National Emergency Training Center
16825 S. Seton Avenue
Emmitsburg, MD 21727-8998

FEMA

R0154

Dear National Fire Academy Student:

By now you should have received an email notification from the National Emergency Training Center (NETC) Admissions Office. This notification indicates your acceptance into the U.S. Fire Administration (USFA), National Fire Academy (NFA) "Safety Program Operations" (SPO) course.

Congratulations on being selected to attend the USFA's/NFA's SPO course.

This 6-day course focuses on applying the risk management model to health and safety aspects of emergency services operations, including program management, day-to-day operations, and incident safety. Other areas covered include firefighter and Emergency Medical Services (EMS) fatality and injury problem; the risk management process; safety responsibilities of department members; health and wellness; investigations; regulations, standards, and policies affecting emergency services safety; and appropriate documentation and record keeping pertaining to firefighter and EMS health and safety.

This class is a six day class which starts on Sunday at 8 a.m. Subsequent classes will meet daily from 8 a.m. to 5 p.m., with evening classes possible. The class graduation ceremony is an important part of the course. You are expected to attend this event. All departing travel arrangements should be made so that you do not leave campus prior to the class graduation.

The course materials for this course are now available in a Bring Your Own Device (BYOD) format which will function on any electronic device. If you own an electronic device (laptop computer, tablet, etc.) and are familiar with its document reader functions, we are asking you to download the Student Manual (SM) **before you travel to Emmitsburg** and bring the preloaded device with you. Please see the page following this letter for complete instructions on successfully downloading your course materials. Please note: If you plan to bring/use an iPad, you may experience issues saving/storing/printing course assignments since there is no USB/thumb drive capacity for these devices.

The NFA classroom environment is computer based. Increased numbers of students and instructors are bringing laptop computers or other electronic devices to campus; you are responsible for the security and maintenance of your equipment. The NFA cannot provide computer software, hardware (which includes disks, printers, scanners, monitors, etc.), or technical support for your device. For your convenience, we do provide surge protector power strips at each classroom table.

Your course may require you to bring reports or projects that may be shared with the class. It is advised that you bring this information in an electronic format. Please discuss this with your course's training specialist before attending class; contact information is located in the last paragraph of this letter.

Should you need to access the Student Computer Lab, it is located in Building D and is available for all students to use. The lab is open daily with a technician available Monday through Thursday from 1700 to 2100 (5 p.m. to 9 p.m.) and on Saturdays from 0800 to 1200 (8 a.m. to noon). The lab uses Windows 7 and Office 2013 as the software standard.

If you need additional information related to your course's content or requirements, please contact Mr. George Morgan, Training Specialist, at (301) 447-1407, or by email at george.morgan@fema.dhs.gov. Good luck, and I hope to see you on campus.

Sincerely,

Eriks J. Gabliks, Superintendent
National Fire Academy
U.S. Fire Administration

Enclosures

National Fire Academy Bring Your Own Device (BYOD)
Course Materials/Download Instructions

The **first step** is to download ADOBE Reader to your device. This will enable you to read and manipulate the course materials. ADOBE Reader can be used to comment and highlight text in Portable Document Format (PDF) documents. It is an excellent tool for note-taking purposes.

For Laptops and Computers

ADOBE Reader can be downloaded from www.adobe.com/downloads/. It is a free download. Please note that depending on your settings, you may have to temporarily disable your antivirus software.

For Tablets and Other Similar Hand-Held Devices

ADOBE Reader can be downloaded onto devices such as iPads, android tablets, and other hand-held devices. ADOBE Reader for these types of devices can be found in the device's Application Store using the search function and typing in "ADOBE Reader." Follow the instructions given. **It is a free application.** Note: In order to have the editing capabilities/toolbar, the document needs to be "opened with ADOBE Reader." There should be a function on your device to do this.

After you have successfully downloaded the ADOBE Reader, please use the following Web link to download your R0154, "Safety Program Operations" (SPO) Student Manual (SM). (You may copy/paste this link into your Web browser.)

https://nfa.usfa.fema.gov/ax/sm/sm_r0154.pdf

Note: Please make sure you download the ADOBE Reader first. To open the SM, you will need to open the ADOBE Reader and then open the SM through the ADOBE Reader in order for the note-taking tools to work properly.

If you need assistance, please contact nfaonlinetier2@fema.dhs.gov.

Safety Program Operations
Pre-course Student Preparation Requirements

Please complete the following prior to the first day of class:

- The body of the most current Firefighter Fatalities in United States report – available on the USFA Web Page at https://www.usfa.fema.gov/downloads/pdf/publications/ff_fat17.pdf
- 16 Firefighter Life Safety Initiatives.
- Reading on Crew Resource Management.
- Student Manual Unit 1 – The Firefighter Fatality and Injury Problem
- Student Manual Unit 2 – Risk Management Process
- Pre-course Preparation Sheet

Students are requested to bring any or all of the following Standard Operating Procedures and Policies from their departments (in electronic format if possible) to share with other students in the class. These SOPs will not be used directly in class discussions, but may be helpful in some course activities.

- Accident & Injury Investigation
- Accident and Injury Reporting Procedures
- Driving\Emergency Response
- Highway\Traffic Safety
- Infection Control
- ISO & HSO job descriptions
- Physical Fitness
- PPE
- Rehab
- Risk Management Plan
- RIT\RIC
- Safety
- Technical Rescue

Safety Program Operations

PRE-COURSE PREPARATION

In order to prepare for the course introduction activity, please complete the following information survey and provide a thoughtful response to the subsequent questions. This information will form the basis for a student activity toward the end of the course.

1. Utilizing the latest *Firefighter Fatalities in the United States in Report*, provide answers to the following:
   a. Total fatalities for the year _____
   b. Number of volunteer fatalities _____ Percent of overall number _____
   c. Number of career fatalities _____ Percent of overall number _____
   d. Number of Wildland firefighter fatalities _____
   e. Number of fatalities related to emergency duties _____
   f. Fatalities attributed to
      i. Violence or assault _____
      ii. Caught or trapped _____
      iii. Motor vehicle collisions _____
      iv. Struck/contact with object _____
      v. Fell/jumped _____
   g. Fatalities from Stroke _____ Percent of overall number _____
   h. Fatalities from Cardiac Arrest _____ Percent of overall number _____
   i. On-duty heart attacks occurring on the scene of the incident _____

Describe your expectation from the course:

Continued on Next Page

Safety Program Operations

PRE-COURSE PREPARATION

Please identify three *Emerging Health and Safety Issues* affecting or that possibly could affect you and your department.

1.

2.

3.

16 FIREFIGHTER LIFE SAFETY INITIATIVES

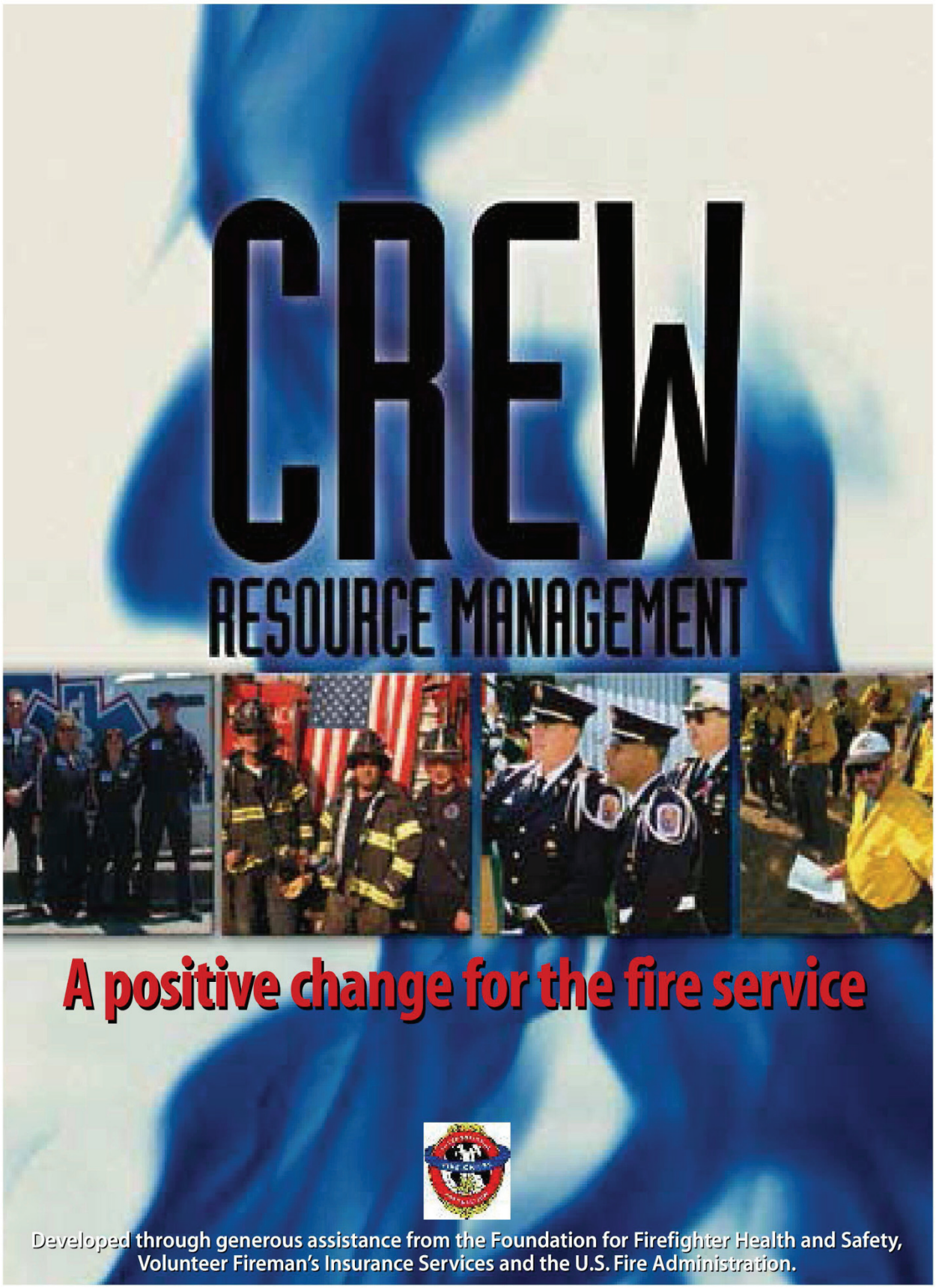
1. Define and advocate the need for a cultural change within the fire service relating to safety; incorporating leadership, management, supervision, accountability and personal responsibility.
2. Enhance the personal and organizational accountability for health and safety throughout the fire service.
3. Focus greater attention on the integration of risk management with incident management at all levels, including strategic, tactical, and planning responsibilities.
4. All firefighters must be empowered to stop unsafe practices.
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.
6. Develop and implement national medical and physical fitness standards that are equally applicable to all firefighters, based on the duties they are expected to perform.
7. Create a national research agenda and data collection system that relates to the initiatives.
8. Utilize available technology wherever it can produce higher levels of health and safety.
9. Thoroughly investigate all firefighter fatalities, injuries, and near misses.
10. Grant programs should support the implementation of safe practices and/or mandate safe practices as an eligibility requirement.
11. National standards for emergency response policies and procedures should be developed and championed.
12. National protocols for response to violent incidents should be developed and championed.
13. Firefighters and their families must have access to counseling and psychological support.
14. Public education must receive more resources and be championed as a critical fire and life safety program.
15. Advocacy must be strengthened for the enforcement of codes and the installation of home fire sprinklers.
16. Safety must be a primary consideration in the design of apparatus and equipment.

LEARN MORE: www.EveryoneGoesHome.com

Funding provided by the Department of Homeland Security, Assistance to Firefighters Grant and the generosity of Fireman's Fund Insurance Company.

Homeland Security

Fireman's Fund Insurance Company


CREW
RESOURCE MANAGEMENT
A positive change for the fire service
Developed through generous assistance from the Foundation for Firefighter Health and Safety,
Volunteer Fireman's Insurance Services and the U.S. Fire Administration.

★ ACKNOWLEDGMENTS ★

Crew Resource Management (CRM) is the effective use of **all** *resources to minimize errors, improve safety and improve performance. To that end it is only fitting that the ideology of CRM was used to assemble this training manual. The following people contributed time, talent and funds to developing this work.*

Garry L. Briese, CAE, Executive Director of the IAFC was the determined visionary for this work. He embarked on the journey to bring this work to fruition in 1999. In his usual fashion, Garry took a small spark, turned it into a glowing ember, and through his continued vision and effort ignited what is rapidly becoming a national effort to embrace CRM in the fire service.

Dennis Smith, author of Report from Engine Co. 82, Report from Ground Zero and prominent leader in a number of charitable organizations, contributed the seed money to set the wheels in motion to produce this manual.

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The attendees who took time out of their busy schedules to attend CRM meetings to share, instruct and opine on how CRM should be implemented in the fire service:

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Hank Kim, International Association of Fire Fighters (District of Columbia)
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John Tippett
IAFC, Special Projects
August 2002

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INTRODUCTION

No one intentionally sets out to commit an error. Captain Edward J. Smith was diligently working to validate the White Star Lines' claims that the ship under his command, Titanic, was the largest, fastest, safest liner in the world. The ship's vaunted invincibility lulled Smith and the ship's crew into a false sense of security as it traversed the North Atlantic on its fateful maiden voyage. Nor did the incident commander at Boston's tragic Vendome fire intentionally leave his personnel in harm's way. However human behavior patterns suggest that the most well intentioned, best-trained, consistently performing individuals and work groups commit errors. Some of these errors are miniscule in scope and have little or no impact on events. Others are calamitous. The purpose of this manual is to introduce a concept to the fire service that will spark a top-to-bottom behavioral change in the way we approach our work.

We know that accidents are not just random occurrences. People cause accidents and make errors. The concept introduced in this manual has a proven history in reducing errors in two industries (aviation and military) with parallel work group structures. Welcome to your first exposure to breaking the unacceptable death and injury rate stalemate that has plagued the fire service for the last 12 years. Be prepared to adopt and implement a paradigm approach to error, injury and fatality prevention. Welcome to Crew Resource Management.

Tragic Watersheds

On July 1, 1988, the Hackensack (N.J.) Fire Department responded to a fire in the service bay area of the Hackensack Ford dealership. Arriving units found a well-developed fire in the bowstring truss space above the service bay area. A recall of off-duty personnel was initiated to provide additional resources. Understaffed crews fought the fire for a period of time before being ordered to retreat. A catastrophic collapse occurred before the crews could exit the building. Three firefighters were killed in the initial collapse. Two other firefighters were trapped in a concrete block room used to secure mechanics' tools. Numerous radio transmissions were made by the trapped firefighters, telling command where the men were trapped. Command answered one of the transmissions but called the wrong unit. Repeated calls from the trapped firefighters went unanswered. Video footage of the incident shows a chaotic scene. The incident commander is seen with his portable radio slung over his shoulder participating in the fire fighting operations. After 27 calls for help, the radio goes silent. The two entombed firefighters run out of air and suffocate, bringing the death toll to five and completely demoralizing the 100-member department.

On October 27, 1997, the District of Columbia Fire Department responded to a fire in a corner grocery at Fourth and Kennedy Streets, N.W. DCFD crews initiated an aggressive interior attack on the fire. The fire, however, had already gained considerable control of the building. Crews evacuated the building after feeling heat rapidly building up and the floor shift. The crew of Engine 14 exited and realized their officer was not with them. They reported their discovery to another officer who told them he was sure their officer was somewhere—they just became separated by the confusion. The crew was unable to find their officer, so they again reported their missing officer to yet another officer. Several minutes passed before Engine 14's crew could get anyone to believe them. The fire was extinguished after an extended defensive operation and a search was conducted. The missing officer was found dead in the basement. Post incident analysis of the radio transmissions identified a single call from the officer ("14's in the basement") that was not heard on the fireground. Several other microphone clicks can be heard and were suspected (but not confirmed) as coming from the officer.

The DCFD officer died nine years after the Hackensack tragedy. From 1997 to 2001, approximately 500 firefighters died in structure fires and fire fighting operations in places such as Worcester, Mass.; Keokuk, Iowa; Louisville, Ky.; and New York City. Despite the diverse locations and circumstances, several common threads appear in each of the tragedies. Factors that contributed to these and other fire service tragedies are remarkably similar to factors identified by an industry that began adopting Crew Resource Management as a mantra more than 25 years ago.

The nation's aviation industry recognized that human error was the prevailing cause in aviation disasters. They embarked on a long, arduous and sometimes acrimonious trek to change behaviors and traditions to reduce the likelihood of repeat tragedies. The lessons learned by this industry are worth study by the fire service because of common contributing factors to the deaths in both industries. The captain ruled the flight cockpit with an iron hand before the advent of CRM. On the fire scene, the chief is always in charge and expects (and is expected in some cases) to make all decisions. Both industries ultimately rely on people to accomplish tasks and meet objectives that may involve life-or-death decisions. A person's very humanity contributes to errors that are the root cause of tragedy.

A Tale of Two Flights

United Airlines Flight 173 was on final approach to Portland International Airport after an uneventful flight on December 28, 1978. The cockpit crew of three consisted of an experienced DC-8 pilot, first officer and flight engineer. Eight flight attendants and 181 passengers occupied the cabin. The pilot noticed that he had not received the usual "three down and green" indicator telling him that all landing gear was properly deployed. The nose gear light failed to illuminate green. The pilot notified the air traffic control center and requested additional flight time to resolve the situation. He went through his checklists while circling. In spite of the crew's efforts, the nose gear landing light continued to glow "red" indicating the gear was not locked into position.

Throughout the troubleshooting the first officer and flight engineer had informed the pilot that the plane was running low on fuel. The pilot either ignored the warnings or did not comprehend the messages. Approximately six miles southeast of the airport runway the perfectly capable, but fuel starved plane crashed into a wooded residential area. Eight passengers and two crew members were killed, and 23 people were seriously injured. The lack of a post crash fire kept the death toll mercifully low. The lack of communication skills under stress, situational awareness, team building, decision making and task allocation sent the plane into the ground. The post crash analysis determined that the green light indicator for the nose landing gear had a burned-out bulb. The nose gear had been down and locked the entire time.

Flight 173's disaster was the catalyst for the aviation industry's recognition that technology alone was not the cause of air mishaps. A bold, new thinking evolved. The DC-8 used by Flight 173 was a fully functional, mechanically sound airframe that crashed because the humans flying the machine became over-engrossed in a burned-out light bulb. The pilot became so absorbed in the burned-out bulb that he forgot to fly the plane. As a result, a new training program was implemented that sought to capture and minimize human frailty. Cockpit Resource Management had arrived.

