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Foreword

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. Rarely does anyone take responsibility for a fire fighter’s death.

Now, more than ever, when one of our members is killed in the line of duty, we need to know what really happened. Every fire fighter’s death must receive a thorough and unbiased investigation. We owe it to every fallen hero, every family member left behind, and the 225,000 members of our Union.

It is time we take a harder look at how and why our people are killed. 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. We are not calling for a witch hunt each time a fire fighter is killed in the line of duty. However, we will not allow a fire fighter’s death to be in vain.

The IAFF manual on Fire Fighter Line-of-Duty Death and Injury Investigations has been developed to assist local affiliates in conducting an investigation when a brother or sister is injured or killed. Many local affiliates will find that the investigation process is most effective when implemented in a joint labor/management setting. When locals and their fire departments can work together on investigations, we encourage that the information in this manual be shared freely.

The fire service population we address in this manual includes fire fighters, paramedics, and emergency medical technicians across the United States and Canada. The manual incorporates the resources of investigation management, United States government documents, National Fire Protection Association standards, occupational medicine, and other relevant sources to make a comprehensive guidebook of value to all our members.

This manual is dedicated to the fire fighters who have died in the line of duty. From their deaths we will learn how to prevent further tragedies.

Harold A. Schaitberger
General President

Vincent J. Bollon
General Secretary-Treasurer
Acknowledgments

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# Table of Contents

## SECTION 1 - MANAGING AND INVESTIGATING THE INCIDENT

### Chapter 1 .......................................................................................................................... 1

**Introduction** ........................................................................................................... 1
- The IAFF Philosophy of Incident Investigation ........................................................ 2
- How to Use This Manual ......................................................................................... 2
- Summary ............................................................................................................... 3

### Chapter 2 ........................................................................................................................ 5

**Overview of the Investigation Process** ........................................................................ 5
- Accident vs. Incidents ................................................................................................. 5
- Systems Analysis ........................................................................................................ 5
- Root Cause Assessment ............................................................................................ 6
- The Interested Parties and Sources of Bias ............................................................... 6
- Criminal Investigations ............................................................................................. 7
- Pre-planning for the Investigation .......................................................................... 7
- Conducting the Investigation .................................................................................... 8
- Follow-up of the Investigation ............................................................................... 9

### Chapter 3 ....................................................................................................................... 11

**The Investigation Team** .......................................................................................... 11
- Qualities of an Investigator ..................................................................................... 11
- Selecting the Investigation Team .......................................................................... 12
- The Investigation Team Leader ............................................................................. 13
- The Investigation Coordinator ............................................................................... 13
- The Safety Specialist .............................................................................................. 14
- The Investigation Team Members ......................................................................... 14
- Technical Specialists ............................................................................................... 15
- Documenter and Photographer ............................................................................. 15
- Assembling and Training the Investigation Team ............................................... 15
- Simulating an Incident Investigation ................................................................... 16
- Summary .............................................................................................................. 17

### Chapter 4 ....................................................................................................................... 19

**Incident Scene Description** ..................................................................................... 19
- Preserving the Scene ............................................................................................... 19
- Physical Evidence .................................................................................................... 19
- Evidence Position Mapping .................................................................................. 20
- Preserving Physical Evidence ............................................................................... 25
- Transportation and Storage of Physical Evidence .............................................. 26
- Chain of Custody for Physical Evidence ............................................................... 26
- Examination and Testing of Physical Evidence .................................................. 26
- Comparative Examination and Testing ................................................................. 27
- Evidence Disposition ............................................................................................ 27
Developing an Incident Time Line .............................................................. 27
Time Line Incident Sequencing Analysis ................................................... 27
Steps in Diagramming Using Time Line Incident Sequencing
Analysis .................................................................................................... 32

Chapter 5 ................................................................................................................... 35

Incident Scene Photograph ................................................................................. 35
Photography Composition and Technique .................................................... 35
The Photograph Log ...................................................................................... 36
When Should Pictures Be Taken? ................................................................. 36
Photograph Tips ............................................................................................. 36
Processing of Film and Proof Sheets ............................................................. 36
News Media .................................................................................................... 37
Conclusion ...................................................................................................... 37

Chapter 6 ................................................................................................................... 39
Interviewing Witnesses ...................................................................................... 39
Witnesses: People with Information ............................................................. 39
Factors Affecting Witness Testimony ............................................................ 40
Planning the Interview ................................................................................... 41
Beginning the Interview ............................................................................... 42
Obtaining Initial Information ....................................................................... 42
Expanding Information ............................................................................... 43
Control Questions ......................................................................................... 43
Closing the Interview .................................................................................... 43
Interview Tips and Techniques ..................................................................... 44
Recording Witness Testimony ..................................................................... 44
Written Statements ....................................................................................... 44
Tape Recorders .............................................................................................. 45
Analyzing Witness Testimony ...................................................................... 45
Follow-up Interviews ................................................................................... 46
The Ten Commandments for Interviewing Witnesses ............................. 47
Conclusion ...................................................................................................... 47
Sample Witness Interview Questions ......................................................... 48

Chapter 7 ................................................................................................................... 53
Public Relations ................................................................................................... 53
Initial Notification of Death or Injury ............................................................ 53
The Investigation Team’s Media Contact ....................................................... 53
Media Outlets ................................................................................................. 54
Notifying the Media ....................................................................................... 54
News Releases ............................................................................................... 55
News Conference .......................................................................................... 55
Working with Reporters ............................................................................... 56
The Interview Process ................................................................................... 57

Chapter 8 ................................................................................................................... 59
Sources of Outside Assistance ........................................................................... 59
International Association of Fire Fighters .................................................... 59
National Institute for Occupational Safety and Health ............................ 60
Department of Transportation ..................................................................... 61
National Transportation Safety Board ......................................................... 62
SECTION 2 - AUDITING THE INCIDENT

Chapter 9 ................................................................................................................... 67

Review of the Fire Department Organizational Structure .......... 67
   Organizational Culture ................................................................. 67
   Auditing Points ........................................................................... 69

Chapter 10 ................................................................................................................. 75

Incident Management ................................................................. 71
   Evaluating Risks ........................................................................ 72
   Auditing Points ........................................................................ 73
   Emergency Incident Communications ........................................ 73
   Evaluating the Command Structure ........................................... 74
   Training ................................................................. 75
   Personnel Accountability ............................................................. 75
   Rapid Intervention Teams ......................................................... 76
   Emergency Incident Rehabilitation ............................................. 76
   Incident Commander Responsibilities ........................................ 76
   Command Staff Responsibilities .................................................. 77
   Safety Officer ........................................................................... 79
   Staffing ................................................................................. 79
   Risk Management ..................................................................... 80

Chapter 11 ................................................................................................................. 83

Fire Department Communications ........................................ 83
   Evaluating Message Content .................................................... 83
   Auditing Points ........................................................................ 84
   Management Functions .............................................................. 84
   Dispatch Functions .................................................................... 85
   Communications Equipment ..................................................... 85
   Fire Ground Communication ..................................................... 86

Chapter 12 ................................................................................................................. 89

Fireground Tactics ................................................................. 89
   Auditing Points ........................................................................ 90
   Pre-planning and Standard Operating Procedures .................... 90
   Search and Rescue ................................................................. 90
   Apparatus Placement ............................................................... 91
   Fire Fighter Assignments and Water Delivery ......................... 91
   Ventilation .............................................................................. 93
   Aerial and Ladder Operations .................................................. 93
Chapter 13 ................................................................................................................. 95

Medical Aspects of the Investigation ........................................................................ 95

Autopsies ................................................................................................................... 95
Occupational Medicine Programs ........................................................................... 96
IAFF/IAFC Fire Service Joint Labor Management Wellness/ 
Fitness Initiative ......................................................................................................... 97
Auditing Points ......................................................................................................... 97

Chapter 14 ................................................................................................................. 99

SCBA Program Evaluation ....................................................................................... 99
Auditing Points ......................................................................................................... 99
Respiratory Protection Program Administration ...................................................... 99
SCBA Training .......................................................................................................... 102
SCBA Safety ............................................................................................................. 103
SCBA In-service Inspection ....................................................................................... 104
SCBA Maintenance Program .................................................................................... 104
Preventative Maintenance Program ........................................................................ 105
Air Quality Control .................................................................................................. 105
Program Evaluation Requirements .......................................................................... 106

Chapter 15 ............................................................................................................... 109

Documenting the Condition of Protective Clothing and Equipment .................. 109

Self-Contained Breathing Apparatus ..................................................................... 109
PASS Device ............................................................................................................ 110
Protective Clothing ................................................................................................. 111
Protective Clothing Assessment ............................................................................. 112
Helmet Inspection ................................................................................................... 112
Hood Inspection ...................................................................................................... 112
Structural Fire Protective Clothing ....................................................................... 113
Glove Inspection ..................................................................................................... 113
Footwear .................................................................................................................. 113
Station/Work Uniform ............................................................................................. 114
Expert Evaluation of Protective Clothing and Equipment .................................... 114

Chapter 16 ............................................................................................................... 117

The Importance of Training and Training Records ............................................... 117

Why Maintain Training Records ......................................................................... 117
Types of Training Reports ....................................................................................... 118
Information Available in Training Records ............................................................ 119
Evaluating Training Records .................................................................................. 119
Computerized Training Records ........................................................................... 120

Chapter 17 ............................................................................................................... 121

OSHA Fire Brigades Standard .................................................................................. 121
Auditing Points ......................................................................................................... 121

Chapter 18 ............................................................................................................... 123

OSHA PPE and Respiratory Protection Training Requirements ........................ 123
Auditing Points ......................................................................................................... 123
<table>
<thead>
<tr>
<th>Chapter 19</th>
<th>NFPA 1001 - Fire Fighter Professional Qualifications</th>
<th>125</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Auditing Points</td>
<td>125</td>
</tr>
<tr>
<td>Chapter 20</td>
<td>NFPA 1002 - Vehicle Driver Professional Qualifications</td>
<td>127</td>
</tr>
<tr>
<td></td>
<td>Auditing Points</td>
<td>127</td>
</tr>
<tr>
<td>Chapter 21</td>
<td>NFPA 1003 - Airport Fire Fighter Professional Qualifications</td>
<td>129</td>
</tr>
<tr>
<td></td>
<td>Auditing Points</td>
<td>129</td>
</tr>
<tr>
<td>Chapter 22</td>
<td>NFPA 1021 - Fire Officer Professional Qualifications</td>
<td>131</td>
</tr>
<tr>
<td></td>
<td>Auditing Points</td>
<td>131</td>
</tr>
<tr>
<td>Chapter 23</td>
<td>OSHA HAZWOPER Standard</td>
<td>133</td>
</tr>
<tr>
<td></td>
<td>Auditing Points</td>
<td>133</td>
</tr>
<tr>
<td></td>
<td>Additional Training Materials</td>
<td>133</td>
</tr>
<tr>
<td>Chapter 24</td>
<td>NFPA 472 - Professional Competencies of HazMat Responders</td>
<td>135</td>
</tr>
<tr>
<td></td>
<td>Auditing Points</td>
<td>135</td>
</tr>
<tr>
<td>Chapter 25</td>
<td>Preparing the Investigation Report</td>
<td>139</td>
</tr>
<tr>
<td></td>
<td>Writing the Investigation Report</td>
<td>139</td>
</tr>
<tr>
<td></td>
<td>Report Preparation Tips</td>
<td>140</td>
</tr>
<tr>
<td></td>
<td>Presentation of the Investigation Report</td>
<td>140</td>
</tr>
<tr>
<td></td>
<td>Sample Investigation Report Outline</td>
<td>141</td>
</tr>
</tbody>
</table>

**SECTION 3 - WORKSHEETS, FORMS AND REFERENCE MATERIALS**

- **Appendix A**
  - Photographic Investigative Worksheet

- **Appendix B**
  - Witness Written Statement Form

- **Appendix C**
  - Media Inventory Form

- **Appendix D-1**
  - IAFF Line-of-Duty Death Notification, Assistance and Investigation Policy
Appendix D-2
IAFF Funeral Protocol for Line-of-Duty Deaths

Appendix D-3
IAFF Line-of-Duty Death Form for U.S. Fire Fighters

Appendix D-4
IAFF Line-of-Duty Death Form for Canadian Fire Fighters

Appendix E
USFA Firefighter Autopsy Protocol

Appendix F
Sample SCBA Evaluation Request Letter

Appendix G
Self-Contained Breathing Apparatus and Personal Protective Equipment Inspection Forms
The profession of fire fighting is and has always been a hazardous occupation. Every year the IAFF publishes its annual *Death and Injury Survey*, and each year the hazards of fire fighting continue to exist in ever varied forms. During the last decade, the *Death and Injury Survey* reported that professional fire fighters experienced 352 line-of-duty deaths, 611 occupational disease deaths, 337,622 injuries and 7,467 forced retirements due to occupationally-induced diseases or injuries. The high number of fire fighter line-of-duty fatalities have ranked fire fighting among other publicized hazardous occupations in the private sector, such as mining and construction.

Of the injuries reported, approximately 80% occurred while at the emergency scene. The data shows more than 40% of all fire fighters are injured at least once during the course of each year. These figures only scratch the surface in detailing the hazards of fire fighting. The nature of the job is so varied and extensive, that civilians often do not truly understand what a fire fighter’s job entails. Fire fighters are physically and psychologically challenged. Challenges include structural fires, vehicle accidents, hazardous materials incidents, rescues, wildland fires, explosions, chemical exposures, extreme temperature environments, infectious disease exposures, occupational disease and cancer, fireground injuries, environmental exposures, psychological stress, noise, physical fitness conditioning, and personal time management.

Fire fighters are constantly making transitions from the calm, peaceful environment of the firehouse to the hostility of the fireground and other emergency scenes. The working environment can also mean a transition from below freezing temperatures to temperatures between 100°F and 1,500°F at the fire itself. Fire fighting involves strenuous physical exertion made more burdensome by protective clothing and breathing apparatus which weighs 45 to 65 pounds. These constant transformations, temperature extremes and strenuous physical activities have numerous psychological and physiological side effects.

Nevertheless, fire fighters perform such vital tactical activities as securing and applying water, structural ventilation, search and rescue, exposure protection, confinement and extinguishment of fire, property conservation, and overhaul. Modern fire fighters provide vital community services including fire suppression, fire prevention, emergency medical response, hazardous materials response, urban search and rescue, and technical rescue, including rescues in swift water, contaminated water, high-angle locations, and confined spaces. Fire fighters respond to virtually every man-made and natural emergency event and disaster.

As a consequence of the work, fire fighters are subjected to many hazards and dangerous situations while providing community protection. In any given year there may not be well publicized multiple fire fighter fatalities at a single event to serve as an unfortunate reminder of the occupational hazards. Nonetheless, the number of deaths and injuries are relatively constant from year to year.
The stability of the annual number of deaths and injuries indicates that there are trends that can be studied. Analysis of these trends enables researchers to predict the number and nature of deaths and injuries in a given year. If injuries can be predicted, then injuries can be prevented. Though it cannot be predicted that on a given day a specific fire fighter in a certain city will be critically injured, certain factors are more likely to result in deaths or injuries. For example, close examination of traffic “accidents” has resulted in a better understanding of how road design, car design features, driver errors, seat belts, air bags, speed limits, and motorcycle helmets influence vehicular injuries. This information has assisted engineers, legislators, and drivers to make intelligent decisions. The accurate and detailed investigation of fire fighter fatalities and injuries is necessary if the fire service is to take the next step to protect fire fighters’ health and safety.

Completing an investigation of a line-of-duty death or any incident in which fire fighters have been seriously injured is of the utmost importance. In the case of a line-of-duty death, the investigation may prove to be one of the most difficult tasks an investigation team may be directed to complete. It is important for fire departments, as well as IAFF locals, to have at their disposal an established protocol to follow for the completion of the incident investigation. A thorough investigation will take time and will require patience from all involved so that it can be completed in a thorough, unbiased fashion. The final report of an investigation should be based solely on the facts, leaving no room for conjecture, assumptions, speculation, opinion, or unsubstantiated theories.

The investigation of fire fighter deaths and injuries is critical to improving the safety of the profession. A fatality or serious injury investigation must be a methodical effort to collect, analyze, and report, in an accurate and unbiased manner, the facts surrounding an incident. The goal of every investigation should be to determine what happened, why it happened, and what can be done to prevent future injuries, both within the department and throughout the fire fighting profession.

Investigations should not be threatening to the people directly involved in the incident. Some may fear that the investigation’s goal is to find a responsible party to blame. Consequently, many fatalities and serious injuries are not fully investigated. Detailed investigations usually reveal similar incidents that were either ignored or dismissed as rare occurrences or minor “accidents” and not worthy of an investigation or report.

When a fire fighter is killed in the line of duty, it is viewed as a tragedy. When a police officer is killed on the job, it is viewed as a crime. The line-of-duty death of a police officer usually results in a full and thorough investigation and the police departments make the results known. The IAFF believes that we must ensure that the same kind of careful and independent scrutiny is applied to investigations of fire fighter deaths and serious injuries. The IAFF believes that the lessons learned from a thorough investigation will prevent needless deaths in the future. This manual will help local union members and fire departments conduct an investigation if a fire fighter is killed or injured in the line of duty.

This manual is designed to serve as a guide for fire departments and IAFF affiliates undertaking the incident investigation process. While intended for use when a fire fighter has been killed or severely injured in the line of duty, IAFF affiliates and fire departments should find that the investigation process also serves as an internal audit tool. The manual is divided into three sections.
• Section one of the manual contains chapters on: investigation philosophy, selecting investigation team members, incident scene description and photography, conducting witness interviews, public relations, and sources of outside assistance. While each local affiliate and fire department will have to develop their own policies and procedures, this section will aid in the assembly of an investigation team and the conduct of such an investigation.

• Section two of the manual will assist investigators in auditing individual components of the fire department’s organization. Each chapter contains auditing points that are designed to raise key issues regarding the response, determine the root causes of injuries, and lead to the development of corrective actions.

• Section three contains forms and references that can be used during an investigation.

Each investigation is unique. Consequently, not every chapter will be applicable in each investigation. Investigators may need more technical information than this manual can provide. Investigation team members must trust their judgment and experience in determining when to bring in additional resources. The International Association of Fire Fighters stands ready to provide local affiliates with any further assistance necessary to initiate and complete investigations.

Each year, dozens of professional fire fighters are killed and tens of thousands are seriously injured in the line of duty. The investigation of these deaths and injuries is critical to improving the safety of the fire fighting profession and serves as a systematic method to analyze the fire department system. Understanding the interaction between people, tools, and the environment will reveal why injuries occur and how they can be prevented. The investigation process should be an unbiased and cooperative effort by both labor and management.

SUMMARY
Chapter 2

Overview of the Investigation Process

The process of conducting an incident investigation is complicated and may take a relatively long period of time (weeks or months). Certain tasks must be completed before anybody is ever injured, other tasks take place as part of the official investigation process, and some issues brought to light by the investigation will require corrective action outside of the investigation process. An overview of the investigation process is helpful in gaining a perspective of the process you are about to begin.

Accident vs. Incidents

Most fire fighter deaths and serious injuries are not thoroughly investigated because they are simply attributed to the “risks” of fire fighting or bad luck. Yet, the vast majority of fire fighter fatalities and injuries are predictable and preventable. The first step toward a successful investigation is replacing the word “accident” with “incident.” Using the word accident implies an undesirable situation over which the fire fighter or fire department has no control (a meteor falling from the sky). An incident is simply an event with negative implications. However, calling an event an incident acknowledges that action could have been taken which would have affected the outcome.

Systems Analysis

Understanding the philosophy behind incident investigation allows investigators to put procedures in proper context. The fire department response to any emergency is a complex system of people, tools, and environment interacting in a specific manner to accomplish a defined task. In the case of a fire department, the task is providing emergency services to a community. When a fire fighter is injured, the system has failed to work properly. To fully understand the interactions, investigators must understand each element of the system, as illustrated in Figure 1.1.

Figure 1 System Interaction Diagram
The outcome of all fire fighting incidents depends on the interaction of the three fundamental system elements.

- **People** include management, administration, operation, suppression, and support personnel. When examining the human component of a system, consider such things as training, communication, tactics, decision making, and physical ability.

- **Tools** cover a wide range of implements, including personal protective equipment, hose lines, saws, and apparatus. When reviewing tools, look at their selection, use, performance, and maintenance in relation to established standards.

- **The environment** in which fire fighters work can be very dangerous. Some hazards include fire, toxic atmospheres, hazardous materials, low visibility, heat, and heavy or sharp objects.

The implementation of fireground procedures and tactics and usage of equipment are based upon the demands of the environment. The interaction between components of a system affect the whole system. A principal factor in a successful investigation is understanding these interactions. Why did the fire fighter advance the hose line in that manner? Why did the incident commander attack the fire from that side of the building? Why were the SCBAs maintained, or not maintained, in a certain way? This manual will help investigators understand the role of each system element in the emergency response.

Incidents occur because a series of individual events, decisions, and circumstances have combined to form a specific chain of events. The chain of events will often involve several different people (chiefs, training officers, incident commanders, fire fighters) making multiple decisions (training content, maintenance schedules, fireground tactics) over a long course of time (rookie training, at the fireground). The investigation will determine areas where there are problems and deficiencies within the current system by examining this chain and determining what links were critical to the incident.

Fatalities and injuries occur because numerous factors place stress on the system. These factors include human actions, physical conditions, and functional limitations within the system.

The goal of an investigation is not to place blame, but rather to identify deficiencies in policy, procedures, and other actions that contributed to the incident and to make corrective recommendations. This is best accomplished when labor and management work together with injury prevention as their common goal.

Different parties, each with a legitimate interest, often seek different results from an investigation. Labor may want to blame the management structure within the department and/or the management structure within the department may want to blame the individual(s) involved. Other parties, concerned mainly with their financial liability, may become deeply involved. Fire fighters should not automatically distrust people who are not members of the rank and file. However, fire fighters should be aware that people with vested interests may not always have fire fighter health and safety as their primary goal. Groups that have a vested interest in the outcome of the investigation include the following.
• The local union, which must ensure that the investigation of any death or injury is a fair and accurate description of the events that transpired.

• The fire department, which may oppose any findings of unsafe working conditions or negligence.

• The municipality’s risk manager, who may try to limit financial liability.

• The municipality’s workers’ compensation insurer, which may or may not pay benefits depending on findings of negligence and which may adjust future premiums based on a specific incident.

• The equipment manufacturer, whose product may have failed in a way which caused or contributed to the incident, and is seeking to protect its reputation or limit financial liability.

• The federal, state, or provincial occupational safety and health agency, which is responsible for determining if the employer complied with all applicable laws and regulations.

• Other agencies or organizations (i.e., the International Association of Fire Fighters (IAFF), the National Institute for Occupational Safety and Health (NIOSH), the United States Fire Administration (USFA), or the National Fire Protection Association (NFPA)) may choose to become involved if they believe that the investigation of an incident is under their jurisdiction or in their interest.

Members of the fire department investigating an incident involving a death or serious injury may be placed in the difficult position of investigating the actions of friends, co-workers, and superior officers. There may be internal pressure to find a particular individual or a certain action responsible for the death or injury. There may also be the temptation to omit or cover-up details in order to protect the reputation of a specific individual or the whole department. When a fatality or serious injury occurs, emotional reactions are natural; and, they can be magnified by the investigation process. Investigations must always attempt to separate facts from emotions and opinions. The investigation should always be limited to finding facts and developing recommendations.

On occasion, there may be criminal activity involved in the incident. Possible crimes include arson, illegal activities being carried out on the premises (e.g., clandestine drug labs or illegal storage sites for hazardous materials), or the willful violation of federal, state, or provincial safety regulations. When one or more of these situations are found to exist, it is the responsibility of the investigation team to make their report based solely on the facts as they pertain to the fire department’s response. The fatality or serious injury investigation team’s role should not include determining fire causation.

1. **Identify prospective team members.** A list of prospective team members should be maintained, based on the individual abilities and qualifications of fire department personnel. The team should include members who are very familiar with the operations and hazards associated with the type of incident being investigated. Outside experts, including law enforcement, should be identified for special technical roles in the investigation. Some jurisdictions
with limited numbers of qualified personnel and resources may opt to formalize a regional, multi-departmental investigative team.

2. **Provide training to the team members.** Team members must be trained in, and familiar with, both investigation process and techniques. Providing training before an incident occurs will ensure that team members are capable of arriving at the incident scene ready to work.

3. **Prepare equipment.** Team members must be provided with and trained in the use of the necessary investigatory equipment.

