U.S. Fire Administration
Working for a fire-safe America

Risk Management Practices in the Fire Service

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FEMA

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Mission Statement

We provide national leadership to foster a solid foundation for our fire and emergency services stakeholders in prevention, preparedness and response.

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Preface

This report was developed through a partnership between the U.S. Fire Administration (USFA) and the International Fire Service Training Association (IFSTA) at Oklahoma State University (OSU). The IFSTA and its partner OSU Fire Protection Publications have been major publishers of fire service training materials since 1934. Through IFSTAs affiliation with the OSU College of Engineering, Architecture and Technology, it also conducts a variety of funded, technical research on fire service, fire prevention, and life safety issues. They have published numerous previous reports for the USFA. The extensive information provided within this report would not have been possible without the dedication and efforts of the following people assigned to this project:

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Risk Management Practices in the Fire Service

Chapter 1: Overview

This chapter provides a basic understanding of the risk management vocabulary and presents the operational assumptions and concepts that form the foundation of a risk management philosophy. This chapter helps prepare fire service executive staff, Incident Commanders (ICs) and other emergency responders in the following ways:

❯ Defining risk and risk management.
❯ Describing the risk management mission.
❯ Providing examples of operational risk management considerations.

This chapter also addresses the following portions of the National Fallen Firefighters Foundation's (NFFF's) 16 Firefighter Life Safety Initiatives (FLSIs):

❯ Initiative 3: Focus greater attention on the integration of risk management with incident management at all levels, including strategic, tactical and planning responsibilities.

❯ Initiative 4: All firefighters must be empowered to stop unsafe practices.

❯ Initiative 14: Public education must receive more resources and be championed as a critical fire and life safety program.

❯ Initiative 15: Advocacy must be strengthened for the enforcement of codes and the installation of home fire sprinklers.

Defining risk

To discuss risk management, we must first define what we mean by "risk." Unfortunately, the term risk has come to be used interchangeably in widely disparate settings. As a result, its meaning can be blurred in the minds of many.

Dictionaries define risk as both a noun and a verb:

❯ (noun) The possibility of meeting danger or suffering harm or loss, or exposure to harm or loss.
❯ (noun) A person or thing insured or representing a source of risk.
❯ (verb) To expose to the chance of injury or loss.

Determining factors

Three interrelated determining factors are inherent in all the above definitions:

❯ The probability that an undesired event might occur.
❯ A harmful or undesirable consequence.
❯ The severity of the harm that might result.

Describing risk

The probability of an occurrence can be described in subjective terms, such as rare and high, or in numerical terms, such as one in a million, one in three, and 20 percent.

In the same way, harmful consequences are often expressed in descriptive terms like death, incapacitation, injury, disaster, and destruction. They may also be described in

more concrete terms, such as "loss of a $1.5 million facility" or "the combined costs of medical payments, compensation, pension benefits, and lost productivity" (in the event of a worker's injury).

Probability and consequence can be combined and expressed mathematically as the product of loss and probability. An insurance company, for example, might describe a facility as a $10 million risk with a 2 percent probability of loss. A financial analyst might calculate a $10 million investment that has a 2 percent probability of loss as a $200,000 risk.

What is risk?

The probability of risk

The probability of risk is two-pronged. It relates not only to the risk of something undesirable happening, but also to the probable outcome as rated on a scale of negative consequences. For example, based on statistical calculations, we can predict the number of traffic accidents likely to occur per million miles driven. We can also predict the number of injuries and fatalities that will come about as a result. However, such a statistics-based approach will not tell us as individuals where or when we might be involved in an accident ourselves. Those predictive statistics certainly cannot tell us if our next accident will be a fender bender in a shopping center parking lot on a sunny afternoon, or a multivehicle pileup on a dark two-lane road on a stormy night.

Assessing risk

The integration of probability and consequence helps us plan our lives and guides many of the routine personal and professional decisions we make every day. Out of habit, we often apply the term risk to virtually any type or degree of undesirable consequences or negative outcomes — from a minor inconvenience to a major disaster. For instance, we might talk about the risk of having to share a 60 second elevator ride with an undesirable companion, or we might talk about the risk of an earthquake devastating a region of the United States.

Each situation carries with it a probability of occurrence and a potential degree of harm that might result. When we subjectively weigh a risk in terms of the undesirable consequence, we might place the outcome anywhere on a scale of undesirability. In the examples above, we might measure the negative outcome in lives lost and property damage in the millions, or simply by wishing we had waited for the next elevator.

Types of risk

Relative risk

We judge the consequences of specific unpleasant events on a broad scale of relative undesirability. For example, a heart attack can lead to hospitalization, therapy and a long period of recovery. Or it can be fatal. Both potential outcomes are undesirable. Clearly, though, recovery is the better alternative. Often, a person who has recovered from a heart attack considers the probability and potential consequences of having another and attempts to mitigate that risk by changing exercise patterns, eating habits, and other lifestyle choices.

Photo courtesy of Chris Mickal, New Orleans (LA) Fire Department Photo Unit.

Insurance risk

An insurance company refers to the item, object or person insured as the risk. When we buy fire insurance, we make value judgments about how much we are willing to pay to be compensated for a loss if our property is damaged or destroyed by fire **(see Figure 1.1).** When an insurance company sells us that policy, it is making a value judgment about two aspects of probability:

❯ The probability that a fire will occur.
❯ The probable extent of the loss that will result.

Probability, premiums and profits

To determine a premium, an insurance company evaluates the probability of a loss occurring and the potential size of that loss. When it establishes the rate profit for a fire insurance policy, a company takes into account many of the property's characteristics, such as:

❯ The type of structure.
❯ Size.
❯ Value of contents.
❯ On-site activities.
❯ Built-in fire protection systems.
❯ Available fire department resources.

Insurers work those factors into a prediction that considers the loss history of similar properties, the level of public fire protection, and other influences (such as local climate).

The rate is ultimately based on the insurer's loss experience with similar risks, as well as the probability and potential scope of loss for the insured property — over time. If predictions are not accurate for a specific building, the insurer should still be profitable if its predictions are generally accurate across a large number of insured risks.

Three levels of risk management

In this section, we will examine the principles and practices of risk management as they apply on three levels:

1. The community as a whole.
2. The emergency response organization.
3. Emergency response operations.

According to the National Fire Protection Association (NFPA) 1250, *Recommended Practice in Fire and Emergency Service Organization Risk Management,* the term "risk management" refers to the process of planning, organizing, directing and controlling the resources and activities of an organization in order to minimize detrimental effects on that organization. Risk management comprises the entire process of identification and evaluation of risks, as well as the identification, selection and implementation of control measures that might alter risk. Those control measures, defined in **Table 1.1,** can be categorized in the following ways:

❯ Administrative.
❯ Engineering.
❯ Personal protection.

Table 1.1 — Risk management control measures		
These controls …	**Consist of …**	**And are intended to …**
Administrative	Guidelines, policies and procedures established to limit losses. Examples: ❯ Standard operating procedures. ❯ Training requirements. ❯ Safe work practices. ❯ Regulations and standards.	Make the task safe for the worker.
Engineering	Engineered systems that remove or limit hazards. Examples: ❯ Apparatus design. ❯ Mechanical ventilation. ❯ Lock-out and tag-out of electrical hazards.	Make the task safe for the worker.
Personal protection	Equipment, clothing and devices designed to protect the worker. Examples: ❯ Helmets. ❯ Gloves. ❯ Self-contained breathing apparatus (SCBA). ❯ Tools.	Make the worker safe from the hazards.

Risk management in the community

By having trained personnel, as well as specialized equipment on hand, emergency responders exemplify a community's response to risk. In fact, the basic mission of the fire, Emergency Medical Services (EMS), and rescue services is intimately related to the control of risk throughout a community. Fire departments play a critical role in defending their communities against fires and other situations that threaten lives and property.

Although most public fire departments focus on the control of fires in individual properties and the rescue of endangered occupants, the fire suppression role of the fire department is still based on the need to protect the community's property and population. In that respect, the fire department is part of the community's fire risk management program. It exists to limit the probable loss when a fire occurs.

Delivering fire control services to the community

A community expresses its assessment of overall fire risk through the control-service resources it is willing to commit to its fire department. If the fire department is unable to perform its fire control mission, the community's fire risk balance could be compromised. The fire chief is responsible for the following:

❯ Managing the community's fire risk.
❯ Providing a set of services that are part of the risk management system (the service delivery mission).
❯ Ensuring the department can perform its mission at all times.

Risk management related missions

In addition to fire control units, most of the other services within fire departments and other emergency response organizations also conduct activities directly related to community risk management.

EMS respond to urgent situations that are related to the health and welfare of the community's citizens **(see Figure 1.2).** Emergency management services protect the community from the effects of man-made and natural disasters. Rescue teams safely remove citizens from dangerous predicaments, avoiding the risk of injury or death that untrained, unprepared citizens might face if they tried to perform that mission. Hazardous materials response teams protect the population and the environment from the effects of uncontrolled releases of hazardous materials. The common thread among the missions of all those teams is the community's need for protection from potentially harmful or undesirable events.

Historical note:

Public fire departments were organized primarily to defend communities against the risk of conflagrations. Conflagrations grow from small fires that are not controlled in their early stages until they reach a size where they cannot be controlled. Before modern concepts of fire protection were developed, conflagrations often devastated cities and towns.

Over the years, our increasing ability to limit the size of fires has almost, but not entirely, eliminated the occurrence of urban conflagration. Today, the wildland urban interface continues to challenge emergency responders with a version of conflagration.

Figure 1.2 — Fire departments provide emergency medical services in a variety of manners.

Photo courtesy of Mike Wieder, Stillwater, OK.

Such teams play significant roles in reducing a community's vulnerability to one or more types of harm. Just the same, emergency response is typically only one dimension of their total mission; however, the need for today's fire service needs to be multifaceted to support the needs of the local communities.

Risk management related activities

Key activities that support risk management principles and practices include fire prevention, code enforcement, public education, and other efforts that make citizens more aware of how to do the following:

❯ Recognize potentially dangerous situations.
❯ Prevent risks that cause emergencies.
❯ Respond effectively to an emergency.

Communities benefit from educational and motivational programs, such as:

❯ Hazard recognition, avoidance and elimination.
❯ Standards that require automatic sprinkler systems, fire-resistive construction and fire alarm installation.
❯ Inspection and code compliance enforcement.

Taken together, all these activities reduce a community's vulnerability and are an integral part of a community's fire risk management system.

Organizational risk management

The responsibility of a manager to safeguard the assets of their organization is just as applicable to an emergency response agency as to any business or family. Although their mission is to manage community risk, fire departments and other emergency service organizations must also be concerned with risk to themselves. In several different ways, those risks can keep the organization from successfully carrying out its mission. The fire department is open to a variety of risks similar to those faced by every private organization and enterprise.

There are interesting parallels between the two sectors. A risk manager in a private enterprise tries to protect the assets of the enterprise and ensure that it can stay in business. Similarly, a risk manager in a fire department tries to protect public assets, including its personnel, facilities, and equipment, as well as making sure the emergency service organization can perform its mission.

Public and private risks — A comparison

By the same token, the nature of the risks each organization faces and the impact of loss can be quite different. Just as a fire in a restaurant can put it out of business, a fire at a fire station can compromise the capacity of that fire department to respond to fires. Many of the assets of the fire department are just as essential to the ability to deliver emergency services as a kitchen is to a restaurant's ability to serve food. However, there is one critical difference. If a restaurant loses business, its employees might be out of work, but the patrons can find someplace else to eat. If a fire station burns down, the community as a whole may be without adequate fire protection or EMS.

Emergency response as an essential public service

Emergency response organizations are viewed as essential public services. Emergency response managers should recognize that they are responsible for ensuring that their organizations are always ready and able to perform their missions and to meet the expectations of their communities. Emergency response managers must be aware of potential disruptions to service. After all, they are expected to recognize and manage risk as part of their everyday professional lives.

The managers of public safety organizations are also custodians of public funds and assets. They must restrict any undesirable outcome that costs money, consumes public dollars, and reduces the government's capability to spend those funds where they would do the best. For example, an agency could run up large bills replacing or repairing damaged, lost or stolen equipment and apparatus **(see Figure 1.3).** It could also incur high expenses paying liability claims for vehicle accidents, paying medical bills for injured members, legal expenses to defend against claims, and paying overtime replacing them. In other words, the agency could be spending money to compensate for circumstances that should have been avoided. It is the manager's responsibility to prevent such things from happening.

Figure 1.3 — Damage to fire apparatus creates additional costs for fire departments to encumber.

Photo courtesy of Ron Jeffers, Union City, NJ.

Operational risks

Some risks are unavoidable and are accepted as part of the duty of a firefighter or a member of a public emergency response system. When one's mission is to save the property and lives of people in danger, one must expect to encounter danger. Emergency responders are recognized for their bravery because they are willing to accept risks the general public finds personally unacceptable. Certainly, the nature of the activities of emergency responders exposes them to a high level of inherent risk that all too often results in line-of-duty injuries and deaths.

Some risks are simply too great to take. Conditions or circumstances can exist in which the proper response is to not take actions that could place the lives of responders in danger. Training that prepares an emergency responder to recognize and respect dangerous situations and to work safely in a dangerous environment provides a considerable amount of counterbalance to the risk inherent in the work itself. The equipment that makes it possible to survive and safely perform required actions also helps balance the risk.

Identification, evaluation and control

Although we cannot always eliminate such danger from the work environment, we can reduce the risk of injury or death if we:

- Identify the nature of the threat (identify).
- Determine the risk potential, based on signs and symptoms (evaluate).
- Incorporate risk management practices into the plan for conducting operations (control).

The concepts of operational risk management have always been important considerations for emergency response organizations. The actual application of risk management is a focal point of incident management. A relatively new development within emergency service organizations is community risk reduction, which will be discussed later in this report.

Operational risk management involves a higher level of risk

A significantly higher level of risk management is involved in directing emergency operations and in regulating the overall exposure of responders to the risks of an incident. Emergency incident risk management expands the standard approach to directing and conducting emergency operations by incorporating risk evaluation and the assessment of optional approaches to the problems at hand. Doing that serves as the basis for determining what levels of risk are acceptable in different situations and guides ICs as they make strategic decisions. To deliver emergency services with an appropriate concern for the health and safety of the personnel who provide those services, an incident manager or IC must balance the approaches he or she takes.

Planning to manage risk

The NFPA adopted NFPA 1500, *Standard on Fire Department Occupational Safety, Health, and Wellness Program* in 1987. It was the first consensus standard to directly address many issues that are related to the avoidance of injuries, fatalities and occupational illnesses that emergency response personnel experience while performing their duties. In 2000, the NFPA adopted NFPA 1250, with of scope of establishing minimum criteria to develop, implement or evaluate a fire and emergency service organization risk management program.

The elements of a risk management plan, as outlined in NFPA 1500, are intended to apply to all aspects of a fire department's operations and activities. It is their application to emergency operations in particular, though, that makes the risk management plan a significant advancement in risk management. Annex D in NFPA 1500 summarizes the provisions of a risk management plan as follows:

- ❯ Risk identification.
- ❯ Risk evaluation.
- ❯ Establishing priorities for action.
- ❯ Risk control.
- ❯ Other methods of control.
- ❯ Risk management monitoring and follow-up.

Summary

The primary focus of this manual is the application of risk management concepts to the operational practice of fire departments. Throughout the manual, we address specific challenges involved in incorporating a "risk management approach" into the delivery of fire department services. It is a goal of this manual to assist departments and their leaders in their efforts to improve the performance of their organizations and to reduce the risks their communities, their organizations, and their individual members face virtually every day.

Some of the key points discussed in this chapter include the following:

❯ Individuals who provide emergency services accept a higher level of risk than members of the general public; hopefully, we can learn to manage these risks.

❯ Risk management is a dynamic system that must be managed — not a "worry of the week" problem to be solved.

❯ A significantly increased risk of injury or death is part of the environment in which emergency responders are expected to perform their duties.

❯ It is impossible to avoid many of the risks inherent in an emergency responder's work environment, but, through control measures, we take steps to minimize those risks.

❯ The risk of injury or death is reduced by the following control measures:
  ‣ Training, experience, protective clothing and equipment.
  ‣ Implementation of appropriate strategies and tactics.
  ‣ Avoidance of unnecessary risks.

❯ NFPA 1500 requires the establishment of a written risk management plan.

❯ The application of risk management to emergency operations is intended to recognize the inherent risks and assist an IC in implementing appropriate plans and actions in dangerous situations. Development and implementation of any community's risk-reduction efforts must address engineering, education and enforcement programs.

❯ Fire departments must manage financial, liability and safety risks within three major categories:
  ‣ Risk to the community (community risk).
  ‣ Risk to the fire department organization (organizational risk).
  ‣ Risk during emergency operations (operational risk).

Chapter 2: Organizational Risk Management

The objectives of this chapter are as follows:

❯ Define risk management and loss control.

❯ Introduce the general principles of risk management and loss control as they apply to organizations that deliver emergency services.

❯ Present a five-step risk management process that can be used by emergency service providers.

❯ Address legal responsibility as a component of risk management.

❯ Address specific areas of concern relating to risk management for fire departments and other emergency service providers.

This chapter also addresses the following portions of the NFFF's 16 FLSIs:

❯ Initiative 1: Define and advocate the need for a cultural change within the fire service relating to safety; incorporating leadership, management, supervision, accountability and personal responsibility.

❯ Initiative 2: Enhance the personal and organizational accountability for health and safety throughout the fire service.

❯ Initiative 4: All firefighters must be empowered to stop unsafe practices.

Definitions and concepts

Risk

The New Oxford American Dictionary defines risk as follows:

❯ A situation involving exposure to danger.
❯ Expose (someone or something valued) to danger, harm or loss.

NFPA 1500 defines risk as follows: "A risk is a measure of the probability and severity of adverse effects that result from an exposure to a hazard."

The concept of risk includes two dimensions of probability: the probability that an undesirable event will occur, and the probable magnitude or severity of the undesirable consequences. The term risk is used in several contexts to refer to undesirable consequences that might occur in different situations. Those consequences might include the following:

❯ Death/Injury.
❯ Property loss or damage leading to increased operating costs.
❯ Payments for losses incurred by others.
❯ Loss of the ability to provide service.
❯ Inconvenience and many other considerations.

Management

Webster's New World Dictionary defines management as, "The way something is handled, careful treatment, supervising skills, or those in charge of a business or group." Management suggests an organized and directed approach that implements evaluated techniques to control systems, events and people. Risk management implements a proactive, rather than reactive, approach to solving problems or limiting risks. The term "risk management" refers to a systematic effort to identify, evaluate and control risk(s) to reduce both the probability that something might go wrong and the adverse effects (magnitude) if something does go wrong.

Exposure

Exposure is an important term related to risk management. Exposure is a threat that some action (or even nonaction) can lead to a loss of some kind. Recognizing and identifying exposures is an essential step in any risk management program.

Risk management

Risk management incorporates a full range of measures that may be used to limit, reduce or eliminate the probability that an undesirable outcome will occur. It also includes all types of measures that can be used to limit, reduce or eliminate the anticipated magnitude of the undesirable outcome, if it does occur. Risk management measures may address the probability of the occurrence, the probable magnitude of the outcome, or both.

Emergency service organizations are involved in many situations that could result in undesirable outcomes, including death or injury to members of the department while delivering emergency services. Other undesirable outcomes include loss or damage to the organization's apparatus, equipment or facilities that would have to be replaced or repaired. They would also include the death or injury of other people that could result from errors or omissions by the emergency service providers, as well as damage to their property.

Managing organizational risk is not unique to fire departments. All organizations must manage some types of risk. The nature of the activities conducted by a fire department makes risk management a highly important and challenging task. Some potential exposure areas and specific examples within each of those areas are listed in **Table 2.1.**

Table 2.1 — Exposures and techniques	
Potential exposure area	**Risk management techniques**
Personnel	**Personnel**
Failure to meet minimum performance requirements.	Establish minimum performances.
Failure to properly train.	Establish and conduct performance-based training for all personnel. Training should conform to relevant OSHA, NFPA and other standards.
Failure to adequately equip.	Provide protective equipment that meets NFPA standards.
Fire inspection practices	**Fire inspection practices**
Failure to notify owners of hazards.	Require complete records of every inspection.
Failure to pursue compliance.	Consistently issue citations and seek judicial intervention when hazards are imminent.
Administration	**Administration**
Level of service not defined.	Define level of service for all service deliverables.
Incomplete records.	Document and address all complaints promptly (policy).
Communication	**Communication**
Failure to dispatch promptly.	Ensure that specific dispatch policies are in place and that performance is monitored.
Failure to properly advise callers of potential delay.	Establish policy and procedure to address these issues.