The industry's senior pilots initially rejected the program. The airline "chain of command" had a traditionally rigid hierarchy with an autocratic captain and subservient flight crew. The cabin crew was not even considered part of the flying team. This tradition closely mirrored the maritime industry's concept of the captain being "master of the ship." The industry, however, held fast. Cockpit Resource Management evolved into Crew Resource Management, and the training became mandatory for all pilots and flight crews.

Flash forward to United Airlines Flight 232 bound for Los Angeles from Chicago in July 1989. The plane experiences a catastrophic failure of one of its engines in flight. All three hydraulic lines necessary for controlling flaps, rudders and other flight controls are severed. Flight 232 has suffered an in-flight disaster that robbed the crew of primary and redundant safety features that are built into every airframe. The flight crew and a check ride pilot, using engine controls alone, manage to bring the crippled plane into the Sioux City, Iowa airport. The plane made a spectacular crash landing captured on film by media news crews. One hundred eleven people were killed in the crash. However, 184 survived. What actions did the crew of Flight 232 take to save the 184 passengers? The crew, led by the pilot, initiated behaviors learned in a training program that taught them to overcome the five factors that contribute to human error. The pilot and crew attributed their success to Cockpit Resource Management. CRM finally had the landmark event necessary to validate its worth.

CRM in the Fire Service: Breaking the Chain of Complacency

Photo by Chauncey Bowers, Prince George's County Fire/EMS

Additional industries looked into and adopted CRM throughout the 1980s and 1990s. The medical field, military and maritime trades introduced CRM[1] into their fields with dramatic results. The U.S. Coast Guard reports a 74 percent

[1] *LCDR Valerian Welicka, USCG (DC), presentation at IAFC headquarters, June 14, 2001*

reduction in its injury rate since adopting CRM. U.S. air disasters (not related to terrorism) have fallen from approximately 20 per year to one to two per year.[2]

The fire service in the United States has been lulled into a weary acceptance of an "average 100 line-of-duty deaths and 100,000 lost time injuries per year" mentality. None of these deaths or injuries is considered an intentional act. Firefighters do not report to the station for duty and state, "Today I will take actions that will intentionally kill and/or injure myself and my colleagues." There are voices that insist all has been done for firefighter safety, and we are living with the best possible circumstances. Any further change in fire fighting tactics will essentially put us outside the building on all fires and essentially out of business. Firefighters are not being killed and injured by flames, smoke and heat. Reading between the lines of the line-of-duty death reports reveals the effects of adrenaline and machismo are significant factors. Communication failures, poor decision making, lack of situational awareness, poor task allocation and leadership failures are listed as the contributing factors in far too many NIOSH Firefighter Line-of-Duty Death Reports. Since the factors are the same as those cited in aviation disaster reports, it logically follows that CRM would benefit the fire service. We need to look to new venues to break the chain of complacency.

A comparison of the interaction and behaviors of emergency service crews and flight crews reveals a number of additional similarities. Both crews are structured with a leader and one or more crew members. The group functions best when it works as a cohesive team. The team can spend hours of time performing mundane activities and then be called upon to act swiftly under stressful conditions. Some crews work together frequently and others are assembled on short notice.

Crew Resource Management can be taught using a variety of methods. The airline industry uses a three-step process to teach the five factors (communication, situational awareness, decision making, teamwork, barriers) that comprise CRM. The first step, awareness (which is the function of this text), introduces the concept. The second step, reinforcement, underpins the awareness level by having attendees participate in simulated activities that require action to overcome problems in the five factors that lead to disaster. The third step, refresh, is a session that reminds participants of the basic concepts and reinforces the five factors through lecture and role play. The second and third steps provide for repetitive (or in-service) training to reinforce the five factors. This training is based on the concept of Recognition Primed Decision Making. (Recognition Primed Decision Making is explained in greater detail in the Decision Making section of this text.) While the fire service certainly could benefit from a program as intensive as the airline industry's, the current airline training has evolved over a 25-year period. Getting the word out is the first step. Becoming familiar with the five factors is an essential first component of the first step.

Communication

Communication is the key to success in any endeavor. We all have experienced misunderstandings that led to errors and mistakes. CRM teaches people to focus on the communication model (sender-message-medium-receiver-feedback), speaking directly and respectfully and communication responsibility.

Situational Awareness

Situational awareness is a concept that discusses the need to maintain attentiveness to an event. It discusses the effects of perception, observation and stress on personnel. There is emphasis on the need to recognize that situations in the emergency services are particularly dynamic and require full attention.

Decision Making

Decision making is based on information. Emergency service decision making relies heavily on risk/benefit analysis. Too little information results in poor risk assessment by the decision maker and results in errors, injury and death. Too much information overloads the decision maker and makes it difficult to make effective decisions. CRM training concentrates on giving and receiving information so appropriate decisions can be made.

Teamwork

Any group that fails to perform as a team is eventually doomed to fail. Failure in the emergency service field results in excessive damage, poor crew performance, injury and death. CRM training emphasizes team performance through exercises in the awareness tier and crew performance during the reinforcement tier. The training also focuses on "leadership-followership" so all members understand their place on the team and the need for mutual respect.

Barriers

The final factor addressed in CRM training is recognizing the effect of barriers on the other four factors. Barriers are any factors that inhibit communication, situational awareness, decision making and teamwork. Barriers can be external (physical) or internal (prejudice, opinions, attitudes, stress). The CRM segment on barriers focuses on recognizing that barriers exist and taking steps to neutralize their negative effect.

[2] *Mr. Chris Hart, FAA (DC), presentation at IAFC headquarters, September 18, 2000.*

C R E W R E S O U R C E M A N A G E M E N T

Crew Resource Management requires a commitment to change leadership and operating cultures that have evolved over generations of time. The similarities between the flight deck and the cab of an emergency vehicle suggest that CRM has application to the emergency services. CRM's goals are to minimize the effect that human error has on operations and maximize human performance. Crews trained in CRM learn skills that enhance communication, maintain situational awareness, strengthen decision making and improve teamwork. The U.S. military, medical industry and shipping industry already have adopted the concept. Developing and adopting Crew Resource Management for the nation's emergency services is the next logical step toward a safer, more effective service.

Over the next decade, approximately 1,100 firefighters will die, and one million will be injured if the fire service continues down its current path. We are well protected from flames, heat and smoke thanks to technology. However, if we do not take some action to arrest the effects of adrenaline and machismo (cholesterol requires another approach), we are doomed to continue a history of grand funerals and mourned losses. The answer may lie in Crew Resource Management. The fire service can adopt the proven concepts of CRM. If history holds true, the fire service will realize the same benefits that other industries have achieved in arresting catastrophic events caused by adrenaline and machismo (aka: human error). CRM has a 25-year record of proven success.

What is Crew Resource Management (CRM)?

Simply put, Crew Resource Management is the effective use of all resources. The Federal Aviation Administration's Advisory Rule expands the definition to include software, hardware and humanware in its definition. The ultimate goal for the FAA is achieving safe and efficient flight operations. Their specific listing of software, hardware and humanware is meant to emphasize the point that problem solving involves using all available tools.

CRM is not an attempt to undermine the legal ranking fire officer's authority. Nor is CRM management by committee. Tom Lubnau and Randy Okray observed that CRM is a "force multiplier."[3] In fact authority should be enhanced through the use of CRM. All team members direct information flow to the officer. While opinions are valid, the final decision on a course of action still rests with the officer. Using CRM provides for:

- ★ *better teamwork*
- ★ *newly acquired communication and problem solving skills*
- ★ *an operating philosophy that promotes team member input while preserving legal authority*
- ★ *proactive accident prevention.*

[3] *Lubnau, Okray, "Crew Resource Management for the Fire Service," Fire Engineering, p. 99, August 2001.*

LEADERSHIP/FOLLOWERSHIP- A NEW LOOK AT TEAMWORK

Teamwork requires group members to cooperate in order to accomplish common goals. Goal accomplishment requires someone (a leader) to identify what the goals are and at least one other person, or group of people (followers), to perform tasks that will achieve the established goals. The very nature of fire service work requires that people work in groups to accomplish tasks. The breakdown of teamwork results in two ends: inefficient goal attainment and injuries.

Leadership

Fire service leadership is established by both formal and informal mechanisms. Laws enacted by local governments define the mission and structure of a fire department. The internal structure of the fire service has traditionally followed a quasi-military structure that defines lines of authority. Department members in leadership positions from chief to company officer are obligated to acquire and develop leadership skills that best serve the community and the department. Human behavior specialists have identified four leadership skills that are critical to the leadership function. These skills are authority, mentoring, conflict resolution and mission analysis.

Authority

CRM recognizes and reinforces the legitimate authority of the fire department structure through four points. Ensuring mission safety, point one, is the first requirement of every assignment. The once proud declaration, "Fire fighting is the most dangerous occupation in America," is no longer acceptable. Every fire service leader and the people led expect to be able to carry out their assigned tasks and return home safely to their loved ones. Mission safety requires the commitment of all members. However, the ultimate responsibility for member safety lies with the leader.

The second point necessary for successful authority involves fostering an environment of respectful communication among the crew. Respectful communication is one of the core elements of CRM. This conclusion was derived from research of aircraft disasters conducted by the aviation industry. The research and report results strongly suggest that failures to communicate or misunderstood communication (verbal and non-verbal) are significant contributing factors in airline disasters. The same conclusions have been reached in several high-profile fire service disasters (e.g., Storm King Mountain; Hackensack, N.J.; Washington, D.C.'s

Photo by Bryan Day, NIFC

Cherry Road). Leaders who are open and promote respectful communication with their personnel are more effective.

Establishing tasks with clearly defined goals is the third point in CRM's reinforcement of legitimate authority. Personnel clearly thrive and excel when they are given work assignments that have attainable, defined goals. By nature people want to do a good job. The sense of accomplishment and boost in morale that are derived from accomplishment fuel a member's sense of self worth, improve performance and heighten the individual's awareness. Highly motivated members satisfied with their performance and entrusted to complete tasks are less likely to sustain injuries or make mistakes.

The fourth point involves including crew input (when appropriate) when activities are altered or situations change. The critical phrase here is "crew input." Leaders do not wake up in the morning and set goals to make decisions that will have the department membership hate them. They often are left to make decisions in a vacuum because of a lack of input from subordinates. Soliciting input is not intended to relieve a leader of his duty to make decisions. Nor is crew input an abdication of authority on the part of the group leader. Actually, the intent of soliciting crew input is to guarantee that all factors possible are weighed so the leader's decision making is enhanced. Two sets of eyes see more than one set, four sets see more than two and so on.

Mentoring

The second leadership skill necessary to develop is mentoring. Mentoring is a fundamental function of any leadership position. Developing and supporting prospective leaders ensures a department's future. A sense of commitment from department leadership to its members is fostered. Leaders must possess a high degree of self confidence and commitment in order to mentor others. Self confidence permits leaders to impart knowledge and allow for a member's personal growth without feeling threatened.

Technical competence is an essential component of mentoring. Through technical competence a leader is able to:

- ★ *Demonstrate skills and techniques*
- ★ *Demonstrate professional standards and best practices*
- ★ *Verbalize errors and limitations promptly*
- ★ *Recommend solutions to enhance crew effectiveness*
- ★ *Monitor and assess crew performance*
- ★ *Motivate members.*

This give-and-take process allows members to develop confidence in their leader, trust the leader's judgment, accept decisions, perform better as a team and grow personally.

Conflict Resolution

Conflict inevitably arises in groups. Conflict can be healthy and unhealthy. Resolving unhealthy conflict quickly and positively promotes harmony and goal accomplishment. One of the double-edged swords of CRM is that it can give rise to conflict if members let their egos get in the way of their reasoning. Recognizing and accepting this point suggests that leaders develop effective conflict resolution skills and followers respectfully address rank with their concerns.

A frequently heard opening complaint in conflict resolution is, "The other side is not listening to me." Arresting this complaint can be rather simple. The first step is to provide a legitimate avenue for dissent. Leaders who are accessible and acknowledge differences of opinion are halfway toward conflict resolution. The second step in conflict resolution can be more complicated. Emotions can run high during periods of conflict, clouding the root cause (or causes) of conflict. However, using effective listening techniques, avoiding emotional involvement and staying focused on cause identification can help a leader weed through the rhetoric and identify core conflict issues.

Crew members should be encouraged to diplomatically question the actions/decisions of others. Fostering this aspect of conflict resolution is not without some heartburn. Zealots empowered to "question authority" believe they have the right to challenge all decisions made by leadership under the guise of CRM. Nothing could be further from the truth. Questioning authority in the CRM world should more appropriately be termed "confirming situational awareness." (Note: Situational awareness will be discussed in depth in a later section.) Expressing a difference of opinion diplomatically and in a non-threatening way can be accomplished using the five-step Assertive Statement[4] method.

1. *Opening/attention – Say the person's name.*
2. *State concern/owned emotion – "I'm very uncomfortable with . . ."*
3. *State the problem as you see it – real or perceived.*
4. *Offer a solution – "I think we should . . ."* **(Major success key)**
5. *Obtain agreement – "What do you think?"*

The Assertive Statement method should be used where risks are low, time is not a factor and lives are not in danger. While offering a solution is considered a major success key in the assertive statement, the lack of a solution should not prevent a crew member from pointing out a potential problem.

A second, more forceful method is available but should be reserved for those situations where members are engaged in high-risk activities and the potential for tragedy is real. This method is known as the "This is Stupid!" (TIS) technique. Asserting opinion in this environment is reserved for life threatening situations. It is the "red flag" of respectful communicating in the leadership/followership arena. The statement focuses on actions, not individuals. Therein lies its successful key. If the statement were turned to say, "You are stupid!" the leader becomes defensive. This defensive posture leads to an inability to see the potentially tragic error because of the distracting nature of a personal attack. "This is stupid" is the last tool in the toolbox prudently used to direct a leader to review actions or activities that are potentially dangerous. A department may wish to create or develop its own "call sign" to indicate a TIS event is occurring. This call sign should be simple and recognizable by every crew member. Call signs offer the benefit of being less inflammatory than "This is stupid," but carry the same "let's review what's going on here, now!" weight. Some examples of TIS call signs include: "red flag," "TIS" and "red light."

[4] *The five step "Assertive Statement" was developed and trademarked by Todd Bishop, Vice President, Error Prevention Institute Incorporated. Used with permission. EPI specializes in Error Prevention Training. See bibliography for contact information.*

Photo by Andrea Booher, FEMA

Successful leaders accept conflict as a normal component of leading people. A CRM trained leader will acknowledge the difference of opinion, accept constructive criticism and recognize that differences of opinion will crop up within any work group. The leader's response to criticism will drive successful goal attainment and prevent injuries to the group. Effective leaders will recognize that differences of opinion exist, accept constructive criticism, actively listen to what subordinates are saying, employ subordinate counsel and reinforce that the final decision rests with the leader.

Mission Analysis

The final leadership skill to develop is mission analysis. Mission analysis can be likened to the size-up process. Its components include: evaluating risk versus gain, identifying objectives, developing strategies and tactics to meet the identified objectives, implementing an action plan, expecting the unexpected, evaluating the effectiveness of the action plan (critiquing) and devising alternative strategies. Most fire officers are well versed in the size-up process. Mission analysis, therefore, should be the easiest skill in the CRM Leadership/Followership component to develop.

Followership

Goal attainment and teamwork require people who can think and follow direction. CRM empowers followers to challenge a leader's decisions. This empowerment is not doled out indiscriminately or without thought. Followers have a significant obligation to meet in order to maintain their right to challenge a leader. One of the core tenets of CRM is that the authority of the leader is preserved and protected unless the leader is incapacitated. In order for followers to be at their peak, they have to be at the top of their game and develop skills to be more effective.

Self Assessment

The physical and mental condition of any team member is critical to mission success. Being at the top of one's game is also a crucial factor in error recognition and mitigation. Alert, oriented people do not make mistakes. Since CRM recognizes that to err is human, being alert and oriented (i.e., maintaining situational awareness) is an incumbent requirement of every team member.

Being physically fit is a fire service standard. The physical and mental demands of the job require participants to be in the best health possible. This health requirement carries through to CRM as well. There is a wealth of information and programs available to assist firefighters in staying healthy. In a nutshell, followers need to be:

- ★ *Physically fit*
- ★ *Hydrated*
- ★ *Nourished*
- ★ *Rested*

Mental condition is also a critical followership self-assessment category. People, regardless of their task assignment or

organizational position, make fewer mistakes when they are focused on their assigned tasks. Good followers understand that stress is an operational distracter. Stress is a function of any number of outside influences. Some stresses are interpersonal, others environmental. Identifying sources of stress, recognizing stress affects performance and taking steps to minimize stress are all necessary in the effective use of CRM.

Sources of Stress

- ★ *Anxiety*
- ★ *Frustration*
- ★ *Noise*
- ★ *Temperature Extremes*
- ★ *Hydration*
- ★ *Drugs*
- ★ *Fear*
- ★ *Anger*
- ★ *Vibration*
- ★ *Hunger*
- ★ *Time Pressure*
- ★ *Incentives*
- ★ *Time of Day*
- ★ *Training*
- ★ *Alertness*
- ★ *Lack of Rest*
- ★ *Punishments/Reprisals*

Understanding the human animal is not a requirement reserved for leaders. Attitude, memory limits and behavioral tendencies play a significant role in followership as well. The term attitude is often overused. However, the components of attitude, frame of mind, prejudices and interests all play a role in the actions and interactions of people. The leader's role is to create an environment where crew members can feel comfortable coming forward with a stress event that may impair their performance.

Recognizing memory limits is a trait that reminds followers that leaders can be extremely capable, but nonetheless human. Typically, people can remember up to 10 items (recall the cadence of the ABCs?). Armed with this fact, followers can assist leaders by making up the difference and referring to checklists.

Knowledge of behavioral tendencies also can provide followers with tools to be effective team members. Acquiring a knowledge base of how a particular leader reacts in various situations can be extremely beneficial to a follower. This knowledge base provides the follower with the information necessary to develop strategies for approaching and communicating with a leader.

Photo by Tim Syzmanski, Las Vegas Fire Department

Followers are the power that permits work groups and organizations to achieve goals. We all have to answer to someone, so in essence we are all followers. Even leaders need to be good followers. Consider the list of skills outlined on the next page as necessary to develop for good followership.

Another mental component to assess is your mental attitude. The FAA has identified five hazardous attitudes pilots exhibit. A noted fire service leader versed in the human factors field, Tony Kern, has identified two others. These attitudes are uncannily applicable to the fire service. We do not have to look around very far to see examples of these attitudes. We may have even exhibited some of these attitudes ourselves. The interesting point to evaluate in the self-assessment arena is how these attitudes affected team performance and what steps do we take to prevent them from wreaking havoc with team operations. The attitudes are: anti-authority, impulsivity, invulnerability, machismo, resignation, pressing and "air show syndrome."