4. **Fire department procedures.** The fire department must develop local procedures governing how the investigation will proceed; policies that govern the authority and responsibilities of the investigation team; plans to ensure the prompt notification of team members; procedures for collecting and preserving evidence; policies for coordinating activities with outside agencies, and other policies and procedures enabling its members to conduct an investigation.

---

**CONDUCTING THE INVESTIGATION**

1. **Immediately secure the area.** Control access to the incident scene with barriers, and post guards to ensure that the scene remains intact. Do not move evidence, apparatus, or equipment until its position has been recorded by the investigation team. Immediately establish an accurate documentation of the chain of individuals involved and the condition, handling or moving of any evidence, apparatus, or equipment at the scene. The sooner the scene is secured, the easier it will be to investigate the incident and account for disruptions in physical evidence.

2. **Notify all appropriate people.** The notification of appropriate fire department personnel is vital to ensuring that the investigation begins smoothly. Any notification of personnel outside the department (e.g., media) should not take place until the immediate family members of affected personnel have been notified.

3. **Identify potential witnesses.** Obtain a list of all people who were involved in the incident, witnessed the incident, or may have useful information about the incident.

4. **Document the physical evidence.** Utilize investigatory tools and equipment to document the condition of the scene. Notepads, cameras, video recorders, and tape measures are useful in determining the physical layout of the incident scene and the relative position of key pieces of evidence. Certain pieces of evidence must be preserved and tested for compliance with appropriate standards. In these cases, evidence should be impounded and protected by the investigation team. Particular attention should be paid to protective clothing and equipment. Arrangements for an autopsy must also be made.

5. **Conduct interviews.** Witnesses must be questioned in an open-ended manner to obtain all pertinent information available. Interviews should be recorded or documented in some manner. In some cases follow-up interviews may be necessary to clarify details or corroborate other witnesses' statements. The list of witnesses may grow as different avenues of investigation are pursued.
6. Collect records, analyze information and develop recommendations. All data, records, reports and evidence must be gathered and evaluated to determine the root cause, contributory factors, and mitigating factors of the incident. Important records include: radio transcripts, photographs, maintenance records, training records, and medical records. Analysis includes a review of the actual operations against departmental procedures and national standards.

7. Write a report. The final product of the investigation process is a report that details the chain of events in the incident, vital facts and information, factors affecting the incident, and steps that can be taken to prevent a similar incident from occurring.

**FOLLOW-UP OF THE INVESTIGATION**

1. Implement corrective actions. The fire department must use the report as a conduit for implementing changes in the department’s operations and management. Implementation of the report’s findings may require additions and changes in existing procedures and programs.

2. Disseminate the findings. Other fire departments and fire fighters can learn valuable information from the publication of incident reports.

**END NOTE**

Investigating a line-of-duty death or injury is one of the most difficult and important tasks a fire department can undertake. An accurate investigation must be completed despite emotional stress, the strain of an internal investigation, and the pressure to quickly release information to both the department and the public. The foundation of any investigation is the selection, planning and training of the investigation team.

When a small group of people are unexpectedly brought together to work in close proximity in the investigation of an incident, the highest degree of professionalism is required. There are certain personal attributes which describe the qualities of successful investigators, such as:

**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** - Formal incident investigation training combined with field experience (i.e., command, operations, administration, and training) will produce the most capable investigation team. Every completed investigation results in an increased awareness of both the capabilities and limitations of the investigators. An understanding of limitations allows an investigator to determine when an outside expert is needed.

**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 is 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 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 investigation of a death or injury is not a job for one person. Typically, a thorough investigation will require three to five team members. Smaller teams may be overworked, larger teams may be too difficult to manage. Specialists may also be needed to complete certain aspects of the investigation. The selection of qualified team members should be a cooperative effort by both labor and management. The team should reflect a balanced blend of labor and management appointees with complementary professional skills.

An investigation team is designed, much like an incident command structure, to expand or contract, based upon need. Depending upon the size of the department and the demands of the investigation, the investigation team may consist of a team leader, investigation coordinator, and team members with expertise in safety, operations, engineering, medicine, protective clothing and equipment (PPE), law enforcement and/or area experts. The following provides an example of an investigation team organizational chart.
<table>
<thead>
<tr>
<th>THE INVESTIGATION TEAM LEADER</th>
<th>THE INVESTIGATION COORDINATOR</th>
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<tbody>
<tr>
<td>The investigation team leader provides direction and ensures the continuity of the investigation team. The team leader’s management experience will help the team move from the on-scene investigation to the issuance of a final report. The team leader must have the ability to handle diverse and competing interests, a strong background in fire fighting operations, and the full functional authority to conduct an independent investigation. When fire department management seeks an accurate investigation of the incident, there should be no fear of adverse consequences from the investigation.</td>
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<tr>
<td>The investigation team leader’s responsibilities include the following:</td>
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<tr>
<td>• Accept responsibility for the security and control of the incident scene from the incident commander</td>
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<td>• Determine the disciplines needed to conduct the investigation, and make recommendations for team members</td>
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<tr>
<td>• Conduct the investigation team orientation at the fireground</td>
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<tr>
<td>• Review the progress of team members and re-allocate resources or modify assignments as necessary</td>
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<tr>
<td>• Coordinate the investigation team members’ activities</td>
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<tr>
<td>• Approve requests for resources and people to assist in the investigation. This may involve a temporary reassignment from their normal duties</td>
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<tr>
<td>• Approve the removal of evidence from the incident scene</td>
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<tr>
<td>• Approve and direct any scene reconstruction, special disassemblies, or technical examination of evidence</td>
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<tr>
<td>• Assume or designate responsibilities for public relations, press releases, or media interviews</td>
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<tr>
<td>• Coordinate the release or disposal of evidence</td>
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<tr>
<td>• Provide status reports to management and union leadership</td>
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<tr>
<td>• Coordinate final analysis, review of conclusions, and drafting of the final report</td>
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</tr>
<tr>
<td>The investigation coordinator serves as an assistant to the investigation team leader. In larger investigations, the coordinator’s job functions may be vital to the efficient operation of the team. Smaller investigations may require that the duties of the coordinator be assumed by the team leader. The investigation coordinator should have management experience and be involved with fire department operations.</td>
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<tr>
<td>The investigation coordinator’s job functions include the following:</td>
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<tr>
<td>• Maintain familiarity with the team members work progress</td>
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<tr>
<td>• Advise the team leader of significant aspects of the investigation</td>
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<tr>
<td>• Supervise and/or coordinate the work of specialists or experts who are on the investigation team</td>
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</table>
### The Safety Specialist

- Monitor the preservation and chain-of-custody for evidence
- Ensure that adequate work area, transportation, computers, and other resources are available
- Coordinate outside investigating agencies’ activities (e.g., police, coroner’s office, OSHA, NIOSH)

The safety specialist should always be a member of the fire department’s health and safety committee and aware of ongoing safety issues within the department. The safety specialist should have a good working knowledge of federal, state, and provincial occupational safety and health (e.g., OSHA) regulations and fire service standards (e.g., NFPA standards). The safety specialist has job functions both before and during the incident investigation.\(^5\)

Before the incident:

- Advise management on investigation policy and standard operating procedures to ensure that adequate pre-planning occurs
- Ensure that informational resources and contact people are accessible
- Develop and maintain investigation team kits
- Assist in investigator training

During the investigation:

- Advise the team leader on the priority of work tasks to be accomplished
- Assist in the determination of incident scene safety for investigators
- Advise investigators about methods, techniques, and sources of outside assistance or information
- Advise the investigation team of all applicable federal, state, and provincial regulations and industry standards of professional practice

### The Investigation Team Members

The core of the investigation team are fire department members who have both technical knowledge and experience in various aspects of the investigation. Team members should be knowledgeable in training, fireground operations, communication, incident command, fireground accountability, and equipment maintenance. The team should be balanced so that all areas are represented. Team member’s responsibilities include the following.\(^6\)

- 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 and examine, where appropriate, all equipment
- Report progress to the team leader or coordinator
- Assist in the analysis of information to determine the causal factors of the incident
- Assist in developing investigation’s conclusions, recommending preventive measures, and drafting the report

Professionals with expertise in a specific area are sometimes needed to evaluate medical evidence, protective equipment, maintenance practices, or standard operating guidelines, as dictated by the investigation. Local law enforcement is an excellent source of investigation expertise. A police detective should be a technical member of every investigation team. The team leader should not hesitate to involve experts in the investigation when the technical demands exceed the team’s capabilities. Outside experts may be found through local contacts, universities, national fire service organizations, or government agencies. The use of technical experts greatly enhances the impartiality of the investigation. It is beneficial to identify experts and develop working relationships in advance.

The medical histories of fire fighters are best analyzed and interpreted by a physician. The autopsy of a fire fighter who died in the line of duty is always conducted by the local medical examiner, in accordance with accepted procedures. However, the investigation team may need a physician to help interpret the medical examiner’s findings and/or review other medical records. Physicians are also useful in investigations in which fire fighters are severely injured. The fire department’s physician is a suitable candidate for the investigation and already familiar with the demands of the job and the physiological burden of protective clothing and equipment.

In some cases, the performance of protective clothing or equipment may be a factor in the incident. Testing laboratories are needed to evaluate the performance of protective clothing and equipment. Tests may evaluate the physical and design properties of the equipment in comparison to national performance standards. Outside experts can also review maintenance records and evaluate the fire department’s maintenance procedures for appropriateness.

During the investigative process, considerable time is spent documenting evidence, conducting outside research, filing, and compiling all evidence. All teams need to have a skilled documenter and a skilled photographer.

Much like all other fire department tasks, pre-planning and training are the keys to successful outcomes. Qualified individuals who are candidates for the team should be identified before an incident occurs. Training will help team members understand the procedures and techniques involved in an investigation. Furthermore, if people in the department become aware of the team’s mission and training before an incident occurs, they will be less suspicious and more cooperative during an actual investigation.

The training should include the following.

- The department’s investigation philosophy, policies, and purpose
• Standard operating procedures for the conduct of 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
• Media relations
• Elements of a completed investigation report

The team needs time to practice the steps necessary to conduct an investigation. Practice investigations are an excellent method to both review investigator training and test departmental standard operating procedures. Such investigations help ensure that an investigation can get underway as smoothly and quickly as possible.

Each member of the team shall be provided with a pre-assembled investigative equipment kit (i.e., a “Go Bag”). Such kits are collections of items an investigator may need during an investigation. Some items to include are listed below.

• Note paper
• Graph paper
• Departmental forms
• Pens, pencils, color pencils
• Camera with several rolls of film, lenses, flash, and extra batteries
• Pocket tape recorder with extra batteries
• Tape measure
• Chain of custody forms/tags
• Plastic bags for evidence collection
• Flashlight with extra batteries (if possible, obtain fresh supplies on call-out)
• Footwear (heavy duty, waterproof)
• Gloves (leather, rubber, heavy duty, latex gloves)
• Hat/Cap to protect against sun or cold
• Candy bars, gum, or other quick energy food

Investigator training using simulated incidents links theory with practical application. Setting-up a simulated incident requires a great deal of work, but can be an important training exercise. The following are suggestions for running a simulation.

• Select a scenario that is most likely to occur in the fire department, or use an actual incident scenario where a fire fighter was injured. 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 incident investigation report.

The more effort that is put into creating the simulation, and the more realistic the simulation, the greater the participation and benefit to team members. A full critique of such an exercise must be conducted by the entire investigative team.

Every investigation begins with the selection of an investigation team. The selection process should include input from both labor and management to set a cooperative, goal-oriented tone for the investigation. The qualities of each investigator will influence the dynamics of the investigation team, and consequently, the dynamic of the investigation process. Try to select people with integrity, good communication skills, and the highest levels of professional experience in the fire service. Selecting qualified team members and providing them with appropriate training and resources will produce a professional investigation resulting in an accurate incident investigation.

**Summary**

**Additional Reading**


**End Notes**


3Ibid.

4Ibid.

5Ibid.

6Ibid.
An important source of information and evidence are the positions of people, equipment, apparatus, and elements within the physical environment. In documenting an incident scene, the investigator’s goal is to record the scene in a manner that allows the investigator to recall his or her observations at a later date. Proper documentation is critical because the investigation team gets only one chance at this task. Documentation methods include photographs, videotapes, diagrams (including time sequence diagrams), maps, tape recordings, and written notes. Thorough and accurate recording of the scene is essential because it is from this compilation of factual data that investigative opinions and conclusions are developed and supported.

The fire department should arrange to have a police officer or a fire fighter who has been trained by the police department perform these tasks.

The incident scene itself (the land, structures, apparatus, hose lays, etc.) should be considered evidence. Examination and analysis of the scene are important in determining the actions and locations of the responding fire fighters. Improper preservation of the scene may result in the contamination, loss, or avoidable movement of physical evidence. Improper preservation may also reduce the evidentiary value of the physical evidence. The preservation of the scene must begin immediately. Access to the fire scene must be limited to only authorized personnel. Scene security may be maintained by fire fighters or police officers assigned to this duty.

Investigators must figure out what happened to the fire fighter, how it happened, and why it happened, based upon the evidence. Since it is difficult to instantly recognize which factors will be important in the final analysis, investigators should accurately document all pieces of evidence.

During the course of the investigation, the investigators are responsible for locating, collecting, identifying, storing, examining, and arranging for the testing of physical evidence that may prove or disprove a particular fact or issue. The investigator must be thoroughly familiar with chain of custody procedures and accepted methods of processing physical evidence.

There are certain items at the incident scene that should always be documented.

- The location and position of dead or injured persons
- The position of hose lines
- The location and position of apparatus
- The location of the incident command post
- The location of tools and equipment
- The location of pieces broken off from equipment or tools
- The location of windows, doors, and ventilation openings (include details of whether the doors were open/closed or broken/intact)
- Areas of debris (roof /floor collapse)
- Incident management structure at the time of the incident

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</tr>
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• Incident manager and location at the time of the incident
• Adverse environmental conditions (night, wind, rain)
• Protective clothing and equipment (secured as recovered)
• Major features of rooms, including furniture
• Scratches, gouges, dents, or breakage related to fire fighter activity
• Any other items that appear significant
• Building documents, including past inspections

While investigators are looking for the items listed above, it is also advisable to look for what is missing from the incident scene. What is not found at the incident scene can be as significant as what is there. Vital parts of tools, equipment, and protective clothing that are missing, or ventilation activities not conducted, may indicate additional areas of concern for investigators.

The goal of describing the incident scene is to record the position of people, tools, apparatus, and elements of the physical environment. Investigators may use a video camera to record the incident scene. Drawings are the most common method of recording position. Investigators documenting and analyzing the incident scene can make or obtain various types of drawings, including sketches, diagrams, and plans. The exact detail required in the drawings depends on the judgment of the investigator. Drawings are used to support memory and illustrate details. The investigation team should use the law enforcement investigator for all evidence documentation.

After selecting the level of detail to which a drawing will be made, fire investigators must decide how to record observations. Once again, decisions should be made with the understanding that there may be only one chance to document the scene. Supplemented by video and photographs, line drawings depict an incident scene well and can assist investigators in analysis.

In selecting the type of drawing to obtain or create, the investigators should ask what construction features, equipment, or other factors are relevant to the cause and origin of the incident. In all investigations, drawings should consist, at a minimum, of a simple sketch. A typical building sketch would show the relative locations of rooms, stairs, windows, doors, and associated damage. These drawings can be done free-hand with dimensions that are paced off or measured. More complex scenes may require developing or acquiring building plans, street plans, or detailed documentation of equipment, apparatus, and personal protective equipment.

For the investigator trying to document an incident scene, it is important to be aware of the names of drawings and the level of detail on each of the following types of drawings.

• Sketches: freehand drawings of concepts (see example, Figure 1)
• Schematic design drawings: drafted drawings showing the preliminary design layout with little detail (see examples, Figures 2 - 5)
• Design development drawings: drafted drawings defining and detailing the schematic drawings
• 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

Figure 1


NOTE: Schematic diagram from Pittsburgh Fire Department “Findings and Recommendations of the Bricelyn Street Board of Inquiry,” February 14, 1995, Appendix D.
It is always necessary for the investigator to immediately preserve and protect specific items of physical evidence. The investigator should take every reasonable precaution to preserve and protect physical evidence. The handling and movement of physical evidence should be avoided until it has been properly documented. Contamination of physical evidence can occur from improper methods of collection, storage, or shipment. Like improper preservation of the incident scene, any contamination of physical evidence may reduce its evidentiary value. All physical evidence must be tagged, and all individuals handling evidence must be logged.

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.

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 common items, such as envelopes, paper bags, plastic bags, glass containers, or metal cans. Investigators may also use containers specifically designed for certain types of physical evidence. The investigator’s 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.

The location of physical evidence should be thoroughly documented before it is moved. Field notes, written reports, sketches, diagrams with accurate measurements, photography, and video can be used to diagram location. The 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.

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

The purpose of such documentation is two-fold. First, the documentation should assist the investigator in establishing the origin of the physical evidence, including its location at the time of discovery and its condition. Second, the documentation should also assist the investigator in establishing that the physical evidence has not been contaminated or altered.
Transportation and Storage of Physical Evidence

Transportation of physical evidence to the laboratory or testing facility can be done either by hand delivery or shipment. Whenever possible, it is recommended that physical evidence be hand delivered for examination and testing. Hand delivery minimizes the potential of the physical evidence becoming damaged, misplaced, or stolen. It is recommended that the physical evidence remain in the immediate possession and control of the investigator until arrival and transfer of custody at the laboratory or testing facility.

The investigator should define the scope of the examination or testing procedures desired in writing. This request should include the name, address, and telephone number of the investigator; a detailed listing of the physical evidence being submitted for examination and testing; and, any other information required. This request may also include the facts and circumstances of the incident.

It may sometimes be necessary to ship physical evidence to a laboratory or testing facility for examination and testing. When this becomes necessary, the investigator should take every precaution to preserve the integrity of that physical evidence.

A “Letter of Transmittal” should be placed in a sealed envelope and attached to the box. It should include the name, address, and telephone number of the investigator, a detailed listing of the physical evidence being submitted for examination and testing, the nature and scope of the examination and testing desired, and any other information required.

Physical evidence should be maintained in the best possible condition until it is no longer needed. It should always be protected from loss, contamination, and degradation.

Chain of Custody for Physical Evidence

The value of physical evidence depends on the investigator’s efforts to maintain the security and integrity of that evidence from the time of its initial discovery and collection to its subsequent examination and testing. At all times after its discovery and collection, physical evidence should be stored in a secured location. Access to this storage location must be limited to minimize the number of individuals in the chain of custody. Wherever possible, the storage location is under the sole control of the investigator. When it is necessary to pass the physical evidence from one person to another, the chain of custody should be documented using a form on which the receiving person signs for the physical evidence. The written chain of custody must include a log of individuals handling the evidence, the date and time of such handling, and the reason for which the evidence was handled.

Examination and Testing of Physical Evidence

Once collected, physical evidence is usually examined and tested in a laboratory or other testing facility. 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; to 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 by procedures that have 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.
Comparative Examination and Testing

During the course of certain investigations, the investigator may wish to have items, such as equipment, examined to determine their compliance with recognized standards. Such standards are published by the National Institute for Occupational Safety and Health, the National Fire Protection Association, the American Society for Testing and Materials, and other organizations.

Another method of comparative examination and testing involves the use of a sample product. Utilizing a sample allows the testing of an undamaged specimen of a particular product to determine its properties. Investigators must ensure that the sample is the same make and model as the product being investigated. This technique may be particularly useful when examining undamaged sections of protective clothing to determine if heavily damaged sections performed as expected.

Evidence Disposition

The investigator is often faced with disposing of evidence after an investigation has been completed. The investigator should not destroy or discard evidence 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. For criminal investigations, evidence is typically kept in police custody.

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.

Developing an Incident Time Line

Emergency response by a fire department is an extremely complicated event. Often, several people perform many different tasks with a variety of tools. It may be difficult to understand the impact of any single action because of the distance in time and space between the event and the final outcome. Time line sequencing analysis is a useful technique to describe the critical events that occur at an incident and determine what was critical to events. Before performing a time line sequencing analysis it is necessary to develop a time line.

Developing a time line is a relatively simple process. The first step is arranging the individual events of the incident in chronological order (the order in which they occur). Begin with the events which have definite times based upon radio or dispatch transcripts (the time of alarm, the time of the first arriving engine, etc.). Next, add events to the time line based upon witnesses’ narrative descriptions. While it is often impossible to ascribe a specific time to an individual event, it is usually possible to develop a bracket of time based upon the narrative (e.g., “We did X before Y and after W” or “We were doing A when the evacuation call went out.”).

The final product is a very detailed description of the order of events at an incident. Some events are known to have occurred at a specific time, while others may have occurred over a range of time. Some events occur independently, while others occur simultaneously. The time line contains both critical information and supporting information.

Time Line Incident Sequencing Analysis

To organize the events time line, place all of the events in order using a process called time line incidence sequencing analysis. When using this analysis, the event is broken down into series or sequences of individual events, the relationships of these sequences to each other, and their effects and contributions to the outcome.
Some elements of the sequence can be identified as “causal factors.” Recommendations to avoid another incident should focus on these causal elements.

Everything that occurs within a fire department is governed by the fire department’s management policies or lack thereof. Any injury is assumed to stem from either the effects of these policies, the lack of policies addressing specific issues, or policies (SOPs) not being followed.

The actions, conditions and events drawn in Figure 6 is called the “Universal Model” for accident causation. In the Universal Model, all causal factors stem from management’s policies. The focus of the Universal Model is on those factors that can be controlled and that immediately precede the point of irreversibility. The point of irreversibility is the specific event which leads to the loss incident. The chain of events can be broken at any time until this point is reached. Beyond this point little can be done except to try to minimize the severity of the effects. At the point of irreversibility (or near it) there is always some transfer of energy which will cause harm if personnel are exposed. This harm (the injury) can occur all at once (acute effects) such as impact injuries from an explosion, or slowly over time (cumulative effects) such as noise induced hearing loss.

The controllable factors are of three types: human action, physical conditions, and the exceeding of functional limitations of system elements (human or non-human). Each of these factors can influence one or both of the other two factors. They may occur in parallel or series sequences. In the Universal Model, all of these factors are within the “sphere of control.” The sphere of control surrounds those factors that can be modified through policies, training, and education of department personnel.

Descriptions of the three types of controllable factors are listed below.

- **Physical Conditions** are hazards involving equipment, facilities, machinery, walking-working surfaces, structures, tools, etc., which exist within any system according to the nature of its design. *Conditions are depicted in the time line incident sequencing analysis by a circle.*

- **Actions** are hazards involving human behavior which occur during system operation or maintenance. These hazards have been controlled traditionally through supervision and proper safety training. Often the operational system found at the fireground calls for human performance beyond that which may be expected, consequently, actions have incorrectly been blamed for many injuries which were actually the result of other factors as well. *Actions are depicted in the time line incident sequencing analysis by a square.*

- **Examples of Limitations** are the tensile strength of a metal tool, the attention span of personnel, the braking distance of an apparatus, containment pressure of a gas cylinder, capacity of an electrical conductor, lifting strength of personnel, reaction time of personnel, stability of a structure, knowledge of personnel, the operating life of a component, etc. When human beings are involved in a “system” in which an incident has occurred, human limitations must be considered and evaluated. Factors that can affect human limitations are: age, gender, stress (physical or emotional), illness, fitness, and experience. Hazards due to exceeded limitations have to be controlled by safe design and proper maintenance of equipment and, where human factors are involved, by effective SOPs and training. No element in the system should be pushed beyond its limitation. *Exceeded limitations are depicted in the time line incident sequencing analysis by a hexagram.*
Figure 6

The Universal Model of Incident Causation
The three factors above (physical conditions, actions and exceeded limitations) can occur after the point of irreversibility as well as before it. Those factors that occur before the point of irreversibility are called causal factors, and can be controlled and corrected. Those that occur after the point of irreversibility are called either mitigating or aggravating factors, depending on their effect on the outcome of the incident. Consider the following example.

While responding to a fire emergency, the engine is struck by a civilian vehicle that failed to yield the right-of-way. The engine hits the curb and flips on its side. Because the fire fighters were following fire department SOP’s and received quality training, all fire fighters were seated and wearing seatbelts. Since the fire fighters were not injured, sitting in position and wearing seatbelts are mitigating factors. However, if a fire fighter had been injured during this incident, for example from being struck by an unrestrained SCBA, the failure to properly stow and restrain the SCBA would be considered an aggravating factor.

The following (Figures 7 - 10) are examples of sequences that are acceptable for use when developing a time line incident sequencing analysis. These four diagrams illustrate all the relational possibilities that can exist in any give sequence of events. Any situation can be broken down into a time line incident sequencing analysis by using these four basic possibilities.

**Figure 7 - The Series Dependent Event**

```
A → B
```

This sequence shows that action A is primarily responsible for condition B. There is a direct causal relationship implied between A and B.