Fire department risk management — Its mission

Managing risk for others is, in fact, the fire department's mission. The community is always at risk from an endless number of potential hazards or sources that could cause harm. The mission of the fire department is to reduce the probability of harm to the community that could result from different harmful situations and circumstances. The fire department must manage its internal (organizational) risk while it performs its mission of managing external (community) risk. This report addresses managing risk within fire departments and other emergency service organizations.

Supporting the mission statement

Every fire department has the need to explicitly express its mission in the form of a mission statement. That formal document can be the starting point for a department's risk management efforts and can form the base from which to create a broad spectrum of risk management policies, processes and procedures to be implemented throughout every level of the entire organization — top, middle and bottom.

High risks require special attention

Different activities that are performed by emergency service organizations involve exposure to different kinds of risks. The primary mission of fire departments is to reduce the probability that the community will be damaged or destroyed by fire and the probability that deaths or injuries will result from fires. The probability of fire occurrence is addressed through fire prevention and public education activities, which are relatively low risk activities. Fire suppression and rescue functions are conducted to limit the damage and other negative consequences that result when a fire does occur and involves significantly higher risk to the service providers. For example:

❯ EMS reduce the risk of death or disability when citizens are injured or suffer from serious illnesses.

❯ Hazardous materials response teams address the risk that is created by harmful substances that have escaped from their normal containment.

❯ Confined space and technical rescue teams conduct high risk tasks that require the highest level of risk management when responding to incidents that other people or organizations are not prepared to manage.

Although each emergency service organization is associated with a dimension of risk management at the community level, this report is directed toward management of **internal risk** — which includes all the things that can go wrong when departments attempt to deliver the services that define their mission. It also includes any undesirable outcomes that might result from nonemergency activities and other functions the organization performs.

Losses and loss control

Delivering emergency services involves high-risk activities

Every person and every organization has to face a variety of risks in life. The following are some examples of these risks:

❯ The risk of being involved in a traffic accident, or being injured in an accident.
❯ The risk of your house being struck by lightning.
❯ The risk of you being struck by lightning.
❯ The risk of a floor collapse or the risk of being on the floor when it does collapse.

Everyone also participates in some form of personal and organizational risk management, such as driving safely to avoid accidents and wearing seat belts to limit injuries if an accident should occur. Fire departments and emergency service organizations have a special need for risk management due to the following:

❯ They engage in high risk activities that expose them to elevated risk.

❯ They are responsible for delivering critical emergency services to protect their communities.

If we didn't attempt to manage risk, we would be leaving our fate to chance. There is a possibility we would soon be dead, injured, battered, broken-down or incapable of protecting anything. The risk management process is a system developed to limit both the probability that undesirable events will occur and the magnitude of those consequences if they do occur. We will never be able to eliminate all risks, but we can eliminate some, reduce many,

and limit even more. For example, to reduce the probability of firefighters being injured, we develop and conduct training programs. Driver training reduces the probability of vehicle accidents. Furthermore, to reduce the magnitude of injury if a vehicle is involved in an accident, we enforce a policy that requires the use of seat belts.

Loss control is a component of risk management; the objective of the loss component of control is to limit the consequences of risk. There are hundreds of potential risk losses that are faced by fire departments, but essentially, they fit into four major management categories:

1. Personnel losses. These losses include life loss, injury and illness to members of the department. People are important. They are our most important asset and must be protected.

2. Property losses. Fire department property includes vehicles, facilities and equipment. Losses in this category could include an apparatus that is damaged or destroyed in an accident, a fire station that is damaged by a fire, or a piece of equipment that is lost or stolen.

3. Downtime losses. These losses result when property is not available for its intended use. An apparatus that is out of service as the result of an accident is not available to respond. A fire station that is damaged by a fire may not be able to house firefighters or an apparatus.

4. Liability losses. Liability is the obligation to compensate others for losses and damages that are caused by our acts or omissions. The frequency and magnitude of this type of loss for fire departments are rapidly increasing. A person who sues the fire department for negligence after being injured in an accident with a firetruck creates a significant potential liability to the department.

Most losses can be related to some form of cost to the organization. Loss reduction is intended to minimize these costs, which can be classified as direct or indirect.

Direct and indirect losses

Life safety, that of the public and of our response team members, is always the primary concern. The cost of loss can be high for individuals, as well as organizations. Direct costs are usually easy to identify. The loss of a piece of equipment will cost a certain number of dollars to replace. An apparatus involved in an incident will cost "X" dollars to repair. Indirect costs associated with these losses, such as the impact of not having that piece of equipment available when it is needed, might be difficult to determine. There are many types of indirect costs that should be recognized.

For example, an injury to a firefighter often costs much more than the direct costs associated with treating the injury. Direct costs would involve doctors' bills and hospital expenses. Worker's compensation insurance might pay for that firefighter's lost time and medical treatment, but higher claims could cause the costs of insurance to increase. The injured firefighter's position might have to be filled using overtime. If the firefighter is permanently disabled, the department might have to recruit and train a replacement. The firefighter's experience and knowledge might never be replaced. The department might also have to pay for a doctor's evaluation of the firefighter's medical condition and for a lawyer to process a disability pension.

Organizational risk management system

The fire department risk management program is a system of functions, components and activities designed to reduce the level of risk throughout the organization. All department members are responsible for managing various components of that system.

NFPA 1500 mandates planning to manage organizational risk. Section 4.3.1 states the following:

> The fire department shall adopt an official written departmental occupational safety and health policy that identifies specific goals and objectives for the prevention and elimination of accidents and occupational injuries, exposures of communicable disease, illnesses and fatalities.

NFPA 1500's intent is to provide the framework for a safety and health program for a fire department or any other organization that provides similar services.

There is no single method or solution to manage risk. Numerous publications provide a wide range of suggested methodologies for managing risk. Determining how to manage risk is a decision each department must make individually. The process must be frequently reviewed and, where necessary, upgraded. Most importantly, once a risk management process is instituted, it must be properly managed, continuously evaluated, and updated at least annually.

The role of a risk manager

In "Emergency Incident Risk Management: A Safety & Health Perspective," Murrey E. Loflin and Jonathan D. Kipp offer this profile of the risk manager:

> This individual will typically have oversight over the risk management programs of several departments, emergency services among them. However, many of the functions can be centralized, which will relieve the department's administrator from some of the risk management tasks. Most frequently, the risk manager will handle relations with outside agencies such as insurance companies and/or agents, and can be responsible for handling the insurance needs of various departments. In addition, this individual is familiar with the overall risk management process, and can serve as a valuable resource for guidance and information.

Goals and objectives: The foundation of the system

A risk management system is a dynamic process. To be effective, its objectives should begin with establishing goals, followed by establishing objectives to meet those goals. As in any system, the goals and objectives should be as follows:

- **S**pecific.
- **M**easurable.
- **A**ttainable.
- **R**ealistic.
- **T**ime-based.

Those who are expected to see that the goals are met should be involved in the process. Risk management should be looked upon as a continuous, on-going, standard process for an emergency service organization. There will always be risks, and there will always be room for improvement.

One of the fire department's goals should be to minimize injuries. For example, the objective might be established as "reduce on-the-job injuries by 25 percent for FY17."

To meet an objective, the department should establish specific plans or actions that support its achievement. One action might be that all department members participate in a training program designed to increase member awareness of the causes of injuries. Another might be to ensure adequate lighting is provided at incident scenes so members can identify and avoid safety hazards.

The steps in the process

Any system for managing risk must provide for three fundamental steps:

1. Identification of risk.
2. Evaluation of the probability and the potential magnitude of losses related to those risks.
3. Establishment of appropriate control measures.

Agencies, organizations and individuals have developed several different models that can be used as a foundation for a fire department risk management program. Most of the models use five to 10 steps. The model presented in this report uses five steps.

The essential steps of all of the models include the identification of risks and the evaluation of the potential harm that can result. That is followed by the identification, selection and implementation of control measures. The number of steps depends on how these individual core steps are broken down.

No matter how many control measures are applied, it must be recognized that losses will most likely occur and that control mechanisms for funding those losses must also be provided.

The five principal risk management steps

The five principle risk management steps that will be addressed in this section provide a solid foundation for developing a risk management program. The steps are as follows:

1. Identifying risk exposure.
2. Evaluating risk potential.
3. Ranking and prioritizing risks.
4. Determining and implementing control actions.
5. Evaluating and revising actions and techniques.

Step 1: Identifying risk exposure

This is the foundation of an integrated process for managing risks. Its purpose is to identify the kinds of things that create risks to the fire department. A fire department's exposure to risk stretches beyond emergency response and training activities. Potential risks in all activities can be grouped in several different ways. General areas of risk to consider:

- People: deaths, illnesses and injuries, health exposures.
- Apparatus and vehicles: accidents, malicious acts, damage due to mechanical failure, operator error.
- Occupancies/Facilities: natural disasters, fires, malicious acts, failure to open apparatus bay doors before driving out.
- Equipment: theft, damage from use, damage from misuse, failure to close doors before leaving.

Look to your own department. Use incident, injury, accident and other internal reports to identify local experience and trends.

Potential risks should also be identified through reading articles and reports and through analyzing data from other sources of information. Neighboring departments that are "similar" might have experienced losses that can alert you to specific potential losses. Comparing data with other organizations or national averages could also identify problems that might not have been recognized within the organization. A fire department that records one injury per fire might consider that rate routine until it finds that surrounding fire departments have less than one injury for every five fires. Numerous professional and trade organizations can provide relevant risk identification information.

Step 2: Evaluating risk potential

The evaluation of risk potential involves determining or estimating the likelihood that an event will occur and the consequences that will result if it does. Probability is generally established by studying the frequency at which incidents have occurred in the past. However, an undesirable event might not have a local history. The fact that something has not happened to one particular fire department in the past does not ensure that it will not happen in the future. Similarly, the magnitude of a loss might be predictable from past experiences, but it is important to remember that **incidents with the most severe consequences are usually the rarest.**

Note: If incidents with severe consequences occurred more often, we would be compelled to prevent them. This is a simple illustration of the principles of risk management.

The evaluation step should provide information to answer the following questions:

❯ What is our local experience?

❯ What do we know about national experience?

❯ What are the probabilities of different things happening?

❯ What are the probable consequences if they do occur?

In evaluating risk potential, both the likelihood and loss potential need to be addressed simultaneously.

In the book previously mentioned, "Emergency Incident Risk Management: A Safety & Health Perspective," Kipp and Loflin refer to using "frequency" and "severity" as measures to evaluate risk potential. The text provides a methodology and sample risk management plan that serve as effective tools for integrating frequency and severity factors into a document with which to put a department's risks into priority.

Frequency is an estimate of how often a loss has occurred — or is likely to occur — as a result of any of the risks determined during the identification step. Severity, which constitutes the second half of the evaluation phase, estimates the potential losses to the organization posed by the identified risk.

Step 3: Ranking and prioritizing risks

After considering the probabilities of occurrence and the probable outcomes, the next step is to prioritize the risks and decide on the areas that need to be addressed as priorities **(see Figure 2.1).** Generally, risks with the most severe potential outcomes are considered ahead of risks with relatively minor outcomes. Those that are more likely to occur are prioritized ahead of those that are less likely to occur. Doing that requires a considerable amount of judgment and a thorough analysis of the practicality of addressing certain types of risks.

Figure 2.1 — Establishing priorities for risk management actions.

High Severity Low Frequency	High Severity High Frequency
Low Severity Low Frequency	Low Severity High Frequency

Most organizations will be able to identify a fairly long list of risks that deserve attention that should be able to address several of them simultaneously or in fairly rapid succession, including some that are relatively easy and inexpensive and some that might require a major effort over a lengthy period of time. The compilation of a prioritized list of areas needing attention is an important step in managing risk.

For example, applying a band of reflective tape to the front, rear and sides of all emergency vehicles to increase their visibility can be accomplished quickly and inexpensively. On the other hand, providing thermal imaging camera for all front-line apparatus might take several years and involve a considerable expense. Enforcing a policy that requires all firefighters to remain seated with their seat belts fastened while vehicles are in motion should not involve any expense or take more than a few hours to implement.

Step 4: Determining and implementing control actions

Several factors must be considered in determining control actions. Those factors are often interrelated. They will frequently make it difficult to act on one without having an impact on another. Before implementing control measures, the cost and associated benefits will have to be considered. The benefits will frequently deal with improved safety and health to personnel, but if they cost real dollars, someone will have to justify the cost. In determining which control actions to implement, the following factors should be considered.

Predicted effect

What savings will likely result? This factor will require the risk manager to estimate the predicted effect of control actions that would be implemented. When considered in conjunction with the cost to implement the control, it will determine the cost/benefit factor.

Time required

How long will it take to implement the control measures? Can the resources needed to control the risk be used more efficiently and effectively during that time? Will other efforts be adversely affected?

Time to results

This is not the same as time required. Long term results are a very difficult "sell" in today's environment. The community and those responsible for allocating its tax dollars might not be patient. If the effort is critical to the department's risk management goals, and results will not be seen for an extended period of time, effective communication of the plan and its benefits to the community, its leaders, and its elected officials, is essential.

Effort required

How much is required, and can that effort be more effectively applied to other programs? Is there more than one solution? Will one solution require less effort than others? If you're looking for more efficient ways to address a risk, involve the people it affects the most.

Associated costs

How much will it cost — directly and indirectly? How do you arrive at and document those costs? Cost alone will often determine if a proposed control measure is implemented or ignored. It will always affect where that measure appears on a priority list. Although it is a component of the cost/benefit factor, it will also be viewed separately. As discussed earlier, all factors need to be considered collectively. The determination to implement control measures directly related to the safety or health of workers must not be made based solely on cost. The risk manager, however, must be able to properly establish, and then communicate, both direct and indirect costs.

Insurance costs

Will initiating the control measure reduce the related insurance cost? Will implementing it increase that cost? If so, is the cost reduction or cost increase worth instituting or not instituting the measure? Costs for almost all insurance programs are determined by viewing loss experiences generically and also on a customer specific basis. Costs are established by estimating anticipated losses. Departments with high accident or injury rates will pay more. Those with less will pay less.

Funding

Risk management requires a balance of other risk control and risk financing measures. The measures or methods used should support each other. They are essential to any risk management strategy. Effective risk control efforts will limit the costs of risk financing while financing will limit address costs when control measures fail. There are two principal types of risk financing: risk retention and risk transfer.

Risk retention relies on internal funds. Risk transfer, on the other hand, looks outside the organization for money needed to pay for losses. Risk retention techniques:

❯ Budgeting to pay for relatively inexpensive or small losses, such as minor damage to apparatus, equipment or facilities.

❯ Establishing a reserve fund to address irregular losses.

❯ Borrowing funds to pay for unexpected losses. In this case, the borrower has an obligation to pay a specific amount for a given loss. The risk is therefore retained and not transferred.

Risk transfer techniques:

❯ Purchasing commercial insurance and contractually transferring the risk to another entity.

❯ Insurance that transfers the financial burden for future risks to the insurer in exchange for a fee.

❯ Contractual transfers that involve another entity assuming responsibility for the financial burden of a loss. This option is frequently referred to as an indemnity clause.

Cost/Benefit analysis

Ranking and prioritizing risks is an integrated process that requires the frequency and severity of a risk be quantified and ranked in some way. Each of the ranked risks should then be prioritized by evaluating a series of risk factors. The risk manager will seldom have all the data required to make a quantitative assessment and will have to rely on knowledge, experience and judgment to make required assumptions.

The risk manager will need to consider all the factors above in developing a cost/benefit analysis. Although the benefits will frequently deal with improved safety and health of personnel, if they cost real dollars, someone will have to prepare a "balance sheet" (cost/benefit analysis). The sheet will require real and valid numbers. Someone will have to justify the numbers and prove the benefits are worth the investment. **Figure 2.2** presents a sample "balance sheet" for conducting a cost/benefit analysis. Many of the publications referenced in the appendix also provide recommendations or models for conducting a cost/benefit analysis. Figure 2.2 is intended to be a tool, and like any other tool, can be modified. Use a tool that meets your needs. No matter how you conduct a cost/benefit analysis, the value of your findings will depend upon the quality of your data and your assumptions.

Figure 2.2 — Example of a cost/benefit analysis balance sheet.

ESTIMATED SAVINGS AFTER CONTROL COSTS:

❯ Total estimated savings: $7,160

❯ Total cost of control: $325

I.   CURRENT STATE: (Briefly describe assumptions and provide facts.)
Example: There were 25 hand injuries that resulted from packing hose during the previous year.
Direct costs: (Describe assumptions or provide costs.)
    1.   Hospital/Medical costs: 25 x $250 = $6,250
    TOTAL DIRECT COSTS: $6,250
Indirect costs: (Describe assumptions or provide costs.)
    1.   Additional staffing to fill positions: 15 shifts x 180 per shift = $2,700
    TOTAL INDIRECT COST: $2,700
    TOTAL CURRENT STATE COSTS: $8,950

II. FUTURE STATE: (Describe assumptions or provide facts.)
Example: Revised procedure and training will prevent 80 percent of all identified injuries.
Direct costs: (Describe assumptions.)
    1.   Hospital/Medical costs: 5 x $250 = $1,250
    TOTAL DIRECT COSTS $1,250
Indirect costs: (Describe assumptions.)
    1.   Additional staffing to fill positions: 3 x $180 = $540
    TOTAL INDIRECT COSTS: $540
    TOTAL FUTURE STATE COSTS: $1,790

III. TOTAL ESTIMATED SAVINGS PRIOR TO CONTROL EXPENDITURES:
    Total cost current state = $8,950
    Total cost future state = $1,790
    TOTAL ESTIMATED SAVINGS PRIOR TO CONTROL EXPENDITURES

IV. COSTS ASSOCIATED WITH CONTROL MEASURE: (Briefly describe.)
Example: Revised operational procedure and shift training will reduce injuries by 80 percent.
Direct costs: (List the direct costs associated with the proposed control measure.)
    1.   Cost of video = $325
    TOTAL DIRECT COSTS: $325
Indirect costs: (List the direct costs associated with the proposed control measure.)
    1.   Training - shift requirement - no cost.
    TOTAL INDIRECT COSTS: $0
    TOTAL COSTS ASSOCIATED WITH CONTROL MEASURE: $325

V.   **TOTAL ESTIMATED SAVINGS AFTER CONTROL COSTS: $6,835**

Options and categories of control measures

The means by which potential risks are addressed are referred to as risk control options. Methods that are used to address the risks are categorized into three risk control categories. The specific steps that are taken to control the risks are referred to as risk control measures. In almost all cases, the options, categories and specific methods selected are intended to limit the risk potential. There are three risk control options:

1. Risk avoidance.
2. Risk reduction.
3. Risk transfer.

Total risk avoidance is a sure route to reducing risks. It is usually the safest solution, but often the least realistic. Many times, it is no option at all. We can't stop going to fires, and all fires present some risks. If an action, activity or condition pose a risk to the operation, consider whether or not it can be avoided or eliminated entirely. Although we are required to respond to a structural fire, we can choose not to enter the structure.

Risk can often be reduced by planning, training, testing, maintenance of standards, and enforcement of codes. The fundamental purpose of standard operating procedures (SOPs), planning and training is to reduce the risk to personnel. Proper selection, design and maintenance of facilities and vehicles is intended to reduce various forms of risk.

It may be feasible to transfer our risks to other parties by purchasing insurance or contracting out to other organizations to perform certain activities. Good risk management practices should reduce insurance costs. In addition to assuming a portion of the risk, many insurance companies provide valuable assistance in identifying and reducing risks. By doing so, they intend to reduce a department's losses and the probability of claims.

Risk control categories

When it is not possible to eliminate risks, they should be limited or minimized. For example, although we can't eliminate the need for firefighters to respond to emergencies, we can minimize the risk they face while responding to and operating at an incident. Risks may be systematically eliminated or minimized by implementing control measures. Control measures fit into three general areas which we call risk control categories. The general categories of control are as follows:

- Administrative.
- Engineering.
- Personal protection.

