

Health and Safety Officer

HSO-Student Manual

3rd Edition, 1st Printing-August 2009



FEMA

**FEMA/USFEMA/NFA
HSO-SM
August 2009
3rd Edition, 1st Printing**

Health and Safety Officer



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FEMA

U.S. DEPARTMENT OF HOMELAND SECURITY

UNITED STATES FIRE ADMINISTRATION

NATIONAL FIRE ACADEMY

FOREWORD

The U.S. Fire Administration (USFA), an important component of the Department of Homeland Security (DHS), serves the leadership of this Nation as the DHS's fire protection and emergency response expert. The USFA is located at the National Emergency Training Center (NETC) in Emmitsburg, Maryland, and includes the National Fire Academy (NFA), National Fire Data Center (NFDC), National Fire Programs (NFP), and the National Preparedness Network (PREPnet). The USFA also provides oversight and management of the Noble Training Center in Anniston, Alabama. The mission of the USFA is to save lives and reduce economic losses due to fire and related emergencies through training, research, data collection and analysis, public education, and coordination with other Federal agencies and fire protection and emergency service personnel.

The USFA's National Fire Academy offers a diverse course delivery system, combining resident courses, off-campus deliveries in cooperation with State training organizations, weekend instruction, and online courses. The USFA maintains a blended learning approach to its course selections and course development. Resident courses are delivered at both the Emmitsburg campus and the Noble facility. Off-campus courses are delivered in cooperation with State and local fire training organizations to ensure this Nation's firefighters are prepared for the hazards they face.

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COURSE SCHEDULE

- Unit 1: Introduction
- Unit 2: Principles of Risk Management
- Unit 3: The Duties and Responsibilities of the Health and Safety Officer
- Unit 4: Health Maintenance
- Unit 5: Safety Areas of Concern
- Unit 6: Systems-Based Change: Using Facts and Measurements
- Unit 7: Closing and Course Summary

UNIT 1: INTRODUCTION

COURSE GOAL

To provide fire and emergency medical services (EMS) department personnel with the knowledge and skills needed to perform the duties of the Health and Safety Officer (HSO).

OBJECTIVES

The students will:

- 1. Describe the history of the fire department's Safety Officer position.*
 - 2. Identify the role of the HSO position.*
 - 3. Describe the flow of the course.*
-

INTRODUCTION

Goal

The goal of this course is to provide fire department members and other emergency medical services (EMS) personnel with information on the knowledge and skills needed to effectively manage a fire department's Occupational Safety and Health Program. It is designed to prepare students to assist or become Health and Safety Officers (HSOs) within their organizations.

Scope

This course provides information on the following topics: risk management; laws, codes, and standards; health maintenance and wellness; and the Occupational Safety and Health Program. The HSO manages the safety, health, and wellness of all fire department members and leads in the organization's efforts to develop, maintain, improve, and implement a Risk Management Plan. This course provides information using instructor-led discussion, multimedia activities, and small group discussions to convey instructional points.

Audience

There are three primary audiences anticipated for this course:

1. Fire and EMS department officers who have been designated by the authority having jurisdiction (AHJ) as the department Safety Officer.
2. Fire and EMS department members who may be assigned the HSO position.
3. Members of a department's Occupational Safety and Health Committee.

HISTORY OF THE FIRE DEPARTMENT SAFETY OFFICER

Over the past 30 years, the fire service has seen the origin and development of the fire department Safety Officer position. As the fire service moves into the new millennium, there are ever-increasing needs and requirements for this position. Safety Officers now must manage an organization's pre-emergency risk management program and function as the manager or administrator of a fire department's occupational safety and health program.

The Occupational Safety and Health Administration (OSHA) was established by Congress in the early 1970s and delegated the authority to regulate and set standards for all industries. For some time, Industrial Fire Brigades have been addressed by enforceable regulations found at 29 Code of Federal Regulations (CFR) 1910.156, *Industrial Fire Brigades*. These regulations have been accepted by the National Fire Protection Association (NFPA) as applying to all fire departments and related firefighting organizations. The regulations are also accepted under many State laws

as similar efforts to regulate occupational safety and health within a State have been implemented. OSHA's regulations cover personal protective equipment (PPE), training, respiratory protection, and the use of firefighting equipment.

These regulations have expanded as we learn more about a number of areas including

- hazardous materials mitigation;
- infection control;
- confined space entry; and
- respiratory protection.

In 1977, the NFPA originally adopted NFPA 1521[®], *Standard for Fire Department Safety Officer*. For the first time, the fire service community recognized that a fire department needed a Safety Officer with commonly accepted organizational duties and a position of leadership. This standard provided the minimum requirements that a fire department would establish to manage the safety program.

NFPA 1521[®] provides the qualifications and functions for several roles that a fire department should address:

- Fire department Safety Officer.

The functions of the Safety Officer include the functions of both the HSO and the Incident Safety Officer (ISO) as explained below. These roles can be performed by one member, or several members, as designated by the fire chief.

- Health and Safety Officer.

The HSO is the member of the fire department assigned and authorized by the fire chief as the manager of the safety and health program and the person who performs the duties and responsibilities specified in NFPA 1521[®]. This individual can also assume the role of an ISO.

- Incident Safety Officer.

The ISO is an individual appointed by the Incident Commander (IC) to respond to an incident scene to perform the duties and responsibilities specified in NFPA 1521[®]. The ISO can be assigned at the incident. The individual appointed or assigned for this purpose may be the department's HSO.

ROLES FOR THE HEALTH AND SAFETY OFFICER

This course will deal primarily with the role of an HSO. This role is outlined in NFPA 1521[®], and with NFPA 1500[®], *Standard on Fire Department Occupational Safety and Health Program*.

Attitudes toward safety and health in the fire service have changed, and will continue to change. Occupational safety and health requirements continue to evolve as can be expected because of the investments being made in standard-setting efforts, in research about safety and occupational health, and on the qualifications of emergency responders. Federal and/or State laws now regulate components of the fire service occupational safety and health process which include

- Risk Management Plans;
- Occupational Safety and Health Program development;
- facility safety;
- training and education;
- PPE;
- respiratory protection;
- infection control; and
- health maintenance.

The Safety Officer's roles and responsibilities are complex. This individual is responsible for these areas and other job tasks required by the fire department. These other jobs include maintaining a liaison with the Training Officer, Infection Control Officer, and other department members. Other specific functions of the Safety Officer may include the development and design of new apparatus, control over the purchase of turnout gear and other PPE, and the incorporation of safety and health into the design of fire stations and facilities. Under the NFPA standards, the Safety Officer must have knowledge of issues such as risk management, building construction, accident prevention, emergency incident operations, and infection control procedures.

COURSE OVERVIEW

The following areas are covered in each unit.

Unit 1: Introduction

This is a 2-day course and students should read through the Student Manual (SM). The course is designed to prepare students to become an HSO.

Unit 2: Principles of Risk Management

The principles of risk management and the practical application of this process for daily activities, both emergency and nonemergency, are presented.

Unit 3: The Duties and Responsibilities of the Health and Safety Officer

The data on firefighter injuries and line-of-duty deaths (LODDs) indicate the need for Risk Management Plans and an Occupational Safety and Health Program. Information and data are used by the HSO to improve these plans and programs on a continuous basis. Short-term tools and the longer-term influences of these plans and the Occupational Safety and Health Program should lead to many benefits for the organization, to its communities, and to firefighters. This unit provides the student with information about how HSOs manage risk as they accomplish the duties and responsibilities of the position.

Unit 4: Health Maintenance

This unit examines the components of a health maintenance program, including medical monitoring, a comprehensive wellness program, a physical fitness program, and an infection control program. The HSO has allies within the department, which includes the department's designated physician(s). The HSO can draw upon the applicable standards to be successful.

Unit 5: Safety Areas of Concern

This unit examines current issues related to wildland fire; highway/traffic safety; incident-scene rehabilitation; incidents involving terrorism; the components of a protective clothing selection, care, and maintenance program; and a facility safety program. The more students know about operations and organizational safety, the more successful they can be in carrying out their responsibilities and communicating successfully across the organization.

Unit 6: Systems-Based Change: Using Facts and Measurements

Change in an organization often takes time. The HSO can use facts and lessons learned to continuously improve the Risk Management Plan and the Occupational Safety and Health Program. The process of investigation is an essential component of an occupational safety and health program. After-action reports and postincident analyses also provide information useful to a fire department as it examines its operations.

Unit 7: Closing and Course Summary

A review of the course and discussion of the goals and safety issues presented at the beginning of the course are presented in this unit. The examination and course evaluation will be administered by the instructor.

SUMMARY

The HSO is the manager of the fire or EMS department's Occupational Safety and Health Program. The HSO is a key actor in the department's use of a Risk Management Plan. This HSO course focuses specific attention on the NFPA standards that apply to this position. Appointed by the department chief, the HSO is responsible for ensuring that the department has a program that provides for the safety, health, and wellness of its members, and that is compliant with State, local, and Federal laws.

Unit Attachments

Emmitsburg Vigilant Hose Company

Driver/Operator Myers was working as a pump operator at the scene of a brush fire on the campus of Mount Saint Mary's College in Emmitsburg, MD. The brush fire was caused by the spread of an unattended fire being used to dispose of cleared brush and trees. Driver/Operator Myers had been working for about 45 minutes when he collapsed from a heart attack. He had not complained of any sickness prior to his attack. Emergency medical care was provided by members of his department, the local ambulance squad, and paramedics. Despite their efforts, Driver/Operator Myers was pronounced dead at a local hospital. Additional information about this incident can be found in National Institute of Occupational Safety and Health (NIOSH) Fire Fighter Fatality Investigation, online at (<http://www.cdc.gov/niosh/fire/reports/face9943.html>).

Philadelphia Fire Department

The Philadelphia Fire Department responded to a fire in the Rising Sun Baptist Church, located at 745 South 12th Street in South Philadelphia. The church was built in 1846. The five-alarm fire, which was ruled accidental, claimed the lives of two Philadelphia firefighters.

Pittsburgh Bureau of Fire

In February 1995, The Pittsburgh Bureau of Fire responded to a multistory residential structure fire. Three Pittsburgh firefighters died after a stairway collapsed, trapping them in the basement. Captain Thomas Brooks, Firefighter Patricia Conroy, and Firefighter Marc Kolenda died from asphyxiation when they ran out of air while operating a hoseline in the basement. Investigations by the City of Pittsburgh and others, after the fire, indicated that problems with Incident Command and accountability were key factors contributing to the firefighters' deaths. Other factors included a possible lack of crew integrity and a failure of the crew to take emergency survival actions that may have helped them escape. All of the deceased firefighters were wearing Personal Alert Safety System (PASS) devices that were found in the "off" position. The fire was ruled an arson fire.

STUDENT INFORMATION SHEET

NAME: _____

DEPARTMENT: _____

CITY (OR COUNTY), STATE: _____

POPULATION SERVED BY DEPARTMENT: _____

AREA SERVED BY DEPARTMENT (SQUARE MILES): _____

Total Department Size

FULL-TIME/CAREER PERSONNEL: _____

PART-TIME/RESERVE PERSONNEL: _____

VOLUNTEER PERSONNEL: _____

STATIONS: _____

Organization Delivery Profile

HAZARDOUS MATERIALS: YES NO

CONFINED SPACE/TECHNICAL RESCUE: YES NO

EMS Call Volume

ALS FIRST RESPONSE: _____

BLS FIRST RESPONSE: _____

ALS TRANSPORT: _____

BLS TRANSPORT: _____

What I hope to take away from this course:

Safety problems in the jurisdiction or community:

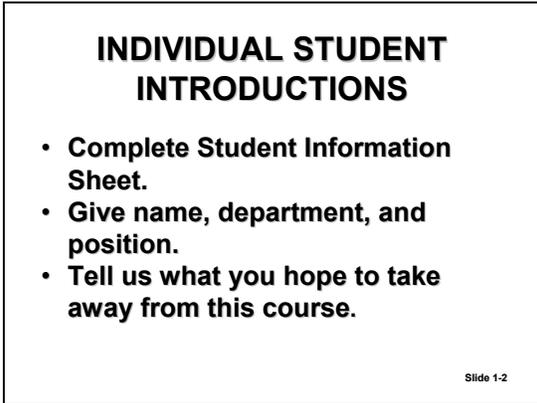
Safety problems in the department and why:

NOTE-TAKING GUIDE

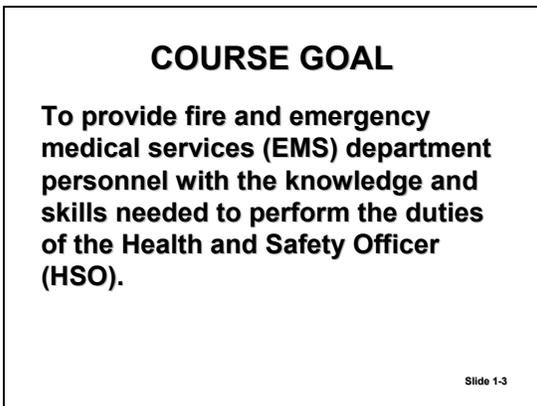
Slide 1-1



Slide 1-2



Slide 1-3



Slide 1-4

COURSE SCOPE

- This course provides information on:
 - Risk management.
 - Laws, codes, and standards.
 - Health maintenance and wellness.
 - Occupational Safety and Health Programs.
- The HSO manages the safety, health, and wellness of all personnel and leads in the organization's efforts to develop, maintain, improve, and implement a Risk Management Plan.

Slide 1-4

Slide 1-5

AUDIENCE NOTES

- Fire and EMS department officers who have been designated by the authority having jurisdiction (AHJ) as the department's Safety Officer
- Fire and EMS department members who may be assigned the HSO position
- Members of a department's Occupational Safety and Health Committee

Slide 1-5

Slide 1-6

OBJECTIVES

The students will:

- Describe the history of fire department's Safety Officer position.
- Identify the roles of the HSO position.
- Describe the flow of the course.

Slide 1-6

Slide 1-7

HISTORY FOR THE HEALTH AND SAFETY OFFICER POSITIONS

- Position evolved over 30 years; the National Fire Protection Association's (NFPA's) standard adopted in 1977.
- NFPA recognizes an HSO and an Incident Safety Officer (ISO).
- The Occupational Safety and Health Administration (OSHA) regulations now address:
 - Hazardous materials mitigation.
 - Infection control.
 - Confined-space entry.
 - Respiratory protection.

Slide 1-7

Slide 1-8

REGULATIONS

Federal and/or State laws now regulate components of the fire service occupational safety and health process.



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"These fire drills are getting pretty intense."

Slide 1-8

Slide 1-9

ROLES FOR THE HEALTH AND SAFETY OFFICER

- Lead in the development and improvement of the Risk Management Plan
- Lead in the development and improvement of the Occupational Safety and Health Program
- Monitor and contribute to the safety of all aspects of the organization
- Contribute to the training and education plans for the organization

Slide 1-9

Slide 1-10

COURSE OVERVIEW

- **Unit 1: Introduction**
- **Unit 2: Principles of Risk Management**
- **Unit 3: The Duties and Responsibilities of the Health and Safety Officer**
- **Unit 4: Health Maintenance**
- **Unit 5: Safety Areas of Concern**
- **Unit 6: Systems-Based Change: Using Facts and Measurements**
- **Unit 7: Closing and Course Summary**

Slide 1-10

Slide 1-11

SUMMARY

- **The HSO is the manager of the fire department's Occupational Safety and Health Program.**
- **Position is appointed by the department chief.**
- **The HSO is responsible for ensuring the department has a program for safety, health, and wellness of its members, and it complies with applicable laws.**

Slide 1-11

UNIT 2: PRINCIPLES OF RISK MANAGEMENT

OBJECTIVES

The students will:

- 1. Describe the classic Risk Management Model.*
 - 2. Identify the basics of risk management at an emergency and pre-emergency, and the related role of the Health and Safety Officer (HSO).*
 - 3. Describe the application of risk management principles in training evolutions.*
 - 4. Develop a Risk Management Plan for a specific risk.*
-

INTRODUCTION

In the Post-Katrina Emergency Reform Act (October 2006), Congress endorsed a policy that the Department of Homeland Security (DHS) and the Federal Emergency Management Agency (FEMA) should be risk-based and all-hazards in perspective. More and more, fire and emergency medical services (EMS) departments are similarly being asked to adopt strategic plans that address community-based views of the risks or threats around them. For example, the Commission on Fire Accreditation International (CFAI) has issued a self-assessment guide book that calls on fire departments to begin with an assessment of the risks or threats that they should consider in their nearby communities, and to use this knowledge in their strategic planning efforts.

The National Fire Protection Agency (NFPA) has long called for adoption of Risk Management Plans by fire departments. NFPA 1500[®], *Standard on Fire Department Occupational Safety and Health Program* includes Risk Management Plans. This standard addresses operational as well as organizational views of risks.

We all know that emergency responders face risk--the threats are real and the consequences to them, and to the public, are also real. The use of risk management by responder organizations, such as fire departments and EMS organizations, is a conscious and planned effort to lower vulnerabilities by identifying and understanding the threats, and better preparing to avoid them or respond to them when an incident arises.

At the time of an incident the consequences for the public and for responders can be lowered if:

- Standard Operating Procedures (SOPs) and standards of safety are known and applied;
- equipment and tactical approaches are tested and used appropriately;
- situational awareness is maintained; and
- safety is the first priority during the job.

The Health and Safety Officer (HSO) is the person called upon to conduct a risk management process that leads to the establishment of a Risk Management Plan for the department and its Occupational Safety and Health Program. Both the Risk Management Plan and the Occupational Safety and Health Program are then translated into safe strategies, tactics, and behaviors during the management of an incident.

The statistics on firefighter fatality and injuries are beginning to remain constant or move downward. These statistics indicate occupational safety and health is becoming a standard part of fire and EMS department operations and activities. However, there is still an incredible amount of work ahead for the fire service regarding occupational safety and health.

In years past, the fire service had the "distinction" of being the most hazardous occupation in the country. Slowly, the fire service is losing this title and is taking pride in conducting safe and effective operations. Firefighter fatality statistics released by the NFPA indicate that 118 firefighters died in the line of duty in 2007. These data on fatalities, which are collected annually by NFPA, identify issues that need to be addressed through an aggressive Occupational Safety and Health Program and through strong operational procedures.

RISK MANAGEMENT PROCESS

The fire service has a means of evaluating, controlling, or eliminating the risks faced by a fire department. Indeed, risk must be managed if the organization is to improve.

This process of risk management was formally introduced to the fire service in the 1992 edition of NFPA 1500[®]. The intent of incorporating risk management into this standard was to provide guidance in the development of a comprehensive organizational Risk Management Plan.

The Risk Management Plan requires and includes a proactive and functioning Occupational Safety and Health Program. The focus was to introduce the fire service to both organizational (theoretical) risk management and operational (practical) risk management with emphasis on safety and health. In NFPA 1500[®], organizational risk management was addressed in the administrative requirements for a fire department, and operational risk management was included in the emergency operations section of the standard. The U.S. Fire Administration (USFA) publication, *Risk Management Practices in the Fire Service*, lays out five basic components for a risk management process:

1. Identification of potential risks or threats.
2. Evaluation of the probability and potential consequences of these risks or threats to the public, to property and the environment, and to responders.
3. Prioritization of the threats or risks.
4. Development and implementation of control measures to lower the risks (and their consequences).
5. Monitoring of control measures to ensure their effectiveness.

These five steps are discussed in detail in the following subsections. Fire departments and other responder organizations can use these components to help them form and maintain Risk Management Plans.

Once created, the plan should be periodically updated based on conditions, circumstances, and experience. It is a fundamental tenet of risk management that it be **ongoing, evolving, regularly refreshed, and a continuously improved process**.

Risk Identification

What might go wrong? Risk may be defined as anything that could happen to an organization. What might go wrong? A risk might be associated with a training exercise, an emergency medical incident, or a fall in the station. Identifying the risks may be a complex process because you may be trying to identify what "may" happen. Identifying the risks may also be a simple process because the risk is obvious. Within the community you may identify commercial buildings and industrial sites where there are risks. Critical infrastructure and key resources (CIKR) may be a target of terrorists or simply recognized as having important consequences if an incident cannot be easily stabilized at the site. Your own data should help you identify locations where incidents occur frequently.

A good Risk Management Plan begins with a comprehensive inventory of all things that might go wrong. Compile a list of all emergency and nonemergency operations in which the department participates. There are many sources to assist with this identification process. You should look toward the local, regional, and State emergency management plans as sources of threat or risk identification.

Seek input and ideas from personnel, trade journals, professional associations, and other service providers and responder organizations including the police, public health, emergency medical response organizations, and others.

Risk Evaluation

Once the risks are identified, they can be evaluated from the standpoint of both frequency and the type and severity of consequences. Risk evaluation in the classic risk management process involves two terms: **frequency** and **severity**.

The term "frequency" addresses the likelihood of occurrence. Typically, if a particular type of injury (e.g., back injury) has occurred repeatedly, it will continue to occur until effective control measures are implemented. The process of evaluating risks provides information on **how often** a risk is likely to occur. There are no hard and fast rules for what frequency is acceptable. It is a subjective measure, dependent on the individual, organization, and the person doing the evaluation.

The term "severity" addresses the degree of seriousness of the incident and how great the loss or the consequences of the risk are or will be if the incident occurs, or if it is unmitigated by response actions or control measures. Severity can be measured in a variety of ways:

- loss of life;
- number of serious injuries;
- number of injuries; and
- degree of public health or environmental damage, etc.

Consequences can also be recorded by looking at areas such as:

- time away from work;
- cost of damage;
- cost of, and time for, repair or replacement;
- disruption of service; and
- impact on the organization or its legal costs.

"Vulnerability" is a Risk-Based Consideration

Recently, FEMA has also recognized another factor; namely, "**vulnerability**." Organizations need to consider how vulnerable a place or site is to a given threat. Some places are less vulnerable than others. An older structure built without sprinklers would be more vulnerable to a fire than one with sprinklers. A well-managed industrial site that has adopted and tested a number of safety and security measures is less vulnerable than a site that has no plans or measures in place.

Using the information gathered in the identification step, the risks can be classified based on severity or consequence and frequency. The simple table displayed in Figure 2-1 can be used.

Risk or Threat	Frequency	Measures of Severity or Consequence
Name of an operational risk	<ul style="list-style-type: none"> • Every day • Seldom • Almost never 	<ul style="list-style-type: none"> • Not severe • Significant influence on community • Catastrophic effects
Name of an organizational risk	<ul style="list-style-type: none"> • Every day • Seldom • Rarely 	<ul style="list-style-type: none"> • Minor • Significant to those affected • Serious and life-threatening

**Figure 2-1
Illustration of a Risk Table**

Operational risks are likely to depend greatly on the organization, where it is located, and what mutual-aid agreements affect it.

Organizational risks for fire departments are well-known, of course, and they form the basis of much of a fire department's Risk Management Plan. Organizational risk management is discussed, in more detail, later in this unit.

Establishing Priorities

Taken in combination, the results of the frequency and severity determinations give an organization some measures that help it determine which risks or threats should have priority in its plans. Organizations need to prioritize the risks for the simple reason that budgets are limited, and there are some areas that are not well controlled by a fire department or an EMS

organization. The attention of the organization should be responsibly applied based on some priority scheme.

Any risk that has both a high probability of occurrence and serious consequences deserves a high priority. A nonserious incident with a low likelihood of occurrence should be a much lower priority. It may, in fact, get no attention at all. Note the great subjectivity here, particularly for emergency response organizations like fire departments. For instance, an organization or community may demand that a risk that has a low probability of occurrence, but very serious consequences, be addressed as a priority.

Figure 2-2 illustrates a four-part way to think of risks and priorities. The boxes on the right indicate threats or risks that occur frequently. The upper boxes indicate risks, if they occur, that have high consequences. In the simple XY Graph that follows, risks that lie in the box in the upper right should get significant attention in a Risk Management Plan. The items found in the box on the lower left, in contrast, probably should have little to no attention.

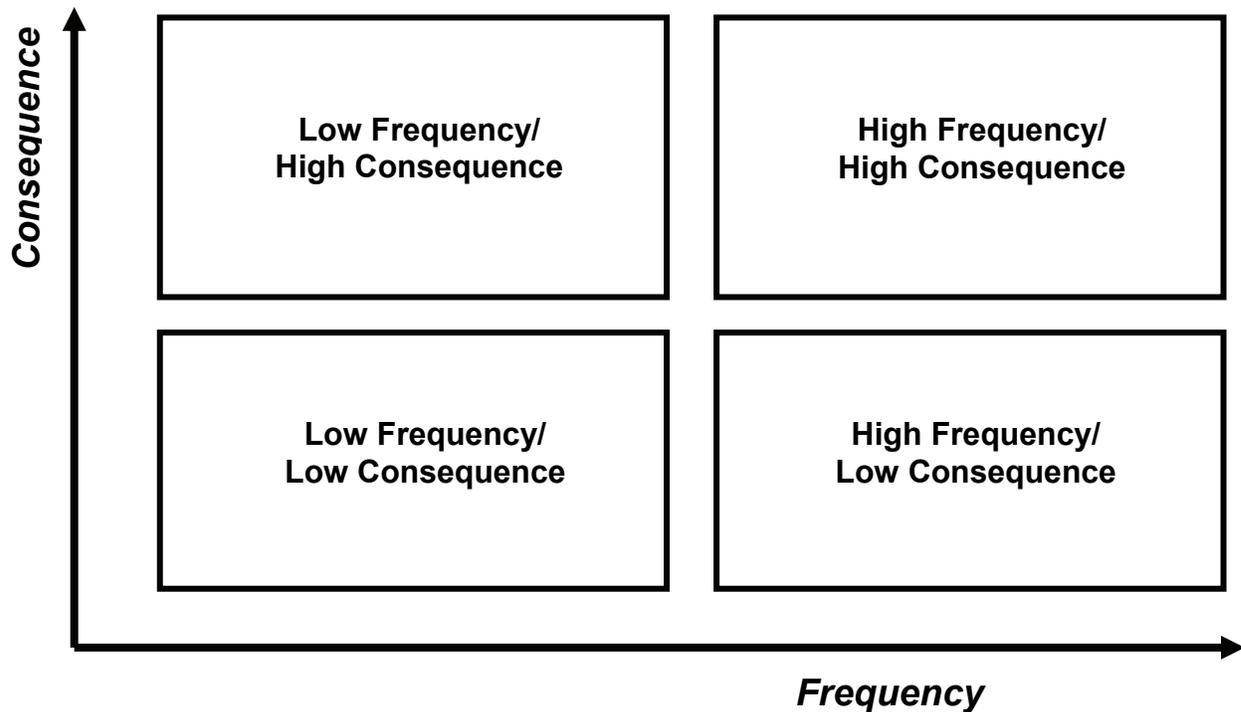


Figure 2-2
XY Graph for Prioritizing Risk

Risk-Control Measures

At this point in the process, risks have been identified and evaluated, so it is time to consider solutions. The organization can draw on a number of basic risk-control approaches including risk avoidance, implementation of control measures, and risk transfer. Risk-control measures are

any solutions used for the elimination or reduction of real or potential hazards or risks through the implementation of controls.

In any situation, the best choice is **risk avoidance**. Simply put, this means avoid the activity that creates the risk. In an emergency services organization, this is frequently impractical. Lifting a stretcher presents a serious back injury risk, but one cannot avoid this risk and still provide effective service.

An example of risk avoidance that has been very practical is the use of sharps containers. The risks associated with recapping needles are well documented, so recapping is no longer an accepted practice. This risky behavior can be avoided through the proper use of a sharps container.

The most common method used for the management of risk is the adoption of effective **risk-control measures**. While control measures will not eliminate the risk, they can reduce the likelihood of occurrence or mitigate the severity. Safety programs, ongoing training, education programs, and well-defined SOPs are all effective control measures.

A collision between emergency response vehicles and other vehicles is a risk at intersections. This risk has a relatively high frequency of occurrence and the consequences are severe. SOPs that require a full stop at red lights and at other "negative" rights-of-ways can help to control both the frequency and severity of such potential collisions. EMS personnel also take steps to keep traffic away from their work areas as a risk-control measure.

Communicable diseases pose a real risk, and an infection control program should be established and understood by everyone. The control measures for infectious disease should address

- training and education;
- personal protective equipment (PPE) aspects;
- immunizations;
- exposure management;
- cleaning and disinfecting;
- facilities and vehicles; and
- disposal rules.

Risk transfer is a common strategy for many organizations. Transfer of risk isn't easily applied to most operational risk scenarios. Since it is the job of EMS personnel to respond and treat, there is no one to transfer the risk to. Still, there are areas for which organizations can transfer risk to those who are better prepared to handle them. For example, organizations might transfer risk to outside firms for:

- equipment decontamination;
- tanker inspections; and
- special ambulance services to ensure patient isolation.

Other organizations can shift financial risks by purchasing insurance. This has no bearing on the operational duties of responders (though it may have some use from the response organization's perspective of its economic risks).

Risk Monitoring

The last step in the process is risk management monitoring. Once control measures have been implemented, they need to be evaluated to measure their effectiveness. Any problems that occur require revisions or modifications to the SOPs or other control measures. This final step ensures that the system is dynamic. The reporting of the data will also facilitate periodic reviews of the entire safety program.

The intent of the Risk Management Plan is to develop a strategy for reducing the inherent risks, lowering the frequency of occurrence, lessening vulnerabilities, and lowering the consequences. Regardless of the size or type of fire or EMS department, every organization should operate within the parameters of a Risk Management Plan.

ORGANIZATIONAL RISK MANAGEMENT FROM NFPA 1500[®]

Risk Management (organizational risk definition)

The process of planning, organizing, directing, and controlling the resources and activities of an organization in order to minimize detrimental effects on that organization.

NFPA 1500[®]

The primary focus of internal or organizational risk management is the safety and health of personnel.

In NFPA 1500[®] risk management is addressed in the administrative requirements for a fire department. The organizational risk management process develops a foundation for effectively managing all identifiable risks a fire department encounters on a daily basis.

The Risk Management Plan for a fire department organization will include an Occupational Safety and Health Program. The Occupational Safety and Health Program needs to be both proactive and functioning. The plan will also identify and explain each standard of safety for the daily operations of the organization. These standards of safety establish the parameters within which operations are conducted during both emergency and nonemergency situations. The intent is for all members to operate within a standard level of safety and not to deviate from it. The plan should explain how incident personnel should assess the safety issues for each type of incident or event they confront.

Under NFPA 1500[®] the Risk Management Plan and program needs to:

- include an official, written Risk Management Plan which addresses organizational policies and procedures; and
- address administration, facilities, training, vehicle operations, protective clothing and equipment, operations, and emergency and nonemergency incidents.

The organization's Risk Management Plan should address pre-emergency risks, nonemergency risks, and risk management at an emergency.

PRE-EMERGENCY RISK MANAGEMENT

Pre-emergency risk management looks at activities that take place prior to any emergency. It uses the classic Risk Management Model approach to prevent, prepare for, and establish control measures anticipating problems so that onscene risk management is easier to perform and more effective.

Three initial components of pre-emergency risk management include

1. A written Risk Management Plan.
2. A written Occupational Safety and Health Program.
3. A Risk Management Toolbox.

Each will affect the daily operations of the organization based on local factors such as philosophy, implementation, and management. Each of these pre-emergency risk management components will be expanded in further detail so they can be clearly understood and recognized for the importance they play in the overall risk management process.

Most organizations have used a written Occupational Safety and Health Program for years, and an HSO to oversee its management and use. For many organizations, the component least likely to be in place is the written Risk Management Plan.

Written Risk Management Plan

Risks are identified and evaluated, priorities determined, and control measures established.

A written Risk Management Plan will include the result of this process along with the review of the organization's health and safety policy and procedures. By formulating this plan, the organization is taking steps to avoid or control the risks (which will also help to protect against liability). The resulting plan will define how tasks, functions, or operations can be conducted in the safest manner possible.

The Risk Management Plan should address every function of the organization. There is a long list of operating areas that needs to be reviewed in order to establish a sound Risk Management Plan for a fire or EMS department, including

- dispatch procedures;
- hiring selection;
- physical fitness and skills of personnel;
- stress management;
- training and continuing education;
- probationary employment and supervision;
- inspection and maintenance of facilities;
- vehicle operations;
- PPE;
- debriefing effectiveness;
- documentation practices;
- safety standards and related standards such as response times;
- operations at emergency incidents (e.g., the Incident Command System (ICS), SOPs, and guides are tested and analyzed);
- operations at nonemergency incidents;
- employee attrition;
- controlled substances handling;
- hazardous materials;
- infectious disease;
- incidents involving violence;
- mutual-aid interactions; and
- other related activities.

Written Occupational Safety and Health Program

The safety, health, and welfare of personnel is one of the most (if not the most) important responsibilities for a fire chief or other top administrator of an organization. The lack of personnel, who may be absent because of occupational injuries or illnesses, disrupts the operation of the organization, affects morale, and diminishes the organization's effectiveness.

The safety and health program outlines procedures for department personnel that, if followed, will enable them to perform their daily duties and responsibilities in a safe and effective manner. An effective written program places the responsibility and authority for safety on all personnel. It holds supervisors accountable for ensuring that personnel understand and comply with the requirements of this program.

There is no set method for developing a safety and health policy. The policy may be a separate document or a part of an SOP manual. Whatever method is used, all personnel must be provided with training and familiarization so they understand the intent and concept of this policy.

Unfortunately, many policies written by an organization are placed in binders and put on a shelf never to be seen again. If this happens to the safety and health policy, it will lead to a lack of compliance by personnel, lack of support by supervisors, and general apathy.

