptoms of member-related problems such as substance abuse, situational stress, and behavioral change, and identify the appropriate action to be taken for each according to the policies and procedures established by the authority having jurisdiction?
4. Has the Fire Officer met the applicable requirements of NFPA 1021?
5. How has the Fire Officer demonstrated a thorough understanding of the incident command system and the fireground accountability system?
6. How has the Fire Officer demonstrated a thorough understanding of fireground tactics?
7. For certification at Level II, has the Fire Officer II candidate met the requirements of Fire Officer I and Fire Instructor I as defined in NFPA 1041, Standard for Fire Service Instructor Professional Qualifications?
8. Has the Fire Officer II met the applicable requirements of NFPA 1021?
9. Has the Fire Officer III candidate met the applicable requirements of Fire Officer II and Fire Instructor II as defined in NFPA 1041?
10. Has the Fire Officer IV met the applicable requirements of NFPA 1021?

11. When reviewing previous incident reports of the fire officer(s) involved in the incident, are there any trends that indicate incomplete understanding of the skills and knowledge required for their jobs? Were recommendations for corrective actions, if any, implemented by the fire department?

ADDITIONAL READING

NFPA 1021 - Fire Officer Professional Qualifications, National Fire Protection Association.

ANNEX C7: OSHA HAZARDOUS WASTE OPERATIONS AND EMERGENCY RESPONSE STANDARD

Subject:	Training
Sub-Heading:	Hazardous Waste Operations and Emergency Response
Standard:	29 CFR 1910.120 (q) - Hazardous Waste Operations and Emergency Response
Issuing Body:	U. S. DOL, Occupational Safety and Health Administration; U.S. Environmental Protection Agency
Applicability:	Law applying to public fire departments in all states with OSHA Plans and in all other states through EPA enforcement, all U.S. private fire departments, and all U.S. federal fire departments

AUDITING POINTS

1. Is the training based on the duties and functions to be performed by each member of an emergency response organization. The skill and knowledge levels required for all new responders must be conveyed to them through training before they are permitted to take part in actual emergency operations on an incident.
 - Have employees been trained in the knowledge and skills required for hazardous materials response before participating in actual responses?
2. Has the employer designated the responder level at which their employees are expected to perform? Employers must designate the level to which employees will be trained in hazardous material response. Consult 29 CFR 1910.120 for the OSHA regulatory descriptions of the response levels and the skills in which competency must be demonstrated.
3. Are the expectations and skill requirements for each responder level listed in standard operating procedures, and available to all employees?
4. Has the employer trained the employees sufficiently to allow them to operate at their designated response levels?
5. Was the training based specifically upon the duties and functions to be performed by each responder?
6. What kind and quality of training documentation is available (e.g., attendance logs, training content, training length, competency or mastery testing)?
7. For responder levels requiring employer certification of competency, has the employer certified competency in writing?
8. Who conducted the training and was the trainer qualified to teach the material? Trainers who teach any of the above training subjects must have satisfactorily completed a training course for teaching the subjects they are expected to teach or they must have the training and instructional experience necessary to demonstrate competent instructional skills along with a good command of the subject matter of the courses they are to teach.

9. Did employees, who are trained in hazardous materials response, receive annual refresher training of sufficient content and duration to maintain their competencies, or must demonstrate competency in those areas at least annually? The employer must also state, in writing, whether each employee has received training or demonstrated competency. Copies of these statements, along with the methods used to demonstrate competency must be kept on record by the employer.
 - Did the employer document the training and methodology used to demonstrate competency? Was the method appropriate and sufficient to determine competency?

ADDITIONAL TRAINING MATERIALS

The International Association of Fire Fighters, Hazardous Materials Training Department is solely devoted to training in hazardous materials response. The mission of the department is the development, integration, planning, and evaluation of all levels of hazardous materials training to emergency response personnel. The department is funded through cooperative agreements with the National Institute for Occupational Safety and Health (NIOSH), the National Institute of Environmental Health Sciences (NIEHS), the Department of Energy (DOE), the Department of Transportation (DOT), and the Environmental Protection Agency (EPA). The IAFF has developed considerable training materials for hazardous materials response and conducts training for fire fighters throughout the United States. For further information regarding materials and training contact:

International Association of Fire Fighters
Hazardous Materials Training Department
1750 New York Avenue, NW
Washington, DC 20006

ADDITIONAL READING

Title 29 Code of Federal Regulations part 1910.120 (q) - Hazardous Waste Operations and Emergency Response.