Administrative controls, such as SOPs, and engineering controls, such as apparatus specifications, are directed toward making the workplace safe for the firefighter. In contrast, personal protection controls, such as SCBA are focused on making the firefighter safe for the workplace. When establishing a risk control program, fire departments should use administrative and engineering controls to limit exposure to risk before relying on personal protection control measures.

Administrative controls provide the foundation for a department's risk control program. They include the following:

- ❯ Emergency vehicle operation procedures and regulations.
- ❯ Training requirements.
- ❯ Enforcement of fire codes.
- ❯ Preincident planning to identify hazards accountability systems.

Consistent application and enforcement of administrative controls constitute an essential administrative control. If you have a policy and don't enforce it, or if you have a required procedure and don't require it, in reality you have neither a policy nor a procedure.

Engineering controls are intended to remove specific hazards from the workplace. Fire departments use engineering controls to improve safety and health in fire stations and on apparatus by designing improved components or entire systems. Improving ventilation at a fire station to remove diesel exhaust, relocating the siren on an apparatus to reduce noise in the cab, providing foam for flammable liquid fires, and providing lighting for night operations are all examples of engineering controls.

Personal protection controls do not remove hazards from the workplace. They are designed to provide an element of personal safety. Personal protective clothing, SCBA, personal alert safety system (PASS) devices, and life safety ropes are examples of personal protection controls. When operating at emergency incidents, firefighters are required to rely heavily on personal protection controls.

Step 5: Evaluating and revising actions and techniques

Risk management should be a continual process with established mechanisms to monitor performance and evaluate progress. Risk management efforts should yield positive results in terms of better outcomes. The change may be sudden and obvious, or it may take a long time to yield measurable results.

The evaluation stage should parallel the steps that were taken to identify risks and seek confirmation that the process is working. It should focus on the areas that were identified as requiring attention and provide follow-up to determine if they actually result in the desired change in outcomes. In many cases, this will include an improved focus on the problem areas, since a risk management action plan can include a component to more closely monitor the specific area of concern.

For example, if hand injuries were identified as a problem and new gloves were issued as the solution, the frequency and severity of hand injuries should be monitored to confirm that the desired impact is being achieved. Doing that might include a more detailed process for categorizing hand injuries and considering the effectiveness of the new gloves.

All actions should be evaluated routinely to ensure that they are achieving the desired outcomes and are not creating other unanticipated problems. Risk management is a process of balancing different factors. The balance can often be influenced by any number of changing circumstances.

Risk management is a system, not a solution

Kipp and Loflin define the risk management process as "a system for treating pure risk; identification analysis of exposures, selection of appropriate risk management techniques to handle exposures, implementation of chosen techniques and monitoring of results." The risk management process is intended to minimize losses. It is a dynamic system and

not a fixed solution. Most losses are avoidable costs, and no department can afford to pay for avoidable costs. The results of administrative, engineering and personal protection control systems will determine the success of your risk management program.

Legal responsibility

The risk that an individual or organization could be held legally responsible for an undesirable outcome is one important consideration in risk management. Organizations are generally considered to be legally responsible for any harm that results from their acts or omissions, and they are expected to conduct their activities in a responsible manner that does not expose individuals or the community to an unreasonable level of risk. This basic principle could apply to a wide variety of injuries:

- ❯ Physical injury or fatality.
- ❯ Damage to public or private property.
- ❯ Damage to the environment.
- ❯ Negative economic impacts on an individual or corporation.
- ❯ Damage to an individual's reputation.

Statutory immunity

Because of the nature of the mission, many fire departments have limited statutory immunity under state laws. Statutory immunity protects them from being held responsible for failure to provide adequate protection to save lives or property from fires, assuming the fire department did not cause the fire and did not take any unreasonable actions that resulted in a greater loss.

Most legal decisions have found that the duty of a fire department is to protect the community at large from fires, which does not include a specific duty to protect individual citizens or their property. This gives the fire chief or the IC a large measure of authority to make decisions concerning whether it is reasonable or unreasonable to attempt to save property, based on the risks to firefighters that would be involved in attempting to save it.

This type of statutory immunity is usually limited to the delivery of specific governmental services and may not apply to incident types other than fires. Depending on the state and location, contracted companies and independent volunteer organizations might not have the same statutory immunity. The rules are different in different states and for different services, particularly for EMS that have a direct service delivery relationship with their patients.

Responsibility to provide a safe and healthy workplace

The fire department, like other public or private organizations, also has legal responsibilities to manage the level of risk to which its members and employees are exposed in the performance of their activities. These duties are defined by occupational safety and health laws and regulations as an employer's responsibility to provide a reasonably safe and healthy work environment for employees.

Virtually every human activity involves some degree of risk, and every occupation involves at least some potential for injury, illness or even death. In most work relationships, the employer is considered to have almost unlimited responsibility to manage the level of risk. There are few occupations today where the willingness to accept a high risk of injury or death is considered to be an important qualification.

Because they cannot be held responsible for hazards that might be present where their work must be performed, fire departments and other emergency response agencies have a different relationship with occupational risk than any other type of organization. The nature of the work requires emergency responders to accept situations as they are found and to deal with whatever unplanned and uncontrolled event might ensue.

Although the risks involved in a specific situation might be beyond the ability of the responding agency to predict or control, the nature of the risks is usually predictable. Many risks are avoidable. Under those circumstances, fire departments must be prepared to work as safely as is reasonably possible.

The following are some key factors about the fire department's work environment that must be considered:

❯ A fire department has limited control over the emergency location until it is called to respond to an emergency.

❯ The work environment is not designed with the expectation that the fire department might have to respond to work.

❯ The nature of the work is dealing with situations that are too dangerous for anyone else to handle.

❯ The urgency of the situation usually does not allow a fire department to know the current hazards that are present before they take action.

It is important to note that these factors apply only to the emergency response environment. The fire department has the same responsibility as any other organization for the safety of its members when they are working at a facility that is under the control of the department.

Acceptance of risk

Emergency responders knowingly accept the increased risk of accidents, injuries and potential death that is inherent in their work. They willingly operate in an elevated risk environment. In most states, legal precedents protect a property owner against negligence suits brought by firefighters for injury or death resulting from an incident on their property. What is the rationale behind such precedents? It is assumed that the firefighter was aware of the risks involved in the activity and knowingly/willingly accepted them.

That principle has been challenged in cases in which the evidence indicates the occupant or property owner was doing something that posed an unreasonable risk to the responders. The property owner's protection might be compromised if hazards have been knowingly concealed or if the owner has failed to correct fire code violations.

The requirement in NFPA 1500 to incorporate risk management in the process of conducting emergency operations can be interpreted as increasing the duty of fire officers to be responsible for the health and safety of the personnel they command and supervise. That responsibility is different in some respects from the duty to provide protection to the community.

An Incident Commander must have responsibility with authority

Because the primary responsibility of a fire department is to protect the community from fires, state and local laws usually provide a fire chief virtually unlimited power to control and determine the fate of private property that is burning or threatened by fire. An IC can make a determination to let a building burn due to the excessive risk to firefighters and if the structure's integrity is compromised. In an extreme situation, the decision could

be to discontinue rescue operations because the possibility of a successful rescue does not justify the risk to rescuers. The laws provide for such discretionary power because it would be virtually impossible to conduct emergency operations under the threat of being legally challenged over every discretionary decision.

A fire chief must have the authority to make discretionary decisions for the overall good and public safety of the community. In the absence of gross negligence, the law provides protection for fire departments and ICs.

Protection from liability

It is within the legal rights of virtually anyone to file a suit against any individual or organization for anything bad that happens to them. There are no guarantees that a fire department or fire chief will not be sued. The immunity principles make it easier to defend against such suits and often to have them dismissed as groundless. Still, it should not come as a surprise to any public official to become a defendant in legal action. NFPA 1500 establishes a set of risk management principles that could be cited to justify a decision not to expose firefighters to excessive risks.

Occupational safety and health regulations

The Occupational Safety and Health Administration (OSHA) of the U.S. Department of Labor (DOL) enforces federal standards that apply to private sector workers and employees of the federal government. The primary regulations that apply to fire departments are OSHA's 1910.120 (Hazardous Materials); 1910.134 (Respiratory Protection); 1910.154, 155 and 156 (Fire Brigades); 1910.1030 (Bloodborne Pathogens); and 1910.1200 (Hazard Communication). Hazardous materials regulations are also enforced by the Environmental Protection Agency where OSHA does not have jurisdiction. In addition, every state has a regulatory structure to provide for the safety and health of workers.

OSHA regulations establish a minimum standard. Individual "OSHA Plan states" may adopt equivalent or more stringent regulations. Those states also determine if they will enforce regulations for volunteer fire departments and other emergency response organizations, or if they will only apply them to paid workers. Increasingly, the trend is to enforce the same regulations on volunteer organizations and fully-paid departments.

Occupational Safety and Health Administration Plan states

Twenty-two states and territories (known as "OSHA Plan states") have agreements with the DOL to enforce federal standards through state agencies. Even though the DOL does not have jurisdiction over state and local government agencies, designated state agencies in the OSHA Plan states are required to enforce federal regulations on public agencies.

Non-Occupational Safety Health Administration Plan states

OSHA itself enforces federal regulations in the remaining states. States that do not have agreements to enforce the federal regulations generally adopt their own regulations and determine how to apply them. For example, in some states, the regulation of fire departments is assigned — not to an occupational safety and health agency — but to the state fire marshal or a state agency responsible for fire protection regulations.

Policies and enforcement programs differ significantly from state to state, so it is important that each fire department and emergency response agency become familiar with specific regulations that apply and become familiar with the state agency that has the authority to enforce them.

A regulatory framework

OSHA regulations and other federal and state regulations that apply to worker health and safety do not specifically address operational risk management. However, they do establish a regulatory framework that is intended to establish a safe working environment. In most cases, the regulatory language does not address the issue of an inherently dangerous occupation, but does hold an employer responsible for recognizing hazards and taking appropriate action to eliminate or minimize the risk of harm to the employees.

Consensus standards

Where there is no specific regulation, most regulatory agencies have the ability to refer to a consensus standard that addresses a specific issue. An agency may also refer to an established consensus standard that establishes a reasonable standard of care if it is more specifically applicable to a subject or situation than the regulation that is in force.

In this manner, NFPA 1500 establishes a basic foundation for a risk management approach to emergency operations. A fire department that adopted and conscientiously followed the requirements of NFPA 1500 would be in a very good position to show that it is approaching risk management proactively and responsibly. The same basic concept applies to all of the provisions of NFPA 1500. A fire department that adopts and follows the requirements of NFPA 1500 will meet or exceed the requirements enforced by most regulatory agencies.

It is very difficult to determine if a fire department has an effective approach to operational risk management without examining its application to specific situations. A regulatory agency might examine a department's SOPs and training programs to see what is documented, but it is difficult to judge from the written procedures if a risk management approach is routinely applied and if its application is reasonable. Actions taken at a particular incident might be reviewed by a regulatory agency to determine if appropriate procedures were followed.

Examples:

❯ An aerial ladder collapses at a fire, causing serious injury to a firefighter. Was the ladder tested by a qualified individual or company within the previous year? Was it regularly inspected for defects? Was the operator properly trained?

❯ A firefighter becomes lost in a burning building, runs out of air, and dies. Were their SCBA properly maintained and tested? Was the air quality checked? Was the PASS device working? Did they use a buddy system? Was accountability used? Was there an appropriate incident command system in place?

❯ A fire in a chemical facility results in a major ecological incident when water runoff carries contaminants into a protected wildlife refuge. Did the fire department take appropriate action to control or prevent the runoff? Did the effort to control and extinguish the fire create a greater problem than letting it burn? Is the fire department or the owner of the facility responsible?

In such cases, it is likely that the risk management approach defined in NFPA 1500 would be used as a yardstick to determine if appropriate judgment was used. There have been relatively few cases in which a fire department has been fined or formal warnings have been issued for failure to comply with occupational safety and health regulations at particular incidents — although substantial fines have been assessed in some of those cases. Enforcement actions against fire departments are generally initiated by state occupational safety and health authorities, which have jurisdiction over local government agencies.

Documentation is essential

Because operational risk management requires a large measure of subjective judgment, its performance can be most easily evaluated after an incident occurs. Risk management practices are most likely to be reviewed in two sets of circumstances:

1. If a regulatory investigation is prompted by an accident that has resulted in a death or injury.

2. If a complaint is filed by a member of the department.

A fire department should be able to demonstrate that its individual officers and members:

❯ Are competent and well-trained in the duties they are expected to perform.
❯ Are familiar with the regulations and current standards that apply to those duties.
❯ Follow established SOPs and standard operating guidelines (SOGs) that are consistent with the regulations and standards.

The department should also be able to show that it applies a consistent approach to risk management to every incident.

Specific areas of concern for the emergency service risk manager

The responsibility for managing risk in an organization that exists to provide emergency public safety services is extremely challenging. On one side of the equation, it can be easy to categorize many risks as inherent, and to let the objective of saving lives and property dominate the mission. On the other side of the equation, an approach that is too conservative could render the service ineffective.

In some situations, poor risk management judgment can create even greater risks. For example, a fire department that arrives too late at an incident will be unsuccessful at saving lives or limiting property losses, but a fire department that drives too fast in order to arrive quickly may cause as many deaths as it prevents. The only reasonable approach is to embrace a professional, responsible and systematic approach to managing risk and to apply it unwaveringly to every aspect and activity of the organization.

Balancing risks at the scene of an incident

Balancing risk factors is most critical at the scene of an emergency incident where situational judgment must be exercised at an incident by individuals that are at different levels within the organization — from the IC down to the Company Officer (CO) and the individual firefighter who must decide what to do in the face of a critical situation.

Why risk has to be managed even during nonemergency times

Many risk factors can be managed in nonemergency times to regulate the level of risk in operational situations. For example, a ladder that is too expensive to test or repair becomes a major liability if it collapses when it is being used at a fire. SCBA that has not been thoroughly inspected, tested and calibrated for over a year might be "good enough" today, but it might not be good enough tomorrow, if a medical examiner determines an inadequately maintained breathing apparatus caused a firefighter's death.

Poorly trained firefighters might be able to survive dozens of easy situations, yet be unprepared for the first life-threatening emergency they face. An SOP that is routinely ignored because it is inconvenient for the majority of situations could also be ignored in a situation in which it is critically important. Knowing a building has a wood truss roof might not seem important unless the attic is on fire.

Summary

❯ Most individuals responsible for risk management in emergency response organizations are not professional risk managers.

❯ Just because something has not happened to one particular fire department in the past does not ensure that it will not happen in the future. The magnitude of a loss could be predictable from past experiences, but by the same token, incidents with the most severe consequences are usually the rarest.

❯ Many departments are, to a certain degree, effectively dealing with risk without formal risk management programs. For example, most departments require firefighters to be trained to a certain level and to wear full protective clothing when responding to a fire. Equipment is inspected and maintained on a scheduled basis, and various certifications are required for specified responsibilities. The risk management process incorporates and expands those practices and provides a systematic approach to safety and loss control. The risk management process is intended to provide a comprehensive and detailed system for examining practical and cost effective ways of addressing potential losses.

Chapter 3: Operational Risk Management

The purpose of this chapter is to provide practical information on how to meet applicable national firefighter health and safety standards, such as NFPA 1500, especially as it relates to risk management planning during emergency operations. The objectives of this chapter include the following:

❯ Explain the application of risk management to emergency operations.

❯ Provide guidance on appropriate practices and judgmental factors that must be considered in conducting emergency incidents.

❯ Recommend ways to develop and improve operational risk management skills.

This chapter also addresses the following portions of the NFFF's 16 FLSIs:

❯ Initiative 2: Enhance the personal and organizational accountability for health and safety throughout the fire service.

❯ Initiative 3: Focus greater attention on the integration of risk management with incident management at all levels, including strategic, tactical and planning responsibilities.

❯ Initiative 5: Develop and implement national standards for training, qualifications and certification (including regular recertification) that are equally applicable to all firefighters based on the duties they are expected to perform.

❯ Initiative 9: Thoroughly investigate all firefighter fatalities, injuries and near-misses.

Risk management and emergency response

Operational risk management refers primarily to the risk of injury or death to emergency responders that could result from the performance of their duties. In a broader sense, it applies to other types of accidents and undesirable events that could occur during emergency operations.

Emergency responders knowingly subject themselves to elevated levels of risk in the performance of their duties **(see Figure 3.1).** Some of those risks are unpredictable and unavoidable. On the other hand, many are well-known and can be effectively limited or avoided through the application of operational risk management practices.

Figure 3.1 — There is an element of risk associated with every emergency.

Photo courtesy of Bob Esposito, Pennsburg, PA.

Acceptance of risk

The acceptance of risk by emergency responders is intimately related to the reasons emergency organizations exist. Emergency responders perform essential functions too dangerous for ordinary citizens who are neither properly trained nor adequately equipped, or who might not be physically able to perform such functions. Emergency responders place themselves between the public and a variety of dangers to protect the lives of others. They accept the increased risk to their own lives that is often involved in protecting life and property.

Risk is an inherent component of the work emergency responders perform. Their ability to work in an elevated risk environment sets emergency responders apart from the general population. In order to survive, emergency responders must effectively manage their exposure to risk by recognizing danger, considering and weighing alternatives, and balancing anticipated benefits with potential consequences. In some cases, doing that leads to the conclusion that a given situation simply does not justify the risk involved in taking action.

Risk management occurs at every level of an organization in an emergency operation. It must begin at the top, where the IC must determine the appropriate strategy for the incident, and extends down to COs who must evaluate conditions that define the risk exposure for small groups of workers before they initiate and as they perform their assigned functions. It extends still further throughout the entire organization, top-middle-bottom, down to the individual emergency responder who must use the same type of judgment to decide on personal actions in many situations.

Bravery in the face of risk

Firefighters' reputations are frequently associated with courage and bravery. That perception often suggests that firefighters are willing to accept any risk to their personal safety to perform their duties. Blind acceptance of risk used to be virtually unlimited and unquestioned in the fire service. It was not unusual for firefighters to be exposed to very high levels of risk, with very little concern for their personal safety. Firefighters were expected to follow any order without question and to accept any risk to accomplish the mission. The most respected firefighters were often those with the most obvious disregard for their own safety — those who demonstrated the attitude that the fire must be defeated "at any cost."

Today, we are moving toward a different perception of the relationship between bravery and risk. Without question, we still respect, value and honor bravery and courage, particularly when a situation involves saving lives.

Even so, a contemporary sense of values requires a very different assessment of appropriate and inappropriate risks. In many cases, that calls for limiting the exposure of personnel to risks that they might be willing to accept for themselves. A fire department's definition of acceptable risk might be more conservative than the level of risk an individual firefighter might willingly accept. In the current value system, higher level officers are often more responsible for limiting risk exposure than for demanding courage from their forces.

There are times when only a rescuer's willingness to risk life and limb can save a life. Bravery is still a respected and valued quality for emergency responders. Medals of valor are given to individuals who are willing to risk their own lives to save a total stranger. The general public admire the heroism of firefighters and emergency responders, but no one expects them to risk their lives where there are no lives to be saved.

Today's risk versus protection

Today's emergency responders have advanced clothing and equipment to protect them, much more capable apparatus and equipment to work with, and much better training than previous generations. Even so, they must also face some situations that are much more complicated. Their ability to perform safely and effectively in high risk environments is highly dependent on their ability to recognize the specific dangers that apply to each situation and to work within the limitations of their protective clothing, protective equipment, training, and incident management system (supervision, coordination and SOPs).

What is expected?

The citizens and visitors who depend on emergency service providers for protection have varying perceptions and expectations about the delivery of those services. The general public clearly recognize and value the courage and bravery of all emergency responders, but they also recognize that there are reasonable limits as to what can be expected and what is a reasonable level of risk. The expectation is that firefighters will act rationally and professionally, controlling threatening situations without exposing themselves to unnecessary danger.