**Figure 8 - A Single Event Triggering Two**

```
A
  ↓
  B
  ↓
  C
```

This sequence shows that exceeded limitation A is primarily responsible for the occurrence of actions B and C.
This sequence shows that exceeded limitation A is primarily responsible for condition B. Action C and condition D occur independently. When B, C, and D occur, the point of irreversibility is reached. The best method to abate this situation is to keep exceeded limitation A from occurring. Exceeded limitations are well within the sphere of control of Universal Model. By correcting A, the point of irreversibility cannot be reached regardless of whether action C and condition D occur or not.
1. Identify the incident that resulted in a serious injury or fatality.

2. Identify the point of irreversibility.

3. Connect these two points by including any mitigating or aggravating factors.

4. Add any mitigating or aggravating factors that occur after the injury to produce further injury (a subsequent occurrence that meets the criteria above).

5. Identify effects that resulted from the injury.

6. Identify causal factors that immediately precede the point of irreversibility.

7. Identify other causal factors that precede these and events leading up to them.

8. Include factors if:
   - They are hazardous or unusual events, or
   - They immediately precede causal factors already identified.

9. Do not include management factors (e.g., supervision or policies) even though these factors are involved. Management factors must be identified systematically with the use of other techniques.

By using time line incident sequencing analysis, investigators can break a confusing event into a schematic that will show all of the following.

- The exact sequence of important events
- The identity of problem factors within the current system/situation
- The relational proximity and dependency of those factors

Often, a time line incident sequencing analysis diagram can become very long and drawn out without revealing the intended information. Extreme care should be taken to only include the relevant factors. It is easy to include extraneous information. Each factor that is added should be considered carefully. Additionally, it is just as easy to include events in the time line that should be broken down further because they are actually combinations of actions, conditions or exceeded limitations. There is no substitute for experience when it comes to developing a time line incident sequencing analysis. Thus, all members of the investigation team are involved in its creation.

In addition, all possibilities should be considered. No possibility or idea should ever be ruled out until the facts and evidence rule it out. The time line incident sequencing analysis, when done correctly, is an effective tool that can be used in the processes of hazard identification and hazard education.

The following is an example of a simple time line incident sequencing analysis.

**Scenario:** Lieutenant Jones was walking through the apparatus bay one night. He tripped over a hose line that was lying on the floor across the walkway and fell. As a result of the fall, Lieutenant Jones broke his hip and was hospitalized.

The time line sequence analysis for this example is shown in Figure 11.
**ADDITIONAL READING**


**END NOTES**


Incident Scene Photography

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 made may become evident at later viewings. They also substantiate reports and statements of the investigator.

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 include those of the responding fire services. Pertinent items are hydrant locations, engine company positions, hose lays, attack line locations, aerial location, ladder placement, etc., and any event that played a role in the outcome of the fire.

Exterior Photographs  A series of exterior shots should be taken to establish the location of a fire scene. These could include street signs or access streets, numerical addresses, or landmarks that can be readily identified and are likely to remain for some time. Exterior photographs should also be taken of all sides and corners of a structure.

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 spread. Photographs of structural elements such as windows, roofs, or damaged walls should be taken because these elements play a significant role in the outcome of the incident. Code violations or structural deficiencies should also be photographed because the incident outcome may have been impacted by those deficiencies.

Evidence Photographs  Items of evidentiary value (eg., SCBA or protective clothing) 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. The location and position of evidence can be of vital importance. Photographs show the evidence in its original location as well as their condition when found.

Victim Photographs  The locations of dead or injured fire fighters should be documented, and any evidence of actions taken or performed by those people photographed. If there is a death involved, the body should be photographed. Victims’ injuries and their clothing worn should also be photographed.

Witness Viewpoint Photographs  If during an investigation witnesses give testimony as to what they observed from a certain location, a photograph should be taken from the most identical view available.
Aerial Photographs  The views from a high vantage point, which can be an aerial fire apparatus, adjacent building or hill, or from an airplane or helicopter, can often be useful.

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 film and video is to maintain a photo log including:

- Picture number
- 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 does the picture show

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 as layers of debris are removed.

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 after use to prevent confusion or loss.
- Do not combine multiple incidents on one roll of film. Complete each fire scene and remove the last roll from the camera before leaving the scene.
- Carry extra batteries, especially in cold weather when they can be drained quickly.

The purchase and processing of 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.
The 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 on an as needed basis. When enlarged, photos should be cropped to include only the valuable information.

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.

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.

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


Questioning witnesses is a vital part of every investigation, and often the success of the investigations will rely on how effectively the witnesses are interviewed. Witnesses should be interviewed in a voluntary cooperative manner rather than interrogated. Witnesses should be informed that the overall goal of the interview is future accident prevention.

*Interviews* should be open, honest, and non-judgmental of the interviewee. The goal is simply to share information about the incident in question. The interview is usually conducted as informally as possible, with the interviewer and interviewee regarded as equals.

*Interrogations* are generally regarded as formal and authoritarian in nature. Interrogations call to mind confrontational relationships, such as lawyer/witness examinations or police officer/criminal suspect interviews. Here the interrogator may enlist devious questions in order to trick, trap, or antagonize the witness. Adversarial interactions will make the interviewee 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

It is essential that the investigator establish a trust with all witnesses. It must be stressed that the purpose of the interview is to prevent future incidents and is not a witch-hunt.

Witnesses have information which will be useful in determining what happened at the incident, and why it happened. They may contribute two types of information to the investigation. The first, direct information, deals with events that took place immediately prior to or during the incident. People with direct information have either observed or participated in the incident. Indirect information reveals the general circumstances surrounding the incident, or specific technical knowledge which may explain aspects of the incident.

Sources of direct information include:

- Fire fighters
- Fire officers
- The incident commander
- The safety officer
- Dispatchers
• Police officers
• Owner/occupants of the building
• Civilian witnesses
• News media personnel

Building occupants and civilian witnesses may have observed the early stages of the incident. These people will often have information about the origin of the fire and the evolution of the fire fighters’ response. They can be useful in verifying both fire fighter and equipment locations and operations.

Indirect information is also important to an investigation. Types of indirect information include maintenance records, inspection logs, medical information, training documents, and the technical specifications of equipment. Sources of indirect information are useful in understanding the circumstances surrounding and contributing to the incident. People with indirect information may include:

• Co-workers
• Maintenance professionals
• Rescue personnel
• Family and friends
• Family/department physicians
• Medical examiner
• Training instructors
• Technical specialists (engineers, metallurgists, NIOSH, etc.)

A thorough investigation of all sources of information is vital to determining the facts surrounding an incident.

The accuracy of an investigation often relies on interviewing the people with direct information as soon after the incident as possible. This is one of several reasons why investigation responsibilities should be assigned and investigators trained before an incident occurs.

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

Background and Experience: Witness reliability is dependent upon background and experience. Less experienced witnesses tend to have difficulty recalling specific details because they failed to be of interest, seemed unimportant, or were unfamiliar. However, less experienced witnesses may still have valuable information or observations.

Perception: People tend to be especially perceptive in areas which personally affect them. Fire fighters will tend to be aware of their interactions with the Incident Commander and their partner. Particularly in a large fire, fire fighters often will not know how other companies respond. It is especially important to differentiate between what is seen and heard by the witness and what is assumed. Emotions and excitement tend to increase distortion and exaggeration in descriptions of the incident, particularly if the injured 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 given 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 witnesses’ initial observations 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 important, was not asked, or may purposely omit details for a specific reason. The interviewer should make note of missing information when listening to or reading the initial statement. The interviewer should attempt to fill in the gaps by asking specific questions.

Form Limitations: Witnesses who are asked to complete forms tend to answer only the questions listed on the form. Furthermore, they also tend to utilize only the space allocated on the form. This leads the witness to omit information because they think there is no space for their answers.

Individual Versus Group Witness Interviews: Witnesses can be influenced by group interviews. In most incidents, the principal participants do not observe all that has happened during the response. The participants will invariably have questions about what happened, what was different, what went wrong, and what could have prevented the injury? In order to answer their own questions, witnesses may “fill in the blanks” with information or details they hear during group interviews.

The factors influencing testimony are particularly important among fire fighters because of the close working and living conditions associated with the job. One technique for keeping witnesses from influencing each other is to separate them and ask them to prepare an initial written statement about the incident. This allows the witness to begin to review the incident in their mind and prepare diagrams or maps which may be useful in the interview. An initial written statement should always be followed by an interview. Each witness should be given the opportunity to speak about the incident and clarify issues.

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 created. An investigator with a domineering personality can intimidate a witness into forgetting or intentionally omitting information. Investigators 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 such information is unimportant.

Prior to any interview, the investigator should compile a list of facts and questions about the incident. It is vital to view the incident scene before beginning the interview process so as to understand the witness’s references or descriptions. Likewise it is often beneficial to have background information on the witness. When investigators meet the witness make sure they have any available photographs, radio transcripts, interview forms, scrap paper, pens, etc. that will be needed.

Once a witness has been identified, the investigator should plan how to meet and interview the witness. It is generally advisable to meet with those people most directly involved in the incident first, since they will have the most information (e.g.,
the incident commander, fire fighters, radio dispatchers). Later witnesses can be used to fill in details or corroborate statements or observations.

Contact the witness by phone, introduce yourself, and explain the goals of the incident investigation. Promptness is vital to the witness recall. Select a time and place for the interview that is conducive to communication. The interview area should ideally be private and quiet. Eliminate all possible distractions or interruptions. For example, the investigator may want to close any doors in the room, draw the window blinds, and not answer phone calls while with the witness. If investigators expect that the witness may be hostile, interview in a setting other than the individual’s “home turf.” Furthermore, it is best not to conduct interviews where peer pressure will be an issue (e.g., the fire house).

**OBTAINING INITIAL INFORMATION**

When the investigators meet the witness, they should introduce themselves and any other members of the interviewing group. Unless the witness is known to the investigator, show them identification. It is important to establish a professional relationship from the outset. 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. Look the witness’ in the eyes and listen to what they are saying. The initial tone set will impact the rest of the interview. Regardless of the witness’ personality and behavior, the investigator must always be objective and professional.

The questioning of witnesses is a time consuming process, but if done properly, will yield a great deal of information. It is usually good to begin the interview with easy questions which will be non-threatening and easy for the witness to answer. For example, the investigator should start by asking the witness’ name, job title, work shift, and about their experience or training. These initial, mundane questions allow both investigators and the witness to get comfortable with the interview process.

**BEGINNING THE INTERVIEW**

A good way to start the more informative part of the interview is by asking the witness to relate, in their own words, what they saw, did, or heard before, during and after the incident. At this point the investigators should focus on being a good listener and a note taker. Do not interrupt the witness during this part of the interview. The events may be related out of chronological sequence and in a descending order of vividness to the witness. Witnesses will often jump backward and forward in chronological time as they recall specific event details. Later in the interview the investigator can focus on filling in information gaps by asking pointed questions, or clarifying the chronological sequence of events.

Some witnesses will have a difficult time putting their observations into words. Many times a sketch or diagram can be helpful in drawing out witness testimony or helping the interviewer understanding statements. There will be periods of silence during the interview. Some witnesses may need these periods of silence to think or organize thoughts, others may be uncomfortable. However, witnesses will often begin talking to fill these periods of silence because they think the investigator expects more information. Often, it is during these moments when witness give the small details that may be critical to understanding what happened at the incident. Analyze the statements given during the interview for possible questions to be asked during a future interview.
Only after the witness has finished telling everything remembered or thought important, should the investigator begin to ask questions. Questions should try to fill in details that are missing or unclear and try to confirm the chronological sequence of events. Questioning should be guided by notes taking during the first part of the interview and the investigator’s viewing of the scene. Investigators may also find previous interviews are a good aide in discovering key issues to explore in depth.

When questioning witnesses try to remain neutral. People will be more forthcoming if they feel the investigators are non-judgmental. Always be straightforward and honest with the witness. Remember the goal of gaining information rather than tricking or trapping the witness. If investigators ask questions that can be answered with a yes or no, the witness will answer with only one word. 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?”

When listening to the witness pay close attention to the difference between facts and speculation. Try to clarify what the witness directly observed from what was told or heard from somebody else. Make sure that the investigators fully understand the meaning of each statement made by the witness before ending the interview.

A good interview technique is to ask control questions of each witness. These questions are simple facts which will help ensure the accuracy of the interview and allow investigators to gauge the witness’s credibility. These questions should be mixed in with other questions as the witness is prompted to expand on information. Some control questions include:

- The time and location of the incident
- The order of engine/apparatus arrival
- The placement of apparatus and equipment
- The identity of the incident commander and/or safety officer
- Environmental conditions such as weather, lighting, or surrounding structures
- Other fire fighters or witnesses at the incident
- If anything was moved, adjusted, turned on/off, or removed from the incident scene (particularly important regarding the personal protective equipment of the injured fire fighters)
- When the witness first realized that something was wrong

Control questions are useful because they may spark memories that have not yet been dealt with in the interview process.

Once the investigators have obtained all the information that they think the witness can provide, they should begin to close the interview. One of the best ways to conclude an interview is by asking the witness what could be done to prevent a similar incident. This question allows the witness to offer opinions rather than talk about an actual role in the incident. Thus, it is far less threatening. Answers will provide investigators with ideas for possible corrective actions for the incident report.
Furthermore, the witness may comment on management practices or deficiencies which they were deliberately trying to avoid during the interview for fear of retaliation. These comments may be addressed in future interviews or other parts of the investigation.

At the conclusion of the interview, the witness should always be asked if there are any questions of the investigator. The witness should also be told how to reach investigators in the event the witness recalls something else of importance.

**INTERVIEW TIPS AND TECHNIQUES**

- Always be courteous when dealing with the witness. Be patient if the 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 about or are unclear.

- Make sure the witness understands the purpose of the interview.

- Have questions ready before starting the interview.

- Speak with the witness’ terms, not yours.

- 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 ask the first question, and wait for an answer; then ask the second question and wait for an answer, etc.

**RECORDING WITNESS TESTIMONY**

The information volunteered during an interview should always be recorded on paper and/or with a tape recorder. Good note keeping is vital because investigators will interview several witnesses over a long period of time. Remembering the details of each interview is virtually impossible. A second investigator, acting as a documenter, is strongly recommended. One interviewer can focus on conducting the interview while the documenter should strictly take notes. This will avoid witness distraction and interruption of the investigator’s natural flow of questioning.

**WRITTEN STATEMENTS**

At times investigators will not be able to interview a witness as quickly as they would like. In these situations investigators should ask the witness to make a written statement. A written statement is simply the witness’ narrative description about the incident. It will be useful to assist the witness by helping them organize the statement. You may choose to suggest an outline if the witness appears to be having difficulty organizing thoughts. You should encourage the witness to include any drawings, diagrams, or sketches which help explain what happened.

Encourage the witness to include all details relevant to the incident. Often the little details that seem to have no significance may help piece together the large puzzle.
When asking a witness to make a written statement make sure that they are provided with plenty of paper. If given a single sheet of paper or a limited departmental form, the witness will write as little as they reasonably can.

If the witness is interviewed both orally and provides a written statement, check that both sources of information agree with each other. Inconsistencies may be the subject of future interviews. The witness should always be provided with a copy of the personal statement. Rereading the statement a day or two later may spark more memories in the witness.

A sample written statement form is included in Appendix B.

A tape recorder can be an important interview tool. Recording the interview questions and answers will allow the investigator to concentrate on the interview process. While this is a great advantage, tape recorders can also make witnesses nervous or anxious. Recordings can supplement good notes but cannot replace note taking, or turn a bad interview into a good interview.

When tape recording an interview there are several potential complications. There is the possibility of background noise rendering the testimony unintelligible, electronic or mechanical failure, and possible erasure of the tape. These reasons illustrate why a tape recording should supplement notes and not replace them.

Begin the recording by having the person state their: name, address, employer, engine company, etc. Then ask them if they are aware that the interview is being recorded. At the conclusion of the interview, the interview tape should always be transcribed to ensure that a hard copy is available.

Analyzing testimony is one of the most important aspects of the investigation. Once investigators have drawn out all of the information from all the witnesses they must decide what is credible and what is not. There will always be contradicting testimony and inaccuracies in every investigation. When interviewing witnesses, and later when analyzing their testimony, investigators need to consider the psychological stresses to which the person has been subjected. The fire fighter may have been injured, or had personal life or welfare threatened, or witnessed a friend or co-worker killed in the incident. These stresses will make the fire fighter a less than perfect observer. People who experience great stress are likely to remember fewer details of the incident. Particularly lengths of time are likely to be greatly shortened or lengthened as the witness recounts the incident.

Some factors which should be considered when evaluating testimony are:

- The length of time between incident and the interview. Over time details are forgotten and subjected to other influences.

- The amount of contact the witness has had with other principal witnesses in the incident.

- People who feel like they may have made a mistake, caused or contributed to the incident may give misinformation or omit details to cover-up errors by themselves, the deceased member, or management.
• Contact with the news media, other investigators, or management who may ask leading questions or present “facts” which cause the witness to question self testimony.

• Signs of shock, amnesia, or critical incident stress resulting from the incident.

• General health issues or the use of any prescription drugs, non-prescription drugs or alcohol which can affect memory, vision, or perception.

• Personal interest in ending the interview, evading responsibility, or diverting the investigation team’s attention from a particular area or subject.

• What portion of the testimony is fact and what is assumption or rationalization. People have a natural tendency to make assumptions in order to answer questions which they have asked themselves.

A good way to evaluate witness accuracy is to make a chart comparing witness’ answers (see Figure 1). Compare witness’ answers to both control questions and suspected occurrences to look for agreement. Note that differences in technical knowledge, points of observation, access to information, lighting, noise, and obstruction of vision both lead to, and explain differences in testimony.

```
<table>
<thead>
<tr>
<th></th>
<th>Fact 1</th>
<th>Fact 2</th>
<th>Theory 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firefighter 1</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Firefighter 2</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Fire Officer 1</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Incident Commander</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Witness Smith</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>
```

Investigators can generally infer that a witness who was correct about the control questions was a good observer of the incident, whereas an observer who did not remember the simple facts may not be a good observer. This is not always the case, investigators will need to look at each statement made by each witness critically, but this is a good technique for beginning the evaluation process.

Follow-up interviews are usually necessary to clarify questions, conflicting testimony, gaps in information, or factors in the incident not initially explored. Follow-up interviews should be conducted in a manner similar to the initial interviews. Investigators should be open and honest with the witness where ever possible. Let the witness know that there are missing or conflicting pieces of information and that they are simply trying to find out what happened. The interviewer should be careful not to imply that the witness is lying or has given wrong answers, nor should the investigator ask leading questions which may cause the witness to reverse testimony or lie about details to please the investigator or end the interview. Remember that no testimony will be identical each time it is repeated.
THE TEN COMMANDMENTS FOR INTERVIEWING WITNESSES

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 the 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 or 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 the others depend on it.
    You just can’t do a good job of listening while you are talking.

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.


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**

1. What is your legal name?
2. Do you have a nickname or other name by which co-workers call you?
3. For fire fighters, what is your:
   a. District (Division)?
   b. Company?
   c. Shift (Group)?
   For all:
   a. Home address?
   b. Mailing address?
   c. Home telephone number?
   d. Business address?
   e. Business telephone number?
4. Do you have any physical problems which affect how you hear or see things?
5. What is your education level?
6. Do you have any professional knowledge or training related to fire fighting?
7. What are your work /shift hours?
8. What is your job title at work?
9. What are your work duties?
10. Who is your supervisor?
11. How long have you been working at your job?

**Time and Place of Incident**

1. What time did the incident occur (day, hour, minute)?
2. Please describe the fireground.
3. Please describe the area around the fireground.
4. Were there any environmental factors that contributed to, or complicated, the incident?
5. How would you describe the building design and construction?
6. What portion of the building was involved in the fire when you arrived?
7. What was the weather like?
8. Please describe the visibility at the fireground.
9. Did anything block your view of operations?

**Incident Description**

1. Please describe in detail what you saw and heard at the fireground from when you first arrived until the end of the incident.
2. Could you draw a diagram of the fireground?
3. When did you first know something was wrong?
4. What attracted your attention to ____________?
5. During the incident, where were you standing?
6. What work tasks did you do during the incident?
7. What did you see?
8. What did you hear?
9. What commands were you given during the incident?
10. Who gave them to you?
11. Were you properly trained and equipped to carry out those commands?
12. Who else was at the fireground?
**INTERACTIONS WITH OTHER WITNESSES OR INTERVIEWERS**

1. Have you spoken with anybody else about the incident?
2. Tell me about the conversation:
   a. Dates and/or times
   b. Circumstances surrounding the conversation
   c. Information given or received
   d. Other people who were involved in, or heard the conversation
   e. The general substance of each person’s remarks
   f. Any exact words remembered
   g. Any notes or records of the conversation
3. Have you given any other verbal statements about this incident?
4. To whom?
5. When did you make the statement?
6. Was anybody else there while you were making the statement?
7. Were there any notes or records made of the statement?
8. Have you prepared any written statements about the incident?
9. Who asked you to prepare the statement?
10. To whom did you give the statement?
11. Do you have a copy of the statement?
12. Have you made any maps, sketches, diagrams, or taken any photos of the fireground?
13. Do you know of anybody else who did?

**WHEN A TOOL OR PIECE OF EQUIPMENT HAS FAILED**

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

**MAINTENANCE, INSPECTION, AND TESTING**

1. What is the regular maintenance program for the _____?
2. Please describe the cleaning and maintenance procedures.
3. What type of preventive maintenance is performed on _____?
4. What maintenance records are kept?
5. Have any defects been noted?
6. Who is responsible for maintenance?

**WHEN FIRE IS INVOLVED**

1. When did the fire start?
2. Where did the fire start?
3. When did you first notice the fire?
4. Who notified the fire department?
5. How long did it take them to respond?
6. When was the fire under control?
7. When was the incident terminated?
8. What caused the fire?
9. Were there any chemicals involved in the fire?
10. Were there any unusual smells?
11. What color was the smoke?
<table>
<thead>
<tr>
<th>WHEN SOMEONE HAS FALLEN</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Where did you/they fall?</td>
</tr>
<tr>
<td>2. What was the initial position before falling?</td>
</tr>
<tr>
<td>3. Where did you/they land?</td>
</tr>
<tr>
<td>4. What were you/they doing when the fall happened?</td>
</tr>
<tr>
<td>5. What injuries were sustained in the fall?</td>
</tr>
<tr>
<td>6. Were there any sounds or cries prior to the fall?</td>
</tr>
<tr>
<td>7. What type of footwear was used during the incident?</td>
</tr>
<tr>
<td>8. Was it in good condition at the time?</td>
</tr>
<tr>
<td>9. What was the condition of the floor?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DEPARTMENTAL STANDARD OPERATING PROCEDURES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. What departmental SOPs applied to the incident?</td>
</tr>
<tr>
<td>2. Please describe the SOPs.</td>
</tr>
<tr>
<td>3. Are SOPs generally followed?</td>
</tr>
<tr>
<td>4. When have the SOPs not been followed?</td>
</tr>
<tr>
<td>5. Please compare what actually happens in the field to what the SOPs say.</td>
</tr>
</tbody>
</table>

<table>
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<tr>
<th>INJURY AND MEDICAL HISTORY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. What injuries did you sustain during the incident?</td>
</tr>
<tr>
<td>a. Type (cuts, burns, fractures)</td>
</tr>
<tr>
<td>b. Position on body</td>
</tr>
<tr>
<td>c. Description of severity</td>
</tr>
<tr>
<td>2. When during the incident did you sustain the injuries?</td>
</tr>
<tr>
<td>3. Was there a rehabilitation station at the incident?</td>
</tr>
<tr>
<td>4. Did you go there?</td>
</tr>
<tr>
<td>5. What type of medical treatment were you given?</td>
</tr>
<tr>
<td>6. Did you return to duty?</td>
</tr>
<tr>
<td>7. Did you have any pre-existing medical conditions or symptoms?</td>
</tr>
<tr>
<td>8. When was your last work period prior to the incident?</td>
</tr>
<tr>
<td>9. Have you consumed any alcohol in the last 24 hours?</td>
</tr>
<tr>
<td>10. If so, how much?</td>
</tr>
<tr>
<td>11. Were you taking any non-prescription medication at the time of the incident?</td>
</tr>
<tr>
<td>12. If so, what type and dosage?</td>
</tr>
<tr>
<td>13. Were you taking any prescription medication at the time of the incident?</td>
</tr>
<tr>
<td>14. If so, what type and dosage?</td>
</tr>
<tr>
<td>15. When was the medication perscribed?</td>
</tr>
<tr>
<td>16. Who is the physician who perscribed the medication?</td>
</tr>
<tr>
<td>17. Was a fire department injury report filed?</td>
</tr>
</tbody>
</table>
END NOTES

1Federal Aviation Administration, Aircraft Accident Investigation, On-scene Investigation Management, Volume 1, Chapter 6, 2nd. Ed., 1995, p. 5.
4Federal Aviation Administration, Aircraft Accident Investigation, On-scene Investigation Management, Volume 1, Chapter 6, 2nd. Ed., 1995, p. 11.
Effective public and media relations are an important facet of incident investigations, particularly regarding line-of-duty deaths. In the event of a fire fighter death or serious injury, widespread media coverage is inevitable. The purpose of media relations at this point is to ensure that coverage is factual. If facts are available to the media quickly, the chances of exaggeration and speculation are diminished.