Anti-authority is the "Don't tell me what to do!" attitude. This mindset is a team killer from the start. Think of any situation where this attitude has been displayed. The very root of the independent stance taken by the anti-authority person destroys a team before it can gel. At the very least it forces the team to roll with a bent axle, stressing a team and depriving it of the synergy necessary to accomplish goals.

The second hazardous attitude identified is impulsivity: the "we gotta do something NOW!" view—no forethought, just react. Failure to assess the scene properly, failure to formulate an action plan and failure to perform any logical thought

Followership skills

Respect authority.
Be safe.
Keep your fellow followers and leaders safe.
Accept that authority goes with responsibility.
Know the limits of your own authority.
Desire to make the leader succeed.
Possess good communication skills.
Develop and maintain a positive learning attitude.
Keep ego in check.
Demand clear assignments.
Establish an assertiveness/authority balance.
Accept direction and information as needed.
Publicly acknowledge mistakes.
Report status of work.
Be flexible.

process before taking action are the hallmarks of impulsivity. In some circles impulsivity is known as "white-eye rollback." We have all seen examples of this behavior. It is the wide-eyed firefighter who leaps from the rig grabbing a hoseline, completely disregarding his safety to do battle with the dreaded demon fire. The firefighter races right up to the very precipice of the flaming trash dumpster, sticks his unprotected face into smoke from unknown contents, shrieking for water through fits of coughing and slays the dragon! All because there is a fire and we have to do something about it right now! Too many firefighters who acted without assessing have died in the line of duty. We must get away from the attitude that it is just a routine call, act first—think second.

The next two attitudes, invulnerability and machismo, are closely tied to impulsivity. There is a chicken-versus-egg quality to all three. The attitude of invulnerability leads one to believe that, "It can't happen to me." Firefighters with this attitude tend to take unnecessary risks. When they survive, they point to their survival as justification that their actions were the right thing to do. Weary guardian angels and dumb luck would probably be the more appropriate factors to recognize. The job of fire fighting is not without risks. However, team members with the invulnerability complex jeopardize the entire team.

Machismo arguably causes more fireground injuries than any other factor. The fire service traditions of "Show me what you got, kid" and "I can do anything you can do, better" have been the hallmarks of fire station life for decades. The trend toward a more diverse fire service has pushed the bar of machismo or proving oneself even higher. Falling into the traps of invulnerability and machismo are self-destructive personally and professionally, period.

Resignation. The mention of the word in fire service circles conjures up the antipathy of what fire fighting is all about. However, firefighters displaying the resignation attitude believe they cannot make a difference. Resignation is the Yin to impulsivity's Yang. The resigned firefighter leaves all decision making to others, even acquiescing when he knows an action is too risky. He just wants to get along and not make waves, regardless of the cost.

Pressing is the attitude that can best be associated with the dumpster fire that is dispatched just as the roast is coming out of the oven. Crews race to the scene blowing traffic lights, leave the SCBA on the rig and gloves in the coat pocket, extinguish the fire quickly and race back to the station to catch at least one piece of roast beef before it can be more appropriately deemed Grade A leather upper. The crew of our fictional pumper achieved goal attainment in the wake of critical judgment errors in time. The guardian angels and dumb luck will sooner or later submit their retirement papers, leaving firefighters exhibiting the pressing attitude to their own demise. Pressing ultimately results in mistakes, injury and death.

Tony Kern coined the phrase "air show syndrome" to describe a hazardous attitude that insidiously finds its way into every fire department. You may already recognize this attitude as "We've done this before and nothing happened, chief," or "They always do it this way on B shift, cap." Some fire service members become complacent about the dangers of the job after surviving close calls. They feel the need to push the envelope a little further each time or given the chance to perform (e.g., featured on a media news report or documentary) and exhibit behaviors that are akin to aerial daredevils. Such behavior may result in tragedy as it sometimes does for the aerial daredevil.

Several years ago the Discovery Channel aired a documentary on a metropolitan fire department. One of the companies spotlighted responded to a fire in a row house. The company arrived on the scene and ran to the rear of the house with a hoseline from another engine. The fire was in

Antidotes to Hazardous Behaviors[5]

Hazardous Behavior	Antidote
ANTI-AUTHORITY *"Don't tell me."*	*"Follow the rules. They are usually right."*
IMPULSIVITY *"Do something – Quickly!"*	*"Not so fast. Think first."*
INVULNERABILITY *"It won't happen to me."*	*"It can happen to me."*
MACHISMO *"I can do it."*	*"Taking chances is foolish."*
RESIGNATION *"What's the use?"*	*"I'm not hopeless. I can make a difference in my world."*
PRESSING *"Let's hurry up and get this thing done so we can go home."*	*"If a job is worth doing, it is worth doing right the first time."*
AIRSHOW SYNDROME *"I am going to look so good. Look at me."*	*"Let's get the job done right."*

the basement, and the spotlighted company had a good shot at the fire as they positioned at the threshold of a basement door, except for one significant point: companies that had entered from the front of the house were already hitting the fire. A narrated voiceover dramatically described the action as the company officer warned the firefighter on the nozzle to stand back. The firefighter (not wearing SCBA, gloves or protective hood) replied that he was okay, protected by a draft. The firefighter also added that the crew from upstairs was pushing the fire on the crew at the basement door. The narrator noted that the basement door crew was at "serious risk." Seconds later a huge cloud of steam burst from the basement door, enveloping the basement door crew, burning the nozzleman (who by this time had removed his helmet to don his SCBA). The crew retreated from the threshold, momentarily stunned. They then pulled their hoseline around to a side window (also billowing clouds of steam and smoke) and made another attempt to enter the basement. The engine crew upstairs continued to fight the fire. Driven back by intense steam, the basement door crew finally gave up on entering the basement. The injured firefighter sought medical treatment (reluctantly under orders said the narrator) and was off duty for two shifts. Classic fire service Airshow Syndrome was captured forever on videotape.

Fighting the Feeling

The hazardous attitude behaviors spread like a viral infection. Human behavior specialists who have studied the effects of the infection also have identified antidotes to the dangerous acts resulting from the hazardous attitudes. The antidotes require a perpetual vigilance on the part of all personnel. Simply put, the cure for the infection is as simple as consciously reversing the hazardous attitude. The "Student Pilot Judgment Training Manual"[5] advocates memorizing the antidotes to protect one's self (and those around) from catastrophe.

[5] *Diehl, Alan, Ph.D., de Bagheera Buch, Georgette, Ph.D., Livak, Gary Spencer, authors, The Student Pilot Judgment Training Manual.*

C R E W R E S O U R C E M A N A G E M E N T

COMMUNICATION

Overview

There is universal agreement that communication is the key to success in any endeavor. Firefighters are acutely aware of this fact. A number of firefighter fatality incidents list communication breakdowns as contributing factors. Five particularly poignant examples of how communication breakdowns impacted firefighter safety are the Hackensack Ford Fire (Hackensack, N.J., July 1988), Storm King Mountain (Colorado, July 1994), Louisville House Fire (Louisville, Ky., February 1997) the Kennedy Street Fire (Washington, D.C., October 1997) and the World Trade Center Attack (New York City, September 2001). Interruptions in the communications flow process resulted in messages and orders being misinterpreted, not properly conveyed, completely missed or improperly carried out. The results were devastating.

Communication takes place between at least two people (a sender and a receiver) and generally involves six steps.

- ★ *The sender formulates an idea in Step 1*
- ★ *That message is encoded in Step 2*
- ★ *Step 3 involves sending the message through a medium*
- ★ *The receiver receives the message in Step 4*
- ★ *The receiver decodes the message in Step 5*
- ★ *Step 6 has the receiver confirming understanding by providing feedback to the sender.*

Errors that occur throughout the communication process contribute to injury and death. These errors can be divided into three categories: sender errors, receiver errors and filters or roadblocks.

Sender errors

A response of, "What do you mean?" is a good indicator that the receiver has missed the sender's message. There are a variety of reasons why this occurs. The most frequently encountered problems are:

- ★ **Not establishing a frame of reference.** *If the receiver is not on the same page as the sender, miscommunication occurs.*
- ★ **Omission of information.** *The sender leaves out pertinent details that affect a receiver's ability to comprehend what is being said. "Pull that line" leaves quite a few unanswered questions. "Pull that line to the front door and standby until I finish my circle check" gives the receiver more direction and mission definition.*
- ★ **Providing biased or weighted information.** *Inserting the sender's opinion when providing information.*
- ★ **Assuming messages only depend on words.** *The sender underestimates the power and importance of tone and body language.*
- ★ **Not willing to repeat information.** *We normally talk at about 125 words/minute and think at 500-1,000 words/minute. Senders who only say something once run a very high risk of failure if they think*

Photo by Jocelyn Augustino, FEMA

their message penetrates all of the thinking, talking and other external stimuli.

- ★ **Disrespectful communication.** *Want to ensure your message is blocked? Open your communication with an insult, demeaning or degrading remark.*

Receiver Errors

A receiver also can make mistakes that interrupt the communication chain (remember, to err is human). Receiver errors generally fall into six categories.

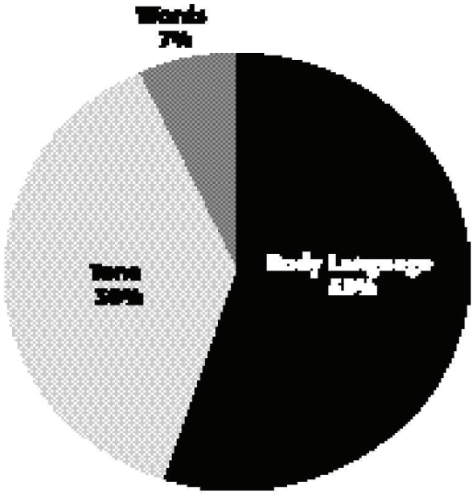
- ★ **Listening with a preconceived notion.** *The receiver already has his mind made up before the sender can formulate a thought.*
- ★ **Poor preparation.** *Receiving messages is more than just allowing the words to pass through your ears. Receiving a message is a conscious process.*
- ★ **Thinking ahead of the sender.** *Extrapolating the sender's thoughts, putting words into someone's mouth, finishing sentences for a sender, formulating a response before the sender finishes (the trigger phrase here is "Hear me out," from the sender) are all examples of thinking ahead of the sender.*
- ★ **Missing the non-verbal signals.** *Overlooking body language and facial expressions can be crippling when it comes to interpreting communications.*
- ★ **Not asking for clarification.** *Failing to employ the old standby, "So what you are saying is . . ." can be the death of good communication.*
- ★ **Disrespectful communication.** *Want to slam the door shut on a message? Respond with an insult, demeaning or degrading remark.*

Filters and Roadblocks[6]

We bring certain impressions to the table as we communicate. These impressions are based on how we were raised by our parents, life experiences and the influence of others. When we communicate with others, these impressions can serve to interrupt communication. Being aware of these "filters" prior to communicating can prevent the communication from becoming a conflict. Some of these filters, sometimes called "roadblocks," include:

- ★ *A natural resistance to change initial impression*
- ★ *Defending ourselves from looking foolish or stupid*
- ★ *Supporting our opinion even when it is not totally correct*
- ★ *Blaming others when our message is misunderstood*
- ★ *Intentionally withholding information that could benefit the group*
- ★ *The Halo Effect (usually bestowed on a group member thought to be infallible)*

Conveying Thoughts



- ★ *"Odd Man Out" (a crew member who does not have the ear of the group because of tenure, race, creed or gender)*
- ★ *Complacency*
- ★ *Fatigue*
- ★ *Reckless attitude (risk taker who does not use a risk/benefit analysis).*

The cornerstone principle of CRM is effective communication. Communicating is at the root of everything we do. Speaking comes to mind as the principal method of communication, but we humans actually convey messages three ways: verbally (words), tone (inflection) and body language. Of the three ways, body language ranks highest in the ways we convey messages, followed by tone. Words, while important, are the trailing method of conveying thought.

Every time air passes our vocal cords, we are communicating verbally (words/tone). Body language (non-verbal communication) takes place over a wider range of media and, as the chart indicates, has a greater impact on conveying messages. Facial expressions, body posture, gestures and dress are the components of body language.

Communicating in CRM boils down to this: respectfully communicate what you mean in clear text and confirm what is being conveyed to you. Errors are reduced through clear, concise communication, injuries are avoided and performance is enhanced. CRM accomplishes the clear communication process by using five skills: inquiry, advocacy, listening, con-

[6] *National Wildfire Coordinating Group, Human Factors on the Fireline, October 2000.*

flict resolution and critique (or feedback). Learning and employing these skills places firefighters in a position to proactively stay ahead of the injury and death curve.

Inquiry

Curiosity is a natural human trait. Wondering how things work, challenging the status quo, raging against the machine, a simple "Why?" all contribute to how we learn and how we apply what we learn. Inquiry in the CRM world maximizes the positive aspects of this human trait. Firefighters are provided with a tool to "raise their hand" in the name of self-preservation and protection. Inquiry is not a revolutionary concept in the fire service. It is already an ingrained process in a firefighter's decision making. The first question of size up (a firefighter's fundamental obligation at any emergency) is, "What do I have?"

CRM inquiry is revolutionary is in its empowerment to everyone on the emergency scene. Inquiry encourages firefighters to speak up (respectfully for maximum effect) when they recognize that a discrepancy exists between what is happening and what should be happening. A three-person engine company is stretching a handline to begin an attack at a single-family dwelling. The officer, preoccupied with assisting with the hoseline stretch, misses the fact that the flames are licking at the house electrical service. The pump operator notices, calls to the officer and asks the officer if he sees that the current path the hoseline crew is taking will travel in the fall line of the power lines. The officer looks up, recognizes the hazard and redirects his hose hauler out of harm's way. The pump operator's initial action (calling to the officer) is inquiry. This action leads to error identification and mitigation. In inquiry the subordinate needs to be proactive, use clear concise questions and express concerns accurately.

Advocacy

What next? Questioning the wisdom of a superior's decision can be gut wrenching. As a subordinate, how do you approach a superior and tell him that a foul up is brewing? The answer lies in being an advocate of your position. The most effective method for advocating your position is through the use of the assertive statement outlined in Section I, Leadership/Followership. The five parts of the assertive statement are:

- ★ *An opening statement using the addressed person's name ("Dave," "Captain," "Chief")*
- ★ *Stating your concern as an owned emotion ("I think we are heading for a problem . . .")*
- ★ *Stating the problem as you see it ("It looks like that building is getting ready to flash")*
- ★ *Offering a solution ("I think we should evacuate the interior crews right now")*
- ★ *Obtaining agreement ("Do you agree?").*

Using advocacy helps promote situational awareness, improve understanding and avoid catastrophe. When firefighters use advocacy, they rightfully believe that they are in charge of their destiny and become more willing to meet goals and objectives.

Listening

"Did you understand what I said?" and "What did he say?" are two of the most frequently uttered sentences. These questions are key to affirming communication. Unfortunately, not asking these questions is a significant contributing factor to errors.

Listening is a fluid, dynamic process that involves more than just hearing. Active listeners watch and process verbal and non-verbal forms of communication to gain total understanding. Becoming an effective listener is a learned trait. Part of that learning process is being aware of obstacles that affect active listening. An active listener learns to avoid the traps that prevent listening and comprehension. Consider the following to become a better listener:

- ★ *Use all of your senses to stay focused on the sender*
- ★ *Make eye contact with the sender*
- ★ *Suppress filters that affect listening (personal prejudices, preconceived opinions, gossip)*
- ★ *Repeat the sender's message to confirm understanding*
- ★ *Create an environment conducive to communication (move away from the command net radios so you can hear a face-to-face conversation).*

The active listener overcomes the majority of problems encountered in our environment through mastery of the art of listening. The learned skill of listening also is dependent upon several other factors such as maintaining situational awareness and being in good overall health. When filters, cultural roadblocks or other problems impede listening, errors emerge in a way that is truly reflected in the line from the movie Cool Hand Luke: "What we have here is a failure to communicate."

Conflict Resolution

Conflict is a normal occurrence in group dynamics. Conflict is the natural result of people thinking. Everyone should expect that at some point in time there will be conflict in groups. Once group members are prepared for the inevitable, resolving conflict becomes an easier experience. Conflict resolution techniques are an integral part of CRM. The principal key to conflict resolution revolves around "what is right, not who is right."[7]

[7] *Lubnau, Okray, Crew Resource Management for the Fire Service. 2002.*

Staying focused on the issue at hand is a cardinal rule in conflict resolution. It is also one of the most difficult to employ. Therefore all participants must continually remind themselves to devote all attention to the current source of conflict. Conflict resolution is not the place to open old wounds. Biases need to be put aside. Concentrating all efforts on resolution is the primary goal of everyone involved.

Feedback

The final step in the communication process is to provide feedback. Feedback confirms comprehension. Providing feedback is also known as "critiquing." Conscious feedback must be provided during every communication interaction. After-action reports, critiques and post-incident analyses are already well known terms in the fire service. These are all forms of feedback.

The fundamental objective of feedback is to confirm understanding. Once feedback has been provided to the sender in the communication process, communication is considered complete. Feedback in the form of a critique also serves to reinforce communication.

The goal of any communication is to send information. In order for the communication to be complete, feedback must be supplied to ensure understanding. Communicating involves using verbal and non-verbal messages that are understood by the sender and receiver. Communication is not complete until the loop is complete. The crux of CRM is effective communication. Time and again disaster analysis points to breaks in the communication loop as contributory and often the principal cause. Using effective communication is imperative for all levels of an organization. The fire service is no different. Our history is overflowing with examples of communication breakdowns that resulted in death. Improving communication skills is accomplished in the same way firefighters become proficient at advancing hoselines and throwing ladders. Practice makes perfect.

DECISION MAKING

A three-member engine company arrives at the scene of a working fire in a four-story multi-family dwelling on a raw, rain-swept afternoon. Fire is evident on the second floor, extending rapidly to the third. Department SOPs call for the engine to lay a supply line from the nearest water supply and initiate fire attack. As the engine pulls up to the hydrant, agitated occupants run up to the pumper and yell that there are people trapped on the top floor and people jumping from the third floor. The rest of the assignment is enroute, but the hands on the arrival clock seem to be moving counterclockwise. What should the crew do, attack the fire or perform rescues? Should the officer skip the layout and blitz the fire with the deck gun or pull the pumper out of the way and use its ground ladders to pluck as many people from the building as possible while the fire extends into the attic space and threatens more occupants? Should the officer establish command while the other two firefighters work, or would it be better to work as a three-person team to accomplish fire attack or rescues? Is there a "right" decision?

