

Health and Safety Officer

HSO-Student Manual

2nd Edition, 2nd Printing-June 2004



Homeland
Security

**FEMA/USFA/NFA
HSO-SM
June 2004
2nd Edition, 2nd Printing**

Health and Safety Officer



**Homeland
Security**

Health and Safety Officer

HSO-Student Manual

2nd Edition, 2nd Printing-June 2004



Homeland
Security

NOTICE:

This material has been developed by the National Fire Programs Section (NFP) of the United States Fire Administration (USFA) for use by state and metropolitan fire training programs. NFP endorsement of this material is conditional on use without modification. NFP material, whether printed text or software, may not be used in any manner that would mislead or that would suggest or imply endorsement by NFP of any commercial product, process, or service.

U.S. DEPARTMENT OF HOMELAND SECURITY

PREPAREDNESS DIRECTORATE

UNITED STATES FIRE ADMINISTRATION

NATIONAL FIRE ACADEMY

FOREWORD

The U.S. Fire Administration (USFA), an important component of the Department of Homeland Security (DHS) Preparedness Directorate, 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 its 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.

In recent years increasing responses to a wide variety of emergency situations have raised dramatically the fire service's awareness of the need for responder safety programs. These programs are crucial for all firefighters who respond to emergency situations. One of USFA's operational objectives is to reduce by 25 percent the loss of life of firefighters, whether in a large department or in a small, rural fire company.

The NFA believes that the Safety Officer's responsibilities fall into two clear-cut categories: those associated with responding to and operating at the incident scene and those associated with managing the day-to-day affairs of the department. Therefore, in 1993 the NFA developed two courses, one called *Incident Safety Officer* and the other called *Health and Safety Officer*. These courses were completely revised in 2003.

The staff of the USFA is proud to join with state and local fire agencies in providing educational opportunities to the members of the nation's fire services, in an effort to reduce the number of firefighters and other responders killed and injured in the line of duty or as a result thereof.

TABLE OF CONTENTS

	PAGE
Foreword	iii
Table of Contents	v
Course Schedule	vii
UNIT 1: INTRODUCTION	SM 1-1
UNIT 2: PRINCIPLES OF RISK MANAGEMENT	SM 2-1
UNIT 3: MANAGING RISK	SM 3-1
UNIT 4: HEALTH MAINTENANCE	SM 4-1
UNIT 5: CURRENT ISSUES	SM 5-1
UNIT 6: SYSTEMS CHANGE	SM 6-1
UNIT 7: PROCESS APPLICATION	SM 7-1

Appendices

COURSE SCHEDULE

Unit 1:	Introduction
Unit 2:	Principles of Risk Management
Unit 3:	Managing Risk
Unit 4:	Health Maintenance
Unit 5:	Current Issues
Unit 6:	Systems Change
Unit 7:	Process Application

UNIT 1: INTRODUCTION

TERMINAL OBJECTIVE

At the conclusion of this unit, the students will be able to identify the components of a fire department occupational safety and health program.

ENABLING OBJECTIVES

The students will:

- 1. Describe the history of the Incident Command System (ICS).*
 - 2. Describe the evolution of the fire department Safety Officer.*
-

INTRODUCTION

Student Manual

Student Manuals (SM's) are designed to be used minimally during lecture. There is space to make notes of important information presented during the lecture. The instructor will ask you to use the SM during assigned activities.

Individual Student Introductions

You will be asked by your instructor to give the following information during student introductions:

- name, department, and position;
- discuss what you hope to take away with you upon completion of the course (course expectations); and
- identify a safety issue that is affecting the operation of your fire department (emergency or nonemergency).

COURSE GOAL, SCOPE, AND TARGET AUDIENCE

Goal

To provide information related to risk management; laws, codes, and standards; health maintenance and wellness; and investigations that affect an occupational safety and health program.

Scope

To provide the students with the knowledge and skills needed to manage a fire department occupational safety and health program effectively.

The Health and Safety Officer (HSO) manages the fire department's occupational safety and health program, affecting safety, health, and wellness of all fire department members. This course provides information using instructor-led discussion, multimedia activities, and group dynamics to convey instructional points.

Audience

Fire department officers who have been designated by the authority having jurisdiction (AHJ) as the fire department Safety Officer, fire department members who may be assigned this responsibility in the future, and members of a department's Occupational Safety and Health Committee.

HISTORY OF THE INCIDENT COMMAND SYSTEM

In the early 1970's, Southern California experienced several devastating wildland fires. The overall cost and loss associated with these fires totaled \$18 million per day. This multijurisdictional disaster was the impetus for the development of an improved interagency Incident Management System (IMS) known as the ICS. The ICS is one of the beneficial results of a federally funded project called FIREScope that was convened after these fires, and whose charter was to examine various aspects of interagency response to incidents.

FIREScope derives its name from **FI**re **RE**Sources of **CA**lifornia **O**rganized for **P**otential **E**mergencies. The FIREScope ICS is primarily a command and control system delineating job responsibilities and organizational structure for the purpose of managing day-to-day fire and rescue operations. It also is flexible enough to manage catastrophic incidents involving thousands of emergency response and management personnel.

The National Inter-Agency Incident Management System (NIIMS) is another system using ICS that was developed by the wildland community in order to provide a common system for wildland fire protection agencies at the local, State, and Federal levels. The NIIMS organization includes the Bureau of Land Management, the Bureau of Indian Affairs, the U.S. Fish and Wildlife Service, the U.S. Forest Service, representatives of State foresters, and the National Park Service. NIIMS consists of five major subsystems that collectively provide a total systems approach to risk management:

1. The ICS, which includes operating requirements, eight interactive components, and procedures for organizing and operating an on-scene management structure.
2. Training that is standardized and supports the effective operations of NIIMS.

3. A qualification and certification system that provides personnel across the Nation with standard training, experience, and physical requirements to fill specific positions in the ICS.
4. Publications management that includes development, publication, and distribution of NIIMS materials.
5. Supporting technologies such as orthophoto mapping, infrared photography, and a multiagency coordination system that supports NIIMS operations.

Since the development of the ICS, the fire service has experienced several challenges in understanding its application. As a result, inconsistencies in the system began to develop; other hybrid systems came into existence, further distancing a common approach to incident command. A single IMS is critical for effective command and control of major incidents. At such incidents, a single department may interface with other agencies on the local, State, and Federal level. In order to reduce the inherent confusion that may be associated with larger scale incidents, using a common command system is a must.

Recognizing the challenges that were occurring in the fire service in applying a common approach to incident command, the National Fire Service Incident Management System Consortium was created in 1990. Its purpose is to evaluate an approach to developing a single Command system. The Consortium consists of many individual fire service leaders, representatives of most major fire service organizations, and representatives of Federal agencies including FIRESCOPE. One of the significant outcomes of the work done by the Consortium was the identification of the need to develop operational protocols within the ICS, so that fire and rescue personnel would be able to apply the ICS as one common system. In 1993, as a result of this, the IMS Consortium completed its first document: *Model Procedures Guide for Structural Firefighting*. FIRESCOPE adopted this in principle as an application to the Model FIRESCOPE ICS. The basic premise is that the organizational structure found in the FIRESCOPE ICS now is enhanced with operational protocols that allow the Nation's fire and rescue personnel to apply the ICS effectively regardless of what area in the country they are assigned. The National Fire Academy (NFA), having adopted the FIRESCOPE ICS in 1980, has incorporated this material into its training curriculum and will continue to reach the thousands of fire service personnel with one common incident command and control system.

It is important to note that the FIRESCOPE Model ICS has had other applications or modules similar to the structural firefighting applications that have been in place for some time. These create a framework for other

activities to operate in and further enhance the use of ICS. As an example, there are the multicasualty, hazardous material, and the Urban Search and Rescue (US&R) applications.

The Federal Emergency Management Agency (FEMA) formally adopted the FIRESCOPE ICS as the IMS for any Federal response required by the agency. Since then, several other Federal agencies have adopted the FIRESCOPE ICS as well.

HISTORY OF THE FIRE DEPARTMENT SAFETY OFFICER

Over the past 20 years, the fire service has seen the origin and development of the fire department Safety Officer. During this time, a great deal of positive change has emerged in the fire service. Vast improvements have been made in the advancement of firefighter safety and health. One of these changes has been the progression of the fire department Safety Officer. As the fire service moves into the new millennium, there are ever-increasing needs and requirements for this position, not only to be part of the management and control process during an emergency incident but to function as the manager or administrator of the fire department's occupational safety and health program.

In December 1970, President Richard M. Nixon signed into law the Williams-Steiger Occupational Safety and Health Act, which enacted occupational safety and health regulations for the first time ever in this country. On April 28, 1971, the Williams-Steiger Act became law establishing the Occupational Safety and Health Administration (OSHA). With the development of occupational safety and health standards for general industry, there were applicable requirements for the fire service in 29 Code of Federal Regulations (CFR) 1910.156, *Industrial Fire Brigades*. This standard contains requirements for personal protective equipment (PPE), training, respiratory protection, and the use of firefighting equipment. Basically, this was the fire service's introduction to safety and health requirements. Over the past 10 to 15 years, these requirements have increased with mandates for the following:

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

With the emphasis being placed on employee safety and health, the fire service slowly recognized the need for this 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, the National Fire Protection Association (NFPA) adopted NFPA 1521, *Standard for Fire Department Safety Officer*. 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 that will manage the safety program for 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 Incident Safety Officer (ISO).

This course will deal primarily with those objectives outlined in NFPA 1521, *Standard on Fire Department Safety Officer*. The numbering of this Standard was changed during the 1992 revision of the document to be consistent with the numbering of umbrella documents under NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*. NFPA 1521 provides the qualifications, authority, and functions for both roles of the fire department Safety Officer. To further clarify and understand the functions of these roles, each is defined as per NFPA 1521:

- **Fire department Safety Officer:** Functions comprised of the HSO and the ISO. These roles can be performed by one member or several members as designated by the fire chief.
- **Health and Safety Officer:** The member of the fire department assigned and authorized by the fire chief as the manager of the safety and health program and who performs the duties and responsibilities specified in NFPA 1521. This individual can be the ISO or it can be a separate function.
- **Incident Safety Officer:** An individual appointed to respond to or assigned at an incident scene by the Incident Commander (IC) to perform the duties and responsibilities specified in NFPA 1521. The individual can be the HSO, or it can be a separate function.

Attitudes toward safety and health in the fire service are gradually changing. Occupational safety and health requirements have changed in a positive way over the past 20 years. Federal and/or State laws now regulate components of the fire service occupational safety and health process which include

- development of an occupational safety and health program;
- 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 the above listed areas and other job tasks as required by the fire department, which include maintaining a liaison with the Training Officer, Infection Control Officer, and other department members. The Safety Officer must have a knowledge of issues such as risk management, building construction, accident prevention, emergency incident operations, and infection control procedures. Other functions of the Safety Officer may include the development and design of new apparatus, the purchase of turnout gear and other PPE, and the incorporation of safety and health into the design of fire stations and facilities.

COURSE OVERVIEW

Unit 2: Principles of Risk Management.

Risk management principles and the practical application of this process for daily activities, both emergency and nonemergency.

Unit 3: Managing Risk.

Review current data on firefighter fatalities and injuries. Discuss the impact that a firefighter fatality or serious firefighter injury has on a fire department problem. The development of codes, standards, and regulations greatly affect the operations of a fire department and fire fighter safety and health. The NFPA Standards-making process is the primary focus of this unit. Understand how the HSO effectively manages risk.

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.

Unit 5: Current Issues.

This unit examines current issues, including highway/traffic safety, incident scene rehabilitation, incidents involving terrorism, the components of a protective clothing selection, care, and maintenance (SCAM) program, and a facility safety program.

Unit 6: Systems Change.

The investigation process is an essential component of an occupational safety and health program. Also, a fire department must examine its operations through the postincident analysis process.

Unit 7: Process Application.

A review of the course and discussion of the safety issues presented at the beginning of the course. The student examination and course examination will be administered by the instructor.

SUMMARY

The HSO is the manager of the fire department's occupational safety and health program. Appointed by the fire chief, the HSO is responsible for ensuring that the department has a compliant program that provides for the safety, health, and wellness of the firefighters. The components of this course will serve as a guide for the development and implementation of a compliant occupational safety and health program.

VIDEO: "FIREFIGHTER FATALITIES: DEPARTMENT IMPACT"**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, Maryland. He had been working for about 45 minutes when he collapsed with a heart attack. Driver/Operator Myers 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 by paramedics. Despite their efforts, Driver/Operator Myers was pronounced dead at a local hospital. The brush fire was caused by the spread of an unattended fire being used to dispose of cleared brush and trees. Additional information about this incident can be found in National Institute of Occupational Safety and Health (NIOSH) Fire Fighter Fatality Investigation 99-F-43.

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--Vencent C. Acey (Rescue 1) and John Redmond (Ladder 11).

Pittsburgh Bureau of Fire

The Pittsburgh Bureau of Fire responded to a residential structure fire in a multistory structure. 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 as an arson fire, and a suspect has been arrested.

STUDENT INFORMATION SHEET

NAME: _____

DEPARTMENT: _____

CITY (OR COUNTY), STATE: _____

POPULATION SERVED BY DEPARTMENT: _____

AREA SERVED BY DEPARTMENT (SQUARE MILES): _____

Department Size:

FULL-TIME/CAREER PERSONNEL: _____

PART-TIME/RESERVE PERSONNEL: _____

VOLUNTEER PERSONNEL: _____

NUMBER OF STATIONS: _____

Organization Delivery Profile

HAZARDOUS MATERIALS: YES NO

CONFINED SPACE/TECHNICAL RESCUE: YES NO

EMS:

ALS FIRST RESPONSE: _____

BLS FIRST RESPONSE: _____

ALS TRANSPORT: _____

BLS TRANSPORT: _____

What I hope to take away from this course:

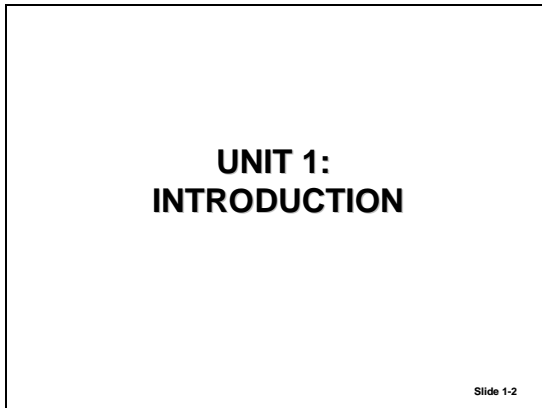
Safety problem in the department and why:

NOTE-TAKING GUIDE

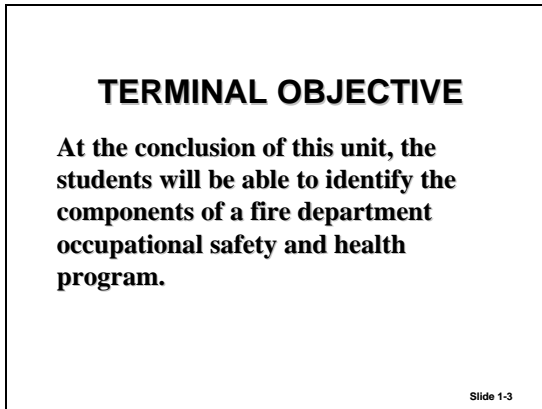
Slide 1-1



Slide 1-2



Slide 1-3



Slide 1-4

ENABLING OBJECTIVES

The students will:

- Describe the history of the Incident Command System (ICS).
- Describe the evolution of the fire department Safety Officer.

Slide 1-4

Slide 1-5

INTRODUCTION

- Welcome
- Instructor introduction
- Class roster
 - Verification of name, address, telephone number, e-mail address
- Student Manual (SM)

Slide 1-5

Slide 1-6

INTRODUCTION (cont'd)

Individual student introductions

- Give name, department, and position
- State what you hope to take away from this course
- Identify a safety problem within your department
 - Emergency
 - Nonemergency

Slide 1-6

Slide 1-7

VIDEO:

**"Firefighter Fatalities:
Department Impact"**



Slide 1-7

Slide 1-8

OVERVIEW

- Course goal
- Scope
- Target audience



Slide 1-8

Slide 1-9

OVERVIEW (cont'd)

Goal: To provide information on:

- Risk management
- Laws, codes, and standards
- Health maintenance and wellness
- Investigations

Slide 1-9

Slide 1-10

OVERVIEW (cont'd)

Scope: Provide knowledge and skills needed for the effective management of a fire department occupational safety and health program

Slide 1-10

Slide 1-11

OVERVIEW (cont'd)

Audience:

- Fire department officers designated by the authority having jurisdiction (AHJ) as the fire department Safety Officer
- Fire department members who may be assigned this responsibility in the future
- Members of a department's Occupational Safety and Health Committee

Slide 1-11

Slide 1-12

**HISTORY OF THE INCIDENT
COMMAND SYSTEM**

**Incident Command System
Model**

Slide 1-12

Slide 1-13

INCIDENT COMMAND SYSTEM

**Development of National Inter Agency
Incident Management System (NIIMS)**

- **Devastating wildland fires in Southern California in early 1970's**
- **Examining various aspects concerning interagency response to incidents**

Slide 1-13

Slide 1-14

FIRESCOPE

- **Fire**
- **RESources of California**
- **Organized for Potential Emergencies**
- **Command and control system assigning job responsibilities and organizational structure**
- **Management of day-to-day operations**
- **Manage catastrophic incidents**

Slide 1-14

Slide 1-15

NATIONAL INTER- AGENCY INCIDENT MANAGEMENT SYSTEM

- **Developed by the wildland community to provide a common system**
- **Includes six agencies**
- **Consists of five major subsystems**

Slide 1-15

Slide 1-16

NEED FOR A SINGLE INCIDENT COMMAND SYSTEM MODEL

- Inconsistencies
- Effective command
- Reduce confusion

Slide 1-16

Slide 1-17

NATIONAL FIRE SERVICE INCIDENT MANAGEMENT SYSTEM CONSORTIUM

- Created in 1990
- Determine what IMS would look like in the future
- Consists of leaders and representatives from most major fire service organizations and Federal agencies
- *Model Procedures Guide for Structural Firefighting*

Slide 1-17

Slide 1-18

NATIONAL FIRE ACADEMY

- Adopted FIREScope ICS in 1980
- National Fire Academy (NFA) incorporated this material into its training curriculum

Slide 1-18

Slide 1-19

FIRESCOPE

Other FIRESCOPE Model ICS applications:

- Multicasualty
- Hazardous materials
- Urban Search and Rescue (US&R)

Slide 1-19

Slide 1-20

HISTORY OF THE HEALTH AND SAFETY OFFICER

Fire department Safety Officer

- Term used since inception (1977)
- National Fire Protection Association (NFPA) 1521, *Standard for Fire Department Safety Officer*
- New term introduced in 1993 during course development

Slide 1-20

Slide 1-21

FIRE DEPARTMENT SAFETY OFFICER

- Health and Safety Officer (HSO)
- Incident Safety Officer (ISO)



Slide 1-21

Slide 1-22

HEALTH AND SAFETY OFFICER

- Appointed by fire chief
- Manager of the department's occupational safety and health program
- Complies with current edition of NFPA 1521, *Standard for Fire Department Safety Officer*
- Can also function as ISO

Slide 1-22

Slide 1-23

COURSE OVERVIEW

- Unit 2: Principles of Risk Management
- Unit 3: Managing Risk
- Unit 4: Health Maintenance
- Unit 5: Current Issues
- Unit 6: Systems Change
- Unit 7: Process Application


Slide 1-23

Slide 1-24

COURSE OVERVIEW (cont'd)

Unit 2: Principles of Risk Management

- Explain the principles of risk management
- How risk management will be incorporated into this course



Slide 1-24

Slide 1-25

COURSE OVERVIEW (cont'd)

Unit 3: Managing Risk

- Discuss firefighter fatalities and injuries
- Importance of laws, codes, and standards
- HSO's role in managing risk



Slide 1-25

Slide 1-26

COURSE OVERVIEW (cont'd)

Unit 4: Health Maintenance

- The components of a health maintenance program
- The components of a comprehensive wellness program



Slide 1-26

Slide 1-27

COURSE OVERVIEW (cont'd)

Unit 5: Current Issues

- Highway/Traffic safety
- Incident scene rehabilitation
- Terrorism
- PPE SCAM
- Facility safety



Slide 1-27

Slide 1-28

COURSE OVERVIEW (cont'd)

Unit 6: Systems Change

- Discussion on the investigation process
- Postincident analysis
- Both continuous improvement programs



Slide 1-28

Slide 1-29

COURSE OVERVIEW (cont'd)

Unit 7: Process Application

- Putting the process together in order to weave safety into the current fabric of the organization
- Course review



Slide 1-29

Slide 1-30

SUMMARY

- Review administrative issues if there are any questions.
- The role of the HSO in policy and procedure issues that affect the health and safety of emergency responders.
- Risk management will be the key to the development and implementation of a fire department occupational safety and health program.

Slide 1-30

UNIT 2: PRINCIPLES OF RISK MANAGEMENT

TERMINAL OBJECTIVE

At the conclusion of this unit, the students will be able to explain the principles of risk management for the fire service.

ENABLING OBJECTIVES

The students will:

- 1. Discuss the classic risk management model.*
 - 2. Discuss the importance of recognizing low-frequency/high-risk incidents.*
 - 3. Discuss the application of risk management principles in practical training evolutions.*
 - 4. Discuss the roles of the Health and Safety Officer (HSO) and the Incident Safety Officer (ISO) in emergency risk management.*
 - 5. Develop a Risk Management Plan for a specific risk.*
-

RISK

Over the past decade, the fire service has slowly recognized the importance of ensuring the safety, health, and welfare of its firefighters. The fire service is beginning to understand the necessity and rationale for developing, implementing, and maintaining a proactive, comprehensive occupational safety and health program. However, there are still many fire service personnel who do not subscribe to the safety and health philosophy. Tradition plays a major role in this lack of understanding of firefighter safety and health. Although the struggle is far from over, the fire service is learning the lesson that safety is good business.

Firefighter fatality and injury statistics are beginning to remain constant or move downward. This indicates occupational safety and health is becoming a standard part of fire 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 National Fire Protection Association (NFPA) indicate that 102 firefighters died in the line of duty in 2002. This statistical data, which is collected annually, identifies issues that can be addressed through an aggressive occupational safety and health program and strong operational procedures.

Risk Management Process

The fire service has a means of evaluating and controlling or eliminating the hazards that create the inherent risks during the delivery of service, a process known as risk management. Risk management is a very broad and progressive process that has been used successfully by many organizations and businesses for many years.

Risk (definition): A measure of the probability and severity of adverse effects that result from an exposure to a hazard.

Risk management (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

This process was formally introduced to the fire service in the 1992 edition of NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*. The intent of incorporating risk management into this Standard was to provide guidance in the development of a comprehensive organizational Risk Management Plan. This Risk Management Plan requires and includes a proactive and functioning occupational safety and health system or 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. The organizational risk management process develops a foundation for effectively managing all identifiable risks a fire department encounters on a daily basis, including operational risks and hazards.

The effective management of risk is an active, dynamic process, not an event or dormant program. The Risk Management Plan establishes a standard of safety for the daily operations of a fire department. This standard of safety establishes the parameters in which we conduct operations during emergency and nonemergency situations. The intent is for all members to operate within this standard level of safety and not to deviate from this process. Control measures are used to ensure the safety and health of departmental personnel.

Risk Management Model

The classic risk management model presents a systematic approach for identifying and planning for the control of risks. This methodical process for making decisions can be used not only for the nonemergency risks that all organizations must address, but also for the risks associated with the response to and mitigation of an emergency incident. The factors at each incident always will vary, but, as we have known for years, continual training in all aspects of the approach will yield the best, most consistent results possible.

The model has five basic steps, as listed below. Each one depends upon information generated by the previous step, so it is important to evaluate each one before moving on to the next.

The model has five primary components, or steps, which serve as a foundation for this process. These five steps are discussed in detail in the following sections.

- risk identification;

- risk evaluation;
- establishing priorities or prioritization;
- risk control techniques; and
- monitoring.

For each step in the process, it is important to record performance criteria, suggestions, and recommendations. This data will provide the elements that formulate a written risk management plan. The number of pages in the plan has no impact on effectiveness.

Once created, the plan should be periodically (at least annually) updated. Consider it a dynamic process not a static event with a single, written record. Keep the plan current based on conditions, circumstances, and experience.

Identifying Risks

What might go wrong? Compile a list of all emergency and nonemergency operations in which the department participates. Ideally, plan for the worst, but hope for the best. There are many sources to assist with this identification process. The first, and possibly the most effective, is the department's loss prevention data. Seek input and ideas from personnel, trade journals, professional associations, and other service providers. When using ideas from other fire departments or organizations, simply consider local circumstances when formulating the list.

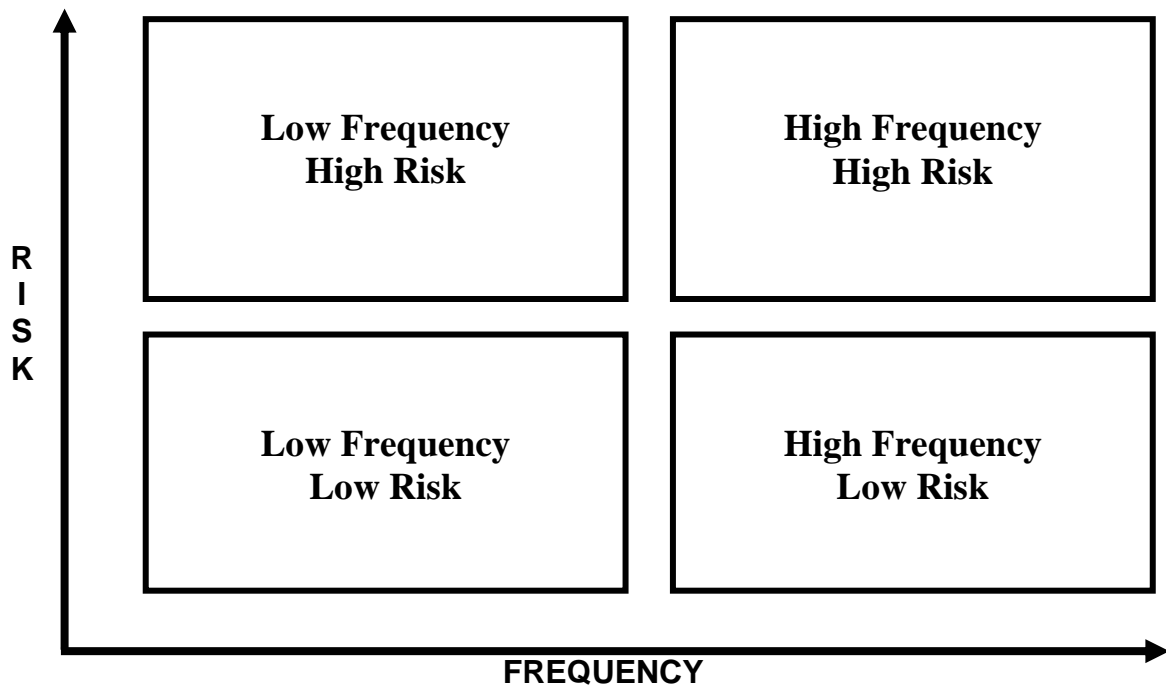
Risk Evaluation

Once the risks are identified, they can be evaluated from both a frequency and severity standpoint. Frequency addresses the likelihood of occurrence. Typically, if a particular type of incident (e.g., back injuries) has occurred repeatedly, these incidents will continue to occur until effective control measures are implemented.

Severity addresses the degree of seriousness of the incident. This can be measured in a variety of ways, such as time away from work, cost of damage, cost of (and time for) repair or replacement, disruption of service, or legal costs. Using the information gathered in the identification step, the risks can be classified based on severity.

Establishing Priorities

Taken in combination, the results of the frequency and severity determinations will help to establish priorities for determining action. Any risk that has a low probability of occurrence, but will have serious consequences (high risk or severity), deserves immediate action and would be considered a high priority item. Nonserious incidents with a low likelihood of occurrence are a lower priority and can be placed near the bottom of the "action required" list.



Risk Control

At this point in the process, risks have been identified and evaluated, so it is time to find solutions. There are several approaches to take, including risk avoidance, implementation of control measures, and risk transfer.

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

An example of where avoidance has been very practical is the widespread, hopefully universal, use of sharps containers. The risks associated with recapping needles are well documented; therefore, 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 **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 and education programs, and well-defined Standard Operating Procedures (SOP's) all are effective control measures.