ANNEX C8: NFPA 472 - PROFESSIONAL COMPETENCE OF RESPONDERS TO HAZARDOUS MATERIALS INCIDENTS

Subject:	Training
Sub-Heading:	Fire Fighters
Standard:	NFPA 472 - Professional Competence of Responders to Hazardous Materials Incidents
Issuing Body:	National Fire Protection Association
Applicability:	Industry consensus standard of minimum professional practice for hazardous materials response personnel

AUDITING POINTS

1. Do the fire fighter's job responsibilities warrant training as a first responder at the awareness level? Has that training requirement been met?
 - First responders at the awareness level are those persons who, in the course of their normal duties, may be the first on the scene of an emergency involving hazardous materials. First responders at the awareness level are expected to recognize the presence of hazardous materials, protect themselves, call for trained personnel, and secure the area.
 - First responders at the awareness level must be trained to meet certain competencies of NFPA 472. In addition, first responders at the awareness level must receive training to meet requirements of Occupational Safety and Health Administration (OSHA), local occupational health and safety regulatory agencies, and the U.S. Environmental Protection Agency (EPA), as appropriate for their jurisdiction.
2. Have fire fighters at the awareness level been provided with the knowledge and skills to meet the applicable requirements of the first responder at the awareness level in NFPA 472?
3. Have the first responders received periodic refresher training and/or drills?
4. Does the local emergency response plan and the department's standard operating procedure clearly list the expectations and restrictions on the performance of first responders at the awareness level?
5. Have the first responders been trained in the specific local procedures?
6. Do the fire fighter's job responsibilities warrant training as a first responder at the operations level? Has that training requirement been met?
 - First responders at the operational level are those persons who respond to releases or potential releases of hazardous materials as part of the initial response to the incident for the purpose of protecting nearby persons, the environment, or property from the effects of the release. They must be trained to respond in a defensive fashion to control the release from a safe distance and keep it from spreading.
 - First responders at the operational level must be trained to meet all requirements at the awareness and operational levels. In addition, first responders at the operational level must receive training to meet requirements of OSHA, local occupational health and safety regulatory agencies, and EPA, as appropriate for their jurisdiction.

7. Have fire fighters at the operational level been provided with the knowledge and skills to meet the applicable requirements of the first responder at the operational level in NFPA 472?
8. Have the first responders at the operational level received periodic refresher training and/or drills?
9. Does the local emergency response plan and the department's standard operating procedure clearly list the expectations and restrictions on the performance of first responders at the operations level?
10. Has the employee been trained in specific local procedures?
11. Do the fire fighter's job responsibilities warrant training at the technician level? Has that training requirement been met?
 - Hazardous materials technicians are those who respond to releases or potential releases of hazardous materials for the purpose of controlling the release. Hazardous materials technicians are expected to use specialized chemical protective clothing and specialized control equipment.
 - Hazardous materials technicians must be trained to meet all requirements at the first responder awareness and operational levels and at the technician level. In addition, hazardous materials technicians must meet the training requirements and be provided medical surveillance in accordance with requirements of OSHA, local occupational health and safety regulatory agencies, and EPA, as appropriate for their jurisdiction.
12. The goal of training at the technician level must be to provide the hazardous materials technician with the knowledge and skills to perform required tasks safely. Therefore, in addition to being competent at both the first responder awareness and operational levels, the hazardous materials technician must meet the applicable requirements of NFPA 472.
13. Have hazardous materials technicians received periodic refresher training and/or drills?
14. Does the local emergency response plan and the department's standard operating procedure clearly list the expectations and restrictions on the performance of hazardous materials technicians?
15. Have hazardous materials technicians been trained in the specific local procedures?
16. Do the fire fighter's job responsibilities warrant training as an incident commander? Has that training requirement been met?
 - The incident commander is that person who is responsible for directing and coordinating all aspects of a hazardous materials incident.
 - The incident commander must be trained to meet all requirements for the first responder at the awareness and operational levels, as well as requirements for Haz Mat incident command. In addition, the incident commander must receive additional training to meet requirements of OSHA, local occupational health and safety regulatory agencies, and EPA, as appropriate for his or her jurisdiction.

17. The incident commander must meet the applicable requirements of NFPA 472.
18. Has the incident commander participated in periodic refresher training and/or drills?
19. Does the local emergency response plan and the department's standard operating procedure clearly list the expectations and restrictions on the performance of the incident commander?
20. Has the incident commander been trained in the specific local procedures?

ADDITIONAL READING

NFPA 472 - Professional Competence of Responders to Hazardous Materials Incidents, National Fire Protection Association.

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