To meet the requirements of NFPA 1500[®], an organization should implement written safety and health procedures that provide definite measures for preventing and eliminating occupational accidents, injuries, illnesses, and fatalities.

An integral part of any safety and health program or effort is the statement of a safety policy adopted by the leaders of the organization. A sample policy, which is simple, yet concise, is included in NFPA 1500[®]. Regardless of the size of an organization, this policy statement can work very well.

Risk Management Toolbox

Within the pre-emergency risk management process, there is a long list of elements to address. Several tools are used by an organization to establish an effective risk management program. You can consider this as a Risk Management Toolbox.

Some of the key elements of such a toolbox are

- SOPs and Standard Operating Guidelines (SOGs) (as used by some organizations);
- effective training;
- PPE and personal protective clothing;
- apparatus and equipment;
- ICS; and
- a personnel accountability system.

Standard Operating Procedures and Guidelines

SOPs are written policies developed by an organization that define exact methods or activities performed by its members. These procedures affect only the operation of the organization that writes and adopts them. These procedures must be based on recognized laws and regulations. SOPs are the foundation from which an organization functions on a daily basis. They should cover all the organization's operations--both emergency and nonemergency.

The basis of an SOP is quite simple, though at times we tend to make it more difficult than we need to. As SOPs are developed and written, training must take place in order for personnel to understand what is expected of them. Once the SOPs become effective, they become enforceable.

Once the training and education process has been completed, there is no excuse for noncompliance. The development of an SOP for interior structural firefighting, for instance, mandates that personnel wear full-protective clothing and equipment including self-contained

breathing apparatus (SCBA) and facepiece. Nevertheless, the fire service struggles at times with compliance.

As departments or organizations use SOPs, there must also be a process for reviewing and amending them. This process needs to identify the effectiveness of the SOPs--are they being used and what have been the results when they are used. If the SOPs are not being followed or the results can be improved, then the SOP should be changed. Some SOPs may be unnecessary. SOPs/SOGs that are on the shelf for the sake of being on the shelf do no good. This is why it is important to have a systematic process to review the SOPs on a regularly scheduled basis.

Personal Protective Clothing and Equipment

Prior to participating in any emergency operation, an organization must define what the minimum level of protective clothing should be for its personnel to conduct its activities.

The organization has the obligation to ensure that the equipment provided is compliant and meets the intent for which it will be used. A risk management program and Occupational Safety and Health Administration (OSHA) compliance will ensure that all personnel understand the use and limitations of the respective protective clothing and equipment.

Note that PPE are tested to ensure they meet certain standards. This means that they may fail once they go outside the standard limits (e.g., protective gloves have varying thicknesses, and defined temperature limits for turnout gears). The maintenance and care of protective clothing is important to the safety of the wearer. Poorly maintained protective clothing and PPE lead to accidents and injuries. The manufacturer's recommendations regarding cleaning and repairing these garments and equipment should be followed.

Apparatus and Equipment

The apparatus and equipment that are used for emergency operations must be properly maintained to maximize safety. The supplies, associated PPE, and special equipment should be on board in proper working order. A Risk Management Plan should address the procedures that are used to make sure that equipment is on board, that preventive maintenance programs are in place, and that a response guide about "emergency driving" rules and practices is in place.

The preventive maintenance program will ensure that routine maintenance and repairs are performed on apparatus on a scheduled basis. There will be criteria in place that allow apparatus to be placed out of service if certain conditions exist (e.g., poor brakes). Maintenance and repairs performed on the apparatus must be done or completed by certified mechanics.

Incident Command System and Safety

The Command and control of an incident is the key to an effective, efficient, and safe operation. Safety is the first priority recognized by all emergency management organizations. The risks are too great to allow an incident to be managed in an aimless and chaotic manner.

The National Incident Management System (NIMS) ICS identifies a Safety Officer or Incident Safety Officer (ISO) as a Command Staff position. The role of the ISO is to focus on the on-scene assessment and identification of risks, the establishment of safety priorities, and the safety control measures that are needed for an incident or event. The HSO will have helped an organization to produce the guides and operating procedures expected to be used by a person assigned to be an ISO.

The next unit of this course covers the basics of the NIMS ICS adopted by FEMA and the National Fire Academy (NFA). Most State laws and the Emergency Management Assistance Compact (EMAC) expect this ICS model to be the model used by responder organizations of all types.

Through SOPs, an organization should provide for an incident safety approach that calls for:

- the assessment of risks;
- input into incident action planning and decisionmaking;
- input into strategies and tactical designs;
- a role in Command and control; and
- authority to halt to any action that is deemed to be unsafe.

Personnel Accountability System

Managing an incident scene and maintaining accountability for personnel are functions of Incident Command and the responsibility of all supervisors and personnel. Being able to account for the location of each member at an emergency incident is imperative. The HSO has a critical role in ensuring that a personnel accountability system has been developed by the department, and personnel have been trained to use the system.

Such a system stems from the implementation of a Risk Management Plan that includes safety standards, incident-specific assessment guides, and SOPs that make personnel responsible for knowing the location of all incident personnel, and what safety issues or problems are being confronted at all times.

We know that even with SOPs, training, and the full commitment of the organization to its safety standards, "freelancing" still exists. The organization's adoption of a thoughtful personnel accountability system is an excellent control measure that is expected to be one of the most important elements of a Risk Management Plan.

Effective Training

Training is vital. It ensures consistency, efficiency, accountability, and safety. Without training, an incident scene can be an out-of-control mess. Untrained personnel can be liabilities at a scene and a cause of injuries and avoidable losses. Note that shortfalls in training will undoubtedly expose the organization to litigation brought on by patients, victims' families, and responders.

The training process is an avenue for testing and evaluating new or revised SOPs or policies. Training is also the approach for instituting and enforcing the safety process in a nonemergency mode or setting.

Also note that a training exercise can be one of the most dangerous nonemergency activities addressed by the organization. The Risk Management Plan should ensure that training situations, like live-fire evolutions, are specifically addressed.

Training as a Risk Management Control Measure

Safety has to be an integral part of any training program. It is also important that training and education is integrated into the Occupational Safety and Health Program. The organization has the responsibility to ensure that the training program incorporates safety into all facets of recruit, firefighter, officer, and other types of training provided. Safety is an essential component that must be incorporated into all training.

In order for the Occupational Safety and Health Program to be successful, members must also be trained and educated about the program's benefits and the content of its components and initiatives. Training on the Risk Management Plan and the Occupational Safety and Health Program is not a one-time issue. These plans and programs should be revisited during:

- inservice training;
- officer training;
- company drills;
- regional exercises;
- live-fire evolutions; and
- any other educational or training opportunities.

The HSO should work with all the Administrative Units and Operating Divisions to ensure that the training has safety aspects built in and visible.

Live-Fire and Other Training Where the Risks are High

An excellent example of incorporating risk management into the fire service involves live-fire training. NFPA 1403[®], *Standard on Live Fire Training Evolutions*, was developed due to numerous firefighter fatalities and severe injuries occurring during live-fire training evolutions in

the 1980s. Training still remains a cause of firefighter deaths and injuries. Safety problems arise from various sources including

- the use of flammable materials;
- poor water supply and backup lines;
- the lack of PPE;
- the lack of preplanning or escape routes; and
- the lack of an incident management system.

NFPA 1403[®] now outlines requirements that the HSO should address in the department's training plans and efforts. The standard addresses issues such as:

- the use of an ISO;
- environmental impacts;
- disconnecting utilities;
- building construction and condition;
- use of proper PPE;
- proper water supply and hoselines, including backup lines;
- preplanning with students about escape routes;
- use of an incident management/command system;
- instructor/student ratio; and
- EMS being available on scene.

The HSO must be involved in the development of a live-fire training evolution. The HSO will serve as the risk manager of this process and may become the ISO. If any one of the issues listed above cannot be met, or creates a problem, the HSO has the authority to halt the training exercise or modify the intent from offensive to defensive. The HSO will participate throughout the evolution by serving as the ISO or working with the ISO.

RISK MANAGEMENT AT AN EMERGENCY

The effective management of operational risk is primarily the function of the Incident Commander (IC) and the ISO, when one is appointed or used.

The HSO plays a role in the management of risk at an emergency. First, the ISO depends on the success of the department's Occupational Safety and Health Program and its Risk Management Plan. The hard work of the HSO is translated into action at the emergency incident and at live-fire training evolutions.

Second, the efforts of the HSO, in concert with the chief and other leaders of the department, ensure that supervisors and firefighters have had training in proper procedures, on the ICS, and on various aspects of their jobs. Such training needs to have health and safety aspects embedded. Third, ICs and ISOs depend on firefighters being healthy and fit enough to perform their jobs. All firefighters should know the standards of safety and take personal responsibility for meeting and honoring them. They learn this through the work of the HSO.

The HSO will be the lead person within the department to assist the chief in developing the procedures and guides covering the following important onscene aspects, which are

- how to contribute to incident action planning, the assessment of safety concerns and risks, and the development of safe strategies and tactics;
- how and when to monitor the stability of a structure/container;
- how to ensure proper and mandatory use of PPE and protective clothing by all members;
- how to ensure accountability of personnel;
- how to establish and maintain the rehabilitation efforts for personnel;
- how to monitor the safety aspects of incident operations;
- how to set up and maintain medical care for responders; and
- how to perform after-action analyses, investigate if necessary, and report on injuries, fatalities, and damage to department vehicles and equipment.

The effective management of operational risk is an active, dynamic process. The Risk Management Plan incorporates the following:

- the standards of safety;
- operating procedures and guides; and
- command and control expectations.

The intent is for all members to willingly operate within the standards and not to deviate.

Note that the department's HSO may be the logical and obvious member to fulfill the ISO role. More often, this responsibility is transferred to someone designated to serve as the ISO on scene. In these cases, the HSO will become an available resource to assist the ISO.

Acceptable and Unacceptable Risk

There is a very narrow line between acceptable and unacceptable risk, especially during fireground operations. The first-arriving officer has the responsibility to conduct a risk assessment upon arrival at an incident scene and to communicate this analysis to other responding Units and the Command Officer. The tactics used should continuously match the risk assessment and the operational risk management procedures established by the fire department. The IC must decide on the appropriate tactics. At times, difficult decisions must be made regarding the risk to firefighters and the individuals they are trying to rescue. Effective risk management control measures help make this process safer.

The International Association of Fire Chiefs (IAFC) has a set of 10 Rules of Engagement (Figure 2-3) and a Risk Assessment/Rules of Engagement (Figure 2-4) that should be considered by the HSO in developing all aspects of the Risk Management Plan and the Occupational Safety and Health Program of the fire department.

10 Rules of Engagement for Structural Firefighting

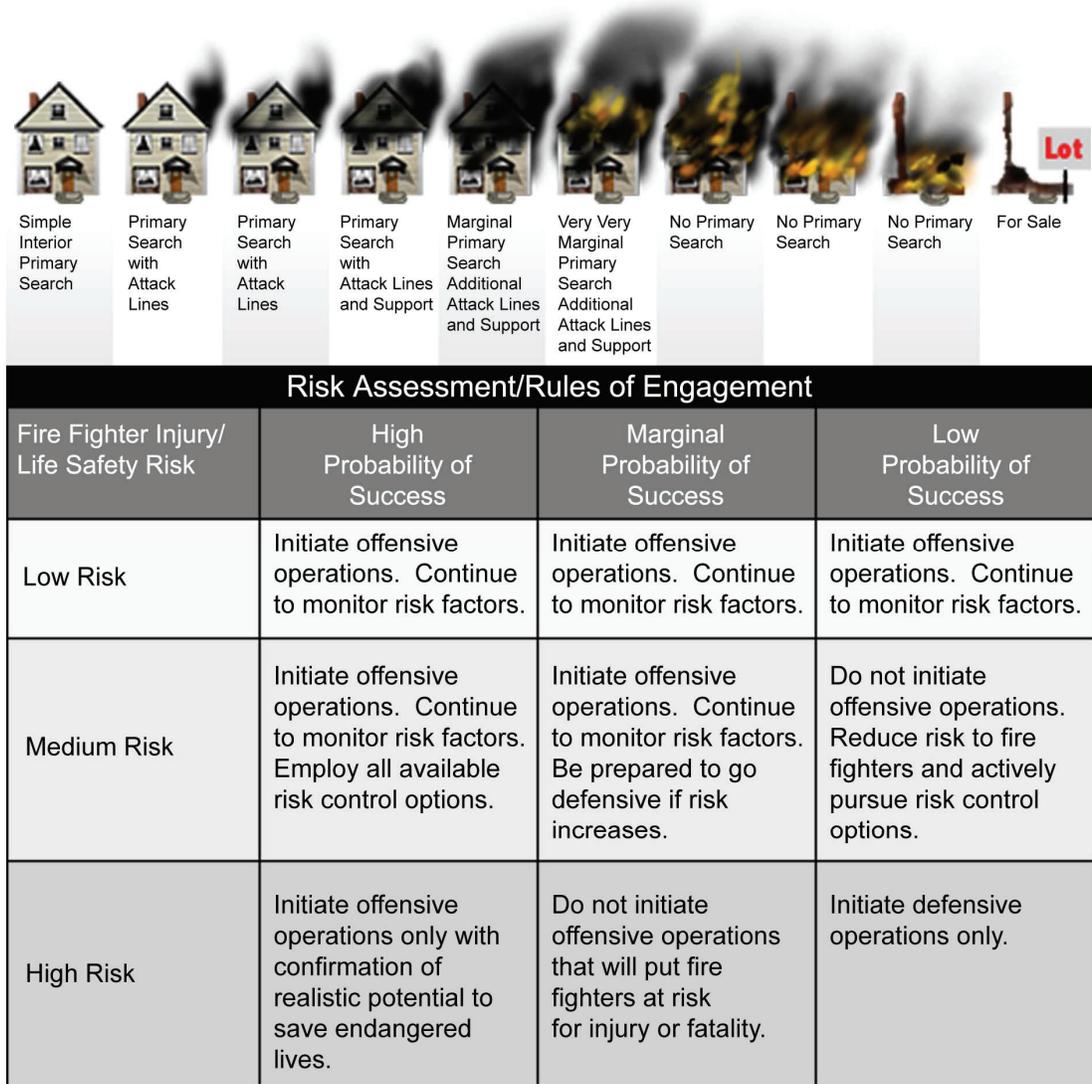
Acceptability of Risk

1. No building or property is worth the life of a firefighter.
2. All interior firefighting involves an inherent risk.
3. Some risk is acceptable, in a measured and controlled manner.
4. No level of risk is acceptable where there is no potential to save lives or savable property.
5. Firefighters shall not be committed to interior offensive firefighting operations in abandoned or derelict buildings.

Risk Assessment

1. All feasible measures shall be taken to limit or avoid risks through risk assessment by a qualified officer.
2. It is the responsibility of the IC to evaluate the level of risk in every situation.
3. Risk assessment is a continuous process for the entire duration of each incident.
4. If conditions change, and risk increases, change strategy and tactics.
5. No building or property is worth the life of a firefighter.

Figure 2-3
International Association of Fire Chiefs Rules of Engagement



**Figure 2-4
Risk Assessment/Rules of Engagement**

AFTER-ACTION OR POSTINCIDENT ANALYSIS

Another part of the toolbox applied to risk management of an emergency is the Postincident Analysis (PIA), (ICS refers to this as after-action reporting). The HSO will take a firm role in this process, especially when serious injuries or fatalities have occurred. The safety aspects of these analyses will normally be a joint effort of the ISO and the HSO although the HSO may simply review the report for the less-complex incidents. The ISO must participate in the formal process and prepare a written report outlining the pertinent information related to responder safety and health. Report templates are normally a part of the Occupational Safety and Health Program established by the HSO. The HSO will analyze all such reports and look for trends and root-causes for recurring problems. The HSO will also work with the proper chain of Command if corrective actions or changes in policies and procedures are called for by the analyses.

SUMMARY

For risk management efforts to be successful, a risk management process must be developed and used with **all** members of the organization involved. Members need an understanding of the concepts, philosophies, and importance of the process to them and the community. Members should know that there are risks, and understand why SOPs, safety standards, personnel accountability, and all other elements of risk management exist. Members should have a personal sense of responsibility for safety and risk management. HSOs should be able to measure their success by how well the organization's members understand and accept risk management.

The HSO will take the lead in working with the chief to establish the organization's Risk Management Plan. The risk and problem identification efforts used in risk management require considerable factfinding, information-gathering, and analyses. The HSO should see these efforts as primary responsibilities to the organization.

The HSO contributes to many areas of the department, especially to ensuring that safety is woven into the organization through the development of its SOPs/SOGs. The HSO should review all training plans and courses to ensure that relevant safety aspects are properly included.

The HSO may become an ISO. In fact, during an emergency the HSO is one of the primary resources for ICs and any assigned ISOs. The HSO will help to translate the emergency plans of their jurisdiction, explain the mutual-aid agreements and SOPs that may apply, and assist the ISO, when called upon, with the assessment of risks and the development of control measures. When safety concerns and problems are confronted by the organization, the HSO will have had a say in how the department manages the risk.

Activity 2.1

Risk Management Plan for a Specific Area of Safety Concern

Purpose

To identify, evaluate, prioritize, and provide control measures for risks associated with emergency and nonemergency functions of a fire or EMS department.

Directions

1. In this small group activity, you will identify the risks associated with the function assigned to your group. These risks should be identified in the assigned columns of the Identifying and Prioritizing Risks Worksheet. The topics are
 - a. Fire department facilities.
 - b. Selection, care, and maintenance of PPE.
 - c. Operations at highway incidents.
 - d. Emergency response by department vehicles.
2. After you have identified the risks, your group should evaluate and prioritize those risks in the assigned column and provide a brief rationale for your decision.
3. You will have 30 minutes to complete this activity. You then will give a 5-minute oral presentation of your findings to the entire class. Each presentation will be followed by a 5-minute general discussion led by the instructor.

Activity 2.1 (cont'd)

Identifying and Prioritizing Risks Worksheet

Function: _____

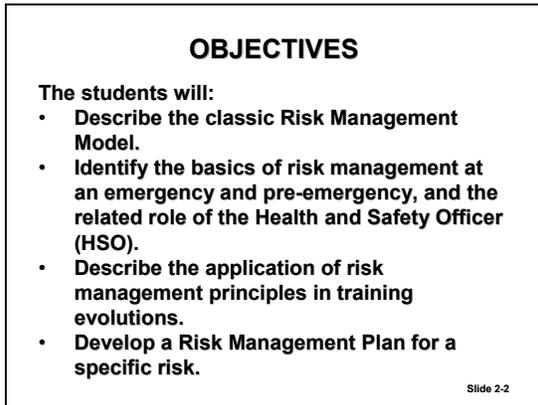
Risk	Risk Identification/ Evaluation	Prioritization	Rationale	Control Measures

NOTE-TAKING GUIDE

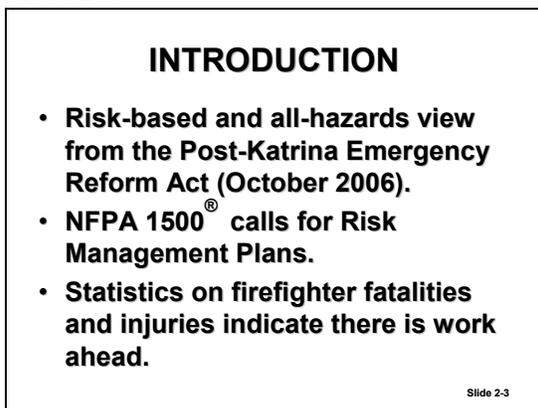
Slide 2-1



Slide 2-2



Slide 2-3



Slide 2-4

RISK MANAGEMENT PROCESS

- Risk must be managed if the organization is to improve.
- Leads to a proactive and functioning Occupational Safety and Health Program.



Slide 2-4

Slide 2-5

FIVE BASIC COMPONENTS

- Identification of potential risks
- Evaluation of probability and potential consequences
- Prioritization of threats or risks
- Control measures to lower risks (and their consequences)
- Monitoring control measures

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Slide 2-6

RISK IDENTIFICATION

- What might go wrong?
- What could happen in your community or in your organization?
- Do you have critical infrastructure and key resources (CIKR) in your area?
- Seek input from personnel, professional associations, and other responder organizations.

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Slide 2-7

RISK EVALUATION

**Two key terms to remember:
Evaluate risk from the standpoint of
both frequency and severity (or
consequences).**

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FREQUENCY AND SEVERITY

Frequency: <ul style="list-style-type: none">• Likelihood of occurrence?• Has it occurred repeatedly?	Severity: <ul style="list-style-type: none">• The degree of seriousness.• How great is the loss?
---	--

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Slide 2-9

ESTABLISHING PRIORITIES

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• Any risk with both high probability of occurrence and serious consequences deserves a high priority.

• Remember the XY Graph.

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Slide 2-10

RISK-CONTROL MEASURES

- Risk avoidance
- Risk-control measures
 - Policies
 - Personal protective equipment (PPE)
 - Training and education
 - Standard Operating Procedures (SOPs) and Standard Operating Guidelines (SOGs)
- Risk transfer

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Slide 2-11

RISK MONITORING

- Gather data on the effectiveness of control measures
- Analyze, report, and discuss improvements
- Change policies, procedures, safety standards, and other aspects whenever needed

Slide 2-11

Slide 2-12

ORGANIZATIONAL RISK MANAGEMENT

Defined by NFPA 1500[®]: "The process of planning, organizing, directing, and controlling the resources and activities of an organization in order to minimize detrimental effects on that organization."

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Slide 2-13

The primary focus of internal or organizational risk management is the safety and health of personnel.

Slide 2-13

Slide 2-14

PRE-EMERGENCY RISK MANAGEMENT: WHAT IS IT?

- Looks at activities that take place prior to any emergency
- Uses classic Risk Management Model to prevent, prepare for, and establish control measures that anticipate problems

Slide 2-14

Slide 2-15

COMPONENTS OF PRE-EMERGENCY RISK MANAGEMENT

- Written Risk Management Plan
- Written Occupational Safety and Health Program
- Risk Management Toolbox

Slide 2-15

Slide 2-16

WRITTEN RISK MANAGEMENT PLAN

- Risks are identified and evaluated, priorities determined, and control measures established.
- Plan defines how tasks, functions, and operations can be conducted in the safest manner.



Slide 2-16

Slide 2-17

WRITTEN OCCUPATIONAL SAFETY AND HEALTH PROGRAM



- Places the responsibility and authority for safety on all personnel
- Improves morale and the effectiveness of the organization

Slide 2-17

Slide 2-18

KEY ELEMENTS OF RISK MANAGEMENT TOOLBOX

- SOPs/SOGs
- PPE/Clothing
- Apparatus and equipment
- Incident Command System (ICS)
- Personnel accountability system
- Effective and safe training

Slide 2-18

Slide 2-19

**SOURCES OF LIVE-FIRE
TRAINING RISKS**

- Use of flammable materials
- Poor water supply and backup lines
- Lack of PPE
- Lack of preplanning or escape routes
- ICS

Slide 2-19

Slide 2-20

**RISK MANAGEMENT AT AN
EMERGENCY**

- Primary responsibility of Incident Commander (IC) and the Incident Safety Officer (ISO).
- ISO depends on success of preplanning.
- HSO responsible for seeing that all training has been done before hand.
- IC and Safety Officer depend on responders being healthy and fit enough to perform jobs.

Slide 2-20

Slide 2-21

**ACCEPTABLE RISK VERSUS
UNACCEPTABLE RISK**

- Very narrow line between them.
- First-arriving officer does initial scene risk assessment.
- Tactics used should continuously match the risk assessment.
- HSO establishes the basic safety Rules of Engagement and SOPs/SOGs.

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Slide 2-22

AFTER-ACTION OR POST-INCIDENT ANALYSIS

- ICS refers to this as the "after-action" report.
- ISO will prepare a written report.
- HSO will analyze all reports to look for trends, and work on corrective action where necessary.

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Slide 2-23

SUMMARY

- A risk management process must be developed and used with all personnel of the organization involved.
- Responders should have a personal sense of responsibility for safety and risk management.
- The HSO helps to weave this sense of safety throughout the organization.

Slide 2-23

Slide 2-24

**Activity 2.1
Risk Management Plan for a
Specific Area of Safety
Concern**

Slide 2-24

UNIT 3: THE DUTIES AND RESPONSIBILITIES OF THE HEALTH AND SAFETY OFFICER

OBJECTIVES

The students will:

- 1. Describe how fatalities and injuries impact the organization and how the data point to key risk factors.*
 - 2. Describe how the Health and Safety Officer (HSO) uses short-term (dynamic) changes compared to long-term (comprehensive) changes to manage risk.*
 - 3. Define the role and responsibilities of the HSO.*
 - 4. Discuss the effect of regulations, standards, and policies on the work of the HSO.*
 - 5. Describe the components of a fire or emergency medical services (EMS) department Occupational Safety and Health Program.*
-

INTRODUCTION

The focus of this unit will be managing risk--an active view of the role of the Health and Safety Officer (HSO). The last unit discussed the principles of risk management and the elements of a department's Risk Management Plan.

What Does a Health and Safety Officer Do?

The HSO is a planner, adviser, and active participant in the fire department's day-to-day operations. The HSO's role also includes organizational long-term planning. Success requires an organizational culture that supports long-term health and safety.

We know that the HSO will be called upon to draft and "sell" a Risk Management Plan and the Occupational Safety and Health Program to the organization. This is a long-term view of success. Change in any organization needs to happen, but sometimes it takes time. An Occupational Safety and Health Program should continuously be improved based on what the department and fire and emergency medical services (EMS), as a whole, is learning. The HSO will establish, maintain, and continuously improve risk management within the department.

The HSO is an active manager of the risks. Among the many duties, the HSO:

- guides Incident Commanders (ICs) and Incident Safety Officers (ISOs) on responder safety and welfare;
- oversees safety during departmental training evolutions;
- contributes to the program of care and maintenance of equipment and vehicles;
- oversees the safety aspects of the facilities; and
- assists personnel in dealing with health risks.

A successful HSO has a special talent of being able to focus on managing risk while also helping the chief on a long-term basis to move the department to incorporating and adopting a culture of safety, and a commitment to health and fitness.

A comprehensive Occupational Safety and Health Program is a crucial component for the success of any fire or EMS department. This program has long-term, positive implications for the department and for firefighters. The dynamic, day-to-day management duties of the HSO will have a more obvious influence on the health and welfare of the department's members. Combined, short-term actions and long-term plans and programs will mean that risks are being managed.

When risks are managed the department should see the statistics change in a positive way by reducing firefighter fatalities, accidents, exposures, and injuries, and by improving the department's success in managing incidents.

The HSO has one of the most important leadership roles within a department. We should all want the HSO to be successful in his/her dynamic, long-term, and more comprehensive efforts.

INFORMATION AND STATISTICS ABOUT FATALITIES AND INJURIES

Statistics help us understand more about the risks that responders confront every day in their jobs. As we know, the HSO is the department's leader in the risk management process discussed in Unit 2: Principles of Risk Management. The HSO will know how to gather information and use statistics in any number of areas of his/her work, such as planning, program development, postincident analyses, and education and training efforts.

Statistics are important. We cannot, of course, lose sight of the real impact of a firefighter's death or serious injury on the organization and the responder's family.

The effect of a responder fatality on the immediate family cannot be overstated. What is not often seen or felt by those outside of the family is the financial hardship that may loom, the loneliness after the funeral and tributes are over, and the sense of life-long loss without a loved one.

The impact on the fallen responder's extended family and department is also severe. Surviving responders who were involved in the incident may second-guess their decisions and believe that the responder might still be alive if they had done something differently. The IC may feel a sense of personal and professional loss. The stress on the organization can even lead to a breakdown in communication between officers and other personnel, the unofficial assignment of blame, and stress in personal and professional relationships among department members.

A severe responder injury can have an impact on the family and the department that is just as serious. The injury may require a long period of recovery, and may be severe enough that the responder may never recover fully, forcing the responder to retire from service. Many injuries, although not fatal to the responder, have a life-long negative influence on the responder's quality of life and his or her family, the ability of the responder to support his or her family, and the long-term life expectancy of the responder.

Firefighter Fatalities

Congress created the National Fallen Firefighters Foundation (NFFF) to lead a nationwide effort to honor America's fallen firefighters. Since 1992, the nonprofit foundation has developed and expanded programs that fulfill that mandate. Recognizing the need to do more to prevent line-of-duty deaths (LODDs) and injuries, the foundation launched a national initiative to bring prevention to the forefront.

The Firefighter Life Safety Initiative includes 16 critical points. More than half of these points affect the HSO's job on a day-to-day basis, such as:

- Define and advocate the need for a cultural change within the fire service relating to safety by incorporating leadership, management, supervision, accountability, and personal responsibility.

- Enhance the personal and organizational accountability for health and safety throughout the fire service.
- Focus greater attention on the integration of risk management with incident management at all levels, including strategic, tactical, and planning responsibilities.
- Empower all firefighters to stop unsafe practices.
- Develop and implement national standards for training, qualifications, and certification (including regular recertification) that are equally applicable to all firefighters based on the duties they are expected to perform.
- Develop and implement national medical and physical fitness standards that are equally applicable to all firefighters, based on the duties they are expected to perform.
- Provide firefighters and their families access to counseling and psychological support.
- Provide public education with more resources and champion it as a critical fire and life-safety program.

The HSO's long-term duties should consider and encompass all aspects of this list in the department's efforts to establish risk management, and to improve its Occupational Health and Safety Program.

The foundation has brought "safety" to the forefront in training and operations. The *Everyone Goes Home* program was developed as a result of the work of the foundation. The *Everyone Goes Home* program provides resource materials to fire departments for promoting safety, offering training classes, and publicizing the need for safety. The materials can be accessed through the NFFF's Web site (<http://www.firehero.org/>).

Each year, approximately 100 firefighters lose their lives in the line of duty. In 1977, a National Fire Protection Association (NFPA)/United States Fire Administration (USFA) statistical series was formalized to issue reports on fatalities for each year. These reports are available at (<http://www.usfa.dhs.gov/fireservice/fatalities/statistics/>).

On-duty firefighter deaths include any death that occurs when the firefighter is on duty. This includes firefighters who die at an emergency incident scene, during training, during fire department functions, and as the result of other accidents or illnesses that strike while the firefighter is on duty. Career firefighters are considered on duty during their scheduled work shifts. Volunteer firefighters are considered on duty while participating in any fire department non-emergency function, and from the time of alarm until the close of an emergency incident.

"Sudden cardiac death is consistently the number one cause of on-duty firefighter fatalities in the United States" (NFPA 2007).

The HSO should keep in mind some of the following points of information about deaths and injuries within the fire service:

- Training-related events are now recognized as needing attention like any other incident. The NFPA reported that 10 percent of on-duty deaths occurred during training-related activities (apparatus and equipment drills; physical fitness; live-fire training; underwater/dive training; and during classes or seminars).
- Age statistics point out that firefighters under the age of 35 are more likely to be killed by a traumatic injury while those over 35 are more likely to succumb to nontraumatic deaths because of heart-related conditions and strokes. Firefighters over the age of 50 succumb at a much higher rate than those who are younger.
- Accidents at highway incidents do not lead to many traumatic injuries or deaths, but safety measures need the most attention to keep responders from being struck by a vehicle while providing roadside care.
- Motor vehicle crashes account for 20 to 25 percent of all firefighter fatalities. Seatbelts need to be worn, whether a firefighter is on the way to the station to respond to an incident, or when they are the operator or passenger in a department vehicle. Operating procedures should be very clear about driving not too fast.
- Wildland firefighting is different than structural firefighting and requires different safety strategies and operational tactics to avoid traumatic injuries, burns, and asphyxiation. The statistics point to these the main areas of safety concern.

A later unit will provide many of these and other areas of safety concern that the HSO should know about to be successful in his/her job.

Firefighter Injuries

In 2007, more than 38,000 firefighters were injured on firegrounds. (*Firefighter Injuries in the United States*, NFPA, November 2008.) Statistics from the NFPA's survey program are shown in Table 3-1 on the following page.