Some typical control measures instituted to control fireground injuries include accountability, use of full protective clothing, a mandatory respiratory protection program, training and education, and competent SOP's. These control measures coupled together make an effective program that ensures safe fireground operations.

Risk transfer can be accomplished in two primary ways: physically transferring the risk to somebody else or through the purchase of insurance. For a fire or emergency medical services (EMS) organization, the transfer of risk may be difficult if not impossible. However, an example of risk transfer would be contracting out the operation and maintenance of helicopters for use by responders. The risks associated with those activities have been transferred to a private contractor.

The purchase of insurance transfers financial risk only. In addition, it does nothing to affect the likelihood of occurrence. Buying fire insurance on a fire station, while highly recommended to protect the assets of the department, does nothing to prevent the station from burning down. Therefore, insurance is no substitute for effective control measures.

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 in the process have to be revised or modified. This final step ensures that the system is dynamic, and will facilitate periodic reviews of the entire program.

The intent of the Risk Management Plan is to develop a strategy for reducing the inherent risks associated with fire department operations. Regardless of the size or type of fire department, every organization should operate within the parameters of a Risk Management Plan. This is a dynamic and aggressive process that must be monitored and revised annually by the HSO.

Training as a Risk Management Control Measure

Safety has to be an integral part of any training program, and training and education must be 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. In the past, though it may not have been spelled out, safety has been included in training for personnel. Safety is a valuable component of the training program and is visible throughout the process. This is evident throughout the various training and certification programs.

In order for the occupational safety and health program to be successful, members must be trained and educated to comply with the requirements. As with any policy or procedure, if the program is sent out without proper training, the success and/or compliance will be poor. Also, training on the occupational safety and health program is not a one-time issue. The process should be revisited during in-service training, officer training, company drills, or any other avenue that is convenient for personnel.

Practical Training

An excellent example of incorporating risk management into the fire service occurred due to a serious problem involving live fire training. In 1985, the NFPA passed a Standard that detailed the minimum requirements for 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 early 1980's. These requirements outlined exactly what was needed to conduct live fire training safely in an acquired structure. Before NFPA 1403, the safety of members involved with live fire training depended upon the staff conducting the training. This Standard proved that successful training can be accomplished without injuring the members involved.

There was little or no regard for the safety of personnel involved in these operations. After several significant incidents that included firefighter fatalities and/serious injuries, the fire service began to realize the need for guidelines when conducting live fire training. The safety problems included the use of flammable materials, poor water supply and backup lines, the lack of proper personal protective equipment (PPE), no preplanning or escape routes, and the lack of an incident management system.

The advent of NFPA 1403 provided strict requirements when conducting live fire training in burn buildings or acquired structures. NFPA 1403 addresses issues such as:

- safety, including use of an HSO and an ISO;
- environmental impact;
- 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 incident management/command system;
- instructor/student ratio; and
- emergency medical care (basic life support capabilities) on scene.

Without these guidelines in place, the organization can greatly increase its liability and jeopardize the safety and welfare of personnel.

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. One of the primary issues is the inspection of the acquired structure. The HSO must decide if the structure will serve as a safe environment for the live fire training evolution based upon the goals of the training exercise. If any one of the issues listed in the previous section cannot be met or creates a problem, the HSO has the authority to halt this training exercise or modify the intent (offensive to defensive). The HSO will participate throughout the evolution, serving as the ISO or working with the ISO.

Emergency Risk Management

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

The HSO plays a role in this process with the establishment of the department's occupational safety and health program. The effective management of operational risk is an active, dynamic process, not an event or dormant program. The Risk Management Plan establishes a standard of safety for the daily operations of a fire department. This standard of safety establishes the parameters in which we conduct operations during emergency and nonemergency situations. The intent is for all members to operate within this standard level of safety and not to deviate from this process. Control measures are used to ensure the safety and health of department personnel.

Health and Safety Officer

Another factor in this process is to have a member of the department effectively manage this process. The HSO is the logical and obvious member to fulfill this role. The HSO, in cooperation with the chief, directs the development and implementation of the organizational risk management program. Once this process has become functional, the HSO, in cooperation with the chief, will be the manager. The operational risk management process will be the responsibility of the ISO and the IC of any particular incident. Ensuring that risks are properly managed and controlled has a proactive affect on eliminating firefighter fatalities, reducing accidents and injuries, and enhancing fire department operations.

More often, this responsibility is transferred to the ISO. The ISO ensures the proper management of the fireground or incident scene. Statistics indicate that the incident scene (fireground) generates more fatalities and more injuries than any other operation firefighters perform, including responding to/returning from incidents, nonfireground emergencies, training, and other on-duty activities.

The ISO is a vital part of the Incident Command System (ICS) process relating to firefighter safety. The ISO must have the authority from the chief of the department to suspend immediately any operation that jeopardizes the safety of department personnel. The ISO also shall ensure that the health and welfare of members are maintained through the rehabilitation process at an emergency incident, especially during extended emergency operations.

Incident scene safety performance includes the following:

- monitoring of structure/container stability;
- ensuring proper and mandatory use of protective clothing and equipment by all members;
- accountability of personnel;
- rehabilitation of personnel;
- addressing any safety concerns of the IC; and
- investigating damage to department equipment or injuries to personnel at the scene.

From a risk management standpoint as well as a safety aspect, the use of an ISO enhances incident operations. The use of an effective incident management system coupled with good risk management techniques, ensures a successful outcome. For decades, the fire service has placed little emphasis on the safety and welfare of the firefighter. Our mission is to provide emergency service to our customers as efficiently and safely as

possible, but to take care of ourselves as well. The ISO in effect, should be the operational risk manager for the fire department.

The criterion for the ISO is to respond to incidents that pose a high risk to personnel. The ISO should be assigned not only to structure fires but also to hazardous material incidents and technical rescue operations. These criteria can be dictated through the department's Incident Management System procedures. The ISO should be dispatched on second alarms (for example), called as needed by the IC, or respond at will based on information dictating the response. The department may use a responding command officer to assume the role of ISO based on the need of the incident. The ISO may differ from the HSO. Whomever assumes the role of ISO must have an understanding of what is required on this function.

The ISO must be able to identify incident scene safety hazards and conditions and take immediate measures to correct them to prevent injuries to department members, equipment, and apparatus. Upon arrival at the scene, the ISO must meet with the IC to determine if there are any immediate safety concerns. Once the ISO is assigned to the safety sector, he/she must monitor the incident scene for potential safety problems. A few examples of such safety hazards or conditions are as follows:

- use of full protective clothing and equipment;
- structure stability;
- conflicting operations;
- staffing;
- freelancing;
- personnel accountability;
- safety zones; and
- rest and rehabilitation of crew members.

The IC is responsible for the overall safety of everyone at an incident, but it is the ISO's responsibility to ensure that this happens. The ISO must be given the authority to stop any operation that affects the safety and welfare of members operating at the incident. In addition to the safety sector, an assistant ISO may be designated in charge of the "rehab" sector. This is often the most neglected incident scene function, but certainly one of most important. The "rehab" sector must be established at an incident of any magnitude as well as one under extreme weather conditions. The "rehab" sector provides an opportunity for personnel to rest, check their medical condition, and be hydrated with water or noncarbonated fruit drink. The ISO and the function that this position represents is part of the risk management toolbox that ensures the safety, health, and welfare of members operating at an emergency incident.

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 match the risk assessment and the operational risk management procedures established by the fire department. All officers, firefighters, the IC, and the ISO must be continually involved with the risk assessment of the situation. 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.

Through the monitoring of incident scene operations, the ISO must ensure that the operations match the risk assessment formulated by the IC. If the risk assessment and the operations do not match, the ISO has the authority to alter, suspend, or terminate these operations. In NFPA 1500, risk management is discussed extensively regarding the effective management and control of emergency operations.

- The IC needs to connect risk management into the regular functions of the incident management strategy and tactics. Safety is paramount and the utmost responsibility of the IC. Factors that need to be considered in the operational risk management process are standard evaluation of the situation, strategic decisionmaking, tactical designing, plan evaluation and revision, and operational command and control.
- The concept of risk management to be used by members during emergency incidents is based on the following:
 - Members are to be limited to situations where there is a potential to save endangered lives.
 - Inherent risks to the safety of members are to be limited to protect savable property.
 - Members are to accept no risk when there is no possibility to save lives or property.
 - The IC must determine and evaluate the risk to members with respect to the purpose and potential results of the incident action plan in each situation.

- Risk management principles must be applied by all supervisory personnel at all levels while operating within the requirements of the department's Incident Management System. These principles define the limits of acceptable and unacceptable positions and functions for all members at the incident scene.
- As an ISO, this individual or members are responsible for operating at incidents other than firefighting operations.

International Association of Fire Chiefs Rules of Engagement












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 Incident Commander 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.

										
Simple Interior Primary Search	Primary Search with Attack Lines	Primary Search with Attack Lines	Primary Search with Attack Lines and Support	Marginal Primary Search Additional Attack Lines and Support	Very Very Marginal Primary Search Additional Attack Lines and Support	No Primary Search	No Primary Search	No Primary Search	No Primary Search	For Sale
Risk Assessment/Rules of Engagement										
Fire Fighter Injury/ Life Safety Risk	High Probability of Success			Marginal Probability of Success			Low Probability of Success			
Low Risk	Initiate offensive operations. Continue to monitor risk factors.			Initiate offensive operations. Continue to monitor risk factors.			Initiate offensive operations. Continue to monitor risk factors.			
Medium Risk	Initiate offensive operations. Continue to monitor risk factors. Employ all available risk control options.			Initiate offensive operations. Continue to monitor risk factors. Be prepared to go defensive if risk increases.			Do not initiate offensive operations. Reduce risk to fire fighters and actively pursue risk control options.			
High Risk	Initiate offensive operations only with confirmation of realistic potential to save endangered lives.			Do not initiate offensive operations that will put fire fighters at risk for injury or fatality.			Initiate defensive operations only.			

Postincident Analysis

Another part of the risk management toolbox is the postincident analysis. This is a joint effort of the ISO and the HSO. The ISO must participate in the formal process and also prepare a written report outlining the pertinent information regarding the incident as it relates to firefighter safety and health. The HSO needs to ensure that information discussed includes protective clothing and equipment, personnel accountability, rapid intervention crews, "Rehab" and any other safety and health issues that were of concern during the incident. Any policy changes must be addressed through proper department channels to ensure change takes effect.

SUMMARY

For risk management efforts to be successful, they require support from personnel at all levels of the organization. Problem identification often requires considerable fact-finding and information-gathering activities. Risk managers will need to be seen as trustworthy in order for personnel to be forthcoming regarding risk management issues. Blindly imposing restrictions and recordkeeping requirements will only frustrate members and likely will defeat the very purposes of risk management. To be successful, it is important that organizational members understand and feel that they are valuable contributors to the risk management process--as opposed to feeling the process is being forced upon them.

Activity 2.1

Risk Management Plan for a Specific Risk

Purpose

To identify, evaluate, prioritize, and provide control measures for risks associated with emergency and nonemergency functions of a fire 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 column of the worksheet. The topics are
 - a. Fire department facilities.
 - b. Selection, care, and maintenance (SCAM) of PPE.
 - c. Operations at highway incidents.
 - d. Emergency response of fire 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

**UNIT 2:
PRINCIPLES OF RISK
MANAGEMENT**

Slide 2-1

Slide 2-2

TERMINAL OBJECTIVE

At the conclusion of this unit, the students will be able to explain the principles of risk management for the fire service.

Slide 2-2

Slide 2-3

ENABLING OBJECTIVES

The students will:

- **Discuss the classic risk management model.**
- **Discuss the importance of recognizing low-frequency/high-risk incidents.**
- **Discuss the application of risk management principles in practical training evolutions.**

Slide 2-3

Slide 2-4

**ENABLING OBJECTIVES
(cont'd)**

- Discuss the roles of the Health and Safety Officer (HSO) and the Incident Safety Officer (ISO) in emergency risk management.
- Develop a Risk Management Plan for a specific risk.

Slide 2-4

Slide 2-5

**DEFINE
RISK**

Slide 2-5

Slide 2-6

**RISK MANAGEMENT
PROCESS**

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

Slide 2-6

Slide 2-7

ORGANIZATIONAL RISK MANAGEMENT

- Focus on firefighter safety and health
- Nonemergency risk management-- hazards common to all work environments
- Pre-emergency risk management
- Emergency risk management

Slide 2-7

Slide 2-8

RISK MANAGEMENT MODEL

- Risk identification
- Risk evaluation
- Risk prioritization
- Risk control measures
- Risk monitoring

Slide 2-8

Slide 2-9

IDENTIFYING RISKS

- Make a list of all possible risks for all operations from department's Mission Statement
- Analyze department accident and injury statistics to help identify risks

Slide 2-9

Slide 2-10

IDENTIFYING RISKS (cont'd)

- Find out about near misses and operations that have injured members of your organization in the past
- Use the experience of others and don't be afraid to ask questions

Slide 2-10

Slide 2-11

RISK EVALUATION

- Determine which risks need to be controlled first
- XY Graph: frequency and risk (severity)
- Frequency: How often does the potential for risk occur?

Slide 2-11

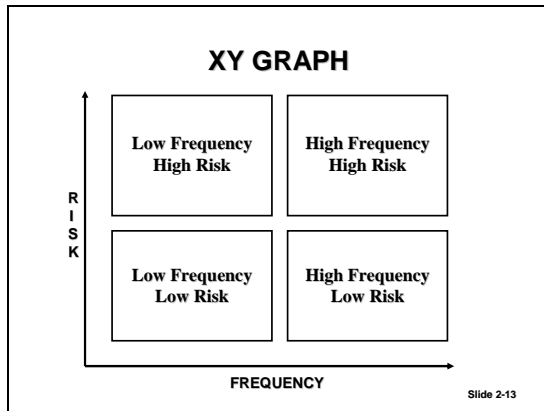
Slide 2-12

RISK EVALUATION (cont'd)

- Risk (severity): How severe are the consequences if something goes wrong?
- Accident and injury data
- National Fire Incident Reporting System (NFIRS)
- NFPA 901, *Standard Classifications for Incident Reporting and Fire Protection Data*

Slide 2-12

Slide 2-13



Slide 2-14

RISK MANAGEMENT MATRIX

- **High risk/High frequency**
(e.g., residential structure fires)
- **Low frequency/Low risk**
(e.g., nonemergency response incidents--CO detector)
- **Low frequency/High risk**
(e.g., technical rescue incidents)

Slide 2-14

Slide 2-15

PRIORITIZATION OF RISK

- **Decision as to which risks will be controlled first**
- **Low frequency/High risk**
- **Difficult decision**
- **Based on analysis by risk managers, HSO, and Occupational Safety and Health Committee**

Slide 2-15

Slide 2-16

PRIORITIZATION OF RISK (cont'd)

- **There is no absolutely correct priority order.**
- **Matrix may help in classifying problems.**

Slide 2-16

Slide 2-17

RISK CONTROL

- **Avoidance (e.g., not letting families ride in fire department vehicles, e.g., ambulance)**
- **Transfer**
 - **Insurance transfers risk to someone else**

Slide 2-17

Slide 2-18

CONTROL MEASURES

- **Use of personal protective equipment (PPE) and self-contained breathing apparatus (SCBA)**
- **Incident Command System (ICS)**
- **Personnel accountability system**
- **Training**

Slide 2-18

Slide 2-19

FREQUENCY/RISK MATRIX

- Discretionary time
 - Time to think
- Nondiscretionary time
 - No time to think
- Recognition-Primed Decisionmaking

Slide 2-19

Slide 2-20

VIDEO:

"Gordon Graham on Risk Management"



Slide 2-20

Slide 2-21

TRAINING

- Control measure
- Part of risk management toolbox
- Addresses low-frequency/high-risk events



Slide 2-21

Slide 2-22

PRACTICAL TRAINING EXERCISES

- Training exercises are not emergencies; they are designed to serve as a learning scenario.
- All risk management control measures designed for use in actual emergencies must be used in the training environment to reinforce learning.

Slide 2-22

Slide 2-23

PRACTICAL TRAINING EXERCISES (cont'd)

- NFPA 1403, *Standard on Live Fire Training Evolutions*
- An excellent risk management tool
- Medical standby at training
- Firefighter fatalities at live fire training despite the Standard

Slide 2-23

Slide 2-24

EMERGENCY RISK MANAGEMENT

- Parameters defined by the fire department
- Integrated into the department's ICS policy
- ISO is the incident scene risk manager

Slide 2-24

Slide 2-25

EMERGENCY RISK MANAGEMENT (cont'd)

Defined in NFPA Standards

- 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*

Slide 2-25

Slide 2-26

HEALTH AND SAFETY OFFICER

- Responsible for occupational safety and health program, which includes incident operations
- Develops an incident Risk Management Plan that is implemented into the fire department's ICS

Slide 2-26

Slide 2-27

HEALTH AND SAFETY OFFICER (cont'd)

The incident Risk Management Plan shall

- Meet the requirements of Chapter 8 of NFPA 1500
- Be evaluated and revised periodically as needed

Slide 2-27

Slide 2-28

**INTERNATIONAL
ASSOCIATION OF FIRE
CHIEFS (IAFC) "RULES OF
ENGAGEMENT"**

Slide 2-28

Slide 2-29

TEN RULES OF ENGAGEMENT

Acceptability of Risk

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

Slide 2-29

Slide 2-30

**TEN RULES OF ENGAGEMENT
(cont'd)**

Risk Assessment

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

Slide 2-30

Slide 2-31

ACCEPTABLE RISK

	Fire Fighter Injury Life Safety Risk	High Probability of Success	Medium Probability of Success	Low Probability of Success
Low Risk	Initiate offensive operations only. Continue to monitor risk. Do not initiate defensive operations.	Initiate offensive operations only. Continue to monitor risk. Do not initiate defensive operations.	Initiate offensive operations only. Continue to monitor risk. Do not initiate defensive operations.	Initiate offensive operations only. Continue to monitor risk. Do not initiate defensive operations.
Medium Risk	Initiate offensive operations only. Continue to monitor risk. Do not initiate defensive operations.	Initiate offensive operations only. Continue to monitor risk. Do not initiate defensive operations.	Initiate offensive operations only. Continue to monitor risk. Do not initiate defensive operations.	Initiate offensive operations only. Continue to monitor risk. Do not initiate defensive operations.
High Risk	Initiate offensive operations only. Continue to monitor risk. Do not initiate defensive operations.	Initiate offensive operations only. Continue to monitor risk. Do not initiate defensive operations.	Initiate offensive operations only. Continue to monitor risk. Do not initiate defensive operations.	Initiate offensive operations only. Continue to monitor risk. Do not initiate defensive operations.

Slide 2-31

Slide 2-32

RISK MANAGEMENT PLAN

- Required by NFPA 1500
- Shall include components for all activities provided by the fire department
- Nonemergency and emergency operations

Slide 2-32

Slide 2-33

RISK MANAGEMENT PLAN (cont'd)

- Example provided in the Annex of NFPA 1500
- Revised annually to reflect impact of the occupational safety and health program

Slide 2-33

Slide 2-34

SUMMARY

- Risk management, for the purposes of this course, focuses on firefighter safety and health.
- Risk management is a process.

Slide 2-34

Slide 2-35

SUMMARY (cont'd)

- A fire department must develop and implement a written Risk Management Plan, which is reviewed and evaluated annually.

Slide 2-35

Slide 2-36

Activity 2.1 Risk Management Plan for a Specific Risk

Slide 2-36

UNIT 3: MANAGING RISK

TERMINAL OBJECTIVE

At the conclusion of this unit, the students will be able to explain how the Health and Safety Officer (HSO) manages risk effectively.

ENABLING OBJECTIVES

The students will:

1. *Discuss the importance of managing risk versus risk management.*
 2. *Describe how firefighter fatalities and injuries affect the risk management process.*
 3. *Describe how the HSO can manage risk for short-term (dynamic) situations versus long-term (comprehensive) situations.*
 4. *Define the roles and responsibilities of the HSO relating to managing risk.*
 5. *Discuss role identification for the HSO and the Incident Safety Officer (ISO).*
 6. *Discuss the effect of regulations, standards, and policies that influence firefighter safety.*
 7. *Describe the components of a fire department occupational safety and health program.*
-

MANAGING RISK VERSUS RISK MANAGEMENT

The focus of this unit will be managing risk rather than risk management, which was discussed in Unit 2: Principles of Risk Management. One of the primary roles of the Health and Safety Officer (HSO) is to develop and implement a Risk Management Plan. Risk management is defined **as the process of planning, organizing, directing, and controlling the resources and activities of an organization in order to minimize detrimental effects on an organization.** This is a methodical and timely process used to control and manage risks encountered by a fire department. Managing risk is defined **as a process to integrate dynamic and forceful control measures to reduce the risk of death or injury to firefighters.** In order to manage risk effectively, a written Risk Management Plan must be implemented by the fire department.

The fire service has a means of evaluating and controlling or eliminating the hazards that create the inherent risks during the delivery of service, a process known as risk management. Risk management is a very broad and progressive process that has been used successfully by many organizations and businesses for many years. The intent of incorporating risk management was to provide guidance in the development of a comprehensive organizational Risk Management Plan. This 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 the standard, organizational risk management was addressed in the administrative requirements for a fire department and operational risk management was included in the emergency operations section. The organizational risk management process develops a foundation for the effective management of all identifiable risks a fire department encounters on a daily basis including operational risks and hazards.

The effective management of risk is an active, dynamic process, not an event or dormant program. The Risk Management Plan establishes a standard of safety for the daily operations of a fire department. This standard of safety establishes the parameters in which we conduct operations during emergency and nonemergency situations. The intent is for all members to operate within this standard level of safety and not to deviate from this process. Control measures are used to ensure the safety and health of departmental personnel. Another factor is to have a member of the department manage this process. The HSO is the logical and obvious member to fulfill this role. The HSO, in cooperation with the chief, directs the development and implementation of the organizational risk management program. Once this process has become functional, the

HSO, in cooperation with the chief, will be the manager. The operational risk management process will be the responsibility of the Incident Safety Officer (ISO) and the Incident Commander (IC) of the particular incident. Ensuring that risks are managed and controlled properly has a proactive affect on eliminating firefighter fatalities, reducing accidents and injuries, and enhancing fire department operations.

FIREFIGHTER FATALITIES AND INJURIES

The death or serious injury of a firefighter in the line of duty is a failure in the firefighter health and safety system. In the vast majority of cases, the occurrence of a firefighter death or injury cannot be attributed to a single action or lack of action--it is the failure of the system.

The effect of a firefighter fatality on the firefighter's immediate family cannot be overstated. What is not often known to those outside of the family is the financial hardship, the loneliness after the funeral and tributes are over, and the balance of a lifetime without the presence of a loved one.

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

A severe firefighter injury can have an effect on the firefighter's family and the fire department that is just as serious as the effect of a firefighter death. The injury may require a long period of recovery, the injuries may be severe enough that the firefighter may never recover fully, the firefighter may be forced to retire from the fire service or from a nonfire service career (in the case of a volunteer firefighter). Many injuries, although not fatal to the firefighter, have a life-long effect on the quality of life of the firefighter and his or her family, the ability of the firefighter to support his or her family, and the long-term life expectancy of the firefighter.

The purpose of this course is to give you the skills that you need to prevent firefighter deaths and injuries.

Firefighter Fatalities

Each year, approximately 100 firefighters give their lives in the line of duty. Firefighter fatality statistics for the United States were first tracked systematically in 1977 through a joint effort of the National Fire Protection Agency (NFPA) and the United States Fire Administration (USFA). Since 1977, the number of on-duty firefighter fatalities has followed an overall downward trend. The obvious exception to this trend was in 2001, when 344 New York City firefighters were killed in the terrorist attacks on the World Trade Center (WTC) on September 11.

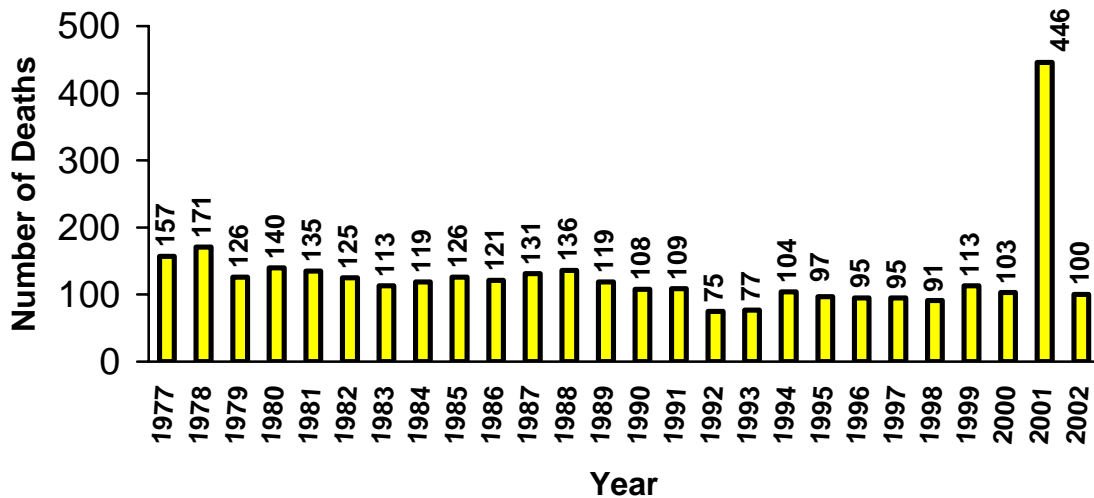


Figure 3-1
On Duty Firefighter Fatalities

A study conducted for the USFA addressed firefighter fatalities that occurred from 1990 through 2000. The study results follow.

The Leading Cause of Firefighter Deaths is Heart Attacks

Forty-four percent of the firefighters who die while on duty suffer from overexertion. Traumatic injuries accounted for 27 percent of the deaths during the period, and asphyxiation and burns accounted for 20 percent of the deaths.

Traumatic Death and Age

Firefighters under the age of 35 are more likely to be killed by a traumatic injury. Firefighters over age 35 are more likely to succumb to nontraumatic deaths such as heart attacks and cerebrovascular accidents (CVA's) also known as strokes.

In approximately 60 percent of the fatalities, the firefighter was over 40 years of age and one-third were over 50. Nationally, firefighters over age 50 comprise only 16 percent of the total population of firefighters.

Emergency Medical Services

Although the vast majority of the incidents handled by fire departments are related to emergency medicine, only three percent of all firefighter fatalities occur during this type of incident. Traumatic injuries, such as being struck by a vehicle while providing care by the roadside accounted for 50 percent of these deaths.

Vehicle Crashes

Motor vehicle crashes account for between 20 and 25 percent of all firefighter fatalities. Of the firefighters that were killed while responding to an emergency, 85 percent were volunteers.

The type of vehicle involved in the most fatal crashes was the firefighter personal vehicle. After personal vehicles, the type of vehicles involved in the most fatal crashes were tankers (tenders), engine/pumpers, and aircraft.

A recent study of crashes involving tankers performed by the USFA found that seatbelts were not being worn by the firefighter that was killed in 34 of 42 cases.

Training Deaths

Approximately six percent of all firefighter fatalities occur during training. Most of these deaths occur during physical fitness training and are cardiac related. A significant number of deaths occur during training from smoke inhalation.

Wildland Firefighters

Wildland firefighters are employed either full-time or part-time, and have the primary duty of controlling wildland fires. Smokejumpers, the crews of wildland firefighting aircrafts, and hand crews are included in this classification. The study found that very few wildland firefighters died of heart attacks (only seven percent). The majority of wildland firefighters die of traumatic injuries (58 percent) and burns/asphyxiation (23 percent).

Multiple Firefighter Deaths

Between 1990 and 2000, 8 percent of fatal incidents involved the death of more than one firefighter. These deaths accounted for 14 percent of all firefighter deaths.

The largest loss of life during a single incident from 1990 to 2000 was the loss of 14 firefighters in a wildland fire in Colorado on July 6, 1994.

Three hundred and forty-four firefighters died at the WTC towers in New York City on September 11, 2001. This is the largest loss of firefighter lives at any single incident in the history of the United States, and for all of recorded worldwide fire service history. The next highest loss of firefighter lives on a single incident was the explosion of two ships in Texas City, Texas, on April 16, 1947. Twenty-seven firefighters were killed. The only other incident to claim over 20 firefighter's lives was an incident in Chicago on December 22, 1910¹.

Special Firefighter Fatality Research by the National Fire Protection Association

According to research conducted by the NFPA, the rate of firefighter deaths at structure fires has not followed the nationwide reduction in the number of structure fires. Firefighter deaths at the scene of structure fires have remained constant at about five firefighter deaths per 100,000 structure fires. There are fewer firefighter deaths at structure fires, but there has been no change in the number of firefighter deaths per structure fire since their research began in 1977.