However, the rights of the fire fighter’s family and the integrity of the investigation must also be respected. Balancing these various interests requires careful consideration and experience. The media’s job is to get the story and report it to the public. Well-managed public relations are an effective method of protecting against inaccurate statements or false conclusions by the media.

Receiving the news of a death or injury can be a traumatic experience. When a fire fighter is injured in the line-of-duty, the family should always be personally notified by the fire department to ensure that the family receives the most recent and accurate information. No names should be given to the media until the family has been notified.

Local affiliates should notify the IAFF of line-of-duty deaths immediately. The IAFF may be able to provide technical assistance for the investigation through the Department of Occupational Health and Safety and help with press releases and media relations through the Department of Public Relations and Communications. When a brother or sister dies in the line of duty it is an emotionally charged time for all those involved. Locals often find it helpful to have professional guidance as they go through the process of investigating the incident and working with the media.

The manner in which a fire department or local affiliate choose to honor a fallen fire fighter is often highly personal and influenced by local tradition. The IAFF has developed a protocol to assist fire departments and IAFF local affiliates with line-of-duty death funerals and is contained in Appendix D.

When an incident resulting in death or serious injury occurs, it is in the best interest of the fire department and the local to notify the media before media members discover it on their own. This allows the department and the local to provide a media contact who can help control the flow of information. A prompt press release or a press conference can prevent the spread of erroneous information and rumors. Make sure everyone on the investigation team knows that only the designated media contact should speak with the press. If a fire department member speculates about the incident to the press and then the media spokesperson declines to confirm that speculation, it may appear that the department is trying to cover up something. Remember that the media tends to dwell on conflict and the provocative or controversial aspects of a story.

Due to the nature of fire fighting (especially the aspects of drama, danger, valor, and tragedy), the news media is very interested in line-of-duty deaths and injuries. However, like the public, members of the news media do not fully understand all of
the techniques, procedures, operations, protective equipment, or problems associated with fire fighting. Consequently, the media’s reporting of the incident may appear to be incorrect or slanted. The designated media spokesperson can alleviate these inaccuracies by communicating with and informing the media.

Deadlines are critical to every newspaper, television news team and radio news operation. If investigators fail to meet press deadlines, the media will release their story without the investigators’ input. Assist the media with the information on who, what, when, and where. Be cautious with your words because they are being recorded or written down for quotes to 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.

Remember, the news media can also assist in the investigation by supplying incident photographs and videos or the names of witnesses.

In most communities, there are a variety of media outlets, and media from other markets may also be interested in a line-of-duty death. Media outlets are the community’s sources of information. It is advisable to become familiar with the local media outlets and reporters. Appendix C provides a “Media Inventory Form.” This form is a useful way to summarize the information that must be on hand when contacting each individual media outlet. Take the time to fill in the information for the media outlets so that it will be available when needed. Information can be obtained by calling the media outlet directly.

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

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

Television is considered the dominant news medium in most areas. More importantly though, 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.

In many cases, the fire department or the local affiliate are the ones to initiate contact with the local media. If the fire department and the union local are working together, the media contact may be provided by either organization. If there is one contact from each, they should be coordinated so that the message is the same. Often contact is by telephone, with the first minute of a phone conversation with a reporter the most important. In some cases the investigators may know the writer or reporter, in other cases they may not. When calling the media outlet, ask for the news desk or assignment editor.
In general, there are two vehicles for publicizing a death or injury. They are the news release and the news conference. Investigators do not have to be experts in media relations to produce an effective news release or put on a successful news conference. However, there are several steps that need to be followed.

**NEWS RELEASES**

Although reporters and editors rarely admit it, much of the news that is printed or broadcast originates with news releases. A news release should give a reporter or editor an idea for a story. Follow the steps below in assembling a proper news release.

- Identify the release in the upper left hand corner with the fire department name and/or the local number and affiliation. Be sure to include the contact person's name, address, and phone number. Also make sure that it carries the release date.

- The news release should be typewritten and printed on only one side of the paper. Keep it short and concise.

- Your news release should follow the inverted pyramid style of writing, with information appearing in its order of importance (with relatively less important background information last). The inverted pyramid allows an editor to easily cut the story as needed without losing important facts.

- Always use short paragraphs. A headline should be put on 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 should be faxed to the local media and/or handed out at a news conference.

**NEWS CONFERENCE**

A news conference is an excellent mechanism for saving time by providing identical information to several media contacts at once. Only one person should be in charge of all media arrangements. This person should also be involved in site planning so that all demands made by the media can be taken into account. The site of the news conference should have a reserved area for reporters and camera operators. The reserved areas should give the media a privileged view of the activity.

Make sure that there is a good sound system and a podium big enough to accept the attachment of a number of microphones. The use of a “multi-box” permits individual reporters to plug in their tape recorders and eliminates the need for a large number of microphones. Also make sure that there are enough electrical outlets for television and radio equipment.

Be sure to notify every community news outlet of the news conference. Whether investigators fax or telephone the media, the information about the conference should be directed to the assignment editor or the news director. Be sure to give them the date, time, location and topic of the news conference.

A media kit of materials should be prepared for distribution at the news conference. This kit should include any press releases that investigators have prepared, text of any speeches or statements to be made at the conference, a fact sheet about the department and/or local, and biographies of the fallen fire fighters.
Working with Reporters

Reporters should be asked to identify themselves and register. However, do not make registration overly difficult and never use it for small groups where investigators know the journalists by sight. The media liaison must remain in control of the event.

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

The Interview Process

In most cases, contact with the media is through a reporter.

Never talk “off the record” with the media, because there is no such thing. Everything said can be reported on the evening news or in the morning paper. Don’t get into a confrontation with reporters. Remember, it is always easier for the reporter to ask questions than for investigators to answer them. In difficult situations, rely on the facts of the incident and maintain a professional image both personally and organizationally.

If a reporter requests an interview or a comment, do not feel 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 by being prepared.

The following are some good guidelines for participating in an interview:

DOs:

• Prepare two or three key pieces of information that investigators want to get across
• 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, 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’Ts:

• Avoid getting trapped into drawing conclusions
• Never be defensive about the investigation or fire department performance
• Don’t be afraid to say: “I don’t know” if, in fact, you don’t know
• Don’t get emotional or lose self-control with the media
• Never 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 they will provide the information as soon as it is known. Don’t risk credibility by trying to guess or speculate. Some phrases that are responsive to a reporter’s questions, but still protective of undetermined facts include the following.
• “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 been interviewed yet may hear or see these statements and may be influenced by them.

**ADDITIONAL READING**

*Effective Public and Media Relations*, International Association of Fire Fighters.

*Public Relations: Putting It All Together*, International Association of Fire Fighters.
Chapter 8

Sources of Outside Assistance

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

The International Association of Fire Fighters is an international labor union affiliated with the AFL-CIO and the Canadian Labour Congress. The IAFF represents over 225,000 paid professional fire service and emergency medical employees in the United States and Canada. The membership of the IAFF is employed by various parties including the federal government, states, provinces, counties, municipalities, fire districts, airports, and industrial manufacturers. The IAFF has been actively involved in occupational health and safety issues for fire fighters, EMTs, and paramedics.

The purpose of the IAFF’s Occupational Health and Safety Department 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 Department offers a comprehensive array of services, including the following pertaining to investigations of serious injuries and fatalities.

- The identification of the safety and health 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 and Safety Department also
provides technical assistance to principal officers, other IAFF departments, IAFF state/provincial associations, and local affiliates on issues pertaining to safety and health, 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 Medicine Resident Program. The program, initiated through convention action, provides a full time occupational medicine physician position within the Department. The resident physician provides the department with technical medical assistance, assists in medical assessments after exposures and consults in incident investigations.

- The Department 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 Department 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.

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. This specific information and notification forms are provided in Appendix D.

**National Institute for Occupational Safety and Health**

200 Independence Avenue, NW
Room 715-H
Washington, DC 20006
(202) 401-0721
(202) 260-4464 (FAX)

The National Institute for Occupational Safety and Health (NIOSH) was established within the U.S. Department of Health and Human Services (HHS) 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.

NIOSH has been named as the testing, approving, and certifying agency for a number of types of personal protective equipment, including respirators (SCBA). The NIOSH Certification and Testing Laboratory has the following responsibilities.

- Developing and promulgating certification tests and requirements for personal protective devices and industrial hazard measuring programs
- Testing and certifying these products
- Preparing lists of certified products
- Surveying manufacturer’s plants to check their quality inspection programs
• Periodic testing of certified devices and instruments procured in the open market
• Developing new test methods and requirements for product improvement, when necessary to assure worker protection

NIOSH has an interest in situations where breathing apparatus 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 SCBA has not been performing as it should be, the fire department should contact NIOSH and request to have the apparatus examined.

Additionally, at the request of a 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 Health Hazard Evaluation (HHE) program or the Fatality Assessment and Control Evaluation (FACE). IAFF Local affiliates should contact the IAFF Department of Occupational Health and Safety for assistance in requesting a NIOSH investigation.

• Questions related to SCBA evaluations should be directed to the Division of Respiratory Disease Studies, Respirator Certification and Quality Assurance Branch, 1095 Willowdale Road, Morgantown, WV 26505, (304) 285-5907.

• Fatality assessments (FACE investigation) are handled by the Division of Safety Research, Surveillance and Field Investigations Branch, 1095 Willowdale Road, Morgantown, WV 26505, (304) 285-5916.

• Health hazard evaluations (HHE) are handled by the Division of Surveillance, Hazard Evaluations, and Field Studies, 4676 Columbia Parkway, Cincinnati, OH 45226, (513) 841-4428.

• For information on hazardous materials, contact the Division of Biomedical and Behavioral Science, Experimental Toxicology Branch, 4676 Columbia Parkway, Cincinnati, OH 45226, (513) 533-8392.

In his fiscal year 1998 budget request, President Clinton proposed that NIOSH investigate all U.S. line-of-duty fatalities among fire fighters. The proposal, made in support of his commitment to the IAFF, seeks $2.5 million for the project.

The DOT has an interest in two 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. 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.
The NTSB was established in 1966 as an independent government 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 National Transportation Safety Board is required by law to do the following.

- Investigate and determine the facts, conditions, and circumstances and the cause or probable cause of 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.
  - Other accident which occurs 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 be otherwise carry out the policy of 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 and,
  • Accidents and Aviation incidents involving public aircraft other than aircraft of the Armed Forces and the Intelligence 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, or 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
16825 South Seton Avenue
Emmitsburg, MD 21727
(800) 238-3358 (General Information)
(800) 638-1821 (Research Library)

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. The USFA will, when deemed appropriate, contract 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 Institute of Emergency Vehicle Safety
320 Cabrillo Lane
Reno, NV 89510
(702) 425-4300
(702) 425-4307 (FAX)

The EVS is a nonprofit organization with the goal of reducing deaths and injuries resulting from incidents involving emergency service vehicles. Among their services, EVS conducts fleet evaluations, accident/defect investigations, and failure analysis on emergency vehicles and/or aerials.

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

The NFPA is a nonprofit organization that develops consensus standards concerning fire protection and the fire service. Currently, NFPA publishes more than 300 individual codes and standards, 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 usually cover 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 Standard for Portable Fire Extinguishers
NFPA 101 Life Safety Code
NFPA 471 Standard on Responding to Hazardous Materials Incidents
NFPA 472 Standard for Professional Competence of Responders to Hazardous Materials Incidents
NFPA 473 Standard for Competencies for EMS Personnel Responding to Hazardous Materials Incidents
NFPA 1001 Standard for Fire Fighter Professional Qualifications
NFPA 1002 Standard for Fire Department Vehicle Driver/Operator Professional Qualifications
NFPA 1003 Standard for Airport Fire Fighter Professional Qualifications
NFPA 1021 Standard for Fire Officer Professional Qualifications
NFPA 1031 Standard for Professional Qualifications for Fire Inspector
NFPA 1033 Standard for Professional Qualifications for Fire Investigator
NFPA 1035 Standard for Professional Qualifications for Public Fire and Life Safety Educator
NFPA 1041 Standard for Fire Service Instructor Professional Qualifications
NFPA 1201 Standard for Developing Fire Protection Services for the Public
NFPA 1221 Standard for Public Fire Service Communications Systems
NFPA 1402 Guide to Building Fire Service Training Centers
NFPA 1403 Standard on Live Fire Training Evolutions
NFPA 1406 Standard for Outside Live Fire Training Evolutions
NFPA 1500 Standard on Fire Department Occupational Safety and Health Program
NFPA 1521 Standard for Fire Department Safety Officer
NFPA 1561 Standard on Fire Department Incident Management System
NFPA 1581 Standard on Fire Department Infection Control Program
NFPA 1582 Standard on Medical Requirements for Fire Fighters
NFPA 1901 Standard for Automotive Fire Apparatus
NFPA 1911 Standard for Service Tests of Pumps on Fire Department Apparatus
NFPA 1914 Standard for Testing Fire Department Aerial Devices
NFPA 1931 Standard on Design of and Design Verification Tests for Fire Department Ground Ladders
NFPA 1932 Standard on Use, Maintenance and Service Testing of Fire Department Ground Ladders
NFPA 1961 Standard on Fire Hose
NFPA 1962 Standard for Care, Use and Service Testing of Fire Hose Including Connections and Nozzles
NFPA 1963 Standard for Fire Hose Connections
NFPA 1964 Standard for Spray Nozzles
NFPA 1971 Protective Ensemble for Structural Fire Fighting (formerly Standard on Protective Clothing for Structural Fire Fighting)
NFPA 1972 Standard on Helmets for Structural Fire Fighting (now combined in NFPA 1971)
NFPA 1973 Standard on Gloves for Structural Fire Fighting (now combined in NFPA 1971)
NFPA 1974 Standard on Protective Footwear for Structural Fire Fighting (now combined in NFPA 1971)
NFPA 1975 Standard on Station/Work Uniforms for Structural Fire Fighting
NFPA 1976 Standard on Protective Clothing for Proximity Fire Fighting
NFPA 1977 Standard on Protective Clothing for Wildland Fire Fighting
NFPA 1981 Standard on Open-Circuit Self-Contained Breathing Apparatus for Fire Fighters
NFPA 1982 Standard on Personal Alert Safety Systems for Fire Fighters
NFPA 1983 Standard on Fire Service Life Safety Rope and System Components
NFPA 1991 Standard on Vapor-Protective Suits for Hazardous Chemical Emergencies
NFPA 1992 Standard on Liquid Splash-Protective Suits for Hazardous Chemical Emergencies
NFPA 1993 Standard on Support Function Protective Garments for Hazardous Chemical Emergencies
NFPA 1999 Standard on Protective Clothing for Emergency Medical Operations

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The AOEC is a network of U.S. medical clinics dedicated to research, education, prevention, and treatment of occupational and environmental diseases. 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
Division of Toxicology
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Atlanta, GA 30333
(404) 639-6304

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.
Chapter 9

Review of the Fire Department Organizational Structure

Fire departments are expected to reduce the risk within their areas of jurisdiction by taking measures to prevent the outbreak of fires, to limit the extent and severity of fires, to provide for the removal or rescue of endangered persons, to control and extinguish fires, and to perform other emergency response operations including emergency medical services, hazardous materials response, technical rescue response, and other emergency functions.

To achieve these objectives, fire departments provide fire response capabilities, including the delivery of fire suppression forces, communications, fire prevention, code enforcement, fire investigations, public education programs, and programs for community involvement.

Preventive efforts, risk reduction and control, and fire suppression results in variable levels of risk to the jurisdictions and their residents. Consequently, the level of community risk is determined by the level of resources provided to the fire department. The public entity controlling the level of fire department resources defines the limit of fire department’s services. These political decisions, usually made through the budget process, determine the efficiency and efficacy of fire department operations.

The management activities and organizational policies of the fire department must be separate from the political activities of the governing body (e.g., city council). This should not be confused with laws by which the scope of the fire department’s operations can be organized including statutes, city charters, or special acts that define a fire department’s service area. Laws or ordinances may also apply to the fire department’s organization, including civil service provisions and other regulations, such as permissible work hours for fire department members.

Everything that occurs within a fire department is governed by the fire department’s management policies, or lack thereof. Therefore, any incident investigation must also evaluate the effects of these policies, including the effects of a lack of policies addressing specific issues or of policies not being followed. The organization’s written and unwritten policies create a culture which exerts pressure on the department’s members.

Fire service organizations must provide highly reliable services to the community. Suppression activities are complex and interdependent. These activities are also time-critical and the consequences of failure are severe. The department’s mission necessitates that fire fighters live in close quarters and develop trust and respect for each others’ abilities. These close relationships exist within a departmental culture and structure that may be significant factors in the incident investigation.

A department’s culture consists of a very specific set of values and attitudes which supports certain behaviors and discourages others (usually through peer pressure or discipline). These values and attitudes provide fire fighters with guidelines to use in gathering and processing information about their surroundings. The team oriented nature of fire fighting magnifies the effect of organizational culture.
The magnification of department values can result in either uniform strength or uniform weakness. For example, a lack of good communication skills can result in loss of leadership, failure to recognize hazards, and lack of coordinated actions. Usually a failure of the organizational culture indicates that the team has a “blind spot.” When everyone in the team or department has the same attitude, nobody notices the problem because there is nothing to compare it against. For example, when a team has poor communication skills they may not recognize the problem because they do not have a model for good communication.

Individual fire fighter’s attitudes and behavior reflect the team’s values and attitudes. These, in turn, reflect the department’s cultural values, attitudes, actions, and reactions (praise, punishment, or indifference). The department’s culture is either created or enabled by the management structure from line officers to the fire chief. Formal sources of information about the department’s culture include policy statements, directives, standard operating procedures, and memos. Informal sources of information are more difficult to assess but are equally important. Informal sources often reveal how departments prioritize fire fighter’s health and safety. How important is it to follow procedures for every incident (both large and small fires)? Is priority given to ensuring and properly maintaining an adequate supply of protective clothing and equipment? Are fire fighters’ concerns addressed by management? Is the department so set in the aggressive “can do” attitude that fear of switching from an offensive operational mode to a defensive mode results in death? Are there significant differences between what fire fighters are trained to do and what actually happens in the field?

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.”

An additional problem often imposed upon fire departments by city managers is the attitude “do more with less.” This attitude usually pushes people and equipment to work beyond their capabilities by sacrificing safety. The funding level of the fire department is a political decision that must not be allowed to impact the health and safety of fire fighters.

While conducting the investigation it is important to keep in mind the fire department’s culture. Is everything correct on paper? Are written policies actually practiced in the field? Finally, what behaviors are rewarded, punished, or ignored by management?

Additional Reading


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?

**End Note**

Effective incident management is one of the best methods of mitigating the hazards associated with emergency response. Failure to implement uniform and effective incident management practices has resulted in many firefighter fatalities. The "NIOSH ALERT: Request for Assistance in Preventing Injuries and Deaths of Fire Fighters" and countless accident investigations have revealed that operating without effective incident management and fireground accountability systems has resulted in numerous firefighter deaths and injuries.

An incident management system is intended to provide a standard approach to operations and accountability at emergency response events. The primary objective of this system is operational and firefighter safety. The command officer must be able to successfully apply effective and efficient management techniques at all incidents.

The following points are considered to be key factors in any incident management system for a fire department.

- Overall authority and responsibility is assigned to the incident commander.
- The incident management system provides structured authority and responsibilities for different command levels and positions.
- There is a structured hierarchy reporting system with a manageable span of control at each level.
- The system is used to coordinate all incident scene operations.
- Individuals performing command functions must be trained and qualified.
- Everyone involved in operations at the incident scene has a position in the system that includes reporting and receiving assignments in a standard manner.
- The system is documented in written standard operating procedures.
- The system is simple, familiar, and used routinely at all incidents.
- 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 the response of resources 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 main purpose of an incident management system is to provide structure and coordination to the management of emergency incidents. In addition, the operational safety and health of fire department personnel conducting those activities is of paramount importance. Incident management systems are designed to be used by trained individuals. Though there are many different emergency situations requiring considerable judgment, there are several key components of the incident management system which may not be compromised.
The International Association of Fire Fighters has endorsed the model procedures developed by the National Fire Service Incident Management System Consortium Model Procedures Committee. These procedures were designed as a guide to assist emergency service organizations in implementing an incident management system. It also serves as the initial design document from which a fire department should operate during emergency incidents. Once the model is adopted by the jurisdiction and personnel have been trained in its use, it provides easily understood organizational structure and procedures to follow during emergency incidents.

The three models published to date encourage the use of an incident management system for structural and high-rise fire incidents and for multiple casualty incidents. Incident management systems can be used in small, routine incidents and can be expanded to meet the needs of an escalating incident. The committee is in the process of developing procedures for HAZMAT, Urban Search and Rescue, and system interface.

The fundamental question that must always be answered is, “was it appropriate for fire fighters to be in the building?” Fire departments are expected to reduce risks within their areas of jurisdiction by taking measures to prevent the outbreak of fires, limit the extent and severity of fires, provide for the removal or rescue of endangered persons, control and extinguish fires that occur within the jurisdiction, and perform other emergency response operations including delivery of emergency medical services. Preventive efforts, risk reduction and control, and fire suppression capabilities result in variable levels of risk among jurisdictions and their residents. Level of community risk is thus determined by the level of resources, including personnel staffing, provided to the fire department. The public entity controlling the fire department makes political decisions that determine the efficiency and efficacy of the fire department. Political realities can be very different than community expectations regarding fire department deployment.

The level of fire risk that the community is willing to accept should not be confused with the protection of the health and safety of fire personnel. The community may determine, politically, the number of fire houses, response times and total on duty personnel. They are not allowed to determine the minimum number of personnel necessary for safe response or dictate the appropriateness of operations.

The acceptability of the level of risk is directly related to the potential to save lives or property. Where there is no potential to save lives, the risk to fire department personnel must be evaluated in proportion to the ability to save property of value. 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.

NFPA 1500 outlines the accepted risk management practices during emergency operations.

EVALUATING RISKS
<table>
<thead>
<tr>
<th>AUDITING POINTS</th>
<th>INCIDENT MANAGEMENT SYSTEM IMPLEMENTATION</th>
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<tbody>
<tr>
<td>1. Fire departments must adopt an incident management system to manage all emergency incidents. Has the system been designed to meet the particular characteristics of the department?</td>
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<td>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.</td>
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<tr>
<td>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, to be prepared for escalation, and to be cognizant of the risks that exist at all incidents. Interviews with fire fighters can reveal the organizational culture of the fire department.</td>
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<td>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?</td>
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<tr>
<td>5. Does the fire department provide ongoing training in the incident management system?</td>
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<td>6. Is the incident management system’s application part of the critique process?</td>
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<td>7. Do the standard operating procedures of the incident management system include standard protocols and terminology for radio communications? Refer to Chapter 11 for more detailed information on fireground communications.</td>
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<td>8. 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.</td>
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<td>9. Has the department developed standard terminology to convey key information, including strategic modes of operation, situation reports, and emergency notifications of imminent hazards?</td>
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<td>10. 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.</td>
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<td>11. 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)?</td>
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</table>
12. 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?

13. 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 one incident commander or to establish a unified command structure?

14. 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?

15. 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?

16. 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?

17. Does the incident commander have the authority to determine and implement the appropriate level and elements of the incident management system?

18. 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.

19. Are the supervisory assignments defined by function or 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.

20. When an assignment deviates from the standard operating procedures, does the incident commander identify and clarify the parameters of the assignment?

21. Was a safety sector established at major incidents and at any high-risk incidents? The safety sector 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 sector.

22. 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.

23. 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?

24. 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?

25. 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?

26. Does the incident management system provide for the accountability of all personnel operating at the incident scene?

27. 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?

28. Does the accountability system provide an accurate account of the location and function of each company or unit at the scene of the incident?

29. 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?

30. Does the system include a specific method to identify and track personnel entering and leaving the hazard area?

31. 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?

32. Are supervisors required to account for the location of all fire fighters at regular intervals during the incident?

33. 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.