Emergency response organizations are expected to take every reasonable step to protect their workers from accidents, injuries or disabling occupational diseases. The general public expect emergency response organizations to provide their personnel with the

training, tools, equipment and support systems that are necessary to perform safely, as well as effectively. The community is generally willing to pay for equipment emergency responders need, particularly when they are needed to save lives, if those needs are clearly presented. It is not acceptable to the public for fire departments to risk the lives of their members because they are not adequately trained or equipped or because they do not apply appropriate judgment in conducting emergency operations.

The public recognizes that many aspects of emergency operations are dangerous and unpredictable. No one expects firefighters to risk their lives where there are no lives to be saved. There is no logical reason for firefighters to risk their lives fighting fires in known abandoned structures.

The risk balance for an unoccupied structure might require conducting aggressive offensive fire attack operations, but those operations always involve some degree of risk. Using protective clothing, protective equipment, good training, tactics, supervision and other factors reduce risk, but the risks cannot be eliminated. If a danger is recognized, it should be avoided. The only acceptable risks in operations are those that are directed toward saving lives or property, inherent dangers of an unanticipated event, and unknown hazards.

The fundamental principle of occupational safety and health

The fundamental principle of occupational safety and health laws is that an employer (the fire department or emergency service organization) is responsible for providing a reasonably safe and healthy workplace for an employee. The application of this concept to emergency operations essentially means an organization must do the following:

❯ Recognize, identify and evaluate the dangers inherent in performing emergency operations.
❯ Take reasonable steps to protect employees from those dangers.

Determining what is reasonable in this context generally involves interpreting standards that have been incorporated by reference into regulations, such as NFPA 1500. The expectation today is that firefighters must be properly trained, supervised and equipped to function as safely as possible, recognizing the inherent risk factors that are involved in conducting emergency operations.

Review of operations

Every IC should anticipate that the authority having jurisdiction for occupational safety and health laws will thoroughly review any incidents in which injuries or fatalities occur, using NFPA 1500 and other applicable standards as benchmarks, to consider if actions taken were reasonable under the circumstances. A fire department should expect that an investigation would seek to determine if its members were provided with every appropriate form of protection, including training and SOPs.

The best approach a fire department can take is to regularly review and evaluate its own operations. That way a department can ensure all the components to manage operational risk are in place and that established procedures are consistently applied. The review will address administrative, engineering and personal protection risk management control methods. The review should determine if established policies, procedures, training and equipment are appropriate, and if actions taken in conducting operations are reasonable.

Managing risk in emergency incidents

Risk management is recognized as an inherent and important responsibility of emergency response agencies on emergency scenes, but it is also recognized in the day-to-day operations of the organization. Today, we expect the officers who command and supervise emergency operations to function as real-time risk managers, which involves making critical decisions very quickly with limited information.

Risk management is a fundamental responsibility

Managing risk is a fundamental responsibility at every level of the incident management process **(see Figure 3.2).** The specific recognition of risk management is relatively new, but most of the basic principles have always been incorporated into the management of emergency incidents. Fire officers have always been called-upon to make decisions that weigh the risks of a particular course of action against the potential benefits. The major change is the recognition of risk management at the emergency scene as a well-defined, value-driven process — not just a matter of personal and situational judgment.

Figure 3.2 — Command personnel must manage numerous risks and personnel at incidents.

Photo courtesy of Ron Jeffers, Union City, NJ.

Develop an incident management plan and share it

An IC who establishes the overall strategic plan for an incident must identify and evaluate the risks involved in each situation. They must make conscious decisions about the acceptable level of exposure to those risks. Supervisors who direct and regulate the activities of their subordinates at every level within the incident management structure must be guided by the IC's strategic plan, including the risk management considerations incorporated into the

strategic plan. All supervisors must also continually evaluate the particular risks present within their assigned areas of responsibility.

Safe operation at any incident will require continuous identification, evaluation and control of changing conditions. The responsibility to identify, evaluate and manage risks extends to every individual operating at the incident.

National Fire Protection Association 1500

NFPA 1500 defines the basic principles of operational risk management. The standard establishes specific expectations that the officer in command of an emergency incident will manage the level of risk to firefighters as a fundamental incident management responsibility.

The risk management approach described in NFPA 1500 should be used as the basis for a fire department's operational risk management policies. A policy statement, supported by a system of SOPs or SOGs, should establish the specific manner in which all members of a department, from the fire chief on down to the newest member, expect to operate at emergency incidents. The principles have been widely adopted as the standard operational approach to risk management. The section that specifically refers to operational risk management was introduced in the 1992 edition of NFPA 1500.

Systematic approach required: All members must be involved

The individual in command of an incident is specifically responsible for managing risk at the incident; however, one person cannot be expected to apply these principles to an incident if the organization has not integrated a standard approach to risk management into its SOPs and its organizational culture. To be effective, risk management principles and policies must be integrated into the entire operational approach of the fire department or emergency response organization. They must be incorporated within the duties and responsibilities of every officer, supervisor and member.

Risk assessment

The most important and difficult concept in the operational risk management process is the actual determination of the types and levels of risk that are present in each situation and the degree of risk that is acceptable for the personnel who are operating at that incident. There is always some degree of risk involved in conducting emergency operations. The IC has to determine the limits of risk that are acceptable for each situation and direct operations to ensure that those limits are not exceeded. There are three simple guidelines that define acceptable levels of risk:

1. Activities that present a significant risk to the safety of members shall be limited to situations in which there is a potential to save endangered lives.

2. Activities routinely employed to protect property shall be recognized as inherent risks to the safety of members, and actions shall be taken to reduce or avoid those risks.

3. No risk to the safety of members shall be acceptable when there is no possibility to save lives or property **(see Figure 3.3).**

Figure 3.3 — No significant risk to personnel should be taken when a building is obviously going to be a total loss.

Photo courtesy of Chris Mickal, New Orleans (LA) Fire Department Photo Unit.

Those three statements place major responsibility on an IC to first, identify and evaluate the risks that are present in each situation, and then exercise good judgment to determine when the level of risk is excessive. Without good judgment, risk management policies are nothing more than words on paper.

Risk management drives the strategic plan

The strategic plan for a fire defines where, when and how firefighters will seek to control that fire. An IC's most fundamental responsibility is to establish and implement a strategic plan to conduct an emergency operation. The IC must always weigh the exposure to danger against the anticipated results of a strategic plan. Risk management is one essential consideration in developing a strategic plan.

An IC's choice of operational mode, offensive or defensive, defines the "rules" that apply to everyone involved in that incident. In offensive situations, firefighters enter burning structures and attempt to control a fire where it is burning. They expose themselves to all the risks present in that environment. In the defensive mode, firefighters avoid many of those risks by staying out of the most dangerous areas and conducting operations that limit the spread of a fire to an area that can be defended without exposing participants to unnecessary risks.

Note: A parallel exists with every emergency operation in which ICs must decide if the potential benefits justify exposing personnel to the risks that are present.

Initial risk assessment

The determination of acceptable risk and the choice of operational mode begin with the first arriving officer, who must assume command of the incident and make an initial size-up. Even if the decision applies to only the first arriving company, basic risk management policies must be applied to determine appropriate actions, including the initial choice between offensive and defensive operations.

At a fire incident, the first arriving CO often has to decide if and when it is appropriate to enter a burning structure to conduct offensive operations. The choice depends on risk factors that are identified with respect to the size, location and stage of the fire, as well as the capabilities of the fire suppression force.

Before an interior attack can be initiated, the officer must be assured that firefighters and equipment available on the scene have the capability to conduct a safe and effective interior operation. The initial risk assessment must consider the possibility of saving lives, because the acceptable level of risk to save a life is higher than the acceptable risk to protect property. It must also consider the fire conditions and the risks they present to firefighters. If the first unit does not deliver enough personnel to conduct a reasonably safe interior attack operation, the interior attack might have to be delayed until additional personnel arrive. If the situation is too dangerous for safe entry, the plan should be limited to exterior operations.

Note: A similar determination must be made for many other types of emergency incidents. For example, in a trench rescue situation, the decision would be related to whether or not it is safe to have the first-arriving personnel begin to dig to rescue a trapped victim. If the risk to rescuers is excessive, a rescue attempt must wait until a specially trained trench rescue team arrives with the appropriate equipment and shoring. The decision depends on where and how the victim is trapped and the risk of further collapse that could turn the rescuers into victims. Similarly, in a confined space rescue incident, the first arriving officer must determine if personnel at the scene have the skills and equipment that are needed to initiate a rescue operation. If not, the rescue must wait until a specialized team responds.

Risk factors known and assumed

It is often impossible to obtain and verify all the pertinent information before making important strategic decisions. The decisions that guide initial actions must often be made with a limited amount of information, making allowances for factors that are not known. A rapid size-up seldom allows for a full evaluation of all the risk factors. An IC must consciously differentiate between factors that are "known" and those that are based on assumptions, experience and standard approaches. The IC must then place a priority on either confirming these assumptions or revising them as soon as factual information can be obtained.

Ongoing Incident Commander responsibilities

An IC is responsible for determining the operational mode, offensive or defensive, for the entire duration of the incident. After making an initial strategic determination, an IC should define tactical objectives and assign resources to perform specific functions. He or she must also begin to establish a command structure to effectively supervise the operation. Whenever command of an incident is transferred, the responsibility for strategic risk management is also transferred **(see Figure 3.4).**

Figure 3.4 — Transfer of command should occur at the CP.

Photo courtesy of Ron Jeffers, Union City, NJ.

Responsibilities at all levels

Officers and supervisors assigned at each level of the incident management organization must apply risk management policies within their areas of responsibility by following the strategic plan and the associated "rules" established by the IC. Keeping the IC informed is one of their major responsibilities. That is especially true if changing conditions indicate the need to change the strategic plan.

The single most important reason to establish an effective incident management structure is to ensure that operations are conducted safely. Every individual in the incident management structure is responsible for monitoring and evaluating risks and for keeping the IC informed of any factor that could be a reason to reconsider the risk management balance.

A risk assessment should be reprocessed with every observation and progress report. Every bit of new information that comes to the IC should be considered to see if strategy or tactics should be changed.

Roles and responsibilities

As indicated in **Table 3.1,** every individual in the emergency response system has a role in operational risk management.

Table 3.1 — Roles and responsibilities in operational risk management	
Role	**Responsibilities**
Incident Commander	Is expected to make strategic decisions based on risk acceptance or avoidance. Decisions are incorporated in the selection of offensive or defensive operations — a major component of the strategic plan for the incident.
Sector and Company Officers	Are expected to supervise tactical operations based on risk acceptance/avoidance in the situations they encounter within the areas they supervise. Their determinations must be consistent with the direction provided by the Incident Commander. They must keep the Incident Commander informed of any situations they encounter that may have an impact on the strategic plan.
Individual emergency responders	When no officer is present, might be called on to make personal decisions about risk acceptance/ avoidance, which must also be consistent with the strategic plan and with departmental policies. They also need to keep their officers informed of any significant information.
Incident Safety Officer On-scene Risk Manager	Is the risk management consultant for emergency operations The Incident Safety Officer is an advisor to the Incident Commander and should provide an overview of the situation specifically directed toward identifying and evaluating safety concerns.

Gathering additional information

The initial strategic plan is always subject to revision as the amount of confirmed information increases and the degree of uncertainty decreases. An IC must constantly seek out information to replace assumptions or perceptions with verified facts. Officers assigned to supervise different areas or functions are expected to provide regular progress reports to an IC. In addition, an IC must ask questions and actively seek information that is not always provided without prompting.

An IC should not hesitate to assign individuals to reconnaissance missions to observe conditions firsthand, or seek out information and report back to the Command Post (CP). An IC should always have this capability, even if it requires calling for an additional CO or Command Officer to perform this important function. At major incidents, reconnaissance can often be assigned to staff personnel who report to the CP, especially to individuals known to be particularly capable at gathering and managing information.

The role of the Incident Safety Officer

There should be a standard system for assigning an Incident Safety Officer at working incidents, preferably by dispatching someone (or more than one person) with this specific responsibility **(see Figure 3.5).** Whenever possible, the Incident Safety Officer should begin

by making a 360-degree survey of the incident scene to evaluate the overall situation and look for the following:

- ❯ Problems.
- ❯ Hazards.
- ❯ Inconsistent observations.
- ❯ Any other factor that could indicate a safety concern.

After making an initial survey, the Incident Safety Officer should report to the CP to discuss his or her observations and safety concerns with the IC.

Balancing perspectives

The Incident Safety Officer does not relieve an IC of the responsibility for managing risk at an incident. By the same token, an IC should be able to rely on the Incident Safety Officer to provide a balancing perspective on the situation. An IC should look at a situation as, "How to get the job done and operate safely." The Incident Safety Officer should look at the situation as, "How to operate safely and still get the job done."

In most cases, the two perspectives should lead an IC and the Incident Safety Officer to reach the same conclusions. If they do not, the IC must recognize the possibility of a problem and rethink the risk analysis.

Figure 3.5 — The safety officer must be able to visualize the entire incident scene.

Photo courtesy of IFSTA/Fire Protection Publications.

Application of risk management policies

An IC has to successfully balance two sets of factors:

1. Those that determine the nature and extent of operations.
2. Those that address the safe conduct of operations.

This section explores some of the complexities involved in trying to consistently apply risk management policies to determine the nature and extent of operations.

The operational risk management guidelines defined earlier establish a simple framework that should serve as the basis for operational risk management decisions. Many situations are complicated. It is often difficult to interpret how a policy that is stated in general terms relates to a specific situation. An IC is expected to:

- ❯ Use judgment and experience.
- ❯ Make reasonable decisions in the application of policy guidelines.

An IC has a wide span of discretionary authority for making risk management decisions. A strategic plan must not needlessly place the lives of emergency responders in danger, but it should not be so over-cautious that it allows a fire to destroy property that could be saved, or keeps other valuable functions from being performed. The ultimate test of a risk management decision is whether or not a reasonable, well-informed person would find the decision appropriate under the circumstances.

Experience and judgment

The circumstances responders actually encounter in emergency incidents are often very complex. That fact can make it extremely difficult to apply the required policy guidelines to each particular situation. The application of policy guidelines requires specific skills at obtaining, considering and applying information. A combination of experience and judgment are essential to perform the actual evaluation of the risk factors.

Unoccupied, vacant and abandoned buildings

As **Table 3.2** shows, the distinguishing characteristics of unoccupied, vacant and abandoned structures influence an ICs' decisions. Fires in vacant, unoccupied or abandoned buildings are a problem to many fire departments. The fundamental risk management guidelines state that the lives of firefighters should not be risked where there is no possibility of saving lives or property. That would restrict entry into many vacant or abandoned structures to conduct interior operations on the basis that there are no occupants and there is nothing of value to be saved.

Table 3.2 — Distinguishing building characteristics	
Describe a building or structure as …	Implies
Unoccupied	That it has no contents and is suitable for occupancy; however, no one is present at the time of the incident.
Vacant	That the interior space is not currently in use and presumably has neither contents of value or occupants. However, the structure itself might be considered valuable property.
Abandoned	That it has no value that justifies the level of risk associated with an interior, offensive operation, unless the possibility of transients in the building exists.

The first priority in a fire suppression operation is rescue. Many fire departments operate with the assumption that there could be occupants in any building. As long as it is reasonably safe to enter, they attempt to conduct a search of every occupancy. If the structure (or part of it) is fully involved in flames, there is no reasonable possibility that anyone could be alive to rescue and no reason to conduct an interior search.

Unoccupied and vacant structures could justify operations that involve a limited amount of risk. It could also be appropriate to enter an abandoned building to conduct a rapid search if there is reason to believe that it might be occupied by transients or other "unofficial" occupants. Some deciding factors to be weighed:

- ❯ The extent of the fire.
- ❯ The structure's condition.
- ❯ Whether it is truly abandoned or simply vacant.

Judging the risks of abandoned structures

Firefighters arriving at a small fire in an abandoned building might have to consider the risks they could encounter in an interior attack versus the consequences of not attacking the

fire. There might not be any justification to risk the lives of firefighters to save a worthless structure, but it could be possible to justify making entry to extinguish an incipient stage fire or a fire that is contained within a small area. If the fire can be safely controlled, an interior attack might involve less risk than staying outside and letting the fire grow.

This type of attack is justifiable only when not attacking and controlling the small fire would expose firefighters to a greater risk. If entry is made in this type of situation, it must be very cautious and closely supervised.

Risk to the community

The risk evaluation might have to consider more than the structure that is on fire. A fire that grows to fully involve a large abandoned building could create a significant risk of fire spread to occupied exposures or to the surrounding area. The IC might have to weigh the risks of an offensive attack against the risk of fire spread to the exposures.

If the exposures can be protected without exposing the surrounding community to excessive risk, the IC can evaluate the risks to firefighters in relation to the building that is on fire. If the resulting fire cannot be contained to the abandoned building, the risk evaluation should also consider the potential consequences of a fully involved structure.

Unusual situational risks

There are many additional examples of situations in which good judgment is clearly required, considering the health and safety of firefighters in relation to the potential consequences of different strategies. The potential consequences often have to be considered in determining the level of risk that is acceptable.

Here are two examples:

1. A building could be known to contain hazardous materials that would cause a massive contamination problem if water runoff carried them into a nearby river. That possibility could make it unacceptable to fight a fire, causing the fire department to limit control actions to protecting exposures.

2. In another situation, should a fire be allowed to burn, the release of toxic products of combustion could result in the greatest risk. In some cases, the risk of exposing firefighters to hazardous materials could make it unacceptable to enter. In other cases, entering and controlling the fire before it reaches the hazardous materials could be the best plan to protect the firefighters and the community from a greater risk.

Unusual structural situations

Firefighters should never assume a situation is "routine." They should always be looking out for situations that present unusual risks. Well-developed sources of information can uncover hundreds of factors that might draw immediate attention to the possibility of high risk. When any of those factors are seen or reported, an IC should automatically do the following:

❯ Reprocess risk management decisions already made.
❯ Re-evaluate the strategy adopted for the incident.

In "Fire Command: The Essentials of Local IMS," retired Fire Chief Alan Brunacini of the Phoenix, Arizona, Fire Department points to three components that comprise incident information management:

1. Visual reconnaissance.
2. Preincident planning.
3. Familiarity with the location or situation.

Examples of these include the following:

❯ Buildings with grade level entrances on different sides that lead to different interior floor levels. That could cause confusion about the level where different crews are operating above, below or on the same level as the fire.

❯ Buildings that have been remodeled, where interior supports may have been removed or replaced with inadequate construction.

❯ Buildings with extra roofs, floor coverings, or ceilings that conceal the original construction. Such spaces make it impossible to evaluate the structural characteristics and might allow a fire to grow and extend.

❯ Buildings with engineered, lightweight structural systems, such as lightweight wood trusses, that are susceptible to sudden and early collapse.

❯ Buildings with unexpected interior shafts or stairways that could allow a fire to extend to an upper level.

❯ Buildings with complicated interior arrangements and long travel distances to entry and exit points.

❯ Interconnections between buildings that cannot be easily interpreted from the exterior arrangement.

Evaluating information from different sources

While conducting operations, an IC should carefully evaluate information and reports that come from sector officers or other individuals, and should consider their consistency. Communication starts with knowing how to listen carefully and critically. If information does not appear to make sense, an IC should question and verify it. An IC should always take a pessimistic view of conflicting or uncertain information. It is alright to hope for the best, but plans and actions should always anticipate the worst predictable outcome. Some examples:

❯ Reports from different sources that describe inconsistent fire conditions. One observer might report "fire under control," while another reports heavy smoke or fire conditions. The discrepancy suggests they are looking at different areas, or that one does not know about fire conditions that are evident to the other. Crews operating in the area where the fire appears to be under control might be in serious danger if they do not know where the fire actually is or if it is still burning.

❯ Evidence of a significant interior fire that cannot be located should sound a warning to the IC. Crews working in a smoke-filled building might be unable to find the fire; although, at the same time, the continuing or increasing presence of heavy smoke suggests that a significant fire is burning somewhere inside the structure. The risk of a sudden outbreak of fire or a structural collapse increases with time spent on the scene.

An IC and other officers should look for unusual colors or movement of smoke. Smoke movement often provides good information about the size and extent of a fire. A distinct thermal column and rapid smoke movement would suggest the presence of a hot fire, possibly in a concealed space.