Decision making can be divided into two general categories—life threatening and non-life threatening. Non-life threatening decisions are typically made when a decision maker has time to evaluate options in an unhurried manner and chooses the best option. Life-threatening decisions do not offer such leisurely reflection.

Making decisions, regardless of threat, depends on four factors: information, experience, knowledge and urgency. Making rapid, correct decisions on the fireground requires that the information avalanche and information chasm situations faced by fireground officers be rapidly processed and formulated into an action plan. Klein found that fireground officers made decisions during fire combat by using a unique adapted behavior. Robbed of the ability to fully analyze all options during working fire conditions because of time compression, fireground officers defaulted to previous experiences (known as "pattern matching") of similar situations to plot courses of action (Gary Klein, 1995). Klein also discovered that fireground officers often select the first decision that comes to mind, virtually eliminating any analysis. This method of making decisions is the widely recognized recognition primed decision-making model.

The fireground officers of the '60s and '70s, officers whose decision-making capabilities were formed under actual fireground situations, are rapidly fading from the ranks. Fires are also on the decline. Today's fire officers are now arriving at

Photo by Tim Syzmanski, Las Vegas Fire Department

incidents that they literally have never seen before with perhaps no knowledge of methods or techniques to mitigate the emergency. However, the urgency factor is still present. This urgency factor in some cases may be self-imposed but still affects the decision-making process.

As humans we are all prone to make mistakes. Marcus Tullius Cicero (106-43 BC) astutely noted this flaw in our character with his statement, "to err is human." Mistakes typically fall into two categories, omissions and commissions. Omissions are unintentional. They occur when the decision maker misses a step in a procedure (e.g., skips over turning on the SCBA cylinder during a donning drill), mixes up the steps in a procedure or order (e.g., transposing two digits in a telephone number) or cannot remember the steps in a procedure (e.g., "Was it pull up the protective hood first then don the SCBA facepiece or don the SCBA facepiece and then pull up the protective hood?"). Commissions are deliberate actions that result from misapplication of an accepted rule/policy/procedure (the captain of the Grandcamp battening down the hatches to control a fire in a hold full of ammonium nitrate while the ship laid at anchor in Texas City, 1947), lack of knowledge about the gravity of a situation (Kingman, Ariz. firefighters attempting to extinguish a burning propane tank with limited water supply, 12 firefighters killed), purposely violating policy to save time or defending freelancing activity on the fireground.

The CRM Contribution

Crew Resource Management provides work groups with a framework to process all information and formulate action plans. The leader retains ultimate authority but processes

FEMA News Photo

inputs from the crew to render more efficient and correct decisions. CRM teaches leaders to be less the "fighter pilot" and more the "bomber pilot." Leaders versed in CRM recognize the limits of their ability (to err is human) and encourage their subordinates to participate in the decision-making process. Subordinates versed in CRM recognize the importance of providing their leader with as much pertinent information as possible to assist their leader in making the best decision possible, regardless of the consequences.

No discussion of decision making would be complete without some strategies to promote improved decision making. Decisions are not made in vacuums. CRM's primary tenet requires use of all resources to their fullest potential to prevent mistakes and promote success. Adopting this tenet as a daily mantra will enhance decision making on all levels. Fire service leaders will recognize and appreciate the value of the additional eyes, ears, opinions, experience and knowledge of their subordinates. Subordinate personnel will improve their decision-making skills as they are solicited for input.

In the world of dwindling structure fires, fire officers from company officer to chief of department need to substitute real life experience with realistic, situational training that taps the same decision-making processes as real world challenges. Command and control training opportunities exist throughout the United States. These training situations teach risk/benefit analysis, promote naturalistic decision making and give officers confidence in themselves.

Learning and practicing successful decision-making models will also improve a leader's skill. Ludwig Benner developed one of the most successful models. Dr. Benner's model, known as "DECIDE," provides a six-step process for reaching a decision. Using Benner's model provides leaders with a proven method for analyzing a situation, weighing options and taking appropriate action.

The "DECIDE" Model

- **D** *etermine the problem.*
- **E** *valuate the scope of the problem.*
- **C** *onsider available options for mitigating the problem.*
- **I** *dentify the most appropriate option.*
- **D** *o the most appropriate option.*
- **E** *valuate the effectiveness of actions.*

SITUATIONAL AWARENESS

The station chef is in the firehouse kitchen preparing dinner. Several pots are going on the stove, and he is talking to the battalion officer trying to get off next shift. Temperatures continue to rise in the pots, and the latent heat of vaporization point is reached while the cook has his back to the stove confirming his leave plans. Pots begin boiling over faster than the cook can drop the phone and reach the stove. The night's dinner is flowing across the stove and onto the kitchen floor. The cook's epithets and clouds of steam stream into the day room alerting the rest of the shift. The cook's failure to maintain situational awareness sends the shift dejectedly to the watch desk in search of the carryout menus.

Situational awareness has three components: awareness, reality and perception. Disaster (small or large) is the result when situational awareness is lost. Situational awareness is an internal process that goes on constantly, much like size-up. Like size-up, situational awareness must be updated constantly through the principles of observation and communication. The dynamic, fluid emergencies firefighters respond to require that firefighters maintain the absolute highest state of alertness and attention at all times.

Since firefighters are human and subject to the same human frailties as the rest of the general population, the loss of situational awareness does occur. The nature of the firefighter's work requires that losing situational awareness be kept in check. When situational awareness is maintained, incidents are mitigated smoothly and injuries are eliminated. The loss of situational awareness can be attributed to eight factors. Remembering these factors arms firefighters with another weapon to stave off mistakes. Remaining vigilant for the appearance of these factors and taking action to arrest their influence gives firefighters an advantage over the catastrophic, life-altering incident.

Photo by Bryan Day, NIFC

Photo by Roman Bas/FEMA News Photo

Loss of Situational Awareness Indicators

Ambiguity	Open to more than one interpretation or unclear.
Distraction	Attention is drawn away from the original focus of attention.
Fixation	Focusing attention on one item excluding all others.
Overload	Too busy to stay on top of everything.
Complacency	A false sense of comfort that masks deficiencies and danger.
Improper procedure	Deviating from SOPs without justification.
Unresolved discrepancy	Failure to resolve conflicts or conflicting conditions.
"Nobody flying the plane"	Self-explanatory.

Reality and perception refer to what is going on and what we perceive is going on. Communication and observation are essential in order to make reality and perception equivalent enough to be considered identical. The best way to avoid losing situational awareness is to be alert for the loss of situational awareness indicators. There is no greater defense against the loss of situational awareness than perpetual vigilance.

WORKLOAD MANAGEMENT

The advent of the 10-digit telephone number pushes the average human brain to the limit of its recall ability. We marvel at those individuals who are great multitaskers. As we undertake more work without shedding other work, our ability to perform each assigned task with equal efficiency begins to decline to the point of inefficiency. Your ability to comprehend the previous sentence is a case in point. You may have had to read the sentence twice to understand its meaning. Sentences in excess of 20 words tend to overload our ability to understand the meaning with one read. We compensate by reading the sentence a second time and breaking the sentence into more manageable parts: workload management.

A number of studies conducted by Dr. Robert Helmreich (University of Texas) concluded that commercial airline pilots believed that they were immune to overload. Part of a pilot's training and indoctrination creates the development of a self confidence that leads pilots to believe they "can do anything." Helmreich discovered, however, that a pilot's performance under stress was not always as good as the pilot perceived. Some pilots failed to recognize that they were overloaded and made mistakes that were not corrected.

Workload management is a system used by effective leaders to divide a given task into equal parts to ensure no one worker is overloaded, including the leader. Overloaded workers make mistakes. The mistakes range from a simple clerical error to loss of life. Workload management:

- ★ *Promotes teamwork by emphasizing the interdependence a crew has on each other*
- ★ *Provides an increased margin of safety as a result of a crew's balanced workload*
- ★ *Encourages teams to develop strategies for handling work overload.*

One fire department's approach to fighting structure fires provides an example of workload management for the structure fire safety component. This department dispatches two command officers to each full assignment (four engines, two trucks, one heavy rescue and an EMS unit). The ranking command officer typically serves as incident commander. The junior command officer takes interior. The incident commander may call for an additional assignment known as a safety dispatch when a working fire is confirmed. The safety dispatch is comprised of two additional companies. One company is assigned as the rapid intervention company. The second company is assigned as the safety support company. The officer of the safety support company is typically assigned as the incident safety officer. One of the safety support company members is assigned as the incident command aide. The third member of the safety support company is assigned as the accountability officer. By dividing the safety functions into manageable parts, the incident commander can then devote his/her attention to command decision making. This is a critical area for all chief officers. Being an effective fireground leader/manager is far superior to the chief-in-charge making all decisions. Delegating responsibility along with authority is essential.

Photo by Tim Syzmanski, Las Vegas Fire Department

ERROR MANAGEMENT AND STANDARDIZATION

The fire service is in the business of error mitigation—that is, managing the mistakes of others. We are known as the "last line of defense." The drawback to the service's approach to date is the "last line of defense" mentality has caused us to pay less than the necessary attention to managing our own errors. Since errors are a fact of life (and the reason our service exists), it stands to reason that minimizing our own errors would improve safety. Improving safety translates to reduced deaths and injuries. Reductions in deaths and injuries translate to a more effective workforce. Sounds simple enough. But enter the human factor and the fire service's history of "jumping to a concussion" (an old life net drill adage). Approximately half of all firefighter line-of-duty deaths can be attributed to error. Few firefighters deliberately enter a burning structure, swift water event, confined space, hairpin turn or any other hazardous situation with the intent of doing themselves harm. The other 50 percent (death from stress) also can be arguably attributed to error: that is failing to take care of himself or herself (poor physical conditioning, poor diet, smoking).

The safety pyramid, originated by Heinrich in the 1930s and modified in recent years, illustrates a sobering presentation on the impact of errors in the workplace. While we focus on the singular, catastrophic fatality event at the top of the pyramid, we fail to see the bigger picture of how prevalent errors are in the world. Dr. Robert Helmreich, Ph.D., a noted human error specialist considered to be one of the founders of Crew Resource Management, developed an Error Management Model that provides a framework we can use on a daily basis to attack the staggering numbers found in the safety pyramid.

The first step, avoid, is the step that offers the greatest number of opportunities to prevent error with the least risk. Error avoidance can be actively practiced by following six tenets outlined by the airline industry.

- ★ *Maintain a high level of proficiency*
- ★ *Follow SOPs*
- ★ *Minimize distractions*
- ★ *Plan ahead*
- ★ *Maintain situational awareness*
- ★ *Effectively use all resources.*

Three of the six steps—maintaining proficiency, following SOPs and planning ahead—have been part of the fire department drumbeat for generations. Minimizing distractions has slowly made inroads in the last decade.

Photo by Tim Syzmanski, Las Vegas Fire Department

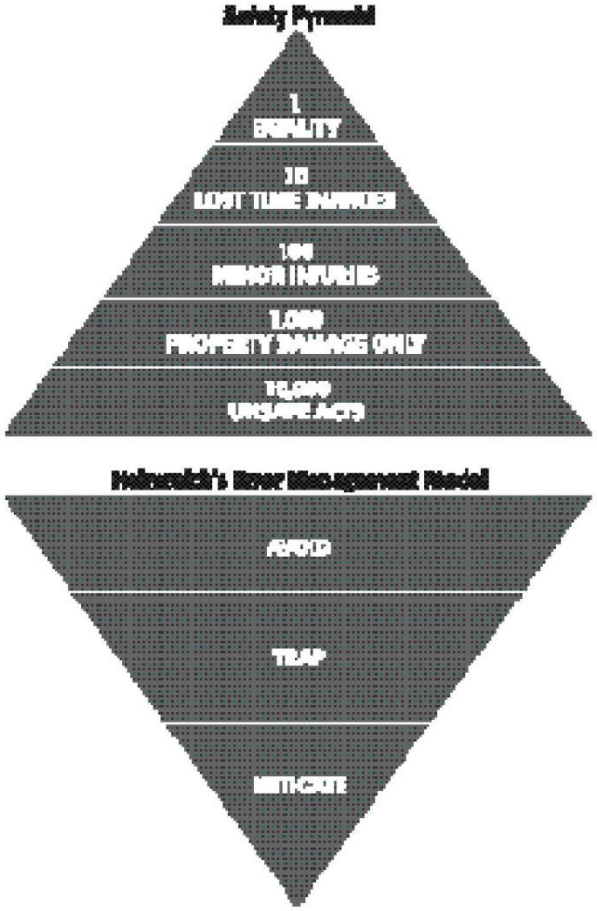


Photo by Tim Syzmanski, Las Vegas Fire Department

Maintaining situational awareness is new terminology for the fire service but can be likened to a crusty mentor's admonishment to "pay attention" at all times. Effectively using all resources involves using CRM. Avoidance is the least labor-intensive error management action that results in the most effective error management effort. Doing your job and doing it well leads to a subconscious error avoidance strategy.

To err is human, ergo mistakes will occur. Avoidance will not always be successful because the fire service mission is to take action to minimize disaster, and humans fulfill the role of firefighter. The fire service typically arrives at incidents and initiates the final step in someone else's error management model, mitigation. But within the service's own error management model, trapping errors follows avoidance. Once an error occurs, all efforts must be exerted to keep the error to its least damaging level. The second step in error management is accomplished through creating layers of redundancy. Redundancy provides a series of "safety nets" or "barriers" designed to keep an error from escalating into a catastrophe. These layers of redundancy mirror the six actions outlined in error management.

The first barrier is maintaining a high level of proficiency. Few fire departments spend more than five percent of their total work time actually handling emergencies. Therefore, a significant portion of a department's productive time needs to be devoted to training and preparation. The late Vince Lombardi's statement "You will play like you practice" is as true for the fire service as it is for the NFL. Well-trained and proficient firefighters make fewer mistakes.

A solid set of well-developed, tried-and-true standard operating procedures cannot be given short shrift. SOPs provide the usual course of action for crews to follow. The advantages of good SOPs are well known. The SOPs contribution to error management lies in their consistency and standardization. The predictability of knowing where each company will be on a structure assignment reduces the potential for duplication of effort and problems such as opposing hoselines. Procedures cannot be created for every situation, however. Even the best-designed systems can be circumvented because human fallibility is a given. The ill-timed venting of a structure before hoselines are in position is a good example.

Minimizing distractions and maintaining situational awareness are barriers that also contribute to minimizing error. A fire service crew, like its aviation and military counterparts, cannot afford to be less than fully engaged and focused on its mission. Distractions diminish operational readiness and contribute to a loss of situational awareness. The airline industry's crash history is replete with cockpit recordings that indicate crews were not focused on flying the plane. In one case a pilot and co-pilot were engaged in a casual discussion of the attributes of a par-

ticular flight attendant during their pre-flight check. When the plane attempted to take-off, the flaps were in the wrong position and the plane crashed, killing all aboard. The flight crew's distraction and loss of situational awareness were deadly.

When errors escape avoidance and holes in barriers allow errors to penetrate the layers, mitigation is the last-ditch effort available to head off a catastrophic event. As noted above, the fire service is the mitigating force in other people's error management systems. But who is the mitigation component in the fire service error management model? The answer is the same component trained to avoid and trap the errors of others—members trained in CRM. Fire department personnel trained in CRM are prepared for all eventualities. They strive on a daily basis to minimize errors through avoidance and trapping but also are prepared to implement mitigation efforts when necessary. The department freely overlaps all three steps in the error management model to ensure the consequences of errors are minimized. Mitigation requires that firefighters be vigilant and stay focused. Being vigilant and staying focused require communication, workload management, decision making and teamwork. How do we know these efforts work? Ask the U.S. Coast Guard. Since implementing CRM in the 1980s, the Coast Guard has experienced a 74 percent reduction in injuries.

Layers of Defense ("Redundancy") Reduce Errors 2nd Step in Error Management

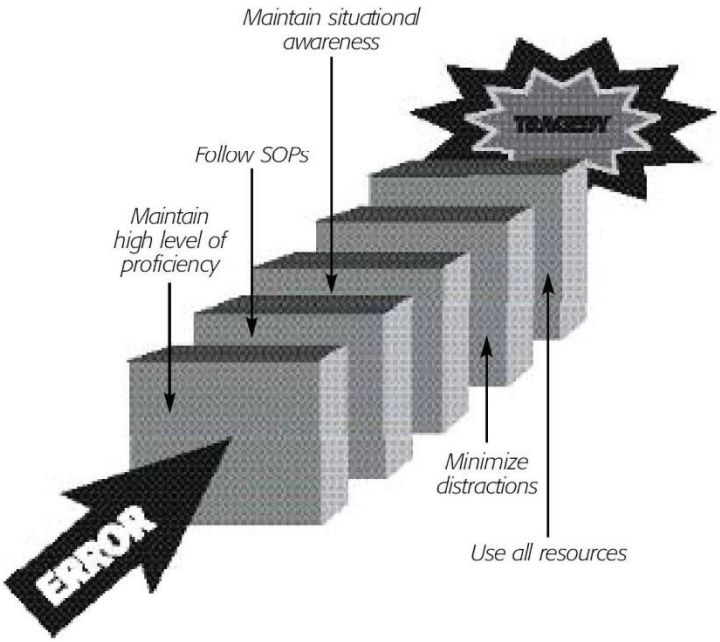


Photo by Tim Syzmanski, Las Vegas Fire Department

So what are the keys to error management?

1. **ACKNOWLEDGE** *that we are error prone. This does not mean errors are an acceptable way of life, just that we should be prepared for them to occur.*

2. **Maximize BARRIERS.** *Keep as much redundancy in your operations as possible. Minimize task loading by using SOPs and CRM. Recognize that reduced staffing may impair your ability to recognize errors by up to 50 percent.*

3. **COMMUNICATE** *risks and intentions. Speak up about anything that reduces your ability to detect errors or increases your chances of making errors.*

4. **Follow the SOPs.** *A NASA/University of Texas study found that pilots who intentionally ignored an SOP were 1.6 times more likely to commit a second error.*

5. **Is this action SENSIBLE?** *Take a moment to think with your analytical head, not your emotional heart. Some sample self-questions might include: What is to be gained from this interior attack? Do I have adequate resources at this time to commit to holding this fire line?*

APPLYING CRM AT YOUR FIRE DEPARTMENT

You now have been introduced to Crew Resource Management. Where do you go from here? If you return to your department and issue a decree that from this point forward everyone will practice CRM, you will likely find CRM hanging in the closet next to the three-quarter boots, playpipe and aluminum helmets. CRM is a lifestyle change for everyone in the chain of command. The entire department must be brought on board for CRM to be effective. One of the greatest advantages CRM presents to the masses is empowerment. CRM insists that everyone has a voice and an input that must be valued and assessed. CRM also reinforces the fact that leaders have the ultimate authority in decision making but encourages them to obtain input prior to making decisions. CRM does not advocate the leaderless group or call for the overthrow of the chain of command. Rather CRM is a "force multiplier" (Lubnau, Okray) that enhances a department's operation because it sets the stage for thousands of pairs of eyes and ears to look out for errors and improve safety.