- Report of a missing fire fighter
- Going to a defensive operational mode (withdrawal from the structure)
- Hazardous event at the incident (wall collapse, flashover)
• Completion of search and rescue
• After 30 minutes from initial entry
• When the fire is declared under control
• As needed or at the discretion of the incident commander

34. Does the fire department have a standardized term and/or tone to announce that a fire fighter is in trouble (May Day Alert)?

35. Does the fire department require fire fighters to call “May Day” or other alert anytime they believe they are lost or in trouble?

36. 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.

37. Has the incident commander provided personnel for the immediate rescue of individuals operating at emergency incidents if the need arises?

38. Has the incident commander evaluated the situation and the risks to operating teams, and provided one or more rapid intervention crews commensurate with the needs of the situation? The composition and structure of rapid intervention crews can be flexible based on the type of incident and the size and complexity of operations.

39. 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.

40. 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?

41. Are fire fighters automatically sent to rehabilitation after finishing two 30-minute SCBA bottles or one 60-minute bottle?

42. 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, for determining the overall strategy that will be employed, for summoning and assigning adequate resources to deal with the situation, for evaluating progress and changing the strategy as appropriate, for communicating directions and interpreting progress reports from assigned persons in the command structure, and for bringing the incident to a termination.

43. Is the identity of the incident commander clear to all personnel operating at the incident?

44. 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.

45. 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?

46. Are procedures governing the circumstances and procedures for the transfer of command included in the incident management system?

47. 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.

48. Is the incident commander required to maintain control of access to the incident scene?

49. 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?

50. Are any changes in strategy immediately communicated to all affected supervisors?

51. 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 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.

52. Do the standard operating procedures define the roles and responsibilities of personnel assigned to command staff functions?

53. 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?
54. Is the safety officer required to immediately inform the incident commander of any actions taken to correct imminent hazards at an emergency scene?

55. 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?

56. 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.

57. Is the incident management system capable of recording and tracking the assignment of resources for the duration of an incident?

58. 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?

59. 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?

60. Is the safety and health of all personnel of primary consideration in all tactical decisions?

61. Does the incident management system provide a system to manage the reserves of personnel and other resources at or near the incident scene?

62. 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.

63. 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 to fifteen 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.

64. Do supervisors have the authority and responsibility to take immediate action to correct imminent hazards and to advise the appropriate supervisor regarding these actions?

65. Do supervisors coordinate their activities with other supervisors?

66. 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?
67. Does the fire department have standard operating procedures that define, within the incident command structure, the activities of the safety officer (sector) at the incident scene and the safety officer's functional intervention methods and authority?

68. 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.

69. When inexperienced members are working at an incident, is direct supervision provided by more experienced officers or members?

70. 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 emergency.

71. 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.

72. Are the standby team members provided with at least the appropriate full protective clothing, protective equipment, and SCBA?

73. 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?

74. 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.

75. Is the recommended minimum acceptable staffing level of four members responding on each engine to any type of fire followed?
76. 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.

77. 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.

78. Did the incident commander evaluate the risk to members with respect to the purpose and potential results of their actions in each situation?

79. In situations where the risk to fire department members was excessive, were activities limited to defensive operations?

80. 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?

81. At special operations incidents 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, 1992.


“Response to IDLH Atmospheres,” Letter from Joseph A. Dear, Assistant Secretary of Labor, Department of Labor, July 30, 1996.
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 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 communications occur during major emergencies. The ability to meet this demand requires adequate design and planning. 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.

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 “emergency traffic” or priority messages receive 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.

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 with often 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.

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. Additionally, fire departments should move from radio codes to plain English. Radio codes cause confusion, particularly when other agencies are involved in an incident.

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)?

• **How** -- How should the listener respond (with hose lines, medical unit, building evacuation)?

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?

**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 | 4. 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. |
| | 5. Is there a standard operating procedure addressing dispatcher’s responsibility when there is a report of a lost/trapped fire fighter? |
| | 6. Is there an emergency traffic tone initiated by dispatchers for all tactical channels that is sounded when there is an emergency on the fireground? |
| | 7. Are the dispatchers trained in the department’s incident command and emergency scene management procedures? |
| | 8. 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? |
| | 9. 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, out of service due to other reasons) readily available to the operators at all times? |
| | 10. Do dispatchers send the appropriate units to reported emergency incidents based on written operational procedures? Are the written procedures appropriate? |
| | 11. 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. |
| | 12. Are all outside devices, radio, telephone, or other means for alerting off-duty fire fighters tested daily? |
| | 13. Are all wired radio and voice amplification circuits subjected to talking tests at least twice daily? |
| | 14. 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. |
| | 15. Are visual and audible means available to indicate a 20% or greater reduction in the normal current in any dispatch circuit? All devices connected in series with any dispatch circuit should function properly when the dispatch circuit current is reduced to 70% of normal. |
| COMMUNICATIONS EQUIPMENT | 16. Is the installed communications system functioning properly? |
| | 17. Should normal power be lost, is there a backup power supply for all communications equipment? |
| | 18. Are there excessive delays in sending messages? |
19. 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

20. Is the communications systems 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?

21. Is radio equipment installed in the fire department vehicles and used to communicate with the communications center and between companies?

22. Does each fire station have the means to manually acknowledge the receipt of alarms received from the communications center?

23. Is there an alerting system to announce the nature and location of alarms to all responding personnel?

24. Are all radio and telephone messages to the communications center automatically recorded using equipment that also records the time?

25. 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.

26. 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?

27. If the department uses fire-portable radio transceivers, can they be placed into transmit mode only by operator action on a mechanically guarded switch?

28. If the department uses multiple-frequency fire-radio transceivers, are they capable of changing channels while operators are wearing gloves?

29. Does every chief officer, company officer, and response team have a portable radio while assigned to emergency duty?

30. 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?

31. If the department uses radio pocket pagers, do they audibly signal an alert before the battery is incapable of operating the pager?

32. 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?

33. Are radio calls from the fireground to the communications center answered promptly?
34. 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.

35. 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.

36. 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?

37. Are words pronounced distinctly and slowly?

38. When transmissions are unclear, incomplete, or vague, does the receiving person request the transmission be repeated?

39. Is the fire department’s business communications system separate from the emergency communications system?

40. Is the communications system designed and operated to ensure that emergency communications take priority over non-emergency messages?

41. 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).

42. When conditions allow, does the officer in charge report supplementary information to the communications center and provide additional status reports?

43. 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?

44. If the department has multiple frequencies, are multi-channel radios used to provide access for any channel that the user needs to access?

45. Do fire departments with mutual aid agreements have the ability to effectively integrate communications?

46. 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.

47. 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 developed.
**ADDITIONAL READING**


Chapter 12

**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 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, that may not be violated under any condition. For example, every fire fighter must have appropriate personal protective equipment, fireground accountability must always be maintained, rehabilitation of fire fighters must be available, and each team must have a portable radio.

- **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 the firescene. 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 firefighter’s tasks must be performed correctly. The deployment of firefighters, 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 firefighters, tasks may not be done safely, or at all. Staffing and support will impact all other decisions on the fireground. A reserve of firefighters should be staged and available in the event the operation is expanded and so that firefighters 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, 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.

- Did the firefighters follow the departmental standard operating procedures correctly?
- Did the departmental standard operating procedures direct firefighters to take the proper course of action?
- 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-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?

**Search and Rescue**

4. Did the firefighters make an interior attack on an untenable structure (e.g., under construction, being demolished)?
<table>
<thead>
<tr>
<th>Fire Fighter Assignments and Water Delivery</th>
<th>Apparatus Placement</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. Did fire fighters place water between the victims and the fire?</td>
<td>9. Does the fire department have predetermined apparatus positioning assignments to ensure exposure coverage (e.g., first engine covers the front of the building, second due covers the back exposure)?</td>
</tr>
<tr>
<td>6. Does the department have standard search procedures and patterns?</td>
<td>10. Did apparatus placement follow those predetermined assignments and/or were they in logical tactical positions?</td>
</tr>
<tr>
<td>7. Were there any areas of the building that were not searched?</td>
<td>11. If fire officer or apparatus driver deviated from these assignments, what was the reason?</td>
</tr>
<tr>
<td>8. 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?</td>
<td>12. If exposure coverage deviated from the department’s standard operating procedures, did the first arriving engine communicate with the incoming apparatus?</td>
</tr>
<tr>
<td>9. Does the fire department have predetermined apparatus positioning assignments to ensure exposure coverage (e.g., first engine covers the front of the building, second due covers the back exposure)?</td>
<td>13. Were trucks positioned to make the most efficient use of their capabilities?</td>
</tr>
<tr>
<td>10. Did apparatus placement follow those predetermined assignments and/or were they in logical tactical positions?</td>
<td>14. Once a truck was positioned, were the wheels chocked and outriggers deployed?</td>
</tr>
<tr>
<td>11. If fire officer or apparatus driver deviated from these assignments, what was the reason?</td>
<td>15. Were apparatus placed for use on scene to protect fire fighters and were emergency lights left on for visibility?</td>
</tr>
<tr>
<td>12. If exposure coverage deviated from the department’s standard operating procedures, did the first arriving engine communicate with the incoming apparatus?</td>
<td>16. Does the department have standard operating procedures that govern initial fire fighter assignments?</td>
</tr>
<tr>
<td>13. Were trucks positioned to make the most efficient use of their capabilities?</td>
<td>17. Were those assignments followed?</td>
</tr>
<tr>
<td>14. Once a truck was positioned, were the wheels chocked and outriggers deployed?</td>
<td>18. If not, what was the reason for the deviation? Did the incident commander know about/order the deviation?</td>
</tr>
<tr>
<td>15. Were apparatus placed for use on scene to protect fire fighters and were emergency lights left on for visibility?</td>
<td>19. Do the department standard operating procedures list the tools that fire fighters should carry into the structure?</td>
</tr>
<tr>
<td>16. Does the department have standard operating procedures that govern initial fire fighter assignments?</td>
<td>20. Do engine companies have both attack lines and backup hose lines?</td>
</tr>
<tr>
<td>17. Were those assignments followed?</td>
<td>21. Are lengths of hose appropriate for the types of structures the department protects?</td>
</tr>
<tr>
<td>18. If not, what was the reason for the deviation? Did the incident commander know about/order the deviation?</td>
<td>22. Is the engine water pump of sufficient capacity to meet the needs of the company?</td>
</tr>
<tr>
<td>19. Do the department standard operating procedures list the tools that fire fighters should carry into the structure?</td>
<td>23. Is the engine’s booster tank large enough to meet the needs of the company?</td>
</tr>
<tr>
<td>20. Do engine companies have both attack lines and backup hose lines?</td>
<td>24. Was an adequate water supply secured and were adequate supply lines laid?</td>
</tr>
<tr>
<td>21. Are lengths of hose appropriate for the types of structures the department protects?</td>
<td>25. Does the engine company have a deluge set available for use?</td>
</tr>
</tbody>
</table>
26. Does the engine have at least one pre-connected soft sleeve to allow for fast, efficient hydrant connection?

27. When the engine company responded to the incident, did they follow departmental procedures and provide an appropriate water supply?

28. Were backup lines laid out immediately after the initial attack lines and in the same location as the attack lines?

29. Were the backup lines charged and ready for use?

30. Did the backup lines provide greater water volume and penetration than the initial attack lines?

31. Did fire fighters attempt to gain control of interior stairways and hallways?

32. 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?

33. If a defensive mode was used, were all fire fighters outside the structure?

34. Once a water source was established, were attack lines taken to the seat of the fire?

35. Did fire fighters take an elevator directly to the fire floor?

36. If there was no fire fighter control switch in the elevator, did the fire fighters still use the elevator?

37. When making interior attacks, were solid stream nozzles (or fog nozzles adjusted to solid stream setting) utilized?

38. If the fire area was small, did the fire fighters direct the fire stream at the base of the fire?

39. If the fire area was large, did the fire fighters direct the stream at the ceiling above the fire area?

40. Were fire fighters aware of the water load (approximately 8.3 lbs./gal.) on the structure?

41. 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?

42. If the fire fighters entered a very hot room with no fire, did they leave immediately and check the area below?

43. If fog streams were utilized inside the building, was adequate ventilation provided downstream of the nozzle?

44. At multiple level structures, were fire fighters assigned to suppression activities above the main body of the fire before the fire was under attack?

45. Did fire fighters protect close exposures of the building from radiant heat and downwind exposures from convection heat?
46. If there were signs of fire in concealed spaces, did fire fighters open up the spaces and inspected for vertical and horizontal fire spread?

47. Were fire fighters assigned to the floor above the fire to check for fire spread from window to window?

48. If the fire was too large to control with hand lines, did fire fighters deploy a heavy stream device to attack the fire?

49. When conducting operations in a standpipe equipped building, did fire fighters always use fire department hose (rather than pre-installed hose)?

50. Were fire fighters assigned to operate above or below an involved truss roof?

51. Were attack lines charged and ready for use during the ventilation process?

52. Was the fire ventilated directly above the fire area or above a vertical shaft through which smoke and gases travel?

53. 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?

54. Were proper techniques used for ventilation?

55. When using windows for ventilation, were downwind windows opened before upwind windows?

56. Was fire structure ventilated working from the top of the building to the bottom of the building?

57. If signs of smoldering fire were encountered (backdraft situation), was the structure ventilated at a high point before the fire was attacked?

58. When size up indicated that fire fighters could be injured when ventilation (high risk of backdraft), did the fire fighters ventilate the windows from a distance with a ladder or water stream?

59. If positive pressure ventilation (PPV) was used, was there an “exit point” for smoke and gases in the fire area to produce effective ventilation?

60. Was PPV effectively monitored, controlled, and coordinated?

61. Was an aerial or other water stream used to deliver water through a roof ventilation hole, thus destroying the venting process?

62. 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?

63. When the aerial ladder or platform was placed, was consideration given to operational needs, victim rescue, and wind conditions?

64. When raising and lowering the aerial, was consideration given to potential obstructions that could be hit by the aerial (e.g., power lines, trees)?
65. 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**


**END NOTE**

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 mask and 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 fighters 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.

A complete autopsy should be done for every line-of-duty death. The United States Fire Administration, with the participation of the IAFF, developed the “Firefighter Autopsy Protocol,” provided in Appendix E. Autopsies serve four purposes.

- To assist the investigation in determining the cause of death
- To help determine eligibility for death benefits under the U.S. Public Safety Officer Benefits Program, as well as state, provincial, and local programs
- 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
- 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.
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). Haz Mat 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

The standards NFPA 1500, Standard on Fire Department Occupational Safety and Health Program, and NFPA 1582, Standard on Medical Requirements for Fire Fighters, detail the health and fitness requirements for individuals currently serving as fire fighters. NFPA 1582 recommends that an annual medical evaluation be conducted every year. The medical evaluation should consist of at least the following components.

- An interval medical history
- An interval occupational history, including significant exposures
- Height and weight
- Blood pressure

The medical evaluation should follow a protocol that determines when a more thorough medical examination is indicated. The annual medical evaluations should also include a full medical examination based upon the following schedule.

- Ages 29 and under every 3 years
- Ages 30 to 39 every 2 years
- Ages 40 and above every year

Full medical examinations should also be conducted before a fire fighter is returned to duty from a disability-related leave of absence.
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 Fire Service Joint Labor Management Wellness/Fitness Initiative 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, 1995.
- NFPA 1582: Medical Requirements for Firefighters, National Fire Protection Association.
- IAFF/IAFC Fire Service Joint Labor Management Wellness/Fitness Initiative, 1997, IAFF.
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.

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. Does 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. Where carried on apparatus, are SCBA secured (e.g., in brackets or carrying cases) 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?
27. 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?

28. Are records of all respiratory protection training maintained, including training of personnel involved in maintenance of such equipment?

29. Has the fire department established minimum performance standards for donning respiratory protection equipment?

30. Prior to initial training, have fire fighters been examined and certified by a physician as being medically and physically fit?

31. 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?

32. 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.

33. Is the face piece seal verified for each fire fighter by qualitative fit testing on an annual basis and any time that new types of SCBA are issued? Each new fire fighter must be tested before being permitted to use 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.

34. 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

35. Is facial hair that interferes with the face piece seal prohibited for fire fighters required to use respiratory protection equipment?

36. If eyeglasses are worn, does the fire fighter use frames that do not pass through the seal area of the face piece?

37. 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?

38. 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?

39. 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?
40. Are there written standard operating procedures for the safe operation of respiratory protection equipment during training and on the emergency scene?

41. 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?

42. 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?

43. Does the fire department periodically evaluate its fire fighters’ use and operation of SCBA under simulated emergency incidents?

44. 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?

45. 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

46. 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

47. 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 unintentionally 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-to-face piece 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

48. Is annual SCBA training provided to each fire fighter required to use breathing apparatus? This training must include re-evaluation of the individual for the required face piece seal.

49. 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.

50. Are monthly inspection 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.

51. Does the fire department require inspection of respiratory protection equipment by the user before and after each use?

52. Are all maintenance and repairs on SCBA conducted in accordance with manufacturer’s instructions by qualified personnel?
53. 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

54. Is each fire fighter trained in the fire department’s cleaning and sanitizing procedure?

55. Are fire fighters required to clean and sanitize each SCBA after each use upon their return to the fire station?

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

57. 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.

58. Does the air for SCBA taken from a compressor, cascade system, or other storage system meet the testing and quality requirements of ANSI Standard CGA G7.1, Commodity Specification for Air, with a minimum air quality of Grade D and a maximum dew point of –50°F (–45°C) or 10°F (5°C) lower than the coldest temperature expected in the area?

• The fire department must be able to document that the laboratory testing is performed at a laboratory accredited by the American Industrial Hygiene Association, the American Association for Laboratory Accreditation, or the National Voluntary Laboratory Accreditation Program.

• Laboratories must be required to notify the fire department immediately of air not meeting the requirements.

59. 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 that it meets the requirements addressed in audit point 58?

60. 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.

61. Are any air cylinders that contain air suspected of not meeting air quality standards immediately emptied and purged?

62. Does the fire department maintain all SCBA air cylinders at not less than 90% of the rated pressure stamped on the cylinder?
63. Are cylinders filled to less than 90% of their rated pressure segregated from full cylinders until they are refilled?

64. Are written policies established to ensure that air is obtained only from a source that meets the quality requirements?

65. Is refilling conducted by qualified personnel using proper equipment and following manufacturer’s instructions?

66. Are the proper operating procedures and safety precautions posted in a conspicuous location at the fill station?

67. Are the personnel assigned to operate fill station equipment required to visually inspect all cylinders before filling?

68. 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?

69. If a breathing air compressor system (mobile or fixed) is used, is it located in an area where the air is free from contamination?

70. Does the fire department have the ability to support emergency scene operations of extended duration by providing a reserve supply of air for SCBA?

71. 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 of Grade D air (20 ppm)?

72. Is the equipment used to produce compressed air for SCBA inspected and maintained in accordance with the manufacturer’s instructions?

73. Are all filters and other components of air purification systems inspected and replaced in accordance with the manufacturer’s instructions?

74. Are records maintained for each air compressor, fill station, cascade cylinder, purification system, and related equipment used to produce and store air for SCBA? The record must indicate the date of purchase, location, inspection, maintenance, and testing of the device.

75. 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?

76. 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?

77. Are any problem areas involving use, equipment, inspection, maintenance, and repair schedules addressed on a timely basis?

78. Are the levels of responsibility for the SCBA program established and maintained to ensure that proper assignments are made and that all firefighters of the program know exactly which duties they are to perform?
79. Are any failures encountered in the respiratory protection program dealing with use, training, or equipment investigated and corrective action taken to prevent the recurrence of an additional failure of a similar or related nature?

**ADDITIONAL READING**

Chapter 15

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. The 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 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 destroys the item. Therefore, it is important to properly document the condition of the clothing and equipment through a detailed written description and photographs/video before any testing is conducted.

Evaluation of 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, a 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 SCBA?
- If not, where was 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)?

• Was 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 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), in Morgantown, West Virginia. Upon written request, NIOSH investigators will conduct an independent inspection and evaluation of the SCBA. Appendix G provides a sample SCBA evaluation request letter which should be sent to NIOSH along with the SCBA to be inspected.

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 the hazard area. Investigators should include the following in their observations.

• Was the victim wearing a PASS device when he or 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?

PASS Device
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? (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 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 wet when worn (including wet from an earlier response).

If possible, it is useful to have the injured firefighter 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.

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? 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?
### Station/Work Uniform Inspection

- Leather
  - Seam integrity?
  - Material damage (rips, tears, holes)?
  - Steel toe or shank damage?
  - Sole tread wear?
  - Waterproofness?
  - Closure system?

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

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 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 attached as an appendix to the report.

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 left alone with impounded items.

### Additional Reading


END NOTE

Chapter 16

The Importance of Training and Training Records

When responding to emergency incidents, fire fighters must make critical decisions in a short amount of time based upon incomplete information. Under extreme stress, people rely on the habits and behaviors most familiar to them. Training is the foundation upon which all employees base actions and reactions at the incident scene. A balance between manipulative skills training and classroom sessions should be considered in the preparation of training. Training schedules should include all of the topics necessary to satisfy job knowledge requirements and to maintain skills already learned.

Training records are a valuable source of information for incident investigators. The paper trail can guide the investigator through an examination of the policies and procedures that shape the environment of the fire department. The knowledge and skills instilled by training are tempered with experience acquired on the job. Incident investigation must evaluate the differences between the classroom and the incident scene. Training documents show irrefutable evidence that may not come out in interviews, or may be used to guide questioning in an interview. In some investigations, training may be the direct cause of the incident, while in others training may be a link in the chain of events that led to the injury. Almost every investigation reveals evidence of inadequate training or differences between training and actual operations. Investigators have the difficult task determining the significance of these issues to the incident.

Why Maintain Training Records

All fire department members must receive standardized instruction and training if they are to respond effectively and cohesively to an emergency. Fire training records and reports may be only part of the documentation typically necessary to meet legal and statutory requirements. Training records have an important function in the administration of a fire department.

Training records and reports should be used by training officers and management to analyze the effectiveness of the training program. Training records and reports should also be used to develop specific training objectives and to evaluate compliance with, or deficiencies in, the training program. Compliance with training requirements should be documented. Fire departments should be able to clearly document the performance of individuals and teams related to the following.

- Compliance with personnel performance standards
- Documentation of career development training and education
- Cooperation with other agencies with which the fire department executes joint specialty operations (e.g., emergency medical services)
- Training required by regulatory agencies (e.g., OSHA, EPA, DOT)

When properly compiled and evaluated, these records enable management to make effective decisions for planning, programming, and budgeting operations.
The number and types of training reports that must be prepared vary from department to department. While there are differing needs among fire departments, certain reports are common to most departments. Some typical training reports include the following.

- A complete inventory of apparatus and equipment assigned to the training division
- Detailed plans for training improvements that include all equipment and facility needs and cost figures
- A detailed periodic report on and evaluation of the training of all fire fighters
- A monthly summary of all activities of the training division
- An annual report of all activities of the training division—the annual report should describe the accomplishments during the year, restate the goals and objectives of the training division, and describe the projected plans for the upcoming year

Performance tests, examinations, and personnel evaluations can contribute to the development of training programs if the results are analyzed, filed, and properly applied. Training records should be kept current and should reflect the status and progress of all personnel receiving training. Typical training records should include the following.

- A daily training record
- A company record
- An individual training record
- Special and summary records

Departmental training records are permanent records showing all the training that fire department personnel have received. These reports should be completed on an annual basis.

Company summary records show all training conducted or attended by the company. The number of hours spent by each individual on each subject should be recorded. This report serves as confirmation that fire fighters are receiving company training. Since most fireground operations are accomplished by more than one fire fighter, group performance evaluations should be part of any training program. A method of measuring the effectiveness of fire department evolutions and the preparation needed for fire fighter crews to operate at an incident should be established.

Individual training records contain a chronological history of an individual’s progress from the time of entry into the fire department until present. These records should indicate the attendance and certification of any classes, training, or courses taken by the fire fighter. The fire department should be able to evaluate the training received by every fire fighter in the department.

A training report should be complete and follow a logical sequence. A report should clearly and concisely present the essentials so that conclusions can be grasped. These documents should relay to the reader at least five specific elements of information as follows:  

1. **Types of Training Reports**

2. **Designated Training Reports**

3. **Performance Records**

4. **Firefighter Evaluation Reports**

5. **Annual Training Reports**
Who -- Who was the instructor?
Who participated; was in attendance?

What -- What was the subject covered?
What equipment was utilized?
What operation was evaluated or affected?
What were the stated objectives and were they met?

When -- When will the event take place; or
When did the event take place?

Where -- Where will the event take place; or
Where did the event take place?