The time factor

One of the major challenges in operational risk management is the time factor. The most critical decisions often have to be made very quickly and under great pressure. An IC must be an efficient decision-maker, able to quickly do the following:

- ❯ Recognize dangerous situations **(see Figure 3.6).**
- ❯ Evaluate information.
- ❯ Make decisions.

Figure 3.6 — Fire personnel must be constantly aware of potential changes to fire intensity and structural integrity.

Photo courtesy of Chris Mickal, New Orleans (LA) Fire Department Photo Unit.

Some emergency responders tend to be more inclined to take action than to stop and compare the risks that could be involved in alternative approaches. Individuals who have to make risk management decisions must be able to gather and process information efficiently and to think clearly and quickly in stressful situations. In some cases, they must slow down action-oriented individuals to provide time to evaluate the situation.

Time tends to work against a decision-maker in high stress situations. The time that is available to make decisions passes very quickly, while the time it takes for information to be gathered and reported seems to take forever. It is easy to lose track of time in a stressful situation. A system that reminds the IC when each 10 or 20-minute period has elapsed is a valuable addition to an incident management system.

In many cases, particularly in fires where the structure is deteriorating as long as the fire continues to burn, the risk factors will also change with time. If a fire is not controlled, interior crews must be withdrawn and regrouped in safe areas before a structural collapse occurs. Waiting to see what happens may prove to be a fatal error.

Rules of thumb

These are some "time factor rules of thumb" for structural collapse:

❯ An ordinary construction building is susceptible to structural collapse after 20 minutes of fire involvement.

❯ A lightweight wood truss structure may collapse within 10 minutes.

❯ A fire in a fire-resistive building may withstand full involvement of a fire area until all of the available fuel is consumed.

Unacceptable risk

There are many situations that require an IC to exercise judgment to determine the acceptable level of risk. There are other situations in which, under almost any conceivable circumstances, the level of risk is clearly unacceptable. When an IC encounters such a situation, he or she must be prepared to direct a course of action that avoids the danger. Examples of these situations include the following:

❯ Fighting fires that could involve explosives.

❯ Conducting interior operations in a structure that exhibits signs of imminent structural collapse. (Any individual who spots evidence of such a condition should immediately see that the IC is made aware of it.)

A fire department officer should have a good knowledge of situations that are outside the limits of acceptable risk exposure and should know how to quickly recognize and react to them. Many risk-laden situations can be identified through inspection activities or preincident planning visits. When situations are found that would create an unacceptable risk, they should be documented in a manner that supports training and hazard awareness, as well as in a way that provides critical information for an IC, should an incident occur at the location.

Focus

There are often many distractions at the scene of an incident that could keep an IC from focusing on (and processing) important risk evaluation factors. That possibility reinforces the importance of making risk assessment a standard part of the process of commanding incidents. If an IC thinks about risk factors in every situation, risk evaluation will become a priority among the distractions of a complex situation.

Thinking ahead of the incident will also help an IC make difficult decisions under the pressure of time. Many situations and circumstances are predictable, whether it is an anticipated fire in a particular building or a predictable situation that could occur in a variety of locations and circumstances. If potential situations can be predicted, and the risk factors can be thoroughly evaluated in advance, when there are no time pressures, an IC only has to recognize that situation when it occurs and has to implement the planned strategy. For example, if an imminent risk of structural collapse is identified, the IC should be prepared

to immediately withdraw all companies from the interior or exposed positions, to conduct a personal accountability of all personnel, and to regroup the operating companies for defensive operations.

Conducting operations safely

The previous section dealt with determining the nature and extent of operations based on reducing the potential for risk to emergency responders at a reasonable and acceptable level in a wide variety of situations. In this section, we will give equal consideration to the safe conduct of operations that limit risk to an acceptable level.

Avoiding operational risks must begin long before an incident occurs. For example, many operational risks could be avoided if fire prevention activities were effectively implemented. When prevention fails, fire departments respond and must face operational risks. To fully avoid operational risk, a fire department would have to take such a cautious approach that it would accomplish very little in the sense of saving lives or property. In many cases, the best way to minimize overall risk is to take decisive action, using all the force necessary to effectively control a problem while it still can be managed.

Emergency operations must always be conducted as safely as possible. Even during potential rescue situations, in which the maximum exposure to risk is permissible, standard safety rules are not suspended. Whether the acceptable level of risk is high or low, the operation must support safe operations with every available skill and technological resource.

Definition of acceptable risk

No on-duty firefighter fatality or serious injury can truly be considered acceptable. However, after taking every reasonable precaution, there is the possibility that a firefighter could be injured or killed. The threshold of acceptable risk is set higher when there is an expectation of saving lives. No property is worth risking the life of a firefighter.

Accepting inherent risks

The risks that are inherent in firefighting and other types of emergency operations are considered acceptable, yet they are significant. After all, it is very possible to be seriously, perhaps fatally, injured as the result of an inherent risk. Then why are inherent risks generally considered acceptable? The risks are considered acceptable only because firefighters and emergency responders are trained, equipped, prepared, and organized to conduct operations with a reasonable degree of safety in dangerous environments. The preparedness makes the inherent risks acceptable.

Operational modes of firefighting

Operational firefighting strategies are based on two distinctly different modes of operation: offensive and defensive. Offensive operations occur when firefighters are in close contact with a fire, inside a building, and exposed to all the potential dangers that exist in that environment. They are dependent on their protective clothing and equipment for protection. When conducting defensive operations, firefighters should be outside the area of direct exposure. Still, many things could happen to injure firefighters. For example, the IC must ensure that all personnel stay outside an area identified as dangerous, including outside the range of falling walls.

Why Incident Commanders might change strategy

Often, the initial action occurs in the offensive mode because occupants are believed to be inside and in need of rescue. Then conditions change. They reach a point at which there is no further possibility that lives can be saved. All occupants may have been removed and accounted for, or the fire may have grown beyond a point where anyone could survive. When that happens, the IC has to re-evaluate the original determination of acceptable risk, now based on the possibility of saving property. The overall situation might no longer support continued interior offensive operations. If the IC determines that the potential benefits no longer justify the risks, he or she must change the strategy from interior offensive operations to exterior defensive operations.

When to change strategy

An IC must change the operational strategy whenever the level of risk deemed to be acceptable for operating personnel is exceeded — either because the situation has changed from a life-saving to a property-saving operation, or because an interior offensive fire attack is not controlling the fire. If that happens, firefighters must be removed from the interior before they are trapped by flames or buried by a structural collapse. An IC must always anticipate the likelihood of deteriorating conditions and be prepared to change his or her strategy on extremely short notice.

The IC should be outside at a CP where the primary tactical-level on-scene incident command functions are performed. This is where it is possible to evaluate the "big picture" and direct operations in an environment that is conducive to managing information and communications. Often, the IC has to depend on other individuals to provide information about changing conditions that are not visible from the CP, particularly interior conditions. At the same time, interior crews have to depend on the IC's ability to evaluate conditions, because their ability to evaluate a situation may be very limited. (It is difficult to evaluate conditions effectively while wearing breathing apparatus and operating a hoseline inside a smoke-filled building.) The IC has to depend on others to report information, particularly risk-related information, and the interior crews have to trust the IC's judgment to decide when it is time to retreat.

Implementing a change in strategy

When the strategy is changed from offensive to defensive, participants are removed from the danger area to operate from positions where there is the least possible risk of accident or injury. To implement the change, an IC should do the following:

❯ Order all interior attack crews to immediately abandon their efforts and evacuate to a safe position. (This can be accomplished by a distinctive radio notification and by other methods, such as sounding apparatus air horns.)

❯ Conduct a positive accountability check to ensure that all personnel have evacuated and removed themselves to safe positions.

Interior crews must be prepared to react to a change in strategy without hesitation or delay. An IC should initiate exterior attack operations only after verifying the safety of all personnel through the personnel accountability system.

Standard operating procedures

SOPs or SOGs establish the basic framework for conducting emergency operations safely and effectively. Some procedures are specifically directed toward safety; others support safe operations by establishing a system of predictable and consistent operations. Coordination, consistency and standard approaches are all important and valuable components of safe emergency operations. One key component of operational risk management is to ensure that operations are always conducted in a standard manner that incorporates a full range of safety considerations.

The need for a consistent approach to safety

Consistency in operational risk management begins with:

❯ Establishing safety procedures.
❯ Obtaining full documentation.
❯ Training all members of the organization in the application of those procedures.
❯ Ensuring that required procedures are consistently implemented at every incident.

A consistent approach to safety requires that all the applicable SOPs are actually followed **(see Figure 3.7).** The only thing worse than having no safety procedures might be to have procedures that are not consistently applied and enforced.

Figure 3.7 — Consistent approach to safety.

Consistent Approach to Safety

DO THE RIGHT THINGS

DO THEM THE RIGHT WAY

ENSURE THEY ARE BEING DONE THE RIGHT WAY
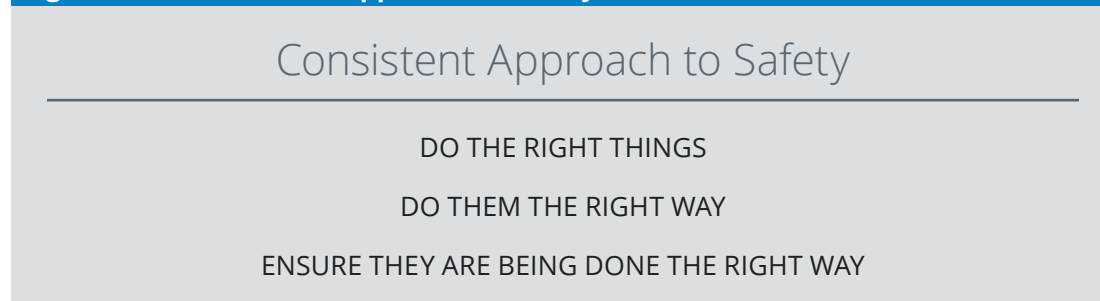
Components of a basic operational system

Important safety-related components and considerations that should be established within a fire department's basic operational system include:

❯ Preincident planning information.
❯ Communications.
❯ Accountability system.
❯ Rapid Intervention Teams (RITs).
❯ Rest and rehabilitation.

Information from preincident planning

ICs are generally pressured by time and must rely heavily on rapidly gaining information visually and by reconnaissance. Commanders usually acquire visual information by personally surveying the scene. Reconnaissance information is usually gathered by others who are assigned to this task by the IC.

An IC can also obtain valuable information from other agencies' formal prefire planning or from other activities that provide useful information. Having access to previously generated sets of facts about a structure or a given situation:

❯ Can provide an IC information that is more complete than would be available through other methods.

❯ Can allow the IC to re-allocate personnel who might have been assigned to reconnaissance and obtaining information on the scene.

❯ Can save valuable time that would be needed to gather information.

Preincident planning and managing information are critical components of the incident risk management system.

Communications

To direct an emergency operation, an IC must have an effective communications system. All interior crews should have portable radios to maintain contact with the IC or their sector supervisor. A reliable two-way radio link between an IC and each operating sector officer, group, company, attack team or other organizational unit provides the means for:

❯ Operating personnel to call for assistance if they need to be rescued.

❯ The IC to direct personnel to evacuate a building or take other actions when he or she recognizes an imminent hazard is recognized or reported.

❯ All personnel to be aware of any changes in the Incident Action Plan (IAP).

A standard protocol should be established for transmitting emergency messages to ensure that they receive priority over all other radio traffic. The radio channel used for tactical communications (tactical channel) at the incident scene should be reserved for that purpose to ensure that unrelated radio traffic does not block out critical messages.

The tactical channel should be used by all units working at the incident, and a designated individual at the CP must constantly monitor the channel for messages concerning safety-related situations or emergencies. Where multiple radio channels are used, there should be one dedicated channel for any unit that needs emergency assistance. That channel must be constantly monitored at the CP.

A personnel accountability system

A personnel accountability system should be employed at emergency incidents to keep track of the location, assignment and welfare of all personnel operating in hazardous or potentially hazardous areas **(see Figure 3.8).** The system should keep track of individuals assigned to each company or team working at the incident scene. It should be used to verify the status of each company or team at regular intervals. An immediate priority must be placed on locating anyone who is not confirmed to be safe when an accountability check is made. A full accountability check should be made when designated events occur, such as:

❯ An evacuation of interior crews.
❯ A switch to defensive strategy.
❯ A report of personnel in trouble.
❯ The reaching of a benchmark.

The ability to use an effective accountability system depends absolutely on the following:

- An effective incident organization.
- A realistic span of control.
- Capable supervisors at every level.
- Recognized responsibilities at all levels.
- All players buying into the process.

Rapid Intervention Teams

Assigning one or more RITs at working incidents provides the ability to immediately initiate a rescue effort to locate, rescue or assist any firefighters (or anyone else) who are in trouble at the scene of an incident. RIT members should be standing-by wearing their protective clothing with SCBA ready for immediate use. They should have forcible entry tools, rescue rope, and any other equipment that could be needed quickly. At hazardous materials incidents, or other situations where special protective equipment is required, the RIT should be ready with the same level of protective clothing and equipment as the entry team requires.

Rest and rehabilitation

Crews who are fatigued are much more susceptible to accidents and injuries than fresh, well-rested crews. The standard operational approach should provide the following to avoid fatigue and exhaustion among crew members:

- Monitored periods of rest.
- Rehabilitation.
- Fluids at regular intervals.
- Medical evaluation.

Figure 3.8 — All members must use the accountability system and procedures in order for it to be effective.

Photo courtesy of Ron Jeffers, Union City, NJ.

Overhaul and salvage

Many fireground injuries occur after the fire is under control — during salvage, overhaul, investigation and returning to service phases of an incident. These activities are usually considered nonurgent priorities. However, this may be the most dangerous time for firefighters, and safety must remain the primary concern. It is often advisable to withdraw crews and assign sector officers or the Incident Safety Officer to conduct a complete survey of the damaged area before assigning personnel to complete the remaining tasks. This survey can identify hazards that must be avoided and can determine where it is safe to operate. It also provides time to set up portable lighting and ventilation fans to eliminate hazards before assigning any crews to work in these areas. Protective breathing apparatus and personal protective equipment (PPE) should not be removed during these operations.

Limiting risk by carrying assigned responsibilities

Fire suppression operations should be conducted by well-trained, well-equipped firefighters, operating under an effective incident management system and working in teams under the supervision of capable officers to perform assigned tasks that have been coordinated within an IAP **(see Figure 3.9).**

Figure 3.9 — Fire attack must be a well-coordinated effort.

Photo courtesy of Ron Jeffers, Union City, NJ.

The IC establishes the overall strategy that defines the acceptable risk level for an incident. The responsibility for managing risk extends throughout the incident management structure. It includes every level from incident command down to the individual firefighters who must be able to recognize hazards and avoid unnecessary risks. The IC must effectively communicate the strategic plan to every part of the organization and must ensure that everyone understands his or her assignment.

Whether or not they agree with the IC's assessment of the situation, subordinates are expected to follow the directions that come down the chain of command. They have to feed information back up the chain of command to keep their IC aware of what is happening.

There is no absolute measure or definition of an acceptable level of risk exposure for individual firefighters performing their duties. Some individuals or crews might be willing to accept a higher level of risk than the organization or the IC are willing to authorize. From their limited perspective, they might be unaware of critical information, or they might simply be willing to expose themselves to a higher level of risk.

A fire department establishes the context in which risk acceptance/avoidance decisions are made. Risk management policies and approaches should be part of the organizational culture — defined by policy, supported by training, and applied with experience and judgment. Operating outside the established system should never be accepted.

A consistent approach and application of safety procedures should establish a basic level of operational safety for the organization. At each incident, the IC adds situational judgment that defines the level of risk exposure for that incident. The operational discipline of the organization must require everyone to follow orders, even if they feel their actions are being unnecessarily restricted.

Personal protection

The ability of fire departments and emergency response organizations to operate safely is constantly improving as advancements are made in personal protective clothing and equipment. These advances have actually reduced the risk of injury or death during operations that were already considered "reasonably safe" in many situations. The margin of safety has been improved for users who are performing the same operations.

The improvements in personal protection have also expanded the range of conditions where firefighters can operate without being injured. In the past, firefighters' levels of exposure were often regulated by the limited protection provided by their protective clothing. Working with exposed ears, poorly insulated gloves, and wearing coats and three-quarter length boots that provided limited insulation, firefighters were able to sense the heat. They were often stopped from further penetration by the threshold of pain. First- and second-degree burns to ears, knees and wrists often provided evidence that firefighters had advanced as far as they could into a superheated atmosphere.

Note: Members must take time to ensure they are wearing appropriate personal protective clothing and equipment. Check each other. No exceptions.

Protection is limited

Firefighters should wear full protective clothing ensembles that meet current standards. Breathing apparatus and PASS should be checked and function-tested at regular intervals to ensure they will perform reliably. Facepiece fitting should be tested regularly. Firefighters should be trained to achieve a high level of confidence and familiarity with their breathing apparatus. Major advances, based on extensively monitoring the environment to which firefighters are exposed, were made in the development of protective clothing and equipment. Levels of exposure to different temperatures were evaluated to establish performance standards for protective clothing, including relative exposure to radiant, convective and conductible heat. The new generation of protective clothing is designed to prevent burns to a firefighter who is caught in a flashover for 10 to 20 seconds. The level of risk to the firefighter is significantly reduced in relation to the atmosphere for which it was designed.

Personal protective clothing and equipment provide limited protection from the heat of a fire. It is very difficult to control the direct exposure of firefighters who are engaged in interior fire attack operations. In many cases, only the individual members who are actually making the attack are in a position to evaluate the interior fire conditions.

Personal protection benefits and concerns

Improved protection might also allow users to increase their penetration into a fire atmosphere, knowingly or unknowingly. Although many injuries have been prevented or reduced in severity with the protection provided by new clothing, the risk balance shifts in the wrong direction if the extra protection causes firefighters to be exposed to a more dangerous situation.

How could that happen? Firefighters might be able to get in deeper and control fires where they could not previously penetrate, but they might also be unable to sense the danger of a hotter atmosphere or rapidly increasing temperatures. In this situation, they might unwittingly expose themselves to an increased risk of severe injury.

An IC at an exterior CP cannot manage this type of risk. If conditions appear to be too dangerous from an IC's vantage point, they must withdraw firefighters from the interior. The operation must switch from offensive to defensive operations.

It is virtually impossible for an IC outside a structure to fully evaluate conditions inside. In most cases, the risk of penetration into the fire atmosphere can be monitored and evaluated only at the place it occurs. An IC has to depend on COs, sector officers and the Incident Safety Officer to help him or her:

❯ Observe and evaluate conditions.
❯ Monitor the level of exposure.
❯ Control the actions of the attack crews.

The advances that have been made in protective clothing and equipment must be matched with closer supervision, coordination and communications. Training, SOPs and experience are also important factors in controlling the exposure to excessive risk and conducting safe operations.

Preparation for incident command

As noted in the previous section, an IC has a wide span of discretionary authority for making risk management decisions. There is no easy way to develop good judgment; some individuals are more capable in this regard than others. That factor should be considered in making promotions and assignments. Experience is always valuable. Gaining experience takes time, and experience can never address every situation an IC might face. Also, there is always a first time for any occurrence to happen.

ICs can improve their abilities and self-confidence in making judgmental decisions through several different methods, beginning with a thorough understanding of the basic policies and their application to specific situations. Experience can be expanded and shared in the following ways:

❯ Training.
❯ Studying reports of incidents that have occurred.
❯ Attending critiques.
❯ Carefully observing as many operations as possible.

Every fire officer and potential emergency IC must be prepared to make critical risk management decisions. An effective IC must be able to evaluate situations and predict outcomes. If the outcome of a situation is predictable, the IC can take action to minimize the exposure of danger to operating personnel. If the outcome is not predictable, or the indicators are not recognized, situations might be left entirely to chance.

To be prepared to make good risk management decisions, a Command Officer has to develop a foundation of knowledge, judgment and experience. The ability to predict outcomes and exercise good judgment must be based on either personal or shared experiences. The risk assessment process should be internalized well in advance of an incident in which its application might be a matter of life or death.

Experience is a job requirement

One of the best ways to develop a base of experience is to consciously identify and evaluate the risk factors that apply to each emergency incident and to practice making judgmental risk management decisions. The conscious application of the risk evaluation process is a good start, but few individuals have the opportunity to personally experience a full range of situations before they are called upon to use their risk management skills.