¹ Hank Pryzyblowicz, Line of Duty Death Research Service.

The NFPA study also found that the rate of firefighters who die of heart attacks at structure fires has been falling since 1978. Firefighters still die of heart attacks at structure fires in unacceptable numbers, but the number of firefighters who die of heart attacks per structure fire has fallen.

The most unanticipated finding of the NFPA research report on firefighter fatalities in structure fires was that the rate of firefighter deaths inside structure fires has risen dramatically. Almost all of the firefighter deaths inside structure fires were the result of smoke inhalation, burns, or crushing injuries. The number of firefighter deaths caused by smoke inhalation has doubled since 1977. Very few firefighter fatalities occur when a firefighter enters a burning structure without a self-contained breathing apparatus (SCBA). In the vast majority of these cases, the firefighter has used an SCBA, but has depleted the unit's air supply.

Firefighter Injuries

Each year, tens of thousands of firefighters are injured in the course of their work. According to an NFPA analysis, there were an average of 90,440 firefighter injuries per year from 1992 through 2001.

For the 10-year period ending in 2001, the NFPA data also shows that:

- Over half of all firefighter injuries occur on the fireground. During the period, an average of 46,837 injuries occurred on the fireground each year. The number of fireground injuries per 1,000 fires dropped 11 percent during the period.
- Injuries at nonfire emergencies accounted for 16 percent of the injuries received by firefighters each year. An average of 14,140 firefighters are injured each year at nonfire emergencies.
- An average of 14,162 firefighter injuries were received each year in vehicle crashes while responding to or returning from an incident in a fire department vehicle. There was an annual average of 1,416 injuries involving personal vehicle crashes.
- The leading type of injury is strains and sprains, accounting for over one-third of all injuries. Strains, sprains, and muscular pain account for approximately half of all nonfireground injuries. Wounds, cuts, bleeding, and bruises account for approximately 20 percent of all injuries.

- There are over 10,000 exposures to infectious diseases encountered by firefighters. This equates to an average of one exposure per 100 emergency medical services (EMS) responses.

Another injury report prepared by NFPA using National Fire Incident Reporting System (NFIRS) data looked at firefighter injuries that occurred at the fireground from 1993 to 1997. The research found that 3.2 percent of the total number of fireground injuries that occur were classified as severe or life threatening. Over one-third of the severe or life-threatening injuries were asphyxiation and cardiac in nature.

DYNAMIC CHANGE VERSUS COMPREHENSIVE CHANGE

This section will discuss the Safety Officer's role for managing risk effectively. This requires involvement from the HSO, ISO, fire chief, and members of the department. This segment focuses on the short-term (dynamic) changes that can positively affect firefighter safety versus the long-term (comprehensive) changes. The department must be willing to accept change, which will occur over time based upon the attitude, behaviors, and culture within the department. Some changes will come more quickly than others, but the entire organization must be willing to accept this change. Two key roles in the organization will be the HSO and the ISO.

The HSO is the program manager of the occupational safety and health program. In order to have an effective program, the fire chief must appoint a qualified member to function in this capacity. Each department is different and the fire chief and staff have to recognize what works well to ensure for the success of the occupational safety and health program. The success of the program is measured in terms of the reduction in the frequency and severity of accidents, occupational injuries and illnesses, and the elimination of fatalities. There are many players in this process, but the HSO has to be the focal point.

The ISO has the responsibility, though on a much shorter interaction, to affect firefighter safety and health effectively.

In order for change to occur, the department must have a Risk Management Plan and an occupational safety and health program in place. All members must have an understanding of these programs and their individual responsibilities for compliance. Managing organizational risk is not unique to fire departments. All organizations must manage some type of risk. The nature of the activities conducted by a fire department makes risk management a highly important and challenging process. The

mission of the fire department is to reduce the probability of harm to the community that could result for different harmful situations and circumstances. The fire department must manage its internal (organizational) risk while it performs its mission of managing external (community) risk.

Risk management consists of many elements such as liability, insurance, safety, health, security, financial impact, and several other elements. For the purpose of this plan, internal (organizational) risk will be addressed. **The primary focus will be firefighter safety and health.**

There is no single method or solution for managing risk effectively. Determining how to manage risk is a decision each fire department must make based on the risk management model. The process must be reviewed annually and where necessary, revised. Most importantly, once a risk management process is implemented, the plan must be managed properly, evaluated continuously, and updated annually.

Dynamic Change

Short-term or dynamic change can occur in a variety of ways. Several examples of dynamic change are

- written Standard Operating Procedures (SOP's):
 - Incident Command System (ICS),
 - personnel accountability system, and
 - highway/traffic safety;
- personal protective equipment (PPE):
 - turnout gear,
 - SCBA, and
 - EMS garments:
 - protective eyewear,
 - gloves,
 - sleeves, and
 - gowns; and
- training and education programs.

These are just a few of many examples that can be put in place with little cost to an emergency services organization. Written SOP's and policy can be developed easily and implemented to meet the needs of the organization. These policies and procedures develop a standard of safety for the organization.

Comprehensive Change

Long-term or comprehensive change will occur gradually based upon the philosophy, planning, and culture of the organization. Several examples of comprehensive change are

- Risk Management Plan;
- occupational safety and health program:
 - health maintenance, and
 - wellness and fitness;
- organizational philosophy:
 - prevention versus reaction,
 - attitude,
 - behavior, and
 - culture; and
- systems change.

In the past 20 years, the importance of firefighter safety and health has been recognized as an important component for the fire service. In Unit 6: Systems Change, methods will be discussed on affecting positive change. Change for an organization can come in a positive manner (e.g., compliant occupational safety and health program) or can come in a negative manner (e.g., firefighter fatality or serious debilitating injury). Hopefully, at the end of each fiscal year or calendar year, each fire department takes the opportunity to evaluate how effectively change has occurred. The HSO conducts a monitoring process of the department's Risk Management Plan. Also, the HSO conducts an analysis of accidents and injury data to determine the frequency and severity of each.

HEALTH AND SAFETY OFFICER

The job functions of the HSO are outlined based upon the requirements of NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program* and NFPA 1521, *Standard for Fire Department Safety Officer*. The essential job functions will serve as the foundation for the development, implementation, and management of a fire department occupational safety and health program.

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, and the focus deals with the safety and health aspects. There are seven or eight components of the risk management process, with safety and health being

two of the components important to this process. General industry has used the risk management concept for years with great success. Incorporating risk management into fire department operations can greatly decrease firefighter fatalities, occupational injuries and illnesses, and health exposures.

The HSO must have a significant role in the development of the department's Risk Management Plan. 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 a static process, but rather a dynamic one that is evaluated and updated continually. This update has to be done at least annually, evaluating run statistics, community risk assessment, accident and injury data, training needs and requirements, and any other factors that affect the Risk Management Plan. The monitoring process also will play 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 determine what laws, codes, and standards are applicable to the fire department from a safety and health prospective. An example of applicable laws, codes, and standards include Occupational Safety and Health Administration (OSHA), NFPA, Environmental Protection Agency (EPA), State motor vehicle codes, State legislation, local ordinances, and jurisdictional policies. The HSO must develop a strategic plan for ensuring compliance with these applicable laws, codes, and standards. Once identified, the HSO must determine how to ensure compliance through fire department policy, procedures, and guidelines.

Once developed, the HSO must submit this information to the fire chief or designated representative for implementation. As with the Risk Management Plan, the HSO must monitor the effectiveness and compliance with the department policy and SOP's and/or guidelines. The HSO will report this information to the fire chief or designated representative.

The HSO will be responsible for compliance with applicable laws, codes, and standards. The fire chief must grant the HSO the authority to ensure compliance to ensure for workplace safety. This is the same authority granted to the ISO to alter, suspend, or terminate operations. In situations where corrective action needs to take place, the HSO must be granted the authority to do so.

Training and Education

The HSO has a lead role to ensure that safety training occurs in the fire department. Safety training occurs during recruit training and at least annually throughout the career of each firefighter. OSHA requires annual training for respiratory protection, Hazardous Waste Operations and Emergency Response (HAZWOPER), infection control, confined space, protective clothing and equipment, and firefighting operations. The HSO may provide instruction or needs to ensure that the training is completed and documented properly. Should a fatality, serious injury, or near miss occur, safety training needs to be conducted to provide information on what occurred and what recommendations were made to prevent the incident from re-occurring.

As part of the ongoing safety training process, the HSO should distribute information that is available through written reports, videotapes, training packages, State and national training programs, the Internet, and any other media. The intention is to ensure that the HSO remains current on safety and health issues that are affecting the fire service and this information is passed on to the members of the fire department.

Accident Prevention

Accident prevention must be a part of any occupational safety and health program regardless of the type of occupation or industry. The HSO must address accident prevention in the development of the fire department's occupational safety and health program. Unfortunately, tradition still plays a large part in how the fire service operates. Occupational accidents, injuries, and illnesses are considered part of the profession and there is nothing the fire service can do to effect change. Unfortunately for the fire service, this thought process will lead us into further change of being reactive rather than being proactive. Accident prevention will take us a long way.

Accident Investigation, Procedures, and Review

In the event of an occupational fatality, injury, near miss, or an accident, the HSO needs to investigate the incident. The intent is that if something goes wrong, the department conducts a complete investigation to ensure that it does not happen again. The fire department needs to have procedures in place in the event of a catastrophic incident to ensure that immediate emergency medical care is provided to the member(s) involved.

Facilities need to be identified in the event of a serious burn, orthopedic injuries, cardiac problems, etc. In the event of an occupational exposure, procedures must be in place to ensure that proper prophylaxis, counseling, and recordkeeping is provided plus followup care is ensured for the welfare of the member exposed. The same treatment needs to occur in the event of an occupational exposure to a hazardous material.

One of the most important procedures that needs to be developed, but hopefully never used, is how to investigate a firefighter fatality or serious injury. There are procedures available from the International Association of Fire Fighters (IAFF) and the International Association of Fire Chiefs (IAFC) that will assist in the development of procedures in the event of a firefighter fatality or serious injury. This procedure needs to be used in the event of a near miss as well.

The intent is that something is wrong that needs to be corrected and it is imperative that action is taken by the fire department to institute change. There are outside agencies involved in this process that need to be identified before an incident occurs. Once a fatality or serious injury occurs, it is too late to start developing procedures.

Firefighter fatality reports 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 fire department.

The HSO must 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. There will be outside agencies conducting investigations as well, and information has to be shared. The intent is not to conceal information or place blame, but rather to determine what happened and why.

Procedures used shall comply with any applicable local, State, or Federal ordinances to ensure proper compliance. In the event of a firefighter fatality, there are specific procedures that need to be addressed with the

Public Safety Officer's Benefit (PSOB) Act, both from a Federal and State level. Procedures must be in place to ensure that timeframes are met in the event of a firefighter fatality.

The HSO needs to evaluate the procedures used in accident and injury investigation periodically to determine if they are adequate. If changes need to be made, then the ISO needs to do so.

Records Management and Data Analysis

Recordkeeping and documentation are two vital components of the occupational safety and health process that the HSO must ensure occurs and manages effectively. In order to recognize the value of the accident and injury data, the HSO must collect and analyze the data and use the results to improve the occupational safety and health program with the fire department. The HSO should publish an annual report that identifies significant incidents that have occurred during the year regarding accidents, occupational fatalities, injuries, illnesses, or exposures. More importantly, the report must identify corrective actions to improve firefighter safety and health.

The HSO shall ensure that recordkeeping relating to apparatus maintenance and repairs are maintained by the fire department. Other records that the HSO needs to ensure that are maintained relate to protective clothing and equipment, facility maintenance, and repairs, as well as SOP's.

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

Apparatus and Equipment

The HSO needs to ensure that all new apparatus and equipment purchased is compliant with NFPA 1500 as well as other applicable codes and standards. The HSO may or may not be a member of the fire department's apparatus and/or protective clothing and equipment committees, but needs to be afforded the opportunity to review and approve specifications for new apparatus and equipment.

As the fire department develops specifications for new apparatus and vehicles, the HSO must be part of the review process to ensure compliance with NFPA 1500 and approve the purchase of new apparatus and vehicles. One of the most important factors is the mounting of tools and equipment.

The HSO has to ensure that the tools and equipment are mounted in compliance with manufacturer's recommendations and NFPA 1500.

NFPA 1500 requires annual service testing for pumps, ladders, hose, and other equipment. The HSO has to ensure this testing is completed and documentation is properly recorded.

Protective clothing and equipment have to be inspected annually per NFPA 1500. The HSO has to develop and provide an inspection program that determines suitability for continued service.

Facility Inspection

The HSO shall ensure all facilities are inspected at least annually, which is required by NFPA 1500. In the appendix of this standard are sample checklists that can be used for the inspection process. Hopefully, the fire department has developed procedures that ensure facilities are inspected more frequently than once a year. A monthly inspection process should ensure compliance and identify any safety and health issues that need to be corrected.

Any safety or health hazards or code violations need to be corrected in a timely manner. The HSO needs to ensure that this process occurs when problems arise.

When new facilities are designed or current facilities that are renovated, the HSO needs to review 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 are addressed and incorporated into the design of the facility.

Health Maintenance

The health and welfare of fire department members is paramount. The HSO must manage this process effectively to ensure a compliant program exists. NFPA 1500 requires that a health maintenance program exist and address 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 fire department physician. This may be an individual employed by the fire department, the authority having jurisdiction, or that is contracted by the fire department. Please review the information in NFPA 1500 and NFPA 1582, *Standard on Comprehensive Occupational Medical Program for Fire Departments*.

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 fire department's Occupational Safety and Health Committee. Any recommendations, made by the occupational safety and health committee, must be communicated to the appropriate authority by the HSO. Any recommendations made by the HSO to enhance occupational safety and health in the fire department have to be made to the appropriate authority.

The HSO works with district, battalion, and Company Officers (CO's) to identify and report any safety and health issues that affect fire department operations. An excellent example is identifying truss roof construction and the adverse effects it could have in the event of an emergency. Preincident planning is another component that would be coupled with this process.

When unsafe practices or hazardous conditions are identified by the ISO or by other means, the HSO shall take the necessary steps to eliminate these situations or issues. Through educational means or additional training, the HSO needs to ensure that the unsafe acts identified are changed and hazardous conditions are corrected. When problems occur with protective clothing and equipment and/or apparatus, the HSO will work with the manufacturer to eliminate the problem.

As will be discussed in Unit 4: Health Maintenance, the HSO shall work with the fire department physician to ensure that medical advice, consultation, treatment, and care is available for all members.

Occupational Safety and Health Committee

The HSO shall ensure that the fire department establishes an Occupational Safety and Health Committee, as required by NFPA 1500. The committee shall meet the requirements of NFPA 1500. The committee is a means of ensuring that the members of the fire 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

Many fire departments provide EMS to the community they serve. A critical part of firefighter safety and health is a proactive infection control program. The HSO must ensure that the infection control program meets the requirements of NFPA 1581, *Standard on Fire Department Infection Control Program* and 1910.1030. NFPA 1581 serves as a foundation for a comprehensive infection control program. Complying with NFPA 1581 will ensure compliance with 1910.1030.

The HSO must serve as the infection control officer if the position is not staffed by the fire department. If an infection control officer function exists, the HSO shall assist this individual to ensure compliance with NFPA 1581 and 1910.1030.

Critical Incident Stress Management

The HSO shall ensure that a critical incident stress management (CISM) program is established by the fire department. This program shall meet the requirements as defined in NFPA 1500. As with many of these programs, the HSO may not be part of the process, but must ensure that it exists. Moreover, a departmental policy or procedure must exist and training and continuing education is available in order for members understand this important process.

Postincident Analysis

The postincident analysis process is a very vital component of the occupational safety and health process. The HSO must ensure that firefighter safety and health concerns are addressed during the postincident analysis.

Similar to the ISO, the HSO must 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. In fire 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 fire department and submitted to a designated staff officer. This process needs to occur, especially in situations where a firefighter fatality, serious injury, or near miss occurred.

Issues that must be addressed in the report by the HSO are

- 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 (IAP) and ISO's Incident Safety Plan need to be identified in the written report and discussed during the postincident analysis. This is a critical point if problems existed, especially if they affected the issues listed above.

ORGANIZATIONAL DUTIES AND RESPONSIBILITIES

Health and Safety Officer

To ensure that the most qualified person serves as the HSO, the listed criteria adequately describes the knowledge, skills, and abilities needed for this position. Though it is not listed, this position requires commitment, time management, understanding, honesty, and self-motivation. The HSO must be able to evaluate programs and projects in an unbiased and fair manner.

As this is an all-encompassing position, the HSO must be at least a Fire Officer I and should have a basic understanding of applicable laws, codes, and standards. This includes general industry standards from OSHA, NFPA Codes and Standards, and departmental regulations.

In order to be an effective HSO, the individual must have served as a firefighter and fire officer to have the experience, knowledge, and understanding of the occupational safety and health hazards encountered during incident operations. An excellent training tool for this is during live

fire training evolutions. This gives the HSO and ISO an environment for learning during controlled fireground operations.

The HSO must understand the basics of safety management, which includes the theory and practical application of accident and loss prevention, accident investigation, accident and injury analysis, basic components of safety management, protective clothing and equipment, and risk management. Most colleges or universities that offer occupational safety and health courses should provide a basic course in safety management. Several companies in general industry plus trade associations such as the American Society of Safety Engineers offer safety management courses for a fee.

As for health and wellness issues, the HSO can use local physical fitness agencies, local universities, or trade associations such as the American College for Sports Medicine. Also, information is available through NFPA and the USFA. This is a new discipline within the fire service, yet one of the most important because it takes care of the fire department's most valuable resource--its members.

With the appointment as HSO, may come the appointment as infection control officer. Even if the department does have an infection control officer, the HSO must have a basic knowledge of infection control practices. NFPA 1581 provides the key components for the operation of an effective infection control program. This standard provides the necessary procedures for ensuring compliance with 29 CFR 1910.134--*Bloodborne Pathogens*. For most fire departments, EMS creates a significant number of incidents that require an aggressive infection control program. The HSO must understand the components of this process to ensure for the safety, health, and welfare of the members.

Incident Safety Officer

The requirements for ISO are very similar to those of the HSO with several exceptions:

- serve as an ISO;
- knowledge of building construction;
- knowledge of the personnel accountability system (PAS); and
- knowledge on incident scene rehabilitation.

A fire department may choose to appoint an ISO on scene rather than designate one. Yet, the member that serves in this capacity must understand the issues dealing with incident scene safety. As discussed

earlier, the ISO must develop an incident safety plan that is based upon the IAP. This requires the ISO to work within the incident management system and serve as a part of the Command Staff. The sole function is to observe and correct, as necessary, any imminent safety hazards that may exist at the incident scene.

Building construction has become a significant issue during incident operations due to the increasing number of firefighter fatalities involved with truss construction. The identification of truss construction is a significant part of the fireground safety process. The issue of building construction ties in with a risk management issue, which is preincident planning. Preincident planning is part of the risk management "toolbox" and plays a significant role in the fireground safety process because it allows members to conduct an inspection of the facility prior to an emergency.

The ISO must understand the department's personnel accountability system, both as a player and a coach. One of the primary functions of the ISO is to ensure that no personnel on scene freelance or become separated from their crew. Personnel accountability is another tool from the risk management "toolbox" which is vital to firefighter safety and health.

And finally, a significant part of incident scene safety is ensuring for the health and welfare of firefighters. The ISO is not necessarily responsible for establishing "Rehab" but must ensure that this process has been established by "Command." It is imperative that "Rehab" is established during weather extremes, extended operations, and any other time that members need rest and rehabilitation during emergency operations. "Rehab" consists of moving members out of the environment, rest, medical evaluation, hydration, and food (for long-term operations).

LAWS, CODES, AND STANDARDS

Regulations

Prior to discussing specific laws, codes, and standards, it is important to understand the implication and the effect each has on the operations of a fire department. **Regulations** are developed and executed by governmental agencies in response to public laws enacted by legislative assemblies. Public laws result from bills that are introduced by legislators and approved by the lawmaking body. Once the legislation is approved and signed, the appropriate agency develops the regulations. This process occurs at all levels of government, Federal, State, and local. State and local regulations affect only the State or jurisdiction in which they are adopted.

Occupational Safety and Health Administration

OSHA is a branch of the Department of Labor. OSHA issues regulations, which are mandatory requirements. OSHA was created in 1970 to provide written requirements for ensuring occupational safety and health standards for employees.

Under the Occupational Safety and Health Act of 1970, the Federal OSHA has no direct power to ensure that State and local governments comply with safety and health standards for public employees. OSHA law does permit other methods to be used to provide maximum protection of public employees' safety and health.

Twenty-six States/territories have established and maintain an effective and comprehensive occupational safety and health program for public employees. The State plan must meet or exceed the requirements of Federal OSHA. OSHA gives a State plan 6 months from the publication date of a final standard to adopt a similar standard. All fire departments, whether State, county, or municipal, in any of the States or territories that have an OSHA plan agreement in effect, have the protection of the minimal acceptable safety and health standards mandated by Federal OSHA. The States/territories having State OSHA plans, as of this writing, are included in Table 3-1.

Table 3-1

States/Territories With OSHA Plans		
Alaska	Michigan	South Carolina
Arizona	Minnesota	Tennessee
California	Nevada	Utah
Connecticut	New Jersey	Vermont
Hawaii	New Mexico	Virginia
Indiana	New York	Virgin Islands
Iowa	North Carolina	Washington
Kentucky	Oregon	Wyoming
Maryland	Puerto Rico	

Several OSHA standards affect department personnel. 29 CFR 1910.120, HAZWOPER, and 29 CFR 1910.1030, *Occupational Exposure to Bloodborne Pathogens*, mandate requirements for maintaining an employee's medical records for 30 years past retirement date

(29 CFR 1910.20, *Access to Employee Exposure and Medical Records*). Other OSHA standards that the Health and Safety Officer should be familiar with are

- 29 CFR 1910.95, *Occupational Noise Exposure*;
- 29 CFR 1910.133, *Eye and Face Protection*;
- 29 CFR 1910.134, *Respiratory Protection*;
- 29 CFR 1910.156, *Fire Brigades*; and
- 29 CFR 1910.1200, *Hazard Communication*.

Occupational Safety and Health Administration Documentation Requirements

To ensure that employers record and maintain injury data relating to employees, OSHA has mandated recordkeeping requirements. An occupational injury must meet one or more of the following conditions:

- loss of consciousness;
- restriction of work or motion;
- transfer to limited duty; and
- medical treatment other than first aid.

The employer must publish and post data each year on a specific OSHA form called the "OSHA Log 300." The employer must document:

- 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.

The OSHA Log 300 must be posted from February 1 to April 30 of each year.

Usually it would be 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.

The medical effects of an exposure to a hazardous material or job-related exposure to a communicable disease may not appear immediately, and when they do, 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 be maintained for 30 years after employment.

Superfund Amendments and Reauthorization Act of 1986

Section 126 of the Superfund Amendments and Reauthorization Act of 1986 (SARA) requires the EPA to issue an identical set of regulations, covering anyone not covered by 29 CFR 1910.120, HAZWOPER. States that do not operate under Federal OSHA are required to comply with the requirements of EPA, which are identical to OSHA's requirements. The importance to emergency response personnel is that both require the use of an incident management system, use of an ISO at hazardous materials incidents, and use of a health monitoring process for employees exposed or potentially exposed at a hazardous materials incident.

Ryan White Comprehensive AIDS Resources Emergency Act

The Ryan White Comprehensive AIDS Resources Emergency Act (CARE) of 1990 has provisions that require emergency responders to be notified if they were exposed to a communicable disease during treatment of a patient. The notification process requires that the testing source or agency, such as a hospital, notify the affected employee directly. The Ryan White CARE Act protects the confidentiality of the affected employee.

State Codes

One example of State regulations affecting fire and EMS departments is the 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 is stopped and discharging passengers.

A second example is the development of an annual vehicle inspection program for all fire apparatus. This requirement has become law in several States over the past several years. Due to the number of firefighter fatalities from vehicle accidents caused by poor vehicle maintenance, State legislatures mandate that a certified inspector inspect all fire apparatus annually.

Consensus Standards

The poor safety record of the fire service over the years has been the leading impetus for developing standards. These standards have addressed PPE and clothing, apparatus, hazardous materials, infection control, and other pertinent issues.

Standards are established by general consensus as a procedure or document that can be implemented or adopted. Nonregulatory organizations (e.g., NFPA, American National Standards Institute (ANSI)) or associations develop consensus standards based on input from members who participate in their standards-making process. These organizations have procedures that dictate the requirements for the development of standards. The "authority having jurisdiction" (AHJ) is defined as: "the organization, office, or individual responsible for approving equipment, an installation, or a procedure." AHJ is used by the NFPA in its documents in a broad manner because jurisdiction and approval agencies vary, as do their responsibilities. Standards developed by a consensus process are available for adoption by public agencies or authorities (e.g., authority having jurisdiction) that have lawmaking or rulemaking capabilities. Standards can be used for ordinances, laws, regulations, administrative orders, and SOP's.

These organizations or associations have guidelines that dictate the procedures for developing standards as well as the format for publication. The structure of the committees must be balanced so that one special interest or group cannot dominate. The number of members is another consideration. A few of the guidelines that govern the standards-making process include the process of incorporating comments or suggestions into committee standards, how a new document is developed, the length of the process, the revision process, and how long it takes to revise a standard. NFPA publishes all of their standards in a specific format. The NFPA guidelines for publication format can be found in the NFPA *Manual of Style*. This document is available and can be downloaded from NFPA's Web site at: <http://www.nfpa.org>

Consensus standards are not mandatory unless officially adopted by public authorities with lawmaking or rulemaking abilities. Once a legislative body adopts a consensus standard as law in whole or in part, the consensus standard becomes a mandatory requirement in that jurisdiction.

National Fire Protection Association

Since 1896, the 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*. The NFPA publishes over 270 nationally recognized Codes and Standards.

The NFPA Board of Directors has general charge of all NFPA activities. The Board appoints a Standards Council composed of 13 persons to administer the Association's Standards-development activities and regulations. Members of the council are familiar with the technical and Standards development functions of the NFPA and are selected from a broad range of appropriate interests. The Secretary of the Council is a nonvoting member of the NFPA staff. All committees involved in making Standards operate following the Regulations Governing Committee Projects (published in NFPA's Annual Directory).

Public Notice

The NFPA constantly seeks new ways to encourage technical and consumer input to the Standards-making system. Public notices play a major role in fulfilling this objective. Ten steps are currently subject to some form of public notice:

1. Intent to develop a Standard.
2. Schedule of technical committee meetings.
3. Call for Proposals to develop or amend a Standard.
4. Disposition of the Proposals.
5. Availability of *Report on Proposals* (ROP) for public review and comment.

6. Disposition of specific public comments.
7. Availability of *Report on Comments* (ROC).
8. Announcements of all NFPA meetings.
9. Announcements on the fate of each document.
10. Frequent notices dealing with the Standards-making system.

Assignment of Projects to Committees

Anyone can submit a request for a new Fire Safety Standards project. NFPA publishes an announcement in its membership newsletter, *Fire News*. The announcement acknowledges that the NFPA received a request for a new project and requests comments on the need for the project, information on organizations that may be active in the subject matter of the proposed project, a listing of available resource material, and an indication of who would be willing to participate in the project if it is approved by the Standards Council. The Standards Council then reviews the proposed Standards project and the public comments it generates.

If the council determines the need for the proposed project, it either assigns the project to an existing technical committee or establishes a new committee whose membership reflects a fair balance of concerned interests. All NFPA Standards are developed and revised periodically by these technical committees. Members of the committees are appointed by the Standards Council and include volunteer experts representing the government, educational institutions, business, insurance companies, industry, and consumers. Some 5,000 persons with diverse interests and expertise in fire safety make up approximately 235 committees within the NFPA Standards-making system. Each committee member is classified by interest (see Table 3-2), and the committee is structured so that not more than one-third of the membership is from a single interest. The Standards Council assigns a scope of activity to each committee to avoid conflict or duplication of effort.

Table 3-2
NFPA Classification of Committee Members

M	Manufacturer
U	User
I/M	Installer/Maintainer
L	Labor
E	Enforcing Authority
I	Insurance
SE	Special Expert
C	Consumer
R/T	Applied Research/Testing Laboratory

Technical Committee Activities

Once a technical committee has been established, the NFPA issues public notices announcing the committee's next meeting date and calling for specific proposals from interested persons. Public notices appear in *Fire News*, the ANSI's *Reporter*, the *Federal Register*, and relevant trade journals. Anyone may submit a proposal for text to be included in the new document or, in the case of an existing committee, to amend text in an existing document.