Why -- Where is the event necessary; or
Where did the event occur?

Furthermore, a report should provide sufficient discussion to ensure the correct interpretation of the findings. These records should require the signatures of the instructor and the participant as a record of each fire fighter’s participation in the training.

Accuracy and clarity are essential in any training report. If investigators detect inaccuracy, then the veracity and value of the report is called into question.

The evaluation of training records should be done at specified intervals by the local department training officer or training committee. The evaluation of training records should also be done by the incident investigation team. The training program evaluation should include the following.

- How does the fire department document the performance and abilities of its members?
- Do training records meet all legal, statutory, and professional standards?
- Is training standardized across the department?
- Does the training allow demonstration of skills as well as the opportunity to practice the skills under realistic circumstances?

Each training record should be evaluated to determine the following.³

- Has the fire fighter completed all the required training?
- If not, has the fire fighter been scheduled for missed classes?
- Do performance deficiencies show up on the fire fighter’s training record?
- If performance deficiencies exist, what kind of program is being developed to overcome them?
- Have companies met all the required job performance standards established by the department?
- If job performance standards have not been met, have the problems been identified and a program developed to overcome them?
• Are there areas of training that are being completely overlooked?

• Is the cycle of training sufficient to maintain skill levels?

When reviewing records throughout the audit, compare records with personnel interviews to ensure accuracy and truthfulness.

Most training records can be maintained in their entirety in a computerized form. However, it is important to note that some training records must be maintained in their original hard-copy form. In various appeal proceedings, OSHA has held that original records are required to be maintained for training activities that are conducted specifically to comply with an OSHA-mandated training requirement. Examples of this type of training include the following.

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

Accurate and complete training records also are required by a number of different laws and standards. Federal, state, and provincial regulations require specific amounts and types of training. NFPA 1403, Standard on Live Fire Training Evolutions in Structures, and NFPA 1500, Standard on Fire Department Occupational Safety and Health Program, also require the documentation of specific training.

Records are the tools for tracking human resource development within the fire department. The objective of the training process is to improve the performance of the individual and the overall performance of the organization. Training programs established and implemented within the department should be people-oriented and action-minded, and the records and reporting system used in conjunction with the program should reflect these concepts.


2Ibid.
3Ibid, p. 7.
Subject: Training
Sub-Heading: Fire Fighters
Issuing Body: U.S. DOL; 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 1021)

3. 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?

4. Are fire fighters who perform interior structural fire fighting trained at least quarterly and all other members trained at least annually?

5. Have the fire fighters been informed of special hazards, as required by 29 CFR 1910.156 (c)(4)?

6. Has the employer developed and made available written standard operating procedures, as required by 29 CFR 1910.156 (c)(4)?

7. Are the standard operating procedures sufficiently detailed to guide employees in appropriate responses to emergencies?

8. Do employees receive training in implementation of the procedures?

9. Are procedures implemented as written?

ADDITIONAL READING

Chapter 18

OSHA PPE AND RESPIRATORY PROTECTION TRAINING REQUIREMENTS

Subject: Training
Sub-Heading: Fire Fighters
29 CFR 1910.134 - Respiratory Protection
Issuing Body: U.S. DOL; 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

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. 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 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 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.

8. 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 facepiece, or temple pieces on glasses. Also, the absence of one or both dentures can seriously affect the fit of a facepiece. The worker’s diligence in observing these factors shall be evaluated by periodic check. To assure proper protection, the facepiece fit shall be checked by the wearer each time the respirator is donned.

9. How frequently is respiratory protection refresher training given?

10. Were users trained in the limitations and most common modes of failure of the respiratory protection they utilize?

11. Is there a regular internal inspection to determine the effectiveness of the program?

**Additional Reading**


Chapter 19

**NFPA 1001 - Fire Fighter Professional Qualifications**

### 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 Section 1-3.3 requires that “evaluators shall be individuals who were not involved as instructors for the objective being evaluated.” Do the instructors have sufficient training and experience to be qualified instructors?

4. Does the department designate fire fighters as either Fire Fighter I or II based upon the NFPA 1001 standard?
   - NFPA 1001 Section 1-3.5 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 1001 Section 1-3.6 requires that the fire fighter shall meet all of the objectives for both Fire Fighter I and Fire Fighter II.

5. Are the duties and expectations of fire fighters commensurate with their training and experience?

6. 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.

7. Has the fire fighter been trained in the use of personal protective equipment and is able to identify the function of the following articles or protective equipment?
   - Helmet
   - Hood
   - Boots
- Gloves
- Protective coat
- Protective trousers
- Self-contained breathing apparatus (SCBA)
- Personal alert safety system (PASS)
- Eye protection.

8. 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.

9. Has the employer verified that the fire fighters can demonstrate the donning and doffing of protective equipment.

10. 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?

11. Have fire fighters been trained in the local incident management system and personal accountability system? Did the training include elements of the systems as well as the role of fire fighters within the systems?

12. Have fire fighters who may be required to assume or transfer command demonstrated their ability to operate within the local system?

13. 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
   - Emergency evacuation signals

14. Have the fire fighters been trained in the use of all tools and equipment provided to them?

15. Have the fire fighters been trained in the local water distribution system and other water sources in the local community?

16. Have the fire fighters been trained in the specifics of the nozzles and hoses owned by the fire department?

17. Have the fire fighters been trained in, and demonstrated ability to comply with, all fire department fireground standard operating procedures?

**ADDITIONAL READING**

Chapter 20

NFPA 1002 - Vehicle Driver Professional Qualifications

Auditing Points

Subject: Training
Sub-Heading: Fire Department Vehicle Driver
Standard: NFPA 1002 - Fire Department Vehicle Driver/Operator Professional Qualifications
Issuing Body: National Fire Protection Association
Applicability: Industry consensus standard of minimum professional practice for vehicle driver/operators

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?

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**

Chapter 21

1. For certification as an airport fire fighter, did the candidate meet requirements for Fire Fighter I defined in NFPA 1001 and the first responder operations level defined in NFPA 472? Refer to the auditing guidelines for these standards to evaluate this requirement.

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, and facilities, and related areas? The items listed below are considered to be prerequisite 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 topographic layout and drainage systems
   - Aircraft maintenance facilities

3. Has the department performed and documented fire fighter training in the airport’s incident management system, emergency plan, radio frequencies and procedures, tower light signals, and all local policies and procedures?

4. Has the department trained fire fighters in the proper response to the various types of aircraft which utilize the airport?

5. Have fire fighters been trained in airport and aircraft practices for hazardous conditions and the applicable standby procedures?

6. Are fire fighters knowledgeable in the following.

   - Aircraft familiarization, including conventional and composite materials used in aircraft construction
   - Aircraft terminology
   - Automatic explosive devices
• Hazardous areas in and around aircraft
• Aircraft fueling systems (hydrant/vehicle)
• Aircraft shutdown procedures
• Aircraft extinguishing systems
• Aircraft brake systems
• Aircraft egress/ingress (hatches, doors, and evacuation chutes)
• Unique fuels used on aircraft
• Location and operation of aircraft oxygen systems
• Tactics and strategy of fighting aircraft fires, including the approach, positioning, initial attack, and the selection, application, and management of the extinguishing agents

7. Do the airport fire fighters understand the fire behavior of aircraft fuels in pools, physical properties and characteristics of aircraft fuel, use of protective clothing, and fire extinguishment material selection and management?

8. Have airport fire fighters been trained in the special properties and uses of proximity fire fighting protective clothing and equipment?

9. For fire fighters dealing with military planes, has the department performed and documented training in special hazards (munitions, explosives, and other special hazards)?

**Additional Reading**

Chapter 22

**NFPA 1021 - Fire Officer Professional Qualifications**

**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.
Chapter 23

OSHA HAZWOPER 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. EPA
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?

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
Chapter 24

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**

Chapter 25

PREPARING THE INVESTIGATION REPORT

The process of investigating a death, injury or incident generates many facts and much speculation. Analysis of the data results in both conclusions and unanswered questions. Ultimately investigators must develop recommendations to prevent similar occurrences based upon facts and supported by their investigative work. The investigation report provides a condensation of relevant facts about the incident. When writing the report, investigators must keep in mind that the objective of the investigation process is to discover exactly what happened and determine how to prevent similar occurrences, not to affix blame or punish fire department members. Consequently, all items included in the investigation report must be precise, accurate, and complete.

The investigation report is divided into the following sections: incident summary, facts, analysis, conclusions, and recommendations. Within each major section there are subsections.

The incident summary should be placed first in the document, but compiled last. The summary provides a concise report of the who, what, when, where, and why of the incident.

Facts should be presented in the report in the most logical sequence to convey the events to readers. Information that has not been proven to be factual but appears to be very credible should be included in the report, provided that it is identified as unsubstantiated. Any supporting data necessary to bolster the report should also be included. Unsupported hypothesis and uncertainties revealed during the investigation should not be included in the report. The facts must answer the questions who, what, when, where, and why of the incident. The report must identify the principal people involved in the incident and include each person’s name, job classification, length of service, task experience, and job training. Descriptions of location should be as detailed as necessary to convey an exact location. The sequence of events is critical when describing the fire department response to the incident. Descriptions of injuries and damages sustained in the incident should also be included.

In the analysis and conclusion sections of the report, the factual information that has been gathered is analyzed. The facts, conditions, circumstances, and inferences are weighed to support the conclusions that will follow later in the report. The analysis and conclusions must state the mechanism by which the events occurred (how) and why they occurred. While many of the conclusions reached by the investigators may be directly related to the incident, some conclusions may speak to underlying contributory conditions in the fire department. It is important to remember that the fire department is a complex system and that a chain of events led to the incident. Conclusions that cannot be supported by the facts and analysis must not be included in the report.

The development of recommendations is a crucial function of the investigation process. The fire department cannot take specific corrective actions unless the investigation team develops specific recommendations upon which to act. When structuring recommendations, each item should be listed separately and clearly. If
corrective actions build upon one another, then they should be listed sequentially so that the reader can view them all at the same time.

• The report must always state the facts.

• The report must accurately and clearly state the investigation team’s findings.

• Write the summary after the report is complete.

• All information contained in the summary must be supported by the body of the report.

• Make sure that there are good bridges between the facts, conclusions, and recommendations.

• Make sure that all conclusions and recommendations are supported by the facts and analysis. Statements of fact should be supported by details.

• All recommendations must address a problem identified by the investigation.

• Include both statements to the presence or absence of a history of problems (e.g., Fire fighter Smith had (did not have) a history of cardiopulmonary disease).

• The report must be understandable by non-fire fighters (a glossary may be helpful). Avoid the use of jargon, codes, slang, or acronyms unless they are readily understood by the general public.

• When including maps or drawing, make sure that there is some scale reference.

• Write simply and clearly.

• Check the report for errors in spelling and grammar. Using simple active sentences will keep errors to a minimum.

• Verb tenses must be consistent throughout the report.

• The entire report must make sense when read out loud.

The report should be presented to the fire chief and union president in its final form. It is often beneficial to present the document in a meeting with all team members present. The investigation team leader should present an overview of the report. Particular attention should be paid to the conclusions and recommendations. Team members should be prepared to answer questions from the fire chief or union president. A special presentation should be made to the family members of deceased fire fighters and any fire fighter involved in the incident. The final report should then be released to the entire fire department. The investigation team may wish to hold a news conference to brief the media and the community of the findings.

When and what can be released when the report is complete will be heavily debated locally. However, the open release of a comprehensive fatality or serious injury investigation report can result in change within the fire service that most certainly will save the lives of other fire fighters.
SAMPLE INVESTIGATION REPORT OUTLINE

Incident Summary:
- Brief description of the incident
- Brief description of the location
- Outline of time frame
- List of personnel involved
- Summary of outcome (injuries and damage)

The Investigation Team:
- Team members
- Summary of methods

Facts:
- Detailed description of the location (including relevant diagrams, photographs, etc.)
- Environmental influences
- Apparatus placement, assignments, and actual tasks
- Incident management, tactics, communications summary
- Incident time line
- Equipment availability and serviceability
- Witness statements
- Condition of protective clothing and equipment
- Radio transcripts

Analysis:
- Incident time line sequencing analysis
- Comparison of actions against applicable standards
- Review of qualification, experience, and training of involved personnel
- Summary of Medical and Coroner Reports
- Review of supervisory qualifications
- Performance analysis of protective clothing and equipment
- Analysis of staffing level
- Analysis of fireground communications
- Review of previous deficiencies and corrective actions

Conclusions:
- List of all direct and indirect causal factors
- List of all mitigating factors

Recommendations:
- Specific remedial actions

Appendices:
- Attach supporting documentation
- Attach external reports (e.g., NIOSH review of SCBA)
Appendix A

Photographic Investigative Worksheet
PHOTOGRAPHIC INVESTIGATIVE WORKSHEET

A. IDENTIFICATION AND GENERAL INFORMATION

Case ________________________________

Case Number __________________________ Date __/__/____

Photographer’s Name and Position ________________________________

Location ______________________________________________________________________

Camera Type __________________ Make __________________
Lens Focal Length ______________ Film Type __________________
Brand ______________ Speed __________________

General Weather and Lighting Conditions ________________________________

Special Equipment ________________________________________________________________________

B. INDIVIDUAL EXPOSURES *NORTH =

1. Subject ______________________________________________________________________
   f/number __________ shutter speed ________ distance _______________

2. Subject ______________________________________________________________________
   f/number __________ shutter speed ________ distance _______________

3. Subject ______________________________________________________________________
   f/number __________ shutter speed ________ distance _______________

4. Subject ______________________________________________________________________
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5. Subject ______________________________________________________________________
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21. Subject ____________________________  
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22. Subject ____________________________  
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23. Subject ____________________________  
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24. Subject ____________________________  
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25. Subject ____________________________  
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26. Subject ____________________________  
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27. Subject ____________________________  
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28. Subject ____________________________  
   f/number ______ shutter speed ______ distance ______
PHOTOGRAPHIC INVESTIGATIVE WORKSHEET

Remarks:

_________________________________________________________________________________
_________________________________________________________________________________
_________________________________________________________________________________
_________________________________________________________________________________
_________________________________________________________________________________
C. PROCESSING AND CHAIN OF CUSTODY

1. Deposited By ___________________________ Date ____________________________

2. Film Lab ________________________________________________________________

3. Received By ___________________________ Date ____________________________

4. Processing Technician _______________________ Date Processed ______________

5. Receipt Number __________________________ Envelope Number _____________

6. Mail Processing:

Certified Mail Receipt Number __________________________
Date Mailed ___________________________ Date Received ______________
Mailed By ___________________________ Date Mailed ______________
Received By ___________________________ Date Received ______________

7. Special instructions for processing (Continuous-roll, contact prints duplicates, full frame printing, color corrections, etc.):

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
Appendix B

Witness Written Statement Form
Form for Written Statements

(First name, Middle initial, Last name) ___________________________ 
(Today’s Date) ___________________________ 

(Address) ___________________________ 
(Telephone number) ___________________________ 

(Station Assignment) (Company Assignment) (Station Telephone #) 

(Incident Location) ___________________________ 
(Incident Date) ___________________________ 

Please draw a diagram of the incident. In your diagram please include:  
- Building location  
- Apparatus placement (include engine numbers)  
- Fire fighter locations  
- Water sources and hose/nozzle placement

Note: Diagram is not to scale ___________________________ 
(Signature) ___________________________
Please describe what you directly saw and heard at the incident. Include information about:

- Fire fighting tactics
- The incident command system
- Fireground accountability
- Equipment & Apparatus
- Building structural integrity
- Any other unusual or significant factors
(First name, Middle initial, Last name) __________________________

(Today’s Date) __________________________

(Signature)
Media Inventory Form

Station Information
Name of Media Outlet ____________________________________________
Address _________________________________________________________
Telephone ________________________________________________________
Fax ______________________________________________________________
Owned By _________________________________________________________
Coverage Area ____________________________________________________
Audience Size _____________________________________________________
Audience Profile _________________________________________________

News Programs
Morning _________________ at ________ Deadline _______________________
Afternoon _________________ at ________ Deadline _______________________
Evening _________________ at ________ Deadline _________________________
Late Evening _________________ at ________ Deadline ______________________
Late Night News _________________ at ________ Deadline ___________________
Other _________________ at ________ Deadline __________________________

Personnel
News Director _______________________________________________________
Assignment Editor _________________________________________________
Program Director __________________________________________________
Reporters _________________________________________________________

This outlet:

- Takes actualities Yes No
- Takes film footage Yes No
- Covers live interviews Yes No
- Covers press conferences Yes No
- Uses news releases Yes No
Appendix D

IAFF Policies, Protocols, and Forms for Line-of-Duty Deaths and Incident Investigations
IAFF Line-of-Duty Death Notification, Assistance and Investigation Policy
In the event of a line-of-duty death, the local union must notify the IAFF District Vice President and the IAFF and be prepared to supply the following information.

- Member’s full name
- Member’s age at death
- Member’s rank
- Member’s Social Security Number (US) or Social Insurance Number (CAN)
- IAFF membership number
- Date of death
- Cause of death (if known)
- Name/Address/Telephone number of spouse (married) or parents (single)
- Names/Ages of children
- Local union number, President, Address/Telephone number
- Local union officer serving as PSOB contact
- Name/Address/Telephone number of mayor/local jurisdiction official
- Name/Address/Telephone number of fire chief
- Name of fire department
- Funeral arrangements (dates, times, and locations)

The IAFF Department of Occupational Health and Safety Line-of-Duty Death Form should be immediately faxed, even if partial information is available, to the IAFF.

Upon receipt of the above information, the IAFF General President notifies the IAFF General Secretary-Treasurer who notifies, by facsimile, all IAFF Vice Presidents, State/Provincial Associations, and when requested, local affiliates. The Vice President of the district where the death occurred will be immediately contacted by telephone.

Upon receipt of the above information, the IAFF General President notifies the Department of Occupational Health and Safety which prepares appropriate notifications and condolences from the IAFF General President to the following.

- President of the United States/Prime Minister of Canada
- Senators or Member of Parliament from Deceased’s State/Province
- Congressman or MLA/MPP from Deceased’s Congressional District/Riding
- U.S. Secretary of Labor
- Head of State/Provincial Premier
- Mayor/Local Jurisdiction Official
- Fire Chief
- Local Union President
- Appropriate Family Member(s)

The IAFF Department of Occupational Health and Safety notifies the following.

- All IAFF Departments, including the IAFF Canadian Office which notifies appropriate Federal and Provincial government officials.
- United States Fire Administration
• U.S. Department of Justice, Bureau of Justice Assistance (PSOB)
• IAFF Fallen Fire Fighters Memorial

Appropriate letters have been developed and electronically maintained for all above categories. Files are maintained in the IAFF Office for later use (e.g. for the IAFF Death and Injury Survey). The IAFF Department of Occupational Health and Safety maintains a computerized data bank of all IAFF line-of-duty deaths since 1970.

Upon receipt of the above information, the IAFF Department of Occupational Health and Safety provides the Local Union with appropriate information on the Public Safety Officers’ Benefits (PSOB) Program.

The IAFF Department of Occupational Health and Safety notifies the PSOB Coordinator of the line-of-duty death and provides the PSOB Coordinator with the above information.

When necessary, and upon the request of the District Vice President, the IAFF General President assigns the PSOB Coordinator to assist the local union with the PSOB claim.

The PSOB Coordinator coordinates with the District Vice President and the Department of Occupational Health and Safety in working with the local union and the family to assure timely filing of the PSOB claim.

Upon completion of the PSOB case and award of claim, the PSOB Coordinator forwards the claim file to IAFF Department of Occupational Health and Safety office for storage and future use. The IAFF Department of Occupational Health and Safety maintains all IAFF member claims and benefits since 1976.

IAFF attendance at a line-of-duty funeral will include the IAFF District Vice President for the local jurisdiction and, where appropriate, representatives designated and approved by the IAFF General President.

In honor of fire fighters who die in the line of duty, the IAFF presents the Martin E. Pierce Commemorative Line-of-Duty Death medal to the family of the deceased. In such cases, the President of the deceased member’s Local Union, or the Local President’s designee, is responsible for notifying the IAFF as soon as possible that a medal is required.

The surviving spouse or family member of all IAFF members killed in the line of duty on or after the August 5, 1990, passage of 1990 Convention Resolution 85 are eligible to receive an IAFF commemorative medal on behalf of all the members of the IAFF at no cost. Affiliates wishing to obtain a commemorative medal for the spouse or family members of an IAFF member who was killed in the line of duty prior to the date of adoption of Resolution 85, must make such a request through the International General President. Upon approval, the Local may purchase a medal from the IAFF at cost.
For the purposes of this medal, the line-of-duty death of an IAFF member is defined as one of the following.

• Any death of an IAFF member where the deceased member’s family would be eligible for a line-of-duty death benefit under the regulations of the U.S. Public Safety Officers’ Benefits program.
• Any death of an IAFF member that has been determined to be a line-of-duty death by his or her local fire department or employer.
• Any death of an IAFF member where the member died of an injury or illness incurred while engaged in emergency or non-emergency duties on the job or as a result of the job.
• Other cases where a Local President makes a formal request to the IAFF General President, who will evaluate the circumstances surrounding the death of the IAFF member and make a determination based on the facts. Such cases could include the death of an IAFF member resulting from an injury or illness incurred while performing fire fighting or emergency medical duties as a “Good Samaritan” while off duty, or other similar circumstances.

The method of presenting the medal to the surviving spouse or family member of a deceased IAFF member depends upon the individual circumstances, the wishes of the family, and the advice of the local union. It is incumbent upon the Local Union to communicate with the deceased’s family to determine whether it is appropriate to present the medal during the funeral service, during the memorial service, at graveside, or at some other location or later date. It is the responsibility of the Local Union President, or the Local President’s designee, to contact the IAFF as soon as possible to inform of the decision on when the medal will be presented.

Depending on the circumstances, the wishes of the family, and input from the Local Union, the medal will be presented to the family of a deceased IAFF member by the Local President or other designated officer of the deceased member’s Local. In the case of multiple line-of-duty fatalities, the Local Union President or the Local President’s designee, may request that the medal presentation be made by the IAFF General President, the IAFF General Secretary-Treasurer, or the respective IAFF District Vice President for that local.

• In the event of a line-of-duty death, the surviving spouse is entitled to receive the commemorative medal.
• In the event that the spouse is deceased or otherwise unavailable, the child of the deceased member is entitled to receive the medal.
• In the event of multiple children, the oldest child is the recipient.
• If there is neither a surviving spouse or child, the parent(s) of the deceased member receives the medal.
• If there is no spouse, child, or parent, the oldest sibling of the deceased member would receive the medal.
The names of all IAFF members who died in the Line of Duty will be inscribed on the IAFF Fallen Fire Fighter Memorial. The IAFF honors these Brothers and Sisters annually during a ceremony at the Fallen Fire Fighter Memorial Grounds in Colorado Springs, Colorado. The names all IAFF members who die in the line of duty will be published in the LAST ALARM section of the *International Firefighter*.

The IAFF General President may authorize a line-of-duty death investigation for any incident where there has been multiple deaths, a single death with unusual circumstances, or an incident of serious fire fighter injuries with unusual circumstances. An investigation may be authorized if there is any reason to suspect any one or more of the following conditions:

- The collective bargaining agreement between the jurisdiction and the IAFF local affiliate was violated;
- The fire department produced a biased or inaccurate investigation report;
- Standard operating procedures or fire department policies were nonexistent or not followed properly;
- Applicable OSHA, NFPA or other relevant standards were violated;
- Personal protective clothing or equipment were implicated as being causal in the incident;
- The IAFF local union believes compelling facts surrounding the incident warrant an investigation; or
- The IAFF General President believes a line-of-duty death investigation is necessary.

The IAFF District Vice President for the local jurisdiction will be kept apprised of any investigation.

The IAFF Department of Occupational Health and Safety will provide the *IAFF Recommended Protocol for Line-of-Duty Deaths* upon the request of the IAFF District Vice President or the local IAFF affiliate.

The Line-of-Duty Death Reporting Protocol was adopted by the IAFF Executive Board in January, 1989. The IAFF Commemorative Medal was authorized by action of the 40th IAFF Convention in August, 1990 when delegates adopted Resolution 85. The IAFF Executive Board adopted the protocol for qualification and presentation of the medal in December, 1992. The IAFF Commemorative Medal was named the IAFF Martin E. Pierce Commemorative Medal in honor and memory of Secretary-Treasurer Martin E. Pierce at the 43rd IAFF Convention in August 1996. The IAFF Executive Board adopted the IAFF Investigation Policy in July, 1997. The IAFF Executive Board revised and adopted the IAFF Line-of-Duty Death Notification, Assistance, and Investigation Policy in July, 1997.
Appendix D-2

IAFF Funeral Protocol for Line-of-Duty Deaths
The following protocol is to assist IAFF local affiliates in the event of a line-of-duty death of a member. This information is provided for assistance purposes. Each individual affiliate must evaluate its local conditions and utilize, amend, or change these recommendations accordingly.