**Table 3-1
Firefighter Injuries in the United States--NFPA**

Year	Total	Firefighting, Fireground	Responding, Returning	On Scene at Non-fire Calls	Training	Other on-duty
1981	103,340	67,510 (65.3%)	4,945 (4.8%)	9,600 (9.3%)	7,090 (6.9%)	14,195 (13.7%)
1982	98,150	61,370 (62.5%)	5,320 (5.4%)	9,385 (9.6%)	6,125 (6.2%)	15,950 (16.3%)
1983	103,150	61,740 (59.9%)	5,865 (5.7%)	11,105 (10.8%)	6,755 (6.5%)	17,685 (17.1%)
1984	102,300	62,700 (61.3%)	5,845 (5.7%)	10,630 (10.4%)	6,840 (6.7%)	16,285 (15.9%)
1985	100,900	61,255 (60.7%)	5,280 (5.2%)	12,500 (12.4%)	6,050 (6.0%)	15,815 (15.7%)
1986	96,450	55,990 (58.1%)	4,665 (4.8%)	12,545 (13.0%)	6,395 (6.6%)	16,855 (17.5%)
1987	102,600	57,755 (56.3%)	5,075 (4.9%)	13,940 (13.6%)	6,075 (5.9%)	19,755 (19.3%)
1988	102,900	61,790 (60.0%)	5,080 (4.9%)	12,325 (12.0%)	5,840 (5.7%)	17,865 (17.4%)
1989	100,700	58,250 (57.8%)	6,000 (6.0%)	12,580 (12.5%)	6,010 (6.0%)	17,860 (17.7%)
1990	100,300	57,100 (56.9%)	6,115 (6.1%)	14,200 (14.2%)	6,630 (6.6%)	16,255 (16.2%)
1991	103,300	55,830 (54.0%)	5,355 (5.2%)	15,065 (14.6%)	6,600 (6.4%)	20,450 (19.8%)
1992	97,700	52,290 (53.5%)	5,580 (5.7%)	14,645 (15.0%)	7,045 (7.2%)	18,140 (18.6%)
1993	101,500	52,885 (52.1%)	5,595 (5.5%)	16,675 (16.4%)	6,545 (6.5%)	19,800 (19.5%)
1994	95,400	52,875 (55.4%)	5,930 (6.2%)	11,810 (12.4%)	6,780 (7.1%)	18,005 (18.9%)
1995	94,500	50,640 (53.6%)	5,230 (5.5%)	13,500 (14.3%)	7,275 (7.7%)	17,855 (18.9%)
1996	87,150	45,725 (52.5%)	6,315 (7.2%)	12,630 (14.5%)	6,200 (7.1%)	16,280 (18.7%)
1997	85,400	40,920 (47.9%)	5,410 (6.3%)	14,880 (17.4%)	6,510 (7.6%)	17,680 (20.7%)
1998	87,500	43,080 (49.2%)	7,070 (8.1%)	13,960 (16.0%)	7,055 (8.1%)	16,335 (18.7%)
1999	88,500	45,550 (51.5%)	5,890 (6.7%)	13,565 (15.5%)	7,705 (8.7%)	15,790 (17.8%)
2000	84,550	43,065 (51.0%)	4,700 (5.6%)	13,660 (16.2%)	7,400 (8.8%)	15,725 (18.6%)
2001	82,250	41,395 (50.3%)	4,640 (5.6%)	14,140 (17.2%)	6,915 (8.4%)	15,160 (18.4%)
2002	80,800	37,860 (46.9%)	5,805 (7.2%)	15,095 (18.7%)	7,600 (9.4%)	14,440 (17.9%)
2003	78,750	38,045 (48.3%)	5,200 (6.6%)	13,855 (17.6%)	7,100 (9.0%)	14,550 (18.5%)
2004	75,840	36,880 (48.6%)	4,840 (6.4%)	13,150 (17.3%)	6,720 (8.9%)	14,250 (18.8%)
2005	80,100	41,950 (52.4%)	5,455 (6.8%)	12,250 (15.3%)	7,120 (8.9%)	13,325 (16.6%)
2006	83,400	44,210 (53.0%)	4,745 (5.7%)	13,090 (15.7%)	7,665 (9.2%)	13,690 (16.4%)

Note: These figures are based on NFPA's annual National Fire Experience Survey (<http://www.nfpa.org>). Prior to 1981, the categories were somewhat different.

In August 2008, the International Association of Firefighters (IAFF) issued a report on injuries from metropolitan departments. The report, *Contributing Factors to Firefighter Line-Of-Duty Injury in Metropolitan Fire Departments in the United States*, came to the following basic conclusion about firefighter injuries:

Analysis of the roles of various factors suggests that the most prominent contributing factors to firefighter line-of-duty injury in metropolitan fire departments in the United States are lack of situational awareness (37.3%), lack of wellness/fitness (28.5%), and human error (10.6%) (<http://www.iaff.org/08News/PDF/InjuryReport.pdf>).

Fortunately, these statistics indicate that a large majority of injuries are not serious. According to the IAFF report, almost 75 percent of the injuries resulted in no days lost from normal duty. But this study also reported that nearly 6 percent of injuries had significant impact on the firefighter's return to normal duty.

One of the main causes of firefighter injuries, according to the IAFF report, is **lack of situational awareness**. The second contributing factor, according to the report, is lack of **wellness/fitness**. This report plainly underscores why an HSO position exists within the department and why the Occupational Safety and Health Program is focused on improving operating procedures and training, and on getting firefighters to improve their health and fitness. Reports like this should be read by all students and shared with the leadership of the department.

Active risk management requires the HSO to gather information and perform factfinding and analyses. The HSO should regularly scan the Internet and use other readily available published information about the fire service and occupational health and safety. In addition to statistical programs, news services, and other research, the HSO can also draw upon the department's own statistics and multiple States' data by using the National Fire Incident Reporting System (NFIRS) or from the National EMS Information System (NEMESIS).

The use of these sources of information will provide the HSO with a better understanding of the risks confronted by fire and EMS departments and responders. The insights gained from these efforts are all important inputs into a risk management process that the HSO will help to lead.

TOOLS FOR SHORT-TERM (DYNAMIC) CHANGES

The HSO can make positive changes happen in a short amount of time.

This section of the unit focuses on the short-term (dynamic) changes that can positively affect firefighter safety. Overall success may depend on the success of the short-term actions. These actions can help to demonstrate to the members that good plans and programs are beneficial, and not just change for change-sake. The HSO will find they are more successful if the department is willing to accept changes. The whole point of a Risk Management Plan and the Occupational Safety and Health Program is to see that the organization receives continuous improvement. So things need to change.

Several examples of the tools that an HSO has available for dynamic changes include

- written Standard Operating Procedures (SOPs) and guidelines (such as those for the personnel accountability system, highway/traffic safety procedures, incident assessment guides, and others);
- improvements in personal protective equipment (PPE) (such as turnout gear, self-contained breathing apparatus (SCBA), EMS garments, others); and
- updates in the training and education programs.

These examples can put new safety measures in place quickly; so maintain and improve them with little cost to emergency services organizations. These policies and procedures can also serve to establish and implement safety standards.

COMPREHENSIVE OR LONG-TERM CHANGE

The most benefits for the community and the organization will occur if safety is woven into everything it does.

Long-term or comprehensive change in an organization occurs gradually. Every organization has its own culture and may even operate with several dominating philosophies about what it stands for and how its people are supposed to behave. HSOs need to use all of their talents, experience, and communications abilities to be successful in meeting the goal of weaving safety into the fabric of the organization. The levels of comprehensive change include such things as

- the Risk Management Plan and the process used to build and improve it (see Unit 2);
- the written Occupational Safety and Health Program; and
- education and training.

HSOs need to be sensitive to the organization's philosophies and culture. They provide leadership and work with chiefs and other leaders in the organization to help members in participating and embracing the positive changes that will unfold as these plans are implemented.

THE DUTIES AND RESPONSIBILITIES OF THE HEALTH AND SAFETY OFFICER

The job functions of the HSO are often based on NFPA 1500[®], *Standard on Fire Department Occupational Safety and Health Program* and NFPA 1521[®], *Standard for Fire Department Safety Officer*. The essential job functions serve as the foundation for the development, implementation, and management of a fire department's Occupational Safety and Health Program.

A Risk Management Plan

The first requirement of the HSO is to develop a Risk Management Plan for the fire department. Risk management is a broad topic. The HSO focuses on the areas of safety and health.

The Risk Management Plan is developed using the classic Risk Management Model, which includes the following components:

- risk identification;
- evaluation of risks;
- prioritization of risks;
- control measures; and
- monitoring.

The Risk Management Plan is not static, it should be evaluated and changed based on new information, data, and developments in the fire service. An update to the plan has to be done at least annually. The HSO uses department statistics, community risk assessments, accident and injury data, training needs assessments and requirements, and any other areas of safety and health contained in the Risk Management Plan. A continuous monitoring process also plays a significant role in determining what changes and/or additions need to be made to the Risk Management Plan.

Laws, Codes, and Standards

One of the most important responsibilities of the HSO is to be knowledgeable of the laws, codes, and standards that apply to the safety and health of the fire department.

Applicable laws, codes, and standards come from:

- Occupational Safety and Health Administration (OSHA);
- NFPA;
- Environmental Protection Agency (EPA);
- State motor vehicle codes;
- other State legislation;
- local ordinances;
- mutual-aid agreements;
- Emergency Management Assistance Compact (EMAC); and
- jurisdictional policies.

The HSO should regularly review laws and policies to identify what changes have occurred that may impact the Risk Management Plan. Once identified, the HSO must determine how to ensure compliance with the laws and policies. Compliance may require changes in the fire department's policy, procedures, and guidelines. Before implementing changes, the HSO needs to submit the information and plans to the fire chief, or the designated representative, for approval and to gain support for implementation.

The HSO is responsible for compliance with applicable laws, codes, and standards. The department chief should grant the HSO authority to ensure compliance with the Occupational Safety and Health Program. In situations where corrective action needs to take place, the HSO should be granted the authority to accomplish this. This is comparable to the authority granted to the ISO by the IC to alter, suspend, or terminate operations.

Training and Education

The HSO has a lead role in ensuring that safety training occurs in the fire or EMS department. Safety training takes place during recruit training and at least annually throughout the career of each responder. For example, OSHA requires annual training on the following areas:

- respiratory protection;
- Hazardous Waste Operations and Emergency Response (HAZWOPER);
- infection control;
- confined space;
- protective clothing and equipment; and
- firefighting and/or EMS operations.

The HSO may provide the instruction. The HSO should ensure that the training is completed and documented properly. Should a fatality, serious injury, or near miss occur, safety training needs to be conducted regarding any recommendations made to prevent a similar incident from reoccurring.

The HSO must remain current on safety and health issues that affect the fire service. Relevant information needs to be passed on to fire department members. Information can be distributed through written reports, videos, and training packages. This sharing of information is an important part of the ongoing safety training process.

Accident Prevention

Accident prevention must be a part of any Occupational Safety and Health Program regardless of the type of occupation or industry. The SOPs and department guides should make accident avoidance one of the primary objectives. The HSO should ensure that accident prevention has great visibility to all members of the department.

Accident Investigation, Procedures, and Review

In the event of an occupational fatality, injury, near miss, or accident, the HSO will need to investigate. The Postincident Analysis (PIA) should include a review of the department's procedures and training to see if they were appropriate and adequate.

Note that fire department procedures should call for immediate emergency medical care for a member(s) involved in an injury or accident. Prior to the occurrence of an incident, the department should know which medical facilities can best handle specific types of injuries and illnesses such as serious burns, orthopedic injuries, cardiac problems, etc. In the event of an occupational exposure, procedures must be in place to ensure that proper prophylaxis, counseling, followup care, and recordkeeping are provided.

One of the most important procedures that needs to be developed, but hopefully never used, is how to investigate a serious injury or fatality. The IAFF and the International Association of Fire Chiefs (IAFC) provide resources to assist in the development of procedures for this purpose. These procedures need to be used in the event of a near miss as well.

When something goes wrong the department needs to know what should be corrected. Once the department has reached a conclusion regarding the incident, it is imperative that action is taken to institute the appropriate changes.

Firefighter fatality reports normally provide a recommendation section that details actions that could have been taken to prevent a fatality or serious injury. The HSO must disseminate this information to the department.

The HSO should ensure that in the event of an accident, injury, or illness, there are procedures in place to conduct an official investigation. The fire department has the right to conduct an independent investigation to determine what went wrong and why. The intent of such investigations is not to place blame, but rather to determine what happened and why, so that preventive actions can be taken to reduce the risk of repeating the incident. There will be outside agencies conducting investigations as well, and information needs to be shared, rather than concealed, with those conducting the investigations.

The procedures a department uses need to comply with all applicable local, State, or Federal ordinances to ensure proper compliance. In the event of a firefighter fatality, the specific procedures to assist the family with Public Safety Officer's Benefits (PSOB) need to be addressed for both the Federal and State levels. Procedures must also be in place to ensure that timeframes regarding a firefighter fatality are met.

It is important for the HSO to periodically evaluate the procedures used in accident and injury investigation to determine if they are adequate.

Records Management and Data Analysis

The HSO must ensure that appropriate recordkeeping and documentation, two vital components of the occupational safety and health process, occur. The HSO must also manage these processes effectively and recognize the value of accident and injury data. By collecting and analyzing these data, the HSO can use the results to improve the Occupational Safety and Health Program. The HSO should publish an annual report that identifies significant incidents that have occurred during the year including

- accidents;
- occupational fatalities;
- injuries;
- illnesses; or
- exposures.

More importantly, the report must identify corrective actions to improve firefighter safety and health.

The HSO needs to ensure that recordkeeping relating to apparatus maintenance and repairs are maintained by the department. Other records that the HSO also needs to maintain relate to protective clothing and equipment, facility maintenance and repairs, and SOPs.

As the HSO develops policy or procedural changes regarding health and safety, informational files regarding these changes need to be maintained.

Apparatus and Equipment

The HSO should ensure that all new apparatus, including ambulances and equipment purchases are compliant with applicable standards and codes. The HSO should be allowed to review and approve the specifications for new apparatus and equipment procurements.

For example, to comply with NFPA 1500[®], the HSO should ensure that:

- tools and equipment are mounted in compliance with manufacturer's recommendations;
- annual service testing is completed and documented for pumps, ladders, hoses, and other equipment; and
- protective clothing and equipment is inspected annually to determine suitability for continued service.

Facility Inspection

To comply with NFPA 1500[®], the HSO should ensure all facilities are inspected at least annually. The appendix of the NFPA standard includes sample checklists that can be used for the inspection process. Optimally, the department has procedures that ensure facilities are inspected more frequently than once a year. A monthly inspection process ensures compliance and quickly identifies any safety and health issues that need to be corrected. Safety and health hazards or code violations need to be corrected in a timely manner.

When new facilities are designed, or current facilities are renovated, the HSO needs to review the designs and plans to ensure compliance with applicable codes and standards. Issues such as personal hygiene, infection control, diesel exhaust emissions, fire protection, and other safety and health issues should be addressed and incorporated into the design considerations for the facility.

Health Maintenance

The health and welfare of fire and EMS department members is paramount. The HSO must manage this process effectively to ensure the program is compliant with standards, regulations, and codes.

For example, NFPA 1500[®] requires that a health maintenance program exist and that it addresses the following issues:

- medical surveillance (annual medical evaluations and examinations);
- educational programs and information;
- wellness issues;
- physical fitness;
- nutrition;
- cessation programs; and
- injury and illness rehabilitation.

An aggressive and proactive program must be established by working with the department physician. Unit 4: Health Maintenance covers this in more detail.

Liaison

The intent of this section is to identify the various personnel, departments, and agencies that the HSO interacts with in order to provide an effective Occupational Safety and Health Program. The HSO serves as a member of the department's Occupational Safety and Health Committee. Any recommendations made by the committee must be communicated by the HSO to the appropriate authority.

The HSO works with department officers, supervisors, and managers to identify and report safety and health issues that can affect department operations, e.g., identifying a bowstring truss and lightweight-constructed roof during preincident visits. Preincident planning efforts can identify many other issues. The HSO should work with emergency planners for the community, jurisdictions, and region to ensure that safety control measures can be coordinated whenever multijurisdictional incidents occur.

When unsafe practices or hazardous conditions are identified by an ISO or by other means, the HSO shall take the necessary steps to confirm and then address changes to department SOPs or guidelines. Using education or additional training, the HSO can ensure that unsafe acts are changed and hazardous conditions corrected. When problems occur with protective clothing and equipment and/or apparatus, the HSO needs to work with the manufacturer to eliminate the problem.

The HSO shall work with the department's physician(s) to ensure that medical advice, consultation, treatment, and care is available for all members.

Occupational Safety and Health Committee

The HSO should ensure that the department establishes an Occupational Safety and Health Committee. The committee is a means for ensuring that the members of the department have a voice in the safety and health process. Also, it is a method for assisting the HSO in addressing safety and health issues.

Infection Control

A critical part of safety and health is a proactive infection control program. The HSO should ensure that the infection control program meets the requirements of applicable standards, regulations, and codes.

For example NFPA 1581[®], *Standard on Fire Department Infection Control Program*, offers a comprehensive infection control program.

The HSO should serve as the infection control officer if the position is not staffed by the department. If an infection control officer function exists, the HSO should assist this individual to ensure compliance with applicable standards, regulations, and codes, such as NFPA 1581[®] and OSHA regulations on bloodborne pathogens found in 29 CFR 1910.1030.

Critical Incident Stress Management

The HSO should ensure that a Critical Incident Stress Management (CISM) program is established by the department. As with many of these programs, the HSO may not be part of the delivery of the stress management program, but the HSO should ensure that it exists. Moreover, a departmental policy or procedure must exist and be bolstered by training and continuing education to ensure that members fully understand the importance of CISM. An example of requirements for a CISM program is defined in NFPA 1500[®].

Postincident Analysis

The PIA process is a vital component of the occupational safety and health process. The HSO should ensure that responder safety and health concerns are addressed during the PIA.

Similar to the ISO, the HSO should submit a written report addressing safety and health concerns or issues that resulted from the incident. In situations where the ISO and the HSO are the same person, the report can be all inclusive (that is, it will combine the report templates available for the HSO and those for the ISO). In departments where these two functions are separate, two different reports need to be submitted. The reports need to be in a format developed by the department and submitted to a designated staff officer or manager. This process needs to occur, especially in situations where a fatality, serious injury, or near miss occurred.

Areas of occupational safety that the HSO must address in the report include

- protective clothing and equipment;
- use of preincident planning information;
- risk management;
- apparatus and equipment malfunctions or problems;
- personnel accountability; and
- incident scene rehabilitation.

The Incident Action Plan Safety Analysis needs to be identified and discussed in the written PIA report. This is of particular importance if safety or health problems exist.

OCCUPATIONAL SAFETY AND HEALTH PROGRAM

A primary responsibility of a department chief is to develop and implement an Occupational Safety and Health Program. This program ensures the safety and health of all personnel. The chief appoints the HSO to develop and implement the written Occupational Safety and Health Program. Minimum components of this program should include the following:

- program administration and organization;
- training and education;
- vehicles and equipment;
- protective clothing and protective equipment;
- emergency operations;
- facility safety;
- health maintenance;
- physical fitness;
- employee assistance and wellness programs; and
- CISM.

Another important part of this process is the development of a policy statement for the Occupational Safety and Health Program. The following excerpt is an example of a policy statement for the Occupational Safety and Health Program:

The intent of the Anytown Fire and EMS Department is to operate at the highest possible levels of safety and health for all members. The prevention and reduction of the frequency and severity of accidents, occupational injuries, illnesses, and health exposures are the goals of the Anytown Fire and EMS Department. Safety will become a departmental value and this philosophy will apply to all members of the Anytown Fire and EMS Department and to any other persons who might be involved in department operations.

This policy statement made by the chief and/or leaders of the jurisdiction may set the tone for the implementation of the Occupational Safety and Health Program. Members must understand that

safety is not something that is done once in a while or when members feel like doing it. The department sets a standard level of safety and all members abide by this established level.

Written Occupational Safety and Health Program

The HSO must develop a series of objectives that will meet the goals of the Occupational Safety and Health Program. The occupational safety and health policy will establish the basis for the the department's program.

Most departments provide other emergency services in addition to firefighting operations. Based on the department's risk assessment, members are exposed, or can be exposed, to a variety of hazards which create a complex set of occupational safety and health issues and concerns. The direction is to provide the necessary control measures to assist members so that they can perform their assigned daily tasks safely, efficiently, and effectively. There are several important reasons for using an Occupational Safety and Health Program:

- A moral or human obligation for a safety program is evident (to prevent injuries, illnesses, and fatalities).
- The safety program is a sensible economic investment, as this program strives to reduce the frequency and severity of injuries and accidents (which reduces department costs and expenditures for workers' compensation and liability insurance) while improving the effectiveness of operations.
- The program ensures compliance with applicable laws, codes, and standards.

The safety and health of department members is paramount for the successful operation of the department.

An example of a written Occupational Safety and Health Program is provided in the Annex of NFPA 1500[®].

SKILLS, COMPETENCIES, AND QUALIFICATIONS OF HEALTH AND SAFETY OFFICERS

This position requires commitment, time management skills, understanding, honesty, and self-motivation. The HSO must also be able to evaluate programs and projects in an unbiased and fair manner.

This is an all-encompassing position. In order to be an effective HSO, an individual should have served in operational and supervisory positions to have gained experience, knowledge, and understanding of the occupational safety and health hazards encountered during incident operations. Live-fire training evolutions offer opportunities for an HSO (and a potential ISO) to gain operational experience.

Most colleges and universities that offer occupational safety and health courses provide a basic course in safety management. Several companies in general industry as well as trade associations (e.g., the Fire Department Safety Officers Association (FDSOA) and the American Society of Safety Engineers (ASSE)) offer safety management courses.

As for health and wellness issues, the HSO can use physical fitness agencies, local universities, or trade associations (e.g., the American College for Sports Medicine) for gaining additional information and skills. Also, information is available through IAFC, NFPA, National Volunteer Fire Council (NVFC), and the USFA.

LAWS, CODES, AND STANDARDS

Public Laws Lead to Regulations

Regulations are developed and executed by governmental agencies in response to public laws. Public laws or acts stem from legislative assemblies. Once these laws are enacted, the appropriate agency develops regulations to clarify the rules and procedural matters that lead to compliance by those who are affected. This process occurs at all levels of government, Federal, State, and local. State and local regulations normally affect only the State or jurisdiction in which they are adopted.

Laws Affecting Fire and Emergency Medical Services Department's Occupational Safety and Health Program

Occupational Safety and Health Administration-Related Regulations and Documentation Requirements

OSHA is an agency of the U.S. Department of Labor. OSHA issues regulations that apply to any employer covered under the Occupational Safety and Health Act of 1970.

The Federal law recognizes that States may enact health and safety laws that are more comprehensive and powerful than OSHA's. Congress did not want to stop a State from enacting and enforcing laws for health and safety. States actually have more constitutional power to enforce laws on health and safety than the Federal government. If a State does not enact its own conforming law, then Federal regulations will apply. Of course, the Federal government has no statutory power to compel a legislature to take up and pass a bill into law.

Not all States have enacted such conforming laws. Many States and territories have established and maintained an effective and comprehensive Occupational Safety and Health Program that applies to public employees. It is the responsibility of the HSO to be familiar with State and local laws that are applicable.

OSHA and other occupational safety programs have established recordkeeping requirements. For example, an employer must publish and post data each year on a specific OSHA form called the OSHA Log 300, revised 2004. The employer must document each:

- occupational death;
- nonfatal occupational illness; and
- nonfatal occupational injury.

Other information required for the OSHA Log 300 includes

- employee's name;
- job title and work assignment;
- type of injury or illness;
- type and extent of medical treatment; and
- length of lost work time, if any.

Usually it is the HSO's responsibility to maintain the OSHA Log 300. However, municipal or county governments may assign this duty to a safety administrator or risk manager. These individuals would maintain the records for all city or county employees.

This documentation is important. For example, the medical effects of an exposure to a hazardous material, or job-related exposure to a communicable disease, may not immediately appear. When they do appear, treatment might be needed on a long-term basis. Without documentation, claims for medical treatment could be denied. OSHA 29 CFR 1910.1030 requires medical records to be maintained for 30 years after employment.

Superfund Amendments and Reauthorization Act of 1986

The HSO's organization may be required to comply with U.S. Environmental Protection Agency (EPA) regulations which are identical to OSHA's HAZWOPER regulations (29 CFR 1910.120), even if the State has not adopted OSHA's HAZWOPER.

The importance to emergency response personnel is that both OSHA and EPA require the use of:

- an incident management system;
- an ISO at hazardous materials incidents; and
- a health monitoring process for employees exposed or potentially exposed at a hazardous materials incident.

The Superfund Amendments and Reauthorization Act of 1986 (SARA) outlines requirements for the public's right to know (including fire and EMS departments) about hazardous materials in the community. This information can be extremely important to safety planning for a fire or EMS department.

State Laws

One example of State regulations affecting fire and EMS departments are requirements that govern the emergency response of fire and EMS vehicles. Most jurisdictions have requirements for operating vehicles under emergency conditions with defined responsibilities. This would include emergency vehicle operations when passing through intersections with traffic lights, stop signs, or yield signs, or when encountering a school bus that has stopped to discharge passengers. A second example of State regulations includes the development of an annual vehicle inspection program for all fire apparatus. This requirement has become law in a number of States over the past several years. Due to the number of firefighter fatalities from vehicle accidents caused by poor vehicle maintenance, State laws require a certified inspection of all fire apparatus annually.

Note that many NFPA standards and Federal Emergency Management Agency (FEMA) documents refer to legal authority using the term authority having jurisdiction (AHJ). This is a generic way to recognize that lawful jurisdiction and agency authorities exist, but that they vary, as do their responsibilities, by locality and State. Whatever a fire or EMS department does is subject to an AHJ. This is usually a State or local government.

Each fire department will have to develop, implement, and revise a safety and health program to meet the demands, needs, and concerns of the organization. Using current safety and health laws, codes, and standards as a foundation for program development makes this process easier.

The AHJ may be an agency or an individual. Some examples include

- State agencies;
- local agencies;
- regional agencies;
- fire chiefs;
- fire marshals;
- health department officials;
- building inspectors; and
- others having delegated authority under a statute or ordinance.

On Federal government installations, the Command Officer or department official may be the AHJ. Anyone operating as the AHJ is bound to comply with the applicable laws, codes, and standards.

Note that a consensus standard cannot be enforced on a fire department unless the AHJ has lawfully adopted the standard.

Consensus Standards

The fire service demands standards so that known safety measures are available across the United States. Such standards have addressed PPE and clothing, apparatus, hazardous materials, infection control, and other pertinent issues.

Many standards are established by general consensus. These consensus standards are adopted following processes that conform to the expectations of an accrediting institution such as the American National Standards Institute (ANSI). Organizations that do not possess delegated authority under a public law (referred to as nonregulatory organizations) should rely on the input from members who participate in a standards-making process and follow ANSI procedures for standards-setting bodies.

Nonregulatory organizations or associations dictate procedures for developing standards as well as the format for publication. A few of the guidelines that govern the standards-making process include

- the process of incorporating comments or suggestions;
- how a new document is developed;
- the length of the process;
- the revision process; and
- the length of time it takes to revise a standard.

Consensus standards are not mandatory or enforceable unless they are officially adopted by public authorities with lawmaking or rulemaking abilities. Once a legislative body adopts a consensus standard in whole or in part, the consensus standard becomes law. At this point, it is an enforceable requirement in that jurisdiction.

National Fire Protection Association

Since 1896, NFPA has been the leading nonprofit organization in the world dedicated to protecting lives and property from the hazards of fire. NFPA is noted for its involvement in fire prevention, education programs, and the standards-making process. NFPA has developed several of the most well-known and widely-used standards, such as the *National Electrical Code*[®] and the *Code for Safety to Life from Fire in Buildings and Structures*[®]. NFPA publishes over 270 codes and standards.

The NFPA Board of Directors has general charge of all NFPA activities. The Board appoints a Standards Council to administer the Association's standards-development activities and regulations. All committees involved in making standards operate following the Regulations Governing Committee Projects (published in NFPA's Annual Directory).

The USFA, in cooperation with NFPA, developed the video "The Making of Codes and Standards." This video details the standards-making process used by NFPA and indicates how anyone can be involved in the process to develop standards that relate to and affect fire safety and health.

STANDARDS APPLYING TO OCCUPATIONAL HEALTH AND SAFETY

The Department's Own Standard Operating Procedures

SOPs are written policies developed by a department that specify methods for activities performed by members. They often are employed to ensure that an adopted safety standard can be met. These procedures affect only the operation of the department that writes and adopts them. As indicated earlier, the HSO should use these SOPs to leverage changes and move to have them changed as safety and health lessons indicate there is a need. These SOPs have legal meaning for departments in situations when claims or actions are brought against them. An excellent guide to developing SOPs is the USFA's 1999 publication, *Developing Effective Standard Operating Procedures for Fire and EMS Departments* (<http://www.usfa.dhs.gov/downloads/pdf/publications/fa-197-508.pdf>).

NFPA 1500[®], Standard on Fire Department Occupational Safety and Health Program

In November 1983, the NFPA's Standards Council officially approved the development of the Fire Service Occupational Safety and Health (FSOSH) Technical Committee. The mission of this technical committee was to develop a standard that addressed the minimum requirements of a fire service Occupational Safety and Health Program. The reasons for the development of a standard of this nature were numerous, including

- over 100 firefighter fatalities and more than 100,000 firefighter injuries annually;
- high number of disabling injuries and occupational diseases and conditions that have debilitating or fatal consequences;
- alarming evidence of a link to cancer and related diseases caused by occupational exposures to carcinogens, toxic products of combustion, and hazardous materials;
- wide range of hazards a firefighter is exposed to during service delivery of EMS and hazardous materials incidents;
- growing concern regarding occupational stress and the emotional and psychological consequences of providing emergency services;
- lack of a proactive health maintenance and wellness process that monitors the health and welfare of firefighters; and
- evidence of a need for a toolbox to implement a risk management process to reduce occupational risks and liabilities.

Amid controversy, the FSOSH Technical Committee developed NFPA 1500[®], which was issued by the Standards Council in 1987. The standard referenced in this course is the one revised and published in 2007.

NFPA 1521[®], Standard for Fire Department Safety Officer

With a growing emphasis on employee safety and health, the fire service slowly recognized the need for a safety and health process to become a fixture within the operations of a fire

department. More importantly, the need for a person to administer and manage this process became apparent.

In May 1977, NFPA adopted NFPA 1521[®]. For the first time, the fire service developed a standard that defined the functions of a fire department Safety Officer. This standard provided the minimum requirements for an individual to manage the safety program of a fire department. The requirements of this position have increased to the point that the fire department Safety Officer position now has two distinct and vital roles: HSO and ISO.

The fourth revision to NFPA 1521[®] focused on adding requirements regarding the two functions of the fire department Safety Officer, and to distinguish between the roles of the HSO and the ISO. The intent was to make the NFPA 1521[®] document more practical and "user friendly" for fire service personnel who were tasked with the responsibility of serving as the HSO and/or the ISO. One important point was to demonstrate how each position complements the development of the department's Risk Management Program and how each position serves as a risk manager.

American Society for Testing and Materials

The American Society for Testing and Materials (ASTM) is a private, nonprofit organization that develops standards for materials, systems, products, and services. It was founded in 1898 to provide these services for a variety of disciplines.

Standards for EMS are developed by ASTM's Committee F-30, Emergency Medical Services, including Standard Practice for Training the Emergency Medical Technician (Basic) (F-1031) and Standard Guide on Structures and Responsibilities of Emergency Medical Services Systems Organizations (F-1086).

ASTM D 3578, Standard Specification for Rubber Examination Gloves, 1991, includes requirements for sampling to ensure quality control, water-tightness testing for detecting holes in gloves, physical dimension testing to ensure proper fit of the gloves, and physical testing to ensure that the gloves do not tear easily.

Testing methods for personal protective clothing include ASTM F 739, Test Method for Resistance of Protective Clothing Materials to Permeation by Liquids or Gases under Conditions of Continuous Contact, 1991 and ASTM F 1052, Standard Practice for Pressure Testing of Gas Tight Totally Encapsulating Chemical-Protective Suits, 1987. ASTM F 1052 is referenced in NFPA 1991[®], *Standard on Vapor-Protective Ensembles and Clothing for Hazardous Chemical Emergencies*, as a method of testing the gas-tight integrity of the respective protective suit.

SUMMARY

Risks need to be managed. The HSO is the key player within the department to ensure that short-term actions are taken and that the more comprehensive plans and programs are in place to produce the expected benefits for the department, the responders, and the community.

The HSO leads in the development of and improvements to the department's Risk Management Plan. The HSO develops and improves the Occupational Safety and Health Program on a continuous basis. The HSO uses fact-based and data-driven methods that convince all members why safety should be woven into everything done by the department.

The HSO needs a knowledge-base about the laws that apply. The HSO needs to be an effective communicator and a self-motivator with good time-management skills.

Continuous improvement brings many benefits, but it also brings change--something that asks people to step outside their comfort zones. They will only do this willingly and well if they trust what they see and hear.

The HSO has one of the most important leadership roles within a department.

NOTE-TAKING GUIDE

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**UNIT 3:
THE DUTIES AND
RESPONSIBILITIES OF THE
HEALTH AND SAFETY OFFICER**



health and safety

Slide 3-1

Slide 3-2

OBJECTIVES

The students will:

- Describe how fatalities and injuries impact the organization and how the data point to key risk factors.
- Describe how the Health and Safety Officer (HSO) uses short-term (dynamic) changes compared to long-term (comprehensive) changes to manage risk.
- Define the role and responsibilities of the HSO.

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Slide 3-3

OBJECTIVES (cont'd)

- Discuss the effect of regulations, standards, and policies on the work of the HSO.
- Describe the components of a fire or emergency medical services (EMS) department Occupational Safety and Health Program.

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Slide 3-4

INTRODUCTION

What does an HSO do?

- Drafts and "sells" a Risk Management Plan
- Manages risks
- Focuses on managing risk while helping the chief incorporate a culture of safety
- Develops an Occupational Safety and Health Program
- Keeps statistics to show positive change

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Slide 3-5

FATALITIES AND INJURIES

- Statistics help us understand more about the risks that responders confront every day in their jobs.
- Impact of injuries or death on family and department can be severe.
- Many injuries can have a life-long negative influence on firefighter and family.

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Slide 3-6

**NATIONAL FALLEN
FIREFIGHTERS FOUNDATION**

- There are 16 critical points of The Firefighter Life Safety Initiative--half affect the job of the HSO every day.
- The "Everyone Goes Home" program.
- "Sudden cardiac death is consistently the number one cause of on-duty firefighter fatalities in the United States" (National Fire Protection Association (NFPA 2007)).

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Slide 3-7

INJURIES

- Around half of the 80,000 firefighter injuries in the line of duty occur on the fireground (NFPA).
- Prominent factors contributing to injuries (IAFF, 2008):
 - Situational awareness.
 - Wellness/Fitness.