The committee meets to consider all proposals received and drafts a proposed document (or amendments to an existing document) in the form of committee proposals. The submitter of a public proposal may address the committee on his/her proposal at the meetings. Letter ballot approval by at least two-thirds of all committee members eligible to vote is required for committee approval.

If the Standards Council determines that a project is of sufficient magnitude that it spans the scope of more than one committee, the Council may appoint a Technical Correlating Committee. The Technical Correlating Committee directs the activities of the technical committees that have primary responsibility for the development and revision of documents assigned to them. The Technical Correlating Committee coordinates and supervises the work of the technical committees under its charge to ensure that no conflicts exist, that satisfactory correlation is achieved among the documents developed by the technical committees, and that the technical committee activities have been conducted in accordance with the regulations and any approved operating procedures.

Report on Proposals (Formerly Technical Committee Reports)

All proposals, together with the committee action on each proposal and proposed new documents developed by the committee appear as the committee's report in the NFPA's ROP. A two-thirds approval vote by letter ballot of the voting members of the committee is required for committee approval. Should the committee revise or reject a proposal in whole or in part, its report must include the reasons for this change or rejection. The ROP's are sent automatically to each proposer and all affected committee members and are available to anyone on request. The NFPA provides a comment period of at least 60 days for all proposals in the ROP's.

Report on Comments (Formerly Technical Committee Documents)

Anyone can submit a public comment to the proposed changes published in the ROP. At the conclusion of the comment period, the committee reconvenes to discuss the public comments and decide its action on each comment. The submitter of a public comment may address the committee on his/her comment at the meeting. A two-thirds approval vote by letter ballot of the voting members of the committee is required for committee approval of the actions on the comments. All comments, committee action on comments, and the committee's reasons for revising or not accepting comments are published as the Committee's Supplementary Report in the NFPA's ROC. The documentation is furnished to each commenter and committee member automatically and is available to anyone on request.

Association Action

The Committee's Report (ROP) and Supplementary Report (ROC) are presented for open debate at either NFPA's annual meeting in May or its November fall meeting. These meetings are held in various cities throughout the United States and Canada. Anyone, regardless of membership in NFPA, may present views at these meetings; however, only NFPA members of record for at least 180 days may vote on the adoption of the reports.

The only amendments that may be proposed from the floor at an NFPA annual or fall meeting are those that have been published previously as proposals in the ROP or comments in the ROC. Such amendments may be proposed only by the submitter of the original proposal or comment or by his/her duly authorized representative.

Anyone may propose that an entire Committee Report be returned to Committee for further study. Anyone also may propose that a portion of a

report be returned to the wording published in the ROP (i.e., returned to the wording in the previous edition of the document), but only if there has been a change in that portion of the document between the release of the ROP and the release of the ROC. After all views are known, an informed NFPA membership votes to approve, amend, return a portion of the report to the committee, or return the entire report to the committee.

Sequence of Events Leading to Publication of an NFPA Committee Document

- Call for proposals to amend existing document or for recommendations on a new document.
- Committee meets to act on proposals, to develop its own proposals, and to prepare its report.
- Committee votes by letter ballot on proposals. If two-thirds approve, report goes forward; lacking two-thirds approval, report returns to Committee.
- Report is published in the ROP for public review and comment.
- Committee meets to act on each public comment received.
- Committee votes by letter ballot on comments. If two-thirds approve, supplementary report goes forward; lacking two-thirds approval, supplementary report returns to committee.
- Supplementary report is published in the ROC for public review.
- NFPA membership meets (annual or fall meeting) and acts on c-committee report (ROP and ROC).
- Committee votes on any amendments to report approved at NFPA annual or fall meeting.
- Notification of intent to file a complaint to the Standards Council on Association Action must be filed within 20 days of the NFPA annual or fall meeting.
- Standards council decides, based on all evidence, whether or not to issue the Standard or to take other action, including hearing any complaints.
- Appeals to Board of Directors on Standards Council Action must be filed within 20 days of council action.

The final step is the issuance of the document by the Standards Council. The decision is based on all of the information presented, including the vote of the membership and the disposition of any complaints filed with the Standards Council. Once issued by the Standards Council, it is published in pamphlet form and also is included in the appropriate volume of NFPA's *National Fire Codes*.

Complaints and Appeals

Anyone dissatisfied with action taken within NFPA's Standards-Making System may file a complaint to the Association's Standards Council. Areas of complaint may cover

- Standards Council's decision on whether a certain document should be developed;
- Association's action on a proposed Committee Report at an NFPA meeting;
- technical validity or fairness of a document or part of a document; and
- council's decision on the appointment of a nominee to a Committee.

Appeals on the action of the Standards Council may be made to the Board of Directors. A summary of the entire standards-making process can be seen in Figure 3-2.

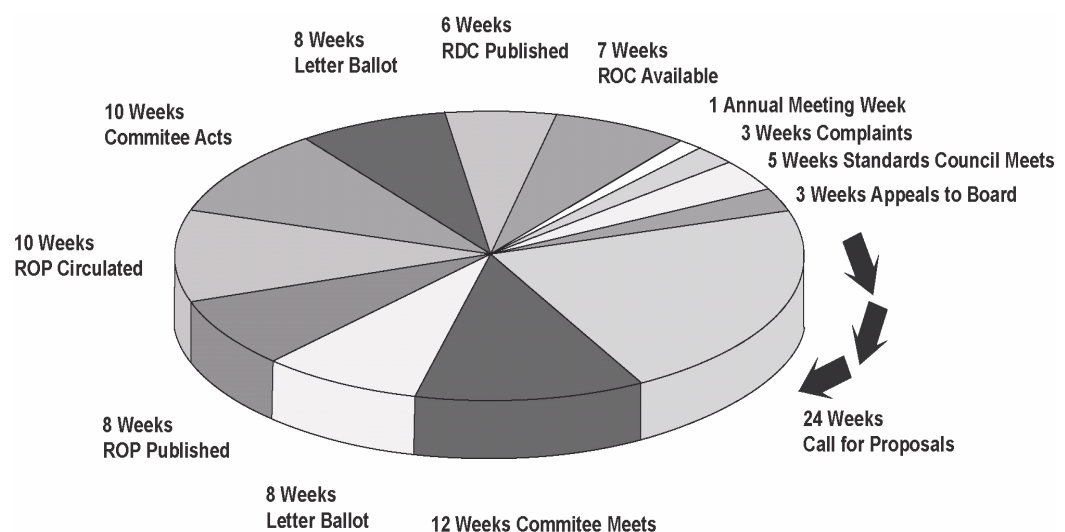


Figure 3-2
Standards-Making Process

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

Standards

SOP's are written policies developed by a department that specify methods for activities performed by members. These procedures affect only the operation of the department that writes and adopts them. The requirements of these procedures must be based on recognized laws, codes, and standards. The department must meet or exceed the requirements. An excellent guide to developing SOP's is the USFA's *Developing Effective Standard Operating Procedures for Fire and EMS Departments*.

Safety Standards for the Fire Service

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 are

- Federal department;
- State department;
- local department;
- other regional department;
- fire chief;
- fire marshal;
- chief of the labor department;
- chief of the health department;
- building official;
- electrical inspector; and
- others having statutory authority.

For insurance purposes, the AHJ may be

- insurance inspection department;
- rating bureau; and
- other insurance company representative.

In many circumstances, the property owner or his/her designated agent assumes the role of AHJ. In government installations, the commanding officer or department official may be the AHJ. Anyone operating in the AHJ is bound to comply with the laws, codes, and standards. It should be remembered that a fire department is not mandated to meet the requirements of consensus standards unless the AHJ has adopted these standards legally.

National Fire Protection Association 1500

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:

- excess of 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 emergency medical services and hazardous materials incidents;
- growing concern with respect to 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
- evident need for a toolbox for implementing a risk management process to reduce occupational risks and a method for reducing liability.

Amid controversy, the FSOSH Technical Committee developed NFPA 1500 which was issued by the Standards Council in 1987. The most current (fourth) edition of NFPA 1500 was adopted in November 2001 and issued by the Standards Council in January 2002. Since the publication of NFPA 1500, firefighter fatalities have decreased to fewer than 100 per year, the fire service is addressing the basic components of firefighter safety and survival, and is actively involved in the Standards-making process.

National Fire Protection Association 1521

With the emphasis being placed on employee safety and health, the fire service slowly recognized the need for this 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, the NFPA adopted NFPA 1521, *Standard for Fire Department Safety Officer*. 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 who will manage the safety program for 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 numbering of this Standard was changed during the 1992 revision of the document to be consistent with the numbering of documents under NFPA 1500. NFPA 1521 Standard provides the qualifications, authority, and functions for both roles of the fire department Safety Officer. To further clarify and understand the functions of these roles, each is defined as per NFPA 1521.

At the NFPA Annual Meeting in May 1992, the Standard was partially revised and the identifying number was changed from NFPA 1501 to NFPA 1521 to fit the numbering plan for the NFPA umbrella documents. After adopting and issuing this Standard, the FSOSH decided to completely rewrite the document, which had changed little from the original requirements issued in August 1977.

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. NFA's National Fire Programs was in the process of developing two new courses that addressed the duties and responsibilities of both the HSO and the ISO. The Technical Committee felt that it was important to mirror and support the work that the National Fire Programs was doing with course development. 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 emergency medical services 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.

OCCUPATIONAL SAFETY AND HEALTH PROGRAM

A primary responsibility of a fire chief is to develop and implement an occupational safety and health program. This program ensures the safety and health of all personnel and supports compliance for this program. The fire chief appoints a HSO to develop and implement the written occupational safety and health program. The minimum components of the occupational safety and health 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 program; and
- critical incident stress management (CISM).

These topics may be part of the actual program or may be independent procedures that outline the specific operation or activity. Another important part of this process is the development of a policy statement for the occupational safety and health program. An example of a policy statement for the occupational safety and health program may be

The intent of the Anytown Fire 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 Department. Safety will become a departmental value and this philosophy will apply to all members of the Anytown Fire Department and to any other persons who might be involved in fire department operations.

This policy will 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 of safety.

To clearly understand how the fire service has reached the current point in the occupational safety and health process it is important to understand how occupational safety and health has evolved in this country. The occupational safety and health movement in the United States has gained momentum over the past 20 years. This information is vital as the HSO formulates a program.

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 infrastructure for the development and establishment of the department's occupational safety and health program. The purpose of the policy is to clarify for all members their responsibility in this process as well as the department's responsibility.

Most fire departments provide other emergency services in addition to firefighting operations. Based upon 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 may perform their assigned daily tasks safely, yet

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 fire department costs and expenditures to workers' compensation and liability insurance.
- The program ensures compliance with applicable laws, codes, and standards.

The safety and health of fire department members is paramount for the successful operation of the fire department. There are many components of the occupational safety and health program that ensure a successful process. This is a comprehensive effort, not an individual or one component effort.

In the Annex of NFPA 1500, an example of a written occupational safety and health program is provided. This is a program that must be evaluated annually based upon the accomplishments and completion of goals. This program also compliments the department's Risk Management Plan.

SUMMARY

In order to effectively manage risk in the fire service, several key components must be in place. The department must have a HSO who manages the Risk Management Plan and the occupational safety and health program.

Risk must be managed on a daily basis. Firefighter fatalities and debilitating injuries and illnesses are fearful reminder that there is a better way doing business. Change must occur in order to provide a safe and healthy work environment for firefighters.

NOTE-TAKING GUIDE

Slide 3-1

**UNIT 3:
MANAGING RISK**

Slide 3-1

Slide 3-2

TERMINAL OBJECTIVE

At the conclusion of this unit, the students will be able to explain how the Health and Safety Officer (HSO) manages risk effectively.

Slide 3-2

Slide 3-3

ENABLING OBJECTIVES

The students will:

- Discuss the importance of managing risk versus risk management.
- Describe how firefighter fatalities and injuries affect the risk management process.

Slide 3-3

Slide 3-4

**ENABLING OBJECTIVES
(cont'd)**

- Describe how the HSO can manage risk for short-term (dynamic) situations versus long-term (comprehensive) situations.
- Define the roles and responsibilities of the HSO relating to managing risk.

Slide 3-4

Slide 3-5

**ENABLING OBJECTIVES
(cont'd)**

- Discuss role identification for the HSO and the Incident Safety Officer (ISO).
- Discuss the effect of regulations, standards, and policies that influence firefighter safety.

Slide 3-5

Slide 3-6

**ENABLING OBJECTIVES
(cont'd)**

- Describe the components of a fire department occupational safety and health program.

Slide 3-6

Slide 3-7

MANAGING RISK VERSUS RISK MANAGEMENT

- Define managing risk
- Define risk management
- Correlation of managing risk to risk management
- Effect on the organization

Slide 3-7

Slide 3-8

MANAGING RISK

Managing risk is defined as a process to integrate dynamic and forceful control measures to reduce the risk of death or injury to firefighters.

Slide 3-8

Slide 3-9

RISK MANAGEMENT

Risk management is defined as the process of planning, organizing, directing, and controlling resources and activities in order to minimize detrimental effects on an organization.

Slide 3-9

Slide 3-10

CORRELATION

- Between risk management and managing risk
- Organizational (theoretical) risk management and operational (practical) risk management with emphasis on safety and health
- Effective management of risk is an active, dynamic process, not an event or dormant program

Slide 3-10

Slide 3-11

EFFECT ON THE ORGANIZATION

- Proactive effect
- Elimination of firefighter fatalities, reducing the frequency and severity accidents injuries, and occupational illnesses
- Enhancing fire department operations
- Good customer service, internal and external

Slide 3-11

Slide 3-12

FIREFIGHTER FATALITIES AND INJURIES

- Average number of firefighter fatalities annually
- Average number of firefighter injuries annually
- Fatalities by type of duty

Slide 3-12

Slide 3-13

FIREFIGHTER FATALITIES AND INJURIES (cont'd)

- **Fatalities by type: overexertion, trauma, asphyxiation, burns, electric shock, and drowning**
- **Injuries by type: strains and sprains and cuts and bleeding**

Slide 3-13

Slide 3-14

FIREFIGHTER FATALITIES AND INJURIES (cont'd)

- **Morale**
- **Financial**
- **Mandate change**
 - Negative
 - Positive



Slide 3-14

Slide 3-15

DYNAMIC CHANGE VERSUS COMPREHENSIVE CHANGE

- **Dynamic**
 - Short term, fast, affecting change
 - SOP's
 - PPE
- **Comprehensive**
 - Risk Management Plan
 - Organizational philosophy
 - Systems change

Slide 3-15

Slide 3-16

INCIDENT SAFETY OFFICER DYNAMIC ISSUES

Short-term results

- Highway/Traffic safety
- Personnel accountability
- Use of PPE

Slide 3-16

Slide 3-17

HEALTH AND SAFETY OFFICER-- COMPREHENSIVE ISSUES

- Risk Management Plan
- Occupational safety and health program
- Organizational philosophy
 - Prevention versus reaction
 - Wellness and fitness
 - SOP's
 - Policy
- Systems change

Slide 3-17

Slide 3-18

HEALTH AND SAFETY OFFICER

- NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*
- NFPA 1521, *Standard for Fire Department Safety Officer*

Slide 3-18

Slide 3-19

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

Job functions:

- Risk management
- Laws, codes, and standards
- Training and education
- Accident prevention
- Accident investigation, procedures, and review

Slide 3-19

Slide 3-20

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

- Records management and data analysis
- Apparatus and equipment
- Facility inspection
- Health maintenance
- Liaison

Slide 3-20

Slide 3-21

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

- Occupational Safety and Health Committee
- Infection control
- Critical incident stress management
- Postincident analysis

Slide 3-21

Slide 3-22

**ORGANIZATIONAL DUTIES
AND RESPONSIBILITIES**

- HSO
- ISO
- Assistant Safety Officer(s)
 - HSO
 - ISO

Slide 3-22

Slide 3-23

**NFPA 1521,
STANDARD FOR FIRE
DEPARTMENT SAFETY
OFFICER**

- Five chapters
- Annex material
- References
- Checklist (facility safety)

Slide 3-23

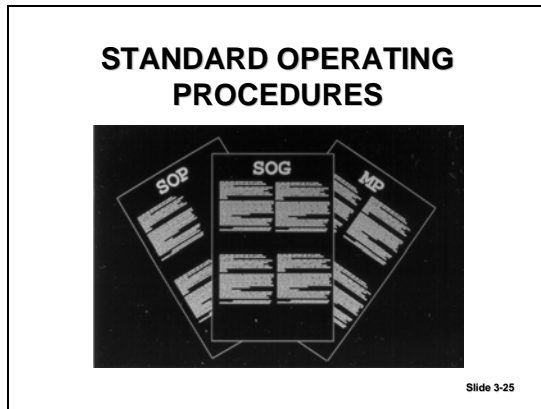
Slide 3-24

ROLE CLARIFICATION

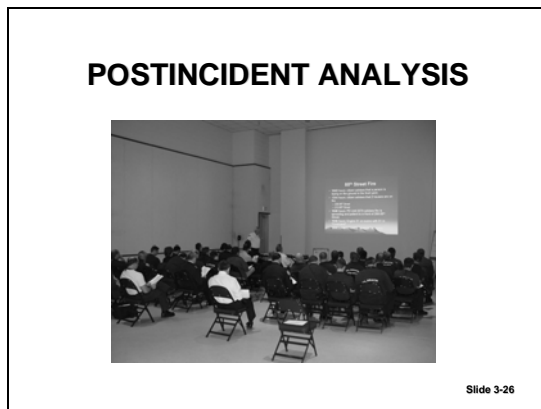
- Duties and responsibilities
 - HSO
 - ISO
 - Both
- Discussion of Safety Officer functions

Slide 3-24

Slide 3-25



Slide 3-26



Slide 3-27



Slide 3-28

VEHICLE INCIDENT



Slide 3-28

Slide 3-29

TECHNICAL RESCUE



Slide 3-29

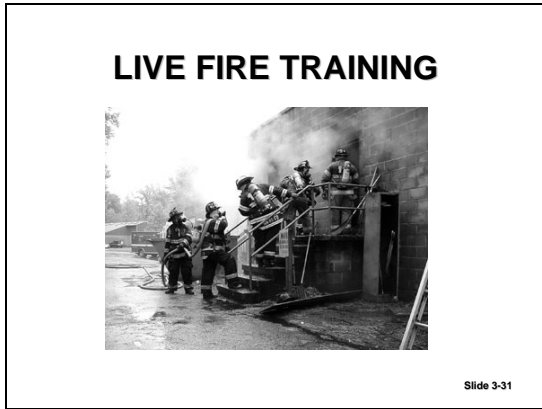
Slide 3-30

EQUIPMENT FAILURE

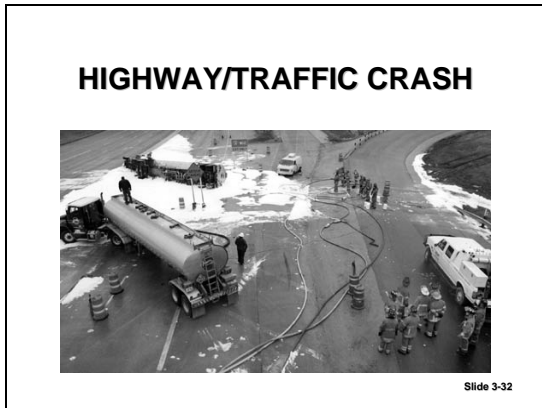


Slide 3-30

Slide 3-31



Slide 3-32



Slide 3-33



Slide 3-34

NATIONAL ORGANIZATIONS

- Congress
- Occupational Safety and Health Administration (OSHA)--
Department of Labor
- National Fire Protection Association (NFPA)

Slide 3-34

Slide 3-35

REGULATIONS

- Developed by government agencies
- Mandatory requirements
- OSHA
 - 26 States and territories
 - State plans must meet or exceed Federal mandates

Slide 3-35

Slide 3-36

OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION STANDARDS

- 1910.120: HAZWOPER
- 1910.134: Respiratory protection
- 1910.156: Industrial fire brigades
- 1910.1030: Bloodborne pathogens
- 1910.1200: Hazard Communication

Slide 3-36

Slide 3-37

DOCUMENTATION

- Occupational injury
- Documentation requirements
 - Injury other than first aid
 - Fatality
 - Occupational illness
- Worker's compensation

Slide 3-37

Slide 3-38

OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION 300 LOG

- Occupational death (fatality)
- Nonfatal occupational illness
- Nonfatal occupational injury
- Must remain posted from February 1 to April 30 each year

Slide 3-38

Slide 3-39

SAMPLE 300 LOG

Slide 3-39

Slide 3-40

**ENVIRONMENTAL PROTECTION
AGENCY**

- Superfund Amendments and Reauthorization Act of 1986 (SARA)
- Identical set of regulations covering those not covered by 1910.120: Hazardous Waste Operations and Emergency Response (HAZWOPER)

Slide 3-40

Slide 3-41

CONSENSUS STANDARDS

- Established by general consensus such as procedure or document that can be implemented or adopted--not mandatory
- Developed by nonregulatory organizations

Slide 3-41

Slide 3-42

**CONSENSUS STANDARDS
(cont'd)**

- The NFPA is the leading nonprofit organization dedicated to protecting lives and property from hazards of fire.
- Developed using guidelines that dictate procedures for developing Standards.

Slide 3-42

Slide 3-43

**NATIONAL FIRE PROTECTION
ASSOCIATION STANDARDS**

Standards that affect firefighter safety and health:

- NFPA 1500--Defines the parameters for a fire department occupational safety and health program
- NFPA 1521--Safety Officer requirements
 - HSO
 - ISO

Slide 3-43

Slide 3-44

VIDEO:

"The Making of Codes and Standards"



Slide 3-44

Slide 3-45

**AMERICAN SOCIETY FOR
TESTING AND MATERIALS**

- American Society for Testing and Materials (ASTM) is a private, nonprofit organization
- Develops standards for:
 - Materials
 - Systems
 - Products
 - Services

Slide 3-45

Slide 3-46

**OCCUPATIONAL SAFETY
AND HEALTH PROGRAM**

Slide 3-46

Slide 3-47

**OCCUPATIONAL SAFETY AND
HEALTH PROGRAM (cont'd)**

- **Mandated by NFPA 1500**
- **Written**
- **Updated annually**
- **Foundation for occupational safety
and health in the department**

Slide 3-47

Slide 3-48

**WRITTEN OCCUPATIONAL
SAFETY AND HEALTH
PROGRAM**

- **Example in Annex of NFPA 1500**
- **Compliments the Risk Management
Plan**
- **Goal is to reduce the frequency and
severity of occupational accidents and
injuries**

Slide 3-48

Slide 3-49

SUMMARY

- The department must have an effective means of managing risk.
- Understand the effect that fatalities and injuries can have on an organization.
- The HSO is the key player for ensuring the department has a
 - Written Risk Management Plan
 - Written occupational safety and health program

Slide 3-49

UNIT 4: HEALTH MAINTENANCE

TERMINAL OBJECTIVE

At the conclusion of this unit, the students will be able to describe the components of a health maintenance program.

ENABLING OBJECTIVES

The students will:

- 1. Describe the importance of medical requirements for firefighters.*
 - 2. Discuss the comprehensive wellness and physical fitness models.*
 - a. Career.*
 - b. Volunteer.*
 - 3. Discuss the components of a compliant infection control program.*
 - 4. Develop the justification for a fire department wellness/fitness program.*
-

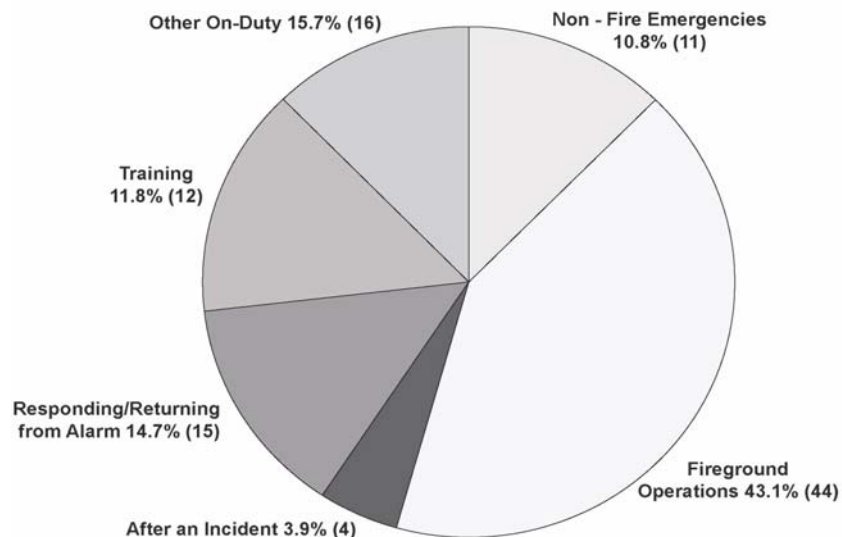
HEALTH MAINTENANCE

Firefighters perform physically and mentally demanding tasks related to the inherent and potential risks they encounter during the course of service delivery. The importance of maintaining good health and physical conditioning is paramount. Firefighters must understand the importance of personal health, proper physical conditioning, and good nutritional habits. In turn, each fire department needs to provide the education and the components of a proactive and effective health maintenance and wellness program.

Firefighters need physical strength to rescue victims, pull hose, move and place ladders, use forcible entry tools, lift and carry patients on stretchers, and work for extended periods of time without sleep or food. These activities must be performed during a variety of weather extremes and in toxic and hazardous atmospheres while wearing and using various types of protective clothing and equipment. Firefighters execute these duties and responsibilities without the benefit of warm-up stretching and exercises. Firefighters and emergency medical services (EMS) personnel deal daily with life-threatening and stressful situations that not only push their bodies physically, but also challenge them mentally. Emergency services members experience higher rates of heart and lung disease, cancer, substance abuse problems, and occupational injuries and illnesses than the general population.

Firefighting has been identified as one of the most hazardous occupations in the United States in terms of fatalities and occupational injuries, illnesses, and health exposures. Data show that the number one cause of firefighter fatalities continues to be cardiac arrest and strokes.

2002 Firefighter Fatality Data (By Function)



Advancements and improvements in firefighting protective clothing and equipment and the control and management of emergency operations have contributed to significant decreases in firefighter fatalities over the past 20 years. Although fatalities have decreased to less than 100 firefighter line-of-duty deaths annually, and occupational injuries average 100,000 to 125,000 annually, other factors influence the need to reduce these numbers. Some of these factors include the financial impact on the fire department, the potential liability against the fire chief and the organization, and the realization that there is a better means of operating a fire department.

Health as a Risk Management Component

Two areas of concern regarding firefighter health are the increasing number of disabling injuries and the growing number of occupational exposures to communicable diseases. These injuries and illnesses often have debilitating or mortal consequences and force members to halt their fire service careers. In addition to their fire suppression operations, the fire service now is taking a more active role in the delivery of emergency medical services, hazardous materials mitigation, and response to technical rescue incidents. These activities expose firefighters to a variety of hazards that present a whole new set of occupational safety and health concerns for the fire service. Also, the firefighters' daily work schedule involves other activities such as training, preincident planning, fire inspections, station and vehicle maintenance, and physical training. Presented with all these activities and job requirements, there is a valid concern about job stress and the emotional and psychological repercussions of providing these services.

Firefighter health and wellness have become and continue to be very important issues in the fire service. Fire departments throughout the country are becoming more focused on developing and implementing methods and procedures which can make the most hazardous and dangerous tasks of extinguishing fires, providing emergency medical services, hazardous materials mitigation, and technical rescue operations much safer and manageable. Health and wellness are components of the risk management process and can have long-term impact and results on the health and welfare of the workforce. As we study and continue to learn about risk management and acquire the benefits of this process, we must ask how this correlates to the fire service.

There has been a great deal of research and published literature related to the health and wellness of emergency services members in the past decade. The results show that endurance, muscle strength, flexibility, and cardiovascular conditioning enable members to perform their jobs safely

and more effectively. Programs that improve these characteristics include overall wellness training, mandatory or scheduled physical fitness programs, workshops for managing job stress, nutrition, substance abuse counseling, and weight control. Many fire departments place a strong emphasis on the physical fitness and wellness of their personnel, while other fire departments are slow to embrace this concept.

The fire department may incorporate other job tasks based upon the mission statement of the organization. The staff and physician need to carefully consider all of the potential job tasks as they relate to the medical requirements (for example, National Fire Protection Association (NFPA) 1582, *Standard on Comprehensive Occupational Medical Program for Fire Departments*).

To ensure for the health and welfare of our members, health and wellness must be included as part of the risk management process. Control measures include these:

- education and training;
- use of consensus standards;
- compliance with mandatory regulations;
- fitness programs;
- wellness initiatives;
- nutritional guidelines;
- stress management programs; and
- infection control procedures.