**Notification**

After the notification of a death of a member, the fire chief should immediately inform union officials and the fire department chaplain.

Fire department should be informed that the local union official(s) wish to accompany those department officials who are dispatched to notify next of kin. After family has been officially notified, the fire department and the local union should notify all members.

**Planning**

Local union president must immediately appoint an individual with the sole responsibility of planning for the deceased member’s funeral.

In order for the local union to be fully prepared the following initial information must be gathered from deceased family as soon as possible. A union/department member should be immediately assigned as a family contact to assist the family and serve as the liaison between the family and those planning the funeral.

- Do they want funeral with full department honors?
- Do they want a church funeral? If so which church?
- Who is their choice of priest, minister, rabbi, or other religious representative?
- Where is the funeral Home?
- Who is the funeral director?

If the family requests a departmental funeral, funeral director should be so notified. The funeral director makes arrangements with the church, cemetery, etc. The union/department should make arrangements for the funeral director to receive deceased’s uniform in the event of a departmental funeral or if requested by family.

List of pallbearers must be obtained from the family. Honor guard members should be selected, usually chosen from house and company members, and scheduled to stand at casket during viewing at funeral home. For funeral service rifle/colors honor guard and ushers should be selected.

Arrangements must begin immediately on site selection for Memorial Service (if planned) and for collation (reception) following funeral/memorial service. Vendors should be immediately solicited for assistance.
The local union must determine the availability of the following:

- white gloves
- union pins
- badge covers
- bunting (fire stations/union hall)

Determine whether church cards (last alarm) are desired and arrange with printer for production (if cards are to be printed). This must be done immediately to allow for printing time.

Secure space from local hotel(s). Remember that fire fighters from throughout the International will attempt to attend funeral. Select one hotel as base for International Principal Officer(s), Vice President(s), and staff.

Establish liaison with police department. The police department can assist with the following.

- Request police department to send out on police blotter the announcement of line-of-duty deaths with as much detail as possible, including funeral arrangements, department and union address, and phone number of local union representative responsible for funeral.
- Request police to provide detail in marked car at deceased house during entire funeral period.
- Request police to have representative at any planning meeting. They can assist with logistical coordination including traffic, crowd control, out-of-town fire fighters, parking, etc.

For line-of-duty departmental funerals the following protocol should be arranged.

Funeral Director is responsible and has the primary concern of assisting the family, including bring them into church, and seating. Department should select Chief-in-Charge for directing and coordinating fire department and fire fighter involvement in funeral.

Honor Guard should post colors prior to church service. Honor guard should be posted outside church on both sides of entrance. Fire department personnel, union officials, fire fighters and civic delegates should line up with honor guard to street. Family passes between ranks. In all instances, family should enter church ahead of any dignitaries. Ushers should keep front right part of church open for members and delegates. After body is greeted all march into church and are seated in the following fashion:

- Fire Chief
- Union President
- International Principal Officer(s)
- Local union officials
- Deceased’s company
- Delegation of department’s chief officers
- Members of department
- Members of other fire departments

All remain standing until all fire fighting delegations are in place.
At conclusion of service, ushers will direct fire fighting delegation to street where they resume original places, facing church, under direction of chief-in-charge. Pallbearers then proceed out of church with body followed by family and other mourners. Chief-in-Charge gives command for salute as body is brought from church and placed in hearse.

After services, funeral director assembles procession. Chief-in-Charge directs all fire fighting personnel, proceed by colors to march ahead of procession to designated pass-in-review position. If desired, a designated fire house could be chosen for pass-in-review. Fire house should have apparatus on apron, with all on-duty personnel at attention, bells tolling as procession passes. After pass-in-review procession proceeds to cemetery.

Chief-in-charge shall be responsible for assembling fire fighters at grave site. It should immediately be determined how many mourners the cemetery and/or grave site area can accommodate. Committal is usually for family and close friends. Apparatus can be detailed to cemetery gates with fire fighters in full dress.

Arrangements can be made for bugler for TAPS and sole bagpiper for playing Amazing Grace, or appropriate hymn. Local musicians unions or schools can usually provide these individuals if unavailable on fire or police department.

Dismissal from grave site is generally followed by reception.

The ringing of the bell and the Fire Fighter’s Prayer are two traditions of the fire service which reflect respect and honor to those who gave their lives to their duty. The ringing of the bell represents the end of the emergency and the return to quarters, and is usually three rings of the bell, three times. Both are provided for local adoption.

After notification of line-of-duty death is completed, flags at all jurisdiction’s properties (government center, fire stations, schools, etc.) should be lowered to half-staff in honor of fallen fire fighter.

Flags at jurisdiction’s properties should remain at half-staff from date of death through the day of committal.

Flags at fire stations and union hall should remain at half-staff for a period of 30 days. Funeral bunting, if used, should also remain on fire stations and union hall for 30 days.

After notification of line-of-duty death is completed, badge covers should be placed across the face of each member’s badge. Badge cover should remain for 30 days.

The IAFF Executive Board first adopted the IAFF funeral protocol in May 1989. The latest edition was revised and adopted in July 1997.
**Bell Ceremony**

The men and women of today’s fire service are confronted with a more dangerous work environment than ever before. We are forced to continually change our strategies and tactics to accomplish our tasks.

Our methods may change, but our goals remain the same as they were in the past, to save lives and to protect property, sometimes at a terrible cost. This is what we do, this is our chosen profession, this is the tradition of the fire fighter.

The fire service of today is ever changing, but is steeped in traditions 200 years old. One such tradition is the sound of a bell.

In the past, as fire fighters began their tour of duty, it was the bell that signaled the beginning of that day’s shift. Throughout the day and night, each alarm was sounded by a bell, which summoned these brave souls to fight fires and to place their lives in jeopardy for the good of their fellow citizen. And when the fire was out and the alarm had come to an end, it was the bell that signaled to all the completion of that call. When a fire fighter had died in the line of duty, paying the supreme sacrifice, it was the mournful toll of the bell that solemnly announced a comrades passing.

We utilize these traditions as symbols, which reflect honor and respect on those who have given so much and who have served so well. To symbolize the devotion that these brave souls had for their duty, a special signal of three rings, three times each, represents the end of our comrades’ duties and that they will be returning to quarters. And so, to those who have selflessly given their lives for the good of their fellow man, their tasks completed, their duties well done, to our comrades, their last alarm, they are going home.

**Fire Fighter’s Prayer**

When I am called to duty, God
Wherever flames may rage
Give me strength to save a life
Whatever be its age.

Let me embrace a little child
Before it is too late
Or save an older person from
The horror of that fate.

Enable me to be alert
And hear the weakest shout,
and quickly and efficiently
To put the fire out.

I want to fill my calling
To give the best in me,
To guard my friend and neighbor
And protect their property.

And, if, according to your will,
While on duty I must answer death’s call;
Bless with your protecting hand
My family, one and all.
Appendix D-3

IAFF Department of Occupational Health & Safety Line-of-Duty Death Information Form for Fire Fighters in the United States
<table>
<thead>
<tr>
<th>Deceased:</th>
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</thead>
<tbody>
<tr>
<td>Date Received</td>
<td>Time Received</td>
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<tr>
<td>Local #</td>
<td>District VP</td>
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<tr>
<td>Rank</td>
<td>Social Security Number</td>
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<tr>
<td>Age</td>
<td>IAFF Membership Number</td>
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<tr>
<td>Date of Death</td>
<td>Cause of Death</td>
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<td>Next of Kin (relationship)</td>
<td>Address</td>
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<td>Telephone</td>
<td></td>
</tr>
<tr>
<td>Children</td>
<td>Age</td>
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</table>

<p>| Local Union Official |                                      |
| Union Official Title |                                      |
| PSOB Contact        |                                      |
| Union Local #       |                                      |
| Address             |                                      |
| Telephone           |                                      |</p>
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<td>Fire Chief</td>
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<td>Fire Department City</td>
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<tr>
<td>Municipal Official (including title)</td>
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<tr>
<td>U.S. Senator</td>
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FAX this Form, as soon as possible to:

IAFF Department of Occupational Health and Safety

202-737-8418
Appendix D-4

IAFF Department of Occupational Health & Safety Line-of-Duty Death Information Form for Fire Fighters in Canada
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<td>Member of Parliament</td>
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<tr>
<td>MLA/MPP</td>
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Funeral Home

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Funeral Date

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Telephone

FAX this Form, as soon as possible to:

IAFF Department of Occupational Health and Safety

202-737-8418
Appendix E

USFA Firefighter Autopsy Protocol
This document was scanned from hard copy to portable document format (PDF) and edited to 99.5% accuracy. Some formatting errors not detected during the optical character recognition process may appear.
Any opinions, findings, conclusions, or recommendations expressed in this publication do not necessarily reflect the views of the Federal Emergency Management Agency or the United States Fire Administration
ACKNOWLEDGEMENT

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I. BACKGROUND

The United States Fire Administration (USFA) has a major commitment to improving the health and safety of firefighters. This mission has created an accompanying interest in learning about the causes of firefighter deaths and injuries. In the process of researching firefighter deaths, it was determined that there is no standard protocol in forensic medicine that would assist a coroner or medical examiner in determining the cause of a firefighter death.

Responding to this concern, the USFA, in 1993, initiated a project to develop a standard firefighter autopsy protocol. Experts in forensic pathology, toxicology, epidemiology, and medicolegal aspects of autopsy, as well as representatives of several national fire service organizations, were selected to serve as a Technical Advisory Committee (TAC), providing guidance, consultation, and review during the development of the protocol. The members of the TAC provided the expertise and experience to develop the actual protocol, which accompanies this report.

The consensus of the TAC is reflected in the protocol, which is intended to provide guidance to medical examiners, coroners, and pathologists on uniform recommended procedures for investigating the causes and contributing factors related to firefighter deaths. The protocol recognizes and addresses those attributes of firefighter casualties which distinguish them from the general population, as well as from civilian fire casualties. These differences include the use of protective clothing and equipment, prolonged exposures to the hazardous environment, and specialized training and duties.

The accompanying documentation is intended to describe the need for the protocol, the situational context under which it was developed, and the major issues that relate to it.

Scope of Problem

Firefighting has been described as one of the nation’s most hazardous occupations. The National Fire Protection Association (Karter, 1993) estimates that 1,058,300 people in the United States are either full- or part-time firefighters, including both career and volunteer personnel. The number of career firefighters (253,000) has been rising steadily throughout the past decade, while the number of volunteer firefighters (805,300) is declining. According to statistics compiled jointly by the USFA and the National Fire Protection Association (NFPA), 1,920 firefighters have lost their lives while on duty in the United States over the past 15 years -- an average of 128 per year. Approximately 45 percent of all firefighter duty deaths during this period were attributed to heart attacks.
Improvements in firefighter health and safety standards and practices, particularly in the areas of personal protective equipment, physical fitness, and training, are widely believed to be responsible for a significant downward trend in line-of-duty deaths during the last 15 years. Between 1977 and 1991, the nation experienced a 32 percent drop in the annual number of firefighter line-of-duty deaths (see Figure 1). The number of line-of-duty deaths in 1992 was a record low of 74. Notwithstanding the significant drop in firefighter deaths, too many firefighters die needlessly each year.

The statistical analysis of firefighter fatalities accounts for how many firefighters have died and to some extent explains how they died, but the available data do not explain why firefighters die. Moreover, a dramatic downward shift in the total number of firefighter deaths in 1992 (and preliminary statistics for 1993) begs still more questions about what, if anything, is being done correctly to prevent line-of-duty deaths.

Epidemiological studies of firefighter mortality conducted in recent years provide interesting insights into how firefighter health and mortality rates compare to other population groups, but they too fall short of explaining conclusively why firefighters die (especially any individual firefighter). The interest in occupational health factors relates
to the frequency of sudden deaths due to heart attacks, as well as chronic conditions which include respiratory disorders, heart disease, and cancer.

**Rationale for the Protocol**

The autopsy protocol was developed to give guidance to qualified professionals on the specific procedures that will be most appropriate in performing an autopsy on a deceased firefighter. The recommended procedures are intended to address the complex relationship between the firefighter and the inherently dangerous work environment where the duties of a firefighter must be performed. *It has been assumed that the user will be qualified, skilled and experienced in performing autopsies, as the protocol is intended only to provide guidance on the special considerations that should apply to a firefighter autopsy.*

It is hoped that a uniform firefighter autopsy protocol will lead to a more thorough documentation of the causes of firefighter deaths for three purposes:

1. to advance the analysis of the causes of firefighter deaths to aid in the development of improved firefighter health and safety equipment, procedures, and standards;
2. to help determine eligibility for death benefits under the federal government’s Public Safety Officer Benefits Program, as well as state and local programs; and
3. to address an increasing interest in the study of deaths that could be related to occupational illnesses among firefighters, both active and retired.

The work environment of the firefighter is inherently dangerous. To survive in that environment, the firefighter routinely uses protective clothing, respiratory protection, safety equipment, and standard operating procedures intended to reduce the level of risk, but which cannot eliminate all risks. It is extremely important, in the event of a failure of those protective systems, to fully and carefully determine what, if anything, may have gone wrong and how, if possible, similar occurrences may be prevented from happening again. An autopsy may provide some of the essential evidence to make those determinations.

The specific issues relating to the determination of eligibility for death benefits are discussed in Part IV of this document. Several areas of interest in the study of chronic health issues are addressed in Part III of this document.

NFPA 1500, *Standard on Fire Department Occupational Safety and Health*, section 8-4.3, recommends, “If a member dies as a result of occupational injury or illness, autopsy results, if available, shall be recorded in the health data base.”

★ ★ ★

-3-
II. MEDICOLEGAL AUTOPSY
PROCEDURES IN THE UNITED STATES

The need to investigate and understand the cause of death, particularly when it occurs under unusual, confusing, or ambiguous circumstances, is almost universal. Nearly every country has established requirements for the medicolegal investigation of unforeseen, unnatural, or violent deaths, usually including workplace accidents and job-related deaths. However, unlike some other industrialized nations, no national system of death investigation exists in the United States. Death investigation in the United States falls under the authority of state and local officials.

Legal structures governing death investigation vary considerably among the 50 states, the District of Columbia, and the territories. Depending on the jurisdiction, the official responsible for determining the cause and manner of death may be a coroner or medical examiner. Most firefighter deaths are investigated as unusual or unforeseen deaths according to state laws and regulations, and a high level of discretion is afforded to coroners and medical examiners in the manner of fulfilling their duties and responsibilities. Only one state, Maryland, specifically requires a medicolegal investigation of all firefighter deaths. Other states, such as New Jersey, have designated the Division of Fire Safety as the lead agency for investigating fire service accidents, but have established no autopsy requirements.

Two publications attempt to organize and describe medicolegal autopsy requirements in the United States:


Notwithstanding the differences among the various systems, all death investigation systems are intended to respond to questions of who died, how and why a death occurred, and (as applicable) who is responsible for the occurrence. This information in turn may be used in legal proceedings, to compile vital statistics, to evaluate medical care and treatment, and to compile factual information on clinical, anatomical, pathological, physiological, and epidemiological subjects for research purposes.

**When Is an Autopsy Required?**

An autopsy is not performed as a part of every death investigation. In most cases, the determination of the need to perform an autopsy is a discretionary responsibility of
the coroner or medical examiner. The issuance of a death certificate does not require an autopsy and only a death certificate is needed to qualify for most insurance and death benefit programs. The coroner or medical examiner may determine that no autopsy is required in any situation where there is sufficient other evidence to make conclusive determinations on the cause and manner of death. Frequently, no autopsy is conducted when a firefighter death is believed to have been caused by natural causes, such as cardiac ischemia, even when it occurs on the scene of or responding to a fire or emergency incident (see Goode, 1990).

Many coroners and medical examiners have had to limit the number of autopsies performed because of cost and time constraints. Fiscal pressures have increased as the number of death investigation cases has increased, particularly those involving violent deaths. The cases in which an autopsy is most likely to be omitted include those where there is a known and undisputed cause of death without suspicion of criminal activity; line-of-duty deaths often fall within these parameters. Autopsies are sometimes omitted because of the religious or personal preferences of the deceased and his or her family.

The failure to conduct autopsies appears to be of significant concern throughout the medicolegal community. Performing autopsies, even in cases of prolonged illness or involving individuals with prior medical histories, would be valuable in conclusively determining the cause of death, gaining a more detailed understanding of injury and disease processes, and evaluating the quality of medical care. According to some in the death investigation profession, a decline in the level of interest in pathology and forensic pathology among medical students has led to a shortage of trained professionals to conduct these procedures.

Autopsies are usually performed to establish or verify the cause of death, or to gather information or evidence that would be helpful in an investigation. Without an autopsy, specific causes, contributing factors, and underlying conditions may go undiscovered and unreported. In the case of firefighter fatalities, this lack of information may significantly hamper our understanding of the hazards of firefighting and limit the ability to develop more effective ways to prevent firefighter deaths and injuries.

* * *

-5-
III. OCCUPATIONAL ASPECTS OF FIREFIGHTING OF SPECIFIC
CONCERN TO AUTOPSY

Firefighter fatalities often result from complicated scenarios. Due to the nature of the occupation, a firefighter’s death could be caused by a wide variety of single factors or a combination of several factors. For example, a firefighter could die from a stress-induced heart attack caused by simple over-exertion; or a firefighter could die from asphyxiation which is actually caused by the failure of his or her breathing apparatus; or a firefighter could die from hypothermia, resulting from being trapped in a structural collapse while fighting a fire on an extremely cold day. A firefighter’s death could be caused by the inhalation of toxic products of combustion, burns, traumatic injury, exposure to hazardous materials, radiation, a variety of other singular causes, or a combination of factors.

A better understanding of the actual causes of firefighter deaths, including all of the causal factors, will require a thorough examination of the protective clothing and equipment that are involved in the incident, a detailed analysis of the situation, and the details that can only be obtained through an autopsy, such as carboxyhemoglobin levels and the presence of toxic products in the respiratory and circulatory systems.

Firefighter Death Classification

The joint USFA/NFPA annual analysis of firefighter line-of-duty deaths uses nine categories to describe the mechanism of injury, which are defined in NFPA 901, Uniform Coding for Fire Protection. Statistics are compiled according to the cause of death as listed on the death certificate for each case. Additional information may be provided to further define the cause, when incident reports and witness accounts are available. The nine causal categories reported in the USFA/NFPA system are:

- Fell/slipped
- Struck by
- Overexertion/Strain
- Fire Department Apparatus Accident
- Caught/Trapped
- Contact with/Exposure to
- Exiting or Escaping/Jumped
- Assaulted
- Other

While cardiac arrest and other stress-related fatalities are the leading cause of fireground deaths, this classification system does not differentiate the causes of cardiac- and stress-related cases; all are classified as “Overexertion/Strain.” Although firefighting is widely recognized as a highly stressful occupation, the physiological and psychological effects of job-related stress have not been clearly established or differentiated, particularly as they affect mortality and morbidity.
The annual USFA/NFPA report also describes firefighter fatalities according to the nature of the death (i.e., the medical cause death), using the following fifteen categories:

- Cardiac arrest
- Internal trauma
- Asphyxiation
- Crushing
- Burns
- Drowning
- Stroke
- Electrocution
- Hemorrhage
- Gunshot
- Aneurysm
- Fracture
- Heat stroke
- Pneumonia
- Other

It should be noted that the USFA/NFPA categories do not correspond with International Classification of Disease (ICD-9) or SNOMED (Standardized Nomenclature of Medicine) cause categories.

**Trends in Line-of-Duty Deaths**

The overall downward trend in line-of-duty deaths has been primarily driven by the downward trend in deaths during fireground operations or while at the fire scene. Fireground deaths account for more than half (963) of all firefighter duty deaths over the last 15 years. Training deaths increased significantly from an average of 5.2 deaths per year during the first 9 years to 11.5 deaths per year during the last 6 years of the period. Responding to and returning from alarms accounted for 26.3 percent of the deaths over the 15-year period.

Heart attacks lead all categories of line-of-duty deaths. Between 1977 and 1991, 45 percent of all firefighter deaths resulted from cardiac disorders, most from myocardial infarction. The proportion of deaths resulting from heart attacks has varied from 33.6 percent to 53.9 percent over the 15-year period.

Fahy (1993) reported that an NFPA study of fatal firefighter heart attacks conducted for the United States Fire Administration determined that about 40 percent of the firefighters who died on duty from heart attacks between 1981 and 1990 (and for whom medical documentation was available) had prior histories of cardiac ischemia, myocardial infarction, or coronary artery bypass surgery. An additional 39 percent had prior histories of acute atherosclerosis (defined as more than 50 percent occlusion); most of these cases involved occlusions greater than 70 percent. Any of these conditions could have represented sufficient cause for disqualification from continued firefighting duty under the provisions of NFPA 1582, *Medical Requirements for Firefighters*, which was adopted in 1992.

The adoption of health maintenance and physical fitness requirements for firefighters is a controversial subject and the requirements of NFPA 1582 have not been widely adopted. This subject is further complicated by the provisions of the Americans
with Disabilities Act (ADA), which may restrict the ability of fire departments to limit the duties of high risk individuals.

**Investigation of Line-of-Duty Deaths**

Fire suppression and emergency operations are inherently dangerous; however, the data on firefighter line-of-duty deaths presented by the statistics in this document suggest that a significant proportion of firefighter deaths, particularly those on the fireground, are preventable. The International Association of Fire Chiefs (IAFC) has developed the *Guide for Investigation of a Line-of-Duty Death*, which provides a systematic approach to the overall investigation of fireground fatalities. The IAFC guide notes that an autopsy should be requested for every line-of-duty death and the results of the autopsy should be included in the report of the investigation.

There has been a significant decline in the number of firefighter deaths during fireground operations, particularly from exposure to combustion products, which appears to be related to the increased use of better protective equipment. Firefighter deaths due to cardiac ailments remain a significant concern, as do traumatic injuries from vehicle accidents and training accidents.

Evaluating the thermal performance of various types of firefighter protective clothing is an example of an area where considerable insight can be gained through accurate anatomical descriptions obtained from an autopsy. Toxicological studies can help investigators better understand the effectiveness of SCBA use and operating procedures on preventing fireground exposures to hazardous atmospheres. Evaluations of body fat, muscle development, and special coronary studies can help develop a database on the relative fitness of firefighters. These types of studies will help reinforce lessons which should help the fire service improve fireground operating procedures, protective equipment, training, and physical fitness. They can also help support the development and use of criteria for regular medical evaluations for firefighters.

If the number of line-of-duty deaths continues to decline it will become more difficult to evaluate improvements in firefighter safety through the mortality statistics. This will place increased emphasis on the need for a detailed investigation and documentation of each and every line-of-duty death. It is a matter of compelling public interest that information about the cause and manner of all firefighter line-of-duty deaths should be thoroughly and systematically collected. The autopsy results should be an important part of the record in each case.

**Fire Toxicology**

A complete understanding of the cause of a firefighter’s death must include some consideration of toxicological agents that may have been involved and how they may have interacted with the deceased’s biological processes and systems to cause death. For
instance, did the inhalation of carbon monoxide result in cardiac ischemia and
subsequent cardiac arrest? Did a toxin enter the body through some route other than
the respiratory system? Did protective clothing or self-contained breathing apparatus
(SCBA) fail to protect the user, or was the user’s air supply depleted? These conditions
are often accompanied by other injuries which may or may not themselves have caused
death, such as crushing forces or prolonged exposure to high radiant heat levels.

Toxicology reports in most autopsies document the positive and negative findings
of a series of tests conducted to detect specific substances which may have caused death.
Such tests commonly include tests for the presence of pharmacological agents and illegal
drugs. In the case of fire victims, the toxicology report should include blood, urine, other
body fluids, and tissue analyses for the presence of combustion products and other
toxicants (and their biomarkers), as well as alcohol and drugs.

The most common products of combustion are carbon monoxide and either soot
or ash, however, acrolein, cyanide, formaldehyde, hydrogen chloride, phenol, phosgene,
polyaromatic hydrocarbons (PAHs), nitrogen oxides, sulfur oxides, water vapor, and
carbon dioxide may also be present. Blood tests for the presence of ethyl alcohol are
typically conducted to determine whether the deceased was under the influence of an
intoxicating beverage at the time of death. Urinalysis should include tests for the
presence of common narcotics, barbiturates, amphetamines, hallucinogens, or
cannabinoids. Tests for other prescription and non-prescription drugs are occasionally
performed to detect such compounds as common steroids, analgesics, and other
indicators of co-existing illnesses/conditions, as well as of drugs used in emergency
resuscitation attempts.