A fire officer must be able to evaluate situations and predict their potential outcomes — particularly high risk situations that might result in very bad outcomes. If the danger is recognized, the IC should be able to determine the appropriate course of action to reduce, minimize, or completely avoid the risk. Judgment is important to differentiate risks that are acceptable from situations that are too dangerous.

The need for judgment

The application of risk management policies relies heavily on the judgment of officers and supervisors, as well as individual firefighters and emergency responders. A capable CO or Command Officer must be able to predict what is likely to happen in a wide variety of situations and to weigh the risks against the potential benefits of different actions. Actual and potential dangers must be recognized, evaluated and placed in perspective in relation to the three guidelines that define acceptable risk (referred to earlier). The ability of trained and experienced officers to make appropriate risk assessments and apply risk management policies requires good judgment.

Judgment is often associated with experience. Personal experience is probably the easiest way to develop good judgment, but in today's reality, a total reliance on experience as the basis for judgment is inadequate. There are far too many lessons to be learned about managing operational risk and too few occasions to develop the necessary experience. In addition, there is no assurance that the experience will come before the situation that requires the best judgment. There isn't time to wait for the experience to develop the judgment.

Developing judgment

A responsible officer must make a full spectrum of efforts to learn about the subject matter that forms the foundation for good judgment by doing the following:

- Taking courses that include operational safety.
- Reading books.
- Studying reports of incidents that have occurred in other jurisdictions.
- Attending critiques.
- Looking at buildings under construction and demolition.
- Looking at buildings where fires have occurred.
- Visiting properties to develop prefire plans.
- Simulation-based training/critiques.

Training for officers and ICs should provide a thorough understanding of the principles of operational risk management and the opportunity to practice their application in exercises and simulations. That type of training is essential to prepare individuals who might have to make critical decisions in situations they have never personally experienced.

Even those officers who respond to a large number of incidents generally face only a few situations that are truly challenging. The relatively large percentage of situations that are uncomplicated and easily controlled tends to make it even more difficult to rely on personal experience to recognize crises and act appropriately. As a result, many ICs rarely get enough "real world" experience to develop solid judgment and decision-making skills. That's why training that provides the opportunity to develop command skills is critically important. Simulations followed by thorough, detailed critiques provide essential learning experiences for all potential ICs.

ICs must develop a discipline for managing incidents systematically, by consistently applying the process and the principles to all types of situations. The regular application of the process will help to develop the habit of approaching every situation in a standard manner. This discipline is essential to avoid the situation in which an IC, facing a critical incident, has to apply an unfamiliar process to fulfill his or her risk management responsibilities.

Judgment under stress

There are times when critical risk management decisions must be made under conditions of extreme stress, with incomplete information and with only seconds to evaluate the alternatives. An IC must be prepared to decide if a given situation justifies the exposure of responders to the degree of risk that would be involved in implementing different strategies. Those determinations must be based on judgment that allows an IC to apply the principles of operational risk management.

Predictability

The ability to anticipate the outcome of emergencies is an essential component of a risk manager's effectiveness. Once a dangerous situation is recognized, it is usually possible to avoid or prevent the undesirable outcome. As Gordon Graham, retired risk manager of the California Highway Patrol, has said, "If it is predictable, it is preventable."

An IC must have these abilities:

❯ Recognize dangerous situations.
❯ Predict what could happen.
❯ Take action to avoid the predictable danger.

An IC should never find themselves in the position of having to say, "I realized what could have happened, but all I could do was hope for the best." In many cases, the explanation for an unfortunate outcome has been, "We recognized the danger, but we took a calculated risk." In many situations, that means somebody recognized danger and did nothing to prevent the occurrence.

The IC should be pessimistic. When an IC recognizes a risk factor that could result in a bad outcome, he or she should make the avoidance of that bad outcome an integral part of the strategic plan. The IC should evaluate the steps that will either prevent it from happening or protect firefighters and emergency workers from harm if it does happen. Possible risk reduction or avoidance actions must be considered in relation to the probability and potential consequences of the negative outcome. These actions must also be balanced against the need to take action to control the emergency.

Do not rely on good luck

An IC should never rely on good luck to make an operation safe and to keep a predictable outcome from happening. Bad luck can ruin a good operation. There are some unavoidable risks that are virtually outside of anyone's control. Those are the inherent risks of conducting emergency operations. Fortune and misfortune definitely play a part in determining outcomes, but they should have an impact only in circumstances that are beyond the control of an IC.

Recognition of dangerous situations

An IC must have the ability to quickly recognize and react to dangerous situations **(see Figure 3.10).** The process of looking out for indications of danger should be a routine part of the incident management process. It extends to everyone involved in operations at the scene. The IC and everyone else involved in the incident should always be on the lookout for indications of potential danger.

Figure 3.10 — The IC must always be alert for signs that the intensity or danger of the incident is increasing.

Photo courtesy of Chris Mickal, New Orleans (LA) Fire Department Photo Unit.

Balancing probabilities and consequences

Risk management always involves balancing probabilities and consequences. There is at least a remote possibility that any burning building could collapse because of some undetected flaw in the construction. That said, it is also true that firefighters cannot effectively control structure fires if they stay out of every burning building. They must be able to recognize buildings that have characteristics that make them more susceptible to structural collapse. There is no excuse for having firefighters buried in the rubble of a building that exhibited recognizable warning signs or characteristics prior to collapse.

In emergency operations, it is often necessary to work with the recognition that something bad could happen. It would be impossible to take effective action without facing some danger. There are some overwhelming potential dangers that are always at least remote possibilities. A trained and experienced officer must develop the ability to recognize dangerous situations and predict outcomes. Once the danger is recognized, the risk assessment has to consider the probabilities and potential consequences to decide if the predictable outcome is unacceptable.

Training and education

It is difficult to train an individual to exercise good judgment. Judgment is highly dependent on experience, which must be acquired and internalized; however, the fundamental principles and application of risk management can be learned. Training should also allow an individual to learn about different situations that have occurred, so the indicators can be recognized, even if the individual has never had the personal experience.

For example, a fire officer must know that lightweight wood truss construction floors and roofs are likely to collapse without warning if the trusses become involved in a fire, even if they have never actually seen it happen. An officer must know about the risk, recognize the type of construction, and know where it is likely to be encountered. Similarly, an officer must know about the risk of a **B**oiling **L**iquid **E**xpanding **V**apor **E**xplosion, even if they have never encountered a burning propane tank. Fire officers should also learn to beware of buildings with entrances on multiple levels that might confuse companies operating on different floors. They should recognize occupancies that are likely to have hazardous contents.

Important experience can be acquired through training that gives an officer the opportunity to relate risk factors and indicators to predictable outcomes. Proven methods:

- ❯ Classes.
- ❯ Seminars.
- ❯ Books.
- ❯ Videos and other media.
- ❯ Simulations and critiques.

It is critical that fire officers also study published incident reports, particularly reports about incidents that resulted in injuries, fatalities or close calls, to determine significant factors in each case. Doing that should prepare an officer to quickly recognize situations that indicate an increased level of risk (such as buildings with lightweight construction components or components that are susceptible to sudden failure) and see how it corresponds to the policies, procedures and trainings of their own organization.

Critiques

Participation in incident critiques should be an important part of the learning process for everyone who responds to emergency incidents **(see Figure 3.11).** Fire officers should carefully review every incident in which they have been involved and use each new experience to expand their personal risk evaluation skills. Looking back, after having seen the outcome, each significant incident allows the participants to focus on the accuracy of their observations and their analysis of the situation.

Figure 3.11 — A formal post-incident critique may be conducted in a comfortable setting well after the incident has ended.

Photo courtesy of IFSTA/Fire Protection Publications.

The learning experience in a critique can be shared by others who were not involved in the incident or in the direction of the operation. One of the most important values of a critique comes from the capacity to replay, in light of the known outcome, the thought process that went into making strategic and tactical decisions. Officers who were involved in the decision-making process should discuss what they saw and how they interpreted the situation. Then they should explain the decisions that were made based on that information. A critique provides an opportunity for others to share the experience of using information and observations to predict outcomes.

Observation

Personal experience should also be supplemented by observing as many incidents as possible. It is often revealing to stand back at a safe distance and watch what is happening at an emergency scene. The "big picture" might be quite different from the narrow perspective that is available to the participants, who might be seeing only a small part of the situation. Monitoring radio traffic also helps to compare visual observations with information reported over the radio from different positions and vantage points. A fire officer should also develop the skill to look for risk indicators in occupancies and locations where they may have to respond at some time in the future. Preincident plans should be developed for high risk occupancies, particularly where the risk indicators are not easily recognized. An observant risk evaluator should always be looking for indications of risk factors.

Some of the most important characteristics of fire behavior can often be interpreted by observing the behavior of smoke and flames and their relationship to the building. Visual clues may also provide important evidence of structural weaknesses. The IC should try to establish the CP at a location that provides a good view of a fire scene. If the IC cannot make a personal 360-degree size-up, he or she should assign personnel to make a full visual survey and report back to the CP.

Practice

The IC must have a well-developed sense of the priorities that will have to be applied to actual situations, based on actual incidents that have occurred, as well as on hypothetical situations that can be imagined or predicted. Aspiring ICs should try to apply this value system to situations that are likely to occur in the particular area where they may be called upon to make those decisions. Working out situations in advance can prove to be extremely valuable when the real situations have to be confronted.

Investigations

The investigation of accidents that occur during emergency operations is an essential component of operational risk management. Those events illustrate the weaknesses of established approaches and identify areas in which improvements are needed.

Although some injuries are unavoidable, they should never be considered acceptable. All injuries should be investigated. The results should be used to reduce the probability of a reoccurrence. In fact, the primary purpose of any safety investigation should always be to reduce the probability of future accidents.

Line-of-duty deaths (LODDs) must always be thoroughly investigated to determine the cause and the steps that are necessary to absolutely keep it from happening again. A fire department should be prepared to immediately launch a full-scale safety investigation when a death or injury occurs. "The Guide for the Investigation of a Line of Duty Death" published by the International Association of Fire Fighters, and the "Firefighter Autopsy Protocol" published by the USFA, are recommended references.

An investigative report example

The following section includes portions of a firefighter fatality investigation developed by the City of Charleston after a fire claimed the lives of nine firefighters on June 18, 2007. The report demonstrates the complexity of a major incident and the difficulties that can be encountered in trying to identify, evaluate and manage the risks that might be present.[1]

Charleston Sofa Super Store Fire — Risk assessment

The importance of conducting fire suppression operations with a "risk management approach" is emphasized in NFPA 1500. The application of the risk management concept to this incident is particularly significant. The risk assessment must be based on a combination of factors, including a size-up of the structure and the fire conditions. The IC seldom has complete knowledge of all the potential risk factors during the early stages of an incident. Operations must often be initiated based on the best information that is available and then adjusted as additional information is obtained.

The fire occurred in a building that was occupied by two operating businesses and was reported by a tenant who detected smoke. The situation observed on arrival appeared to be an exterior fire extending to the interior. The structure appeared to have many of

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[1] J. Gordon Routley, Michael D. Chiaramonte, Brian A. Crawford, Peter A. Piringer, Kevin M. Roche and Timothy E. Sendelbach, *Firefighter fatality investigative report: Sofa Super Store, 1807 Savannah Highway Charleston, South Carolina, June 18, 2007* (May 2008).

the characteristics of a heavy timber structure. These observations would support the initiation of an interior attack. The initial strategic plan was an offensive attack, intended to keep the exterior fire from penetrating into the building.

An east to west attack direction was identified by the first arriving officer and approved by the acting deputy chief who assumed command of the incident. Additional companies were assigned to the west side to prevent extension of the fire and were specifically directed to avoid a conflict with the interior attack crews. The plan was effectively communicated to all of the operating crews. At this stage of the operation, it was not known or suspected that the fire was actually in the basement, or that the basement contained a structural element that would result in a sudden floor collapse.

A prefire plan might have made the IC and other officers more aware of the arrangement of the structure and could have resulted in earlier recognition of the fire in the basement. It is questionable whether the "flaw" in the structure that resulted in a sudden floor collapse would have been recognized when a prefire plan was developed.

As the incident progressed, the attack plan appeared to be successful. The visible exterior fire was controlled, and there were no reports of significant interior involvement from the attack crews. The fact that they had not encountered any significant fire involvement on the ground floor was not reported, so it was assumed that the attack plan was working.

The main body of fire had been located in the basement, under the attack teams, by a company assigned to the west side of the fire, but this information was not reported back to the IC because its significance was not recognized. This critical factor could have caused the IC to evacuate the interior crews before the floor collapsed under their feet.

Progress reports

The IC often has to depend on progress reports and information from other observers to evaluate the effectiveness of the attack plan. One of the primary responsibilities of COs and division or sector officers is to keep the IC informed through regular progress reports. The IC should be informed immediately of any factors that could impact the overall strategy for the incident. To evaluate interior progress, Division Supervisors must either go inside, where the companies are operating, or depend on COs to keep them informed with accurate reports.

At this incident, the assigned Division Supervisors did not transmit any progress reports, positive or negative, to the IC. The COs who were leading the interior attack teams did not provide any progress reports or information on interior conditions to their Division Supervisor, who was located outside the building. He could see that the interior was heavily charged with smoke, but did not know that the companies were encountering very little fire inside. He did not have any information to provide progress reports to the IC and was not asked for a report.

The Division Supervisor on the west side saw the large fire in the basement, moments before the collapse occurred. However, the significance of this observation was not recognized, and it was not reported. It was assumed that the IC knew about the fire in the basement. The presence of interior attack crews immediately above was not known to the crews who found the fire.

In the absence of progress reports, the IC had to rely on other indicators to evaluate the effectiveness of the attack plan. The exterior fire was knocked down, and there were no reports to suggest that the interior crews were having difficulties controlling the fire. These observations suggested that the strategic plan was working. A progress report from either Division Supervisor could have caused the other to recognize the inconsistency and would have alerted the IC to the problem.

Battalion Chiefs — The lack of progress reports appears to be related to the lack of aides or assistants to support the Division Supervisors. The Battalion Chiefs, who are normally assigned as Division Supervisors, do not have aides.

The Battalion Chiefs were overloaded by trying to direct operations and perform accountability functions while trying to monitor two separate radio channels at the same time. Some departments use a "passport" accountability system, which requires a control point to be established outside the building, near each entry and exit point. This could involve them performing this function in addition to monitoring radio traffic. These responsibilities would keep them outside, at secondary CPs, where they have to rely on COs to inform them of interior conditions.

A Battalion Chief would need a "partner" to be able to go inside the building and at least one assistant to stay outside to perform the accountability function. This would require at least two assistants to be assigned to each Battalion Chief.

Reconnaissance — It was difficult to visually size-up the situation from a single vantage point. The configuration of the buildings made it difficult to interpret the interior arrangement without a prefire plan or a 360-degree size-up. Differences in grade levels made it difficult to lap all the way around the structure to determine the arrangement and access points.

The visible smoke and fire conditions were difficult to relate to the actual location and magnitude of the fire inside the structure. All except one of the companies and Command Officers responding on the first alarm approached the fire from the same direction, and all saw the large volume of flames against the west wall of the structure. This observation was interpreted as an exterior fire threatening to extend into the building.

The view from the CP was obstructed by trees and vegetation, which made it difficult to visually size-up the structure. The area where the fire was venting from the basement to the exterior was below the street level and out of sight from the CP.

Operating companies — The interior attack crews never encountered any significant interior fire involvement on the upper level; they found only a few spot fires near the floor which they quickly controlled. They did not realize the fire was in the basement, directly below them, because the concrete floor prevented smoke and flames from penetrating through.

The initial conditions were heavy smoke and moderate heat, which was consistent with their expectations. When rooftop ventilation was accomplished and the heated gases were released, the interior atmosphere cooled, which is usually an indicator of good progress. They believed that their efforts were successfully keeping the fire out of the building.

Engine 5 could not advance the line out onto the roof because of the electrical power line that had dropped in their path. This kept them from closely examining the west wall of the two-story section, which would have allowed them to see that the visible fire was actually venting out of the basement.

Engine 2 located the door into the fire area and determined that a large area of the basement was heavily involved in fire. Because of the assignment they had been given, they expected the attack crews to be pushing the fire toward them, so they prepared to defend their position. They did not recognize that no one else was aware of the large interior fire or that the interior crews were directly over it.

In retrospect, it can be determined that very different interpretations of the structure and the fire were being made from different vantage points. The individuals making these observations did not recognize the significance of their information to the IC. This emphasizes the value of a complete 360-degree size-up of the fire scene, as early as possible, by the IC or by an individual who can report in person to the IC with a "full picture" of the scene.

Ten 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 property.

5. Firefighters shall not be committed to interior offensive firefighting operations in abandoned or derelict buildings.

Risk assessment:

6. All feasible measures shall be taken to limit or avoid risks through risk assessment by a qualified officer.

7. It is the responsibility of the IC to evaluate the level of risk in every situation.

8. Risk assessment is a continuous process for the duration of every incident.

9. If conditions change and risk increases, change strategy and tactics.

10. No building or property is worth the life of a firefighter.

The risk management guidelines are intended to assist the IC in identifying the appropriate strategy for a particular situation:

❯ Offensive strategy involves committing firefighters to conduct an interior fire attack. The objective of an offensive attack is to control and extinguish the fire within the area that is already burning, while preventing extension to any of the exposures.

❯ Defensive strategy is directed toward confining a fire within a defined area, while keeping firefighters outside and in safe operating positions.

The International Association of Fire Chiefs' acceptable risk guidelines would support the initiation of an offensive attack during the initial stage of the Sofa Super Store incident, if the IC believed the fire could be contained to the loading dock without exposing firefighters to excessive risk. (This situation would be classified as Medium Risk and Marginal Probability of Success) **(see Table 3.3).**

Table 3.3 — Risk assessment rules of engagement			
Firefighter injury/life safety risk	High probability of success	Marginal probability of success	Low probability of success
Low	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	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	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.

The fire that was burning in the loading dock presented a significant tactical challenge. The fire involved a relatively large space (approximately 2,200 square feet) that was filled with highly combustible contents. A successful offensive attack would have to deliver sufficient fire flow (water) to overcome the volume of fire within this space.

The situation was greatly compounded by the circumstances. Access to the fire area was difficult, and the building configuration created immediate exposures on three sides. In addition to delivering a powerful attack to suppress the fire within the loading dock, the IC would have to ensure the fire did not extend into any of the exposures.

The IC was responsible for determining whether the available firefighting resources had the ability to control and/or contain the fire and whether this action could be accomplished safely. The risk assessment should have changed as additional information was obtained and fire conditions were re-evaluated. If the IC lacked the capability to conduct a safe and effective offensive fire attack in the time that was available, the strategy should have changed to defensive.

As soon as the fire extended into the void spaces above the showrooms, the situation exceeded the capability of the Charleston Fire Department to control the fire with an offensive strategy. Multiple large hoselines would have been required to stop the spread of hot fire gases within the void spaces. The hoselines would have to be operated by crews inside the showrooms, and would involve opening ceilings to attack the fire. This attack would have to be coordinated with vertical ventilation, opening holes in the roof to release the trapped smoke and fire gases.

A risk management analysis at that point would have determined that attempting to conduct an interior offensive fire attack under these circumstances placed firefighters in conditions of unacceptable risk. (The risk analysis would classify this situation as high risk and low probability of success.) The revised risk analysis would dictate a switch to defensive strategy and the withdrawal of all firefighters from interior positions.

Summary

Clearly, the nature of emergency response itself carries with it some degree of inherent and unavoidable risk. Many of those risks can be readily identified and evaluated. However, no incident should be considered routine. That is why the presence of inherent risk only intensifies the need to implement sound risk management strategies at every level of an emergency response organization and before, during and after every phase of emergency incident operations.

Experience and reality-based training help an emergency response officer develop the judgment that incident command demands. Written policies and standards provide risk management guidelines. PPE provides measurable margins of safety. Still, it takes diligent, watchful, ongoing application of consistent safety-minded practices, during every emergency response operation, to effectively reduce risk to acceptable levels and afford all personnel the highest levels of protection possible.