CRM must be taught to everyone in the department, from first-day rookie to last-day veteran. As training is undertaken, keep your ear to the wall and see if anyone speaks up about how CRM contributed to avoiding, trapping or mitigating an error. Successful CRM programs have been enhanced with the "real life experience" of someone who actually used it. Captain Lloyd Haines and the crew of United Flight 232 may be a little abstract for us, but when Captain Johnson of Engine 14 stands before the department and says, "We avoided a catastrophe on this foggy morning's car crash on the interstate. If my crew and I hadn't received CRM training we would have never . . ." a strong link is created.

This manual has been created to open the door to CRM training. But remember, CRM is more than just a one-time presentation. Success will depend on full acceptance, constant reinforcement and frequent review until CRM becomes the department culture. There are a growing number of excellent CRM instructors and programs available for presentation to your department. Select the best program for your department and train everyone in the department to use CRM. The success of CRM cannot be disputed. The aviation industry has produced its fifth version of CRM, taking 25 years to get to the fifth revision, and now considers CRM a mindset. The Coast Guard and Air Force also have validated CRM with a successful 10-year history. Applying the current death and injury rate, 2,425 additional firefighters will die and 2,375,000 will suffer injuries if the fire service takes 25 years to fully implement CRM. Is that timeline, death rate and injury rate acceptable? Make a bold stroke at reducing firefighter death and injury. Champion adopting CRM in your department.

Photo by Tim Syzmanski, Las Vegas Fire Department

APPENDIX I
CREW RESOURCE MANAGEMENT (CRM) SAMPLE INSTRUCTOR OUTLINE

NOTE: *This sample instructor outline is designed to be expandable. Presentations may range from 30 minutes to four to six hours depending on use of exercises and case studies. Instructors will need to develop a learning objectives slide that reflects the depth of subject. Learning objective slides should reflect an emphasis on exposure to:*

- *History of CRM*
- *Components of CRM*
- *Benefits of CRM*

1. History of Crew Resource Management

a. *In 1976 the aviation industry recognized human error was the primary cause in approximately 60-80 percent of aviation accidents.*
b. *Technological "fixes" only reduced accidents until the next human error.*
c. *A new approach to preventing disasters was born when the industry looked at ways to "fix" the primary cause—human error.*
d. *Originally called "Cockpit Resource Management."*
e. *Title changed to "Crew Resource Management" to incorporate all members of the flight team.*
f. *Program adopted by the U.S. military in the 1990s.*
g. *U.S. Coast Guard has realized a 74 percent reduction in injuries and fatalities since implementing CRM.*
h. *Air disasters have dropped from approximately 20 per year to one to two per year.*

2. Fire Service Experience

a. *Firefighter line-of-duty deaths and injuries have remained relatively static for the last 10 years (97/95,000).*
b. *Three key elements responsible for firefighter deaths:*
   i. *Adrenaline*
   ii. *Over aggressiveness*
   iii. *Cholesterol*
   - Chief Bill Peterson, Plano, TX
c. *Numerous recent NIOSH LODD reports cited poor decision making as a causal factor.*
d. *Watershed Fire Service Tragedies Involving Human Factor Errors*
   i. *Thirty Mile Fire, Washington*
   ii. *Worcester, Massachusetts*
   iii. *Keokuk, Iowa*
   iv. *Washington, D.C.*
   v. *Lake Worth, Texas*
   vi. *Houston, Texas*
   vii. *Memphis, Tennessee*
   viii. *Kansas City, Missouri*
   ix. *Storm King Mountain, Colorado*
   x. *Oklahoma City, Oklahoma*
   xi. *Hackensack, New Jersey*
   xii. *Seattle, Washington*
   xiii. *Boulder, Colorado*
   xiv. *Milford, Michigan*
   xv. *Mann Gulch, Montana*
   xvi. *Lairdsville, New York*

Instructor Note:
Select two or three and provide brief overview of event and human factors involved.

3. Human Factor Error Causes

a. *Gordon Dupont's "Dirty Dozen"*
   i. *Lack of Communication*
   ii. *Complacency*
   iii. *Lack of Knowledge*
   iv. *Distraction*
   v. *Lack of Teamwork*
   vi. *Fatigue*
   vii. *Lack of Resources*
   viii. *Pressure*
   ix. *Lack of Assertiveness*
   x. *Stress*
   xi. *Lack of Awareness*
   xii. *Norms*

b. *Regardless of occupation, people perform work.*

c. *Error causes are consistent for all occupations.*

4. Crew Resource Management

a. *Crew Resource Management (CRM) is a tool created to optimize human performance by reducing the effect of human error through the use of all resources.*

b. *Resources include:*
   i. *People*
   ii. *Hardware*
   iii. *Information*

5. Principles of CRM

a. *Error management through improved training/skills development in six areas:*
   i. *Communication Skills*
   ii. *Teamwork*
   iii. *Task Allocation*
   iv. *Critical Decision Making*
   v. *Situational Awareness*
   vi. *Debrief*

b. *Six steps in detail*
   i. *Communication Skills*
      1. *Six Step Process*
      2. *Abbott & Costello ("Who's on First" video)*
      3. *Dominos (exercise)*
      4. *Paper Tearing (exercise)*
      5. *Communication Barriers (exercise)*
      6. *Appropriate Assertive Behavior*
      7. *Standard Language*
      8. *SOPs*
      9. *"Sterile" Cab*
      10. *Inquiry Skills*
      11. *Advocacy Skills*

Instructor Note:
Use one, two, or all three exercises as time permits.

ii. *Teamwork*
   1. *Leadership*
      a. *Authority*
      b. *Mentoring*
      c. *Conflict Resolution*
      d. *Mission Analysis*
      e. *Teamwork*
   2. *Followership*
      a. *Self Assessment*
      b. *Physical Condition*
      c. *Mental Condition*
      d. *Attitude*
      e. *Understanding human behaviors*
      f. *Followership Skills*
         1) *Respect authority*
         2) *Personal safety*
         3) *Crew Safety*
         4) *Accept authority*
         5) *Know authority limits*
         6) *Leader success*
         7) *Good communication skills*
         8) *Learning attitude*
         9) *Ego in check*
         10) *Balance assertiveness/authority*
         11) *Accept orders*
         12) *Demand clear tasks*
         13) *Admit errors*
         14) *Provide feedback*
         15) *Adapt*

iii. *Task Allocation*
   1. *Know your limits*
   2. *Know your crew's limits*
   3. *Capitalize on strengths*
   4. *Eat the elephant one bite at a time*

iv. *Critical Decision Making*
   1. *Recognize problems*
   2. *Continue to "fly the plane"*
   3. *Maintain Situational Awareness*
   4. *Assess Hazards*
   5. *Assess Resources*
   6. *Solicit Solutions*
   7. *Make a Decision!*
   8. *Rapid Primed Decision Making*
   9. *Ways to increase decision making skills*
      a. *Experience*
      b. *Training*
      c. *Communication*
      d. *Preplanning*

v. *Situational Awareness*
   1. *"Fight the fire!"*
   2. *Assess problems in the time available*
   3. *Gather information from all sources*
   4. *Choose the best option*
   5. *Monitor results—alter as necessary*
   6. *Beware of situational awareness loss factors*

vi. *Debrief*
   1. *Check your feelings at the door*
   2. *Facilitate*
   3. *Prebrief*
   4. *Topics*
   5. *Decorum*
   6. *Analyze*
   7. *Operations*
   8. *Human behaviors*

c. *A high degree of technical proficiency is essential for safe and efficient operations.*
d. *CRM alone cannot overcome a lack of proficiency.*
e. *Technical proficiency alone cannot guarantee safe operations in the absence of effective crew coordination.*
f. *CRM must be taught to all members of the organization.*
g. *Team leader retains authority, recognizes benefits of using all available resources.*

6. Why CRM for us?

a. *We have improved technology and still experience preventable deaths and injuries.*
b. *Parallels between aviation, military, medical industry and fire service errors suggest CRM will work for the fire service.*
c. *If we continue on the current LODD/injury path, we will experience 970 fatalities and 950,000 injuries over the next 10 years.*
d. *"If not now, when? If not us, who?"*

7. IAFC Meetings

a. *September 2000—Kick-off meeting*
b. *June 2001—Recommendations to IAFC Executive Director*
c. *Goal—Reduce the LODD and injuries caused by human factors by 50 percent within five years of implementation*

8. Crew Resource Management—Summary

a. *A proven, positive change to arrest the effects of adrenaline, over aggressiveness, and human error on our culture*
b. *A positive change for our culture*
c. *For further information, refer to:*
   i. *Firehouse (seven-part article) May-August 2001, November 2001, July 2002, August 2002*
   ii. *Fire Engineering, August 2001*
   iii. *Go to the Web and type in keyword "Human Factors," "Crew Resource Management," or "Human Error."*

APPENDIX II CRM EXERCISES
COMMUNICATION EXERCISES

When: *Introduce during the "Communications Skills – Six-step process" segment.*

Purpose: *Emphasize the various forms of communication (one-way, limited two-way and open) and the effect of barriers.*

Duration: *Five minutes*

Materials: *One sheet of paper for each participant.*

Instructions: Paper Tearing

1. *Ask for three or four volunteers from class to step forward.*
2. *Hand each a blank sheet of paper.*
3. *Instruct the group that they must listen to all instructions carefully, not say anything and keep their eyes closed until instructed to open them.*
4. *State the following instructions:*
   a. **Fold** *the paper in half.*
   b. **Tear** *a one-inch square from the lower left corner.*
   c. **Fold** *the paper in half.*
   d. **Tear** *a one-inch square from the upper right corner.*
   e. **Fold** *the paper in half.*
   f. **Tear** *a one-inch corner from the upper left corner.*
   g. **Open** *your eyes, unfold the paper and hold it up for the class to see.*
5. *Discuss the reasons for diverse shapes (i.e., barriers to communication—no vision, vague instructions, etc.).*

Verbal Communications

When: *Introduce during the "Communications Skills—Standard Language" segment.*

Purpose: *Emphasize the various forms of communication (one way, limited two-way and open) and the effect of barriers.*

Duration: *15 minutes, three rotations.*

Materials: *One set of 10 matching dominos for each crew (Note: name the crews to relate to the target audience e.g., engine crew, command staff, Hotshot, etc.).*

Instructions:

1. *Divide class into normal company size.*
2. *Have group select an "officer," "driver," and "firefighter(s)."*
3. *Give one set of dominos to each "officer."*
4. *Have the officer verify that each set contains two sets of five matching dominos (Identical dot patterns, not color, are important.*
5. *Have everyone listen carefully and inform them that the rules change for each rotation.*
6. *Have each officer and driver pair sit back to back so they cannot see each other's dominos.*
7. *Instruct the officer to build a domino shape. Each domino must touch the adjoining domino. The final shape cannot be a circle or a straight line. The goal is for the driver to build the identical shape that the officer built.*
8. *Instruct the officer that he/she may say anything he/she believes is necessary to get the driver to build an identical shape.*
9. *The driver may not make any sounds.*
10. *Firefighters may only watch.*
11. *The other firefighter(s) are observers and may only watch.*
12. *Advise the teams that they have 90 seconds to complete the exercise.*
13. *Confirm all teams are ready, announce "go," and start the clock.*
14. *Call time at 90 seconds and have the officer and driver compare their shapes.*
15. *Have each crew rotate positions.*
16. *Repeat Steps 5-8.*
17. *Instruct the groups: Officers may say anything. Drivers may only say "Yes" or "No." Firefighters may only watch.*
18. *Advise the group that they have 60 seconds, announce "go," and start the clock.*
19. *Stop the clock at 60 seconds and have everyone evaluate his/her work.*
20. *Have groups rotate again. Ensure that everyone is in a position they had not occupied before.*
21. *Repeat Steps 5-8.*
22. *Instruct the groups: Officers may say anything. Drivers may say anything. If the firefighter(s) ask about their role, say, "We don't have time to discuss your role. Groups have 30 seconds to complete the exercise—Go!"*
23. *Call time at 30 seconds and have groups compare work.*
24. *Ask the class if it is possible to complete the task in 30 seconds. (Answer should be no).*
25. *Select an officer and firefighter. Take a seat at the driver position. Instruct the officer to build his shape. Tell the firefighter to start the clock for 30 seconds. When the firefighter says "go," tell the firefighter, "Make mine like the officer's." Lesson—Communication is a two-way street. We must talk and listen to all team members. The answers that we seek may be sitting right next to us.*
26. *Discuss with the class that this exercise was an example of one-way communication (first exercise), limited two-way communication (second exercise) and full two-way communication (third exercise).*

Effective Leader Exercise

When: *Introduce before delivering the "Teamwork—Leadership" segment.*

Duration: *Five minutes*

Instruction:

1. *Have group list the characteristics, qualities or attributes of an effective leader.*
2. *When the list is compiled* ***emphasize*** *that most of the items on the list are "people skills" rather than technical skills.*
3. *Display "Leadership" slide and continue with lecture.*

Effective Follower Exercise

When: *Introduce before delivering the "Teamwork—Followership" segment.*

Duration: *Five minutes*

Instruction:

1. *Have group list the characteristics, qualities or attributes of an effective follower.*
2. *When the list is compiled* ***emphasize*** *that most of the items on the list are "people skills" employed by crew members who desire to perform good work.*
3. *Display "Followership" slide and continue with lecture.*
4. *Compare how many items from the list match those listed in the "Followership" slide.*

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MODULE 1: THE FIREFIGHTER FATALITY AND INJURY PROBLEM

TERMINAL OBJECTIVE

At the conclusion of this module, the students will be able to describe and analyze the scope of the national firefighter fatality and injury problem and the 16 Life Safety Initiatives.

ENABLING OBJECTIVES

The students will:

1. *Identify the most common causes of firefighter deaths in the last decade.*
2. *Identify the most common causes of firefighter injuries in the last decade.*
3. *List the criteria for Line-of-Duty Death.*
4. *Describe the correlation between the 16 Life Safety Initiatives and firefighter deaths and injuries.*
5. *Analyze a given case study to determine factors contributing to a fatality.*

FIREFIGHTER FATALITIES

Introduction

Each year approximately 100 firefighters give their lives in the line of duty. You should research relevant Web sites, such as the United States Fire Administration (USFA) (http://www.usfa.dhs.gov) and the National Fire Protection Association (NFPA) (http://www.nfpa.org), for the most current data.

Several organizations gather statistics on firefighter fatalities to perform analysis and identify trends to help prevent firefighter fatalities in the future. USFA has tracked firefighter fatalities since 1977.

In 1998 the United States Congress established the Fire Fighter Fatality Investigation and Prevention Program within the National Institute of Occupational Safety and Health (NIOSH), part of the Centers for Disease Control and Prevention (CDC). Among the goals of the NIOSH program are investigating firefighter Line-of-Duty Deaths, determining contributing factors, and publishing reports on specific fatalities and special topics that relate to firefighter safety in order to prevent future fatalities and injuries. Since the program's inception, NIOSH has investigated approximately 40 percent of the U.S. firefighter fatalities that have occurred during that period. The products of the program are available for free online (http://www.cdc.gov/niosh/fire/).

The largest number of on-duty deaths in any year has been 441 in 2001. This number includes 343 New York City firefighters that were killed in the attack on the World Trade Center. The large number of firefighters killed in the collapse of the World Trade Center towers is the highest loss of firefighters on a single incident in history.

FIREFIGHTER INJURIES

It is important to understand that there is no national or comprehensive database on firefighter injuries. Three organizations track firefighter injuries in some form. These organizations are USFA, the International Association of Fire Fighters (IAFF), and NFPA.

USFA tracks firefighter injuries through the National Fire Incident Reporting System (NFIRS). NFIRS traditionally has gathered information about firefighter injuries that occur in relation to fire incidents. Recent versions of NFIRS capture non-fire incident–related injuries as well, such as an injury suffered by a firefighter while providing emergency medical service.

IAFF tracks injuries sustained by career firefighters. Data for IAFF is gathered through an annual survey sent to career fire departments. The IAFF data does not include injury or fatality data for career firefighters in departments where the firefighters are not represented by IAFF or for any volunteer, seasonal, or part-time firefighters. Some exceptions may exist, such as a fire department that consists predominantly of career firefighters reporting data for injuries suffered by both career and volunteer firefighters.

The most comprehensive effort to collect information on firefighter injuries is conducted by NFPA. NFPA tracks and reports on firefighter injuries through the use of statistical projections based on data gathered through an annual survey of fire departments.

An analysis of firefighter injuries reported to USFA through NFIRS found the following:

1. The vast majority of firefighter injuries are not life threatening.

2. A significant number of the most severe injuries received by firefighters are caused by overexertion and strain, including a large number of heart attacks and cardiac problems.

3. Violent acts committed against firefighters are small in number but high in severity.

4. Sprains are the most common minor-to-moderate firefighter injury.

5. The most severe firefighter injuries are cardiac and respiratory in nature.

6. The vast majority of firefighter injuries occur at residential occupancies.

It is important to note that NIOSH may also investigate selected injury and near-miss events that represent the potential for new or emerging hazards to the fire service.

EMS FATALITIES AND INJURIES

It is important to note that little or no data is available relating to injuries and fatalities to Emergency Medical Services (EMS) personnel. No one really knows how many EMTs and paramedics are injured in a given year, or how those injuries occurred. No one can say authoritatively how many people died, or how many days of work were lost for a back problem, or how many had pain in a knee or shoulder. Cost estimates are in the millions, but no one really knows for sure.

Data collection can help harried EMS managers see the result of a proper safety program. Good data can earn government dollars, lower insurance costs and produce other significant cost savings. It can help the development of suitable loss control and risk management programs for the EMS industry. At this time, however, no central data collection organization is identified for gathering EMS injury and death statistics. In the case of fire department-based EMS, some statistics may be included in the NFIRS reports, which may make their way into national statistics. Limited information may also be available from the IAFF or the National Safety Council (*Injury Facts*), which lists statistics on vehicle accidents and other forms of injuries leading to on-the-job deaths. For more information on the National Safety Council (NSC) injury and death statistics, visit:
http://www.nsc.org/news_resources/injury_and_death_statistics/Pages/InjuryDeath Statistics.aspx

NEMSIS, the National Emergency Medical Services Information System, is the national repository that will be used to potentially store EMS data from every State in the nation. Since

the 1970s, the need for EMS information systems and databases has been well established, and many statewide data systems have been created. However, these EMS systems vary in their ability to collect patient and systems data to allow analysis at a local, State, and national level. At this time, the emphasis by NEMSIS is collecting patient care data; currently, there is no data collection on responder safety, injuries or deaths.