Personal Protective Equipment

Detailed knowledge of the manner of death requires, among other things, an
evaluation of the performance of the firefighter’s personal protective equipment, which
includes protective clothing and breathing apparatus. There is voluminous anecdotal
evidence that failure to use proper protective equipment has been responsible for many
of firefighter injuries, illnesses, and deaths.

The use of self-contained breathing apparatus (SCBA) has significantly reduced
the number of firefighter injuries and deaths that are attributable to smoke inhalation.
While thermal and respiratory injuries remain a concern in cases of firefighter autopsies,
the widespread use of SCBA has introduced new considerations into the evaluation of
these injuries. For example, knowing that a firefighter’s death was the result of
inhalation of combustion products, when the firefighter was using an SCBA, would
indicate the need to fully evaluate the performance of the SCBA.
Experts may need to be consulted to determine how a firefighter’s protective clothing and equipment performed or failed to perform. The National Institute of Occupational Safety and Health and several independent consultants are available to assist in the evaluation of personal protective equipment.

Non-Line-of-Duty Deaths

Because of their repetitive exposure to toxic environments and carcinogens, many firefighters are concerned that they are at a higher risk to die prematurely, particularly as their longevity on the job increases. The causes of firefighter deaths that occur off-duty (or non-line-of-duty) can sometimes be attributed to one exposure or to a series of exposures to toxins. There have been some major, well documented exposures of firefighters to certain known carcinogens. It has been suggested, for instance, that fires in occupancies manufacturing or storing chemicals in Elizabeth, New Jersey and Fort Lauderdale, Florida are responsible for increased incidence of cancer among the firefighters who fought these blazes.

In recent years, as many as 29 cases of cancer, including 19 cancer deaths, have occurred among the approximately 100 firefighters who fought a fire in 1968 at the Everglades Fertilizer Plant in Fort Lauderdale, Florida. All but one of these cases was diagnosed after the firefighter had retired or resigned from the fire department. This case has prompted the National Institutes of Occupational Safety and Health (NIOSH) to initiate an epidemiological study of firefighters involved in the Everglades fire.

It can be very difficult to directly attribute a non-line-of-duty death to a line-of-duty exposure, especially if the exposure occurred years before the death. Comprehensive autopsies of firefighters whose death may have been caused by a line-of-duty exposure could help establish a better understanding of the relationship between exposures and premature deaths, however this will require much better data be obtained and maintained than is currently the norm.

Many fire departments have mandated physical requirements and medical examinations for firefighters. Regular medical exams and physical testing can track a firefighter’s physical and medical status from hire to retirement, and can serve as a baseline against which to compare, especially after an incident or series of incidents where a firefighter may be concerned that an exposure has jeopardized his or her health. Records of exposures to particular toxins should be kept by the fire department along with the medical records. Such documentation would be valuable in determining whether an exposure led to medical problems, or whether a non-line-of-duty death is related to firefighting or other emergency or occupational activities.
The firefighter autopsy protocol is primarily intended to be applicable to line-of-duty deaths, however it would also be appropriate for non-line-of-duty deaths where an occupational factor is suspected to be involved in the cause of death. For most firefighter deaths which are not duty-related or which involve former firefighters, existing clinical autopsy procedures consistent with the individual’s medical history should be appropriate. The USFA firefighter autopsy protocol has been designed to uncover pertinent forensic information consistent with the distinct occupational aspects of firefighting.

**Firefighter Health**

Several studies have looked at the frequency of premature death rates among active and retired firefighters. Rubin (1992) has described the relationships between the hazards of fire suppression and the risk of premature death from heart disease or cancer as “Firefighter’s Disease.” He notes that relatively little research has been conducted on firefighter mortality and morbidity or the medical treatment of firefighters.

Rubin proposes that a concern for firefighter health should begin with prevention. He suggests that diet, lack of exercise, and lifestyle may be as responsible for premature firefighter deaths as any job-related exposure. The relationships of lifestyle, exercise, and diet with firefighter mortality appear to be more than just conjecture. Epidemiological studies have demonstrated that firefighters are much less likely than the general population to die from natural causes at a given age, early in their careers, because they must be healthier than the average person to pass the rigorous health and fitness standards in order to be hired or approved for volunteer duty. The death rate for firefighters catches up with the rest of the population by their retirement age, which suggests that the so-called “healthy worker effect” diminishes with time, especially if the individuals do not take care of themselves. This takes into account the factor that firefighters tend to retire at a younger age than the general population.

★ ★ ★
IV. PUBLIC SAFETY OFFICER BENEFITS PROGRAM

The Bureau of Justice Assistance of the U.S. Department of Justice, administers the Public Safety Officer Benefits (PSOB) program, which was established by Congress to provide death benefits to family members of “public safety officers found to have died as the direct and proximate result of a personal injury sustained in the line of duty.” (28 CFR 32.1).

Evaluation Criteria

Title 28, Part 32 of the Code of Federal Regulations outlines the eligibility criteria for receiving benefits under this program. Claimants are required to demonstrate that the injury resulting in the death of the public safety officer was the direct result of activities performed in the line of duty. Several claims have been filed in cases where the death resulted from disease or chronic health conditions that were not clearly related to a specific on-duty event. Many of the claims involving deaths resulting from chronic health conditions, such as coronary artery disease, hypertension, and cancer, have been denied because causality could not be clearly and convincingly demonstrated.

Several states have adopted statutes or regulations that establish a presumption in the case of firefighters, that any cardiac or pulmonary disease is occupationally related. Most of these presumptive regulations were adopted in an era when firefighters were routinely exposed to products of combustion without respiratory protection. Some states have more recently extended this presumption to cover cancer as well.

To determine when cardiac deaths could be considered duty-related under the PSOB regulations, an expert panel was convened by the Law Enforcement Assistance Administration, in April 1978 to consider the relative contributions of carbon monoxide and heart disease in firefighter deaths. As a result of this meeting, a standard was established for evaluating claims involving heart attacks, based on evidence that carbon monoxide can increase the susceptibility of an individual to a sudden myocardial infarction. This standard requires that in order to be considered eligible for PSOB compensation, non-smoking firefighters must have a blood carboxyhemoglobin (COHb) level above 10 percent by volume and that firefighters who smoke must have COHb levels above 15 percent by volume. Even if these criteria are met, benefits can still be denied if the medical examiner or coroner performing the autopsy and the pathologist reviewing the case for PSOB determine that carbon monoxide inhalation was not a significant factor in the death or the COHb level found was not a direct causal factor as defined in the PSOB regulations.

In addition to the requirement to demonstrate that the personal injury was incurred in the line of duty, PSOB awards are contingent upon a finding that the death was not caused by intentional misconduct, grossly negligent conduct, or intoxication of
the deceased. The Department of Justice has never denied a PSOB claim on the basis of intentional misconduct or gross negligence on the part of the deceased, and denials for intoxication have been rare.

**Program History**

Between 1976 and 1992, 1,428 firefighter claims were reported to the PSOB office. During this period, 855 cases were approved and 603 were denied. (The additional cases include 30 carried over from previous years.) The majority of the cases denied involved coronary artery or related cardiovascular diseases without supporting evidence of elevated COHb levels.

The PSOB regulations do not require that an autopsy be performed to document the cause of death. Only a death certificate must be provided to establish death and indicate the proximate cause; however, cases can be delayed or complicated by failure to provide toxicological evidence to support the cause of death or rule that intoxication is not involved. According to PSOB officials, autopsy reports were submitted in approximately half of the cases processed; however, the overwhelming majority of those for which claims were denied involved cases where no autopsy was performed. PSOB officials point out that of the claims denied, the majority involved cardiac deaths which were unlikely to qualify, even if autopsies had been performed.

**Issues and Concerns**

Due to the substantial number of firefighter line-of-duty deaths caused by heart attacks, firefighters have expressed considerable interest in the standards used to evaluate these cases. Although it is generally accepted that carbon monoxide exposure can cause cardiac ischemia and subsequent death, considerable disagreement exists regarding the assumption that exposure to combustion products should be the sole determinant to qualify individual heart attack cases as job-related. Many individuals and organizations in the fire service contend that several job-related factors conspire to increase a firefighter's risk of acquiring heart disease.

Similar arguments surround the question of chronic conditions such as cancer. Department of Justice officials indicate that only two claims have been paid in the last 15 years for cancer deaths. Both of these cases involved police officers who died of testicular cancer and in each case there was substantial evidence that the cancer resulted from a single job-related exposure. While it has been established that firefighters routinely operate in environments filled with toxic and carcinogenic compounds, no firefighter cancer death claims have been approved under the PSOB regulations.
Bibliography


APPENDIX 1

Firefighter Personal Protective Equipment
Typical Self-Contained Breathing Apparatus (SCBA)

Typical Boots
Typical Protective Clothing Ensemble
(Full Ensemble Includes SCBA)

Typical Helmet
FIREFIGHTER AUTOPSY PROTOCOL

October 1994
PROTOCOL DISCUSSION

I. Preliminary

A. Circumstances of Death

1. Line-of-Duty
   a. Fire suppression activity
   b. Other official activity

2. Non-Line-of-Duty
   a. Active firefighter activity
   b. Non-Line-of-Duty

B. Medical Records Review

1. Fire department injury/exposure records
   a. Fire department injury/exposure records
   b. Over-the-counter
   c. Administered by paramedics

2. Current medical conditions/medications
   a. Prescribed
   b. Administered by paramedics
   c. Administered by paramedics

C. Complete Work History

1. Length of fire combat duty
2. Other jobs held during fire service
3. Other jobs held after fire service
4. Non-Line-of-Duty

D. Scene Investigation

E. Scene Photography

F. Jurisdiction/Authority to Conduct Autopsy
II. Initial Examination

A. Identification of Victim

B. Document Condition of Personal Protective Equipment (PPE)
   1. Refer to PPE Identification Diagrams on page 6 for standardized nomenclature. PPE description should include:
      a. Turnout coat
      b. Turnout pants
      c. Helmet
      d. Gloves
      e. Boots
      f. Self-Contained Breathing Apparatus
      g. Personal Alert Safety System (PASS)
      h. Protective hood
      i. Clothing worn under turnouts
   2. Use photographs to enhance documentation.

C. Maintenance of Custody of Equipment

Exercise caution when handling contaminated personal protective equipment (PPE), especially from hazardous materials incidents, as residue may be harmful to those involved in the autopsy.

PPE should be sealed in a metal can/drum if fire accelerants or other volatile/toxic chemicals are suspected to be present; otherwise PPE should be air-dried and preserved for examination. Preservation of the original state of PPE, including clothing, is essential. PPE should be considered as evidence, and handled accordingly. The Death Investigation Team should perform or assist in the evaluation/documentation of PPE condition and performance. Documentation of the chain of custody of the PPE is required, especially as it may be examined by a number of individuals. Upon completion of any examination, PPE should be secured in an evidence storage area. (International Association of Fire Chiefs. 1993. Guide for Investigation of a Line-of-Duty Death. Fairfax, VA: pp. 14, 19).

Observations and photos recorded at the scene should indicate whether the deceased was found wearing self-contained breathing apparatus (SCBA) and/or other PPE. If SCBA and personal alert safety system (PASS) are user-controlled, were they properly activated or working at the time of discovery of the deceased? A swab from the inside of the SCBA facepiece may help in determining operability.

A qualified specialist should inspect the PPE and note any damage. The National Institute for Occupational Safety and Health (NIOSH) can assist in the determination of any contribution of the deceased’s SCBA to the death. PPE manufacturers may be able to assist in evaluating damage, but PPE should not be returned to the manufacturer for examination (because of concerns about product liability). Breathing apparatus filter cartridges, if any, should be retained.
Firefighters are trained to provide emergency medical care for fire casualties. Of particular importance is that resuscitative efforts for fellow firefighters are likely to be heroic and prolonged. This fact should be taken into account when examining the body for evidence of medical intervention and interpreting the results of blood gas assay.

A. Document Condition of Body
B. Photograph
C. Radiograph
D. Collect Evidence from External Surfaces
   1. Swabs of nasal/oral soot or other substances
   2. Hair
      - Hair samples should be about the thickness of a finger, pulled out so as to include the roots, tied around the middle, with the proximal and distal ends marked, and stored in a plastic evidence bag.
   3. Injection Sites

E. Collect Vitreous Fluid
   - Vitreous fluid should be taken from both eyes. Vitreous fluid can be used to corroborate blood alcohol levels.

F. Document Burns
   1. Location
   2. Degree
   3. Etiology
   4. Percentage of body surface area (BSA)

G. Biopsy Skin Lesions
IV. Internal Examination

A. Document Evidence of Injury

B. Document Evidence of Medical Treatment

C. Describe Internal Organ System

D. Collect Samples for Toxicologic Analysis
   1. Blood (2 x 2Occ red- and grey-top tubes)
   2. Urine (20 to 30Occ) and/or trimmed bladder
   3. Bile (all available) or Gallbladder (if bile unavailable)
   4. Cerebrospinal Fluid (up to approx. 30 ml)
   5. Soot swabs from airway
      a. Tracheal
      b. Bronchial
   6. Representative sampling of gastric and duodenal contents (50g; note total amount)
   7. Take and retain fresh-frozen samples
      a. Lung 100g
      b. Kidney 100g
      c. Liver 100g
      d. Spleen 100g
      e. Skeletal muscle (Psoas or Thigh) 20g
      f. Subcutaneous fat 20g
      g. Section of bone with marrow (3-4 cm)
      h. Brain 100g
   8. Additional specific samples to be taken:
      a. Tied-off lower lobe of right lung (store in arson debris paint can)
      b. Peripheral blood from leg vein (fluoridated and red-top tubes)
      c. Any specimens taken in field or during hospital resuscitation
      d. Sample hematomas
      e. Any other sites should be labelled

Soot swabs should be obtained from the upper and lower airways as well as from the inside of the SCBA facepiece. These will assist in the determination of SCBA usage and operability.

Note any unusual odors/colors of anything found during the internal examination.

Fresh-frozen samples of vital organs should be taken and retained a minimum of 90 days, preferably longer as storage space permits.

An area of growing interest is the cancer rate of firefighters. Potentially cancerous tissue should be biopsied and saved. Additionally, histological type and the exact location of the tumor (if site-specific) within an organ should be documented in detail.

In the case of incinerated remains, bone marrow or spleen may be the only source of tissue for toxicological studies, especially for those establishing carbon monoxide levels.

Gastric and duodenal contents should be representative. Solid dosage forms should be removed, counted, and analyzed.

When taking lung samples, use the right lung because aspirated foreign materials have a greater propensity to lodge in the right lung.
## V. Toxicological Examination

The toxicologic analysis performed for firefighters should be of a higher order than that performed for civilian fire casualties. In addition to ascertaining blood levels of various toxic products that are commonly found in a fire environment, it is beneficial to know about the presence of any judgment-impairing substances. This may be important in the determination of eligibility for death benefits as well as for determining cause and manner of death. Additionally, knowledge of the presence of Hydrocyanic Acid in the tissues of the deceased may yield important clues about the cause, manner, and mechanism of firefighter death.

### A. Urine Screen/Analysis

- Volatile compounds (e.g., Benzene, Hydrocarbons, Ethanol)
- Psychoactive substances (e.g., Opiate derivatives, Marijuana metabolites, Cocaine metabolites, Stimulants, Phencyclidine)

Determination of specific levels of metals, organic compounds, and gross particulate matter should be conducted because firefighter exposure to these substances is believed to be greater than that for civilians. Additionally, this information may yield important clues about the cause, manner, and mechanism of death.

### B. Blood Analysis

1. Carboxyhemoglobin, Methemoglobin, Sulfhemoglobin
2. Volatile compounds (see A.l. above)
3. Other (e.g., Hydrocyanic Acid, Fluoride)

Use caution when noting the presence of Hydrocyanic Acid as it can be produced by bacterial decomposition within the tissues of the deceased.

Use vitreous fluids or bile to confirm presence of ethanol in either blood or urine.

### C. Subcutaneous Fat Analysis

- Organic compounds, including:
  - Herbicides
  - Pesticides

- Polychlorinated Biphenyls (PCBs)

Check for the presence of PCBs in the subcutaneous fat as this will help in the determination of a history of exposure.

2. PCBs
3. Hydrocarbons
4. Pesticides
5. Hericides
6. Chlorinated Acids
7. Fluorides
8. Aldehydes
9. Hydrocyanic Acid
10. Acrolein
11. Acrylonitrile
12. Vinyl Chloride

### D. Soot Screen (from swabs)

- Metals, including:
  - Arsenic
  - Antimony
  - Lead

- Organics, including:
  - Pesticides
  - Herbicides
  - Vinyl Chloride
  - Acrylonitrile
  - Acrolein

- Particulate analysis

The toxicologic analysis performed for firefighters should be of a higher order than that performed for civilian fire casualties.
### VI. Microscopic Examination

**A. Findings of Microscopic Examination**

Representative samples of all organs and body systems should be collected. The sections should be microscopically examined for malignant neoplasms and other abnormalities, including suggestive premalignant changes.

### VII. Summary of Pathological Findings

**A. Medical Facts**

1. **Correlation**

State objective findings related to gross and microscopic examinations. Correlate physical circumstances, toxicological analyses, and other investigative studies to pathological findings.

### VIII. Conclusions

**A. Discrepancies**

1. Inconsistent observations
2. Differences between death certificate and subsequent findings

**B. Conclusions**

1. List diagnoses on a separate page
2. Cause and manner of death

Include determination of **cause and manner** of death. Describe discrepancies between evidence collected or observations of eyewitnesses and the autopsy findings.

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**Sample Firefighter Personal Protective Equipment (PPE) Identification Diagrams**

(actual PPE styles vary depending on manufacturer)

- **Protective Clothing Ensemble**
  (Full PPE Includes SCBA)

- **Helmet**
- **Boots**
- **Self-Contained Breathing Apparatus**

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Appendix F

Sample SCBA Evaluation Request Letter
Sample SCBA Evaluation Request

Respiratory Problem Coordinator  
Certification and Quality Assurance Branch  
National Institute for Occupational Safety and Health  
1095 Willowdale Road  
Morgantown, WV  26505

Dear Sir:

On (date), a fire fighter for the ____________ Fire Department died in the line of duty. We request that the National Institute for Occupational Safety and Health (NIOSH) inspect and test the self-contained breathing apparatus being worn by the fire fighter to determine its conformance to NIOSH approval requirements.

The SCBA is (model description) (e.g., Scott Air-Pak Model 4.5, 4500 psi, NIOSH approval TC-13F-76). The unit was put into service by the ____________ Fire Department on (date). Copies of available maintenance records showing inspections, upgrades, and overhauls to the SCBA, as well as the last performance test results, are enclosed for your reference.

The following information is also provided to assist you in your evaluation of the SCBA.

____________________________________________________________________________________________________________________________________________________________________________

Provide as much pertinent information as possible about the use of the SCBA at the time of the incident. For example, any problems with the mask indicated by the last radio contact with the fire fighter, previously noted leaks in the breathing tube, and other relevant information.

____________________________________________________________________________________________________________________________________________________________________________

Following your evaluation, the SCBA and written report should be sent to:

__________________________________________
__________________________________________
__________________________________________
__________________________________________

I may be contacted at (____) ____ - ________ for further information. Thank you for your assistance in this matter.

Sincerely,

__________________________________________

cc: IAFF Department of Occupational Health and Safety  
1750 New York Avenue, NW  
Washington, DC  20006
Appendix G

Self-Contained Breathing Apparatus and Personal Protective Equipment Inspection Forms
Self Contained Breathing Apparatus Inspection Form

This form should be completed for all fire fighters seriously injured or killed in the line of duty. Investigators must also ensure that:

- All protective clothing and equipment is photographed to further document its condition.
- All protective clothing and equipment is stored to maintain its present condition.
- Strict chain of custody is maintained for all protective clothing and equipment.

Inspector: ___________________________________________ Date: __________________________

Incident description (include fire fighter’s name and incident location and date): __________________________
__________________________________________________________________________________________
__________________________________________________________________________________________
__________________________________________________________________________________________
__________________________________________________________________________________________

SCBA manufacturer & model #: _________________________________________________________________
NIOSH approval #: (ex. TC-13F-138) __________________________________________________________

1. Was the fire fighter wearing his SCBA?       Yes       No
2. If not, where was the SCBA found in relation to the fire fighter? ____________________________
__________________________________________________________________________________________

3. Was the face piece intact and did it appear to be serviceable?       Yes       No
4. Face piece serial #: _______________________ Manufacturer date: ______________________________
5. Describe the condition of the face piece: ____________________________
__________________________________________________________________________________________
__________________________________________________________________________________________
__________________________________________________________________________________________
__________________________________________________________________________________________

6. Describe the condition of all hoses and tubes: ____________________________
__________________________________________________________________________________________
__________________________________________________________________________________________
__________________________________________________________________________________________
__________________________________________________________________________________________

7. Regulator serial number: ______________________________________________
Mainline valve position: _______________ Bypass valve position: ____________________________
Describe the condition of the regulator: ____________________________
__________________________________________________________________________________________
__________________________________________________________________________________________
__________________________________________________________________________________________
8. Cylinder manufacturer: __________________  Manufacture date: _________________________________
   D.O.T. approval #: __________________  Cylinder pressure capacity: _____________________________
   Describe the condition of the cylinder: ______________________________________________________
   _____________________________________________________________________________________
   _____________________________________________________________________________________
   _____________________________________________________________________________________
   _____________________________________________________________________________________


10. Was the low air alarm functioning?       Yes       No

11. Describe the condition of the back frame: ______________________________________________________
    _____________________________________________________________________________________
    _____________________________________________________________________________________
    _____________________________________________________________________________________
    _____________________________________________________________________________________

12. Describe the condition of the harness assembly:  ________________________________________________
    _____________________________________________________________________________________
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Additional notes:
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Inspector’s Signature: ____________________________________________  Date: ___________________________
Personal Protective Equipment Inspection Form

This form should be completed for all fire fighters seriously injured or killed in the line of duty. Investigators must also ensure that:

- All protective clothing and equipment is photographed to further document its condition.
- All protective clothing and equipment is stored to maintain its present condition.
- Strict chain of custody is maintained for all protective clothing and equipment.

Inspector: ____________________________________________ Date: __________________________

Incident description (include fire fighter’s name and incident location and date): ______________________
_________________________________________________________________________________________
_________________________________________________________________________________________
_________________________________________________________________________________________
_________________________________________________________________________________________

Personal Alert Safety System (PASS)

PASS manufacturer & model #: ________________________________________________________________

1. Was the fire fighter wearing a PASS device?       Yes       No
2. Was the device in the “On” position?       Yes       No
3. Was the device functioning when the fire fighter was found?       Yes       No
4. Was the battery in good condition and sufficiently charged?       Yes       No
5. Describe the condition of the PASS device: ________________________________________________
_________________________________________________________________________________________
_________________________________________________________________________________________
_________________________________________________________________________________________

6. Was the fire fighter carrying a radio?       Yes       No
7. If yes, describe the condition of the radio: ________________________________________________
_________________________________________________________________________________________
_________________________________________________________________________________________
_________________________________________________________________________________________

Protective Clothing

What protective clothing was the fire fighter wearing (circle all that apply)?

turnout coat    turnout pants    helmet    hood    gloves    boots    faceshield
1. Was all protective clothing donned properly?       Yes       No
   If no, explain: ______________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________
2. Describe the condition of the helmet: ______________________________________________________
   ______________________________________________________
   ______________________________________________________
   ______________________________________________________
   ______________________________________________________
   ______________________________________________________
   ______________________________________________________

3. Describe the condition of the hood: ______________________________________________________
   ______________________________________________________
   ______________________________________________________
   ______________________________________________________
   ______________________________________________________
   ______________________________________________________

4. Describe the condition of the turnout coat and pants: ______________________________________
   ______________________________________________________
   ______________________________________________________
   ______________________________________________________
   ______________________________________________________
   ______________________________________________________
   ______________________________________________________
   ______________________________________________________
   ______________________________________________________
   ______________________________________________________

5. Describe the condition of the gloves: _____________________________________________________
   ______________________________________________________
   ______________________________________________________
   ______________________________________________________
   ______________________________________________________
   ______________________________________________________

6. Describe the condition of the footwear: ___________________________________________________
   ______________________________________________________
   ______________________________________________________
   ______________________________________________________
   ______________________________________________________

7. Describe the condition of the station uniform: ____________________________________________
   ______________________________________________________
   ______________________________________________________
   ______________________________________________________
   ______________________________________________________
   ______________________________________________________

Inspector’s Signature: ____________________________________________  Date: _____________