Risk Management Practices in the Fire Service

Chapter 4: Managing Information

The ability to assemble and process incident-related information is an essential skill for people who direct emergency operations. This chapter presents several approaches to managing information to support operational risk management. This chapter includes the following topics:

❯ The importance of preincident planning.
❯ Preincident planning and preparation.
❯ Managing and applying information during emergencies.
❯ Special information management considerations.

This chapter also addresses the following portions of the NFFF's 16 FLSIs:

❯ Initiative 8: Use available technology wherever it can produce higher levels of health and safety.

❯ Initiative 14: Public education must receive more resources and be championed as a critical fire and life safety program.

❯ Initiative 15: Advocacy must be strengthened for the enforcement of codes and the installation of home fire sprinklers.

The importance of managing information

Risk assessment decisions have to be based on information about the risks that are present and significant in each situation, so that the IC can predict what is likely to happen. An individual who has accurate, timely, reliable and complete information is in a much better position to evaluate risk than one who is working with fragments of information and large quantities of confusion. The IC seldom knows everything about a situation at the beginning and sometimes does not find out about important factors until the operation is over.

Two categories of information

Information considerations for risk management fall into two inter-related categories:

1. Preincident planning and preparation.
2. Information management and application during emergencies.

Preincident planning is a crucial component of the risk management process. Preincident planning activities are intended to gather, store and retrieve information that will be valuable when a fire or other emergency incident occurs. What makes it so important? These are the two most important reasons to develop preincident plans:

1. Recognize hazards.
2. Compile pertinent information about those hazards that will help an IC implement the risk management process.

The ability to acquire and manage information during an emergency incident is an important component of incident management and operational risk management **(see Figure 4.1).** The IC's ability to achieve a safe and desirable outcome necessarily involves managing the risks that apply to each situation. In order to successfully manage risk and many other aspects of the incident, the IC needs to quickly and efficiently gather and process information.
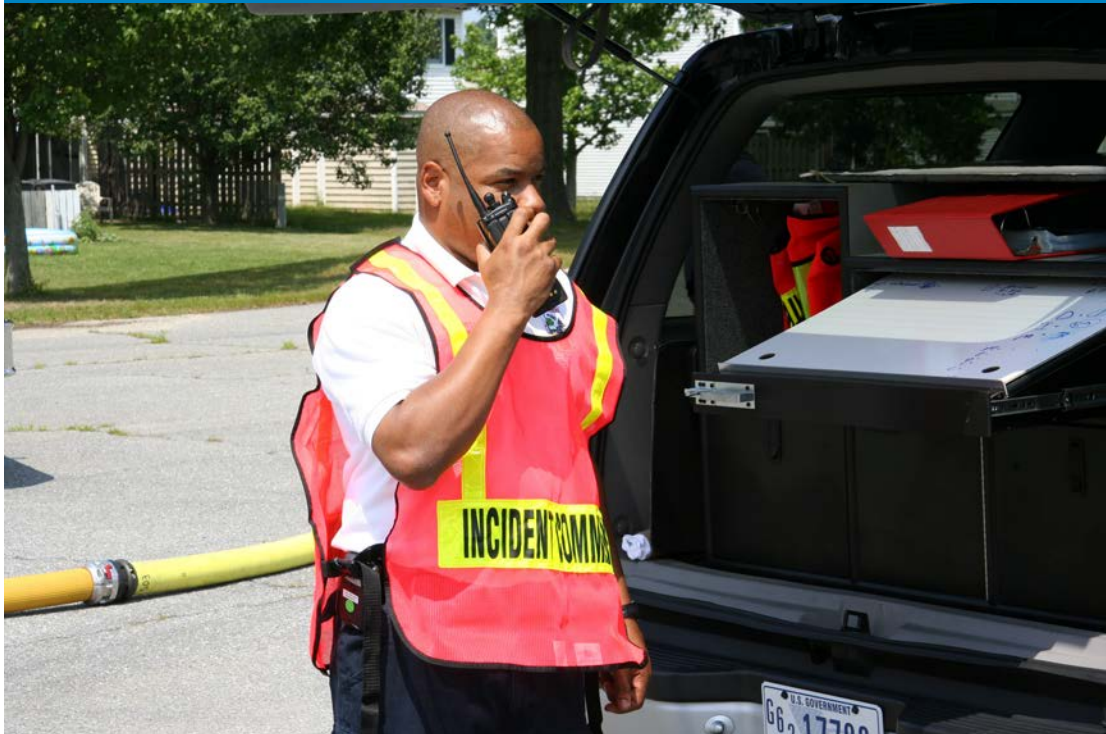
Photo courtesy of IFSTA/Fire Protection Publications.

Preincident planning and preparation

Preincident planning and hazard awareness activities can greatly improve the ability of fire departments and other agencies to deal with operational risk. The more that is known about a property before an incident occurs, the easier it becomes to manage the incident and the related risk. An effective program will allow responders to do the following in advance of an incident:

- ❯ Recognize risks.
- ❯ Fully evaluate the risk.
- ❯ Develop appropriate tactical plans.

The goal of preincident planning

Preincident plans are often developed to support effective tactical operations, but their ability to provide hazard awareness information might be even more significant. That is because, first and foremost, a preincident plan should inform an IC of safety hazards. To do that, the information in the plan has to be timely, accurate and accessible.

Let's look just a little closer at that third point: accessibility. Emergency responders must be able to find the information they need when they need it. What good is accurate information that is made available on a timely basis if it is not also in a format readily accessible to those who need it the most?

Three steps in preincident planning

A preincident plan should make significant information available to the IC when the incident occurs. The most critical information relates to hazards that would be difficult or impossible to identify or evaluate at the time of the incident. Prior awareness may be the only way to account for these risks. Creating prior awareness takes three distinct steps:

1. Gathering information.
2. Recording and storing information.
3. Retrieving and applying information.

In addition, the information should be reviewed at regular intervals and updated as necessary when changes occur.

Information gathering methods

The most common method of developing preincident plan information is to assign the first-due company to gather information by touring target locations and other structures whose features present potential problems, such as lightweight truss construction **(see Figure 4.2).** That approach serves the dual purpose of providing an on-site familiarization tour along with gathering information. Other methods include the following:

Figure 4.2 — Preincident planning is useful in finding otherwise unknown hazards that might be in a facility.

Photo courtesy of IFSTA/Fire Protection Publications.

❯ Assigning a special team or group within the fire department to develop preincident plans.

❯ Entering information directly from information submitted for building occupancy.

❯ Reviewing hazardous materials and special use permits.

❯ Requiring building owners to submit plans in a specific format that meets the requirements of the department.

Whatever method is used, a standard format, such as the one that follows, should be established to enter basic information about each location and particular facts that apply to certain categories of buildings or occupancies.

The objective of site visits

The objective of every preincident site visit should be to gather and organize as much information as possible about the locations where incidents might occur, particularly properties known to be complicated or hazardous. Any information that would make an IC aware of a hazardous situation should be considered important (for example, NFPA 704, *Standard System for the Identification of the Hazards of Materials for Emergency Response*). This is particularly true if the information would not be readily apparent or easily identified during an incident.

The value of site visits

Fire suppression companies should regularly visit occupancies in their response areas to identify hazards and plan effective operations. Why? A preincident planning visit makes it possible, before an emergency occurs, to detect, evaluate and record all types of hazards found at that site. Some examples of these hazards:

❯ The presence of construction components that are susceptible to sudden failure, such as lightweight wood truss roof and floor assemblies, should be prominently noted.

❯ Unusual occupancy characteristics, such as hazardous materials storage or open shafts, should be identified to alert responding companies and inform the IC of the hazards that are likely to be present.

In addition, familiarization visits allow a potential IC to update the recorded information and to consider specific risks and the potential benefits of different strategies that might be employed if an incident were to occur at the location. In the same way, officers should review preincident plan information from time to time, as a training exercise, to become familiar with the documented information and to ensure that it is routinely updated to reflect any changes that have occurred.

Storage, processing and retrieval of information: System options

Over the years, fire departments have developed many different systems with which they gather and store preincident plan information. In many cases, the information processing system has been structured around the capabilities of the hardware and software that happens to be available, rather than designing a system to meet specific needs. Many departments still rely on traditional paper-based systems. In recent years, though, information technology has made remarkable advances and significantly improved departments' gathering, storage and retrieval capabilities.

Paper-based systems

Some systems are based entirely on paper maps, diagrams and printed information. Frequently, information is kept in three-ring binders and carried in the cabs of fire apparatus. Other departments maintain filing cabinets in fire stations or communication centers. Some systems place pertinent information on the premises where an incident might occur. There it can be accessed by units when they arrive at the scene of a call. Storing a preincident plan on the premises is particularly useful for occupancies, such as high-rise buildings that have complex alarm and fire suppression systems. Obviously, the effectiveness of a paper-based system is limited by the ability to organize, store and retrieve information on paper.

Applications of advanced information technology

Several systems have been developed as components of computer-aided dispatch (CAD) systems to automatically retrieve information associated with a specific address when units are dispatched to an incident at that location.

The newest versions of mobile digital terminals have significantly increased capabilities to store graphic and text information that can be updated easily to provide the most accurate information to emergency responders while en route or on the scene.

Factors that drive gathering, storage and retrieval decisions

The purpose of preincident planning is to put information in the hands of an IC. Choices among gathering, storage and retrieval systems storage must always be made with that purpose in mind. One of the most important considerations in entering and managing information should be the easy retrieval of information when it is needed to support an IC's planning and risk assessment priorities. The system should include the following:

❯ Be readily available.
❯ Be easy to use.
❯ Be accurate.
❯ Clearly emphasize the most critical factors.

Effective use of graphics

Graphics presentations should use standard symbols and color coding to convey important information efficiently. Information that is less time-sensitive might be accessed by referencing text pages. Drawings should provide enough information to support operational needs. They should be "user friendly." More detailed drawings and information that are less likely to be critical during an incident can be documented as secondary reference information.
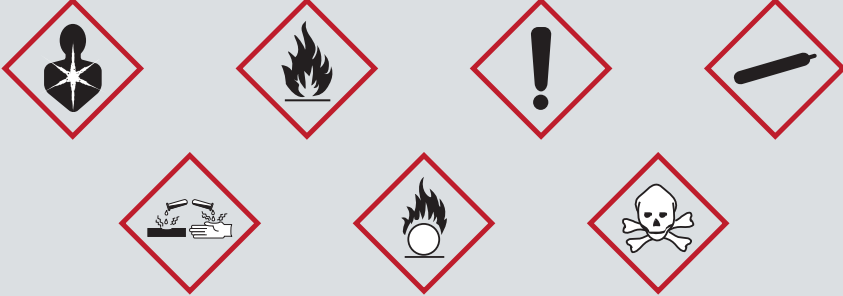
Figure 4.3 — A sample preincident plan form.

Prefire Plan

Building: 221B

Dimensions	Building Informaion	Fire Alarm System
Length: 100 ft **Width:** 90 ft **Floors:** 3 **Sq Ft:** 27,000	**Construction:** Type II **Classification:** Manufacturing	**Make:** FireSafe **Model:** FS-101-XL **Location:** Lobby Mechanical Room

Fire Hydrants	Fire Pumps	Fire Department Connection (FDC)
NE corner @ 52 ft SE corner @ 67 ft	**QTY:** 2 **Make:** Kente **Capacity:** 2,500 GPM **Auto/Manual:** Yes	**QTY:** 1 **Type:** Siamese wall mount **Location:** NE side of building near Door B4

Elevators	Emergency Generator	Uninterrupted Power Supply (UPS)
QTY: 2 **Make:** Upzendowner **Service:** Smith Co. (405) 555-1010	**QTY:** 1 **Make:** Northern CAT **Output:** 480 Kw **Location:** SE corner	**Location:** Room 1001C3

Communications	Roof Access	Sprinkler System (WET)
Public Address System Elevator Phone	**Inside:** 3rd floor Room 303M5	Door B4

Utility Shut-offs

Natural Gas	Water Mains	Electrical
Location: NE side of building near Door B4	**Location:** NE side of building near Door B4	**Location:** Building 221A Generator UPS

Known Chemical Hazards Within Building

Photo courtesy of IFSTA/Fire Protection Publications.

Figure 4.3 shows an example of a preincident plan form.

Managing and applying information during emergencies

An effective preincident plan system must be capable of putting the significant information at an IC's disposal when an incident occurs. The dispatch system should inform responding units when there is a preincident plan available for an occupancy, and the records management system should make the information immediately available.

Early command

The principles of incident management emphasize the need for one person to be in overall command of every incident, from beginning to end, although the identity of that individual might change during the incident. If action takes place before command is established, an IC has to start the process from behind to try to catch up with the situation. To evaluate exposure to risks, an IC must know where companies are operating and what they are doing. An IC who has to start the command process after all the first alarm units are committed is likely to spend the most critical decision-making time just trying to figure out who is where, doing what.

A delay in establishing command adds risk to a situation because it interferes with the prompt identification, evaluation and processing of the risk factors. Risks that have not been identified cannot be evaluated or managed. When effective command is initiated from the outset of operations, an IC should have effective control over all the action taking place and should be in a better position to focus on evaluating risks. When the identity of the IC changes, an orderly transfer of command process ensures that continuity of information is maintained. For that reason, the officer assuming command responsibility for an incident will, in many cases, keep the previous IC involved at the CP for that exact purpose **(see Figure 4.4).**

Figure 4.4 — A relieved initial IC may stay at the CP to assist a new IC.

Photo courtesy of Ron Jeffers, Union City, NJ.

The incident management process is also intended to structure the flow of information up, down and through the entire chain of command. COs and Sector/Group/Division Supervisors move information up the chain of command, just as they move orders and instructions down the chain of command. Effective communications are essential to make the system work.

Officers at different levels in the organization routinely make risk evaluation and risk management decisions within the scope of their responsibilities. Those decisions must be coordinated with the strategic plan that is directed by the IC. They must also be coordinated with other units when the recognized risks may impact their tactics.

Although an incident management structure is intended to facilitate risk management and information flow, it can have the opposite effect if the officers assigned to supervise different areas focus entirely on their own specific assignments or functions, and consequently fail to fulfill their responsibilities for coordinating actions with other groups. Coordinating between activities is often as important as supervision over individual functions. Supervisors must pay attention to what is happening around them, as well as what is happening under their direct supervision.

Consequences of failure

The failure to communicate significant information up and down the incident management structure is one of the most common breakdowns that leads to firefighter injuries and fatalities. Post-incident analysis of fatal incidents often reveals that critical observations were made by individuals on the scene, but the information was not effectively communicated. In many cases, the individual who had the information did not recognize its significance or realize that it was not known by the IC. In other cases, the information would only have been significant if its inconsistency with information coming from a different vantage point had been realized. If neither observer reports their observations, the inconsistency is unlikely to be recognized.

For example, in several incidents, groups of firefighters have died when floors gave way under them while they were searching for, or trying to extinguish, fires on one level when the main body of fire was actually on the level below them. In some cases, other crews were working on the lower level, aware of the fire, but unaware that crews were working directly above the fire. At some incidents, individual firefighters noted factors that indicated the fire was below them, such as a very hot floor or small fires breaking out at the floor level, but did not recognize the significance of their observations until after the incident. Deaths might have been avoided if information had been communicated in a manner that caused the IC to recognize the situation and remove the crews who were operating directly over the fire.

Command support staff

Risk management responsibilities might be compromised if officers within the incident command structure do not have anyone to assist them with support functions, including information support. An officer responsible for supervising an area or function must be aware of tactical activities taking place in that area, as well as the risk factors present. An officer who is preoccupied with managing information and resources could lose track of the actual activities occurring within his or her areas of responsibility. That might become a problem for the IC, as well as for supervisors at other levels of the incident management structure.

Information management is recognized as an important component of incident command. An IC should have one or more assistants at the CP to assist in managing information and handling communications **(see Figure 4.5).** There are specific responsibilities for information management in the Incident Command System assigned to the Resource and Situation Status Units.

Figure 4.5 — During lengthy or complex operations, a variety of personnel may be at the CP at any given time.

Photo courtesy of IFSTA/Fire Protection Publications.

A division or group officer often requires one or more staff assistants to help keep track of information (including accountability tracking) and to ensure that effective communications are maintained with the incident command. A standard system for managing information at a CP or within a sector is an important component of an effective incident management system.

Providing support

In many fire departments, the responsibility for supporting the IC and sector officers used to be assigned to chiefs' aides who acted as both chauffeurs and staff assistants for chief officers. Budget constraints have caused many fire departments to eliminate this position. A variety of other approaches have been developed to provide an equivalent capability to support Command Officers at the scene of an incident.

One option is to dispatch additional Command Officers to working incidents to assemble a command support staff who can effectively manage incidents. Some departments routinely dispatch as many as four chief officers to working one-alarm fires to fill predesignated staff positions, including planning chief, staging officer and safety officer. They may be supplemented by a mobile CP that responds with its own crew to perform command support and information management functions **(see Figures 4.6 a and b).** Another option is to train and dispatch predesignated companies to perform this function at working incidents.

Figures 4.6 a and b — Larger incidents may require the use of a specially-designed mobile CP vehicle.

Photos courtesy of Mike Wieder, Stillwater, OK.

Command support systems

To control the information necessary to manage an incident, fire departments should use these systematic approaches:

❯ Standardized tactical reference worksheets.
❯ Status boards.
❯ Manual and computerized accountability tracking systems.

A standard approach allows for incidents to be expanded or contracted, for command to be transferred, and for the command structure to be adjusted without losing track of important information. All forms and systems should be designed for upward integration, so information developed early can be easily incorporated into an expanding command support system if the incident grows.

Command support systems should be user-friendly and should use color and format to visually assist the user in organizing information. Forms and worksheets can be designed to provide reminders and guide the user through complex situations, with check boxes to indicate that functions have been addressed and blanks to fill in information. Where appropriate, forms should include spaces for drawn-in diagrams and sketches or for preprinted plans, maps, data sheets or printouts from computer systems. The walls of CP vehicles should be set up to locate the same information in the same place every time with "free form" space left for unusual information that could be important for unusual incidents.

All components of a command support system should fit together. Sector officers should have clipboards with grease pencils or writing instruments that can be used outdoors, regardless of the weather. When passport accountability systems are used, individual name tags should fit onto company or team boards. The company boards should fit onto sector boards, and there should be designated spaces on the walls of CP vehicles to mount the sector boards **(see Figure 4.7).** If information is stored in computers, it should be formatted to print out in a format that is compatible with other forms and worksheets.

Photo courtesy of Ron Jeffers, Union City, NJ.

Forms and worksheets should provide a record of an incident that will be valuable for critiques and analysis. The first priority should be to assist Command Officers and COs in managing incidents effectively, safely and efficiently. The officer who concentrates on filling out forms perfectly might fall into the trap of failing to manage the incident or the risks.

Special information management considerations

Hazardous materials

Fire departments should require occupancies that process, store or use hazardous materials to submit inventory information and Material Safety Data Sheets **(see Figure 4.8).** Fire departments should have systems that make such information immediately available to units responding to a reported incident at that location. Preincident information should include the following:

Figure 4.8 — A typical structure containing a 704 marking.

- Location of hazardous materials.
- How it is stored.
- How much of it is stored/used.
- Proper handling techniques.

Photo courtesy of IFSTA/Fire Protection Publications.

The information should also include the following:

- Appropriate emergency actions.
- Personal protective clothing and equipment requirements.
- Evacuation requirements and distances.
- Any other information that would be significant in the event of an emergency.

One of the advantages of preincident planning is that it provides for all the time needed to fully research a situation before it occurs. Instead of attempting to obtain and interpret information about a hazardous material that is already involved in an active incident, the research can be conducted in cooperation with the party responsible for the premises and with access to every available expert and source of information. A fire department might not be able to anticipate every situation that can occur with hazardous materials, but it should be able to assemble enough information to be prepared for most incidents that occur in fixed facilities.

Technical rescue planning

Advance planning and practice can increase the safety of all types of technical rescue operations. Although such incidents can present many complex and unpredictable challenges, some factors are predictable. SOPs should be developed for specific types of operations, and their application should be incorporated in preincident plans for the locations where those incidents can be anticipated. Particular attention should be directed toward locations where the potential need for technical rescue operations can be anticipated:

- Major construction sites.
- Bridge and tunnels.
- Popular recreational climbing areas.
- Swift-water boating areas.