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Slide 3-8

**TOOLS FOR SHORT-TERM
(DYNAMIC) CHANGES**

- Written Standard Operating Procedures (SOPs) and guidelines
- Improvements in personal protective equipment (PPE)
- Updates in training and education



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**TOOLS FOR COMPREHENSIVE
OR LONG-TERM CHANGE**

- Risk Management Plan and the process used to build and improve it
- Occupational Safety and Health Program
- Education and training program

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**HEALTH AND SAFETY OFFICER
DUTIES AND RESPONSIBILITIES**

- Risk Management Plan
- Know the laws and standards
- Occupational Safety and Health Program
- Maintain an up-to-date training/ education program for all members

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Slide 3-11

LAWS, CODES, AND STANDARDS

LAWS
you need to
KNOW

- OSHA
- NFPA
- EPA
- State motor vehicle
- State legislation
- Mutual aid
- AHJ policy
- Local ordinances
- EMAC

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**HEALTH AND SAFETY OFFICER
DUTIES AND RESPONSIBILITIES
(cont'd)**

- Analyses, strategic planning, and community risk assessments
- Accident prevention and feedback loop
- Records and data analysis
- Facilities and equipment
- Health maintenance

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Slide 3-13

**HEALTH AND SAFETY OFFICER
DUTIES AND RESPONSIBILITIES
(cont'd)**

- Committee and other liaison efforts
- Infection control
- Critical Incident Stress Management (CISM)
- Embed safety measures into SOPs and guidelines

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Slide 3-14

TRAINING AND EDUCATION

- Respiratory protection
- Hazardous Waste Operations and Emergency Response (HAZWOPER)
- Infection control
- Confined space
- Protective clothing and equipment
- Firefighting and/or EMS operations

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Slide 3-15

**ACCIDENT INVESTIGATION,
PROCEDURES, AND REVIEW**

- To prevent accidents you must learn from them.
- Procedures should include, "How to investigate a serious injury or fatality."
- The International Association of Fire Fighters (IAFF) and the International Association of Fire Chiefs (IAFC) provide resources.



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RECORDS MANAGEMENT AND DATA ANALYSIS

- The HSO depends on data and records.
- Usually is the records manager for occupational safety and health and for the selection, care, and maintenance of equipment, apparatus, and protective ensembles.
- HSOs should work with other divisions to ensure that data are available for decisionmaking, continuous improvement, and legal purposes.

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APPARATUS AND EQUIPMENT

- New purchases--see the NFPA standards.
- HSO should be allowed to review and approve procurement specifications.
- Assure annual service testing is done.
- Protective clothing and equipment should be inspected annually.

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FACILITY INSPECTION

- HSO should ensure facilities are inspected at least annually.
- Are electrical outlets overloaded?
- Is there any mold in the walls or air handling unit?
- Are exits blocked?
- Are extinguishers inspected and functional?

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Slide 3-19

HEALTH MAINTENANCE

- The health and welfare of personnel is paramount.
- The HSO is a key leader in the success of health maintenance.
- The course devotes an entire unit to covering its elements.

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LIAISON

- Member of the Occupational Safety and Health Committee
- Works with administration and officers
- Works with Incident Safety Officer (ISO)
- Works with department physician(s)

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INFECTION CONTROL

- Know the Occupational Safety and Health Association (OSHA) requirements
- Use NFPA 1581®, *Standard on Fire Department Infection Control Program*
- HSO serves as the Infection Control Officer

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**CRITICAL INCIDENT STRESS
MANAGEMENT**

- The HSO does not need to be part of the program's delivery, but the HSO must ensure that it exists and is available to personnel.
- The HSO should help personnel to understand the value of the program.

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**POSTINCIDENT ANALYSIS
REPORTS**

- Was PPE used?
- Were preincident planning efforts used?
- Did apparatus or equipment malfunction?
- Were personnel held accountable?
- Was there scene rehabilitation?
- Was the Incident Command System (ICS) in place?

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**OCCUPATIONAL SAFETY AND
HEALTH PROGRAM**

- Program administration
- Training and education
- Vehicles and equipment
- PPE and protective equipment
- Emergency operations
- Health maintenance
- Physical fitness

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Slide 3-25

WRITTEN OCCUPATIONAL SAFETY AND HEALTH PROGRAM

- A moral and human obligation
- A sensible economic investment
- Improves effectiveness of operations
- Ensures compliance with applicable laws, codes, and standards

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SKILLS, COMPETENCIES, AND QUALIFICATIONS

- Important competencies and skills:
 - Honesty
 - Time management
 - Analytic skills
 - Ability to communicate
- Understand the basics of safety management
- Experience and education is important

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UNDERSTANDING THE LAW AND OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

- What is your State's law?
- Many States have OSHA-conforming laws, many do not.
- What is OSHA Log 300?

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ADDITIONAL LEGAL CONSIDERATIONS



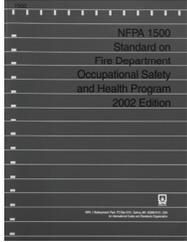
- Other State laws
- Superfund Amendments and Reauthorization Act of 1986 (SARA)

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NATIONAL FIRE PROTECTION ASSOCIATION AND CONSENSUS STANDARDS

- NFPA created in 1896
- A consensus-type, standards-setting organization
- Publishes over 270 codes and standards
- NFPA 1500®
- NFPA 1521®



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Slide 3-30

SUMMARY

- Risks need to be managed.
- The HSO is the key player within the department.
- Full set of short-term and long-term tools for a full set of duties.
- Continuous improvement brings many benefits.

Slide 3-30

UNIT 4: HEALTH MAINTENANCE

OBJECTIVES

The students will:

- 1. Describe a health-maintenance program.*
 - 2. Describe the importance of medical requirements for response personnel.*
 - 3. Identify the comprehensive wellness and physical fitness models for career and volunteer organizations.*
 - 4. Describe the components of a compliant infection control program.*
 - 5. Develop the justification for a fire or emergency medical services (EMS) department wellness/fitness program.*
-

INTRODUCTION

Responders perform physically and mentally demanding tasks that often put them at great personal risk. To meet these demands requires that responders understand the importance of personal health, proper physical conditioning, and good nutritional habits. In turn, each fire and emergency medical services (EMS) department needs to provide all personnel with education and a proactive and effective health-maintenance and wellness program as part of its Occupational Safety and Health Program.

Responders need physical strength and fitness to carry equipment, lift and move patients, rescue victims, pull hoses, move and place ladders, use forcible entry tools, and work for extended periods of time, often without sleep or food. Weather extremes and hazardous environments make such tasks even more difficult. Responders are also restricted by their protective clothing and personal protective equipment (PPE). Responders more often than not execute these duties and responsibilities without the benefit of warmup stretching and exercises.

In addition to their primary duties, the fire and EMS services have also taken a more active role in hazardous materials (hazmat) mitigation, response to technical rescue incidents, and disaster missions. These activities and circumstances present a whole set of occupational safety and health concerns for the fire and EMS.

It is not surprising to find that the responder's job is one of the most stressful and hazardous occupations in the United States. Injuries occur frequently, health problems exist, and line-of-duty deaths (LODDs) occur. The June 2008 report from U.S. Fire Administration (USFA), *Firefighter Fatalities in the United States in 2007*, offers one observation that plainly underscores a main focus of this unit:

In 2007, 55 firefighters died because of stress/overexertion, 52 of these because of heart attacks (the overall total number of fatalities was 118).

The August 2008 International Association of Fire Fighters (IAFF) study and report referenced in Unit 3: The Duties and Responsibilities of the Health and Safety Officer noted that:

Health and fitness was the second most likely contributor to the injury statistics.

Clearly, health and fitness should be one of the most important points of emphasis for all fire departments and firefighters. Health and fitness should be a major element of the department's Occupational Safety and Health Program.

Health Addressed in the Risk Management Plan

Health and fitness should also be addressed in the Risk Management Plan for the department. The Health and Safety Officer (HSO) should ensure that any number of the health-related and fitness-related risks are catalogued as part of the identification step in the risk management process. Control measures, both short-term and long-term, can also be found in a corresponding

catalogue of health and fitness maintenance efforts that a department can employ to avoid or mitigate these risks.

The department may incorporate any number of job tasks based on the mission of the organization. The department needs to carefully match all of the potential job tasks with the fitness and health standards that should apply. Endurance, muscle strength, flexibility, and cardiovascular conditioning enable members to perform their jobs safely and more effectively. Programs that improve these characteristics make sense for the department and should make sense for the individual responder.

The HSO can contribute to the Risk Management Plan of the organization and the maintenance of the Occupational Safety and Health Program by drawing on the components of National Fire Protection Association (NFPA) 1500[®], *Standard on Fire Department Occupational Safety and Health Program*, which address

- medical;
- physical performance;
- physical fitness;
- member assistance and wellness programs; and
- Critical Incident Stress Management (CISM) programs.

In addition to NFPA 1500[®], the NFPA Fire Service Occupational Safety and Health (FSOSH) Technical Committee maintains a set of standards that should provide a strong frame of reference for the HSO:

- NFPA 1521[®], *Standard for Fire Department Safety Officer*;
- NFPA 1561[®], *Standard on Emergency Services Incident Management System*;
- NFPA 1582[®], *Standard on Comprehensive Occupational Medical Program for Fire Department*;
- NFPA 1583[®], *Standard on Health-Related Fitness Programs for Fire Department Members*;
- NFPA 1584[®], *Standard on the Rehabilitation Process for Members During Emergency Operations and Training Exercises*; and
- NFPA 1851[®], *Standard on Selection, Care, and Maintenance of Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting*.

A fire or EMS department is responsible for designating a department physician who serves as medical advisor to the department. The designated physician(s) performs the following functions:

- manages the infection control process as it relates to vaccinations, inoculations, and treatment;
- medically supervises the physical fitness program; and
- reviews medical examinations of members.

The physician may also serve as the certifying physician.

NFPA 1582[®] provides for a medical evaluation process that leads to a physician certifying candidates and members as being fit and healthy to perform their jobs. Medical records, which are kept in a confidential manner separate from personnel files, are usually maintained by the fire department physician. Any medical information relating to examinations, occupational illnesses and injuries, and health exposures are recorded in these files.

The application of these standards and the HSO's work with the designated physicians can provide for effective controls over some of the health and fitness risks faced by responders.

WELLNESS/FITNESS INITIATIVES

The Occupational Safety and Health Program should be coordinated with the Risk Management Plan. In addition to working with the department physician(s), the HSO can help the department adopt a range of wellness and fitness programs, events, and requirements.

The USFA, the International Association of Fire Chiefs (IAFC), and IAFF have partnered for over a decade now to guide departments about wellness and fitness. In 2008, they published the third edition of *The Fire Service Joint Labor Management Wellness-Fitness Initiative*. The goal of this initiative, now referred to as WFI[®], is to improve the quality of life for uniformed personnel.

WFI[®] is very direct about the career meaning of wellness:

Wellness is a personal commitment that all uniformed personnel must make to survive and to sustain a successful career.

There is a common agreement that the effectiveness of firefighters is lessened if they are ill, injured, overweight, or overstressed. WFI[®] makes the case that wellness programs are cost effective for the community since they improve effectiveness while reducing sick leave and injury rates that often require overtime pay (WFI[®], 2008).

The intent of the WFI[®] initiative is that it is implemented as a mandatory, nonpunitive program. The third edition of WFI[®] includes the following 13 programmatic aspects within its medical chapter:

1. Physical examination.
2. Body composition.
3. Annual laboratory analyses.
4. Vision evaluation.
5. Hearing evaluation.
6. Pulmonary evaluation.
7. Aerobic/Cardiovascular evaluation.
8. Cancer screening.

9. Immunizations.
10. Infectious disease screening.
11. Referrals to health-care practitioners.
12. Written feedback (to the personnel).
13. Data collection and reporting (including the documentation of exposures to chemicals, biologics, and other health exposures).

The Fitness chapter includes eight areas of importance:

1. Medical clearance before participating in the program.
2. Onduty time for exercise.
3. Equipment and facilities.
4. Exercise specialists and peer fitness trainers (WFI[®] recommends a Fitness Committee and qualified trainers).
5. Incorporating fitness throughout the fire service.
6. Fitness evaluations.
7. Exercise programs.
8. Nutrition (including an emphasis on hydration).

WFI[®] also encompasses chapters on:

- injury and medical rehabilitation;
- behavioral health;
- cost justification;
- data collection; and
- implementation.

The commitment from labor and management is needed to achieve the benefits of this comprehensive wellness/fitness effort. An annual medical evaluation is one of the key elements of WFI[®]. The annual evaluation is to: identify whether an individual is physically and mentally able to perform essential job duties without undue risk of harm to self or others.

Fitness is an integrated part of the WFI[®] initiative. The IAFF and the IAFC expect a fitness program to be incorporated throughout the fire service. WFI[®] wants all Company Officers (COs) to become wellness agents, and it wants the emphasis on wellness and fitness to begin at the training academy for recruits.

Overall the WFI[®] initiative is comprehensive, up-to-date, confidential, and positive (non-punitive). The National Fire Academy (NFA) wholeheartedly recommends that all fire departments and response organizations consider adopting it or similar programs. The third edition of WFI[®] can be downloaded, without charge, from the Web site of each of the sponsoring organizations, IAFC or IAFF.

National Volunteer Fire Council Fitness and Wellness Program

In October 2008, the National Volunteer Fire Council (NVFC) and the USFA cooperatively published an updated *Health and Wellness Guide for the Volunteer Fire and Emergency Services*.

The NVFC guide provides suggestions and reasons for implementing a health and wellness program. It also provides examples of programs that are working across the Nation, including programs in Wisconsin, Virginia, Vermont, Ohio, Washington, and Florida.

Implementation of the NVFC program by volunteer organizations would include five components:

1. Regular fitness screenings and medical assessments.
2. A fitness program.
3. A behavior modification program.
4. Education of membership.
5. Screening of volunteer applicants.

Just as importantly, the guide lays out the key areas of attention for program administration:

- health and wellness coordinators;
- liability exposure;
- funding alternatives; and
- incentives for participation.

The guide emphasizes to firefighters that there are risk factors that can be modified.

A copy of this guide can be downloaded, free-of-charge, from the NVFC Web site (www.nvfc.org) or the USFA publications Web site (www.usfa.dhs.gov).

MEDICAL EVALUATION

When most people are asked to define a wellness program they describe a physical fitness or exercise program. However, this is only one part of an overall wellness program. This unit emphasizes four components of a wellness program:

1. Annual medical exams.
2. Employee Assistance Program (EAP) including substance abuse.
3. Physical fitness program.
4. Infection control.

Baseline and Annual Medical Exams

Physical examinations and medical testing should occur when new personnel enter the fire department and on an annual basis. It is important to establish the baseline measure of each person's physical condition and vital signs to develop a medical history of all personnel who may be involved in fireground activities.

The baseline should cover a range of medical aspects, including immunizations related to emergency responders. According to NFPA 1582[®], a baseline medical exam for firefighters might include the following tests or examinations:

- a basic medical exam by a licensed physician;
- electrocardiogram (EKG);
- height;
- weight;
- blood pressure;
- heart rate (pulse);
- respiration;
- complete medical history of illnesses/injuries;
- cholesterol level;
- triglycerides (fat level);
- chest x ray;
- tuberculosis (TB) skin test;
- check for skin cancer;
- complete blood count;
- chemistry 23 blood test;
- hepatitis antibodies status;
- urinalysis;
- tetanus update;
- rectal exam for enlarged prostate, blood in stool;
- Prostate-Specific Antigen (PSA) blood test for persons over the age of 50;
- carboxyhemoglobin (baseline carbon monoxide (CO) level);
- vision test;
- hearing test; and
- current list of medications.

In some departments these tests may be done on an annual basis, while others modify their annual evaluation. References for medical examinations can also be found in NFPA 1500[®] (Chapter 8, "Medical and Physical").

The Centers for Disease Control and Prevention (CDC) lists the following two required immunizations and considerations for disaster responders (September 2008):

- **Tetanus.**

In accordance with the current CDC guidelines, responders should receive a tetanus booster if they have not been vaccinated for tetanus during the past 10 years. Td (tetanus/diphtheria) or Tdap (tetanus/diphtheria/pertussis) can be used; getting the Tdap formula for one tetanus booster during adulthood is recommended to maintain protection against pertussis. **While documentation of vaccination is preferred, it should not be a prerequisite to work.**

- **Hepatitis B.**

Hepatitis B vaccine series for persons who will be performing direct patient care or otherwise expected to have contact with bodily fluids.

Hepatitis B vaccination is recommended for anyone at occupational risk for contact with blood and body fluids. The risk of contracting hepatitis B is far greater than for other serious bloodborne diseases such as human immunodeficiency virus (HIV)/acquired immunodeficiency syndrome (AIDS). A postvaccination antibody test is recommended for those who are at ongoing risk for injuries with sharps.

Hepatitis A vaccinations are not routinely recommended, but may be useful where exposure to floodwaters exists. The symptoms of hepatitis A mimic those of the flu.

Flu vaccinations are available. Often, the cost of giving annual flu shots to department members is less than the cost of lost time by those who contract the disease.

Measles outbreaks occur. Fire/EMS response may involve contacts with measles-infected persons. Therefore, the department should consider vaccinating (or revaccinating) personnel at risk of contracting the disease with the measles, mumps, rubella (MMR) vaccine. The decision to revaccinate is based on when the initial vaccination was administered.

Routine immunization of health-care workers against TB, hepatitis A, pertussis, meningococcal disease, typhoid fever, or vaccinia is not recommended. However, immune-prophylaxis for these diseases may be indicated in certain circumstances.

Periodic Medical Evaluations

The periodic medical evaluation medically certifies the member's continued ability to perform assigned job tasks, and identifies any acute changes in the member's health status. Each department member should be medically evaluated annually. The periodic medical evaluation covers the following:

- medical history including any significant changes;
- symptoms;
- significant job-related exposures during the past year; and
- height, weight, visual acuity, and blood pressure.

The extent of the medical evaluation and any further testing depends on the member's current medical condition. The need for a more comprehensive evaluation should be determined based on age, existing medical condition, or other factors that may require thorough assessment. Following the evaluation, the department physician informs the department, in writing, of the member's ability (or inability) to continue the performance of required duties.

Return-to-Duty Exams

The return-to-duty medical evaluation certifies the department member is able to return to full duty following rehabilitation for an occupational injury or illness, or after being absent from duty as a result of a medical condition that could affect job performance. This medical evaluation is conducted as a precaution to protect both the member and the fire department.

Postexposure Exams

Persons exposed to different hazardous materials (hazmat) should be given an initial medical examination to determine the presence of any dangerous chemicals. Since some of these chemicals may not be immediately visible, a routine followup medical check may be necessary a few months after the incident; followup checks could be needed for several years.

Checks for exposures to blood or bodily fluids should follow the procedures outlined in the fire department infection control plan. In some cases a medical exam will be required after an exposure of this nature as well as testing for infectious or communicable diseases.

Employee Medical Records File--State Laws, Occupational Safety and Health Administration, Health Insurance Portability and Accountability Act

All employers are required to keep records of occupational injuries and illnesses. Occupational Safety and Health Administration (OSHA) requirements (Part 1910, Subpart Z) require employers to keep permanent records on employee exposures to certain potentially toxic or harmful physical agents and bloodborne pathogens. Examples of reports to keep in an employee's medical record include:

- annual physical reports;
- return-to-duty reports;
- workers' compensation reports;
- records of vaccinations; and
- exposure reports (hazmat, infectious disease).

Part 1910, Subpart C of the Occupational Safety and Health Act deals with preservation of and access to employee medical records. Medical records are confidential and cannot be disclosed or released without an employee's written consent. An employee's medical record must be maintained for the duration of employment plus 30 years.

Since fire departments and other responder organizations need to deal with workers' compensation matters, they are subject to the personal health record regulations on privacy and security established under the federally-enacted Health Insurance Portability and Accountability Act of 1996 (HIPAA), agency regulations are found at 45 Code of Federal Regulations (CFR) Parts 160, 162 and 164) and similar laws enacted by the States. The HSO should learn about these State laws and Federal regulations to ensure that records are protected securely and held private.

Department Physician

Selecting the department physician is a crucial element of an effective health-maintenance program. The physician ensures that the health-maintenance program succeeds. The majority of fire departments in this country use physicians who are employed by agencies other than the fire department. The services provided to the department may be on a contractual basis or other type of agreement.

Many of the approximately 30,000 fire department organizations are located in relatively remote locations, areas which are medically-underserved. Even in a community where there is no shortage of physicians, there may be no specially trained or qualified individuals available to oversee the occupational health functions of the department.

Most departments operate under fiscal constraints that make it difficult to obtain the full range of physicians' services or special knowledge or expertise related to the work of the department. Regardless of the physician's relationship with the fire department, NFPA 1500[®] calls for minimum requirements to be met.

NFPA 1500[®]

Requirements for the Fire Department Physician

- The fire department will officially designate a physician who is responsible for advising, steering, and counseling the members regarding their health, fitness, and suitability for various duties.
- The fire department physician must provide medical guidance regarding the management of the occupational safety and health program.
- The fire department physician will be a licensed medical doctor or osteopathic physician who is qualified to provide professional expertise in occupational safety and health relating to emergency services.
- The fire department physician will be available for consultation and to provide expert services on an emergency basis.

HEALTH AND WELLNESS

Career Viewpoint of Health and Wellness

Individuals often join a fire or EMS department at a relatively young age and in good health. Over the span of 15 to 20 years, these individuals change. One in four members suffer an occupational injury that results in lost work time. Members are exposed to a variety of hazardous materials such as asbestos, gasoline, diesel fuel, and diesel exhaust fumes. Members are also exposed to communicable diseases, such as hepatitis B, hepatitis C, tuberculosis, bacterial meningitis, and a variety of other airborne and bloodborne diseases.

In addition, as individuals age they may need to contend with a number of "wellness" factors, including

- weight control;
- hearing loss;
- fitness and conditioning;
- alcohol and tobacco use;
- nutrition;
- vaccinations and immunizations; and
- abuse of controlled and other substances.

Proactive Leadership is Needed

A fire or EMS department needs to employ a systems approach to the health-maintenance program if it is to assist its members and maintain its effectiveness. The commitment starts with the department chief and continues down to the newest recruit. Key players involved in this process include

- department chief;
- HSO;
- health and fitness coordinator;
- department physician;
- labor representative;
- Occupational Safety and Health Committee; and
- other interested parties.

This group of proactive individuals will participate in developing the department's policy and procedures. They will also be responsible for developing and implementing the health and wellness program. It is imperative that the end users (response personnel) also have a direct link to this group in order to provide guidance and feedback during the implementation of the program. As with any new program that causes change, resistance is the first and foremost barrier. It is critical that members understand the benefits and importance of the process. Without that understanding, success will be minimal at best.

The Job is the Key

An effective health-maintenance program is built around the job descriptions of each position in the organization. The job description is an important guide when dealing with physical rehabilitation following occupational injuries. The department physician can use the job description to monitor the progress of a member following an occupational injury and determine readiness to return to work.

Other Components to Consider

Physicians Education

Providing a compliant, a medically-certified occupational health program hinges on the department physician having a clearly defined list of what the department's mission or potential range of activities will be. The department's mission statement and job descriptions are excellent resources.

The department physician may need to complete an education and training process to understand and experience the tasks, working environments, protective clothing and PPE, and apparatus used. The size, financial status, safety and health commitment, and organizational values are all variables that influence the occupational health program and the relationship between the department physician and the organization.

Injury Rehabilitation

A rehabilitation process is needed.

Nutrition

Good nutrition is a component that needs more attention because of some of the traditional practices of department. With the growth of the fast-food industry in this country, the nutritional habits of personnel have probably worsened. Proper nutrition is essential to a person's general health, well-being, and quality of life; it is a major factor in physical fitness and conditioning. Proper nutrition provides more energy, helps the body recover from physical stress, and promotes a stronger resistance to illnesses and diseases. A well-balanced diet coupled with an aggressive and consistent exercise program is the most effective method for decreasing body fat. Nutrition is especially important in the fire service where members are regularly exposed to high stress, chemicals and disease, and strenuous physical demands. Two of the major diseases confronted by firefighters are heart disease (high cholesterol, obesity, hypertension, and diabetes) and cancer. A proper diet helps reduce the risks associated with these diseases.

Health and Fitness Coordinator

A health and fitness coordinator can be established as part of the department's efforts to manage occupational safety and health. This person will take a lead role in working with the HSO and the designated physician(s) on all aspects of health maintenance including the wellness and fitness programs and events. Based on the expertise needed, this individual may be a contract employee or a member of the fire department. In either case, this individual must acquire the certifications needed to guide and manage the program properly.

The programs and responsibilities that may be under the direction of the health and fitness coordinator include:

- Medical evaluations/examinations.

The health and fitness coordinator would schedule or provide the data to enable the medical officer's staff to schedule members for annual medical evaluations/examinations.

- Fitness evaluations.

Annual fitness evaluations would be conducted on all department members based on a recognized fitness evaluation process. This would determine suitability for duty based on the criteria established by the department.

- Physical fitness programs.

Each member of the department would be evaluated and prescribed a physical fitness program.

- Wellness programs.

There are a variety of programs that address wellness issues for fire department members such as stress reduction, cessation programs, and nutrition.

- Data collection and analysis.

The health and fitness coordinator would be responsible for tracking the members' fitness performance evaluations and other data that indicate the success of the health and wellness program.

- Prevention programs.

Programs such as cancer screening, vaccinations, and any other programs that would prevent illnesses or determine if health problems exist.

- Liaison.

The health and fitness coordinator would interact with a variety of individuals including the Medical Officer, the HSO, and the Infection Control Officer. There must be a bond among these various positions.

The duties and responsibilities assigned to the health and fitness coordinator are vital to the success of the health and wellness program. Information and communication exchange is essential for the process to work. The health and fitness coordinator must provide the practical application to ensure that the program functions effectively.

BEHAVIORAL HEALTH

A career responder needs to be able to endure the emotional, physical, and mental stresses of the occupation in addition to the stresses of daily life. Specific job stressors for career personnel include

- work schedules that take the member away from the family at night, on weekends, holidays, birthdays, or other important times;
- work weeks that vary, from a 42-hour work week to a 56-hour work week; and
- shift schedules that vary, from 8 hours to 48 hours.

Volunteer personnel have an additional problem of balancing their primary occupation. Working all day at a primary job and all night at a fire or EMS department is physically demanding and stresses home and family commitments.

When an individual is unable to balance these activities, emotional or mental health problems develop. Without intervention, the employee can become a liability to the department and to him/herself. In these situations, the potential for accidents and injuries increases, absenteeism occurs, and job performance suffers. A department invests heavily in each employee.

A behavioral health program reduces the risk to the member and the department, maintains the department's investment in the employee, and promotes the provision of quality service to the community.

The behavioral health program should include

- education;
- nutrition;
- cessation programs (tobacco, alcohol, etc.);
- employee assistance programs;
- substance abuse programs;
- stress management;
- CISM; and
- counseling services.

A stress management program can help personnel cope successfully with occupational stressors and personal problems. The stress management program can be provided either internally or externally as long as the services are available, and members know how to access the correct program to assist with a particular problem.

Stress Management

Stress management programs should address areas such as:

- family problems;
- marital relations;
- financial difficulties;
- legal issues;
- personal concerns related to occupational illnesses or injury; or
- any other problems that affect the mental well-being of personnel.

The stress management program also should include a prevention process. The education of members is vital to the success of this program. To strengthen the prevention aspect, programs can

- introduce stress management training during recruit training;
- conduct stress management training during company in-service;
- recognize the importance of a physical fitness program;
- provide appropriate stress testing to identify problems; and
- offer appropriate, positive assistance.

Members experience a specific type of stress when dealing with trauma, death, and sorrow. Critical incident stress is a normal reaction of people when they experience an abnormal event. Each of us deals with difficult situations in a variety of ways, some more significantly than others. Experiencing emotional stress after a traumatic event is a normal reaction and should not be perceived as a weakness or mental instability. Problems may surface immediately, hours, or even days or weeks after the incident. The department must ensure that help is available for dealing with stress resulting from trauma and that members know how to access the help. Training and education are key factors for successful CISM.

One Standard on Critical Incident Stress Programs

NFPA 1500[®], Chapter 10, *Critical Incident Stress Program*, provides a basic approach to addressing the needs of firefighters who witness trauma, death, and grief. The requirements of NFPA 1500[®] include the following:

- the fire department physician must provide medical direction regarding the operation of CISM;

- the fire department must develop and implement a written policy that establishes a program designed to alleviate mental conditions generated by an incident, which could have an adverse effect on the psychological and physical well-being of fire department members; and
- the program must be available to all members for incidents such as mass casualties, large loss-of-life incidents, fatalities involving children, fatalities involving fire department members, and any other situations that could affect the psychological and physical well-being of fire department members.

BACK INJURY PREVENTION

Back injury prevention is an area that deserves the attention of the HSO. The work of firefighters makes great demands on the core strength areas of a person's body and is very stressful. Back injury prevention is an important aspect of the wellness program. Several areas of back injury prevention are included here.

Posture

Proper posture includes standing and sitting in an upright position without slouching, rounding of the shoulders, or accentuating the natural curves of the spine. Poor posture typically involves holding the head too far forward or allowing the stomach to pull the back forward. If possible, get in the habit of holding in the stomach to keep it from protruding and putting excess force on the spine. When standing, bend your knees slightly. Years of poor posture can lead to weakened spine and abdominal muscles that contribute to back pain and injury.

Proper sleeping posture also is important to prevent and relieve back pain. Sleep on a mattress that is firm, not sagging, but not too hard. Do not sleep on your stomach. Instead, sleep on your side with a pillow between your knees or sleep on your back with a pillow under your knees.

Conditioning

Proper conditioning involves overall conditioning of the body and cardiovascular system with aerobic exercise, as well as strengthening and stretching core muscles of the spine and abdomen. Studies have shown that smoking can contribute to back pain and injury, so if you still smoke, you have yet another reason to think about quitting. Walking, swimming, bicycling, and, for some people, slow, short-distance running are excellent ways to condition the entire body and improve cardiovascular health. In addition to improving general levels of health and fitness, these activities increase blood flow to the spine.

Aerobic activity, along with a healthy diet, helps prevent weight gain, which is a risk factor for back injury. To begin exercising, try walking at a moderate pace and gradually build up your speed.

Stretching and strengthening exercises to increase back and abdomen stability should be done. Because back conditions vary, strengthening and stretching the muscles of the spine and

abdomen should be done under the direction of a physician or physical therapist. These stabilizing exercises improve support for the spine, but proper technique is essential.

Body Mechanics

Body mechanics refers to the way we use our bodies to complete various tasks during activities of daily life. When lifting, bending, or stretching we should think of how we are using our backs to avoid provoking an acute injury. There may be simpler, less strenuous methods or postures that can be used to get something done. Don't be afraid to ask for help.

Instead of bending at the back to pick something up off the floor, stoop down at the knees. Keep the back as straight as possible and maintain proper posture. Instead of reaching overhead, use a sturdy stepstool. Push or pull with your entire body, not just your arms.

When lifting, avoid reaching too far out for the object to be moved, instead, stand close and grasp the object close to the body. Maintain proper posture with back straight and head up. Bend at the knees and hips, not at the back or waist, and use your legs to lift. Pivot at the hips, not the back. If possible, lift from a tabletop or from waist height, rather than from the floor or over your head.

When working, whether sitting or standing, pace your activities and take frequent breaks. Vary the position of your body when standing. Stand on a cushioned mat, if possible. When sitting at a desk, think in terms of right angles (90 degrees, or the shape of an L). Knees should be at 90-degree angles when the soles of the feet are touching the floor. The back and thighs should form 90-degree angles when the body is sitting properly in a chair. Wrists should be straight and elbows at 90-degree angles when the hands are on the desk or keyboard. Use a chair with proper low-back support and keep your head back and shoulders relaxed.

Some studies have found that backbelts worn to prevent back injuries while lifting are not effective, however, they may help remind you to lift with proper body mechanics. Please see the National Institute for Occupational Safety and Health (NIOSH) information regarding backbelts at (<http://www.cdc.gov/niosh/backbelt.html>).

Members must remember if loads cannot be lifted properly (using the natural technique of bending the knees), an excessive strain is put on the spine. This also will accelerate unnecessary wear and tear on the back. The following are the basics to reducing the frequency and severity of back injuries:

- understand and use proper lifting techniques;
- require additional personnel for lifting heavy, bulky, or awkward objects;
- maintain an aggressive injury prevention training program; and
- maintain a fitness program.

PHYSICAL FITNESS

Fire and EMS services are physically demanding occupations. A physical fitness and conditioning program needs to be designed to help personnel develop and maintain the level of fitness needed to perform firefighting and EMS tasks safely and effectively. Personnel need the following physical abilities to perform their various tasks:

- upper body strength;
- leg strength;
- muscular endurance;
- cardiovascular endurance; and
- flexibility.

Engaging in a proactive physical fitness program enables personnel to attain and maintain a level of fitness to perform their daily tasks. Just performing job tasks will not maintain the level of physical fitness required to perform these tasks safely and efficiently.

When participating in a well-balanced fitness program, the entire body gets stronger and more flexible and is better able to resist fatigue. A physical fitness program must be designed to allow each member to start at his/her present level and progress at his/her own pace or rate. The fitness level that personnel achieve is greatly influenced by the motivation to start and continue a physical fitness program. In order to improve an individual level of fitness, personnel must participate on a regular basis. Once the goals are met, personnel must continue to participate in the physical fitness program in order to maintain the new level of fitness.