Data collection about safety issues is a pressing need in EMS. Reasons for collecting data are to focus on trends, to design relevant training programs, to evaluate equipment and to establish policies to reduce injuries, illnesses and deaths. Data collection could go far to help cap avoidable expenditures in EMS.

LINE-OF-DUTY DEATH (LODD)

A *Line-of-Duty Death* is the death of an emergency responder while on duty. On-duty fatalities include any injury or illness sustained while on duty that results in death. The term "on duty" refers to being involved in operations at the scene of an emergency, whether it is a fire or non-fire incident; responding to or returning from an incident; performing other officially assigned duties such as training, maintenance, public education, inspection, investigations, and fundraising; and being on call, under orders, or on standby duty except at the individual's home or place of business. An emergency responder who experiences a heart attack or other fatal injury at home while he or she prepares to respond to an emergency is considered on-duty when the response was initiated. An emergency responder who becomes ill while performing fire department or EMS duties and suffers a heart attack shortly after arriving home or at another location may be considered on-duty if the heart attack event began while the firefighter was on duty.

A fatality may be caused directly by an accidental or intentional injury in either emergency or non-emergency circumstances, or it could be linked to an occupationally related fatal illness. The most common example of a fatal illness incurred on-duty is a heart attack. Fatalities attributed to occupational illnesses also include a communicable disease or other type of bacterial infection contracted while on duty that proved fatal when the illness could be attributed to a documented occupational exposure.

A fire department certainly won't know when it will have a LODD or serious injury; therefore, being familiar with what constitutes a Line-of-Duty Death is a critical preparation step to handling the LODD. The National Fallen Firefighters Foundation (NFFF) has created a training program, *Taking Care of Our Own*®, to assist fire departments in preparing for a serious injury or LODD. The one-day training session provides fire department officers with valuable information to prepare for the worst.

Fire departments are not alone when a Line-of-Duty Death occurs. The NFFF, through a collaborative effort with the U.S. Department of Justice, has developed resources and training to help establish State and regional local assistance State teams (LAST) to assist fire departments in the event of a LODD. LASTs are prepared to provide assistance and comfort to the family and department after a Line-of-Duty Death and to help with filing for Federal, State, and local benefits. More information on LAST can be found by going to

http://firehero.org/resources/departments/last/

A Line-of-Duty Death has tremendous impacts on the member's immediate family, the department and the community. Through the efforts of the NFFF, research has been conducted in each State to identify those benefits available to survivors of State and municipal firefighters who die in the line of duty. Examples of these benefits may include lump-sum death payments, workers' compensation, funeral benefits, pensions and retirement programs, scholarships, and nonprofit/private support. Fire departments are urged to have a current list of Federal, State, and local benefits readily available in the event a LODD occurs. The NFFF has created an interactive map of the United States; when accessing the web site, click on your State for a summary of available benefits. You can find this map at
http://www.firehero.org/resources/benefits/

THE 16 LIFE SAFETY INITIATIVES

NFFF has developed a national program to prevent firefighter Line-of-Duty Deaths and injuries; the ***Everyone Goes Home®*** program uses *16 Firefighter Life Safety Initiatives* to help USFA achieve a 25 percent reduction of fatalities within 5 years, and a 50 percent reduction within 10 years. These initiatives are:

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.

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

3. Focus greater attention on integrating risk management with incident management at all levels, including strategic, tactical, and planning responsibilities.

4. Empower all firefighters to stop unsafe practices.

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

6. Develop and implement national medical and physical fitness standards that apply equally to all firefighters based on the duties they are expected to perform.

7. Create a national research agenda and data collection system that relates to the initiatives.

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

9. Thoroughly investigate all firefighter fatalities, injuries, and near misses.

10. Require grant programs to support the implementation of safe practices and/or mandate safe practices as an eligibility requirement.

11. Develop and champion national standards for emergency response policies and procedures.

12. Develop and champion national protocols for response to violent incidents.

13. Provide access to counseling and psychological support for firefighters and their families.

14. Advocate that public education must receive more resources and must be championed as a critical fire and life safety program.

15. Strengthen advocacy for the enforcement of codes and the installation of home fire sprinklers.

16. Make safety a primary consideration in the design of apparatus and equipment.

Emergency responders are encouraged to consider how each of these Life Safety Initiatives can help reduce or eliminate fatalities and injuries. Additional information on these Life Safety Initiatives can be found at the *Everyone Goes Home* Web site at http://www.everyonegoeshome.com/

SUMMARY

Several organizations gather information on firefighter fatalities and injuries, including the United States Fire Administration, the International Association of Fire Fighters, the National Fire Protection Association, and the National Institute for Occupational Safety and Health. These organizations analyze data to determine trends that might be useful to find ways to reduce the fatality rate.

In a typical year the majority of fatalities occur in the volunteer firefighting community. Heart attacks and vehicle collisions are the leading causes of on-duty fatalities. Strains and sprains are the primary injuries suffered both on and off the fire ground.

Currently, there is no central method to collect information on injuries and fatalities to Emergency Medical Services personnel. Limited information on these statistics may be available from the International Association of Fire Fighters or the National Safety Council in its annual *Injury Facts* publication.

Everyone Goes Home® is a national program developed by the National Fallen Firefighters Foundation to prevent Line-of-Duty Deaths and injuries. In March 2004 a Firefighter Life Safety Summit was held to address the need for change within the fire service. At that summit, the *16 Firefighter Life Safety Initiatives* were created to ensure that ***Everyone Goes Home***.

Activity 1.1

Analysis of Firefighter Fatality

Purpose

To analyze a given case study to determine factors contributing to a fatality.

Directions

1. Your group will go to the computer lab and retrieve a firefighter fatality report from the NIOSH Web site (http://www.cdc.gov/niosh/fire/). The report you retrieve must be a fatality that occurred in the category assigned to your group.

2. You should print a copy of the report your group selects to analyze.

3. Your group should review the case study and complete the review sheet provided with this activity.

4. At the conclusion of your review, select a spokesperson to present a 5-minute summary analysis to the class. Your presentation should be organized as follows:

    a. Give a short summary of the incident and the cause of the firefighter's death.

    b. Discuss **five** factors that contributed to the firefighter's death.

    c. Discuss **five** actions that need to be taken by the fire department to prevent a similar fatality in the future.

5. You have 45 minutes to complete your analysis and prepare your presentation.

Activity 1.1 (cont'd)

Analysis of Firefighter Fatality Worksheet

Read the entire report and then answer the following questions:

1. What was the medical cause of death for the firefighter? If more than one firefighter was killed in association with this incident, select one for your consideration.

_____

_____

_____

2. Was the firefighter properly trained for his/her job?

_____

_____

_____

3. Was the proper level of personal protective clothing and equipment in use?

_____

_____

_____

4. Was an incident command system in place and properly used?

_____

_____

_____

5. Which of the first five recommendations requires action by the Fire Department Safety Officer?

_____

_____

_____

6. What circumstances, action, or lack of actions contributed to the firefighter's death?

_____

_____

_____

7. Which of the first five recommendations requires changes in actions or behavior for firefighters, company officers, chief officers, and fire department management?

_____

_____

_____

NOTE-TAKING GUIDE

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MODULE 1:
THE FIREFIGHTER FATALITY AND INJURY PROBLEM

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TERMINAL OBJECTIVE

At the conclusion of this module, the students will be able to describe the scope of the national firefighter fatality and injury problem.

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ENABLING OBJECTIVES

- **Identify the most common causes of firefighter deaths during the past decade.**
- **Identify the most common causes of firefighter injuries during the past decade.**
- **List the criteria for Line-of-Duty Death.**

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ENABLING OBJECTIVES

- **Describe the correlation between the 16 Life Safety Initiatives and firefighter deaths and injuries.**
- **Analyze a given case study to determine factors contributing to a fatality.**

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FIREFIGHTER FATALITIES AND INJURIES

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INTRODUCTION

- **USFA has been tracking firefighter deaths since 1977.**
- **Highest on-duty death toll was in 2001.**
- **A USFA historical overview reveals a slight downward trend in fatalities during the past 20 years.**

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FIREFIGHTER CASUALTIES 2000-2009

Year	Deaths[1]	Fireground Injuries[2]	Total Injuries[2]
2000	105	43,065	84,550
2001	105[3]	41,395	82,250
2002	101	37,860	80,800
2003	113	38,045	78,750
2004	119[4]	36,880	75,840
2005	115	41,950	80,100
2006	107	44,210	83,400
2007	118	38,340	80,100
2008	118	36,595	79,700
2009	90	32,205	78,150

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CLARIFICATION TO STATISTICS

[1] Number of deaths as published in USFA's annual report on firefighter fatalities.

[2] Number of injuries published in NFPA's annual report on firefighter injuries.

[3] Includes 341 firefighters/responders killed in the line of duty at the World Trade Center.

[4] Hometown Heroes Survivors Benefit Act of 2003 resulted in 10% fatality increase beginning with CY2004.

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MOST COMMON CAUSES OF FATALITIES

- (Unknown)
- Caught or Trapped
- Exposure
- Fall
- Stress/Overexertion
- Struck By
- Vehicle Collision

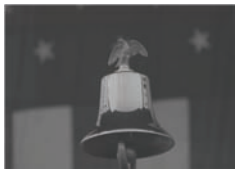

Photo courtesy of Jayson Coil

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NIOSH National Institute for Occupational Safety and Health

Fire Fighter Fatality Investigation and Prevention Program

- In 1998 began investigating firefighter fatalities
- Goals of NIOSH program.
- Reports are available online at http://www.cdc.gov/niosh/fire/

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FIREFIGHTER INJURIES

- No comprehensive database on firefighter injuries.
- Three organizations currently collect injury data:
  - IAFF.
  - NFPA.
  - NFIRS.
- NIOSH may investigate selected injury and near-miss events.

NFPA Homeland Security

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FIREFIGHTER INJURIES

- Analysis of firefighter injuries reported through NFIRS found:
  - Majority of injuries non-life-threatening.
  - Caused by overexertion and strain.
  - Violent acts - low number/high in severity.
  - Sprains most common minor/moderate injury.
  - Most severe - cardiac and respiratory.
  - Majority occur at residential occupancies.
-

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EMS FATALITIES AND INJURIES

- **Little/No data on EMS injuries and fatalities.**
- **No central data collection for EMS injuries and fatalities.**
- **Limited data through IAFF or USFA for FD-based EMS.**
- **National Safety Council (*Injury Facts*) may publish information on private agencies.**

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LINE-OF-DUTY DEATH (LODD)

- **What constitutes a Line-of-Duty Death?**
- **Definitions may vary from State to State.**
- **USFA Firefighter Fatality database provides information on LODDs.**

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LINE-OF-DUTY DEATH (LODD)

- **Fatal injury/illness sustained on-duty.**
- **On-scene of emergency or non-emergency incident.**
- **Responding/Returning from incident.**
- **Other officially assigned duties:**
  - **Examples: training, public education, inspection, and fundraising.**

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LINE-OF-DUTY DEATH (LODD)

- **Fatality does not have to occur during the incident:**
  - **Emergency responders who experience a fatality at home or other location before or after an incident is considered on duty.**
  - **Fatality caused directly by an accidental or intentional injury**
    - **emergency or non-emergency**
    - **occupationally related fatal illness**

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National Fallen Firefighters Foundation

Taking Care of Our Own®

- **National Fallen Firefighter Foundation -**
  - **created program to assist agencies prepare for a serious injury or LODD;**
  - **developed resources/training to help establish state/regional local assistance State teams (LAST).**
  - **Created interactive map showing various benefits available to LODD survivors.**

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FIREFIGHTER LIFE SAFETY INITIATIVES

- ***Everyone Goes Home*® program –**
  - **16 FF Life Safety Initiatives to help USFA achieve objective of reducing preventable firefighter fatalities.**
- **Consider how each Life Safety Initiative can aid in reducing injuries and fatalities.**
- **The 16 Life Safety Initiatives can be found by going to http://www.everyonegoeshome.com/**

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SUMMARY

- **Identify the most common causes of firefighter fatalities?**
- **Identify the most common causes of FF injuries?**
- **List the Criteria for Line-of-Duty Death.**
- **Correlation between 16 Life-Safety Initiatives and firefighter fatalities/injuries.**
- **No central data collection on injuries and fatalities to EMS personnel.**

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Activity 1.1
Analysis of a Firefighter Fatality

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Suggested Readings

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MODULE 2:
RISK MANAGEMENT PROCESS

TERMINAL OBJECTIVE

At the conclusion of this module, the students will be able to describe the goal and apply the steps involved in instituting a risk management program.

ENABLING OBJECTIVES

The students will:

1. *Identify and discuss the risk management and the necessity for fire and EMS departments to do risk management.*

2. *Identify the methods of detecting risk within a department.*

3. *Identify risks (current and potential) involved in both emergency and non-emergency operations.*

4. *Discuss the liability issues related to organizational risks.*

5. *Identify documentation necessary to support/defend the risk management program.*

6. *Use the risk management process to analyze and develop a plan for managing three emerging risks within the student's organization.*

7. *Present to the class a plan outline to deal with an emerging health and safety issue (Day 6 project).*

RISK

Each of us faces risks every day as we work and as we play. No activity is risk-free and there is no way to escape risk completely. Every action that we take carries with it the chance that we might be injured or killed. In most cases, the risks that we take are very minor. For example, the risk of being hit by lightning is very low, yet few of us are comfortable in an open field during an electrical storm.

Insurance companies are very familiar with the concept of risk. Car insurance premiums for an 18-year-old single male are much higher than they are for the same male once he is thirty years old and married, provided he has not had any major losses. The cost of the insurance reflects the risk that is associated with the driving behavior of the same person at different times in his/her life.

As we go through life, we take steps to avoid risk. Sometimes our actions are consciously thought out and sometimes they are automatic. If you choose not to enjoy the thrill of hang gliding because you believe that it is too risky, you have consciously taken steps to completely avoid the risk. Not every risk can be completely avoided. In other cases we can avoid a significant risk but not be completely protected from it. If the law enforcement agencies in your area begin referring to a stretch of road as the "mile of death," you may choose to use another road during your travels. Although you avoid the risk on that stretch of road, there still is some risk associated with driving on any road, so you have not completely avoided the risk.

Emergency responders face significant risks. To deal with those risks, attempts are made to identify and control those associated with the job tasks. This activity is known as **risk management**.

RISK MANAGEMENT

Definition

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

Risk management in the emergency service is not just about preventing monetary loss. It is about preventing disability, loss of life, and/or irreparable business damage as a result of the services. Risk management involves direct hands-on provision of services as well as indirect aspects, including the development of effective training programs and the selection of qualified personnel. Regardless of its specific focus, the overall goal of risk management is to reduce the frequency and severity of preventable, adverse events that create losses. Risk management must be done by every emergency response organization.

Risk management comprises many elements including liability, insurance, safety, health, security, financial impact, and others. The risks encountered by emergency services personnel are many, such as traffic, response hazards, blood and body fluids, and violence. To control

these risks effectively, a fire or emergency medical services (EMS) department must use a risk management program. **The primary focus of the internal (organizational) risk management plan is member safety and health.**

Risk management for emergency response organizations is divided into three categories: non-emergency risk management, pre-emergency risk management, and risk management at emergencies.

Non-emergency risk management looks at the hazards common to all workplaces. This type of risk management might include fire inspections of fire stations and the management offices of emergency response organizations. The risks encountered in these places are no less deadly than those encountered on the emergency scene, but their frequency and severity are lower than those risks faced on the emergency scene.

Pre-emergency risk management looks at activities that take place before the emergency or that may have an effect prior to, responding to, or at an emergency. These activities can have a major impact on the safety of members during response to an emergency. In considering these activities and the reduction of risk, the organization should use laws, regulations, standards, policy or procedure to reduce the risk. Consideration may be given to engineering, administration, or other methods to reduce pre-emergency risk.

Risk management at an emergency is the duty of every responder at every level. Firefighters apply risk management techniques to themselves and to their partners. Company officers manage the risk of firefighters assigned to their company. Command officers have responsibility for everyone on the emergency scene. The Incident Safety Officer assists the Incident Commander by focusing on safety. The same basic techniques that are discussed for non-emergency and pre-emergency risk management apply to risk management at emergencies.

Risk management at emergencies will be addressed in great detail in Module 8: Operational Risk Management. This section discusses risk management in non-emergency and pre-emergency situations.

The safety and health component of risk management was incorporated into National Fire Protection Act (NFPA) 1500, *Standard on Fire Department Occupational Safety and Health*, during the 1992 revision process. Simply stated, the requirements of the risk management program are as follows:

- The fire department shall adopt an official written risk management plan that addresses organizational policies and procedures.

- The risk management plan shall be developed to address the following areas: administration, facilities, training, vehicle operations, protective clothing and equipment, operations at emergency incidents, operations at non-emergency incidents, and other related activities.

- The risk management plan shall include the following components:

- Risk identification
- Risk evaluation
- Risk control techniques
- Risk monitoring

There is an additional step that should be added or incorporated into this process, which is typically inserted between the risk identification and risk control techniques and occurs with the evaluation process. This step is called **prioritization of risks**.

Risk Management Process

Every risk management program should be viewed as a process consisting of the following components:

1. The **identification** of potential risks so that uncertainties can be controlled.

2. The **evaluation** of risks to determine the probability of potential losses.

3. The **prioritization** the risks based on the probability of potential losses.

4. The development and implementation of **control measures** to lessen risks.

5. The **monitoring** of risk management control measures to ensure their effectiveness.

These components are covered in detail in the U.S. Fire Administration (USFA) publication, Risk Management Practices in the Fire Service.

Risk Identification – actual or potential hazards for all job functions.

Risk identification is the process of making a list of things that might go wrong with an operation. A good rule of thumb when identifying risks is to anticipate the worst that can happen. If plans are formulated for a worst-case scenario, anything less can be handled.

Because many accepted standards in the services provided by fire departments have been validated through research, the risk manager must seek out and analyze data and reports that suggest methodologies for aiding the detection and reduction of unsafe activities. Compile a list of all emergency and non-emergency operations provided by the department. Many sources are available to assist with this identification process. The first, and possibly the most effective, is the department's loss prevention data. Other sources for this information may include past department accident and injury statistics, input from members of the department, injury and fatality report publications, and knowledge of the experiences of other emergency service providers.