MEDICAL

NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*, addresses the following components regarding health and wellness:

- medical;
- physical performance;
- physical fitness;
- member assistance program and wellness programs; and
- critical incident stress programs.

One of the goals of the NFPA Fire Service Occupational Safety and Health (FSOSH) Technical Committee was to develop a series of standards that addressed health maintenance, physical performance, and physical fitness. As a sidebar, in 1996, the FSOSH Technical Committee was divided into two technical committees. In July 2002, the two technical committees were merged back into one technical committee, The

FSOSH Technical Committee. This technical committee is responsible for the following documents:

- 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*; and
- NFPA 1584, *Recommended Practice on the Rehabilitation for Members Operating at Incident Scene Operations and Training Exercises*.

The fire service can employ medical and physical guidelines that will benefit all members. NFPA 1500 addresses the medical evaluation for candidates and members. Other components of this chapter include physical performance requirements, physical fitness, establishing a confidential health database, infection control, the fire department physician, and postinjury and illness rehabilitation.

NFPA 1582 provides a medical evaluation process for a fire department physician to certify candidates and members. The medical records are maintained separate from personnel files, in a confidential manner, and usually are maintained by the fire department physician. Any medical information relating to examinations, occupational illnesses and injuries, and health exposures are recorded in these files. A fire department is responsible for designating a fire department physician who serves as medical advisor to the department as it relates to firefighter health. The designated physician is to manage the infection control process as it relates to vaccinations, inoculations, and treatment; medically supervise the physical fitness program; and review medical examinations of members (if not the certifying physician).

FIREFIGHTER WELLNESS/FITNESS PROJECTS

The overall focus for the United States Fire Administration (USFA) is to partner with the International Association of Fire Chiefs (IAFC) and the International Association of Fire Fighters (IAFF) to support the expansion of use by additional fire departments of the *Fire Service Joint Labor Management Wellness/Fitness Initiative*, that has been successfully tested

in several fire departments throughout the United States. The *Fire Service Joint Labor Management Wellness/Fitness Initiative* was developed by the IAFC and the IAFF to enhance firefighter wellness and firefighter health and safety. The expansion of this effort would include fire departments that were not previously part of the program. This initiative would research the effectiveness of the implementation and the overall results of this program in these other departments throughout the country.

This project also would include the continuing development of a peer-credentialing program in support of a standard of job performance requirements for fire department fitness trainers that would be recognized by the American Council on Exercise (ACE), the largest nonprofit exercise foundation in the United States. Quantification of the effectiveness of the peer-credentialing program for fire department fitness trainers would be accomplished with the departments and locals selected to participate in this effort.

This effort could help mitigate the leading cause of firefighter fatalities, stress-related cardiac deaths, which historically have accounted for 50 percent of firefighter fatalities. Reduction of this type of death alone would provide a positive impact on USFA successfully meeting its goal to reduce fatalities of firefighters by 50 percent within 10 years.

International Association of Firefighters/International Association of Fire Chiefs Wellness/Fitness Initiative

In 1997, the IAFF and the IAFC developed a joint program entitled, the *Fire Service Joint Labor Management Wellness/Fitness Initiative*. This program, (which included 10 public professional fire departments in the United States and Canada) was designed to improve the wellness of uniformed members of these fire departments. The wellness program includes

- medical requirements;
- fitness;
- injury/fitness/medical rehabilitation;
- behavioral health;
- data collection; and
- appendix material.

The intent of the program is to strengthen members' temperament and mental and physical capabilities to better handle occupational and life stresses. Departments participating in this program must obtain a commitment from labor and management to achieve the benefits.

The IAFF, in cooperation with the IAFC, has committed to an unprecedented endeavor. Physical, mental, and emotional fitness require an effective wellness program available to recruits, active firefighters, and retirees. The *Fire Service Joint Labor Management Wellness/Fitness Initiative* is an exciting challenge and a positive process for the fire service. An overall wellness/fitness system must be holistic, positive, rehabilitating, and educational. Key issues of the initiative incorporate the following points:

- overcome the historic fire service punitive mentality of physical fitness and wellness issues;
- move beyond negative timed, task-based performance testing to progressive wellness improvement;
- require a commitment by labor and management to a positive individualized fitness/wellness program; and
- develop a holistic wellness approach that includes medical, fitness, injury/fitness/medical rehabilitation, and behavioral health.

Firefighters must continue to respond to emergency incidents that require extreme physical output and often result in physiological and psychological outcomes. Such situations, over time, can and do affect the overall wellness of the firefighting and emergency response system. Tomorrow's fire service requires that we face our destiny of keeping our firefighters fit today. The ultimate goal of joint initiative is to improve the quality of life for all firefighters. The project seeks to prove the value of investing wellness resources over time to maintain a fit, healthy, and capable firefighter throughout his/her 25 to 30+ year career and beyond. An effective program should realize significant cost savings in lost work time, workers' compensation, and disability.

The Process

The first phase of this comprehensive project on physical fitness and wellness issues involved the creation of a network of selected geographically diverse fire departments with excellent union/management relations. Each selected fire department is represented by the fire chief and the IAFF local union president, with invitations extended to the department physician, physiologist, and/or fitness coordinator. A commitment assuring full union/management cooperation on this issue has been received from each department and each department has committed to making a concerted effort towards implementing the task force project.

The second phase entailed the development of a complete physical fitness/wellness program. Through data collection and analysis, the participating departments will create valid baseline data suitable for fire-

service-wide comparisons. The final phase was the formation of a comprehensive program for distribution to the fire service.

The joint initiative is available, without charge, to all IAFF affiliate presidents. It is available as a complete physical fitness and wellness program package and includes a manual and a video.

The Mission

An overall wellness/fitness system must be developed to maintain firefighters' physical and mental capabilities and should be the objective of every fire department in cooperation with its local IAFF affiliate. While such a program may be mandatory, agreement to initiate it must be mutual between the administration and its members represented by the local union. Any program of physical fitness must be positive and not punitive in design; require mandatory participation by all uniformed personnel in the department once implemented; allow for age, gender, and position in the department; allow for on-duty-time participation using facilities provided or arranged by the department; provide for rehabilitation and remedial support for those in need; contain training and education components; and be reasonable and equitable to all participants.

The program must address the following key points:

- confidentiality of behavioral, medical, and fitness evaluations;
- to develop a physical fitness and wellness program that is educational and rehabilitative and is not punitive;
- require a commitment by labor and management to a positive individualized fitness/wellness program; and
- develop a holistic wellness approach.

United States Fire Administration/National Volunteer Fire Council Fitness and Wellness Program

The USFA and the National Volunteer Fire Council (NVFC) announced the initiation of the Volunteer Fire Service Fitness and Wellness Project--a partnership initiative to reduce loss of life among volunteer firefighters from heart attack and stress. USFA is a part of the Federal Emergency Management Agency (FEMA).

"This is the number one cause of line of duty firefighter fatalities in the volunteer fire service," said R. David Paulison, U.S. Fire Administrator. "We are truly pleased to work in partnership with the NVFC in the development of innovative programs to reduce this loss of life."

The partnership effort will involve researching and developing effective examples of health and wellness programs aimed at the needs of the volunteer firefighter. These programs will address fitness and exercise (aerobic, flexibility, strength training, etc.); diet; smoking cessation; and other areas that will have a positive impact on the volunteer fire service community.

This project also will develop information on how volunteer fire departments can enhance compliance with appropriate NFPA firefighter health and safety standards such as NFPA Standard 1583.

NVFC Chairman Philip C. Stittleburg said, "the NVFC is pleased to partner with the USFA in this endeavor to reduce the primary cause of volunteer firefighter fatalities and at the same time contribute to the fitness and wellness of the volunteer fire service."

This project complements existing USFA firefighter wellness and fitness partnerships with the IAFC and the IAFF to support the expansion of the IAFF and IAFC *Fire Service Joint Labor Management Wellness/Fitness Initiative* to additional fire departments.

Further information about the Volunteer Fire Service Fitness and Wellness Program as well as other USFA fire service fitness and wellness partnerships may be found on the USFA Web site at: <http://www.usfa.fema.gov/dhtml/inside-usfa/fitness.cfm>

MEDICAL EVALUATION

When most people are asked to define a wellness program they describe a physical fitness or exercise program. These are only part of an overall wellness program. A wellness program should be viewed as a pie with several pieces that fit together. Fire departments often have one or two components of the program and call them a wellness program. There actually are four major components of a wellness program:

- annual medical exams;
- employee assistance program (EAP) including substance abuse;
- physical fitness program; and
- infection control.

ANNUAL MEDICAL EXAMS

Baselines

Physical examinations and medical testing should occur both 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, and to develop a medical history of all personnel who may be involved in fireground activities.

Vaccinations

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 HIV/AIDS. According to the Advisory Committee on Immunization Practices (ACIP) and the Hospital Infection Control Practices Advisory Committee (HICPAC) postvaccination antibody testing is recommended for those who have blood or patient contact and are at ongoing risk for injuries with sharps. However, studies have indicated that despite declining serum levels of antibody, immunity continues to prevent disease. Therefore, boosters are no longer recommended. This is a change from the 1990 recommendations.

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.

Tetanus boosters are effective for 10 years. However, if an injury occurs which results in an open cut or wound and it has been more than 5 years since the last booster, another is recommended.

Every fall it seems that a new strain of **flu** finds its way to the United States. Researchers try to identify the particular strain ahead of time and develop a vaccine, which can lessen symptoms. 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.

In some parts of the country there have been large outbreaks of **measles**. 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 MMR (measles, mumps, rubella) vaccine. The decision to revaccinate is based on when the initial vaccination was administered. Table 4-1 provides a summary of recommended immunizations.

Table 4-1
Immunization of Health-Care Workers: Recommendations of
the Advisory Committee on Immunization Practices (ACIP)
and the Hospital Infection Control Practices Advisory
Committee (HICPAC)

Disease	Immunization	Notes
Hepatitis B	Series of three doses	Mandated by OSHA that it is offered to employees at employer's expense.
Influenza	Yearly in the fall	Each year influenza vaccine recommendations are reviewed and amended to reflect updated information concerning influenza activity in the United States for the preceding season. These recommendations are published annually in the MMWR, usually during May or June.
Measles, Mumps, Rubella	Series of two doses	MMR is the vaccine of choice.
Varicella	Series of two doses	Recommend for all health-care workers.
Tetanus, Diphtheria	Primary vaccination	Booster is recommended every 10 years. When wound is incurred, booster should be administered if last booster was more than 5 years prior.

**Source: Morbidity and Mortality Weekly Review, Vol. 46, No. RR. 15, Dec. 26, 1997.*

ACIP does not recommend routine immunization of health-care workers against tuberculosis, hepatitis A, pertussis, meningococcal disease, typhoid fever, or vaccinia. However, immunoprophylaxis for these diseases may be indicated in certain circumstances.

In order for the risk management process to be effective, the objectives have to be determined and understood. The axiom on which risk management operates is that the organization needs to be run efficiently and effectively. To ensure this objective is met, all members have to be properly trained and supervised and occupational safety and health is given priority. With this goal in mind, risk management decisions can be made.

Periodic

The periodic medical evaluation medically certifies the member's continued ability to perform the assigned job tasks and identifies any acute changes in the member's health status. Each member must be medically evaluated yearly. The periodic medical evaluation reviews

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

In some departments the baseline tests described earlier may be done on an annual basis, while others modify their annual evaluation. 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. NFPA 1582 describes the components to be included in a comprehensive medical examination. Following the evaluation, the fire department physician informs the department in writing of the member's ability (or inability) to continue the performance of required duties.

Return-to-Duty

The return-to-duty medical evaluation certifies the 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.

Components of a Baseline Examination

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;
- 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;
- PSA blood test for persons over the age of 50;
- carboxyhemoglobin (baseline 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 be found in NFPA 1500 (Chapter 8, "Medical and Physical"), and in NFPA 1582.

Postexposure Exams

Persons exposed to different hazardous materials should be given an initial medical examination to determine the presence of any dangerous chemicals. Since some of these chemicals may not be visible immediately, 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 body 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

All employers are required to keep records of occupational injuries and illnesses. The Occupational Safety and Health Act (Part 1910, Subpart Z) requires 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 report;
- return-to-duty reports;
- workers' compensation reports;
- records of vaccinations; and
- exposure reports (haz mat, 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.

Fire Department Physician

Selecting the fire 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 that are employed by agencies other than the fire department. The services provided to the fire department may be on a contractual basis or other type of agreement. Many of the approximately 34,000 fire departments are located in relatively remote locations, 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 may prohibit the cost of appropriate physicians' services. Departments that are able to obtain occupational health services, either on a contract or voluntary basis, do not automatically have adequate medical support. Physicians who are willing to assist in departmental operations beyond their own expertise may not have ready access to medical oversight of fire

service functions learning resources. Regardless of the relationship with the fire department, there are minimal requirements for the fire department physician.

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

Individuals join a fire department at a relatively young age and in good health. Over the span of 15 to 20 years, these individuals are transformed. One in four members suffer an occupational injury of some magnitude 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 exposed to communicable diseases, such as hepatitis B, hepatitis C, tuberculosis, bacterial meningitis, and a variety of other airborne and bloodborne diseases that are constant risks to firefighters. In addition, individuals must contend with the aging process. Factors that must be addressed as a person ages include

- weight control;
- hearing loss;
- fitness and conditioning;
- alcohol and tobacco use;
- nutrition;
- vaccinations and inoculations;
- substance abuse; and
- wellness.

A fire department needs to employ a systems approach to the health maintenance program. The commitment starts with the fire chief and continues down to the newest recruit. Key players involved in this process include

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

This group develops the department policy and procedures and is responsible for developing and implementing the program. It is imperative that the end users (firefighters) also have a direct link to this group to provide guidance and feedback during the implementation of the program. As with any new program causing change, resistance is the first and foremost barrier. It is critical that members understand the benefits and importance of this process. Without that understanding, success will be minimal at best.

An effective health maintenance program is built around the job descriptions of each position in the organization. The medical requirements in NFPA 1582 are based on the tasks a firefighter is expected to perform during various emergency operations and the requirements of NFPA 1001, *Standard for Fire Fighter Professional Qualifications* or equivalent, for which firefighters are certified. The job description is an important guide when dealing with physical rehabilitation following occupational injuries. The fire 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. An example of a job description for a firefighter:

- Operate as a member of a company at incidents of uncertain duration.
- Spend considerable time outside exposed to a variety of elements.
- Tolerate severe fluctuations in temperatures while performing duties, while wearing protective clothing, which notably impairs body--cooling mechanisms.
- Work in damp, wet, frigid, or dirty areas.

- Perform a variety of tasks on slick or steep surfaces such as roofs, or from ladders.
- Work in environments where traumatic or thermal injuries are possible.
- Face exposure to carcinogenic dusts such as asbestos, toxic substances such as hydrogen cyanide, carbon monoxide, or organic solvents, either through inhalation or skin contact.
- Face possible exposures to infectious diseases such as hepatitis B or HIV.
- Wear and use protective clothing and equipment that weights approximately 30 pounds while performing firefighting tasks.
- Perform complicated tasks during life-threatening emergency conditions.
- Face possible exposure to abhorrent scenes and smells associated with major trauma and burn victims.
- Make rapid transitions from relaxation or sleep to near maximal exertion without warm-up periods.
- Operate in environments of piercing sounds, inadequate visibility, limited movement, at heights, and in enclosed or confined areas.
- Employ manual and power tools in the course of duty.
- Rely on senses of sight, hearing, smell, and touch to aid in determining the seriousness of the emergency, preserve personal safety, and make crucial decisions in a fast-paced, perplexing, and potentially life-threatening environment during the length of the operation.

Providing a compliant medical certification program hinges on the fire department physician having a clearly defined list of department activities. The fire department mission statement and job descriptions are excellent resources. The fire department physician may need to complete an education and training process to understand and experience the tasks, working environments, protective clothing and equipment, and apparatus used in firefighting. 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 fire department physician and the organization.

A wellness component must be included in the health maintenance program. A wellness program should address medical, physical, and emotional health. A rehabilitation process is needed when any of these components becomes unbalanced. Difficulty dealing with occupational and personal stresses can profoundly affect a firefighter's emotional and mental well-being. Once imbalance occurs, problems such as substance abuse or family/marital problems may surface. These problems affect both lifestyle and job performance. A confidential, proactive program should be available to help firefighters and their families find ways to deal with stresses and begin to manage the problems. An employee assistance program or member assistance program is a planned approach for helping employees whose personal problems are affecting their job performance.

Good nutrition is a component of the health maintenance program that is often difficult to implement. Traditionally, fire service eating habits have been poor. With the growth of the fast-food industry in this country, the nutritional habits of firefighters have worsened. Proper nutrition is essential to a person's general health, well-being, and quality of life; and is a major factor in physical fitness and conditioning. Proper nutrition provides more energy, helps the body recover from physical stress, and develops 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.

BACK INJURY PREVENTION

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 for 10 minutes twice per day at a moderate pace and build up to at least one 30-minute walk per day 3 days a week; walking every day is preferable.

Stretching to increase back and abdomen flexibility should be done 5 to 7 days per week, and strengthening exercises should be done at least 4 to 5 days per week. 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 itself, 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 back belts 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 back belts at <http://www.cdc.gov/niosh/backbelt.html>

Maintaining your level of fitness throughout the year will make injury less likely.

Health and Fitness Coordinator

The health and fitness coordinator is responsible for the management of the wellness, physical fitness, and health maintenance programs for the fire department. This individual is appointed by the department to serve as the program manager to ensure compliance with health enhancement programs established by the fire department in conjunction with the fire medical officer.

Based upon the expertise needed, this individual may be a contract employee or a member of the fire department. Whichever, this individual must acquire the certifications needed to guide and manage the program properly.

The programs and responsibilities that are under the direction of the health and fitness coordinator are as follows:

- **Medical Evaluations/Examinations per NFPA 1582:** The health and fitness coordinator would schedule or provide the data to enable the fire 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 upon a recognized fitness evaluation process. This would determine suitability for duty based upon the criteria established by the department.
- **Physical Fitness Programs:** Each member of the department would be evaluated, and prescribed a physical fitness program based upon the fitness evaluation.
- **Wellness Track:** 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 is 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 will prevent illnesses or determine if health problems exist.
- **Liaison:** The health and fitness coordinator must interact with a variety of individuals including the fire 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. There has to be information and communication exchange in order for the process to work. The health and fitness coordinator must provide the practical application to ensure that the program functions.

BEHAVIORAL HEALTH

A firefighter must 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 firefighters include

- work schedules that take the member away from the family at night, on weekends, holidays, birthdays, or other important times;
- work hours that vary from a 56-hour work week to a 42-hour work week; and
- work day that is either 24 hours or a split shift of 10/14 hours.

The split shift means that a firefighter works several 10-hour days (0800 to 1800), off several days, work several night tours (1800 to 0800), and then off several days. Volunteer firefighters have an equivalent problem of balancing their primary occupation, family responsibilities, and their duties with the fire department. Working all day at a primary job and all night at a fire is physically demanding and stresses home and family commitments.

When a firefighter is unable to balance these activities, emotional or mental health problems develop. Without intervention, the employee becomes a liability to the department and to him/herself. The potential for accidents and injuries increases, absenteeism occurs, and job performance is minimal at best. Behavioral health was all but ignored in the past and members were left to solve their problems as best they could. A fire department invests heavily in an employee. The loss of an employee due to a mental condition that could have been prevented is a poor business practice.

With the implementation of the Member Assistance Program (MAP) in the past decade, behavioral health was recognized as a component of overall health and wellness. Critical incident stress management furthered the cause. A behavioral health program reduces the risk to the member and the department, maintains the department's investment in the employee, and the provision of quality service to the community.

The behavioral health program should include

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

A stress management program can help firefighters 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 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 problem that affects the mental well-being of a firefighter. The stress management program also should include a prevention process. Education of members

is vital to the success of this program. To strengthen the prevention aspect:

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

Members experience a specific type of stress when dealing with trauma, death, and sorrow. Critical incident stress is a normal reaction by normal people when experiencing an abnormal event. Each of us deals with difficult situations in a variety of ways, some more significant than others. Experiencing emotional stress after a traumatic event is a very 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 and members know how to access that help. Training and education are key factors for successful critical incident stress management.

NFPA 1500, Chapter 10--Critical Incident Stress Program provides a very basic approach to addressing the needs of firefighters who witness trauma, death, and grief. The requirements of NFPA 1500, Chapter 10 are

- The fire department physician must provide medical direction regarding the operation of the critical incident stress management.
- 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.
- The program must be available to all members for incidents such as mass casualties, large life-loss 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.

PHYSICAL FITNESS

Firefighting is a physically demanding occupation that requires active participation in an effective and practical physical fitness program. A physical fitness and conditioning program must be designed to help firefighters develop and maintain the level of fitness needed to perform

firefighting tasks safely and effectively. The physical abilities needed for firefighters to perform various tasks include the following:

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

Engaging in a proactive physical fitness program enables firefighters to attain and maintain a level of fitness that assists in the performance of their daily tasks. Firefighting has many physical demands, and 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 a firefighter achieves is greatly influenced by the motivation to start and continue a physical fitness program. In order to improve an individual level of fitness, a firefighter must participate on a regular basis. Once the goals are met, a firefighter must continue to participate in the physical fitness program in order to maintain the new level of fitness.

One goal of the physical fitness program is to address back injury prevention. Back injuries represent a large number of occupational incidents that affect members and the fire department in the form of significant medical expenses, lost work time, rehabilitation, and disability retirements. The onset of back problems are the result of injuries and how we use our backs. Improper lifting and bending cause damage to the spine, and this damage is very difficult to reverse. The solution for proper lifting is rather simple when compared to the magnitude of the problem. During lifting operations, bend at the knee, not at the waist. Objects or loads are lifted by the thighs, the most powerful muscle group in the body. Bending the knees brings the load closer to the body, allowing the spine to assume a more comfortable and natural position. Proper lifting techniques must be practiced and used to prevent back injuries. During firefighting operations or other emergency operations such as lifting a patient on a stretcher, sufficient personnel must be used to prevent injury to any member.

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; and
- maintain an aggressive injury prevention training program.

The objectives of the physical fitness program should be to strengthen and condition the cardiovascular system; to tone and strengthen abdominal, back, leg, arm, and other major muscles; and to increase flexibility. The three components of physical fitness outlined in this program are strength, endurance, and flexibility. **Strength** is defined as the ability to exert muscle force. **Endurance** is defined as the ability to continue an activity for a long time period. Endurance is composed of two parts: **muscular endurance** (specific to repeated action of the muscles) and **cardiovascular endurance** (related to the circulatory and respiratory systems). **Flexibility** is defined as the range of motion at the joints. Flexibility helps you to move with ease, thus reducing injuries such as pulled or strained muscles. Adequate levels of these components enable firefighters to perform the physically demanding tasks safely and effectively.

INFECTION CONTROL

In the past 10 to 15 years, the fire service has experienced an unequivocal change in the delivery of emergency medical care. This change was precipitated due to rapid health effects regarding infectious and/or communicable diseases. Emergency services personnel, such as firefighters, law enforcement officers, and EMS personnel face a new occupational threat. Infectious diseases such as human immunodeficiency virus (HIV), hepatitis B (HBV), tuberculosis, and acquired immunodeficiency virus (AIDS) have brought this issue to the forefront in regards to occupational health concerns. The issue of occupational exposures to bloodborne or airborne diseases has created an entirely new focus for emergency services agencies and the personnel that respond to provide patient care.

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 blood and body fluids contact was common as well. Very swiftly, this philosophy changed and new procedures were adapted for emergency services personnel as they delivered patient care. The fundamental reason for change was for personnel to continue delivering patient care, but to add several control measures to ensure that the member was protected properly. Moreover, risk management is and must become an essential component of the infection control process. From a fire service perspective, risk management is a process that reduces the potential for

harm to personnel, equipment, facilities, and apparatus. The fire department or emergency services organization must adopt a risk management program that addresses all operations and activities including administration, training, vehicle operations, protective clothing and equipment, facilities, and emergency operations. Many factors influence the outcome of emergency operations, such as medical requirements, physical fitness requirements, infection control procedures, and other health-related issues. Risk management has to be considered in all decisions regarding personnel safety and health. The intent of the infection control program is to reduce occupational health exposures due to contact with bloodborne or airborne infectious diseases. Due to the probability for an exposure to occur, the risk management process reduces the frequency and severity of an actual exposure occurring.

Within the past 10 years, several national standards have been developed that address infection control for emergency response personnel. In December 1991, the Occupational Safety and Health Administration (OSHA) introduced 29 CFR 1910.1030, *Bloodborne Pathogens*. This set the foundation for developing a comprehensive infection control program for prehospital care personnel. This OSHA standard defined specific criteria for addressing the necessary 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. This standard requires several vital elements to be in place through the department's risk management plan to identify workers at risk, developing control measures for limiting exposures through a combination of training, engineering controls, personal protective equipment (PPE), and hepatitis B vaccinations.

In 1992, the NFPA developed NFPA 1581. This standard provides the minimum requirements for a fire department infection control program based upon the requirements of 29 CFR 1910.1030 and NFPA 1500. This standard expands the OSHA requirements specially addressing the needs for a fire department infection control program. NFPA 1581 requires the following components for a fire department infection control process:

- 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 equipment;

- personal hygiene issues; and
- cleaning facilities.

NFPA 1581 contains appendix material that describes cleaning procedures for structural firefighting protective clothing.

Due to a lack of a standard addressing requirements for airborne diseases, OSHA is currently enforcing procedures developed by the Centers for Disease Control and Prevention (CDC). These current guidelines are for emergency services and health-care organizations to develop an occupational exposure control plan to prevent the occupational transmission of tuberculosis for members at risk. The components of this exposure control plan are very similar to ones developed for exposures to bloodborne pathogens.

As the necessary standards have been identified, each one has specific requirements addressing health concerns to protect the mortality of firefighters and other emergency services members.

Occupational Safety and Health Administration Bloodborne Pathogens Standard

On December 2, 1991, OSHA announced a new standard that has forever changed the delivery of patient care in this country. For the first time, health care workers and their employers were held accountable for their actions during the delivery of prehospital and hospital care. Based upon extensive research and data, these workers are at risk for an occupational exposure to blood and the effects of infectious disease such as HBV.

29 CFR 1910.1030, *Bloodborne Pathogens* was issued to reduce the occupational transmission of infections caused by microorganisms found in human blood, body fluids, and other potential infectious materials (OPIM). Although a variety of harmful microorganisms **may** be transmitted through contact with infected human blood, HBV, and HIV have shown to be responsible for infecting workers who were exposed to human blood and certain other body fluids containing these viruses, through routes like needlestick injuries and by direct contact of mucous membranes and nonintact skin with contaminated blood/materials, in the course of their work. Occupational transmission of HBV occurs much more often than transmission of HIV. Although HIV is transmitted rarely following an occupational exposure incident, the lethal nature of HIV requires that all possible measures be used to prevent exposures to workers.

Based upon the risk analysis, emergency services personnel are considered at-risk workers automatically. There are a number of means for ensuring the protection of workers during the delivery of emergency medical care. This is accomplished in a variety of ways. The process starts with an exposure control plan that describes how the employer (fire department) is going to meet the requirements of this standard. Engineering and work practices (control measures) are to be used by the employer to reduce or, at best, eliminate occupational exposures to workers (members). Where workers are at extreme risk, PPE are used to reduce the risk of an exposure. The standard requires that PPE be available, properly decontaminated, and cleaned after each use or properly disposed of if they are one-use items, and placed back in storage ready for use again. Hand washing and effective personal hygiene are key components of this process to reduce the risk of an exposure after patient care. If handwashing is not feasible or available, antiseptic soap (waterless) or wipes should be provided and used. Hands must be washed after PPE are removed. Hands, mucous membranes, or exposed skin must be washed after an exposure to blood or body fluids. Sharps must not be recapped, bent, or removed unless there is no other practical method. Workplace practices that are discussed include no smoking, eating, drinking, or applying cosmetics or lip balm while wearing PPE, or there is possibility on an exposure. Sharps must be disposed of in appropriate containers that are clearly marked and labeled. Containers must be closable, puncture resistant, leakproof 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 upon the potential for a risk or an exposure. The minimum should be examination gloves when conducting an assessment of a patient that has not suffered any trauma or who is bleeding excessively. The greater the risk of an exposure to blood or body fluids, the more protective clothing should be used. Due to the health problems workers have encountered with latex examination gloves, the employer must provide a variety of hypoallergenic gloves and a variety of sizes. Structural firefighting protective clothing serves as an excellent barrier against blood and body fluids. When firefighters are performing vehicle extrication, turnout gear is the optimum choice of PPE due to sharp surfaces or obstructions. This PPE includes helmet, coat, pants, boots, and gloves.