The objectives of the physical fitness program include

- strengthening and conditioning the cardiovascular system;
- toning and strengthening abdominal, back, leg, arm, and other major muscles; and
- increasing flexibility.

The three components of physical fitness outlined in this program are

1. **Strength**--the ability to exert muscle force.
2. **Endurance**--the ability to continue an activity for a long time period includes both muscular endurance (specific to repeated action of the muscles) and cardiovascular endurance (related to the circulatory and respiratory systems).
3. **Flexibility**--the range of motion at the joints, which helps one to move with ease, thus reducing injuries such as pulled or strained muscles.

Adequate levels of these components enable personnel to perform the physically demanding tasks safely and effectively.

INFECTION CONTROL

Exposure Threats or Risks Exist

Emergency services personnel, such as firefighters, law enforcement officers, and EMS personnel face an occupational threat from infectious diseases such as HIV, hepatitis B, TB, and AIDS.

In the not too distant past, examination gloves, protective clothing, and disposable equipment were nonexistent. Personnel provided mouth-to-mouth resuscitation as a form of artificial ventilation, and contact with blood and bodily fluids was common. New protocols and procedures now apply for emergency services personnel as they deliver victim or patient care.

The HSO must be aware of the related threats or risks. The department should have infection control procedures and protocols to address bloodborne pathogens. The intent of the infection control program is to reduce occupational health exposures related to bloodborne and airborne infectious diseases.

Occupational Safety and Health Association and National Fire Protection Association on Bloodborne Pathogens

In December 1991, OSHA introduced 29 CFR 1910.1030, *Occupational Exposure to Bloodborne Pathogens*. This set the foundation for developing a comprehensive infection control program for prehospital care personnel. This OSHA regulation defines specific criteria for addressing the components needed for effective protection of the worker (employee, member, firefighter) who was exposed or potentially exposed to blood during the course of his/her job performance.

In 1992, NFPA followed with NFPA 1581[®], *Standard on Fire Department Infection Control Program*, to be applied by fire departments for their infection control program. This NFPA standard expands the OSHA requirements, addressing the specific needs for a fire department infection control program. NFPA 1581[®] requires the following components:

- development and implementation of a policy statement;
- training and education programs;
- appointment and use of an Infection Control Officer;
- procedures for notification, verification, treatment, and followup care in the event of an exposure;
- apparatus and vehicle disinfecting and cleaning;
- facility safety;
- operational procedures;
- PPE;
- disinfecting and cleaning of protective clothing and PPE;
- personal hygiene issues; and
- cleaning facilities.

NFPA 1581[®] also contains appendices that describe cleaning procedures for structural firefighting protective clothing.

Some Basic Control Measures

Our evidence of what is effective and what risks exist continues to improve and change. Therefore, the HSO needs to conduct a continuing research effort to remain current on developments in this area. HSOs need to check NFPA and the CDC. The HSO also needs to consult with the department's physician(s) on a regular basis.

A number of basic procedures help to ensure the protection of workers during the delivery of emergency medical care, including

- the organization should have an **exposure control plan** that describes how the employer (fire or EMS department) is going to meet infectious disease control requirements;
- engineering and work practices are to be used by the employer to reduce or, at best, eliminate occupational exposures to workers (members); and
- where workers are at risk, PPE is to be used to reduce the risk of exposure.

Standards require that PPE be available for use, properly decontaminated, and cleaned after each use and placed back in storage ready for use again. If they are one-use items, they are to be properly disposed of once they are used.

Hand washing and effective personal hygiene are key components of the process to reduce the risk of an exposure after patient care. If hand washing is not feasible or available, antiseptic soap (waterless) or wipes should be provided and used. Hands must be washed after PPE is removed. Hands, mucous membranes, or exposed skin must be washed after an exposure to blood or bodily fluids. Sharps must not be recapped, bent, or removed unless there is no other practical method for disposal.

Workplace practices also apply. There should be no unmanaged eating, drinking, smoking, or applying cosmetics or lip balm while wearing PPE. Sharps must be disposed of in appropriate containers that are clearly marked and labeled. Containers must be closable, puncture resistant, leak proof on the sides and bottom, maintained upright, and replaced periodically.

PPE shall be provided at no cost to the employee. PPE for emergency response personnel should include examination gloves, protective eyewear, face protection, protective sleeves, gowns/aprons, and protective footwear. The type of PPE depends on the level of risk. The minimum should be examination gloves when conducting an assessment of a patient who has not suffered any trauma or who is not bleeding excessively. The greater the risk of an exposure to blood or bodily fluids, the more protective clothing should be used. Due to the health problems personnel have encountered with latex examination gloves, the department must provide a variety of hypoallergenic gloves in a variety of sizes.

Structural firefighting protective clothing, also known as "turnout gear" or "bunker gear", serves as an excellent barrier against blood and bodily fluids. When responders are performing vehicle extrication, turnout gear is the optimum choice of PPE due to sharp surfaces or obstructions. This PPE includes helmet with eye protection, coat, pants, boots, and gloves.

PPE is required to be cleaned, washed/laundered, or disposed of appropriately by the department at no cost to the worker. All PPE is to remain at the worksite. No PPE is to be taken home to prevent cross-contamination of family clothing. PPE that is contaminated can be reused if it can be successfully decontaminated and cleaned. If the garment cannot be decontaminated and cleaned, it must be properly disposed of in an approved method. Laundering equipment, located in department facilities, need to be separate from the laundering equipment used for normal cleaning such as linens, uniforms, and towels. The hot water must be above 130 °F (54.4 °C), and wastewater must empty into a sanitary sewer system.

Occupational Exposures

Even with control measures in place, many workers will face occupational exposures.

Workers must be offered the hepatitis B vaccination by the employer at no cost to the worker. The vaccine must be offered to the worker within 10 working days of initial assignment after receiving the proper training. The worker has the right to refuse the vaccination if he/she has previously completed the vaccination, if antibody testing determines the worker is immune to the vaccination, or if the vaccine is contradicted for medical reasons. This process must be supervised by a licensed physician or other certified health care professional according to the requirements of the U.S. Public Health Service.

In the event of an occupational exposure to a worker, postexposure evaluation and followup care, including prophylactic treatment, is to be offered at no cost to the worker. The department or organization is responsible for using a designated officer (Infection Control Officer) to manage this process. If a worker is exposed, the employer must offer a medical evaluation and followup care.

The infection control program should also include the identification, documentation, and testing of any "source individual," which should include analyzing this individual's blood for hepatitis B and HIV. After an exposure incident, the department is responsible for ensuring a confidential medical evaluation and continued followup, including

- documentation of the route of exposure and complete circumstances of how the exposure occurred;
- identification and documentation of the source individual;
- testing of the source individual based upon State or local laws if an exposure occurs.
- if the person is known to be infected with HIV or hepatitis B, testing does not have to occur, but information must be made available to the exposed employee;
- counseling; and
- evaluation of the reported illness.

The employer is responsible for maintaining records according to OSHA medical recordkeeping standard. This recordkeeping process applies to all medical records, including the employee's name, social security number, hepatitis B vaccinations, and all examinations and evaluations afforded the employee by the department. The requirements for medical recordkeeping under the OSHA regulations (29 CFR 1910.20) mean that the department's physician must be involved in this process. This information has to be maintained for the duration of employment plus 30 years. Training records must be maintained for 3 years from the date on which the training occurred. Medical records are strictly confidential and may not be disclosed or reported without the employee's written consent. Medical records are to be available to employees and, on request, to anyone having the written consent of the employee. Training records must be available to the employee or employee's representative upon request.

United States Fire Administration Infection Control Guide for Emergency Services

In 1992, the USFA developed the *Guide to Developing and Managing an Emergency Service Infection Control Program*. This guide was designed to be a compliment to the NFA field course. Because of the many advances that have occurred with the infection control process, the second edition of the guide was released in 2002 (<http://www.usfa.dhs.gov/downloads/pdf/publications/fa-112.pdf>).

SUMMARY

Health is one of the important components of risk management. Response personnel perform physically and mentally demanding tasks that include inherent and potential risks during the course of service delivery. Health and fitness problems lead to injuries and LODD for firefighters. Lack of situational awareness appears to be the only factor that contributes more to injuries and deaths than health and fitness.

HSOs have a number of allies within their departments to draw on to establish and maintain health maintenance efforts and fitness programs. These allies include the department's physician and chief. The HSO can also use standards (such as NFPA, CDC, and OSHA) and health-promotion initiatives to aid in the development and maintenance of the program. Occupational safety and health includes a focus on such issues as behavioral health, wellness and fitness, infection control, medical evaluations, and recordkeeping.

Activity 4.1

Justification for a Fire and Emergency Medical Services Department Health and Wellness/Fitness Program

Purpose

To conduct an analysis to determine factors that could affect the implementation of a health and wellness program in a fire and EMS department.

Directions

1. Your small group is the Health and Safety Committee for your fire and EMS department.
2. Using the scenarios and working in your group, answer the four questions on the following Worksheet and designate one person as the spokesperson for your group.
3. You will have 25 minutes to complete the answers, and your group's spokesperson will give a 5-minute report to the class.

Activity 4.1 (cont'd)

Worksheet

Question 1a: How is a wellness and fitness program justified?

Question 1b: Will there be any barriers (internally and externally) that will need to be addressed?

Question 1c: What will be the "selling" points for this program?

Question 2: Who are the key players that must be involved in this process from start to implementation?

Question 3: What is a realistic development and implementation period for this program? (Assume funding has been secured for this program.)

Question 4: What would be your program development priorities and why?

NOTE-TAKING GUIDE

Slide 4-1

**UNIT 4:
HEALTH MAINTENANCE**



health and safety

Slide 4-1

Slide 4-2

OBJECTIVES

The students will:

- Describe a health-maintenance program.
- Describe the importance of medical requirements for response personnel.
- Identify the comprehensive wellness and physical fitness models for career and volunteer organizations.
- Describe the components of a compliant infection control program.
- Develop the justification for a fire or emergency medical services (EMS) department wellness/fitness program.

Slide 4-2

Slide 4-3

INTRODUCTION

- Response personnel perform physically and mentally demanding tasks, often under great personal risk.
- Firefighter fatalities in 2007:
 - Overall deaths--118.
 - Related to stress/overexertion--55.
 - Heart attacks--52.

Slide 4-3

Slide 4-4

HEALTH ADDRESSED IN THE RISK MANAGEMENT PLAN

- The Health and Safety Officer (HSO) should draw on National Fire Protection Association (NFPA) standards.
- Health and fitness problems are a source of organizational and operational risk that should be identified and managed.
- The organization's physicians are the HSO's allies in bringing effective control measures to bear on the health and fitness of everyone involved.

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Slide 4-5

FIRE SERVICE JOINT LABOR MANAGEMENT WELLNESS-FITNESS INITIATIVE



- The International Association of Fire Chiefs (IAFC), the International Association of Fire Fighters (IAFF), and the U.S. Fire Administration (USFA) cooperated to create this guide for fire departments' 13 medical aspects.
- Fitness aspects--8.
- Agree: It's nonpunitive!

Slide 4-5

Slide 4-6

HEALTH AND WELLNESS GUIDE FOR THE VOLUNTEER FIRE AND EMERGENCY SERVICES

- Cooperative agreement between the National Volunteer Fire Council and USFA.
- Agree: It's non-punitive!



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Slide 4-7

MEDICAL EVALUATIONS

- NFPA 1582®, *Standard on Comprehensive Occupational Medical Program for Fire Departments*, recommends setting multiple medical baselines to follow personnel annually.
- The Centers for Disease Control and Prevention (CDC) recommends vaccines and immunizations for responders.
- Evaluations for return to duty.
- Postexposure exams.

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Slide 4-8

EMPLOYEE MEDICAL RECORDS

- Know your State's laws
- Occupational Safety and Health Administration (OSHA) applies
- Health Insurance Portability and Accountability Act of 1996 (HIPAA) privacy and security applies too
- Protect records, secure records, keep them confidential

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Slide 4-9

CAREER VIEWPOINT

- Individuals change over the span of their careers!
- Proactive leadership is needed to support the HSO and to staff the program.
- The focus on health and fitness (and safety) starts with the job description and then continues.
- Major components of the health-maintenance program are affected by this viewpoint.

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BEHAVIORAL HEALTH

Consider

- Hours away from family
- Working nights, weekends, and holidays
- Working 24 hours a day



Slide 4-10

Slide 4-11

BEHAVIORAL HEALTH PROGRAM TOPICS

- Education
- Cessation programs
- Member assistance programs
- Substance abuse
- Stress management
- Critical Incident Stress Management (CISM)
- Counseling services

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Slide 4-12

BACK INJURY PREVENTION

- Posture
- Body mechanics
- Education
- Conditioning
- Backbelts
 - See the National Institute for Occupational Safety and Health (NIOSH) Web site

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Slide 4-13

PHYSICAL FITNESS

- Upper body strength
- Leg strength
- Muscular endurance
- Cardiovascular endurance
- Flexibility

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Slide 4-14

INFECTION CONTROL



- Inherent risks
- OSHA and NFPA on bloodborne pathogens
- Basic control measures
- Exposure requirements
- Strategic planning

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Slide 4-15

SUMMARY

- Health is one of several components of risk management.
- Wellness/Fitness is known to be a major contributor to risk and a cause of injuries.
- The HSO must work with many others in the department to accomplish all the job's facets.
- Firefighters can cooperate, but we also know that the HSO needs to be a good communicator across the organization to be successful.

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Slide 4-16

Activity 4.1
Justification for a Fire and
Emergency Medical Services
Department Health and
Wellness/Fitness Program

Slide 4-16

UNIT 5: SAFETY AREAS OF CONCERN

OBJECTIVES

The students will:

- 1. Describe the risks and safety approaches expected at wildland fire incidents.*
 - 2. Describe the risks and safety approaches expected at highway/traffic incidents.*
 - 3. Describe the safety concerns relating to incidents involving acts of violence.*
 - 4. Identify the risks associated with department facilities.*
 - 5. Describe the importance of incident scene rehabilitation.*
 - 6. Describe the components of a program for the selection, care, and maintenance of protective clothing and equipment.*
 - 7. Learn the basics of Standard Operating Procedure (SOP) development.*
-

INTRODUCTION

This unit is intended to build the student's knowledge about a select number of operational and organizational areas where risks are confronted. The Health and Safety Officer's (HSO's) job is to establish and continuously improve on the Occupational Safety and Health Program of its organization so the department and each of its members are better prepared to address these risks. The more you know about these risks, the more successful you will be as the HSO. You will be better prepared to translate the lessons from operations into improvements in the safety and health program, and better prepared to communicate to each member of the organization about the things they can do to improve their own safety and welfare.

WILDLAND FIREFIGHTER SAFETY

Wildland and structural firefighters are finding themselves in dangerous role reversals more frequently. For example, wildland firefighters may be called on to protect threatened homes, and structural firefighters may be called on to help battle the surrounding blazes in the wildlands.

Characteristics of Wildland Fires

Wildland fires are different than structural fires. To understand some of the differences, students should read through the following excerpt from Doug Campbell's 2001 article, *Using Humidity or Solar Radiation to Predict Fire Behavior*:

The humidity establishes the baseline fuel moisture content of fuels according to the time lag fuel moisture content of the forest fuel. Humidity readings and fuel moisture measurements are useful to determine the fire behavior potential when no other heating force is present in the fuel bed. Humidity readings used to determine the fuel moisture in 1 and 10 hour time lag fuels are most accurate at night, under cloud cover or under heavy canopy.

Fuels exposed to solar heating are heated and dried beyond the humidity's influence. Forest fuel beds become highly variable in temperature and moisture content due to the variation of solar heating within the fuel bed. Available fuels heated by radiation do not follow the time lag formula of 1 and 10 hour fuels, but change within minutes not hours. The variation of fuel temperature is the cause of the variation in fuel flammability, during daytime hours.

Wildland Compared to Structural Firefighting

In addition to the obvious difference of size, wildland fires require more personnel and more resources spread out over a larger area. Wildland fires require long hours of arduous work in the worst of conditions. In the wildland fire environment, four basic safety hazards confront the firefighter: lightning, fire-weakened timber, rolling rocks, and entrapment by running fires.

Strategies, tactics, and operating procedures must be especially concerned about three, inter-related focal-points of safety in a wildland fire:

1. The firefighters themselves.
2. The area immediately surrounding the firefighter.
3. The overall environment of the fire itself.

Tools and Personal Protective Equipment

Tools and personal protective equipment (PPE) are fundamentally different for structure and wildland firefighting. Firefighters in wildland situations are normally equipped in the following ways:

- Flame-resistant trousers and shirts do not absorb moisture while allowing air to pass through and free movement.
- Hardhat is lightweight, impact-resistant, and well ventilated to protect against heat stress.
- Ventilated safety goggles with impact-resistant lenses minimize fogging.
- Cotton bandana is used for respiratory protection.
- Leather gloves are treated for thermal and flame resistance and designed with minimal seams to prevent blisters when using tools.
- High-top, leather work boots worn with wool socks are lightweight enough to prevent fatigue over long periods of time.
- Field packs distribute weight along the hips and can be removed easily in emergencies.
- Wool jacket has natural fire-resistant properties and good air flow.
- Fire shelter is the last-chance lifesaver and used only when every possible means of escape is exhausted.

The protective equipment used for wildland firefighting does have limitations. Clothing does not provide thermal or steam protection. Self-contained breathing apparatus (SCBA) **are not used** in the wildland environment, leaving firefighters vulnerable to smoke inhalation and carbon monoxide poisoning. Prolonged burning times increase the risks from thermal inversions that trap smoke and gases close to the ground resulting in increased risk of exposure.

10 Standard Fire Orders of the National Wildfire Coordinating Group

The "10 Standard Fire Orders" for wildland fires were developed in 1957 by a Task Force studying ways to prevent firefighter injuries and fatalities.

Shortly after the "10 Standard Fire Orders" were incorporated into firefighter training, the "18 Watch Out Situations" were developed. These 18 situations are more specific and cautionary than the "10 Standard Fire Orders." If firefighters follow the "10 Standard Fire Orders" and are alerted to the "18 Watch Out Situations," much of the risk of wildland firefighting can be reduced. Please take note of the differences and similarities of wildland firefighting to structural firefighting illustrated on the following page in Table 5-1.

**Table 5-1
Comparison of the 10 Standard Fire Orders
and the 18 Watch Out Situations**

10 STANDARD FIRE ORDERS	18 WATCH OUT SITUATIONS
<p><i>The National Wildfire Coordinating Group (NWCG) parent group approved a revision of the 10 Standard Fire Orders. These orders are to be applied to all wildland fire situations.</i></p> <p>Fire Behavior</p> <ol style="list-style-type: none"> 1. Keep informed on fire weather conditions and forecasts. 2. Know what your fire is doing at all times. 3. Base all actions on current and expected behavior of the fire. <p>Fireline Safety</p> <ol style="list-style-type: none"> 4. Identify escape routes and make them known. 5. Post lookouts when there is possible danger. 6. Be alert. Keep calm. Think clearly. Act decisively. <p>Organizational Control</p> <ol style="list-style-type: none"> 7. Maintain prompt communications with your forces, your supervisor, and adjoining forces. 8. Give clear instructions and ensure they are understood. 9. Maintain control of your forces at all times. <p><i>If 1 through 9 are considered, then include:</i></p> <ol style="list-style-type: none"> 10. Fight fire aggressively, having provided for safety first. <p><i>The 10 Standard Fire Orders are firm. We don't break them; we don't bend them. All firefighters have a right to a safe assignment.</i></p>	<ol style="list-style-type: none"> 1. Fire not scouted and sized up. 2. In country not seen in daylight. 3. Safety zones and escape routes not identified. 4. Unfamiliar with weather and local factors influencing fire behavior. 5. Uninformed on strategy, tactics, and hazards. 6. Instructions and assignments not clear. 7. No communication link between crewmembers and supervisor. 8. Constructing line without safe anchor point. 9. Building fireline downhill with fire below. 10. Attempting frontal assault on fire. 11. Unburned fuel between you and fire. 12. Cannot see main fire, not in contact with someone who can. 13. On a hillside where rolling material can ignite fuel below. 14. Weather becoming hotter and drier. 15. Wind increases and/or changes direction. 16. Getting frequent spot fires across line. 17. Terrain and fuels make escape to safety zones difficult. 18. Taking nap near fireline.

LOOKOUTS, COMMUNICATIONS, ESCAPE ROUTES, SAFETY ZONES

The lookouts, communications, escape routes, safety zones (LCES) system approach to fireline safety is an outgrowth of an analysis of fatalities and near misses over 20 years of active fireline suppression duties. LCES simply focuses on the essential elements of the 10 Standard Fire Orders. Its use should be automatic in fireline Operations, and all firefighters should know the LCES interconnection.

LCES is part of the 10 Standard Fire Orders for wildland firefighting. These can be found at (http://www.iaff3779.org/lces_10orders_%2018situations.htm or <http://www.nwcg.gov>).

Each firefighter must know the interconnection of LCES. LCES should be established before fighting the fire and continuously maintained: select lookouts, set up communications, choose escape routes, and select safety zones.

LCES functions sequentially--it's a self-triggering mechanism. Lookouts assess, and continue to assess the fire environment and communicate threats to safety; firefighters are to recognize and then use escape routes to safety zones. All firefighters should be alert to changes in the fire environment and have the authority to initiate communication.

LCES is built on two basic guidelines:

1. **Before** safety is threatened, each firefighter must know how the LCES system will be used.
2. LCES must be reevaluated continuously because fire conditions change.

Figure 5-1 includes a useful checklist regarding LCES.

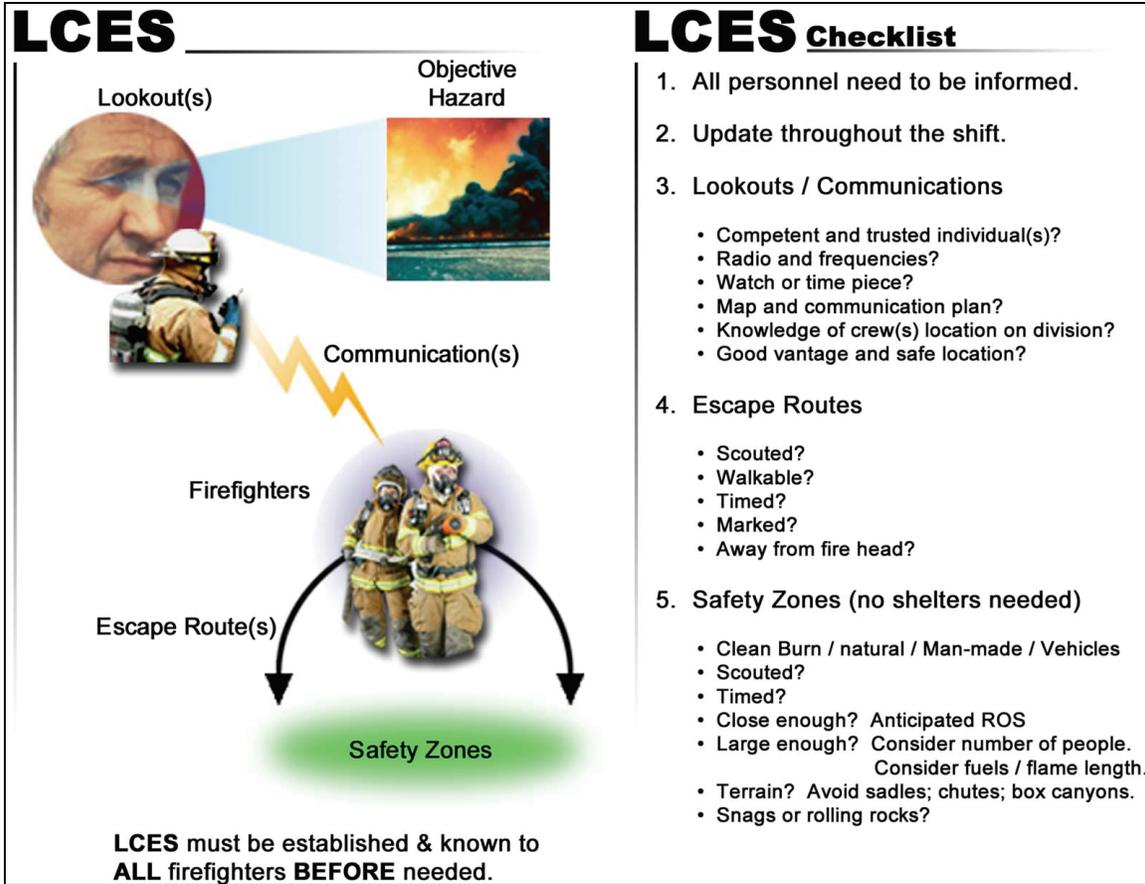


Figure 5-1
LCES Checklist

HIGHWAY OPERATIONS

According to the National Fire Protection Association (NFPA, 2000), from 1995 through 1999, 17 firefighters were struck and killed by motorists. This equates to an 89 percent increase in the number of line-of-duty deaths (LODDs) from this cause compared to the previous 5-year period.

In 2006, there were an estimated 16,020 collisions involving fire department emergency vehicles while responding to or returning from incidents. In 2007, 27 firefighters died in vehicle crashes. According to the U.S. Fire Administration (USFA), approximately 25 percent of firefighters who are killed in the line of duty are responding to or returning from incidents and the majority of the fatalities are a result of vehicle crashes. This represents the second leading cause of firefighter fatalities.

The priorities for any operation at the scene of a highway incident are to:

- preserve life;
- stabilize the incident; and
- protect property and the environment.

Once these priorities are addressed, emergency responders can take actions to restore traffic flow. Restoring the roadway to normal, or near normal, creates a safer environment for the motorists and emergency responders. It also improves the public's perception of the agencies involved and reduces the time and dollar loss resulting from the incident.

A vehicle accident is the most common emergency response and the one that often carries great risk to personnel. Operations should, of course, be conducted in a way that minimizes the risk to the emergency responders. With risks avoided or under control, firefighters can accomplish objectives, and perform their tasks more quickly and effectively.

Team Effort

Managing a highway incident and other related problems is a team effort. Each responding agency and Unit has a role to play in an effective incident operation. Law enforcement, the Department of Transportation (DOT), and the fire and rescue department all play important roles in the management of highway incidents. It is not a question of "who is in charge?" but "**who is in charge of what?**" Care of the injured, protection of the public, safety of the emergency responders, and clearing the traffic lanes should all be priority concerns of the Incident Commander (IC).

Command

It is imperative that Command be established early into any highway operation. The IC is the overall Safety Officer and is responsible for ensuring safe working conditions. Operational objectives and strategies must be determined. This helps in identifying required resources to mitigate the hazard. For example, if a hazardous material is involved, it is important to determine what additional resources would be required for an evacuation.

As in any other operation, accountability of personnel is mandatory. However, in an incident where multiple agencies have personnel and resources at the incident scene, accountability is even more difficult. An accountability group may be established with representatives from multiple agencies assisting in this task.

The management of an incident involving multiple agencies is difficult. Determining who is in charge of what and when is always a situation that may lead to disagreement. Identifying each responding agency and its particular role and responsibility can help to avoid a power struggle once an incident occurs. To avoid such a struggle, preincident agreements should be established with law enforcement, the DOT, and emergency medical services (EMS) agencies. The agreements should identify each agency's roles and responsibilities so that when an incident occurs, these will be already spelled out and agreed upon. In addition, mutual-aid agreements should be established that identify specific responses to deliver appropriate equipment and staffing to the incident.

Roles and Responsibilities

Each responding agency has specific roles and responsibilities at a highway scene. These are delineated here for the various agencies.

Fire Department

- control and extinguish fires;
- establish safe work zones;
- deploy warning devices to give motorists early notification and reaction time;
- control and mitigate any hazardous materials;
- coordinate with law enforcement the control of traffic;
- assist EMS in the treatment and removal of patients;
- extricate trapped victims; and
- preserve the scene for investigation teams.

Emergency Medical Services

- patient triage and assessment;
- patient treatment;
- responder medical services, if needed; and
- transportation.

Law Enforcement

- coordinate with fire department to establish traffic control;
- secure the scene; and
- assist in the identification of any fatalities.

Department of Transportation

- coordinate with fire department for the use of heavy equipment for extrication or removal;
- provide resources and logistical support;
- establish variable message safety boards for motorists; and
- assist with traffic control by the use of movable barriers or vehicles.

Vehicle Recovery Personnel

- coordinate with fire department and law enforcement for the removal of vehicles; and
- assist with heavy extrication and removal.

Response

The officer or supervisor for the responding vehicle should be responsible for the safety of the crew from the time the apparatus leaves until it returns. Safety of the crew is foremost in both emergency and nonemergency situations. Personnel must make every effort to minimize the risk of injury to themselves and those who use the highway system. Personnel will wear appropriate gear and be seated with seatbelt on prior to their vehicle responding to all incidents. Organizations should have Standard Operating Procedures (SOPs) to cover all aspects of the response.

The USFA publishes guides and research initiatives including

- *Alive on Arrival;*
- *Emergency Vehicle Safety Initiative;*
- *Effects of Warning Lamp Color and Intensity on Driver Vision;*
- *Traffic Incident Management Systems; and*
- *Emergency Vehicle Visibility and Conspicuity Study.*

These, and other, reports can be downloaded from the USFA's publications Web site at (<http://www.usfa.dhs.gov>).

Other documents available include

- *Guide to Model Policies and Procedures for Emergency Vehicle Safety*
 - Cooperative publication from USFA and the International Association of Fire Chiefs (IAFC), and
 - Available at (<http://www.iafc.org/vehiclesafety>);
- *Improving Apparatus Response and Roadway Operations Safety in the Career Fire Service*
 - Cooperative publication from USFA and the International Association of Fire Fighters (IAFF), and
 - Available at (<http://www.iaff.org/hs/EVSP/index.html>); and
- *Emergency Vehicle Safe Operations for Volunteer & Small Combination Emergency Service Organizations*
 - Cooperative publication from USFA and the National Volunteer Fire Council (NVFC), and
 - Available at (http://www.nvfc.org/page/988/Emergency_Vehicle_Safe_Operations.htm).

When Units respond to nonemergency situations, all traffic laws governing normal driving practices should be followed. Response apparatus should follow the driving speed as dictated in your SOP.

The left travel lane is the preferable lane of response. When the shoulder must be used, apparatus operators must use extreme caution. Be aware of:

- road signs;
- debris;
- guardrails; and
- oversized and stopped vehicles.

Response via one-way traffic lanes and access ramps should be in the normal direction of travel, unless an officer on the scene can confirm that oncoming traffic has been stopped and no other vehicles will be encountered.

Under no circumstances should crossovers be used for routine changes in travel direction. Large median strip crossovers marked "**Authorized Vehicles Only**" should be used only when apparatus can complete the turn without obstructing the flow of traffic in either travel direction, or when all vehicular traffic has come to a complete stop.

Onscene Actions

In accordance with the *Manual on Uniform Traffic Control Devices* (MUTCD), published by the Federal Highway Administration (FHWA)/DOT, most Temporary Traffic Control (TTC)/incident zones are divided into four areas (Figure 5-2). The **advanced warning area** is the section of highway where drivers are informed of the upcoming incident area. Because drivers on freeways are assuming uninterrupted traffic flow, the advance warning sign should be placed further back from the incident scene than on two-lane roads or urban streets. Table 5-2 (SM p. 5-16) shows the stopping sight distance as a function of speed.