Areas of operations that should be considered in a risk management program include, but are not limited to:

Vehicle accidents	Employee attrition
Vehicle breakdown	Continuing education
Driving skills	Dispatching procedures
Physical fitness of personnel	SOP/Protocols testing
Station inspections	SOP/Protocol deviations
Building safety	Response times
Skills retention	Non-transport times
Hazardous materials exposures	Vehicle down times
Stress management	Mutual aid interactions
Debriefing effectiveness	Controlled substances losses
Documentation	Job-related injuries
Hiring selection criteria	Probationary supervision

Risk Evaluation – the potential of occurrence of a given hazard and the severity of its consequences.

Some aspects of service provision involve more risks than others. Once the risks are identified, they can be evaluated for frequency and severity. Frequency addresses the likelihood of occurrence. Typically, if a particular type of incident (such as back injuries) has occurred repeatedly, it will continue to occur until effective control measures are implemented.

Severity addresses how much damage or injury can be caused by the risk. This can be measured in a variety of ways, such as time away from work, cost of damage, cost of and time for repair or replacement, disruption of service, or legal costs. Using the information gathered in the identification step of the process, the risks can be classified based on severity.

While examining the areas posing the greatest risk, it is also important to monitor underlying causes of deviations from protocols and standard operating procedures (SOPs) that have not materialized into high risk areas. In addition, risk management activities should examine characteristics or factors within an organization that may hinder or enhance risk management efforts. For example, asking the following questions may reveal valuable information.

- Are programs for new-member orientation and mentoring providing inexperienced firefighters with sufficient information and training?

- Are the organization's selection techniques effectively identifying the most qualified personnel for employment?

- Are continuing education/training programs consistently well attended?

In addition to studying factors within the organization, risk management activities should monitor extra-organizational risks created by the system within which the agency functions. Sample questions for evaluating risks in this arena include:

- What scene situations are most dangerous for firefighters?

- What response types can benefit from more staffing on the scene to reduce time or risk to personnel?

Of course, numerous additional questions for consideration could be listed. The risk manager must determine what questions should be asked and then obtain answers to those questions. For risk management activities to be successful, they must include questions, answers, planning efforts, and the introduction and monitoring of programs to manage risks.

Prioritizing Risk – the degree of a hazard based upon the frequency and severity of occurrence.

Taken in combination, the results of the frequency and severity determinations will help to establish priorities for determining action. Any risk that has a high probability of occurrence, combined with serious consequences, deserves immediate action and would be considered a high priority item. On the other end of the scale, non-serious incidents with a low likelihood of occurrence are a lower priority, and can be placed near the bottom of the "action required" list.

A good tool for the risk classification step is the classic matrix pictured in Figure 2-1. Each risk should be placed in one of the four areas. For example, a severe risk that is faced frequently would appear in the upper right-hand box, and a risk that was not severe and was faced on an infrequent basis would be placed in the box in the lower left-hand corner. In general, low-frequency, high-severity risks would be addressed first and low-frequency, low-severity risks would be addressed later.

The prioritization process is not a simple task. There is no one correct priority for each risk. The decision about which risk to handle first depends on local factors such as the availability of resources, the ease of addressing each risk, and the time involved in addressing each risk.

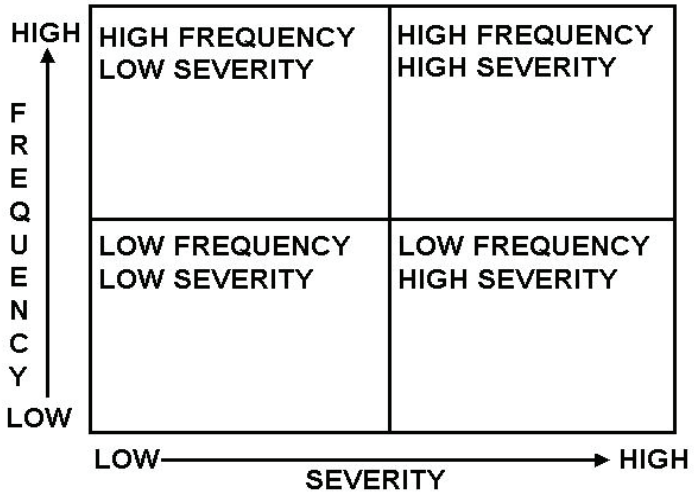

Figure 2-1: Risk Classification Matrix
[Risk Management Practices in the Fire Service (FA-166)]

Gordon Graham, a California risk management consultant, has added a new twist to the time honored frequency/severity matrix. He maintains that high-frequency events, whether low-risk or high-risk, are managed correctly most of the time because responders have seen this type of situation before and know what to do. More problems and danger are presented to responders in low-frequency events because they have little or no experience base to call upon. More specifically, low frequency, high severity events pose the highest risk to responders.

He explains that people have a "hard drive" (or a slide tray for those over age 50) inside of their head. Life and professional experiences are stored on the hard drive. Each time we have an experience, information about what worked and what did not work is loaded onto the hard drive. When we encounter a situation such as a structure fire, we unconsciously take what we see and attempt to match it with situations that we have seen before, situations that are stored on our hard drive. If we have a match, we attempt to apply that stored information to the present situation. In the vast majority of high-frequency events, our experience helps us manage the situation.

Mr. Graham is discussing a concept called **Naturalistic Decision Making** (NDM). This concept (formerly termed **Recognition Primed Decision Making**) evolved from military research in the 1980s. The military found that experienced battlefield commanders quickly analyzed a small number of variables when presented with a situation. The commander used the outcome of this rapid analysis to make decisions on what should be done, based on the hard drive in his head.

The naturalistic decision making (NDM) framework emerged as a means of studying how people actually make decisions and perform cognitively complex functions in demanding situations. These include situations marked by time pressure, uncertainty, vague goals, high stakes, team and organizational constraints, changing conditions, and varying amounts of experience.

The NDM movement originated at a conference in Dayton, Ohio in 1989, since then NDM conferences have been held every 2–3 years, alternating between U.S. and European venues. A series of NDM books have been published, and in 1995 the Human Factors and Ergonomics Society established a new technical group, Cognitive Engineering and Decision Making, that has built on the NDM tradition.

The NDM framework focuses on cognitive functions such as decision making, sense-making, situational awareness, planning – which emerge in natural settings and take forms that are not easily replicated in the laboratory. For example, it is difficult to replicate high stakes, or provide for problem detection, or to achieve extremely high levels of expertise, or to realistically incorporate team and organizational constraints. Therefore, NDM researchers rely on cognitive field research methods such as task analysis to observe and study skilled performers. From the perspective of scientific methodology, NDM studies usually address the initial stages of observing phenomena and developing descriptive accounts. In contrast, controlled laboratory studies emphasize the testing of hypotheses. NDM and controlled experimentation are thus complementary approaches. NDM provides the observations and models, and controlled experimentation provides the testing and formalization.

Naturalistic decision making (NDM) is a model of how people make quick, effective decisions when faced with complex situations. In this model, the decision maker is assumed to generate a

possible course of action, compare it to the constraints imposed by the situation, and select the first course of action that is not rejected. NDM has been described in diverse groups including ICU nurses, fire ground commanders, chess players, and stock market traders. It functions well in conditions of time pressure, and in which information is partial and goals poorly defined. The limitations of NDM include the need for extensive experience among decision-makers (in order to correctly recognize the salient features of a problem and model solutions) and the problem of the failure of recognition and modeling in unusual or misidentified circumstances. It appears to be a valid model for how human decision-makers make decisions.

The NDM model identifies a reasonable reaction as the first one that is immediately considered. NDM combines two ways of developing a decision; the first is recognizing which course of action makes sense, and the second, evaluating the cause of action through imagination to see if the actions resulting from that decision make sense. However, the difference of being experienced or inexperienced plays a major factor in the decision-making processes.

NDM reveals a critical difference between experts and novices when presented with recurring situations. Experienced people will generally be able to come up with quicker decision because the situation may match a prototypical situation they have encountered before. Novices, lacking this experience, must cycle through different possibilities, and tend to use the first course of action that they believe will work. The inexperienced also have the tendencies of using trial and error through their imagination.

There are three variations in NDM strategy. In Variation 1, decision makers recognize the situation as typical: a scenario where both the situational detail and the detail of relevant courses of action are known. Variation 1 is therefore essentially an "If… then…" reaction. A given situation will lead to an immediate course of action as a function of the situation's typicality. More experienced decision makers are more likely to have the knowledge of both prototypical situations and established courses of action that is required for an NDM strategy to qualify as Variation 1.

Variation 2 occurs when the decision maker diagnoses an unknown situation to choose from a known selection of courses of action. Variation 2 takes the form of "If (???)… then…," a phrase which implies the decision maker's specific knowledge of available courses of action but lack of knowledge regarding the parameters of the situation. In order to prevent situational complications and the accrual of misinformation, the decision maker models possible details of the situation carefully and then chooses the most relevant known course of action. Experienced decision makers are more likely to correctly model the situation, and are thus more likely to more quickly choose more appropriate courses of action.

In Variation 3, the decision maker is knowledgeable of the situation but unaware of the proper course of action. The decision maker therefore implements a mental trial and error simulation to develop the most effective course of action. Variation 3 takes the form of "If… then… (???)" wherein the decision maker models outcomes of new or uncommon courses of action. The decision maker will cycle through different courses of action until a course of action appears appropriate to the goals and priorities of the situation. Due to the time constraint fundamental to the NDM model, the decision maker will choose the first course of action which appears

appropriate to the situation. Experienced decision makers are likely to develop a viable course of action more quickly because their expert knowledge can rapidly be used to disqualify inappropriate courses of action.

Application

Naturalistic decision making (NDM) is highly relevant to the leaders or officers of organizations that are affiliated with emergency services such as fire fighters, search and rescue units, police, and other emergency services. It is applied to both the experienced and the inexperienced, and how they manage their decision making processes. The naturalistic decision making (NDM) making model is developed as samples for organizations on how important decisions can affect important situations which may either save lives or take lives. The model develop can be used as a study for organizations to fill in the gaps and to determine which type of NDM variation is more applicable to the organization.

NDM can be used to train firefighters for infrequent high-risk situations by regularly presenting these situations in training. As the situations are managed in training situations, the experience becomes a part of the hard drive. When the event occurs, the firefighter recalls the training in the same manner that previous experiences with high-frequency situations would be recalled. NDM used in training can better prepare emergency responders to work safely.

In fire and emergency services, things are not always what they seem to be. A danger exists if we view all similar situations as if they are the same. There are situations where what worked fine the last time does not work well in the present emergency. That failure or learning event expands the base of knowledge within our hard drives. For example, many fire departments are dealing with the need to convert a residential fire mentality that is unconsciously applied to all structural fire events. If a set of tactics that worked well for fighting 30 residential fires is applied to a fire in a commercial structure, the results may not be the same.

Mr. Graham adds another component to the bottom right box in the frequency/severity matrix – discretionary time. In high-risk, low-frequency situations where responders have the benefit of time, such as a hazardous materials incident with no immediate life threat, there is the opportunity to back away from the hazard. The extra time enables responders to research alternatives, call in technical experts, or use regional resources to address the problem. High-risk, low-frequency situations where there is no time to back off and make decisions pose the most extreme levels of risk to responders and response organizations. Responders are handicapped in these situations by both very little information and very little time.

Graham's risk management concepts can be applied to non-emergency and pre-emergency risk management just as well as they can be applied to emergency situations.

Risk Control Measures – solutions for elimination or reduction of real or potential hazards by implementing effective control measures.

Once all of the risks facing an operation have been identified, solutions for each risk should be sought. Some risks, especially those that occur during emergencies, cannot be completely controlled, but the severity of the risk can be addressed. For example, there is no way for the fire department to control the strength of a structure. The department does have control over the severity of the risk through measures such as controlling access to the area where the structure will fall and by implementing other Standard Operating Procedures (SOPs) that dictate when it is permissible to enter a burning building.

Approaches for controlling risk include risk-avoidance, implementation of control measures, and risk-transfer.

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

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

The most common method used for managing risk is the adoption of effective control measures. While control measures will not eliminate the risk, they can reduce the likelihood of occurrence or mitigate the severity. When risks to emergency responders are identified before the emergency and control measures are put in place, responders will be safer when the emergency occurs. Safety programs, ongoing training and education programs, Personal Protective Equipment (PPE), and well-defined SOPs are all effective control measures.

For example, a collision between emergency response vehicles and civilian vehicles at intersections is a risk that has high severity and relatively high frequency in emergency services. The development of SOPs that require a full stop at red lights and other negative right-of-way situations can help to control the severity and the frequency of this risk. A representative listing of hazards and control measures by subject area can be found in Table 2.1 at the end of this module.

Risk transfer can be accomplished in two primary ways — physically transferring the risk to somebody else, or through the purchase of insurance. For a fire or EMS organization, the transfer of risk may be difficult, if not impossible. However, examples of risk transfer would be 1) scheduling a routine transfer patient in protective isolation in a newer vehicle with circulating air rather than in an older vehicle, 2) contracting out the laundering of contaminated linen/clothing to a commercial laundry, and 3) contracting inspections of gasoline tankers to an outside agency. The risks associated with the last two examples have been transferred to a private contractor.

The purchase of insurance only transfers financial risk. It does nothing to affect the likelihood of occurrence or reverse firefighter injuries/fatalities. Buying fire insurance on the station, while

highly recommended to protect the assets of the department, does nothing to prevent the station from burning down. Therefore, insurance is no substitute for effective control measures.

Risk Monitoring – evaluation of effectiveness of risk control measures.

The last step in the risk management process is risk management monitoring. Once control measures have been implemented, their effectiveness must be evaluated. Any problems that occur in the process may result in changes to control measures. This final step ensures that the system is dynamic and will facilitate periodic reviews of the entire program.

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

For example, the risk to members providing care to a patient with a communicable disease poses a real hazard and should be properly addressed through a written infection control program. The infection control program should include:

Training and education	Exposure management
PPE	Fire department facilities
Health maintenance	Cleaning, disinfecting, and disposal
Immunizations	Fire department vehicles

The Health and Safety Officer, designated Infection Control Officer, Incident Safety Officer, and the department's Occupational Safety and Health Committee should ensure that evaluations and revisions to the risk management plan occur at least annually.

Safety is a major component of risk management. Most of the emphasis placed on risk management from a fire service perspective is from a safety approach. The safety component affects other risk management components in areas such as liability and finance. An aggressive, proactive occupational safety and health program will reduce accidents, injuries, occupational illnesses, and health exposures. This, in turn, reduces the department's liability claims and payments and also positively affects the financial well being of the organization. Many fire departments are self-insured, which means that the entity, jurisdiction, or the fire department generates funding for various types of insurance such as workers' compensation, vehicle, and general liability.

RISK MANAGEMENT PLAN

NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*, requires that all fire departments develop and adopt an official written risk management plan. The plan is required to cover all fire department facilities and operations and to use the classic risk

management methods described earlier. Risk management plans also should be developed for other emergency response organizations such as EMS departments.

The risk management plan should look at every function performed by the organization, both non-emergency and emergency. The plan should identify risks associated with each operation, evaluate and classify the risks faced in each operation by frequency and severity, prioritize the risks associated with every operation and the risks faced by the organization as a whole, and develop risk control measures. In addition, the Fire Department Safety Officer should monitor the effectiveness of the risk control measures that are used. Table 2.1 is an example of a risk management plan.

Table 2.1: Risk Management Plan

Operation and Risk ID	Frequency/ Severity	Rank/ Priority	Control Measures
Emergency Mode Driving			
Collisions with other vehicles	Low/High	High	Emergency mode driving regulations Traffic control devices Warning lights/sirens Speed limitations Public education campaign Not all calls require emergency mode
Collisions with objects	Low/High	High	Emergency mode driving regulations Use of backers Automatic door openers
Injury to passengers	Low/High	High	Seatbelt provision and use Enclose equipment in cab
Injury to others	Low/High	High	Public education campaign Warning lights/sirens Traffic control devices

THE FIRE DEPARTMENT SAFETY OFFICER AS RISK MANAGER

The Fire Department Safety Officer (FDSO) should be involved in all operations of the emergency response agency. He/She brings a safety perspective to all meetings and can provide valuable input to other members of the agency concerning the safety of responders.

The FDSO is the risk manager for the fire or EMS department. He/She is acting as an internal safety consultant when involved in the specification of apparatus or equipment. The FDSO may not be involved, for example, in selecting the components of the drive train of a vehicle, but it is

appropriate for him/her to recommend disc brakes, antilock brakes, and a supplemental braking device such as a magnetic driveline retarder.

Documentation

It can be difficult to identify and solve risk management problems without a paper trail documenting the efforts of the risk manager. Documentation serves multiple purposes. It can validate testimony, assist in testimony by refreshing recall of an event, enable retrospective review without unnecessary duplication of collection efforts, and suggest efforts to reduce risk. Although paperwork does not necessarily demonstrate that an action was taken, it can be convincing evidence. For example, vehicle maintenance logs and canceled checks do not prove a vehicle was repaired, but these documents can effectively persuade a jury.

Documentation that identifies a problem must also indicate what action was taken to correct the problem and show that the task was completed. Recording that a member must attend a continuing education class is effective only if the documentation also shows that the member was aware of the situation and that the assignment was fulfilled. Organizations with well-defined record keeping policies will be better prepared to identify and implement effective interventions for reducing risks.

TRAINING EXERCISES

Some of the most dangerous non-emergency activities that responders can perform are live-fire training and training for special operations such as hazardous materials emergencies or high-angle rescue. Risks at these training exercises mirror the risks in emergency operations. The FDSO should apply to these events the same risk management techniques used at emergencies.

NFPA 1403, *Standard on Live Fire Training Evolutions*, provides safety and operational guidance for live structural fire training, and these same risk management techniques used at emergencies should be applied to training. In his/her role as the agency's internal safety consultant, the FDSO should be involved in planning all training exercises. The FDSO should develop a safety action plan for each exercise and review the plan with the Incident Commander (IC) of the exercise.

The safety action plan should account for:

- Type of exercise to be conducted.
- Risk evaluation of the hazards that may be encountered.
- Review of any applicable standards or regulations governing this type of exercise.
- Preparation of a checklist of hazards to be aware of during the exercise.

- Speaking points for the safety section of a pre-exercise briefing of the participants.

EXTREMELY HAZARDOUS OPERATIONS

Some types of operations pose an extreme hazard to responders and warrant special attention by the FDSO. This section discusses risk management applied to these operations.

Technical Rescue and Hazardous Materials Incidents

Almost every emergency response agency responds to technical rescue or hazardous materials calls. Technical rescue calls may involve trench collapses, water rescue, ice rescue, rescue from heights, or the rescue of persons trapped by a building collapse. Hazardous materials (hazmat) calls include large flammable liquid fires, gas leaks, and other incidents involving chemicals. While every agency faces these risks regularly, their frequency is much lower than most fire or EMS operations.