PPE is required to be cleaned, washed/laundered, or disposed of appropriately by the employer at no cost to the worker. All PPE has to remain at the worksite and nothing 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 facilities, located in fire stations need to be separate from the laundering equipment used for normal cleaning such as linens, uniforms, and towels. The hot water has to be above 130 degrees, and wastewater has to empty into a sanitary sewer system.

Workers have to be offered the HBV vaccination by the employer at no cost to the worker. The worker has to be offered the vaccine within 10 working days of initial assignment after receiving the proper training. The worker has the right to refuse the vaccination if the worker 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 has to be supervised by a licensed physician or other certified health care professional per the requirements of the U.S. Public Health Services.

In the event of an occupational exposure to a worker, postexposure evaluation and followup care, which includes prophylactic treatment, is to be offered at no cost to the worker and must be convenient 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.

This process should also include the identification, documentation, and testing of the "source individual," which should include analyzing this individual's blood for HBV and HIV. Any prophylactic treatment that is recommended by the U.S. Public Health Service, counseling, and evaluation for reported illness. This process should be managed by the department's physician in order to comply with the requirements for medical recordkeeping (29 CFR 1910.20). After an exposure incident, the department is responsible for ensuring a confidential medical evaluation and continued follow-up. This process should include

- Documentation of the route of exposure and complete circumstances of how the exposure occurred.
- Identification and documentation of the source individual; testing of this individual must occur if an exposure occurs based upon State or local laws.
- If the person is known to be infected with HIV or HBV, testing does not have to occur. This information must be made available to the exposed employee.
- Counseling.
- Evaluation of the reported illness.

The employer is responsible for maintaining records according to OSHA medical recordkeeping standard. This recordkeeping process includes all medical records, which including employee's name, Social Security number, hepatitis B vaccination, and all examinations and evaluations afforded the employee by the department. This information has to be maintained for the duration of employment plus 30 years; and training records 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 to anyone having the written consent of the employee upon request. Training records must be available to the employee or employee's representative upon request.

As stated, this standard has greatly affected the operations and management of emergency service agencies. The intent is to provide protection for employees at risk to an exposure to blood or body fluids. The exposure to blood or body fluids is truly an occupational hazard, which must be properly addressed as part of a department's occupational safety and health program.

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 compliment the National Fire Academy (NFA) field course, *Infection Control for Emergency Response Personnel: The Supervisor's Role*. These two projects were designed to provide information and guidance to emergency services regarding communicable disease infection control. The CDC and the OSHA provided technical assistance for both projects.

In 2002, the second edition of the *Guide to Developing and Managing an Emergency Service Infection Control Program* was released due to the many advances that have occurred with the infection control process. The second edition focuses on the management of infection control and provides updates on pertinent information. The new guide is designed to meet or exceed all applicable laws, codes, and regulations.

Strategic Planning for Firefighters and Infection Control

Occupationally, an exposure to a communicable disease, can have devastating results for firefighters in regards to health and wellness. The contracting of a communicable disease could cause early retirement from the fire service, significant health concerns, and reduced life expectancy.

Infection control must become a significant part of the daily operations of firefighters. The delivery of EMS continues to be a major part of service delivery for fire departments. The potential for an exposure is a constant occupational risk that emergency service personnel must realize.

This chapter discussed many ways to reduce and eliminate health exposures to airborne and bloodborne diseases. Firefighters must realize that this is a real occupational threat. The results not only can affect the individual firefighter exposed, but also the department, the governing agency or organization, the family involved, and the community. The cost of treating an exposure is enormous and can have a financial impact on the fire department. Moreover, the human side has more cataclysmic results that will affect the individual, family, department, and community. As a fire department develops or revises its mission statement, infection control has to become a vital part of the process.

SUMMARY

Health is one of the several components of risk management. Firefighters perform physically and mentally demanding tasks related to the inherent and potential risks they encounter during the course of service delivery. The importance of maintaining good health and physical conditioning are paramount. Firefighters must understand the importance of personal health, proper physical conditioning, and good nutritional habits. In turn, each fire department needs to provide the education and the components of a proactive and effective health maintenance and wellness program.

Activity 4.1

Justification for a Fire Department Health and Wellness/Fitness Initiative Program

Purpose

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

Directions

1. Your small group is the Health and Safety Committee for your fire department.
2. Working in your group, answer the four questions below 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.

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

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 once funding is secured?

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

Question 4b: What would you work on first, second, etc., and why?

NOTE-TAKING GUIDE

Slide 4-1

**UNIT 4:
HEALTH MAINTENANCE**

Slide 4-1

Slide 4-2

TERMINAL OBJECTIVE

At the conclusion of this unit, the students will be able to describe the components of a health maintenance program.

Slide 4-2

Slide 4-3

ENABLING OBJECTIVES

The students will:

- **Describe the importance of medical requirements for firefighters.**
- **Discuss the comprehensive wellness and physical fitness models.**
 - **Career.**
 - **Volunteer.**

Slide 4-3

Slide 4-4

**ENABLING OBJECTIVES
(cont'd)**

- Discuss the components of a compliant infection control program.
- Develop the justification for a fire department wellness/fitness program.

Slide 4-4

Slide 4-5

MEDICAL

- Leading cause of firefighter fatalities continues to be cardiac arrest and strokes.
- Most significant impact on firefighter health.



Slide 4-5

Slide 4-6

HEART ATTACK/STROKE


- Most firefighters had serious, preexisting medical conditions.
- Medical condition was known, at least to victim.
 - Source: National Fire Protection Association (NFPA) *Firefighter Fatality Study*

Slide 4-6

Slide 4-7

HEALTH AND WELLNESS

- Components of risk management toolbox.
- Control measures require planning.
- Comprehensive process.



Slide 4-7

Slide 4-8

HEALTH AND WELLNESS PROGRAM

• Education/Training	• Wellness initiatives
• Consensus standards	• Nutrition guidelines
• Mandatory regulations	• Stress management programs
• Health maintenance programs	• Infection control procedures
• Physical fitness	

Slide 4-8

Slide 4-9

NATIONAL FIRE PROTECTION ASSOCIATION 1500

- NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program* (umbrella document)
- Medical
- Physical performance
- Physical fitness
- Member assistance program and wellness programs
- Critical incident stress management programs

Slide 4-9

Slide 4-10

**NATIONAL FIRE PROTECTION
ASSOCIATION MEDICAL AND
HEALTH STANDARDS**

- NFPA 1581, *Standard on Fire Department Infection Control Program*
- NFPA 1582, *Standard on Comprehensive Occupational Medical Program for Fire Departments*

Slide 4-10

Slide 4-11

**NATIONAL FIRE PROTECTION
ASSOCIATION MEDICAL AND
HEALTH STANDARDS (cont'd)**

- 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*

Slide 4-11

Slide 4-12

**NATIONAL FIRE PROTECTION
ASSOCIATION 1582**

- *Standard on Comprehensive Occupational Medical Program for Fire Departments.*
- *Standard meets or exceeds the requirements of 29 CFR 1910.134, Respiratory Protection.*

Slide 4-12

Slide 4-13

**NATIONAL FIRE PROTECTION
ASSOCIATION 1582 (cont'd)**

Mirrors the requirements of the
International Association of Fire
Fighters (IAFF)/International
Association of Fire Chiefs (IAFC)
Wellness/Fitness Initiative

Slide 4-13

Slide 4-14

WELLNESS/FITNESS INITIATIVE

- Joint venture between the IAFF and the IAFC.
- Ten fire departments in the U.S. and Canada initiated this process.
- Focus on health maintenance and wellness.

Slide 4-14

Slide 4-15

**WELLNESS/FITNESS INITIATIVE
(cont'd)**

Process includes

- Medical requirements
- Fitness
- Injury/Fitness/Medical rehabilitation
- Behavioral health
- Data collection
- Appendix material

Slide 4-15

Slide 4-16

**WELLNESS/FITNESS
INITIATIVE (cont'd)**

- Intent of wellness program is to help members handle stresses of life and occupation appropriately.
- Research shows that endurance, muscle strength, flexibility, and cardiovascular conditioning improve safety and effectiveness in job performance.

Slide 4-16

Slide 4-17

**WELLNESS/FITNESS
INITIATIVE (cont'd)**

Partner with United States Fire Administration (USFA) to support the expansion of Fire Service Joint Labor Management Wellness/Fitness Initiative to additional fire departments

Slide 4-17

Slide 4-18

**VOLUNTEER FIRE SERVICE
FITNESS AND WELLNESS
PROGRAMS**

- Partnership between the USFA and the National Volunteer Fire Council (NVFC)
- A partnership initiative to reduce fatalities among volunteer firefighters from heart attack and stroke

Slide 4-18

Slide 4-19

PROGRAM COMPONENTS

- Researching and developing examples of health and wellness programs for volunteer firefighters
- Address fitness and exercise
- Diet
- Smoking cessation
- Other areas
- Compliance with NFPA 1583

Slide 4-19

Slide 4-20

MEDICAL EVALUATION

Preplacement

- Medically certifies candidate to perform firefighting duties
- Physician must understand working environment and job requirements
- Identify existing medical conditions and functional restrictions, and understand how job requirements will affect the condition

Slide 4-20

Slide 4-21

MEDICAL EVALUATION (cont'd)

Periodic

- Certifies member's continued ability to perform assigned job tasks, and identifies acute changes in health
- Conducted yearly

Slide 4-21

Slide 4-22

MEDICAL EVALUATION (cont'd)

Return-to-duty

- Certifies member is medically fit to return to duty after occupational injury or illness
- Conducted after rehabilitation is completed

Slide 4-22

Slide 4-23

BASELINE INFORMATION

- Basic medical exam
- Electrocardiogram
- Height and weight
- Vital signs (BP, pulse, respirations)
- Complete medical history and current medications
- Cholesterol level
- Triglycerides

Slide 4-23

Slide 4-24

BASELINE INFORMATION (cont'd)

- Complete blood count
- Chemistry profile
- Hepatitis antibodies
- Carboxyhemoglobin (baseline CO level)
- Chest X-ray

Slide 4-24

Slide 4-25

**BASELINE INFORMATION
(cont'd)**

- Tuberculosis skin test.
- Urinalysis.
- Tetanus and vaccination updates as indicated.
- Vision and hearing tests.
- References for medical examination can be found in NFPA 1500 and in NFPA 1582.

Slide 4-25

Slide 4-26

VACCINATIONS

- Hepatitis B
- Hepatitis A--not routinely recommended
- Tetanus boosters
 - Effective for 10 years
 - If cut injury occurs, should have booster if the last one was more than 5 years previous
- Flu
 - New strain each year leading to new vaccine
 - Does not carry over from year to year
- Measles--MMR vaccine

Slide 4-26

Slide 4-27

POSTEXPOSURE EXAMS

- Initial and followup for hazardous materials, infectious diseases.
- Followup may be necessary for months or several years.
- Infectious disease control should follow procedures outlined in Infection Control Plan.

Slide 4-27

Slide 4-28

MEDICAL RECORDS

- Health database essential in tracking occupational risks and long-term medical problems
- Must be confidential
- NFPA 1500 identifies requirements for database

Slide 4-28

Slide 4-29

MEDICAL RECORDS (cont'd)

- The Occupational Safety and Health Administration (OSHA) requires employers to keep permanent records on employee exposures and occupational injuries and illnesses.
- Confidentiality is key.
- Records must be maintained for length of employment plus 30 years.

Slide 4-29

Slide 4-30

FIRE DEPARTMENT PHYSICIAN

- May be full-time employee in large departments, or contract or volunteer for volunteer or combination departments.
- Regardless of relationship with fire department, there are minimal requirements for physicians.

Slide 4-30

Slide 4-31

**FIRE DEPARTMENT PHYSICIAN
(cont'd)**

- These requirements are described in NFPA 1500 and NFPA 1582.
- Needs a clearly defined list of activities provided by the department.
- May need to be educated to understand and experience the fire service environment.

Slide 4-31

Slide 4-32

HEALTH AND WELLNESS

Slide 4-32

Slide 4-33

VIDEO:

**"Fit to Survive:
The IAFF/IAFC Wellness/
Fitness Initiative"**



Slide 4-33

Slide 4-34

**HEALTH MAINTENANCE
PROGRAM**

Key components:

- Weight control
- Hearing loss
- Fitness and conditioning
- Alcohol and tobacco use
- Nutrition
- Vaccinations/Inoculations
- Substance abuse
- Wellness

Slide 4-34

Slide 4-35

**HEALTH MAINTENANCE PROGRAM
(cont'd)**

Key personnel:

- Fire chief
- Health and Safety Officer (HSO)
- Health and fitness coordinator
- Fire department physician
- Labor representative
- Occupational Safety and Health Committee
- Firefighters

Slide 4-35

Slide 4-36

**FIRE DEPARTMENT JOB
DESCRIPTIONS**

- One for each position is necessary to develop an effective health maintenance program.
- Medical requirements of NFPA 1582 based on essential tasks identified in NFPA 1001, *Standard for Fire Fighter Professional Qualifications*.
- Based on mission statement, other job tasks may be incorporated.

Slide 4-36

Slide 4-37

WELLNESS COMPONENTS

- **Nutrition**
 - Major factor in physical fitness, wellness, and general health
 - Provides more energy, speeds recovery, increases resistance to disease
- **Nutritional habits**
 - On duty?
 - Off duty?

Slide 4-37

Slide 4-38

BACK INJURY PREVENTION

- **The largest number of workers' compensation claims**
- **Key to controlling back injuries**
 - Use proper lifting techniques
 - Exercise to increase flexibility and back strength

Slide 4-38

Slide 4-39

BACK INJURY PREVENTION (cont'd)

- **Has your department implemented a back injury prevention program?**
- **Does the department issue back-support belts?**
- **If your department provides patient transport, are the ambulances equipped with one-person stretchers?**

Slide 4-39

Slide 4-40

**HEALTH AND FITNESS
COORDINATOR**

- Responsible for program management of wellness, physical fitness, and health maintenance programs
- Programs:
 - Medical evaluations/examinations per NFPA 1582--schedule annual medical evaluations
 - Fitness evaluations--conduct annual fitness evaluations

Slide 4-40

Slide 4-41

**HEALTH AND FITNESS
COORDINATOR (cont'd)**

Program manager

- Physical fitness programs--Prescribe physical fitness program based on fitness evaluation
- Wellness track--Develop wellness programs such as stress reduction, cessation programs, nutrition
- Data collection and analysis--Track and analyze fitness performance evaluations

Slide 4-41

Slide 4-42

**HEALTH AND FITNESS
COORDINATOR (cont'd)**

- Prevention programs--Cancer screening, vaccinations
- Liaison--Interact with fire medical officer, HSO, Infection Control Officer

Slide 4-42

Slide 4-43

BEHAVIORAL HEALTH

- Normal reaction when experiencing an abnormal event.
- Individuals handle difficult situations in a variety of ways.
- Problems may surface immediately after incident or days to weeks later.
- NFPA 1500 provides basic approach to addressing critical incident stress management.

Slide 4-43

Slide 4-44

BEHAVIORAL HEALTH (cont'd)

- Program components should include
 - Education
 - Nutrition
 - Cessation programs
 - Member assistance programs
 - Substance abuse programs
 - Stress management
 - Critical incident stress management
 - Counseling services

Slide 4-44

Slide 4-45

NFPA 1500

- | | |
|--|---|
| Member assistance programs: | Critical Incident Stress Management: |
| • Written policy | • Physician guidance |
| • Member and family assistance program | • Written policy |
| • Written rules and confidentiality | • Criteria for implementation |
| • Wellness program | • Situations involving psychological and physical |
| • Health promotion | |

Slide 4-45

Slide 4-46

PHYSICAL FITNESS

- Program must be customized for each member.
- Components:
 - Strengthen and condition cardiovascular system.
 - Tone and strengthen major muscles.
 - Increase flexibility.

Slide 4-46

Slide 4-47

NFPA 1583

Contents

- Program management
- Program components
- Roles and responsibilities
- Logistics

Slide 4-47

Slide 4-48

NFPA 1583 (cont'd)

Contents (cont'd)

- Health and fitness coordinator
- Fitness assessment
- Exercise and fitness training program
- Health promotion education
- Data collection

Slide 4-48

Slide 4-49

INFECTION CONTROL

Bloodborne pathogens:

- Exposure control plan
- Training and education
- Engineering controls
- Personal protective equipment (PPE)
- Housekeeping
- Hepatitis B vaccination
- Postexposure evaluation and followup
- Medical recordkeeping

Slide 4-49

Slide 4-50

NFPA 1581

Components:

- Risk management
- Training and education
- Infection Control Officer
- Health maintenance
- Exposure incidents

Slide 4-50

Slide 4-51

NFPA 1581 (cont'd)

Components (cont'd)

- Fire department facilities
- Fire department apparatus
- Emergency medical operations protection
- Cleaning, disinfecting, and disposal

Slide 4-51

Slide 4-52

**UNITED STATES FIRE
ADMINISTRATION**

*Guide to Developing and Managing
an Emergency Service Infection
Control Program*

Slide 4-52

Slide 4-53

SUMMARY

- Health is a primary component of risk management.
- Health and wellness are key parts of the occupational safety and health program.
- The health maintenance process is a method for the department to ensure the safety, health, and welfare of members.

Slide 4-53

Slide 4-54

Activity 4.1

**Justification for a Fire
Department Health and
Wellness/Fitness Initiative
Program**

Slide 4-54

UNIT 5: CURRENT ISSUES

TERMINAL OBJECTIVE

At the conclusion of this unit, the students will be able to describe firefighter safety concerns relating to current issues in the fire service.

ENABLING OBJECTIVES

The students will:

- 1. Describe the hazards present at highway/traffic incidents.*
 - 2. Describe the importance of incident scene rehabilitation.*
 - 3. Describe the firefighter safety concerns relating to incidents involving terrorism.*
 - 4. Describe the components of the protective clothing selection, care, and maintenance (SCAM) program.*
 - 5. Identify the risks associated with fire department facilities.*
-

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 over the previous 5-year period.

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

- prevent injury to emergency workers;
- preserve life;
- protect property; and
- restore of traffic flow.

Team Effort

Managing a highway incident and other related problems is a team effort. Each responding agency 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).

Restoring the roadway to normal or near to normal as soon as possible creates a safer environment for the motorist 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 the greatest risk to personnel.

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. The operational mode must be determined. This helps in identifying required resources to mitigate the hazard. For example, if a hazardous material is involved, 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 for disagreement. Identifying each responding agency and its particular role and responsibility can avoid a power struggle when an incident occurs. This can be avoided by establishing preincident agreements with law enforcement, DOT, and emergency medical services (EMS) agencies that identify each agency's roles and responsibilities prior to an occurrence. 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 responsibilities include the following items.

Fire Department

The responsibilities of fire include

- 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 scene for investigation teams.

Emergency Medical Services

EMS responsibility include

- evaluate the condition of patients;
- treatment; and
- transportation.

Law Enforcement

The responsibilities of law enforcement include

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

Department of Transportation

DOT is responsible for the following:

- 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

Vehicle recovery personnel's responsibilities are

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

Response

The Company Officer (CO) is responsible for the safety of the company and his/her crew from the time the apparatus leaves the station 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.

When units respond to nonemergency situations, all traffic laws governing normal driving practices should be followed. Response apparatus should follow the normal driving speed. Upon arrival, the situation is assessed to determine the need for additional resources, and safety work zones are established.

Units responding together in the same direction to an emergency situation should remain in single file in relatively close proximity to one another. This reduces motorists' confusion about how to yield the right of way to emergency apparatus appropriately.

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 vehicles and stopped vehicles.

Vehicle operators must follow all laws governing emergency vehicle response and reduce speed when using the shoulder of the road. A safe response speed for shoulder travel should not exceed 35 miles per hour (mph).

Response on 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

The proper spotting and placement of apparatus is the joint responsibility of the driver and officer. The proper positioning of apparatus at the incident scene assures other responding resources easy access, a safe working area, and contributes to an effective overall operation. Standard practice is to position apparatus in an area of at least one lane wider than the width of the incident to ensure a safe work area. This may be difficult to accomplish on secondary and single-lane roads. Position the apparatus to provide the safest work area possible. The work zone should allow EMS units and the rescue unit to position in close proximity of the incident.

First-arriving engine placement should be

- Back some distance from the incident, using the engine as a safety shield to block only those travel lanes necessary.
- At an angle to the lanes, with the pump panel toward the incident and the front wheels rotated away from the incident. This is commonly referred to as the "fend-out" position.
- The pump panel should face the incident to provide protection for the operator while monitoring apparatus functions. (See Figure 5-1.)

In the event that a motorist strikes the engine, the engine will act as a barrier. In the unlikely event the engine is moved upon impact, it will travel away from the work zone.

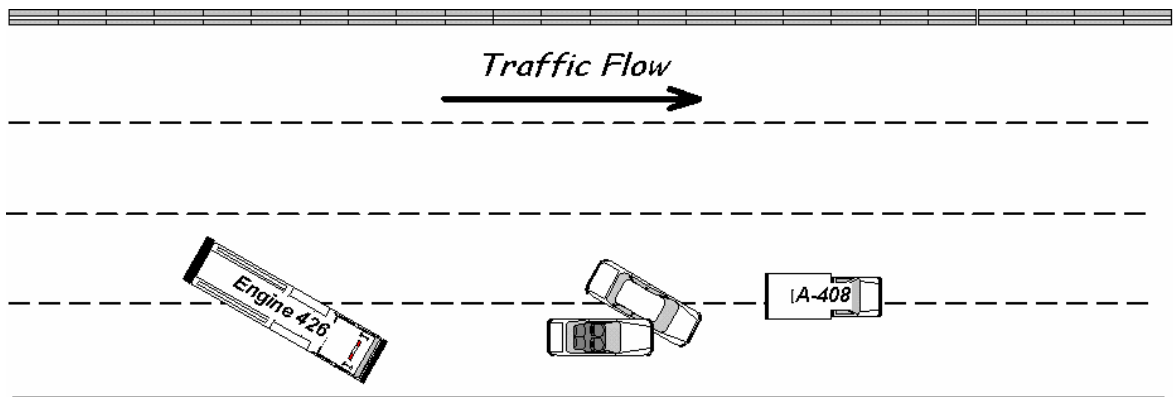


Figure 5-1
Engine Placement

Prior to exiting apparatus, 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 the onboard communications system that traffic has come to a stop and it is safe to exit;
- look down to ensure that debris on the roadway will not become an obstacle, resulting in a personal injury; and
- be in full protective clothing or traffic vests as the situation indicates.

The engine operator should be used as a safety lookout until the appointment of an Incident Safety Officer (ISO) since he/she has the best overall view of the incident scene and can monitor approaching traffic. As soon as possible, the engine operator should place flares and traffic cones. Traffic cones assist in channeling traffic away from the incident. Cones should be used whenever department vehicles are parked on or near any road surface. Placement of cones and/or flares begins closest to the incident, working towards oncoming traffic. Cones and/or flares are placed diagonally across the roadway and around the incident to help establish a safe work zone. When placing cones or flares, be careful to avoid being struck by oncoming traffic.

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

Posted Speed Limit	Distance
35 mph	100 ft.
45 mph	150 ft.
55 mph	200 ft.
65 mph	250 ft. +

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.

When channeling traffic around the incident, cones also are used in front of the incident with the same diagonal placement to direct traffic safely around the work zone. (See Figure 5-2.)

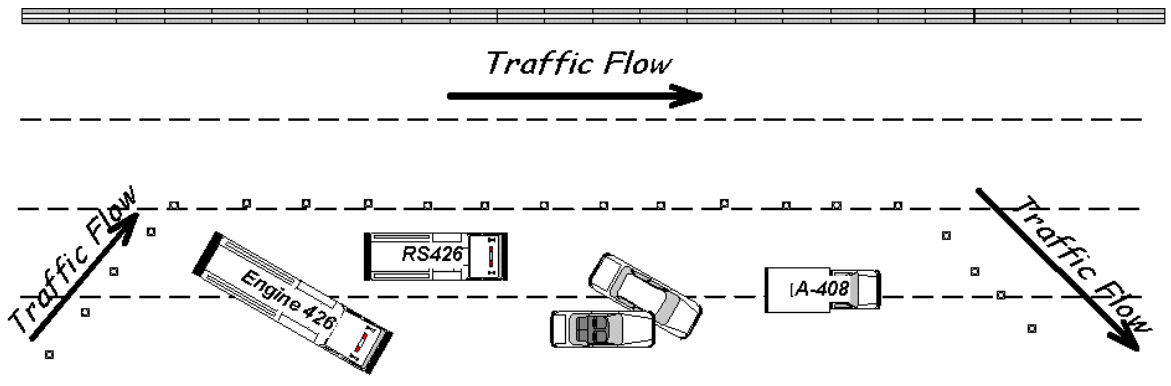


Figure 5-2
Cone Placement

It is possible to channel traffic around a curve, hill, or ramp. The first cone is placed well before the curve, hill, or ramp in such a way that the oncoming driver is made aware of imminent danger. The rest of the cones are placed diagonally across the lanes around the work zone.

The first-arriving company will conduct initial sizeup and hazard risk analysis. Exits, shoulder areas, or a large median should be used for Staging Areas. Do not commit apparatus to a limited access highway unless required. Call for additional resources early, since their arrival may be delayed due to traffic buildup. The need for rehab also should be considered early, especially in extreme weather conditions. Highway operations present limited resources and areas to remove personnel from the elements.

Parking of Response Vehicles

A four-point system should be used whenever vehicles are parked in an area that does not require the channeling of traffic (Figure 5-3). One cone is placed approximately 4 feet from each corner of the vehicle. This assists the motorist and incoming units to identify the established work zone. Additional cones should be placed to identify extended outriggers, booms, and heavy equipment when using this system around aerial apparatus and rescue squads. Keep as many traffic lanes open as possible.

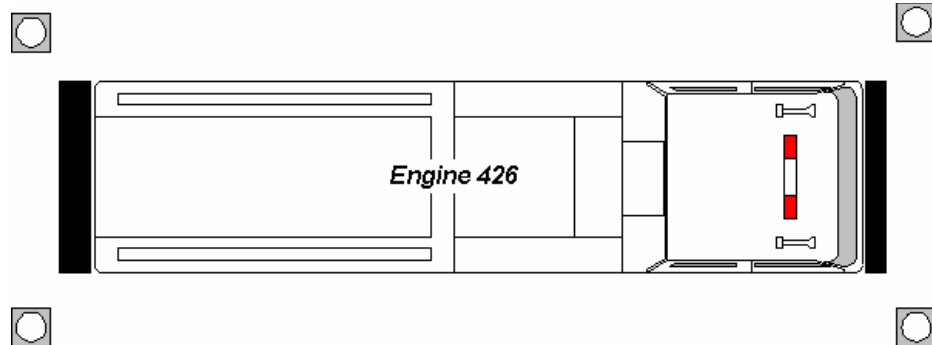


Figure 5-3
Four Point System

All response vehicles, except those needed in the operation and those used as a shield for the work area, should be parked together in a designated area. If one exists, the shoulder or median area should be used. Parking response vehicles completely out of available travel lanes greatly assists in traffic flow. Vehicle headlights should be turned off when parked, if not needed to illuminate the scene.

Apparatus Visibility at Night

Two critical issues related to night visibility are color recognition and glare recovery. 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. Many of the newer vehicles now have a combination of red and 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. This is extremely important when operating on roadways at night. Headlights on the apparatus that shine directly into oncoming traffic can result in drivers literally passing the incident scene blind with no sense of apparatus placement.

Wearing protective clothing and/or traffic vests does not improve the ability of the blinded driver to see personnel standing in the roadway. Studies show that the opposing driver is completely blinded at two and a half car lengths from a vehicle with its headlights on. The best combination of lights to provide maximum visibility is

- red warning lights off;
- headlights off;
- fog lights off;
- pump panel lights on;
- spotlights on rear (and front if equipped) on and directed onto a traffic cone;
- traffic directional boards operating; and
- low beams to light the area if they are directed only on the immediate scene.

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.

INCIDENT SCENE REHABILITATION

The fire department shall develop standard operating procedures (SOP's) that outline a systematic approach for the rehabilitation of members operating at incidents. Provisions addressed in these procedures shall include medical evaluation and treatment, food and fluid replenishment, crew rotation, and relief from extreme climatic conditions. This program should outline an ongoing rehabilitation for simple or short-duration incidents as well as a process 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 developed by the fire department in consultation with the fire department physician and the EMS medical director. If advanced life support (ALS) personnel are available, this level of EMS care is preferred. The IC shall consider the circumstances of each incident and initiate rest and rehabilitation of members in accordance with the fire department's SOP's and with Chapter 8 of NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*, and NFPA 1584, *Recommended Practice on the Rehabilitation for Members Operating at Incident Scene Operations and Training Exercises*.