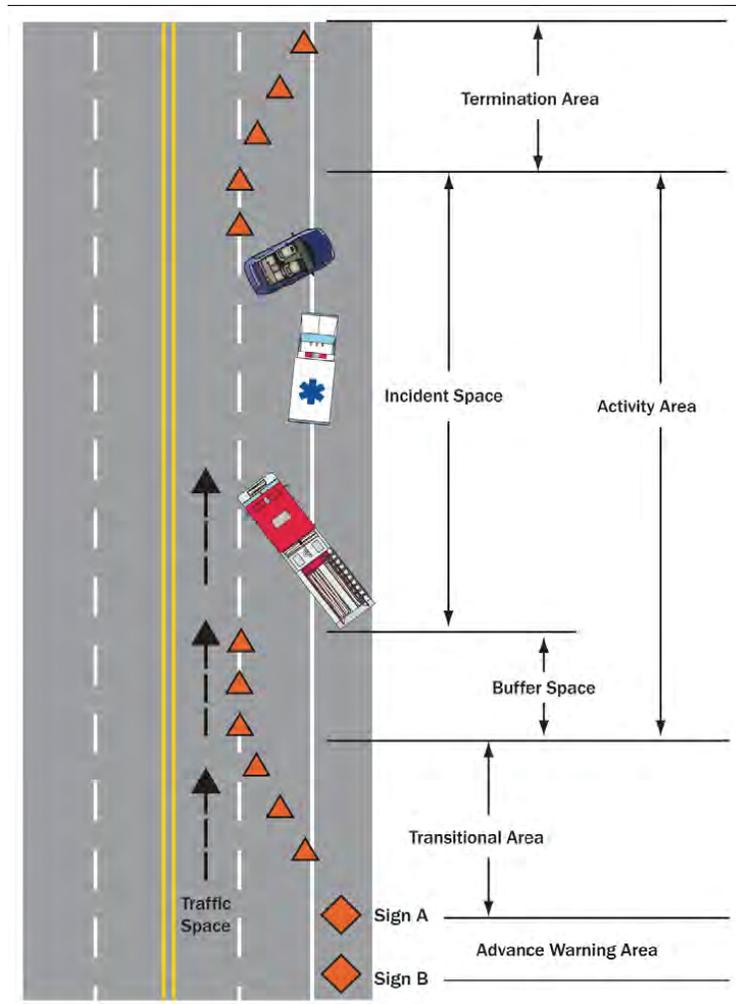


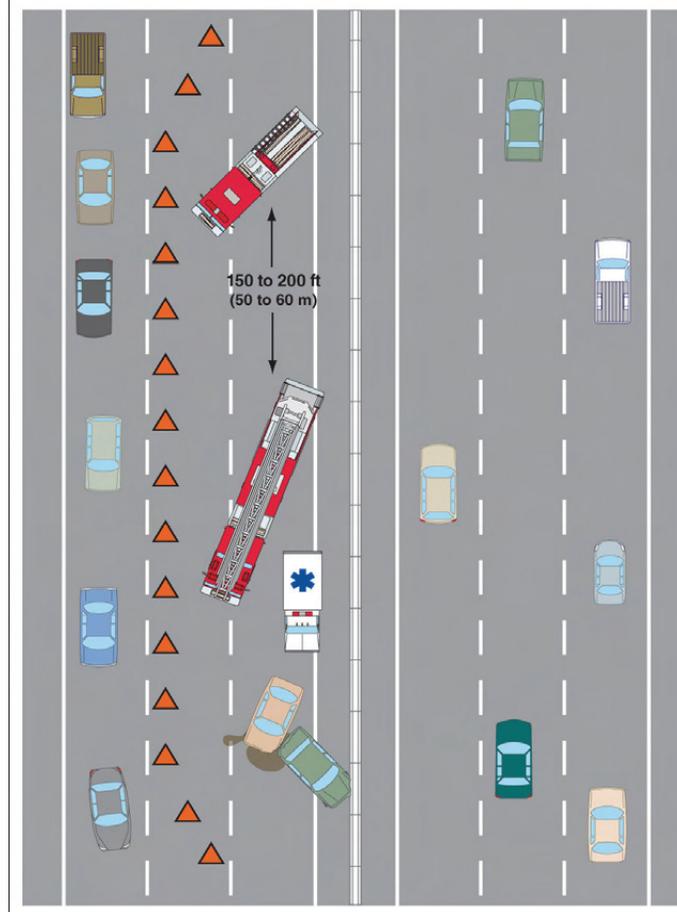
Figure 5-2
Temporary Traffic Control/Incident Zones

The **transition area** is the section of the TTC zone where drivers are redirected from their normal path. This usually involves the creation of tapers using channelizing devices. Tapers may be used in both the transition and termination areas. The MUTCD designates the distance of cone placement to form the tapers based on the speed limit multiplied by the width of the lanes being closed off.

The **activity area** is the section of highway where the work activity or incident takes place. It is made up of the incident space, the traffic space, and the buffer space. The incident space is where the actual work activity occurs. The traffic space is the portion of the roadway used to route traffic through the incident area. The buffer space is the lateral and/or longitudinal area that separates traffic flow from the work area. The buffer space may provide some recovery space for an errant vehicle. The MUTCD (Section 6C.06) specifically states that "an incident response and emergency-vehicle storage area should not extend into any portion of the buffer space."

The **termination area** is used to return drivers to their normal path. It ends at the last TTC device. Conditions and safety considerations may dictate the need for a longitudinal buffer space between the work area and the start of the downstream taper.

See the USFA publication *Traffic Incident Management Systems* for more information on establishing TTCs.



**Figure 5-3
Vehicle Placement**

Vehicle Placement

Effective and safe management of a roadway incident scene begins with the arrival and positioning of the first apparatus. From the very outset of the incident it should be the goal of all responders to protect the incident work area and those who will be operating within this area. According to *Improving Apparatus Response and Roadway Operations Safety in the Career Fire*

Service, developed by the IAFF in conjunction with the USFA, the driver/operator has three primary concerns when determining where to park the apparatus on a roadway emergency scene:

1. Park the apparatus in a manner that reduces the chance of the vehicle being struck by oncoming traffic.
2. Park the apparatus in a manner that shields responders and the operational work area from being exposed to oncoming traffic (Figure 5-3).
3. Park the apparatus in a location that allows for effective deployment of equipment and resources to handle the incident.

The procedures for performing each of these options will differ depending on the type of incident, the type of road, and the surroundings of the emergency scene. Drivers must be versed in the appropriate positioning procedures for all of the possible environments within which they may be expected to operate.

Prior to exiting an emergency response vehicle, personnel must:

- check to ensure that traffic has stopped to avoid the possibility of being struck by a passing vehicle;
- communicate with all personnel via any onboard communications system that traffic has come to a stop and it is safe to exit;
- look down on the incident grounds to ensure that debris will not become an obstacle, resulting in a personal injury; and
- wear full-protective clothing and traffic vests as the situation indicates. (Refer to American National Standards Institute (ANSI)/International Safety Equipment Association (ISEA) 107 and 207, most recent edition, for specific requirements of high-visibility safety apparel.)

The speed of traffic must be considered when establishing a safe work area. Use Table 5-2 on the following page to determine how far to place the first cone or flare away from the incident scene.

Table 5-2
Stopping Sight Distance as a Function of Speed

Speed (mph)	Distance (ft.)
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645
70	730
75	820

Weather should be taken into consideration when setting up the work zones. Rain and fog decrease motorist visibility and wet road surfaces increase the risk of secondary collisions.

Apparatus Visibility at Night

Two critical issues related to night visibility are color recognition and glare recovery by the oncoming motorists. Because most emergency vehicle warning lights are red, it is important to remember that as the human eye adapts to the dark the first color to leave the spectrum is red. Red tends to blend into the nighttime surroundings. Newer vehicles now have a combination of red and blue strobes.

Vision recovery from the effects of glare depends on the prevailing light conditions. Vision recovery from dark to light takes 3 seconds; from light to dark takes at least 6 seconds. A vehicle traveling at 50 mph covers approximately 75 feet per second or 450 feet in the 6 seconds before the driver fully regains night vision. Headlights on the apparatus that shine directly into oncoming traffic can result in drivers literally passing the incident scene blinded.

To reduce the potential negative effects as a result of glare, headlights and fog lights should be shut off at night scenes. Floodlights should be raised to a height that allows light to be directed down on the scene. This can reduce trip hazard by reducing shadows and reduces the chance of blinding oncoming drivers. Many highway safety specialists believe that the rear lights on emergency vehicles parked at a roadway scene should be amber. Many fire departments have moved toward the use of all amber warning lights when parked on the roadway during nighttime operations. In some cases the vehicles are equipped with interlocks that automatically shut off all nonamber warning lights when the parking brake is set.

Section 6I.05 of the MUTCD addresses the use of warning lights as follows:

The use of emergency lighting is essential, especially in the initial stages of a traffic incident. However, it only provides warning; it does not provide effective traffic control. Emergency lighting is often confusing to drivers, especially at night. Drivers approaching the incident from the opposite direction on a divided roadway are often distracted by the lights and slow their response resulting in a hazard to themselves and others traveling in their direction. (It also often results in traffic congestion in the unaffected opposite lane[s] and increases the chance of a secondary collision.)

Clearing Traffic Lanes

Reducing and/or shutting down traffic lanes creates other problems and safety concerns. Closing traffic lanes or keeping lanes closed unnecessarily disrupts traffic throughout the area, can affect businesses in the region significantly, and greatly increases the risk of a secondary incident resulting from traffic backup. One minute of stopped traffic causes an additional 4-minute traffic delay. Therefore, apparatus should be repositioned to allow traffic to flow on as many lanes as possible as soon as the operational phases (extrication, medical care, and suppression) are completed. The officer-in-charge should open closed lanes and place Units in service as soon as practical. However, do not move vehicle parts or "nonessential" items that would later hamper a police investigation.

Policies, Procedures, and Guidelines

As the HSO develops policies, procedures, and guidelines, it is essential to consider standards and recommendations of other area response agencies, DOT, and national organizations.

ACTS OF VIOLENCE AND TERRORISM

The fire service is much more aware now that acts of violence can occur at any incident. Terrorism is something that needs to be considered in all the operating procedures the department adopts.

Terrorism Defined

Terrorism is defined as the use of force or violence against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof to further political or social objectives.

In recent years we have seen attacks against the government and civilians from both foreign and domestic groups. Here is the list:

- Oregon--biological agent dispersed in salad bars;
- Atlanta, GA--Olympic Plaza bombing;
- Sandy Spring, GA--abortion clinic bombing;
- Vail, CO--ski resort, incendiary (arson);
- Fairfax, VA--Central Intelligence Agency (CIA) armed attack;
- New York City, NY--first World Trade Center (WTC) bombing (1993);
- Oklahoma City, OK--Federal building bombing;
- New York City, NY and Arlington, VA; Shanksville, PA--9/11 attacks using hijacked airplanes;
- Boca Raton, FL--anthrax attacks; and
- New York City and Washington, DC--anthrax attacks via mail.

Fire and EMS departments need to be aware that risks and vulnerabilities cannot be viewed just in terms of isolated incidents. We also know that responders can be targets at terrorist events and there is the potential for a carefully timed sequence of additional acts planned to inflict further harm to those who respond. These additional acts can include

- armed resistance;
- use of weapons;
- booby traps; and
- more incidents, of varying types.

Categories of Terrorist Incidents

Chemical Incidents

Chemical agents fall into five classes:

1. Nerve agents.
2. Blister agents.
3. Blood agents.
4. Choking agents.
5. Irritating agents.

The primary routes of exposure to chemical agents are inhalation, ingestion, and skin absorption.

Biological Incidents

Biological agents include anthrax, tularemia, cholera, plague, botulism, and smallpox. Exposure to these agents can occur in a variety of ways: inhalation (aerosol spray or fine powder), ingestion (food or water contamination), direct skin contact, or injection.

Incendiary Incidents

An incendiary device is any mechanical, electrical, or chemical device used to initiate combustion and start a fire intentionally. Incendiary devices may be simple or complex, and come in all shapes and sizes. The type of device is limited only by the terrorist's imagination and ingenuity. Only specially trained personnel should handle incendiary devices discovered prior to ignition.

Nuclear/Radiation Incidents

There are two threats in the area of nuclear incidents. The first is the threatened detonation of a nuclear bomb. The second is the threatened or actual detonation of a conventional explosive incorporating radioactive material. Although the potential for a terrorist organization having access to nuclear explosives was thought to be almost impossible, with the recent changes in terrorist events, we must never be complacent.

Explosive Incidents

It is estimated that 70 percent of worldwide terrorist attacks involve explosives. Bombings are the most likely terrorist attack encountered. Explosions rapidly release gas and heat, affecting both people and structures. Bombs almost always work as designed. It is important to remember that explosions can cause fires, and fires can cause explosions. Firefighters always must be aware of the potential for secondary devices.

Potential Responder Injuries

There are many possibilities for injuries to emergency personnel responding to acts of violence and terrorism. These include

- improvised explosive devices;
- secondary explosive devices;
- firearms;
- exposure to chemicals;
- trapped in building collapse;
- exposure to biological agents;
- exposure to infectious diseases;
- burns from incendiary fire;
- injuries due to damaged building; and
- overexertion.

Key Areas for Protecting Responders

There are no easy answers to protecting responders from these threats, but self-protection is built on the three key areas used for hazmat incidents: time, distance, and shielding.

Time

You should spend the shortest amount of time possible in the hazard area. Use techniques such as rapid entries to conduct reconnaissance and rescue. Minimizing time spent in the affected area also reduces the chance of contaminating the crime scene.

Distance

It should be an absolute rule to maintain a safe distance from the hazard area or projected hazard area. If at all possible, be upwind and uphill from the source. An excellent resource for determining safe distances is the Table of Initial Isolation and Protective Action Distances found in the *North American Emergency Response Guide* (NAERG). This book typically is carried on all emergency response vehicles. Additional copies may be available through local and State emergency management agencies.

Shielding

This can take various forms such as vehicles, buildings, walls, and PPE. However, no matter how much shielding is available, always take full advantage of time and distance.

U.S. Fire Administration Job Aid on Terrorism

The USFA publishes the *Emergency Response to Terrorism: Job Aid*, which is designed to assist the first responder from fire, EMS, hazmat, and/or law enforcement in identifying a potential incident involving terrorists/weapons of mass destruction (WMD) and implementing initial actions. This document is not a training manual but a "memory jogger" for those who have completed the appropriate level of training. This publication is available to emergency response organizations only. It can be downloaded from USFA's Publications Web site at (<http://www.usfa.dhs.gov>).

Safety Operations Team

Safety for terrorism incidents and where there are acts of violence require a team approach. The team should consist of the Incident Safety Officer (ISO), law enforcement, technical advisers, Assistant Safety Officers, and special operational personnel (government and private). The

Safety Operations Team also must communicate closely with Operations (to evaluate and establish operational zones) and EMS (to review exposure symptoms and treatment protocols).

Other responsibilities of the team include

- review, update, and communicate escape routes regularly;
- establish access-control rules of engagement and regularly update them to match the situations;
- provide relief/rotation for Safety Officers;
- establish exposure and documentation procedures;
- notify medical facilities of the situation and the status of patients;
- monitor weather and its impact on operations;
- monitor time on scene and during tactical operations;
- continuously review Rapid Intervention Crew (RIC) operations,
- continuously review Staging locations and procedures;
- continuously review the communications with, the staffing for, and the location of law enforcement;
- continuously review scene security; and
- provide rehabilitation areas.

FACILITY SAFETY

Facility Construction and Design

When designing or considering a design for a new facility, and when renovating a station or other facility, the safety and health of the personnel who will occupy this structure must be of paramount concern. Many risks and hazards can be eliminated and budgets reduced if proper control measures are implemented during the design phase rather than after construction or renovations are completed.

Strategic Planning

Strategic planning is necessary during the design or redesign of new or existing facilities. The department's chief and staff must forecast the current and future needs of the organization. The department's planning staff must ask itself if the current design of the station will be able to accommodate additional personnel/apparatus in 5 to 7 years.

During the design phase, the department's chief and staff must consider the variety of uses for this new facility. The following issues must be considered:

- number of apparatus bays;
- expected size and amount of apparatus;
- size of living quarters;

- rooms for food preparation, hygiene, fitness/recreation, maintenance, and equipment storage;
- administrative offices; and
- public or social use.

Several other issues that must be considered include location, response, use frequency, and special-use equipment.

Location

What are the community's risks and where are they located? Is the proposed location of a facility in an area that has a high crime rate, in an industrial section that could experience an industrial accident, or is it located in a quiet residential area? Is the facility in or near a floodplain, high-wind zone, or seismic region? The location can have a great influence on the safety and health of personnel.

Response

When discussing the location of a facility, consider the response and return of apparatus, normal vehicle traffic, and pedestrian traffic. If the station is on a curve, at an intersection or offsetting intersection, or where drivers will have difficulty seeing an apparatus exit the station, warning devices and traffic signals need to be installed. Stations should be designed to allow apparatus to drive through rather than have to back into quarters from the street.

Occupancy

Will the building be occupied and staffed 24 hours a day? Is the facility for administrative offices or will apparatus only be housed in the building? If the building houses apparatus only, what will occur when personnel perform standby time at the station during inclement weather or periods of high-incident activity? Consideration must be given to eating, sleeping, and hygiene facilities.

Special-Use Equipment

If a facility has additional services added, such as a shop/maintenance facility with cranes, lifts, spray booth, and machinery, what are the hazards to personnel? If a dispatch center is part of the facility, are there provisions such as security, emergency power, and additional space to accommodate this service?

In summary, it is important to realize that strategic planning is critical to the design and use of a department facility. A new facility is a capital expense for a department and the community. Most communities develop a long-term community plan that can be a valuable asset for planning

and designing department facilities. Poor initial planning will create additional expenses in the future.

Life Safety and Building Codes

In accordance with NFPA 1500[®], *Standard on Fire Department Occupational Safety and Health*, all fire stations and fire department facilities must meet the applicable building and fire code requirements. Safety and health for any fire department facility should be given preference. All fire department facilities should conform to NFPA 1[®], *Fire Code*; NFPA 101[®], *Life Safety Code*; and NFPA 70[®], *National Electrical Code*. The fire department and authority having jurisdiction (AHJ) should comply with all applicable plumbing, mechanical, and building codes.

The management of the fire or EMS department must acknowledge that model building codes not only define requirements on the basis of fire and life safety for the personnel assigned to this facility, but also considers the risk to the community posed by the building. Fire-resistive occupancy separations, fire detection and signaling systems, and automatic sprinkler protection must be specified for all fire department facilities. The loss or damage to a fire department facility, including the loss of personnel and equipment, is a tragic, expensive, and devastating event to the community. An incident of this magnitude affects the ability of the organization to provide customer service in an efficient and effective manner.

Occupational Safety and Health Administration Regulations

Depending on the type of department and the location of the jurisdiction, departments may be required to comply with occupational safety and health regulations. The federally-issued regulations (Occupational Safety and Health Administration (OSHA)) are detailed in Title 29 Code of Federal Regulations (CFR), Part 1910, *Safety and Health Standard for General Industry*. These have been incorporated into many State laws. OSHA requirements for fire departments include

- 29 CFR 1910.95, Occupational Noise Exposure;
- 29 CFR 1910.120, Hazardous Waste Operations and Emergency Response;
- 29 CFR 1910.133, Eye and Face Protection;
- 29 CFR 1910.134, Respiratory Protection;
- 29 CFR 1910.154, Fire Protection;
- 29 CFR 1910.1030, Occupational Exposure to Bloodborne Pathogens; and
- 29 CFR 1910.1200, Hazard Communications.

These regulations contain detailed safety requirements for new or existing buildings or facilities. Applicable equipment for stations and facilities should be purchased conforming to or exceeding the requirements of 29 CFR 1910. Existing equipment and facilities should be inspected and brought into compliance.

Americans with Disabilities Act

In addition to the model codes and standards, Federal legislation was passed in 1990 that affected the design and operation of department facilities. The Americans with Disabilities Act (ADA), Title II, requires the U.S. Department of Justice (DOJ) to issue and enforce guidelines (Americans with Disabilities Act Accessibility Guidelines (ADAAG)) for making buildings and facilities accessible to and usable by individuals with disabilities. This legislation applies ADA requirements to public entities such as stations, administrative offices, training centers, and other buildings.

These guidelines apply to new and existing buildings and facilities. Public entity buildings constructed after July 26, 1992, must meet ADAAG. All alterations and additions to Title II buildings must comply with the ADA. Each department must ensure that all buildings and facilities are accessible and use features that are being maintained properly.

If the public visits or uses a department facility, ADA requires disabled parking space(s) close to the building. Access to your facility by a disabled person may require ramps and doors that provide access to personal use areas such as bathrooms, drinking fountains, and telephones.

Health Hazards

Risks or hazards associated with personnel health must be considered, since those risks or hazards can cause an accident or injury. Health risks can cause serious occupational injuries. Health exposures can lead to acute medical illnesses such as cancer, staphylococcus infections, or hepatitis C. These health hazards are not new to the fire service, but they need to be addressed through the fire department's Occupational Safety and Health Program.

Hygiene

Personal hygiene is a fundamental defense against preventing exposures to germs, bacteria, and communicable diseases. All department facilities should have the proper hygiene facilities for washing and cleaning. Restrooms and bathrooms can be a significant source of infection if they are poorly designed and maintained. Restrooms and bathrooms should be kept sanitary. Hand washing should be done only in restrooms or bathrooms, not in kitchen sinks. Restrooms and bathrooms should have push-to-open doors with no handles. This assists in eliminating a place for infectious agents to accumulate and breed. Sink faucets should not require the user to grasp them to turn them on or off. In the event that an old-type faucet exists, the user should turn the faucet on when washing, but use a paper towel to turn off the faucet after drying.

Hand-drying materials should be disposable, or an air-drying machine should be available. This decreases the possibility of infectious bacteria accumulating or breeding on the multiple-use cloth. Although there is the possibility of germs or bacteria being on disposable hand-drying material, the possibility is so remote that it can be disposed of like regular household refuse.

The reinforcement of good personal hygiene is very important. Hand washing is an important element in the process and should be encouraged strongly. In each restroom and bathroom a sign stating "**wash your hands**" should be posted prominently to remind members to take proper measures to protect themselves.

A clothes washer and dryer should be available in each station. The laundry room should be kept clean and orderly. This washer and dryer are to be designated for station/work uniforms. This prevents or avoids contaminated station/work uniforms being taken home by personnel and cross-contaminating family laundry. All necessary detergents and prescrub, proper water temperature, and laundering instructions should be available at the fire station.

Diesel Exhaust

Chapter 9 of NFPA 1500[®] requires that a fire department develop a strategy and action plan for preventing the exposure of firefighters to exhaust emissions, and/or the contamination of living and sleeping areas. Due to the need for a quick response by firefighters to any alarm, fire apparatus is parked close to living areas. The need for immediate service and maintenance of apparatus to maintain good operating conditions dictates the need to park apparatus in an enclosed apparatus bay. The exhaust from all internal combustion engines, including gasoline-powered and diesel-powered engines, contains carbon monoxide, partially burned hydrocarbons, and oxides of sulfur and nitrogen. All of these components of exhaust can be or are harmful to humans.

Studies have shown a direct relation between the chronic effects of exposure to diesel exhaust and lung cancer. The report results indicate that an occupational carcinogenic hazard exists in human exposure to diesel exhaust. As new stations are constructed or existing stations are renovated, a separation between the apparatus floor and living quarters should be provided. There are numerous methods to reduce exposure to exhaust emissions. The most effective method is to connect a hose to the apparatus and vehicles that ventilates exhaust to the outside. This designed exhaust ventilation system should meet all local codes and applicable regulations. Other systems eliminate particulate components of exhaust by filtering the exhaust as it is produced. A reduction in soot accumulation within the apparatus bays and throughout the fire station is a true benefit of an exhaust emission control.

Carbon Monoxide Detectors

Due to the fact that most stations have sleeping and living facilities, the need for carbon monoxide detectors exists. Carbon monoxide is a byproduct of combustion, present whenever fuel is burned. Carbon monoxide is produced by common household appliances such as gas or oil furnaces, refrigerators, clothes dryers, water heaters, gas ranges, and space heaters. Fumes from apparatus and vehicles also contain carbon monoxide and can enter living and sleeping spaces through doorways. All of these sources can contribute to a carbon monoxide problem in a station or other department facility. Carbon monoxide can be trapped in a station due to proper insulation and energy efficient design. Furnace heat exchangers can crack, vents can become

clogged or blocked, or inadequate air supply for combustion appliances can force contamination into the facility.

Carbon monoxide detectors should be placed in the station or facility, especially in the living and sleeping quarters. Also, all equipment should be inspected and maintenance provided as needed. Chapter 7 of NFPA 1500[®] requires that all existing and new fire department facilities have carbon monoxide detectors installed throughout sleeping and living areas.

Infection Control

Department facilities are not exempt from regulations and standards that ensure a safe and healthy work environment. Infection control programs have been covered in Unit 4: Health Maintenance already. Please refer to Unit 4: Health Maintenance.

Facilities must be designed to provide the proper working conditions and to conform to contemporary infection control standards. Proper equipment, protective clothing, and disposal of infectious waste must be provided to ensure compliance with 29 CFR 1910.1030, *Bloodborne Pathogens*. An excellent resource to develop a fire department infection control program is NFPA 1581[®], *Standard on Fire Department Infection Control Program*.

If emergency medical care is provided by the department, proper disinfecting and cleaning will need to occur. The facility will need to be equipped with a decontamination area to properly disinfect personnel, protective clothing, and equipment.

Facility safety and health is just one part of the infection control process. The HSO and the Infection Control Officer must develop an infection control plan that incorporates all the components of the infection control program. All personnel must be trained annually on these procedures, and a periodic review should be completed to determine compliance. A good time to monitor and ensure compliance is after an incident that required decontamination of personnel or equipment.

Infection control procedures should address issues such as the following:

- hand washing;
- the need for protective clothing and equipment while disinfecting and cleaning;
- disinfecting medical equipment, protective clothing, and protective equipment properly and effectively;
- disinfecting and cleaning areas, once finished;
- disposal of contaminated materials in a proper container marked "Infectious Waste"; and
- storing sharps in a sharps container and properly disposing of the container on a regular basis.

Adherence to State and local laws governing infection control is necessary. Failure to comply with these regulations may be the cause of an occupational exposure, which can create added liability for the department.

Decontamination Areas

Disinfecting personnel and equipment must not be performed in the kitchen, living areas, sleeping areas, or personal hygiene areas. Decontamination areas need to be separate areas, properly marked and secured. Appropriate disinfection supplies must be available for personnel to perform these tasks. A nonporous sink, such as stainless steel, with hot and cold running water, should be available. Nonporous materials are more effective than the traditional porous materials such as wood, plastic, and porcelain. These porous materials have a tendency to allow foreign matter to permeate the surface, which makes disinfection of the sink difficult. Other equipment needed for the decontamination area includes

- racks or shelves for air-drying equipment;
- two sinks;
- sprayer attachment;
- drains attached to sanitary sewer system or septic system;
- faucets not requiring grasping;
- continuous molded countertops/splash panels;
- proper lighting;
- proper ventilation; and
- floor drains attached to the sanitary sewer system.

Most stations were not initially designed to incorporate decontamination of infectious waste. Stations that do not have a separate or available room for decontamination may have to add a room or erect a separate building. Each department should develop a plan to address decontamination.

Facility Areas

Each area of a station or facility has particular safety and health issues and features that need to be identified, evaluated, implemented, and monitored.

Kitchen

The kitchen is the central location of activity in most fire stations, including food preparation, eating, discussions/meetings, and watching television. With so many activities occurring in this area, safety and health procedures are paramount. **Medical equipment should never be cleaned, disinfected, or stored in the kitchen area.** All equipment cleaning should be done in a designated area to ensure that chemical or biological agents do not come in contact with food or food preparation utensils and equipment.

Double sinks and a dishwasher should be provided to properly clean dishes and utensils. The refrigerator/freezer should be able to maintain foods at proper temperatures--cold storage at 38 °F (3.3 °C) or less and freezer temperatures at 0 °F (-18 °C) or less. In addition to regular inspections of cold storage appliances, a thermometer should be placed in a conspicuous location in both the refrigerator and the freezer.

Countertops and shelving should be constructed of nonporous materials. Food should be covered and stored properly. Items such as pork, chicken, eggs, and shellfish should be prepared properly to kill the parasites or bacteria normally present in these foods. In the event of an alarm, food should be stored properly to prevent food poisoning. Good safety practices must be used by all members working in the kitchen. Common safety practices should include

- cleaning up after spills;
- storing sharp objects, especially knives, in a safe manner;
- discouraging horseplay;
- watching food on the stove at all times;
- turning off all burners and ovens when not in use;
- using all appliances in accordance with manufacturers' instructions; and
- exercising extreme caution when using knives, graters, slicers, or can openers.

Floors and Walkways

Good housekeeping of floors and walkways is essential to prevent accidents and serious injuries in department facilities. Floors must be kept clean and free from slipping hazards such as loose items and spills. Aisles must be free from obstructions and stairs should be well lighted. Walking surfaces, such as floors, stairs, and aisles, and items such as handrails, slide poles, and slides must be maintained in a safe and operable condition.

Station floors usually have smooth concrete and glossy tile surfaces, which are easily maintained but can cause falls. Ensure that floors are clean and free from slip hazards. The installation of a nonslip floor surface or all-weather carpeting will reduce the slipping problem. Apparatus floors also are being constructed of nonslip material that will accommodate the wear and tear of fire apparatus.

Sleeping Quarters

There should be a minimum floor space for each bed, allowing for rapid and easy access during alarms. Proper ventilation, heating, and cooling are essential to the health of personnel residing in the station. Sleeping quarters should be separated from the rest of the facility, and protected by a fire-resistive wall as well as smoke detectors, carbon monoxide detector(s), and an automatic sprinkler system.

Bathrooms

In addition to the hygiene issues and properly maintaining clean restrooms and bathrooms, showers should be cleaned regularly to prevent the growth of mold and mildew. Showers should have curtains or doors to minimize the amount of water that reaches the floor of the bathroom. Safety glass or plastic panels should be used in the shower doors. Drying racks for towels should be available, and there should be good ventilation to prevent mold and mildew.

Storage

Clean equipment and unused supplies should have a separate storage area. This ensures that contaminants are isolated. The storage area needs to be conspicuously marked and secured. In the event a separate area is not available, a secure locker or cabinet can be used as a suitable substitution. General storage areas have a tendency to become disorganized and cluttered, which can cause slips, falls, fire, or being struck by an object.

Some general safety considerations:

- limited storage in utility rooms;
- storage well organized and maintained;
- heavy items stored near the floor;
- no items blocking utility boxes or escape routes;
- flammable liquids stored in safety containers;
- containers for flammable liquids stored away from heat sources, preferably in a storage container or outside the facility; and
- containers marked properly as to their contents.

Shop/Maintenance Areas

The shop/maintenance area of a station or facility has potential for causing accidents and injuries to personnel. Due to the various types of equipment that can be used, personnel must be properly trained on the equipment before it is used. The HSO should develop detailed procedures for the type of work to be done in the shop.

Equipment must be inspected regularly for defects or broken parts prior to use. Defective or broken equipment should be removed, repaired, or replaced based upon department protocol. Minimal safety equipment should include eye protection and hearing protection, based on noise levels of the equipment. Ventilation is another concern that must be addressed, depending on the types of work conducted in the shop. Housekeeping is a critical factor for ensuring a safe work environment. Poor housekeeping practices can lead to accidents, injuries, and possible fires in the shop area.

Offices

Because the office is a nonemergency work environment, safety issues are often overlooked. Many office injuries are caused by unsafe acts (slips and falls).

Consideration must be given to the type and quality of office furniture purchased. Quality office furniture presents a positive image for the organization and provides for the safety of personnel. Chairs should be purchased that provide proper back support, are comfortable, and will not tip over. Chairs should not be used as a ladder or a step especially if they have casters. Personnel must be extremely careful when working with filing cabinets. Drawers left open can cause a tripping injury or cause the file cabinet to tip over. Office supplies such as pens, pencils, and letter openers should be stored carefully with points down to prevent puncture wounds. When not in use, paper cutters should be kept with the blade down and should be equipped with a blade guard.

Hazards such as fans and portable heaters should be used in areas where they will not be knocked over or will not present a tripping hazard. Electrical cords and telephone wires should be secured. All aisles should be free from storage or materials that could cause a fall. Exits and proper fire protection devices should be present for the safety of personnel as well as presenting a good public image.

Fire Safety Protection

Portable Fire Extinguishers

All department facilities should be equipped with portable fire extinguishers in accordance with applicable standards, NFPA 10[®], *Standard for Portable Fire Extinguishers*. Kitchens, storage areas, shops/maintenance areas, living areas, and offices must be equipped with fire extinguishers that are appropriate for the potential hazard(s) in that particular area of the facility. These portable fire extinguishers should be part of the facility and not assigned to apparatus.

Smoke Detectors

Smoke detectors and a sprinkler system should be provided for all new stations and should be installed when existing buildings are renovated. Smoke detectors should be installed in sleeping quarters, living areas, work areas, and general storage areas. Apparatus bays should be protected by heat detectors.

Sprinkler Systems

NFPA 1500[®] does not specifically require the installation of a sprinkler system in all department facilities, though this practice is strongly encouraged. Local fire or building codes may incorporate NFPA 101[®] depending on the type and use of the department facility. The

installation of a complete sprinkler system in a new department facility may lower the overall cost of the facility. This is due to the alternatives in design and construction, which reduce the costs of construction and the insurance premiums after construction has been completed.

Numerous reasons exist for recommending the installation of a sprinkler system in a department facility. First, a sprinkler system has an impressive track record for the protection of property. The cost of building a station and equipping it with the proper apparatus and inventory is quite an investment for a community. The loss of this property and equipment can have a devastating effect on a community. Second, department members and citizens have a right to be properly protected from fire by a sprinkler system. Every member of the department clearly understands the importance and need for this life-safety equipment to be installed in all buildings. Automatic sprinkler systems installed in department facilities add credibility to the department in the community, plus provide protection for department members.

Facility Inspections

Periodic and Annual Inspections

NFPA 1500[®], Chapter 9, requires that all fire department facilities be inspected at least annually. The HSO is responsible for ensuring that the inspection is conducted. The HSO may or may not be the individual that conducts the inspections. Each fire department is encouraged to develop a checklist that will serve as a guide for documenting and recording the outcome of the inspection. An additional requirement of NFPA 1500[®] is that all facilities should be inspected at least monthly to identify any potential hazards that may exist. The hazards must be corrected in a timely manner.

Maintenance for Department Facilities

The department must establish or have an established system for maintaining all department facilities. This facility or building maintenance program must provide the immediate correction of any safety or health hazard or code violation that currently exists.

In certain situations, department facilities are maintained by an agency other than the department. If this situation exists, the department must institute procedures that expedite requests for repairs, changes, or modifications that relate to occupational safety and health. The department ultimately is responsible for ensuring the safety of its facilities regardless of who provides the maintenance work. If the department must use another city or jurisdictional department or an outside agency, the department must have the necessary procedures in place to address normal and emergency repairs 24 hours a day. The procedures should include the following:

- medium for reporting hazards;
- method for investigating hazards;

- a standard method for implementing temporary control measures (blocking off area, limiting access);
- determining the need for maintenance or repair;
- scheduling and completion of repair; and
- a standard method for ensuring work was completed correctly and in a timely manner.

Once the inspection has been completed, all violations or deficiencies should be corrected immediately. The key is to comply with applicable regulations and standards, such as the requirements of NFPA 1500[®].