It is also possible to develop an SOP for a specific type of technical rescue incident that can be applied at any location. An SOP is a generic preincident plan which is applicable or adaptable to a variety of situations.

Confined spaces

Occupancies where workers occasionally enter areas, or equipment that meets the definition of a confined space, are required to make provisions for rescue. In addition, they must make the location available to the designated rescue team for familiarization and training. Confined space entry certificates are required for entrants and will provide essential information about the space and the hazards. When a fire department is made aware of this type of hazard, the full procedure that would be used for entry into the confined space should be researched, planned, documented and practiced. The rescue plan should be regularly reviewed for training purposes by the companies that would be expected to respond to the location.

Intelligence

One of the most difficult problems for fire departments is how to deal with information related to homeland security threats. It would be difficult to justify withholding this information from the fire suppression forces because advance notice could allow them to identify hazards and avoid unnecessary risk if an anticipated incident actually occurs. However, it is critical that the fire department is a key stakeholder in the threat/vulnerability assessment with appropriate law enforcement to plan, mitigate and prepare for any potential incidents that may occur.

In some special cases, the appropriate law enforcement tactic might be to establish surveillance over the property in an effort to capture an arsonist in the act. That is particularly true when information is confidential and the case is part of a major conspiracy. When that happens, fire suppression units that would respond to the location should be advised of the threat and the surveillance. They should review all available preincident plan information. To develop a preincident plan, a determination would have to be made if their presence at the location would jeopardize the investigation. That is a special form of a risk management decision that would occur in advance of a fire or other emergency situation.

Summary

To be effective, risk management decisions must be based on accurate, timely and complete information about hazards that are present and significant. Managing information must be an organizational priority to properly protect our responders and our communities. Fire departments should design and implement management information systems that enable preincident planning and on-site incident risk management.

Paper-based systems can be effective, but modern information technology is rapidly developing more efficient and more effective ways to provide ICs with information that helps them recognize, evaluate and control risks during emergencies (such as integrated plans tied to the CAD system).

Communication up, down and across the incident chain of command is essential to make maximum use of all available information, to facilitate the risk management process, and to prevent loss and injury. At all times, ICs must be aware of special circumstances and conditions at each emergency location that could affect risk management decisions.

Risk Management Practices in the Fire Service

Chapter 5: Community Risk Reduction

Community risk reduction is the proactive process that fire and emergency service organizations can implement by using appropriate data to understand the primary hazards and risks that are affecting their communities. Community risk reduction is an all-hazard, systematic, communitywide approach that builds partnerships and educational opportunities to provide solutions to the changing needs that challenge the community's vitality, citizens and businesses.

This chapter also addresses the following portions of the NFFF's 16 FLSIs:

❯ Initiative 3: Focus greater attention on the integration of risk management with incident management at all levels, including strategic, tactical and planning responsibilities.

❯ Initiative 14: Public education must receive more resources and be championed as a critical fire and life safety program.

❯ Initiative 15: Advocacy must be strengthened for the enforcement of codes and the installation of home fire sprinklers.

What is community risk reduction?

According to NFPA 1035, *Standard on Fire and Life Safety Educator, Public Information Officer, Youth Firesetter Intervention Specialist and Youth Firesetter Program Manager Professional Qualifications,* community risk reduction is defined as "programs, actions and services used by a community, which prevent or mitigate the loss of life, property and resources associated with life safety, fire and other disasters within a community."

Community risk reduction is nothing new to fire and emergency services; however, due to changes in the community, leadership, financial impacts or other priorities, numerous fire and life safety programs have not been able to be sustained or are no longer relevant. Community risk reduction creates goodwill within your community, helps communities face new and emerging hazards, increases firefighter safety, and is proactive in building support before an incident occurs.

In 1947, President Truman commissioned the "President's Conference on Fire Prevention" that reviewed and raised awareness about the fire problem and introduced the three E's (Education, Enforcement and Engineering) to the fire industry, which was a way to help reduce risks in a systematic order. Later, the National Fire Academy (NFA) would add economic incentive and emergency response to the list, due to the importance in community risk reduction.

In 1972, President Nixon convened the National Commission on Fire Prevention and Control and produced the report "America Burning," which provided recommendations to reduce losses and increase safety to citizens and firefighting personnel. In 1987 and 2002, the "America Burning" report was reviewed and updated. However, many of the recommendations from any of the versions still have not been fully implemented.

Currently, the NFPA has developed other standards and a guide that help share the framework of community risk reduction:

❯ NFPA 1300, *Standard on Community Risk Assessment and Community Risk Reduction Plan Development,* covers requirements on the process to conduct a community risk assessment and to develop, implement and evaluate a community risk-reduction plan.

❯ NFPA 1452, *Guide for Training Fire Service Personnel to Conduct Community Risk Reduction,* helps fire departments design and implement a dwelling fire safety survey as part of a communitywide, all-hazards risk-reduction program to protect lives and property. The guide applies in both rural and urban communities, and serves as a manual for establishing a locally prepared community risk-reduction program designed to address specific problems faced by local fire service organizations.

When fully implemented and adopted by an organization, community risk reduction helps to do the following:

❯ Identify risks.
❯ Prioritize risks.
❯ Determine how to prevent/mitigate risks.
❯ Focus efforts.
❯ Become more of a community player.
❯ Provide value-added services.
❯ Improve quality of life for the community.

Steps of a successful community risk-reduction program

It is critical that organizations follow a step-by-step process to develop a successful and sustainable community risk-reduction program. Too many times, organizations develop a program after an incident or incidents occur that are temporary, without truly defining the root causes and needed changes to reduce the risks or hazards to the community and effect change **(see Figure 5.1).**

Figure 5.1 — The goal of community risk reduction is to prevent critical losses within the jurisdiction.

Photo courtesy of Ron Jeffers, Union City, NJ.

Steps to a successful program:

- Conduct a community analysis.
- Develop partnerships in a community.
- Create a strategy to solve a problem.
- Implement the strategy in the community.
- Evaluate the results.

The needs assessment of the target population is the process of collecting and analyzing information and developing an understanding of the issues, resources and constraints. The assessment's purpose is to determine whether the needs of the people are being met. It is critical that community members should be involved with the entire planning process. Target population and stakeholder involvement is necessary during the planning and implementation stage. This involvement of target population members helps develop program ownership and provides critical insight that could make or break the program's efforts.

The community risk-reduction program needs to have a separate mission statement, which is a narrative statement describing the focus of the program from the overall organizations. This is critical to make sure everyone understands the operations.

Next, the development of program goals that are SMART (**S**pecific, **M**easurable, **A**ttainable, **R**ealistic and **T**ime framed) and shared with all stakeholders will determine if the program becomes successful or not. Developing goals and objectives are necessary for all to understand the importance and to provide a road map to a successful, sustainable program.

Basing a new program on other successful programs is important. A review of the professional literature and other documents will help generate a list of potential interventions.

Selecting appropriate interventions to an identified problem through data, research and community involvement is critical for the program's success and acceptance. The plan evaluation is a continuous process and a step that is often not accomplished to its fullest potential. Selecting evaluation methods and questions that will facilitate process, impact and outcomes will make the program sustainable in reducing the risks.

It is important to test interventions with a small group that represents the target population and helps identify potential flaws or problems with the intervention. Information from this step can help make corrections that streamline resources and time.

Finally, evaluation of a program is necessary for an organization to determine the worth or value of the intervention effort. It is important to note it may take years to start seeing a change in programs and goals, so emergency service leadership needs to be committed.

Implementation of a community risk-reduction program

In 2016, the NFPA Urban Fire and Life Safety Task Force developed a white paper titled "Community Risk Reduction: Doing More with More," which assists in helping fire service leaders gain management support for launching a community risk-reduction program in their departments. To fully integrate all fire protection strategies, the white paper states that fire departments that adopt a community risk-reduction program need to involve the community in problem-solving and strategic implementation, prevent LODDs and injuries, and ensure the survival of the organization.

It is critical that the organizations develop a unified plan that is both strategic and tactical with all internal and external community stakeholders. The following is an example of a case study by the NFA on the process, resources and time commitment required to develop, implement and evaluate a proactive approach to community risks.

Sample community risk-reduction plan

IMPLEMENTATION/EVALUATION PLAN
Central City Life Safety Coalition Bike Safety Program

Vision:

Central City will be one of the safest communities in the region.

Problem Statement:

The problem is Central City has a high rate of bicycle incidents involving children between the ages of 10 and 18, as compared to similar communities.

Goal:

To decrease the number of bicycle incidents involving children between the ages of 10 and 18 in Central City.

Outcome Objectives

By December 2021, reduce bicycle injuries requiring hospitalization to children between the ages of 10 and 18 in Central City from 18.6 per 10,000 population in 2016 to 15.9 per 10,000 population. Target setting method 20 percent. Evaluation methods: EMS reports, hospital records and anecdotes. (Example uses rates per 10,000.)

or

As compared to baseline data, the following changes will have occurred: By December 2021, there will be a 20 percent reduction in bicycle injuries requiring hospitalization to children ages 10 to 18 in Central City. Evaluation methods: EMS reports, hospital records and anecdotes.

By December 2021, there will be a 20 percent reduction in bicycle vehicle collisions involving children ages 10 to 18 cycling in Central City. Evaluation methods: EMS reports, police reports and anecdotes.

Impact Objectives

By June 2018, the Central City Department of Public Works will have installed signage for bicycle routes throughout the city. Evaluation measure: signs installed. Interventions: Education and Engineering.

By August 2018, the local school board will adopt a state-approved K-12 health and safety curriculum with emphasis on highway safety in general, and bicycle safety in particular. Evaluation measure: adoption of curriculum. Intervention: Education.

By January 2019, the Central City Council will have adopted a bike helmet law for children ages 18 and under. Evaluation measure: passage of law. Interventions: Education, Engineering and Enforcement.

By January 2019, each public and private school in Central City will adopt and enforce written policies requiring safe bicycle practices to and from school, including proper use of bicycle helmets on school property. Evaluation measures: adoption and enforcement of policies. Interventions: Education, Engineering and Enforcement.

By January 2019, the Central City Council will have adopted a citywide off-road bicycle trail.

By June 2019, the Central City Police Department will begin enforcing bicycle laws and all laws that affect the safety of bicyclists, including those aimed at aggressive drivers. Evaluation measure: enforcement of law. Interventions: Education and Enforcement.

By December 2020, the Department of Public Works will have marked lanes for on-road bicycle routes in Central City. Evaluation measure: Adoption of bicycle trail. Interventions: Education and Engineering.

As compared to baseline data, the following changes will have occurred: By September 2020, there will be a 50 percent increase in the number of children ages 10 to 18 who wear bike helmets and wear them correctly. Evaluation methods: observational surveys, self-report surveys, and pretests and post-tests. Interventions: Education, Engineering and Enforcement.

By December 2020, there will be a 50 percent increase in the number of children ages 10 to 18 who know rules of the road as they pertain to cycling. Evaluation methods: observational surveys, self-report surveys, and pretests and post-tests. Intervention: Education.

By December 2020, there will be a 50 percent increase in the number of children ages 10 to 18 who obey all traffic signs, signals and other traffic control devices. Evaluation methods: observational surveys, self-report surveys, and pretests and post-tests. Intervention: Education.

By December 2020, there will be a 60 percent increase in the number of bicycles outfitted with safety equipment required by law. Evaluation methods: observational surveys, self-report surveys, and pretests and post-tests. Interventions: Engineering and Enforcement.

By December 2020, there will be a 50 percent increase in the number of parents/caregivers who can name three ways their children can be safe bike riders. Evaluation methods: pretests and post-tests. Intervention: Education.

Process Objectives

Starting January 2018, the project coordinator will monitor changes in the prevalence, incidence and severity of child bicycle injuries by collecting and analyzing data from city EMS run report data, the county medical examiner's logs on fatalities, trauma registry data on children treated in three hospital emergency rooms and local clinics, police reports, and city traffic engineering department reports. Evaluation methods: injury/loss statistics and anecdotes. Intervention: Education.

By January 2018, the coalition will have drafted legislation requiring children ages 18 and under to wear bike helmets when cycling. Evaluation method: drafting of legislation. Intervention: Enforcement.

By April 2018, the project coordinator will begin implementing a social media campaign to raise awareness about bike safety and use various mediums to reach the target audience throughout the life of the program. Evaluation methods: counting number of tweets, tags, posts, news releases and articles, and estimating percent of public receiving the communications. Intervention: Education.

By June 2018, the coalition will develop a calendar to conduct regular meetings to review crash trends and to provide guidance in implementation. Evaluation measure: number of meetings planned.

By September 2018, the coalition will have acquired 300 bicycle helmets and developed a plan for distribution. Evaluation measures: counting number of helmets distributed. Intervention: Education, Engineering and Economic incentive.

By September 2018, the coalition will get approval from local schools to install two bike racks at each school by the end of the fall semester. Evaluation measure: approvals. Interventions: Education and Economic incentive.

By September 2018, the project coordinator will receive commitment from local merchants to offer discounts on bicycle helmets and display posters.

By October 2018, the project coordinator will have received permission from the school board to expand the program to three additional schools in Cleveland Park. Evaluation measures: letter of agreement and adoption of curriculum. Intervention: Education.

By October 2018, the station commander at the Cleveland Park Station, with the assistance of the coalition, will have begun conducting three bike rodeos a year (2018 to 2021) and will offer bike helmets to those qualifying. Evaluation measures: estimating number of people in attendance, number of helmets given away, number of children going through bike rodeo course. Interventions: Education, Engineering and Economic incentive.

By November 2018, the coalition will provide training to law enforcement personnel on effective measures to reduce crashes among bicyclists. Evaluation measure: training law enforcement personnel. Intervention: Education.

By December 2018, the project coordinator will recommend that the board of education adopt a specific health and safety education curriculum to address highway safety in general, and bicycle safety in particular, that meets state-approved K through 12 health and safety objectives. Evaluation measure: recommendation made to board of education. Intervention: Education.

By December 2018, each member of the coalition will have conducted a training/ presentation to a local government agency or a community group about the bicycle safety program. Evaluation measure: counting. Intervention: Education.

By January 2019, the project coordinator will have trained teachers in the three additional schools to use the curriculum consisting of classroom instruction, skill training in traffic, correct fit of helmets, and reinforcement by parents/caregivers. Evaluation measures: skill testing, counting and questionnaires. Intervention: Education.

By December 2020, the coalition will have distributed 300 bicycle helmets to children between the ages of 10 and 16 in Cleveland Park who participate in the free and reduced lunch program, and will have provided education about use, fit and maintenance of bicycles and bicycle helmets. Evaluation measure: counting number of bicycle helmets distributed. Interventions: Education, Engineering and Economic incentive.

Formative Objectives

By April 2017, the Life Safety Coalition will have conducted a community risk assessment of Central City. Evaluation measure: risk assessment conducted.

By April 2017, the Life Safety Coalition will select the risk issue and target population to address in Central City. Evaluation measures: risk issue and target population selected.

By May 2017, the Life Safety Coalition will identify core stakeholders in Central City and the Cleveland Park District to join the bicycle safety program. Evaluation measure: stakeholders identified.

By August 2017, the Life Safety Coalition will develop goals, interventions and objectives for the bicycle safety program. Evaluation measure: goals, interventions and objectives developed.

By September 2017, the Life Safety Coalition will begin a fundraising campaign to raise $10,000 to purchase helmets for children and props for bicycle rodeos. Evaluation measure: fundraising campaign initiated.

By January 2018, the coalition will have developed culturally relevant and multilingual materials and resources to promote bicycle safety. Evaluation measure: development of materials.

By April 2018, the project coordinator will have trained all firefighters in the Central City stations on bike safety, how to conduct a bike rodeo, and fit helmets. Evaluation measure: training.

By April 2018, the coalition will have identified one elementary school to pilot the bicycle safety program. Evaluation measure: pilot selection.

By September 2018, the project coordinator will have trained teachers in the pilot school to use the curriculum consisting of classroom instruction, skill training in traffic, correct fit of helmets, and reinforcement to be given by parents/caregivers. Evaluation methods: skill testing, counting and questionnaires.

By October 2018, teachers in the pilot program will have taught lessons on bike safety and will have conducted pilot testing of students. Evaluation measure: lesson taught.

By October 2018, the project coordinator will have received commitment from local merchants to offer discounts on bicycle helmets and display posters. Evaluation measure: commitment from merchants.

By December 2018, the project coordinator and coalition will review various health and safety education curricula and textbooks to ensure that highway safety in general, and bicycle safety in particular, are included in the state-approved K through 12 health and safety curriculum.

By January 2019, the project coordinator, with the assistance of the coalition, will review materials and make changes based on teachers' recommendations. Evaluation measure: review of materials.

Summary

Community risk reduction is a gateway to the reinvention of the fire service culture. It requires buy-in from the top and strong visionary leadership to champion needed change and navigate the process.

The continued goal of reducing risks within communities is particularly challenging in the face of increased growth demands, changing demographics, emerging hazards, and budget constraints.

Implementing a successful community risk-reduction program brings additional resources to the effort through partnerships within the fire department, as well as the community served. This community-based approach increases public safety because of the collective work with the community to understand, assess and provide inclusive solutions to community safety issues.

It is critical that we develop sustainable, timely and proactive programs for all ages on the community risks that we face every day so we can answer that everlasting question and the media can report on the positive and heroic outcomes of disasters, versus the tragic ones. There have been decades of written after-action reports to major incidents, best practices, development of building and fire codes, fire safety research and security prevention programs. The majority of the time, it is developed and shared after a major incident. We need to develop community risk-reduction programs that can be an integral part of all the stages of our lives, from preschool to nursing home, so everyone can be an advocate every day.

Our world changes every day, and new threats arise. One thing that remains over the centuries is the dedication of professionals around the country willing to sacrifice themselves to help others. Today needs to be the day to truly start making our countries more proactive in risk reduction and crisis management. We all need to start making fire, life safety and security education a priority on an international level, with a consistent message that empowers local jurisdictions and citizens of **all** ages to understand the impacts and affect change without waiting for the next major incident to happen.

Risk Management Practices in the Fire Service

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Appendix: Organizations and Sources Providing Risk Management Information

American Society of Safety Engineers
http://www.asse.org/

Emergency Management Institute
https://training.fema.gov/emi.aspx

National Fallen Firefighters Foundation
Everyone Goes Home
https://www.everyonegoeshome.com/

Fire Department Safety Officers Association
https://www.fdsoa.org/

International Association of Fire Chiefs
https://www.iafc.org/

International Association of Fire Fighters
http://client.prod.iaff.org/

International Fire Service Training Association
https://www.ifsta.org/

International City/County Management Association
https://icma.org/

International Code Council
https://www.iccsafe.org/

National Fire Academy
https://www.usfa.fema.gov/training/nfa/

National Fire Protection Association
http://www.nfpa.org/

National Institute for Occupational Safety and Health
https://www.cdc.gov/niosh/

National Safety Council
http://www.nsc.org/pages/home.aspx

Occupational Safety and Health Administration
https://www.osha.gov/

Public Risk Management Association
http://www.primacentral.org/

Risk Management Society, Inc.
https://www.rims.org/Pages/Default.aspx

U.S. Fire Administration
https://www.usfa.fema.gov/

Vision 20/20 National Strategies for Fire and Loss Prevention
http://strategicfire.org/

Volunteer Firemen's Insurance Services, Inc.
http://www.vfis.com/

Acronyms

CAD   computer-aided dispatch

CO   Company Officer

CP   Command Post

DOL   Department of Labor

EMS   Emergency Medical Services

FLSIs   Firefighter Life Safety Initiatives

IAP   Incident Action Plan

ICs   Incident Commanders

IFSTA   International Fire Service Training Association

LODDs   line-of-duty deaths

NFA   National Fire Academy

NFFF's   National Fallen Firefighters Foundation's

NFPA   National Fire Protection Association

OSHA   Occupational Safety and Health Administration

OSU   Oklahoma State University

PASS   personal alert safety system

PPE   personal protective equipment

RITs   Rapid Intervention Teams

SCBA   self-contained breathing apparatus

SOGs   standard operating guidelines

SOPs   standard operating procedures

USFA   U.S. Fire Administration

U.S. Fire Administration
Working for a fire-safe America

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www.usfa.fema.gov

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