Weather factors during emergency incidents can have a severe impact on the safety and health of the members. Where 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.

Typical rehabilitation considerations for operations during hot weather extremes include

- moving fatigued or unassigned members away from the hazardous area of the incident;
- removal of personal protective equipment (PPE);
- ensuring that personnel are out of direct sunlight;
- ensuring that there is adequate air movement over personnel, either naturally or mechanically;
- providing members 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 members away from the hazardous area of the incident;
- providing shelter from wind and temperature extremes;
- providing members with fluid replenishment, especially water; and
- providing medical evaluation for members showing signs or symptoms of frostbite, hypothermia, or other cold-related injury.

The ISO shall ensure that the IC establishes an incident scene rehabilitation Tactical Level Management Component (TLMC) during emergency operations as required by NFPA 1521, *Standard for Fire Department Safety Officer*.

The incident scene rehabilitation area shall include emergency medical care. 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. However, the ALS (paramedic) level of evaluation and treatment must be available quickly to ensure the proper level of care.

The rehabilitation area shall be established in a safe environment away from the hazardous area of the incident. The resources needed at the rehabilitation area shall include an environment to limit temperature stress, medical equipment, and adequate medical staff. Items that can assist in limiting temperature stress in cold environments include heat, blankets, and protection from the wind. For hot weather, items should include adequate shade, fans, air conditioning, and misting systems. Food and hydration needs include water and oral fluids, food, broth, and fruit. Also, for hydration, a 50/50 mixture of water and an electrolyte replacement drink can be provided. Medical equipment should include blood pressure cuffs, stethoscopes, oxygen, cardiac monitors, thermometers, and intravenous fluid and supplies.

Weather

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. Table 5-1 shows the effect of wind. Table 5-2 shows the wind chill danger categories and Table 5-3 shows the temperature danger categories. Where 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 5-1
Wind Chill Temperatures**

Wind Chill Factor Index													
Wind Speed MPH	Temperature, °F												
	45	40	35	30	25	20	15	10	5	0	-5	-10	-15
5	43	37	32	27	22	16	11	6	0	-5	-10	-15	-21
10	34	28	22	16	10	3	-3	-9	-15	-22	-27	-34	-40
15	29	23	16	9	2	-5	-11	-18	-25	-31	-38	-45	-51
20	26	19	12	4	-3	-10	-17	-24	-31	-39	-46	-53	-60
25	23	16	8	1	-7	-15	-22	-29	-36	-44	-51	-59	-66
30	21	13	6	-2	-10	-18	-25	-33	-41	-49	-56	-64	-71
35	20	12	4	-4	-12	-20	-27	-35	-43	-52	-58	-67	-75
40	19	11	3	-5	-13	-21	-29	-37	-45	-53	-60	-69	-76
45	18	10	2	-6	-14	-22	-30	-38	-46	-54	-62	-70	-78

Wind Chill Temperature, °F	Danger
Above 25°F	Little danger for properly clothed person
25°F to -70°F	Increasing danger, flesh may freeze
Below -70°F	Great danger, flesh may freeze in 30 seconds

**Table 5-2
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 5-3
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!

TERRORISM

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. Terrorists have the knowledge and capability to strike anywhere in the world, and will do whatever they have to do to achieve their goal.

In recent years we have seen an increasing number of attacks against the government and civilians from both foreign and domestic groups. These include

- Oregon--biological agent dispersed in salad bars;
- Atlanta, Georgia--Olympic Plaza bombing;
- Atlanta, Georgia--abortion clinic bombing;
- Vail, Colorado--ski resort, incendiary (arson);
- Fairfax, Virginia--Central Intelligence Agency (CIA) armed attack;
- New York City--first World Trade Center bombing (1993);
- Oklahoma City, Oklahoma--Federal building bombing;

- New York City; Arlington, Virginia; Shanksville, Pennsylvania--attacks using hijacked airplanes;
- Boca Raton, Florida--anthrax attacks; and
- New York City; Washington, DC--anthrax attacks via mail.

Terrorism took on a new dimension in the minds of citizens of the United States after the September 11, 2001, attacks on the World Trade Center and Pentagon. We no longer view our vulnerability in terms of isolated incidents. Our concept of terrorist tactics has changed forever. We now think in terms of airplanes used for routine domestic flights becoming weapons. The bioterrorist threat became a reality with the spread of anthrax through the U.S. Postal Service (USPS). The concern exists that even emergency response vehicles can become weapons. We also know that responders can be targets at terrorist events. Recent events have shown there can be a carefully timed sequence of events planned to inflict further harm to those who respond to the initial incident. These events may include

- armed resistance;
- use of weapons;
- booby traps; and
- secondary events.

Categories of Terrorist Incidents

Chemical Incidents

Chemical agents fall into five classes:

1. nerve agents;
2. blister agents;
3. blood agents;
4. choking agents; and
5. irritating agents.

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

Biological Incidents

Biological agents are fairly accessible and rapidly spread. 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 firefighters and other emergency personnel responding to a terrorist incident. 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.

There are no easy answers to protecting firefighters from these threats, but self-protection is built on the three key areas used for hazardous materials 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.

United States Fire Administration

The United States Fire Administration (USFA) publishes the *Emergency Response to Terrorism: Job Aid*, which is designed to assist the first responder from fire, EMS, haz mat, and/or law enforcement in identifying a possible terrorist/weapons of mass destruction (WMD) incident 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, and can be ordered online from USFA Publications at <http://www.usfa.fema.gov>

Determine Risks Versus Benefits

- Low gain/High risk--no;
- Moderate gain/Low risk--go;
- Low gain/Moderate risk--no; and
- High gain/Low risk--go.

Safety Operations

Safety for these types of incidents will require a team approach. The team should consist of the ISO, law enforcement, technical advisors, 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 include

- review, update and communicate escape routes regularly;
- 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;
- review Rapid Intervention Crew (RIC) operations;
- review Staging locations and procedures;
- review staffing and location of law enforcement;
- Scene security; and
- provide rehabilitation areas.

PERSONAL PROTECTIVE EQUIPMENT--SELECTION, CARE AND MAINTENANCE

NFPA 1851, *Standard on Selection, Care, and Maintenance of Structural Fire Fighting Protective Ensembles*, was quietly approved in February 2001, as a national Standard. How will this Standard change the way fire chiefs and officers do business? More importantly, what added liabilities and responsibilities are coupled with NFPA 1851?

For fire chiefs and officers, the main issues in NFPA 1851 are health, safety, and liability. By adhering to the requirements and policies set out in this standard, departments will reduce the safety risks and potential health hazards related to turnout gear care, maintenance, and repair. It also will protect firefighters, their families, and the public from possible contamination. By complying with the first two issues of health and safety, the issue of liability will be greatly reduced or eliminated.

Pattern Your Response

What's required in NFPA 1851? Section 2.1.2 states:

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.

To accomplish these goals, written SOP's 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.

Although it calls for detailed measures, and will increase the workload to some degree, the actual time spent on this Standard can be kept to a minimum.

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

Selection: The main focus here is to select and purchase structural firefighting ensembles that comply with NFPA 1971, *Standard on Protective Ensemble for Structural Fire Fighting*. 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: Here's some good news. Section A.4.1.2 states: "It is not the intent of this standard to require the cleaning of ensembles and ensemble elements if those elements are not soiled."

Inspections can be divided into two categories: routine and advanced. But if hazardous materials or biological agents contaminate any element, it must be decontaminated prior to any inspection.

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.

These advanced inspections need to be conducted at least once a year, or sooner if routine inspections indicate, and documented on an inspection form. This is a logical assignment for the Safety Officer.

Ensemble elements should be graded into one of four groups:

- new or like-new condition;
- good condition;
- maintenance needed; and
- immediate replacement.

While it's important to maintain quality records detailing the department's turnout gear, maintaining the gear's quality is arguably 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. Here again, 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.

Case for Closets

Keeping your gear neat and tidy after each use won't be worth the effort if it isn't treated properly when it's 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 them. 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 adequately removing contaminants and hazardous materials.

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 thrusts safety, health, and liability problems front and center. Careful effort now will resolve those issues and provide the assurance of knowing that everything required has been done.

"The last thing needed is a firefighter, family member or citizen John Q. Public with a health or safety problem caused by poor handling of this standard," says Chief Darlene Bailey of the Kaleden (B.C.) Fire Department. "The issue of liability then becomes a major concern, and you never know when Murphy, and his well-known law, just might be sitting across from you in court, waiting to hear your explanation."

Michael J. Haskett is a captain on the Kaleden (B.C.) Volunteer Fire Department and a full-time freelance writer. His officer duties include instruction in first responder/first aid and SCBA. He has a diverse background, from business owner and franchise developer to commercial pilot. Haskett can be reached at <mhaskett@vip.net>.

FACILITY SAFETY

Facility Construction and Design

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

Strategic Planning

Strategic planning is a true necessity when considering the design or redesign of new or existing facilities. The fire chief and staff must forecast the current and future needs of the organization. The fire department planning staff must ask themselves if the current design of the fire station will be able to accommodate additional personnel/apparatus in 5 to 7 years.

During the design phase, the fire 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 are location, response, use frequency, and special use equipment.

Location

Is the location of the 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 fire station is on a curve, at an intersection or offsetting intersection, or where drivers will have difficulty seeing an apparatus exit the fire station, warning devices and traffic signals need to be installed. Fire 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 the building house fire apparatus only? If the building houses fire apparatus only, what will occur when personnel perform standby time at the fire 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, which could include a shop/maintenance facility with cranes, lifts, a 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?

Strategic planning is critical to the design and use of a fire department facility. A new facility is a capital expense for a fire department and the community. Most communities develop a long-term community plan that can be a valuable asset for planning and designing fire department facilities. Poor initial planning will create additional expenses in the future.

Life Safety and Building Codes

In accordance with NFPA 1500, 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 preeminent preference. All fire department facilities should conform to NFPA 1, *Uniform 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 model plumbing, mechanical, and building codes.

The management of the fire 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

Depending on the type of fire department and the location of the jurisdiction, fire departments will be required to comply with Federal or State occupational safety and health regulations. These regulations are detailed in Title 29 Code of Federal Regulations (CFR), Part 1910, *Safety and Health Standard for General Industry*. Occupational Safety and Health Administration (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 fire stations and other fire department 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 fire department facilities. The Americans with Disabilities Act (ADA) Title II applies the ADA requirements to public entities such as fire stations, administrative offices, training centers, and other buildings. This legislation requires the U.S. Department of Justice (DOJ) to enforce guidelines for making

buildings and facilities accessible to and usable by individuals with disabilities.

The guidelines apply to new and existing buildings and facilities. Public entity buildings constructed after July 26, 1992, must meet the requirements of the Americans with Disabilities Act Accessibility Guidelines (ADAAG). Existing public buildings were required to be surveyed by July 26, 1992, to identify any noncompliance issues relating to the guidelines. All violations were to be corrected and in compliance by January 26, 1995. All alterations and additions to Title II buildings must comply with the ADA. Each fire 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 fire 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 firefighter health must be considered, as 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 or hepatitis B. 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 fire 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 a 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 rescrub, 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 firefighter 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 fire stations have sleeping and living facilities, the need for carbon monoxide detectors exists. Carbon monoxide is a by-product 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 fire station or other fire department facility. Carbon monoxide can be trapped in a fire 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 fire station or fire department 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

Fire department facilities are not exempt from regulations and standards that ensure a safe and healthy work environment. 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 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 disinfect personnel, protective clothing, and equipment properly.

Facility safety and health is just one part of the infection control process. The Health and Safety Officer (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 emptying the container on a regular basis.

State and local laws governing infection control and compliance are very specific and must be adhered to. Failure to comply with these regulations can cause an occupational exposure and create added liability for the fire department. Compliance may be a less expensive method.

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 the 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 fire stations were not designed initially to incorporate decontamination of infectious waste. This is an issue that has surfaced in the past 8 to 9 years. Fire stations that do not have a separate or available room for decontamination may have to add a room or erect a separate building. A fire department must develop a plan to address this issue.

Facility Areas

Each area of a fire station or fire department 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 and food preparation utensils and equipment.

Double sinks and a dishwasher should be provided to clean dishes and utensils properly. 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 fire 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.

Fire station floors usually have been 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 of 60 square feet (5.6 m²) floor space for each bed. This allows for rapid and easy access during alarms. Proper ventilation, heating, and cooling are essential to the health of personnel living in the fire station. Sleeping quarters should be separated from the rest of the facility, and protected by a 1-hour 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 block utility boxes or escapes;
- 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 fire station or fire department facility has the real potential for causing accidents and injuries to personnel. Due to the various types of equipment that can be used, personnel must be trained properly on the equipment before its use. 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 upon noise levels of the equipment. Ventilation is another concern that must be addressed, depending upon 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 is an often overlooked issue. Seventy-five percent of all office injuries are caused by an unsafe act (slips and falls) by the member.

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 fire department facilities should be equipped with portable fire extinguishers and should be in compliance with 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 fire 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 fire department facilities, though this practice is strongly encouraged. Local fire or building codes may be required by NFPA 101 depending upon the type and use of the fire department facility. The installation of a complete sprinkler system in a new fire 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 fire department facility. First, a sprinkler system has an impressive track record for the protection of property. The cost of building a fire 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, fire department members and citizens have a right to be protected properly from fire by a sprinkler system. Every member of the fire department clearly understands the importance and need for this life safety equipment to be installed in all buildings. Automatic sprinkler systems installed in fire department facilities add credibility to the fire 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 to inspect all facilities at least monthly to identify any potential hazards that may exist. The hazards must be corrected in a timely manner.

Maintenance for Fire Department Facilities

The fire department must establish or have an established system for maintaining all fire 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, fire department facilities are maintained by an agency other than the fire department. If this situation exists, the fire department must institute procedures that expedite requests for repairs, changes, or modifications that relate to occupational safety and health. The fire department ultimately is responsible for ensuring for safety and health of its facilities regardless of who provides the maintenance work. If the fire department must use another city or jurisdictional department or an outside agency, the fire 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 the requirements of NFPA 1500.

SUMMARY

There are several dynamic and changing issues in the fire service. The issues mentioned in this unit are not an all-inclusive list. The hazards and risks associated with highway incidents, weather extremes, and terrorism require specialized training and definitive SOP's. Though highway incidents occur on a consistent basis, thankfully, terrorism does not. Firefighters must be prepared to develop and implement mitigation strategies to combat the problems associated with these incidents. The HSO is a critical component to this process to ensure the safe outcome of an incident involving any one of these situations. The more training and preparation firefighters have, the more likely the incident will have a standard outcome.

Activity 5.1

Fire Station Safety and Health Assessment

Purpose

To develop a risk management plan for facility safety in your fire department based upon the requirements of NFPA 1500.

Directions

1. You will be assigned to a small group to identify facility safety issues based upon issues in your fire department.
2. Each group will be required to identify the risks or hazards associated with fire department facilities using issues from each student's department.
3. The group will prioritize the risks and develop a plan for addressing these risks, and then develop control measures for these risks or hazards.
4. Each group will be responsible for developing an action plan to determine what issues need to be changed immediately (short term) versus comprehensive (long term). This is based on safe working environment versus unsafe environment.
5. Each group will have 20 minutes to complete this assignment and 5 minutes to report its findings to the class.

Activity 5.1 (cont'd)

Worksheet

Location	Risks	Priority	Control Measures
Kitchen			
Living quarters			
Apparatus bay			
Decontamination/ Cleaning room			
Shop			
Fire station			

NOTE-TAKING GUIDE

Slide 5-1

**UNIT 5:
CURRENT ISSUES**

Slide 5-1

Slide 5-2

TERMINAL OBJECTIVE
At the conclusion of this unit, the students will be able to describe firefighter safety concerns relating to current issues in the fire service.

Slide 5-2

Slide 5-3

ENABLING OBJECTIVES
The students will:

- Describe the hazards present at highway/traffic incidents.
- Describe the importance of incident scene rehabilitation.
- Describe the firefighter safety concerns relating to incidents involving terrorism.

Slide 5-3

Slide 5-4

ENABLING OBJECTIVES (cont'd)

- Describe the components of the protective clothing selection, care, and maintenance (SCAM) program.
- Identify the risks associated with fire department facilities.


Slide 5-4

Slide 5-5

HIGHWAY OPERATIONS

Primary objectives

- Prevent injury to emergency workers
- Preserve life
- Protect property
- Restore traffic flow



Slide 5-5

Slide 5-6

VIDEO:

"Hampton Roads Highway Incident Management Plan"




Slide 5-6

Slide 5-7

HIGHWAY OPERATIONS
(cont'd)

Team effort

- Fire/Rescue
- Law enforcement
- Department of Transportation (DOT)
- Who is in charge of what?



Slide 5-7

Slide 5-8

HIGHWAY OPERATIONS
(cont'd)

Command

- Incident Command System (ICS)
- Operational mode
- Accountability

Slide 5-8

Slide 5-9

HIGHWAY OPERATIONS
(cont'd)

Command (cont'd)

- Unified Command
- Memorandums of Agreement (MOA) between agencies
- Mutual-aid agreements

Slide 5-9

Slide 5-10

ROLES AND RESPONSIBILITIES

Fire department

- Control/Extinguish fires
- Establish safe work zones
- Deploy warning devices
- Control/Mitigate hazardous materials
- Coordinate with law enforcement
- Assist emergency medical services (EMS)
- Extricate trapped victims
- Preserve scene

Slide 5-10

Slide 5-11

**ROLES AND RESPONSIBILITIES
(cont'd)**

- EMS
 - Evaluate patients
 - Treatment
 - Transport
- Law enforcement
 - Coordinate with fire for traffic control
 - Secure scene
 - Assist in identification of fatalities

Slide 5-11

Slide 5-12

**ROLES AND RESPONSIBILITIES
(cont'd)**

Department of Transportation (DOT)

- Coordinate with fire department for equipment use
- Provide resources/logistical support
- Establish message safety boards
- Assist with traffic control

Slide 5-12

Slide 5-13

ROLES AND RESPONSIBILITIES (cont'd)

Vehicle recovery personnel

- Coordinate with fire and police for vehicle removal
- Assist with heavy extrication

Slide 5-13

Slide 5-14

RESPONSE

Nonemergency

- Seatbelt/Restraint for all responses
- Follow all traffic laws and use normal speed
- Assess need for additional resources
- Establish safety work zones

Slide 5-14

Slide 5-15

RESPONSE (cont'd)

Emergency

- Wear personal protective equipment (PPE) and highly visible apparel-- American Society of Mechanical Engineers (ASME)
- Multiple units responding together travel in same direction single-file and close proximity
- Travel in left lane

Slide 5-15

Slide 5-16

RESPONSE (cont'd)

Emergency (cont'd)

- **Caution if using shoulder**
 - Road signs
 - Debris
 - Guard rails
 - Oversized/Stopped vehicles
 - Vehicle occupants out of their vehicles
- **Follow all traffic laws governing emergency vehicle response**

Slide 5-16

Slide 5-17

ONSCENE OPERATIONS

- **Scene safety**
- **Park apparatus at an angle**
- **Apparatus will serve as a barrier in the event of an incident**
- **Protection of the pump operator**

Slide 5-17

Slide 5-18

ONSCENE OPERATIONS (cont'd)

Exiting the apparatus

- **Watch traffic**
- **Communicate with all members of the company regarding safety**
- **PPE and reflective garments**

Slide 5-18

Slide 5-19

TRAFFIC CONTROL

- **First-arriving officer must conduct a risk analysis.**
- **Traffic cones placed by pump operator.**
- **Stopping distances/Scene protection based on posted speed limit.**

Slide 5-19

Slide 5-20

TRAFFIC CONTROL (cont'd)

- **Weather needs to be considered, which can increase stopping distances**
- **Coordinated with law enforcement**
- **Request additional resources early (front load the incident)**

Slide 5-20

Slide 5-21

PARKING VEHICLES

- **Four-point system**
- **Used when possible**
- **Designate a Staging Area for apparatus that will not be used**

Slide 5-21

Slide 5-22

PARKING VEHICLES (cont'd)

- Reduce number of emergency lights to amber, if possible
- Turn off headlights

Slide 5-22

Slide 5-23

VISIBILITY AT NIGHT

- Color recognition
- Glare recovery

Slide 5-23

Slide 5-24

VISIBILITY AT NIGHT (cont'd)

Methods for optimum scene lighting

- Warning lights off
- Headlights off
- Pump panel lights on
- Fog lights off
- Spotlights on and facing traffic cones
- Traffic directional boards operating

Slide 5-24

Slide 5-25

CLEARING TRAFFIC LANES

- One minute of stopped traffic = 3- to 4-minute delay
- Close only lanes that are necessary
- If safety is an issue, close all lanes necessary
- Coordinate with law enforcement

Slide 5-25

Slide 5-26

**INCIDENT
SCENE REHABILITATION**

Slide 5-26

Slide 5-27

**REHABILITATION PROGRAM
GOALS**

- Medical evaluation
- Medical treatment (if needed)
- Fluid replenishment

Slide 5-27

Slide 5-28

**REHABILITATION
PROGRAM GOALS (cont'd)**

- Food replenishment (long duration)
- Crew rotation
- Relief from weather extremes
 - Hot
 - Cold
 - Rain

Slide 5-28

Slide 5-29

**STANDARD OPERATING
PROCEDURES**

- Short-duration incidents
 - Fires
 - EMS incidents
- Long-duration incidents
 - Technical rescue
 - Hazardous materials incidents

Slide 5-29

Slide 5-30

COMPLIANCE

- Fire department physician
- NFPA requirements
 - NFPA 1500
 - NFPA 1561
 - NFPA 1584
- Industry standards

Slide 5-30

Slide 5-31

PREVENTING HEAT-RELATED INJURIES

- Move fatigued or unassigned members away from the hazardous area of the incident
- Remove PPE
- Ensure that personnel are out of direct sunlight

Slide 5-31

Slide 5-32

PREVENTING HEAT-RELATED INJURIES (cont'd)

- Ensure that there is adequate air movement over personnel, either naturally or mechanically
- Provide members with fluid replenishment, especially water
- Provide medical evaluation for personnel showing signs or symptoms of heat exhaustion or heat stroke

Slide 5-32

Slide 5-33

PREVENTING COLD-RELATED INJURIES

- Move fatigued or unassigned members away from the hazardous area of the incident
- Provide shelter from wind and temperature extremes

Slide 5-33

Slide 5-37

TEMPERATURE DANGER CATEGORIES

Injuries Associated with Heat Stress Index Conditions		
Heat Index, °F	Danger Category	Injury Threat
Below 60°	None	Little to no danger under normal circumstances
80° to 90°	Caution	Fatigue possible if exposure is prolonged and there is prolonged 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 and heat exhaustion likely and heat stroke possible if exposure is prolonged and there is physical activity
above 130°	Extreme Danger	Heat stroke is imminent

Slide 5-37

Slide 5-38

TERRORISM

Slide 5-38

Slide 5-39

TERRORISM

Definition: 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.

Slide 5-39

Slide 5-40

INCIDENTS

- Oregon--biological agent dispersed in salad bars
- Atlanta, GA--Olympics Plaza bombing
- Atlanta, GA--abortion clinic bombing
- Vail, CO--ski resort, incendiary (arson)
- Fairfax, VA--Central Intelligence Agency (CIA) armed attack

Slide 5-40

Slide 5-41

INCIDENTS (cont'd)

- New York City--first World Trade Center bombing, 1993
- Oklahoma City, OK--Federal building bombing
- New York City, Arlington, VA, Shanksville, PA--attacks using hijacked airplanes
- Boca Raton, FL--anthrax attacks
- New York City, Washington, DC--anthrax attacks via mail

Slide 5-41

Slide 5-42

SEPTEMBER 11, 2001

- World Trade Center--New York City
- Pentagon--Arlington, VA
- Reality of international terrorism in the United States



Slide 5-42

Slide 5-43

CATEGORIES OF TERRORISM

- Chemical incidents
- Biological incidents
- Incendiary incidents--arson
- Nuclear/Radiation incidents
- Explosive incidents

Slide 5-43

Slide 5-44

POTENTIAL RESPONDER INJURIES


<ul style="list-style-type: none"> • Improvised explosive devices • Secondary explosive devices • Firearms • Exposure to chemicals • Trapped in building collapse 	<ul style="list-style-type: none"> • Exposure to biological agents • Exposure to infectious diseases • Burns from incendiary fire • Injuries due to damaged building • Overexertion
--	--

Slide 5-44

Slide 5-45

UNITES STATES FIRE ADMINISTRATION

- *Emergency Response to Terrorism: Job Aid*
- Downloadable from USFA publications at <http://www.usfa.fema.gov>



Department of Homeland Security
Federal Emergency Management Agency

U.S. Fire Administration

Working for a Fire Safe America

Slide 5-45

Slide 5-46

**DETERMINE RISKS VERSUS
BENEFITS**

- Low gain/High risk--no
- Moderate gain/Low risk--go
- Low gain/Moderate risk--no
- High gain/Low risk--go

Slide 5-46

Slide 5-47

SAFETY OPERATIONS

- Reviewing, updating, and communicating escape routes regularly
- Providing relief/rotation for Safety Officers
- Establishing exposure and documentation procedures
- Notifying medical facilities of the situation and patient status
- Monitoring weather and its effect on the situation
- Monitoring time on scene

Slide 5-47

Slide 5-48

SAFETY OPERATIONS (cont'd)

- Reviewing Rapid Intervention Crew (RIC) operations
- Reviewing Staging locations and procedures
- Reviewing staffing and location of law enforcement
- Scene security
- Providing rehabilitation areas

Slide 5-48

Slide 5-49

**PERSONAL PROTECTIVE
EQUIPMENT--SELECTION,
CARE AND MAINTENANCE
(SCAM)**

Slide 5-49

Slide 5-50

NFPA 1851

- *Standard on Selection, Care, and Maintenance of Structural Fire Fighting Protective Ensembles*
- Adopted February 2001
- Intended for fire service to properly maintain PPE
 - Turnout gear
 - Helmets
 - Gloves
 - Footwear
 - Interface component

Slide 5-50

Slide 5-51

NFPA 1851 (cont'd)

- How to select PPE
- When and how to inspect turnout gear
- When and how to clean turnout gear
- How turnout gear shall be repaired
- How to store turnout gear
- Does not cover self-contained breathing apparatus (SCBA) or Personal Alert Safety System (PASS) devices

Slide 5-51

Slide 5-52

NFPA 1851 (cont'd)

Chapters

- Records
- Selection
- Inspection
- Cleaning and decontamination
- Repair
- Storage
- Retirement, disposal, and special-incident procedure

Slide 5-52

Slide 5-53

GRADING ENSEMBLES

Four categories

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



Slide 5-53

Slide 5-54

NFPA 1851

- Why follow NFPA 1851 steps?
 - Buy
 - Inspect
 - Clean
 - Fix
 - Store
 - Dispose
 - Record
- Risk management tool

Slide 5-54

Slide 5-55

**PERSONAL PROTECTIVE
EQUIPMENT CARE ISSUES**

Avoid unneeded damage

- Avoid long-term exposure to direct sunlight, like in the back of a pickup or a hook on the fire station wall
- Avoid exposure to chlorine bleach
 - Causes invisible damage
- Use colored bags to protect from florescent light when in storage

Slide 5-55

Slide 5-56

FACILITY SAFETY

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

Slide 5-56

Slide 5-57

FACILITY SAFETY (cont'd)

- Life safety and building codes
 - National Fire Protection Association (NFPA), Building Officials and Code Administrators International, Inc. (BOCA), (SCBB)
- Occupational Safety and Health Administration (OSHA)
- Americans with Disabilities Act (ADA)

Slide 5-57

Slide 5-58

FACILITY SAFETY (cont'd)

- **Health hazards**
 - State and local health regulations
- **Hygiene**
 - NFPA 1581
- **Diesel exhaust**

Slide 5-58

Slide 5-59

FACILITY SAFETY (cont'd)

- **Carbon monoxide and smoke detectors**
 - NFPA 1500
- **Infection control**
 - NFPA 1581
- **Decontamination areas**
 - NFPA 1581

Slide 5-59

Slide 5-60

FACILITY AREAS

- **Kitchen**
- **Floors and walkways**
- **Sleeping quarters**
- **Bathrooms**
- **Storage**
- **Shop/Maintenance areas**
- **Offices**

Slide 5-60

Slide 5-61

**FIRE PROTECTION
FEATURES**

- **Portable fire extinguishers**
 - **OSHA, NFPA 1500**
- **Smoke detectors**
 - **NFPA 1500**
- **Sprinkler systems**
 - **NFPA 1500**

Slide 5-61

Slide 5-62

FACILITY INSPECTIONS

- **Periodic and annual inspections**
 - **Monthly**
 - **Quarterly**
 - **Annually**
- **Maintenance**
 - **Routine**
 - **Preventive**
 - **Renovation**

Slide 5-62

Slide 5-63

SUMMARY

- **Highway/Traffic incidents**
 - **Risk management**
 - **SOP's**
 - **Training**

Slide 5-63

Slide 5-64

SUMMARY (cont'd)

- Incident scene rehabilitation
 - SOP's
 - Medical guidance
- Terrorism--high-risk, low-frequency incidents
 - Planning
 - ICS
 - Training

Slide 5-64

Slide 5-65

SUMMARY

- PPE SCAM
 - Firefighter safety
 - Internal customer service
 - Cost-benefit program
- Facility safety
 - New facilities
 - Existing facilities

Slide 5-65

Slide 5-66

Activity 5.1
Fire Station Safety and Health Assessment

Slide 5-66

UNIT 6: SYSTEMS CHANGE

TERMINAL OBJECTIVE

At the conclusion of this unit, the students will be able to develop continuous improvement programs, such as investigations and postincident analysis.