INCIDENT SCENE REHABILITATION

When responding to an incident and conducting operations, one of the most important set of safety control measures deals with the responders themselves. For example, wildland fire incidents include long and arduous physical labor. Structural firefighting has the same concerns whenever the incident is of a long duration. Responder safety concerns also arise from weather which affects all incidents.

No matter what the event or incident, responders need to have a process set up so they can move out of the operational line and receive rehabilitation (often so they can return to incident operations). Exhausted, injured, exposed, cold or overheated responders are at personal risk and can jeopardize the success of incident management.

The department should maintain SOPs or Standard Operating Guidelines (SOGs) that outline a systematic approach for the rehabilitation of personnel operating at incidents. These procedures should cover: medical evaluation and treatment, food and fluid replenishment, crew rotation, and relief from extreme climatic conditions. They should outline ongoing rehabilitation for simple or short-duration incidents. Procedures should also outline situations where it is necessary to transition into the rehabilitation needs of a large or long-duration incident.

Medical evaluation and treatment in the onscene rehabilitation area should be conducted according to EMS protocols. If advanced life support (ALS) personnel are available, this level of EMS care is preferred. The IC should consider the circumstances of each incident and initiate rest and rehabilitation of members in accordance with the department's SOGs. Guidance can be found in Chapter 8 of NFPA 1500[®], NFPA 1584[®], *Standard on the Rehabilitation Process for Members During Emergency Operations and Training Exercises*, and the USFA's report *Emergency Incident Rehabilitation*.

Rehabilitation

Typical rehabilitation considerations for operations during hot weather extremes include

- moving fatigued or unassigned personnel away from the hazardous area of the incident;
- removal of PPE;
- ensuring that personnel are out of direct sunlight;

- ensuring that there is adequate air movement over personnel, either naturally or mechanically;
- providing personnel with fluid replenishment, especially water; and
- providing medical evaluation for personnel showing signs or symptoms of heat exhaustion or heat stroke.

Typical rehabilitation considerations for operations during cold weather extremes should include

- moving fatigued or unassigned personnel away from the hazardous area of the incident;
- providing shelter from wind and temperature extremes;
- providing personnel with fluid replenishment, especially water; and
- providing medical evaluation for personnel showing signs or symptoms of frostbite, hypothermia, or other cold-related injury.

Emergency Medical Care

The Incident Safety Officer (ISO) should know how to assist the IC to establish incident-scene rehabilitation during emergency operations following NFPA 1521[®], NFPA 1584[®], and the USFA's *Emergency Incident Rehabilitation* guidelines.

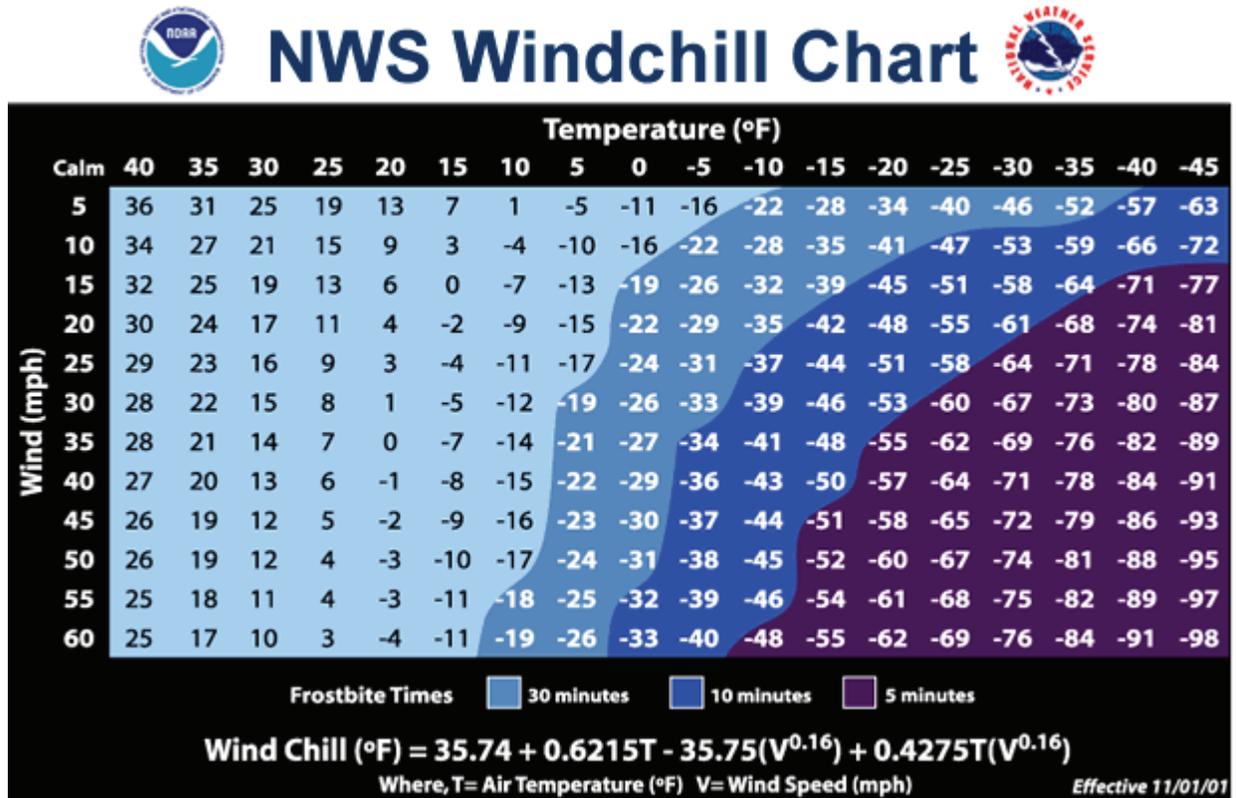
The minimum level of emergency medical care available shall be at least basic life support (BLS) care. The assignment of an ambulance or other support crew to the rehabilitation function is essential during long-duration or heavy-exertion incident operations. This crew can assist with rehabilitation functions as well as be available to provide immediate BLS needs for members. An ALS level of care is preferred for long-duration events and should, at the least, be quickly available to ensure the proper level of care.

The rehabilitation area should be established in a safe environment away from the hazardous area of the incident.

WEATHER FACTORS

Weather factors during emergency incidents can have a severe impact on the safety and health of the members. Humidity and wind have significant effects on temperature. Wind chill temperatures are maintained in a chart found within NFPA 1584[®]. Table 5-2 shows the frostbite times and Table 5-4 shows the temperature danger categories. When these factors combine with long-duration incidents or situations that require heavy exertion, the risks to members increase rapidly. The fire department should develop procedures, in consultation with the fire department physician, to provide relief from adverse climatic conditions.

Table 5-2
Wind Chill Temperatures



**Table 5-3
Heat Index Chart**

Heat Stress Index									
Temp °F	Relative Humidity								
	10 %	20 %	30 %	40 %	50 %	60 %	70 %	80 %	90 %
104	98	104	110	120	132				
102	97	101	108	117	125				
100	95	99	105	110	120	132			
98	93	97	101	106	110	125			
96	91	95	98	104	108	120	128		
94	89	93	95	100	105	111	122		
92	87	90	92	96	100	106	115	122	
90	85	88	90	92	96	100	106	114	122
88	82	86	87	89	93	95	100	106	115
86	80	84	85	87	90	92	96	100	109
82	77	79	80	81	84	86	89	91	95
80	75	77	78	79	81	83	85	86	89
78	72	75	77	78	79	80	81	83	85
76	70	72	75	76	77	77	77	78	79
74	68	70	73	74	75	75	75	76	77

Note: Add 10° when protective clothing is worn and add 10° when in direct sunlight.

**Table 5-4
Temperature Danger Categories**

Temperature °F	Danger Category	Injury Threat
Below 60	None	Little or no danger under normal circumstances.
80 to 90	Caution	Fatigue possible if exposure is prolonged and there is physical activity.
90 to 105	Extreme Caution	Heat cramps and heat exhaustion possible if exposure is prolonged and there is physical activity.
105 to 130	Danger	Heat cramps or exhaustion likely, heat stroke possible if exposure is prolonged and there is physical activity.
Above 130	Extreme Danger	Heat stroke imminent!

PERSONAL PROTECTIVE EQUIPMENT--SELECTION, CARE AND MAINTENANCE

The following NFPA standards provide the basics for the treatment of equipment and gear:

- NFPA 1851[®], *Standard on Selection, Care and Maintenance of Structural Fire Fighting Protective Ensembles* has had a major impact on the fire service. The standard specifies minimum selection, care, and maintenance requirements for structural firefighting protective ensembles.
- NFPA 1971[®], *Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting* establishes minimum levels of protection for operations including, but not limited to, structural firefighting, proximity firefighting, rescue, emergency medical, and other emergency first responder functions. NFPA 1971[®] addresses elements of the individual ensemble, including: coats, trousers, coveralls, helmets, gloves, footwear, and interface components.
- NFPA 1982[®], *Standard on Personal Alert Safety Systems (PASS)*. Based on work begun in 1980, this standard was developed in response to requests from the fire service to establish requirements for a device that would sound an audible signal for aid if a firefighter became incapacitated while operating at an emergency. NFPA 1982[®] specifies minimum requirements for the design, performance, testing, and certification for Personal Alert Safety Systems (PASS) for emergency services personnel. The first edition of NFPA 1982[®] was issued in 1983.
- NFPA 2112[®], *Standard on Flame-Resistant Garments for Protection of Industrial Personnel Against Flash Fire*. Based on work begun in 1999, NFPA 2112[®] provides minimum requirements for the design, construction, evaluation, and certification of flame-resistant garments for use by industrial personnel, with the intent of providing a degree of protection to the wearer and reducing the severity of burn injuries resulting from accidental exposure to hydrocarbon flash fires. The first edition of NFPA 2112[®] was issued in 2001.
- NFPA 2113[®], *Standard on Selection, Care, Use and Maintenance of Flame-Resistant Garments for Protection of Industrial Personnel Against Flash Fire*. Based on work begun in 1999, the purpose of NFPA 2113[®] is to reduce the health and safety risks associated with the incorrect selection and use of flame-resistant garments and those risks associated with incorrectly maintained, contaminated, or damaged flame-resistant garments. The first edition of NFPA 2113[®] was issued in 2001.
- NFPA 1951[®], *Standard on Protective Ensembles for Technical Rescue Operations*. Based on work begun in 1997, this standard answers the need for PPE for fire and emergency services personnel operating at technical rescue incidents involving building or structural collapse, vehicle accidents, confined spaces, trench cave-ins, scaffolding collapses, high-angle climbing accidents, and similar incidents. The first edition of NFPA 1951[®] was issued in July 2001.

- NFPA 1981[®], *Standard on Open-Circuit Self-Contained Breathing Apparatus (SCBA) for Emergency Services*. Based on work begun in 1975, this standard specifies the minimum requirements for the design, performance, testing, and certification of open-circuit SCBA and combination open-circuit SCBA and supplied air respirators (SAR) for the respiratory protection of fire and emergency responders where unknown, immediately dangerous to life and health (IDLH), or potentially IDLH atmospheres exist. The first edition of NFPA 1981[®] was issued in 1981.
- NFPA 1991[®], *Standard on Vapor-Protective Ensembles for Hazardous Materials Emergencies*. Based on work begun in 1986, NFPA 1991[®] specifies the minimum requirements for the design, performance, testing, and certification of vapor-protective ensembles and individual protective elements for chemical vapor protection for fire and emergency service personnel. Additional optional criteria are provided for ensembles and individual protective elements that provide protection for chemical flash fire escape, liquefied gas, chemical and biological warfare agents, and chemical and biological terrorism incidents. The first edition of NFPA 1991[®] was issued in 1990.
- NFPA 1994[®], *Standard on Protective Ensembles for First Responders to CBRN Terrorism Incidents*. Based on work begun in 1998, NFPA 1994[®] specifies the minimum requirements for the design, performance, testing, and certification of protective ensembles for fire and emergency services personnel operating at domestic terrorism incidents involving dual-use industrial chemicals, chemical terrorism agents, or biological terrorism agents. The intent is that the ensembles would be available in quantity, easily donned and used, and designed for single exposure use. The first edition of NFPA 1994[®] was issued in 2001.
- NFPA 1975[®], *Standard on Station/Work Uniforms for Fire and Emergency Services*. Based on work begun in 1975, this standard specifies requirements for the design, performance, testing, and certification of nonprimary protective station/work uniforms and the individual garments comprising station/work uniforms. The document sets requirements for fire and emergency services personnel station/work uniforms that will not contribute to burn injury severity. The first edition of NFPA 1975[®] was issued in 1985.
- NFPA 1992[®], *Standard on Liquid Splash-Protective Ensembles and Clothing for Hazardous Materials Emergencies*. Based on work begun in 1985, NFPA 1992[®] specifies minimum requirements for the design, performance, testing, documentation, and certification for liquid splash-protective ensembles, ensemble elements, and protective clothing used by emergency response personnel during hazmat incidents. The first edition of NFPA 1992[®] was issued in 1990.

- NFPA 1999[®], *Standard on Protective Clothing for Emergency Medical Operations*. Based on work begun in 1990, NFPA 1999[®] specifies the minimum documentation, design, performance, testing, and certification requirements for new single-use and multiple-use emergency medical protective clothing, including garments, gloves, footwear, and face protection devices used by fire and emergency services personnel during emergency medical operations. The purpose of the standard is to establish a minimum level of protection from contact with blood and body fluid-borne pathogens for personnel performing patient care during emergency medical operations. The first edition of NFPA 1999[®] was issued in 1992.
- NFPA 1976[®], *Standard on Protective Ensemble for Proximity Fire Fighting*. NFPA incorporated NFPA 1976[®], which was previously adopted by the Department of Homeland Security (DHS), into the 2007 edition of NFPA 1971[®].
- NFPA 1852[®], *Standard on Selection, Care and Maintenance of Open-Circuit Self-Contained Breathing Apparatus (SCBA)*. NFPA 1852[®] establishes procedures as part of a program to provide care and maintenance for open-circuit SCBA and combination SCBA/SAR in order to reduce the safety risks and potential health risks associated with poorly maintained, contaminated, or damaged SCBA. NFPA 1852[®] was first issued in 2002.

Selection, Care, and Maintenance

Briefly, NFPA[®] 1851, *Standard on Selection, Care, and Maintenance of Protective Ensembles for Structural Fire Fighting Proximity Fire Fighting*, declares

This program shall have the goal of providing structural firefighting protective ensembles and ensemble elements that are suitable and appropriate;...maintaining...in a safe, usable condition;...removing from use...elements that could cause or contribute to user injury, illness, or death because of its condition; and reconditioning, repairing or retiring such...elements. (Section 2.1.2)

To accomplish these goals, written SOGs need to be incorporated defining the various roles and responsibilities of the organization and its members, as well as identifying the program parts. Normally the chief will oversee this and delegate various roles to other members.

This standard can be broken down into seven main sections:

1. Records.
2. Selection.
3. Inspection.
4. Cleaning and decontamination.
5. Repair.
6. Storage.
7. Retirement, disposal, and special-incident procedure.

Records

Records need to be kept on a minimum of 11 items for each ensemble element. Most manufacturers' now place a barcode on each element to make inventory tracking easy. Bar codes can be added in-house to ensemble elements that arrive without them. There also are a number of computer programs available to manage inventories and recordkeeping.

Selection

The main focus here is to select and purchase structural firefighting ensembles that comply with NFPA 1971[®]. Within this standard, the ensemble element must be certified by an independent, third-party certification organization and should carry a stamp on the product label stating such.

Inspection

Unsoiled ensembles need not be cleaned according to Section A.4.1.2:

Ensembles and ensemble elements do need to be inspected however. Inspections can be divided into two categories: routine and advanced. But if hazmat or biological agents contaminate any element, it must be decontaminated prior to any inspection or use.

Routine inspections are to be carried out by each member after each use, but only if exposed, or suspected of having been exposed, to contamination or damage. All ensemble elements, including coats, trousers, hoods, helmets, gloves, and footwear should be inspected for soiling; contamination; physical damage or missing parts; thermal damage; shrinkage; and loss of water resistance, elasticity, and flexibility.

Advanced inspections should be carried out by members who have received training in the inspection of structural firefighting protective clothing and equipment. Each organization should determine the appropriate training level for its department.

Advanced inspections need to be conducted at least once annually or sooner if routine inspections indicate the need. Such inspections should be documented on an inspection form. This is a logical assignment for the HSO.

Ensemble elements should be graded into one of four groups:

1. New or like-new condition.
2. Good condition.
3. Maintenance needed.
4. Immediate replacement.

While it is important to maintain quality records detailing the department's turnout gear, maintaining the gear's quality is even more important.

Cleaning and Decontamination

Cleaning can be a problem for some departments and members. As one career firefighter said, "Don't clean my gear! I don't want to look like a rookie who has never been in a fire. That dirt is my badge of honor."

It's not uncommon for firefighters to wear soiled--and possibly contaminated--turnout gear. Section A.5.1.1 states

The importance of maintaining the cleanliness of ensembles and ensemble elements should not be underestimated. Soiled or contaminated elements are a hazard to firefighters since soils and contaminants can be flammable, toxic or carcinogenic. Additionally, they can have reduced protective performance. Clean elements offer the emergency responder better protection and can add to the life of the elements. Elements should, therefore, be cleaned whenever they have become soiled.

Another area for concern is children. Having inquisitive natures, it's not unusual for them to get right into the action and end up covered in dirt, soot, and contaminants from a firefighter's turnout gear and equipment. They also are less likely to wash away this badge of honor. Extra caution needs to be exercised with the public, and especially children.

Cleaning is broken down into three types: routine, advanced, and specialized. Individual members are responsible for routine cleaning after each use, if any elements are soiled. This light cleaning of ensembles or elements includes spot cleaning, rinsing with a water hose to remove debris, and brushing off any dry material. Most often this can be started at the incident scene, before returning to the station.

If routine cleaning fails to clean the ensemble sufficiently, advanced cleaning is required. Defined as a thorough cleaning by washing with cleaning agents, ensembles will need to be taken out of service temporarily. At a minimum, any element that is soiled shall receive advanced cleaning every 6 months. Contract cleaning, machine washing, and hand washing in a utility sink are all acceptable methods of advanced cleaning. Each organization must determine the level of training required for members who are responsible for performing or managing advanced cleaning.

Specialized cleaning is designed to remove hazardous materials or biological agents. As soon as ensembles or elements are known to be contaminated, they should be isolated, tagged, and bagged for specialized cleaning. If the contaminant can be identified, consult with the manufacturer of the contaminant for an appropriate decontamination agent and process accordingly.

If you're unable to determine the contaminant, use a qualified contract cleaner recommended by the manufacturer. When the ensemble or element is returned, inspect for contamination, repeating this process if needed. The best cleaning procedures for ensembles and elements are the ones provided by the manufacturer. If these aren't available, Section 5.5 details the procedures to follow.

Repair

Sections 6.1.1 and 6.1.3 state

A member(s) of the organization who has received training in the repair of garment elements shall be responsible for performing or managing specialized repairs. All repairs and alterations to garments shall be done in a manner and using materials that are approved by the manufacturer including, but not limited to, fabric, thread type, stitch construction, hardware and hardware backing.

To determine whether field repairs are permitted, the best bet is to check with the ensemble or element manufacturer. The types of field repairs permitted are patching of minor tears, char marks, and ember burns; repairing skipped, broken, and missing stitches; and replacing lost hardware.

Storage

Keeping your gear neat and tidy after each use won't be worth the effort if it isn't treated properly when not in use.

Common sense covers all of the storage requirements. Don't store ensembles and elements in direct sunlight. Clean and dry gear before storing it in a clean, dry, and well-ventilated area. Don't store or transport ensembles and elements in compartments or trunks with sharp objects or other items that could damage the gear. Never store soiled ensembles and elements inside living quarters or with personal belongings unless placed in a protective case or bag to prevent cross-contamination.

Retirement, Disposal, and Special-Incident Procedure

Each organization needs to determine when an ensemble or element should be retired. Factors influencing this decision, among others, should be the overall condition of the item, the cost to repair, the level of deterioration, and the possibility of not adequately removing contaminants and hazmat.

Section 8.2.1 states

Retired structural firefighting ensembles and elements shall be destroyed or disposed of in a manner assuring that they will not be used in any firefighting or emergency activities, including training." An exception to this is if the ensemble or element was retired for reasons other than decontamination or repair problems. Using the ensemble for training purposes is authorized as long as that training doesn't involve live fire, and the ensemble is appropriately marked as such.

In the event of serious firefighter injuries or fatalities, special incident procedures are required for the processing of ensembles and elements. Develop these procedures with other agencies, such as the medical examiner and law enforcement, and other prevailing rules of evidence.

NFPA 1851[®] comes down to seven little words: buy, inspect, clean, fix, store, dispose, and record. Each department needs to incorporate these activities in its day-to-day operations. Doing so can accomplish all of the requirements in NFPA 1851[®]. Failing to do so will lead to safety, health, and liability problems.

SUMMARY

Well-prepared HSOs will have knowledge about as many areas of risk as they can. This will help them to continuously improve the SOPs, the department's training, its hiring practices, the prevention efforts it supports, and the use of its health and fitness events and programs. The benefits to the department are clear. Its members and the public will face lower risks, avoid problems, and/or minimize the harm when the risks are confronted.

Fire and EMS personnel face many hazards and risks. It should be clear by now that situational awareness and firefighter health and fitness are two of the main reasons why injuries and line-of-duty deaths (LODDs) occur. Knowledgeable HSOs can gain the trust and support of all of the department's members. They can communicate better and help the department's leaders to foster a department where safety is woven throughout its administration and operations.

Activity 5.1

Standard Operating Procedures Development for Risk Control

Purpose

To provide a concrete learning opportunity for you about the development of SOPs as a control measure for an operational or organizational risk.

Directions

1. You will be assigned to a small group and given either an operational risk or an organizational risk to address by the instructor. You will discuss how SOPs once adopted and used by personnel can be effective in avoiding, mitigating, or controlling the level of risk and/or the consequences.
2. Prior to attending the class each student will have been asked to bring one or two examples of SOPs used by their organization. These can serve as models for the outline of an SOP for the risk assigned to your group.
3. Each group will outline the basics of an SOP that would offer some level of control and provide bullet points about how it should work, who should know about it and how to use it, how the education and training about it might be done trained, and why this SOP may or may not succeed.
4. Each group will assign a spokesperson who will report to the class about its group's assigned risk and the group's outline and key points for the SOP. This person would also help to field questions and comments offered by the attendees.
5. Each group will have 20 minutes to complete this assignment and 5 minutes to report its findings to the class for a total time of about 50 minutes.

SAFETY AREAS OF CONCERN

Activity 5.1

Worksheet

Scenario 1: Describe the SOPs that would help the ISO to deal with the **initial risk hazard analyses** for a complex incident involving hazmat and a large fire spread over a fringe area (an urban-rural interface).

Scenario 2: Describe the SOPs that help the managers of your search and rescue unit to **establish a Rapid Intervention Crew (RIC) capability** to serve responders involved with a very large, dangerous flood situation.

Scenario 3: Describe the SOPs that an Operations Section Chief might draw upon to help to **find and obtain qualified responders** for a complex, multidiscipline incident where EMS and fire resources are now known to be insufficient.

Scenario 4: Describe the SOPs that might help the situation where two dispatched biological responder units are both returning at the same time, but you have **only one decontamination facility** available.

NOTE-TAKING GUIDE

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**UNIT 5:
SAFETY AREAS OF
CONCERN**



health and safety

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Slide 5-2

OBJECTIVES

The students will:

- Describe the risks and safety approaches expected at wildland fire incidents.
- Describe the risks and safety approaches expected at highway/traffic incidents.
- Describe the safety concerns relating to incidents involving acts of violence.
- Identify the risks associated with department facilities.

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OBJECTIVES (cont'd)

- Describe the importance of incident scene rehabilitation.
- Describe the components of a program for the selection, care, and maintenance of protective clothing and equipment.
- Learn the basics of Standard Operating Procedure (SOP) development.

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Slide 5-4

INTRODUCTION

- The Health and Safety Officer's (HSO's) job is to establish and continuously improve on the Occupational Safety and Health Program of their organization so that the department and each of its members are better prepared to address risks.
- The more the HSO knows, the better.
- The more they know, the better able they will be to communicate about the need for change.

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WILDLAND FIREFIGHTER SAFETY

Wildland and structural firefighters are finding themselves in dangerous role reversals more frequently.



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WILDLAND SAFETY

- Tools and personal protective equipment (PPE)
- "10 Standard Fire Orders" of the National Wildfire Coordinating Group (NWCG)
- "18 Watch Out Situations"



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Slide 5-7

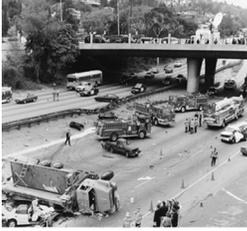
LCES

- **Lookouts**
- **Communications**
- **Escape routes**
- **Safety zones**

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HIGHWAY OPERATIONS



- **Safety**
- **Environmental concerns**
- **Legal and policy directives**

Accident on the State Highway System

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A TEAM EFFORT--FIRE DEPARTMENT

- **Control and extinguish fires**
- **Establish safe work zones**
- **Use warning devices for motorists**
- **Control and mitigate hazardous materials (hazmat)**
- **Assist emergency medical services (EMS)**
- **Extricate trapped victims**
- **Preserve the scene for investigations**

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**A TEAM EFFORT--
EMERGENCY MEDICAL
SERVICES**

- Patient triage and assessment
- Patient treatment
- Responder medical services
- Transportation

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**A TEAM EFFORT--
LAW ENFORCEMENT**

- Coordinate with fire department to establish traffic control
- Secure the scene
- Assist in the identification of fatalities
- Assist in the conduct of investigations

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**A TEAM EFFORT--
DEPARTMENT OF
TRANSPORTATION**

- Coordinate the use of heavy equipment for extrication and removal
- Provide resources and logistical support
- Establish variable message safety boards for motorists
- Assist with traffic control by the use of movable barriers or vehicles

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Emergency Vehicle Safety Initiative
EM-272 August 2006

Alive on Arrival
Tips for Safe Emergency Vehicle Operations

Emergency Vehicle Visibility and Conspicuity Study

Everybody Buckle Up
Every Time

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ONSCENE ACTIONS

- Incident zones--
Manual on Uniform Traffic Control Devices (MUTCD)
- Vehicle placement
- Protective and reflective clothing
- Apparatus visibility at night

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ACTS OF VIOLENCE AND TERRORISM

Terrorism is defined as the use of force or violence against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof to further political or social objectives.

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TERRORIST ATTACKS

- Oregon--biological agent in salad bars
- Georgia--Olympic Plaza and abortion clinic
- Oklahoma City, OK--Federal building
- New York City--World Trade Center (WTC) 1993 and 9/11
- Boca Raton, FL, New York City, and Washington, DC--anthrax

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TYPES OF TERROR ATTACK

- Chemical--nerve agents, choking, blister, blood, and irritating agents
- Biological--anthrax, tularemia, cholera, plague, botulism, and smallpox
- Incendiary--mechanical, electrical, or chemical
- Nuclear/Radiation--threatened detonation, and actual detonation
- Explosive--70 percent of world terrorist attacks

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PROTECTING RESPONDERS

- Time--spend as little time as possible in hot zone.
- Distance--maintain a safe distance from the hazard or projected hazard area. Use the *North American Emergency Response Guide (NAERG)*.
- Shielding--vehicles, buildings, walls, and personal protective equipment (PPE).

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**U.S. FIRE ADMINISTRATION
JOB AID ON TERRORISM**

**Emergency Response to Terrorism:
Job Aid**

<http://www.usfa.fema.gov>

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**SAFETY--A TEAM APPROACH WHEN
THERE IS VIOLENCE**

- Communicate escape routes regularly
- Establish access control
- Provide relief/rotation for the Safety Officers
- Establish exposure and decontamination procedures
- Monitor time
- Monitor weather and its impact
- Continuously review Staging and procedures
- Continuously review scene security
- Provide rehab areas

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FACILITY SAFETY

- Facility construction and design
- Strategic planning
 - Location
 - Response
 - Occupancy
 - Special-use equipment

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**FACILITIES--LIFE
SAFETY AND CODES**

- **Life Safety and Building Codes**
 - NFPA 1500®--all fire stations and fire department facilities must meet the applicable building and fire code requirements
 - NFPA 1®, Uniform Fire Code
 - NFPA 101®, Life Safety Code
 - NFPA 70®, National Electrical Code
- **OSHA Regulations (Title 29 Code of Federal Regulations)**
- **Americans with Disabilities Act (ADA), Title II**

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FACILITY HEALTH HAZARDS

- **Hygiene**
- **Diesel exhaust**
- **Carbon monoxide detectors**
- **Infection control (see Unit 4: Health Maintenance)**
- **Decontamination areas**

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FACILITY SAFETY (cont'd)

• Facility areas	• Fire safety protection
– Kitchen	– Portable fire extinguishers
– Floors and walkways	– Smoke detectors
– Sleeping quarters	– Sprinkler systems
– Bathrooms	• Facility inspections
– Storage	– Periodic and annually
– Shop/Maintenance	– Maintenance
– Offices	

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**INCIDENT SCENE--RESPONDER
REHABILITATION**

- No matter what the incident, responders need to have a process established to move them out of the operational line and receive rehabilitation.
- Procedures or guidelines outline a systematic approach for rehabilitation.
- Procedures to cover medical evaluations and treatment, food, fluid, crew rotation, relief from extreme climatic conditions, and rest.

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WEATHER FACTORS

- Wind chill
- Heat index chart
- Temperature danger categories
- Can have a severe impact on the safety and health of responders and members

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PERSONAL PROTECTIVE EQUIPMENT

- HSOs can draw on the National Fire Protection Association (NFPA) standards to help manage the selection, care, and maintenance of PPE for all activities of the organization, for response conditions, and for other operations.
- As the Safety Officer, you need to be aware of NFPA standards and influence the selection, care, and maintenance of all the PPE.
- There needs to be records kept on each purchase, for the life of the PPE.

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SUMMARY

- The HSO needs to have knowledge about as many areas of risk as possible.
- They continuously improve the SOPs/Standard Operating Guidelines (SOGs) based on lessons learned.
- Situational awareness and responder health and fitness are two of the main reasons why injuries and line-of-duty deaths (LODDs) occur.
- Communicate to all members about the improvements being made to SOPs, PPE, and safety standards.

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**Activity 5.1
Standard Operating
Procedures
Development for Risk Control**

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UNIT 6: SYSTEMS-BASED CHANGE: USING FACTS AND MEASUREMENTS

OBJECTIVES

The students will:

- 1. Describe the systems-based approach to occupational safety and health.*
 - 2. Describe the basics of investigations for incidents involving fatalities, injuries, department vehicle crashes, and health exposures.*
 - 3. Explain how trend analyses and postincident analyses contribute to the Occupational Safety and Health Program.*
-

SYSTEMS-BASED CHANGE

In order to affect change in an organization (e.g., fire or emergency medical services (EMS) department), the change has to occur throughout the organization, from the top to the bottom and inside out.

The department chief is the responsible party for implementing all changes to the department. The chief will, of course, turn to the Health and Safety Officer (HSO) to help develop, implement, and improve the Occupational Safety and Health Program.

When we refer to this as a program, the student should recognize by now that the department should have a number of activities and elements in place as part of a systematic effort to ensure that safety and health matters are part of their organization. It takes a systematic approach to change the system and culture of an organization--this is an example of a systems-based change approach.

Discussed earlier in this course were the firefighter fatality and injury data. The fire service has been doing a lot to improve the health and welfare of its members. One of the most positive changes has been the creation and development of the functions of an HSO. Organizational change usually requires people to become leaders. In the case of the safety and welfare of all personnel, everyone is a leader in producing positive change.

The lessons of firefighting have also found their way into increasingly more thoughtful, continuously improving, and comprehensive standards that are universally being accepted. The National Fire Protection Association (NFPA) 1500[®], *Standard on Fire Department Occupational Safety and Health Program*, for instance, is one of the main focuses of this course. NFPA 1582[®], *Standard on Comprehensive Occupational Medical Program for Fire Departments* is another main focus of this course. The International Association of Fire Fighters (IAFF) and the International Association of Fire Chiefs (IAFC) offer standards for wellness/fitness programs. There are a host of standards that should be used to develop and continuously improve the system of occupational safety and health efforts used within a department.

When an organization recognizes that change must occur, this is a positive start. If your organization's Occupational Safety and Health Program needs improvement, or you are from a new department or organization, you will have your work cut out for you. To be successful, students should have a plan and work with their chief to establish a timeline of actions that develop, implement, and continuously improve the Occupational Safety and Health Program in their department.

The HSO has an important role within the department. The skills and competencies needed to be successful in this role include good listening and analytic skills. The most important skill or talent, however, may be the HSO's ability to navigate the organization's many affected Divisions and Units in a sensitive manner that builds trust and cooperation. If the organization's "system" is to change and gain the benefits of the Occupational Safety and Health Program for its members, for the department, and for the public, the successful HSO should use his/her talents to get all the personnel to buy into the change for the better.

WHY INVESTIGATE?

There is no doubt that members are wary of investigations. This is an area where the HSO plays an essential role in making sure that the positive aspects are derived from an unfortunate occurrence and used for everyone's benefit.