Firefighters and EMS workers are task oriented and tend to make do with the tools at hand. Their natural inclination is to help those in need, regardless of personal risk. Technical rescue and hazmat situations usually require specialized equipment and training. The agency risk management plan should identify a role for first responders to control access to the scene and call in technical experts.

The FDSO does not need to be an expert on all of these hazards. However, a general understanding of the risks and the methods used to control these incidents is necessary. He/She may choose to consult with experts from within or outside the agency when developing SOPs for these types of incidents. These types of operations also tend to be heavily regulated on the local, state, and national levels. These concerns should be addressed in the SOPs.

Incidents Involving Violence

A growing risk faced by responders today is an incident that involves violence. In the past, fire and EMS workers were considered neutral in these situations. The overall positive feeling of the community toward firefighters and EMS workers provided a feeling of security. Changes in our society and the increasing role of the fire service in EMS have increased the exposure to these risks.

Some members of the community may view firefighters and EMS workers as extensions of the government. This point was brought home to all firefighters and EMS workers during the civil disturbance of 1992 in Los Angeles and the surrounding area. Firefighters and EMS workers required police or National Guard escorts in order to perform their jobs, and one firefighter was seriously injured by gunfire.

Exposure to violence can come in many forms, some much less spectacular than civil disturbance. Firefighters and EMS workers are exposed to violence when responding to bomb threats, assaults, shootings/stabbings, domestic violence, robberies, hostage situations, drive-by shootings, and in support of police operations such as raids on drug houses or drug labs.

There are at least two ways to address the increased exposure to the hazards related to violence. The first method is community involvement. The neighborhood fire station traditionally has been a gathering place for the people of the community. However, the downtown fire station with the apparatus doors rolled up and firefighters outside watching the world walk by is a thing of the past in many communities. Closed doors and barbed wire around the parking lot have replaced the open station. Many firefighters do not live in the community they serve. This results in a disassociation of the local firefighters from the people that they serve. This insulation of closed doors or lack of contact degrades the traditional bond that firefighters have enjoyed with their customers and community.

One way to prevent violence toward firefighters and EMS workers is to stay involved with the people in the first-due area or district, open the station up to visitors, and avoid letting the actions of a few generate a siege mentality. Many volunteer fire stations have banquet and meeting facilities attached to their stations. Some career fire departments such as the Orlando (Florida) Fire Department have added community rooms to their fire stations. These facilities provide an opportunity for the members of the department to keep in contact with the residents of their community. A caring and respectful attitude shown toward the people you serve will go a long way.

The second method of addressing the hazards related to violence is through the use of SOPs. When violence does erupt, firefighters and EMS workers have no place in the line of fire. Firefighters and EMS workers do not have the equipment or training to survive these situations and should stay out of the hazard zone until law enforcement officials have stabilized the situation. If a person is in need of medical care as the result of a violent attack, law enforcement should secure the area to allow firefighters and EMS workers to enter, or they should move the victim to a safe area so that treatment can be initiated. These options should be addressed in the agency's SOPs.

If the SOPs direct responders to stage away from **all** incidents involving violence, other problems can arise. The person in the best position to judge the safety of the scene is the company officer, in communication with law enforcement. Firefighters and EMS personnel should also wear uniforms look different than those of law enforcement personnel to avoid any confusion about an individual's role at the scene.

Terrorism

The events of September 11, 2001 put firefighters on notice that the threat from terrorism is real. It should be recognized that the potential for a terroristic type event is another risk to be analyzed. The methods for dealing with a terrorist incident do not vary from commonly accepted

practices for hazardous materials, incidents involving violence, or other types of responses. This issue will be addressed in detail in Module 9: After Action Review.

SUMMARY

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

Table 2.2. Hazards and Control Measures

Apparatus and Vehicles

- All personnel seated in enclosed areas
- Seatbelts provided for all riders
- Equipment inside the passenger compartment secured or enclosed
- Self-contained breathing apparatuses (SCBAs) stored outside of the passenger compartment
- Driver safety training provided to all drivers on the following:

  - Stopping distances
  - Emergency maneuvering
  - Aerial operations
  - Pump operations
  - Backing hazards and the use of spotters
  - Vehicle does not move until all passengers are seated/belted

- Vehicle conspicuity (visibility) in emergency and non-emergency modes
- Emergency mode driving procedures

  - Stop signs and red lights
  - Negative right-of-way situations
  - One-way streets
  - Speed limits
  - Challenge and response routine between the driver and the officer
  - Railroad crossings
  - Dangers posed by engine brakes, retarders, and brake limiting switches

- Weight and brake capacity

  - Loading of new vehicles
  - Weight balancing, side-to-side
  - Tank baffling
  - Military truck conversions; fuel tanker conversions
  - Antilock brakes on newer chassis
  - Automatic chains for colder climates
  - Supplemental braking devices such as jake brakes, transmission retarders, and magnetic driveline retarders

- Passenger heat and noise reduction (sirens, radios, air horns, engine, etc.)

- Patient lifting height for ambulances
- Child safety seats for pediatric riders
- Restraints for EMS providers and others in the back of an ambulance
- Compliance with the appropriate federal or NFPA standard
- Preventive maintenance and inspection program

Facilities

- Smoke detectors and automatic sprinklers
- Diesel exhaust emissions control
- Standard fire safety measures regarding storage, electrical appliances, safety with cigarettes and open flame, and regular inspections
- Dedicated area for the cleaning of EMS equipment, NFPA Standard 1581, *Standard for Fire Department Infection Control Program*

Protective Clothing and Equipment

- Compliance with the appropriate NFPA standard
- **Full** structural protective clothing: helmet, hood, coat, gloves, SCBA, flashlight, trousers, and boots
- Protective clothing for EMS operations: exam gloves, eye and face protection, drapes, gowns, and suits
- Clothing and equipment —and a means for cleaning them—must be provided by the agency
- Uniforms compliant with NFPA 1975
- Clothing worn by volunteer firefighters under structural protective clothing
- SOPs that govern the use and maintenance of protective clothing and equipment
- Right protective clothing for the occasion: structural, wild land, proximity, hazmat, etc.

Equipment

- Proper training for all members expected to use the equipment, a basic requirement
- Weight, center of gravity, and ease of carrying: Are handles in places to make the equipment easy to carry (portable pump)?
- Consideration of noise levels produced by the equipment

Fire fighting

- Use of an incident management system
- Use of incident safety officers on the scene of an emergency
- Working in teams of at least two members in the hazard area
- Use of risk management techniques on the scene of the emergency (risk versus benefit)

Emergency Medical Services

- Use of proper levels of communicable disease protective equipment and clothing
- Proper decontamination of equipment
- Scene control (Traffic accidents, violent incidents, etc.)
- Use of an incident management system
- Proper lifting techniques

Activity 2.1

Pre-Emergency Risk Management

Purpose

To identify pre-emergency risk management measures having an impact on emergency operations.

Directions

1. As you view the video, think about pre-emergency risk management measures related to the scenario.

2. At the conclusion of the video scenario, you have 5 minutes to list on the worksheet the pre-emergency risk management measures that have an impact on this incident.

3. After you complete your list, be prepared to discuss what you have identified with the entire class.

Activity 2.1 (cont'd)

Pre-Emergency Risk Management Worksheet

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

9. _____

Activity 2.2

Identifying and Prioritizing Risks

Purpose

To identify and prioritize risks associated with emergency and non-emergency functions of a fire department and present their findings to the class.

Directions

In this small group activity, you are to identify the risks associated with the function assigned to your group. These risks should be identified in the assigned column of the worksheet.

After you have identified the risks, you are to prioritize those risks in the assigned column and provide a brief rationale for their prioritization.

You have 20 minutes to complete this activity. You will then give a 5 minute oral presentation of your findings to the entire class. Each presentation will be followed by a 5 minute general discussion led by the instructor.

Activity 2.2 (cont'd)

Identifying and Prioritizing Risks Worksheet

Function _____

Identified Risks	Risks Prioritized	Rationale

Activity 2.3

Emerging Issues Risk Management Plan

Objective

At the completion of this activity, the student will be able to use the risk management process to analyze and develop a plan for emerging safety risk management issues within their department.

Directions

In this individual activity, the student will develop ideas for a plan to addressing the emerging safety or risk management issues identified in Module 1 after returning home. This will be presented to the class on Day 6. Use the USFA publication, *Risk Management Practices in the Fire Service*, (p.33-46) to assist with this exercise.

It will be required to complete the majority of this activity outside of class hours. Each student will then be required to give a 5 minute oral presentation of their plan to the class on day six of this course.

Each individual must discuss how their plan will address the topics they have previously identified. Also identify additional resources required to implement the plan. Develop a one page sheet of bulleted items from the plan to post for the class. This will be placed on the classroom shared drive before the start of all presentations on Day 6.

The presentation should identify broad steps to address each emerging issue and the predicted or expected effect of the plan. The time and methods to implement the plan should be briefly outlined.

Suggestions for Activity:

It is suggested that this is started by brainstorming potential programs that will address the particular issues chosen.

Be sure to have a good sense of time on this activity. It is realized that "there's not enough time" and thus it is expected, that a reasonable product will be presented to the rest of the class. The presentation should take **no longer than 5 minutes** and will be evaluated by other students and the instructors. The feedback sheet is attached. Use this evaluation sheet as a guide!

Be prepared to answer questions about the ideas presented from both students and the instructors.

Activity 2.3 (cont'd)

Emerging Issues and Risk Management Student Feedback and Grade Sheet

Use this to evaluate the student presentation of a Risk Management plan. Specific comments will be very helpful as well as the numbers.

Reflect on the students' presentation. Using the following scale; first rate their performance on each of the components. After rating each of the behaviors, rate their overall performance in the skill area.

5 - extremely effective
4 - more than effective
3 - effective
2 - marginally effective
1 - not effective

Overall Score _____
(Max 40 points)

Evaluating Emerging Issues or Risk Potential

_____ Identify three emerging issues in your department for the plan

_____ Identify the probabilities improving safety in your department based on what you have learned in this class

_____ Identify probable consequences if they occur (**consider effects on human resources)**

_____ Identify any known national experience with the emerging issues or risks identified

Evaluating Emerging Issues or Risk Potential Comments

_____

_____

_____

_____

_____

_____

NOTE-TAKING GUIDE

Slide 2-1

MODULE 2:
RISK MANAGEMENT PROCESS

Slide 2-1

Slide 2-2

TERMINAL OBJECTIVE

At the conclusion of this module, the students will be able to describe the goal and apply the steps involved in instituting a risk management program.

Slide 2-2

Slide 2-3

ENABLING OBJECTIVES

- **Identify and discuss the risk management and the necessity for fire and EMS departments to do risk management.**
- **Identify the methods of detecting risk within a department.**

Slide 2-3

Slide 2-4

ENABLING OBJECTIVES

- **Identify risks (current and potential) involved in both emergency and non-emergency operations.**
- **Discuss the liability issues related to organizational risks.**
- **Identify documentation necessary to support/defend the risk management program.**

Slide 2-4

Slide 2-5

ENABLING OBJECTIVES

- **Use the risk management process to analyze and develop a plan for managing a significant risk within the student's organization.**
- **Present to the class a plan to deal with an emerging health and safety issue (Day 6 project).**

Slide 2-5

Slide 2-6

Slide 2-7

DEFINITION

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

Slide 2-7

Slide 2-8

RISK !!!!!!!!!!!

- **We face it every day.**
- **Insurance companies recognize it.**

Slide 2-8

Slide 2-9

RISK

- **We avoid risk.**
- **Make conscious choices to avoid risk.**
- **Some are automatic.**
- **Emergency responders face risk every day.**

- **IT IS "RISK MANAGEMENT"**

Slide 2-9

Slide 2-10

Why Do
Risk Management?

Slide 2-10

Slide 2-11

RISK MANAGEMENT
OVERALL GOAL

To reduce the frequency and severity of preventable, adverse events that create loss

Slide 2-11

Slide 2-12

RISK MANAGEMENT

Is composed of many elements
- Liability
- Insurance
- Safety, Health
- Financial Impacts, etc.

Emergency service risks
- Emergency Response
- Violence
- BBP/ABP
- Toxic Releases
- Etc.

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RISK MANAGEMENT

- **Risk is managed through a "Risk Management Program."**
- **Primary focus of the Risk Management Program must be *Member Safety and Health.***

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NFPA 1500

- **Contains minimum recommendations for occupational safety and health program**
- **Applicable to fire or EMS departments**
- **Develops a risk management plan in accordance with Chapter 4**

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EMERGENCY SERVICES RISK MANAGEMENT CATEGORIES

- **Non-Emergency Risk Management**
- **Pre-Emergency Risk Management**
- **Risk Management at an Emergency**

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RISK MANAGEMENT CONSIDERATIONS

- **Administration and facilities**
- **Training**
- **Vehicle operations**
- **Protective clothing and equipment**
- **Emergency incidents operations**
- **Non-emergency incidents operations**
- **Other related activities**

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RISK MANAGEMENT OVERVIEW

Five-step process:
– Risk Identification
– Risk Evaluation
– Risk Prioritizing
– Risk Control
– Risk Monitoring

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RISK IDENTIFICATION

- **Pertains to actual or potential hazards**
- **Based on department's organizational statement**
- **Involves daily risks encountered**

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RISK IDENTIFICATION

How do managers identify risk?

– Analyze data
– Research reports and trends
– Department reports
– Accident/Injury stats (near misses)
– ASK …

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RISK EVALUATION

- **Likelihood of occurrence of given hazard and severity of consequences**
- **Evaluation of accidents and injuries**
- **Based on frequency and severity**
- **Assessment of underlying causes**
- **Awareness of organizational culture**

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PRE-EMERGENCY RISK

- **Pre-emergency activities or those that effect an emergency**
- **May have major impact on safety**
- **Should use laws, regulations, standards, etc., to reduce risk**
- **Should consider engineering, administration, etc., to reduce risk**

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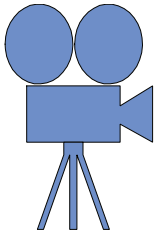

ACTIVITY 2.1

VIDEO : "Phoenix Engine 37"
(Phoenix Fire Department)

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RISK PRIORITIZATION

- **Based on**
  - **frequency and severity of occurrence**
  - **Catastrophic incidents**
  - **FF fatalities, injuries, accidents, and near misses**
- **Any risk that has a high probability of occurring and serious consequences deserves immediate action**

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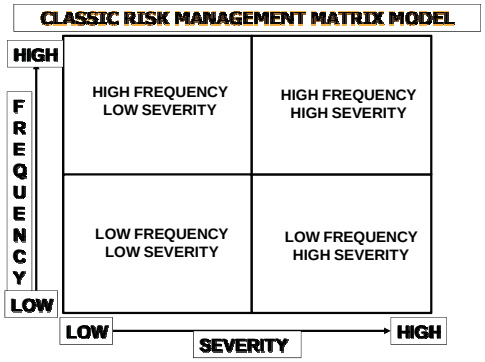

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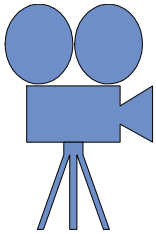

VIDEO : "Fire Service Operations"

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"Fire Service Operations"

VIDEO – Debrief

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NATURALISTIC DECISION MAKING (NDM)

- **Framework used to understand how:**
  - **People actually make decisions.**
  - **Perform cognitively complex functions in demanding situations.[1]**
- **NDM framework focuses on cognitive functions.**
- **NDM provides the observations and models.**

[1] *Source Wikipedia*

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NDM

- **Limitations of NDM include:**
  - **the need for extensive experience.**
  - **the failure of recognition and modeling in unusual or misidentified circumstances.**
- **NDM appears to be a valid model for decision makers.**

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NDM

- **NDM identifies reasonable reaction as first one considered.**
  - **NDM combines two ways decision making**
    - **recognizing course of action**
    - **evaluating cause of action through imagination**
  - **Experienced or inexperienced**
    - **It is a major factor in the decision making**

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THREE VARIATIONS IN NDM STRATEGY

Variation 1 occurs when situational detail and detail of relevant courses of action known.

- **Variation 1 is therefore essentially an "If… then…" reaction.**
- **Experienced decision makers are likely to have knowledge of prototypical situations and established courses of action.**

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THREE VARIATIONS IN NDM STRATEGY

Variation 2 occurs in unknown situation and chooses from a known course of action.

- **Variation 2 takes the form of "If (???)… then…,"**
- **Implies specific knowledge of courses of action but lack of knowledge of parameters of situation.**

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THREE VARIATIONS IN NDM STRATEGY

Variation 3 occurs with knowledge of a situation, but the course of action is unsure

- **Variation 3:**
  - **takes the form of "If… then… (???)".**
  - **implements mental trial and error simulation for course of action.**
- **Experienced decision makers develop a viable course of action more quickly.**

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NDM

- **Naturalistic Decision Making is relevant to leaders or officers of emergency services organizations.**
- **NDM has:**
  - **Applied to experienced and inexperienced decision making.**
  - **Developed samples for organizations.**

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RISK CONTROL MEASURES

- **PPE**
- **Standard Operating Procedures**
- **Training and Education**
- **Incident Command System**

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MONITORING

- **Evaluation of the whole process**
- **9–12 month time frame**
- **Indications the process is or is not working**
- **Changes that can be made:**
  - **As needed, or…..**
  - **As systems change**

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DOCUMENTATION

- **Testimony tool**
- **Retrospective review**
- **Identified problems must be accompanied by documentation of action taken**

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DOCUMENTATION

What are some of the positive and negative results of documentation related to risk management problems?

+ -

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SPECIAL CONCERNS

- **Training**
- **Hazardous Operations**
  - **Technical Rescue**
  - **Hazardous Materials/Terrorism**
  - **Incidents Involving Violence**

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ACTIVITY 2.2

- **In your assigned group, identify the risk associated with the function.**
- **After identifying the risk, use the worksheet to prioritize the risk and provide a brief rationale for your prioritization.**
- **Take 20 minutes to work on this activity.**
- **Write your answers on an easel chart.**
- **Be prepared to provide a 5-minute report on the risk.**

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SUMMARY

- **Methods of detecting increased risk**
- **Current and potential risks in emergency and non-emergency operations**
- **Liability risk issues in organizations**
- **Documentation methods to defend risk management program**
- **Naturalistic Decision Making**

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ACTIVITY 2.3
EMERGING ISSUES
RISK MANAGEMENT PLAN

- **Identify three emerging issues to be addressed after returning home.**
- **Develop a bulleted one-page outline to be submitted to the instructors by 0800 Friday.**
- **Presentation will be no more than 5 minutes.**

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