ENABLING OBJECTIVES

The students will:

- 1. Discuss the investigation process for incidents involving firefighter fatalities, firefighter injuries, fire department vehicle crashes, and health exposures.*
 - 2. Discuss the components of the postincident analysis process.*
-

SYSTEMS CHANGE

In order to effect change in an organization (e.g., fire department), the change has to occur throughout the organization from the top to the bottom. Though needed change may be recognized at different levels of the organization, the fire chief is the responsible party for implementing change.

Occupational safety and health always has been an issue that mandates change in the fire service. Change for an organization can come in a positive manner (e.g., compliant occupational safety and health program) or can come in a negative manner (e.g., firefighter fatality or serious debilitating injury). Discussed earlier in this course were the firefighter fatality and injury data. In the past 15 to 20 years, the fire service has experienced positive change in terms of reducing firefighter fatalities and injuries. The fire service has witnessed change through the standards-making process (e.g., National Fire Protection Association (NFPA) 1500, *Standard on Fire Department Occupational Safety and Health Program*, 29 Code of Federal Regulations (CFR) 1910.134), apparatus design (four-door cabs), and health maintenance programs (NFPA 1582, *Standard on Comprehensive Occupational Medical Program for Fire Departments*, International Association of Fire Fighters/International Association of Fire Chiefs (IAFF/IAFC) Wellness/Fitness).

When an organization recognizes that change must occur, this is a positive start. A plan must be established with a timeline that will ensure a positive outcome. This change process must be tied into the department's Risk Management Plan to ensure that change will occur and the process can be monitored.

Other methods that can be employed to ensure that positive change will happen are continuous improvement programs, including a comprehensive investigation process and postincident analysis.

WHY INVESTIGATE?

Chapter 4 of NFPA 1500 states that fire department is responsible for developing and implementing accident investigation procedures. 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 takes whatever corrective action is necessary 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 our Standard Operating Procedures (SOP's), developing other control measures to prevent the situation from recurring, or minimizing the negative effects of a recurrence.

An investigation by a response agency also may play a part in the defense of the agency against any civil or criminal claim made by a member of the public who feels that he or she was injured by an action or lack of action by the response agency. While others are sure to investigate the incident, the early gathering of facts and photographs of the incident scene will assist the response agency in determining the course of action that it should take if sued.

Accident investigation also may assist the Health and Safety Officer (HSO) in discovering trends that lead to accidents. A seemingly unrelated series of accidents may have one root cause. The HSO should be able to determine the cause of most accidents, and to recommend changes or enhancements that prevent the situation from recurring.

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 will be taking a proactive approach to correcting a potentially serious situation. This will enable the department to review a potentially harmful situation and take the necessary corrective action to hopefully prevent this situation from reoccurring.

WHO SHOULD INVESTIGATE?

In many agencies, the HSO will be the primary investigator of all accidents. In larger fire departments, where the response 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 involved directly.

The HSO may choose to be involved in any accident investigation, even those that are considered routine. In cases where the HSO or Incident Safety Officer (ISO) needs help with an investigation, law enforcement may be a valuable resource, since they have training in investigative techniques.

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. These are the most significant risks that we face, aside from those at the emergency scene.

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 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.

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 to have some other member of the agency available for response. In any case, the HSO should review all collision reports, 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 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.

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 good 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 in service, all 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.

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 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.

RESPONDER FATALITY

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 requirements that must be documented prior to any release of benefits. 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 so it is available if ever needed.

Firefighter fatalities and serious injuries are 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.

HEALTH EXPOSURES

The keys to ensuring compliance with a standard are the exposure control plan and the training of members. Though all of the components are critical to the health and welfare of the members, the written plan provides the necessary guidelines to ensure compliance.

Even if a fire department does not provide emergency medical services (EMS), members remain at risk for exposure when they respond with the EMS agency or if dealing with burn victims on the fireground. Because the Occupational Safety and Health Administration (OSHA) does not have direct authority over all States, one might question if a fire department needs to comply with the requirements of the bloodborne pathogens standard. Regardless of whether the department is located in an "OSHA" State, the standard carries moral, ethical, and liability implications. This is considered the "standard of care" and a department likely would be judged against this standard in the case of litigation.

The fire service is fortunate to have NFPA 1581, *Standard on Fire Department Infection Control Program*, as a resource for infection control procedures. NFPA 1581 requirements parallel the requirements of the OSHA Bloodborne Pathogens standard and provide specific criteria for an effective infection control program. The requirements affect both emergency and nonemergency situations. Another excellent source of information is the United States Fire Administration's (USFA) *Guide to Managing an Emergency Service Infection Control Program*. This guide is a 2001 rewrite of the initial *Guide to Developing and Managing and Emergency Services Infection Control Program* and now provides information on laws, regulations, and standards; components of an infection control program; vehicle, equipment, and facility considerations; and assessing effectiveness of the program. It also lists contacts for additional information.

When an exposure occurs several procedures must occur. 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. Prophylaxis for an exposure differs for each type of communicable disease. Time is an issue in providing prophylaxis and the department must have a system in place to address immediate care for the member.

This system involves the Infection Control Officer, HSO, fire department physician, fire department infection control physician, treating medical facility, risk management division, and others as needed. The USFA *Guide to Managing an Emergency Service Infection Control Program* provides guidance for developing procedures. The fire department physician and fire department infection control physician are key players in developing and implementing this process.

WHAT HAPPENS AFTER THE INVESTIGATION?

A copy of every accident 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 member's confidential medical file.

The results and recommendations of every investigation should be passed on to the member of the organization who is responsible for that operation. For instance, recommendations concerning changes to the design of fire 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.

DATA AND TREND ANALYSIS

The HSO should review data and reports in summary form regularly to determine if any underlying trends emerge. Sometimes the only way to identify a trend is to look at all data in one place at one time. Looking at reports throughout the month or throughout the year in ones and twos will not allow 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 equipped and motivated to help any member of the emergency services 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.

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.

POSTINCIDENT EVALUATION AND ANALYSIS

Nonemergency Evaluation and Analysis

Accidents and injuries occur routinely under nonemergency operations or conditions. The HSO has the responsibility to manage and control these incidents. This may involve department personnel and civilian members of the department. Policy should dictate notification of the HSO. A response by the HSO will depend on the nature and severity of the incident.

Emergency Evaluation and Analysis

Accidents and injuries that occur during emergency operations may be investigated by the Company Officer (CO), the employee's supervisor, or the ISO. The HSO's and/or the ISO's involvement will depend on the nature and severity of the incident.

Documentation Process

A standard organizational form or department reporting procedure must be used when the HSO and ISO conduct an investigation. This report ensures 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.

INTERFACING WITH THE INCIDENT SAFETY OFFICER

As program manager of the safety and health program, the HSO must assist the ISO as needed during investigation or analysis of an incident.

Departmental Procedures

The investigation report may include recommendations for revisions to, or development of, procedures pertaining to department operations. It may indicate that 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.

Training and Education

The recommendations may indicate deficiencies or inadequacies in department operations. If they relate to training and education needs, the HSO must confront these issues.

Health and Safety Officer's Responsibility

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 forgotten quickly. The HSO can make a positive impact under these circumstances.

Recordkeeping

The HSO is responsible for information relating to safety and health. This includes reviewing accident and injury reports and providing a monthly/annual analysis. Trends or patterns relating to accidents, injuries, or recurrence of safety and health issues need to be tracked and identified by the HSO.

Risk Management

The HSO is the department's risk manager. Most departments spend between 5 and 15 percent of their time at emergency incidents. The other 85 to 95 percent of the time is spent in nonemergency situations. The HSO is responsible for managing all situations, including vehicle accidents, accidents or injuries at the station or department offices, or other safety and health issues that develop.

During emergency incidents, the HSO may be involved or may use the ISO or the Incident Commander (IC) as an on-scene risk manager. The intent is to ensure that the process is covered at each emergency incident.

Investigations

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.

Emergency investigations are the responsibility of the ISO. The nature and severity of the situation will dictate the involvement of the HSO. If a fatality or serious injury occurs, the HSO becomes the primary investigator

Training and Education

Based on the investigation reports and analysis, the HSO may determine that a training need exists. This could include training and education in both emergency and nonemergency situations. The HSO may conduct the training, or have the training conducted by other department staff members.

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.

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., 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 problem is identified, the source may be traced to training and education, as well as to procedure development.

Facilities issues may evolve from new laws, standards, and regulations (e.g., OSHA Bloodborne Pathogens Regulation, Americans with Disabilities Act) or from poor design or construction (e.g., sprinkler system malfunctions). This may be an ongoing risk management process to ensure facilities are upgraded to meet current regulations.

The Occupational Safety and Health Committee's Responsibilities

If the department does not have a 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.

With an HSO directing the department's safety and health program, the Occupational Safety and Health Committee still plays a vital role and is a valuable resource to the HSO. The Occupational Safety and Health Committee can assist with training, development, or revision of procedures, rewriting modifications, or any other situation that may require its assistance to complete a project and improve safety and health.

SUMMARY

The investigation of accidents is one of the most important duties of the HSO. Problems identified during this process will enhance the safety of all responders.

If an accident or near miss occurs, and no corrective action is taken to correct the conditions that contributed to the incident, it will happen again--the only unknown factor is when.

NOTE-TAKING GUIDE

Slide 6-1

**UNIT 6:
SYSTEMS CHANGE**

Slide 6-1

Slide 6-2

TERMINAL OBJECTIVE

At the conclusion of this unit, the students will be able to develop continuous improvement programs, such as investigations and postincident analysis.

Slide 6-2

Slide 6-3

ENABLING OBJECTIVES

The students will:


- **Discuss the investigation process for incidents involving firefighter fatalities, firefighter injuries, fire department vehicle crashes, and health exposures.**
- **Discuss the components of the postincident analysis process.**

Slide 6-3

Slide 6-4

SYSTEMS CHANGE

- Philosophical change
- Risk Management Plan



Slide 6-4

Slide 6-5

WHY INVESTIGATE?

- Basis for revisions to the department's Standard Operating Procedures (SOP's) to prevent similar situations in the future
- Establish the facts for possible legal action
- Requirement of National Fire Protection Association (NFPA) Standards

Slide 6-5

Slide 6-6

WHY INVESTIGATE? (cont'd)

- Can be used as a basis for further training and for sharing an individual's experience with other responders to inform them of a hazard
- To identify trends

Slide 6-6

Slide 6-7

WHAT SHOULD BE INVESTIGATED?

- Vehicle collisions (accidents)
- Responder injuries and fatalities
- Near misses (accidents that almost happened; they may not be near misses next time)

Slide 6-7

Slide 6-8

WHAT SHOULD BE INVESTIGATED? (cont'd)

- Exposure to communicable diseases
- Accidents involving failure of a piece of equipment, whether or not an injury, exposure, or death resulted
- Incidents involving fire department facilities

Slide 6-8

Slide 6-9

WHO SHOULD INVESTIGATE?

- | | |
|--|--|
| <ul style="list-style-type: none"> • Situation dictates appropriate response: <ul style="list-style-type: none"> – Fatality – Occupational injury – Occupational illness – Health exposure • SOP defines criteria | <ul style="list-style-type: none"> • Investigation team <ul style="list-style-type: none"> – Immediate supervisor – Health and Safety Officer (HSO) – Incident Safety Officer (ISO) – Infection Control Officer – Law enforcement |
|--|--|

Slide 6-9

Slide 6-10

VEHICLE CRASHES

- Minor fender benders or mirror removals with no injury to responders or civilians may not involve the HSO.
- The HSO should review collision reports that were prepared by others.
- In smaller agencies or in agencies where it is required by SOP, the HSO may be required to respond.

Slide 6-10

Slide 6-11

VEHICLE CRASHES (cont'd)

- Definitive crash investigation procedures
- HSO may be certified in vehicle crash investigation
- Involvement of law enforcement

Slide 6-11

Slide 6-12

VEHICLE CRASHES (cont'd)

- Policy determines lead investigation agency
- Proper documentation of incident

Slide 6-12

Slide 6-13

VEHICLE CRASHES (cont'd)

- Any vehicle involved in a vehicle accident must be inspected prior to being placed back in service.
- Any component failure or suspected failure involving a crash mandates impoundment of the vehicle.
- Certified mechanic must be involved.

Slide 6-13

Slide 6-14

RESPONDER INJURIES

- Serious injury requires taking care of member and family.
- Involvement of immediate supervisor and HSO.

Slide 6-14

Slide 6-15

**RESPONDER INJURIES
(cont'd)**

- Any equipment failure must be impounded.
- Proper documentation.
- Involvement of ISO.

Slide 6-15

Slide 6-16

RESPONDER FATALITY

- **Stressful event**
 - Member's family
 - Fire department family
- **Public Safety Officer's Benefits (PSOB) program mandates**

Slide 6-16

Slide 6-17

RESPONDER FATALITY (cont'd)

- **SOP's in place to address all components of this process**
- **Investigation process**
 - Internal investigation
 - External investigation

Slide 6-17

Slide 6-18

VIDEO:

**"Accident and Injury
Investigation Procedures"**



Slide 6-18

Slide 6-19

HEALTH EXPOSURES

- Member documents incident
- Information reviewed by:
 - HSO
 - Infection Control Officer
- Prophylaxis as needed
- Information to member's medical file

Slide 6-19

Slide 6-20

AFTER THE INVESTIGATION

- A copy of the report should be made part of the agency's permanent file.
- Health records must comply with 29 CFR 1910.20.
- The results and/or recommendations of the investigation should be considered for SOP development.
- Copies of the report should be provided to the department.

Slide 6-20

Slide 6-21

AFTER THE INVESTIGATION (cont'd)

- Discipline not involved with safety.
- HSO involved with the training and education issues.
- Information is the key to minimize rumors.
- Presentation of the facts.

Slide 6-21

Slide 6-22

**DATA AND TREND
ANALYSIS**

Slide 6-22

Slide 6-23

**DATA AND TREND ANALYSIS
(cont'd)**

- HSO prepares an annual report.
 - Accidents.
 - Injuries.
 - Occupational illnesses.
 - Health exposures.
- Trends analysis.
- Comparison with national statistics.

Slide 6-23

Slide 6-24

**Activity 6.1
Accident Investigations**

Slide 6-24

Slide 6-25

**POSTINCIDENT
EVALUATION AND
ANALYSIS**

Slide 6-25

Slide 6-26

**POSTINCIDENT EVALUATION
AND ANALYSIS (cont'd)**

Nonemergency

- Accidents and injuries occur routinely in nonemergency operations.
- The Company Officer (CO) or immediate supervisor may initiate the investigation.
- The HSO's involvement will be based on the nature and severity of the incident.

Slide 6-26

Slide 6-27

**POSTINCIDENT EVALUATION
AND ANALYSIS (cont'd)**

Emergency

- Accidents and injuries at emergency scenes may be investigated by CO's, an immediate supervisor, and/or the ISO.
- The HSO and/or the ISO will be involved based on the nature and severity of the incident.

Slide 6-27

Slide 6-28

**POSTINCIDENT EVALUATION
AND ANALYSIS (cont'd)**

- Written documentation
- Standardized format
- Policy dictates formal process
- Incident Commander (IC) completes the process
- Involves ISO and HSO

Slide 6-28

Slide 6-29

**INTERFACING WITH THE
INCIDENT SAFETY OFFICER**

Slide 6-29

Slide 6-30

**INTERFACING WITH THE
INCIDENT SAFETY OFFICER
(cont'd)**

- HSO will assist the ISO as needed.
- HSO will assist with witness statements.
- HSO will ensure the investigation report is complete.

Slide 6-30

Slide 6-31

**INTERFACING WITH THE INCIDENT
SAFETY OFFICER (cont'd)**

- Investigation report will provide recommendations for change.
 - Revision of current SOP's.
 - Development of new SOP's.
 - Deficiencies in fire department operations.
 - HSO will be involved in training and education process.

Slide 6-31

Slide 6-32

SUMMARY

- Accident investigation is important to prevent the recurrence of accidents in the future.
- The department's HSO must ensure procedures are in place for investigation of firefighter injury, occupational illness, and possible health exposures.

Slide 6-32

Slide 6-33

SUMMARY (cont'd)

If your department has experienced an accident or a near miss and nothing has been done to prevent the situation from recurring, your department will experience the accident again at some time in the future.

Slide 6-33

UNIT 7: PROCESS APPLICATION

TERMINAL OBJECTIVE

The students will be able to identify the major components of a fire department occupational safety and health program.

ENABLING OBJECTIVES

The students will:

- 1. Discuss the philosophy of this course.*
- 2. Discuss why it is important for all members to understand this philosophy.*

SUMMARY/CONCLUSION

The goal of this course is to ensure that the Health and Safety Officer (HSO) "weaves safety into the current fabric of the organization." The subject matter covered in this course will provide the student with a basic foundation to develop a fire department occupational safety and health program.

One of the key components in developing an occupational safety and health program is to develop a standard level of safety. 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 this process. We use a variety of control measures to ensure the safety and health of our members. These control measures include, but are not limited to, training, protective clothing and equipment, the Incident Command System (ICS), personnel accountability, and Standard Operating Procedures (SOP's).

The development of a Risk Management Plan should be started as soon as possible. This process will drive the department's occupational safety and health program. This will be an arduous task, but one that must be completed.

The fire chief has responsibility for the implementation and operation of the department's Risk Management Plan. The department's HSO has the responsibility for managing the Risk Management Plan and revising it annually.

All members of the department have responsibility for ensuring their health and safety based upon the requirements of the Risk Management Plan and the department's occupational safety and health program.

In order to develop and implement the occupational safety and health program, the HSO will have to use numerous resources and materials, both internally and externally. The department's Occupational Safety and Health Committee is a viable resource to use from the beginning. National Fire Protection Association (NFPA) 1500, *Standard on Fire Department Occupational Safety and Health Program* will serve as the guide for implementation and management of this process.

Safety is a component of risk management, not vice versa. Most of the emphasis placed on risk management from a fire service perspective is from a safety approach. The safety component affects other risk management components such as liability and the financial aspect. An aggressive, proactive occupational safety and health program will reduce

accidents, injuries, occupational illnesses, and health exposures, which reduce the department's liability claims and payments and also have a positive effect on the financial well-being of the organization.

Neither of these tasks can be completed quickly. Moreover, the department will need to experience a systems change with the development and implementation of the Risk Management Plan and the occupational safety and health program.

The fire chief takes the lead to ensure that a risk management program is developed and implemented in his/her department. The HSO is delegated the responsibility to ensure that this program is managed effectively and has a positive impact on the fire department, its operations, and its members. Though there are several key players in this process, all members of the fire department have to "buy into" the concept and philosophy of risk management.

To ensure that the systems approach is effective for the fire department, a training and education program must take place. All members have to understand the importance and significance of incorporating risk management into all aspects of fire department operations. There are several components that can reinforce and strengthen the risk management program. These are components that involve the members of the department: occupational safety and health program and the Occupational Safety and Health Committee. This allows the fire department to ensure success of the risk management program through the work of the HSO plus officers and personnel within the department. The HSO is the focal point of this program, but it will be not be successful without the cooperation, support, and compliance of all members. Regardless of the size of a fire department, all members have to understand and support this systems approach.

The major components of this course include the following:

- firefighter fatalities and injuries;
- risk management;
- codes, standards, and regulations;
- health maintenance;
- current issues; and
- systems change.

NOTE-TAKING GUIDE

Slide 7-1

**UNIT 7:
PROCESS APPLICATION**

Slide 7-1

Slide 7-2

TERMINAL OBJECTIVE

The students will be able to identify the major components of a fire department occupational safety and health program.

Slide 7-2

Slide 7-3

ENABLING OBJECTIVES

The students will:

- **Discuss the philosophy of this course.**
- **Discuss why it is important for all members to understand this philosophy.**

Slide 7-3

Slide 7-4

COURSE PHILOSOPHY

- "Weave safety into the fabric of the organization"
- Systems approach
 - Dynamic
 - Comprehensive

Slide 7-4

Slide 7-5

DEPARTMENT PHILOSOPHY

- Develop a standard level of safety throughout the organization.
- Each member understands his/her role in the process.
- Effects positive change in the attitudes, behavior, and culture of the organization.
- Take care of the internal customers.

Slide 7-5

Slide 7-6

SUMMARY/CONCLUSION

- Firefighter fatalities and injuries
- Risk management
- Codes, standards, and regulations

Slide 7-6

Slide 7-7

**SUMMARY/CONCLUSION
(cont'd)**

- **Health maintenance**
- **Current issues**
- **Systems change**

Slide 7-7

APPENDIX A

SOURCES OF ADDITIONAL INFORMATION

United States Fire Administration
16825 South Seton Avenue
Emmitsburg, MD 21727
(800) 238-3358
<http://www.usfa.fema.gov>

National Fire Academy
16825 South Seton Avenue
Emmitsburg, MD 21727
(800) 238-3358
<http://www.usfa.fema.gov/dhtml/fire-service/nfa.cfm>

Learning Resource Center
National Emergency Training Center
16825 South Seton Avenue
Emmitsburg, MD 21727
(800) 638-1821
<http://www.lrc.fema.gov>

Occupational Safety and Health Administration
Publication Information (202) 219-9631
Public Information (202) 219-8151
or contact your local office
<http://www.osha.gov>

Centers for Disease Control and Prevention
1600 Clifton Road, N.E.
Atlanta, GA 30333
(404) 639-3311
<http://www.cdc.gov>

National Institute for Occupational Safety and Health
Appalachian Laboratory for Occupational Safety and Health
944 Chestnut Ridge Road
Morgantown, WV 36505
(800) 356-4674
<http://www.cdc.gov/niosh/homepage.html>

U.S. Government Printing Office
Superintendent of Documents
Washington, DC 20402
(202) 512-1800
<http://www.access.gpo.gov>

National Fire Protection Association
1 Batterymarch Park
P.O. Box 9101
Quincy, MA 02269
(617) 770-3000
<http://www.nfpa.org>

International Association of Fire Fighters
Occupational Safety and Health Department
1750 New York Avenue, N.W.
Washington, DC 20006-5395
(202) 737-8484
<http://www.iaff.org>

International Association of Fire Chiefs
Health and Safety Committee
4025 Fair Ridge Drive
Fairfax, VA 22033
<http://www.iafc.org>

National Safety Council
1121 Spring Lake Drive
Itasca, IL 60143-3201
(630) 285-1121
<http://www.nsc.org>

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 (1998)
NFPA 472	Standard for Professional Competence of Responders to Hazardous Materials Incidents (1997)
NFPA 1001	Standard for Fire Fighter Professional Qualifications (1997)
NFPA 1002	Standard for Fire Apparatus Driver/Operator Professional Qualifications (1998)
NFPA 1021	Standard for Fire Officer Professional Qualifications (1997)
NFPA 1201	Standard for Developing Fire Protection Services for the Public (2000)
NFPA 1221	Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems (1999)
NFPA 1250	Recommended Practice in Emergency Service Organization Risk Management (2000)
NFPA 1403	Standard on Live Fire Training Evolutions (2002)
NFPA 1404	Standard for Fire Service Respiratory Protection Training (2002)
NFPA 1500	Standard on Fire Department Occupational Safety and Health Program (2002)
NFPA 1521	Standard for Fire Department Safety Officer (1997)
NFPA 1561	Standard on Emergency Services Incident Management System (2002)
NFPA 1581	Standard on Fire Department Infection Control Program (2002)
NFPA 1582	Standard on Comprehensive Occupational Medical Program for Fire Departments (2003)
NFPA 1583	Standard on Health Related Fitness Programs for Fire Fighters (2000)
NFPA 1584	Recommended Practice on the Rehabilitation for Members Operating at Incident Scene Operations and Training Exercises (2003)
NFPA 1851	Standard on Selection, Care, and Maintenance of Structural Fire Fighting Protective Ensembles (2001)
NFPA 1901	Standard for Automotive Fire Apparatus (1999)
NFPA 1911	Standard for Service Tests of Fire Pump Systems on Fire Apparatus (1997)
NFPA 1912	Standard for Fire Apparatus Refurbishing (2001)
NFPA 1914	Standard for Testing Fire Department Aerial Devices (1997)
NFPA 1915	Standard for Fire Apparatus Preventive Maintenance Program (2000)
NFPA 1931	Standard on Design of and Design Verification Tests for Fire Department Ground Ladders (1999)
NFPA 1932	Standard on Use, Maintenance and Service Testing of Fire Department Ground Ladders (1999)
NFPA 1936	Standard on Powered Rescue Tool Systems (1999)
NFPA 1961	Standard for Fire Hose (2002)

NFPA 1962	Standard for the Inspection, Care and Use of Fire Hose, Couplings and Nozzles; and the Service Testing of Fire Hose
NFPA 1971	Standard on Protective Ensemble for Structural Fire Fighting (2000)
NFPA 1975	Standard on Station/Work Uniforms for Fire and Emergency Services (1999)
NFPA 1976	Standard on Protective Ensemble for Proximity Fire Fighting (2000)
NFPA 1977	Standard on Protective Clothing and Equipment for Wildland Fire Fighting (1998)
NFPA 1981	Standard on Open-Circuit Self-Contained Breathing Apparatus for Fire and Emergency Services (1997)
NFPA 1982	Standard on Personal Alert Safety Systems (PASS) (1998)
NFPA 1983	Standard on Fire Service Life Safety Rope and System Components (2001)
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 Chemical/Biological Terrorism Incidents (2001)
NFPA 1999	Standard on Protective Clothing for Emergency Medical Operations (1997)
Department of Labor, Occupational Safety and Health Administration	
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
American National Standards Institute (ANSI)	
ANSI/CGA G7.1	Commodity Specifications for Air (1989)
ANSI/Z87.1	Practice for Occupational and Educational Eye and Face Protection (1989)

APPENDIX C

EVALUATION OF YOUR OWN DEPARTMENT'S INCIDENT SAFETY OFFICER PROGRAM

Evaluation of Your Own Department's Incident Safety Officer Program

Incident Safety Program	YES	NO	COMMENTS
My department has a written Incident Command System (ICS) that complies with NFPA 1561.			
My department uses an ICS that complies with NFPA 1561 at all incidents.			
My department has developed a Response Matrix (Plan) for the Incident Safety Officer (ISO) OR			
My department has a Standard Operating Procedure (SOP) for the appointment of an ISO.			
My department uses an Operational Risk Management Plan.			
My department has an SOP for the establishment of an Incident Scene Rehabilitation Program.			
My department has an SOP that defines the ISO duties and responsibilities per NFPA 1521.			
My department uses a Personnel Accountability System at all incidents.			
The Incident Commander (IC) issues the ISO an Incident Action Plan (IAP) as needed.			
The ISO provides the IC with a risk assessment of incident scene operations.			

Incident Safety Program	YES	NO	COMMENTS
The ISO evaluates traffic hazards and apparatus placement, and takes appropriate actions to mitigate hazards.			
The ISO monitors radio communications.			
The ISO advises the IC of the need for Assistant Incident Safety Officers.			
The ISO evaluates the hazards associated with the landing zone and interface with helicopters.			
The ISO evaluates smoke and fire conditions during fire-fighting operations.			
Incidents involving EMS operations meet the requirements of NFPA 1581.			
The ISO meets the requirements of NFPA 1500/NFPA 1521 for Special Operations.			
My department has a SOP in place to ensure that the ISO investigates accidents, injuries, and exposures associated with emergency operations.			
The ISO is involved in the Post-Incident Analysis (PIA) process.			