An organization can't improve itself unless it understands problems and works to identify their causes. Departments will make changes in their Risk Management Plans and operating procedures and guides expecting these changes to have a positive influence on the safety and welfare of its members. Fire departments can't assume that things work--they should take the time to understand what is happening or happened, and make corrections in their plans and programs as a result. One of the most important tools available to the department is a comprehensive investigation process and the use of postincident analyses.

Chapter 4 of NFPA 1500[®] states that a fire department should develop and implement an accident investigation process. This process will include the investigation of accidents, injuries, fatalities, occupational illnesses, and health exposures involving members. All accidents involving fire department vehicles, equipment, or fire department facilities will be investigated. The goal of this investigation process is to ensure that the fire department learns what may have gone wrong and why, and to help it undertake the necessary corrective actions to avoid a reoccurrence of the incident.

The investigation of accidents, exposures, deaths, and injuries provides the emergency response agency with information about what went wrong in an accident and the means to avoid that situation in the future.

Investigations give us facts about an incident, which can provide a basis for correcting Standard Operating Procedures (SOPs) or Standard Operating Guidelines (SOGs), developing other control measures to prevent the situation from recurring, or minimizing the negative effects of a recurrence. An earlier unit showed students basic principles of risk management and identified a number of control measures that are being used effectively by fire departments everywhere. Avoidance of risks is the first and best approach in most cases.

Students should be aware that their organization may be liable for damages and can be sued under certain circumstances (this should vary by State). Risk management and the leaders of your department and jurisdiction would much prefer to avoid legal actions. An investigation by a response agency will play a part in the defense of the agency against any civil claim (or criminal action). While others are sure to investigate a serious incident, the early gathering of facts, such as photographs of an accident or incident scene, will assist the response agency in demonstrating that its safety measures are taken seriously. Such investigations can help the department should a suit or action be brought as a result of some injury, accident, or other claim.

Accident investigations assist the HSO to discover trends. A seemingly unrelated series of accidents may have one root cause. The HSO should be able to use accident cause determinations to assess trends and recommend changes or enhancements that prevent the situation from recurring.

The HSO should ensure that proper recordkeeping steps are being followed for any investigation or postincident analysis. Students should understand that these investigation notes, findings, reports, and files can become part of a legal action, and are likely to be treated as publicly-available records.

WHO SHOULD INVESTIGATE?

The HSO may be the primary investigator of all accidents. In larger fire departments, where the capacity of a single individual is not reasonable, Battalion Chiefs, Shift Safety Officers, or other supervisors should be trained to perform routine investigations. The HSO still should review all accident reports. For significant accidents, exposures, or in the event of the death or serious injury of a responder, the HSO should be directly involved.

The HSO may choose to be involved in any accident investigation, even those that are considered routine or near misses. In cases where the HSO or Incident Safety Officer (ISO) needs help with an investigation, law enforcement agencies or public works/transportation departments may be a valuable resource, since they have training in investigative techniques. HSOs are encouraged to take courses to provide them with more training on investigations, post-incident analyses, and trend analyses.

WHAT SHOULD BE INVESTIGATED?

All accidents, vehicle crashes, health exposures, occupational illnesses, injuries, and fatalities must be investigated. It also is useful to look into the causes of "near misses." These are accidents that almost happen, such as a brush with death at an intersection during response. Microseconds can separate a near miss from a tragic accident.

While the reporting associated with accidents usually is not required for near misses, the HSO should be taking a proactive approach to learning about near misses too. A postincident analysis, investigation of "after-action" reports, can enable the department to learn from a potentially harmful situation and take the necessary corrective action to hopefully prevent this situation from reoccurring.

Investigations of Vehicle Crashes

One of the most significant and spectacular accidents that can be experienced by emergency response agencies is the collision of an emergency response vehicle with another vehicle or an object. Aside from the emergency scene itself, these are the most significant risks that firefighters normally face.

The first concern that the HSO should have upon arrival on the scene is to ensure that all responders involved in the collision, and all civilians who may have been injured receive proper medical care. The HSO should make sure that family notifications have been made, and that a member of the response agency is available to transport family members to the hospital if that service is needed or desired.

The HSO may choose to have minor vehicle collisions documented by a second-level supervisor such as a Battalion Chief. In smaller agencies, where there are no on-duty supervisors, the HSO may have to make arrangements to be available or have some other member of the agency available. In any case, the HSO should review all collision reports, both minor and major.

Vehicle collision analysis is an art and a science best practiced by those who have occasion to use the skills on a regular basis. The HSO should have a basic knowledge of vehicle collision analysis, but the legal investigation and analysis must be performed by a qualified law enforcement official. The HSO should be involved in the analysis in a supporting and observing role. It may be wise to allow a law enforcement official from outside your government structure to perform the analysis (there may be a conflict of interest if the city police department investigates a crash involving a city fire truck or ambulance). A good working relationship with law enforcement officials will make this process easier. HSOs should develop such relationships.

In agencies where significant vehicle collisions occur on a regular basis, the HSO should become more practiced and educated in the skills of an accident investigator.

At every collision involving an emergency response vehicle, photographs of the scene should be taken so that quality reproductions and enlargements are possible. A standard report with a drawing of the scene and statements by all responders and witnesses also should be prepared.

Prior to being placed back into service, all of the involved equipment and vehicles should be inspected by a qualified person. If there is any question that some malfunction of equipment or apparatus was a factor in the collision, the equipment or apparatus should be impounded. It may be wise to allow law enforcement officials to impound the equipment or vehicle to avoid the allegation of impropriety.

Investigations of Responder Injuries

As was the situation with vehicle collisions, the first concern that the HSO should have upon arrival on the scene is to ensure that all responders have received proper medical care. The HSO should make sure that family notifications have been made, and that a member of the response agency is available to transport family members to the hospital if that service is needed or desired.

In cases of minor injury, the HSO may choose to have the injured responder and his or her immediate supervisor fill out accident and injury reports and forms. In many States there are time limits that must be observed between the occurrence of the injury and the report of the injury to the State's department of labor or workers' protection organization.

Prior to being placed back in service, all protective clothing, equipment, and vehicles that may have been involved in the accident should be inspected by a qualified technician. In cases of moderate to severe injury to a responder, all protective clothing and involved equipment should be impounded by the HSO until the conclusion of the investigation.

Investigations of Responder Fatalities

The death of a responder is one of the most stressful events an emergency response agency can experience. The Public Safety Officer's Benefit Program (PSOB) has specific documentation requirements that must be met prior to any release of benefits. The HSO should ensure that this is accomplished correctly. An excellent guide to the investigation of firefighter accidents and injuries is published by the IAFF. It is recommended that a copy be a part of every fire department's library and safety toolkit so it is available if needed.

Firefighter fatalities and serious injuries are also investigated by the National Institute of Occupational Safety and Health (NIOSH), Fatality Investigation Team. Copies of past reports are available from the NIOSH Web page (<http://www2a.cdc.gov/NIOSH-fire-fighter-face/state.asp>). HSOs should review these NIOSH reports on a regular basis. The HSO and the ISO should, of course, fully cooperate with any authority who is investigating a responder fatality.

Infection and Other Health Exposures

Even if a fire department does not provide EMS, personnel remain at risk for exposure when they respond with the EMS agency or when they are dealing with burn victims and other injuries that occur on the fireground.

The department's system or program of occupational safety and health should draw upon NFPA 1581[®], *Standard on Fire Department Infection Control Program*, as a resource for its infection control procedures. NFPA 1581[®] requirements parallel the requirements of OSHA's bloodborne pathogens regulations. The requirements apply in the case of both emergency and nonemergency situations. Another excellent source of information is the U.S. Fire Administration's (USFA's) *Guide to Managing an Emergency Service Infection Control Program (2001)*. Students should note that these standards and guides carry moral, ethical, and legal implications. They provide a "standard of care" that courts will consider. HSOs need to take these into account in all areas of the Occupational Safety and Health Program.

The key to ensuring compliance with a standard is the use of a written exposure control plan and the training of personnel. When an exposure occurs, several procedures must be put in place. These include verification of the exposure; notification of proper medical resources for testing, treatment, and followup care; documentation of the exposure for proper treatment; and followup care through workers' compensation. Avoidance measures or prophylaxis for an exposure differ for each type of communicable disease. Time is an issue and the department must have procedures in place to address immediate care for the member. The exposure control plan and its procedures will involve the Infection Control Officer, HSO, fire department physician, fire department infection control physician, treating medical facilities, the risk management division, and others as needed. The department physician and department infection control physician are key players in developing and implementing this process.

What Happens After the Investigation?

A copy of every investigation report should become a part of the agency's permanent file. Health records, such as communicable disease exposure records, are required to be retained for 30 years after the responder has left employment with the agency. These records are maintained in the individual's confidential medical file.

The results and recommendations of every investigation should be passed on to the individual in the organization who is responsible for that operation. For instance, recommendations concerning changes to the design of apparatus should be routed through the chain of command to the agency's apparatus officer.

Discipline, if any such action is taken as a result of an accident, is not usually the responsibility of the HSO. Although the HSO most likely is an officer in the agency, direct discipline by the HSO may undermine safety efforts in the future. The HSO should report the facts through the chain of command and let the direct supervisor of the affected responder determine appropriate action.

HSOs should also employ these reports to analyze for trends, and the need for changes in the Risk Management Plan, the safety-related operating procedures, guides, and training efforts.

Data and Trend Analysis

The HSO should regularly review data and reports in summary form to determine if any underlying trends emerge. Sometimes the only way to identify a trend is to look at all the data in one place, at one time. Looking at reports throughout the month or throughout the year in one or two places will not allow for proper analysis.

An excellent source of information on all topics related to the emergency services is the Learning Resource Center (LRC) at the National Emergency Training Center (NETC). The LRC is fully equipped and the staff is motivated to help any member of the emergency services community with research on any topic, free of charge. The LRC can provide copies of relevant articles from magazines and mail them to your home or office, and arrange interlibrary loans of materials and publications.

POSTINCIDENT EVALUATION AND ANALYSIS

Documentation Process

A standard organizational form or department reporting procedure should be used when the HSO and ISO conduct an investigation. This report template will ensure that no information is overlooked or forgotten during the process. A completed written report is forwarded to the appropriate personnel inside and outside the department, and the records, including worksheets and any testing data, are to be protected, tracked, and held in a secure manner (electronic records or paper-based records).

Training and Education

The recommendations contained in reports may indicate deficiencies or inadequacies in department operations. If they relate to training and education needs, the HSO must confront these issues as soon as practical. The department should try to avoid training personnel on procedures that are identified as having unnecessary risks.

Standard Operating Procedures

After a review of reports and documentation concerning an incident, or having participated in a postincident analysis, the HSO must evaluate the affected procedures. The HSO may determine that procedures need to be developed or revised to prevent recurrence.

Equipment and Modifications

If the incident is severe, the HSO may be required to evaluate the status of personal protective equipment (PPE) and clothing, apparatus, and facilities.

Issues concerning personal protective clothing may include whether the clothing was being used properly; if it failed, why; discussions with the manufacturer; and whether the proper clothing was being used for the proper incident (e.g., hazardous materials, infection control). PPE must be examined thoroughly to determine if a problem exists. This may require involving the manufacturer or a testing laboratory to assist. Does the problem exist due to poor preventive maintenance (e.g., self-contained breathing apparatus (SCBA)) or improper specifications (e.g., life safety rope)? The investigation process will help determine what modifications are needed.

The HSO will have to work with department mechanics to determine problems with apparatus. Does the problem exist because of human error (e.g., vehicle accident) or due to poor preventive maintenance (e.g., no preventive maintenance program)? Once the equipment problem is identified, the cause may be linked to training and education issues, organizational procedures, procurement, or equipment design.

Facility Questions

Facility questions should be explored continuously. New facts, information, and changes in laws, standards, and regulations occur all the time. There are three obvious points of focus for an HSO: regulations related to bloodborne pathogens, Americans with Disabilities Act (ADA), and construction standards and codes. HSOs should ensure that facilities are upgraded to meet current regulations or respond to the facts uncovered by an investigation or postincident analysis.

Interfacing with the Incident Safety Officer

As program manager of the safety and health program, the HSO must assist the ISO during the emergency and afterwards as needed during any investigation or analysis of an incident.

Onscene Risk Management

The HSO is the department's risk manager. During emergency incidents, the HSO may be involved as the onscene risk manager, or an onscene ISO or the Incident Commander (IC) will be the risk manager. The intent is to ensure that the risk management process is covered at each emergency incident.

The HSO should assist the ISO to understand and apply the emergency plans and mutual-aid agreements that are, in effect, the risk management plans, safety standards, assessment guides for the applicable incident-type, and operating procedures and guides related to safety and health matters for any incident. An ISO may not, in all cases, have a complete knowledge of all these matters and may be dependent upon the HSO for critical advice during the incident.

Investigations with the Incident Safety Officer

The HSO may or may not be required to respond to investigations. For nonemergency situations, the HSO has the primary responsibility for conducting investigations based on the nature or severity of the incident. In some cases, the immediate supervisor may be able to conduct the investigation and forward the report to the HSO. For example, apparatus or vehicle accidents under nonemergency conditions, or personal injuries during daily work functions, may require his/her assistance.

Investigations of emergency incidents are the responsibility of the ISO involved in that incident as they have more direct and immediate knowledge and understanding of the objectives, strategies, tactics, and assignments. The nature and severity of the situation will dictate the involvement of the HSO. If a fatality or serious injury occurs, the HSO will likely become the primary investigator in order to ensure that a person one-step removed from the incident itself is carrying out the process. This will likely bring the appearance of less conflict of interest in these more serious safety matters.

Investigations and postincident analyses can lead to changes in a department's procedures, analyses, and recordkeeping efforts. As the program manager of the safety and health program, the HSO has specific duties and responsibilities as part of the postincident evaluation and analysis. This is an important function because negative aspects of an incident or situation tend to be overlooked or quickly forgotten. The HSO should be able to use the facts and findings to bring out something positive for use by the department.

Departmental Procedures

The investigation report may include recommendations for revisions to, or development of, procedures pertaining to department operations. It may indicate that new procedures should be developed based on actions at an incident. Based on observations of the ISO at an incident, or due to an accident or injury at an incident, a recommendation for policy development or revision of current policy may be part of the report summary.

Recordkeeping

The HSO is responsible for information relating to safety and health. This includes reviewing accident and injury reports and providing a monthly and annual analysis. Trends or patterns relating to accidents, injuries, or the recurrence of safety and health problems need to be tracked and identified by the HSO. The HSO should take possession of the records, or copies of the records that are related to occupational safety and health matters. The HSO should ensure that a completed written report is forwarded to appropriate personnel inside and outside the department and the records, including worksheets and any testing data, are protected, tracked, and held in a secure manner (electronic records or paper-based records).

THE OCCUPATIONAL SAFETY AND HEALTH COMMITTEE'S RESPONSIBILITIES

With an HSO directing the department's safety and health program, the Occupational Safety and Health Committee plays a vital role and is a valuable resource to the HSO. The Occupational Safety and Health Committee can assist with training, program development, or revision to procedures and guides, or any other situation that may require its assistance to complete a project and improve safety and health.

If the department does not have an HSO, the Occupational Safety and Health Committee may be responsible for managing the safety and health program. The responsibilities may be distributed so that each member or small group of the Occupational Safety and Health Committee is assigned a particular function, based on expertise or interest.

SUMMARY

The HSO is a leader within the organization in producing positive changes affecting the health and welfare of all personnel. This will require sensitivity, a fact-based approach, and behaviors and efforts that foster trust within the organization.

The investigation of accidents, injuries, and safety problems is one of the most important duties of the HSO. Analyses can indicate problems and probable causes. This improved understanding can be used to enhance the safety of all responders.

A good system will try to improve. A department will gain the benefits of an improving Occupational Safety and Health Program in terms of improved public trust and good will, improved effectiveness, more efficiencies, lower costs, and less severe consequences or avoided harm to its personnel. The HSO has a good story to tell about the importance of his/her role.

A note of caution, however--a system that is not working well leads to unintended things happening. If an accident or near miss occurs, and nothing is done to correct the conditions that contributed to the incident, it will happen again--the only unknown factor is when.

Activity 6.1

Accident Investigations

Purpose

To allow you to consider issues related to the investigation of an accident.

Directions

1. Your small group will be assigned one of the following four video segments:

- a. Segment 1: "Residential Fire."
- b. Segment 2: "Residential Fire."
- c. Segment 3: "Commercial Fire."
- d. Segment 4: "Apparatus Accident."

2. Answer the following questions in relation to your segment.

a. Is the response of the HSO appropriate? _____

b. Who should the HSO talk to on the scene? _____

c. Is there any equipment that should be impounded or inspected prior to being returned to use? _____

d. Should the HSO get statements from anyone at the scene? _____

e. Who should the HSO ask for to help with this investigation? _____

f. What are your initial recommendations to avoid this situation in the future? _____

3. Appoint a group spokesperson to report to the class.

NOTE-TAKING GUIDE

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**UNIT 6:
SYSTEMS-BASED CHANGE:
USING FACTS AND MEASUREMENTS**



**health and
safety**

Slide 6-1

Slide 6-2

OBJECTIVES

The students will:

- Describe the systems-based approach to occupational safety and health.
- Describe the basics of investigations for incidents involving fatalities, injuries, department vehicle crashes, and health exposures.
- Explain how trend analyses and postincident analyses contribute to the Occupational Safety and Health Program.

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SYSTEMS-BASED CHANGE

- It takes a systematic approach to change the system and culture of an organization.
- The department chief is responsible for implementing changes.
- The Health and Safety Officer (HSO) should be one of the organization's leaders in the implementation and improvement of health and safety programs.

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INVESTIGATE TO IMPROVE

- Investigate to improve.
- Organizations and their people cannot improve unless there is an understanding of the problems and the causes.
- Investigation helps with the broader postincident analysis effort.
- We want risks to be avoided, mitigated, and/or controlled.

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WHO SHOULD INVESTIGATE

- The HSO is the primary investigator.
- In larger departments where there may be more incidents, investigations may be delegated.
- Specialists and law enforcement are valuable resources.
- HSOs are encouraged to take additional classes on investigative techniques.

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WHY INVESTIGATE?

The investigation of accidents, exposures, deaths, and injuries provides the emergency response agency with information about ways to improve.



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WHAT SHOULD BE INVESTIGATED?

- All accidents
- Vehicle crashes
- Health exposures
- Occupational illnesses
- Injuries
- Fatalities and near misses

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HEALTH AND SAFETY OFFICER'S JOB RELATED TO INVESTIGATIONS

- Investigations produce data that may prove the benefits of a procedure or guideline.
- The HSO's pre-emergency efforts provide a key defense should the organization be sued (under certain circumstances this is possible, which varies State to State).
- Lessons learned should be fed back into the Risk Management Plan and the Occupational Safety and Health Program's components.

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WHAT HAPPENS AFTER THE INVESTIGATION?

- A copy of the investigation report should become a part of the agency's records.
- The results and recommendations should be passed on to personnel responsible for the operations.
- Discipline may be the result, but this is not usually the responsibility of the HSO.
- The report should be used to analyze trends.

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POSTINCIDENT EVALUATION AND ANALYSIS

- The monitoring of controls provides information and data.
- Improvements can be made if convincing cases are made.
- The HSO's use of short- and long-term tools should be evaluated.
- The HSO should ensure that measurement is built in to the tools.

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MEASURE AND ANALYZE

- HSOs will focus on response and nonemergency operations.
- Improve occupational safety and health.
- HSO tools deliver data and information:
 - Training and education.
 - Standard Operating Procedures (SOPs).
 - Equipment and modifications.
 - Documentation processing.
 - Facility recordkeeping.

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THE HEALTH AND SAFETY OFFICER AND THE INCIDENT SAFETY OFFICER

- The HSO should assist the Incident Safety Officer (ISO) during an incident concerning all safety matters.
- The HSO may be involved in investigations along with the ISO.
- The HSO learns from ISOs about departmental procedures in action.
- The HSO manages safety recordkeeping and the ISO submits incident specific reports.

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SUMMARY

- The HSO can be a leader within the organization in producing positive changes.
- He/She can influence operations both on the emergency scene and in the station.
- The efforts of the HSO can foster trust and move the organization to a change in its culture and its approaches to safety.

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**Activity 6.1
Accident Investigations**

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UNIT 7: CLOSING AND COURSE SUMMARY

OBJECTIVE

The students will review the major topics covered in this course.

CLOSING AND COURSE SUMMARY

The goal of this course was to ensure that the Health and Safety Officer (HSO) "weaves safety into the current fabric of the organization." In the last unit you were exposed to the idea that a systematic program of efforts concerning safety and health is needed. We have referred to this as a systems-based approach to occupational safety and health.

The subject matter covered in this course provides the student with a basic foundation to develop, implement, and continuously improve a department's Occupational Safety and Health Program.

The key elements of a systematic program are

- safety standards;
- The Risk Management Plan, and control measures and their implementation;
- Standard Operating Procedures (SOPs) and Standard Operating Guidelines (SOGs) for all activities and operations;
- health program for members;
- an Occupational Safety and Health Committee;
- oversight of training;
- training and education for members;
- assessments, investigations, and monitoring of the overall program; and
- appointment of a Health and Safety Officer.

One of the key components in developing an Occupational Safety and Health Program is to develop a standard level of safety. The National Fire Protection Association (NFPA) standards provide the framework. The standard of safety establishes the parameters in which we conduct activities during emergency and nonemergency operations. The intent is for all members to operate within this standard of safety and not deviate from them. Departments systematically use a variety of control measures to ensure the safety and health of its personnel. These control measures include, but are not limited to: training, protective clothing and equipment, use of the Incident Command System (ICS), personnel accountability, and SOPs and SOGs.

All departments should have a Risk Management Plan. If you do not have one now it should be developed and implemented as soon as possible. The HSO should provide the leadership needed to make this happen. If you have a Risk Management Plan, it should be reviewed on a continuous basis, taking the lessons learned from pre-emergency incidents and events and from emergency incidents, to make changes.

The department chief has responsibility for the implementation and operation of the department's Risk Management Plan. The department's HSO should take the lead in developing, improving, and implementing the plan.

All departments should focus attention on the health of personnel. Statistics show the need for members to understand health risks and to learn about the things they can do to improve their health and fitness. HSOs can assist personnel by contributing to changes in training and training

schedules. HSOs can sponsor educational events that inform personnel and their families of health and fitness matters. HSOs can also contribute to budget discussions within their departments to ensure that investments are being made in all health program areas. HSOs should ensure that SOPs and SOGs take personnel's health and fitness into account when duties and roles are assigned (both pre-emergency and during an emergency). HSOs should learn about the National Incident Management System (NIMS) credentialing qualifications that apply to the many positions that personnel can take during an emergency. HSOs can make adjustments to the Risk Management Plan and the Occupational Safety and Health Program to ensure that the department's mission is achieved.

All departments should have an Occupational Safety and Health Committee. The HSO should provide the leadership needed to make this happen. NFPA 1500[®], *Standard on Fire Department Occupational Safety and Health Program* should serve as the guide for implementation and management of this process.

The HSO should ensure that there are safety standards adopted for all functions and areas of operations. SOPs and/or SOGs should be established and continuously updated and improved to ensure that these standards are met.

All departments should apply safety standards to its own training and employ SOPs that ensure that the ISO assigned to the training knows what to do. Procedures should also ensure that trainers and trainees are informed of the procedures, standards, role of the Safety Officer, and any incident-specific aspects of the training.

All departments should have a training program, and all the safety procedures and plans should be incorporated within the program of training--for all roles and duties within the department.

Fire and emergency medical services (EMS) departments serve the public in the following ways, by:

1. Saving lives.
2. Bringing stability and control to an emergency incident.
3. Conserving property and the environment.

Fire and EMS departments are more effective in addressing these three essential priorities if they perform their duties in a safe manner. Safe tactics apply the right resources in appropriate ways. Unsafe tactics too often mean that the tactics fail.

HSOs are the departments' leaders on matters of occupational safety and health. Their efforts will improve the effectiveness of departments in pre-emergency times and also during emergency incidents.

An aggressive, proactive Occupational Safety and Health Program will reduce accidents, injuries, occupational illnesses, and health exposures for responders and for the public. In the department, this means that more qualified and properly trained resources (people and equipment) are available for the department to do its job well. It means that the public knows

that the department has safety as its first priority. Department personnel then demonstrate this every day in every procedure or operational tactic and task they perform. Department chiefs recognize that this is important to the success of the department while it also improves its financial posture and lowers its liabilities. Fire and EMS personnel win and the public wins too, as it gets a more trusted and effective emergency service for less cost.

The department's HSO will recognize that personnel at all levels will be more willing participants in the health and safety program if they "buy into" its benefits to the emergency service and to themselves. It may take time for this buy-in to become real. HSOs should be able to draw on the lessons of this course to help you to change "the system" and the culture of your organization.

Students have already accomplished the first step toward success by getting their chief to approve them for this course. The department chief understands the applicable regulations, NFPA standards, the expectations of your community, and the priority that safety has--it is the number one priority.

Students can return to their organizations better prepared to work with their chiefs to develop and improve the department's Occupational Safety and Health Program and all its elements. HSOs will work with the department's Occupational Safety and Health Committee, and ensure that training and education programs are used and contribute to changing the system from the inside-out. The cooperation and support of all personnel will lead to a compliant program that is continuously improving safety for personnel, and for the effectiveness of the department. Regardless of the size of a department, all personnel have to understand and support this systems-based approach.

NOTE-TAKING GUIDE

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**UNIT 7:
CLOSING AND COURSE
SUMMARY**



**health and
safety**

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COURSE GOAL

The goal of this course was to ensure that the Health and Safety Officer (HSO) can weave safety into the current fabric of the organization, using the tools of risk management and an understanding of systems-based change.

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SUBJECT MATTER COVERED

Key elements provide the HSO with the basic foundation for the development, implementation, and continuous improvement of a department's Occupational Health and Safety Program.

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**KEY ELEMENTS OF
SYSTEMATIC CHANGE**

- Safety standards
- Risk Management Plan
- Standard Operating Procedures (SOPs) and Standard Operating Guidelines (SOGs) for all activities and operations
- Health program for members
- An Occupational Safety and Health Committee
- Oversight of training
- Training and education for members
- Assessment, investigations, and monitoring of the overall program
- Appointment of an HSO

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**BENEFITS OF
ALL THIS HARD WORK**

- Safe strategies and safely-performed tactics make for more successful incident management.
- Responders, including fire and emergency medical services (EMS) personnel, are better able to serve the public good as a result of hard work.
- Public trust is improved too, as safety becomes demonstrated in all the organization's activities.
- The health and welfare of personnel is protected.
- The department continuously improves its outcomes--for lower costs.

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**EXAMINATION AND COURSE
EVALUATION**

Slide 7-6

APPENDIX A SOURCES OF ADDITIONAL INFORMATION

United States Fire Administration
National Fire Academy
16825 South Seton Avenue
Emmitsburg, MD 21727
(301) 447-1000
<http://www.usfa.dhs.gov>
<http://www.usfa.dhs.gov/nfa>

National Fallen Firefighters Foundation
Everyone Goes Home Firefighter Life Safety Initiatives
PO Drawer 498
Emmitsburg, MD 21727
(301) 447-1365
<http://www.firehero.org>
<http://www.everyonegoeshome.com>

Learning Resource Center
National Emergency Training Center
16825 South Seton Avenue
Emmitsburg, MD 21727
(301) 447-1030
<http://www.lrc.fema.gov>

Occupational Safety and Health Administration
200 Constitution Avenue NW
Washington, DC 20210
(800) 321-OSHA (6742)
<http://www.osha.gov>

Centers for Disease Control and Prevention
1600 Clifton Road, N.E.
Atlanta, GA 30333
(800) CDC-INFO (232-4636)
<http://www.cdc.gov>

National Institute for Occupational Safety and Health
Centers for Disease Control and Prevention
(800) CDC-INFO (232-4636)
<http://www.cdc.gov/niosh>

Fire Fighter Fatality Investigation and Prevention Program
National Institute for Occupational Safety and Health
Centers for Disease Control and Prevention
<http://www.cdc.gov/niosh/fire>

U.S. Government Printing Office
Washington, DC 20402
(202) 512-1800
(866) 512-1800
<http://www.access.gpo.gov>

Federal Highway Administration
US Department of Transportation
1200 New Jersey Avenue SE
Washington, DC 20590
(202) 366-4000
<http://www.fhwa.dot.gov>
Manual on Uniform Traffic Control Devices
<http://mutcd.fhwa.dot.gov/>

National Fire Protection Association
1 Batterymarch Park
Quincy, MA 02269
(617) 770-3000
<http://www.nfpa.org>

International Association of Fire Fighters
Occupational Health, Safety and Medicine Department
1750 New York Avenue, NW Suite 300
Washington, DC 20006-5395
(202) 737-8484
<http://www.iaff.org/hs>

International Association of Fire Chiefs
Safety, Health and Survival Section
(703) 273-0911
4025 Fair Ridge Drive
Fairfax, VA 22033
<http://www.iafcsafety.org>
<http://www.iafc.org>

National Safety Council
1121 Spring Lake Drive
Itasca, IL 60143-3201
(630) 285-1121
<http://www.nsc.org>

Responder Safety Institute
<http://www.respondersafety.com>

Fire Department Safety Officers Association
P.O. Box 149
Ashland, MA 01721
(508) 881-3114
<http://www.fdsoa.org>

**APPENDIX B
FIREFIGHTER SAFETY AND HEALTH
STANDARDS AND REGULATIONS**

NFPA Standards	
NFPA 403	Standard for Aircraft Rescue and Fire Fighting Services at Airports
NFPA 472	Standard for Professional Competence of Responders to Hazardous Materials Incidents
NFPA 473	Standard for Competencies for EMS Personnel Responding to Hazardous Materials/WMD Incidents
NFPA 1001	Standard for Fire Fighter Professional Qualifications
NFPA 1002	Standard for Fire Apparatus Driver/Operator Professional Qualifications
NFPA 1021	Standard for Fire Officer Professional Qualifications
NFPA 1026	Standard for Incident Management Personnel Professional Qualifications
NFPA 1051	Standard for Wildland Fire Fighter Professional Qualifications
NFPA 1201	Standard for Developing Fire Protection Services for the Public
NFPA 1221	Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems
NFPA 1250	Recommended Practice in Emergency Service Organization Risk Management
NFPA 1403	Standard on Live Fire Training Evolutions
NFPA 1404	Standard for Fire Service Respiratory Protection Training
NFPA 1407	Standard for Fire Service Rapid Intervention Crews
NFPA 1410	Standard on Training for Initial Emergency Scene Operations
NFPA 1451	Standard for a Fire Service Vehicle Operations Training Program
NFPA 1500	Standard on Fire Department Occupational Safety and Health Program
NFPA 1521	Standard for Fire Department Safety Officer
NFPA 1561	Standard on Emergency Services Incident Management System
NFPA 1581	Standard on Fire Department Infection Control Program
NFPA 1582	Standard on Comprehensive Occupational Medical Program for Fire Departments
NFPA 1583	Standard on Health Related Fitness Programs for Fire Fighters
NFPA 1584	Recommended Practice on the Rehabilitation for Members Operating at Incident Scene Operations and Training Exercises
NFPA 1851	Standard on Selection, Care, and Maintenance of Structural Fire Fighting Protective Ensembles
NFPA 1901	Standard for Automotive Fire Apparatus
NFPA 1906	Standard for Wildland Fire Apparatus
NFPA 1911	Standard for Service Tests of Fire Pump Systems on Fire Apparatus
NFPA 1932	Standard on Use, Maintenance, and Service Testing of Fire Department Ground Ladders
NFPA 1936	Standard on Powered Rescue Tool Systems
NFPA 1961	Standard for Fire Hose
NFPA 1971	Standard on Protective Ensemble for Structural Fire Fighting and Proximity Fire Fighting
NFPA 1975	Standard on Station/Work Uniforms for Emergency Services

HEALTH AND SAFETY OFFICER

NFPA 1977	Standard on Protective Clothing and Equipment for Wildland Fire Fighting
NFPA 1981	Standard on Open-Circuit Self-Contained Breathing Apparatus for Emergency Services
NFPA 1982	Standard on Personal Alert Safety Systems (PASS)
NFPA 1983	Standard on Fire Service Life Safety Rope and System Components
NFPA 1984	Standard on Respirators for Wildland Fire Fighting Operations
NFPA 1989	Standard on Breathing Air Quality for Emergency Services Respiratory Protection
NFPA 1991	Standard on Vapor-Protective Ensembles for Hazardous Materials Emergencies (2000)
NFPA 1992	Standard on Liquid Splash-Protective Ensembles and Clothing for Hazardous Materials Emergencies (2000)
NFPA 1994	Standard on Protective Ensembles for First Responders to CBRN Terrorism Incidents
NFPA 1999	Standard on Protective Clothing for Emergency Medical Operations (1997)

Department of Labor, Occupational Safety and Health Administration Title 29 Code of Federal Regulations	
1910.95	Occupational Noise Exposure
1910.120	Hazardous Waste and Emergency Operations
1910.1030	Occupational Exposure to Bloodborne Pathogens
1910.134	Respiratory Protection
1910.146	Permit-Required Confined Spaces
1910.156	Fire Brigades
1910.133	Eye and Face Protection
1910.20	Access to Employees Exposure and Medical Records

Federal Highway Administration Department of Transportation Title 23 Code of Federal Regulations	
634	Use of High-Visibility Apparel When Working on Federal-Aid Highways

American National Standards Institute (ANSI)	
ANSI/CGA G7.1	Commodity Specifications for Air
ANSI/Z87.1	Practice for Occupational and Educational Eye and Face Protection
ANSI/ISEA 207-2006	High-Visibility Public Safety Vests