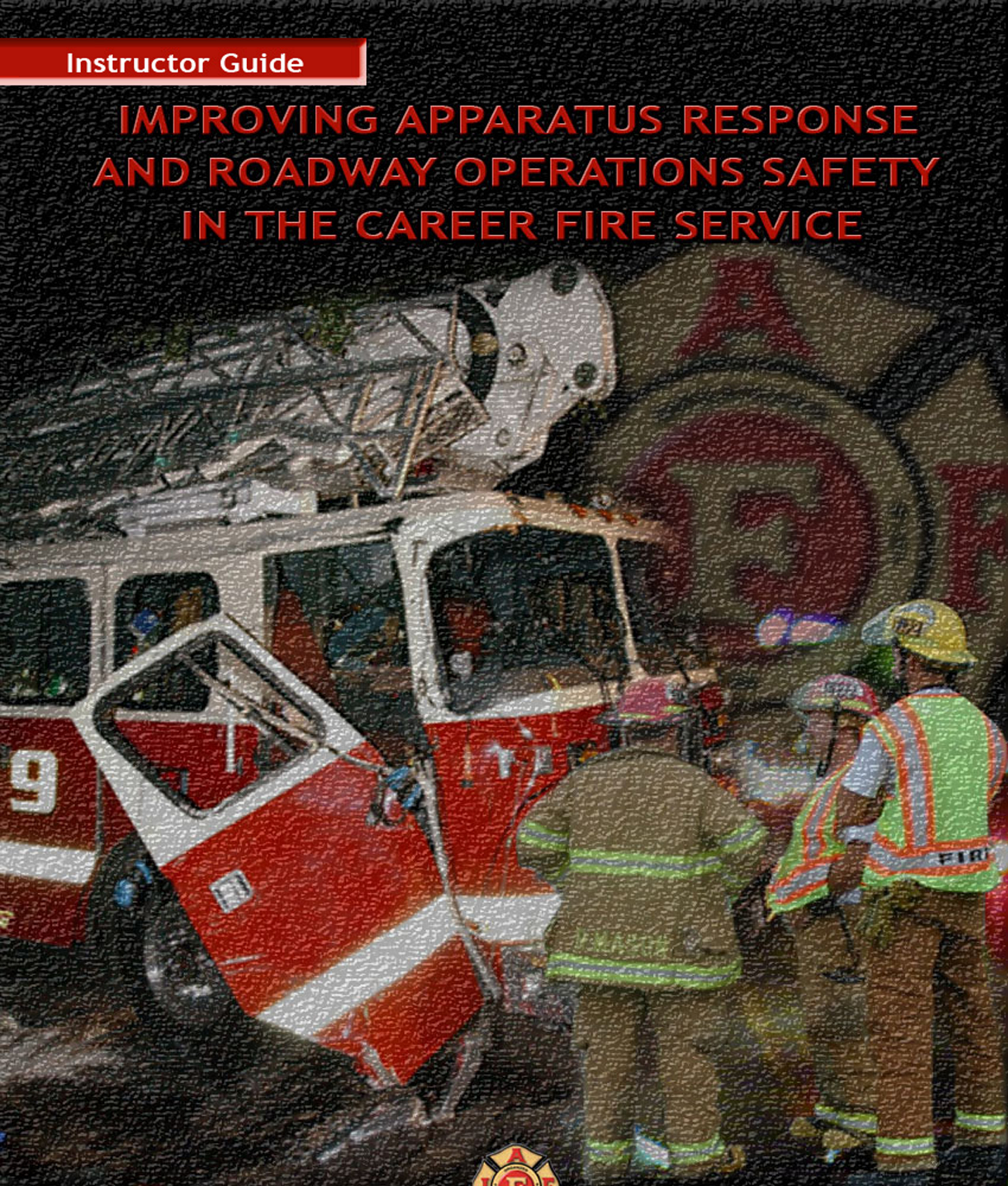
Instructor Guide

# IMPROVING APPARATUS RESPONSE AND ROADWAY OPERATIONS SAFETY IN THE CAREER FIRE SERVICE



Division of Occupational Health, Safety and Medicine
International Association of Fire Fighters, AFL-CIO, CLC

Instructor Guide

# Improving Apparatus Response and Roadway Operations Safety in the Career Fire Service

**Division of Occupational Health, Safety and Medicine**
**International Association of Fire Fighters, AFL-CIO, CLC**

*This project was developed through a Cooperative Agreement (EME-2004-CA-0188) between the Department of Homeland Security, United States Fire Administration and the International Association of Fire Fighters.*

# International Association of Fire Fighters

## *Message from the IAFF General President:*

Throughout my career as a professional fire fighter and while at the IAFF, I have recognized the impact of quality training. The training that you provide as an instructor embodies one of my key goals: improve the safety and welfare of both our nations' fire fighters and emergency medical personnel through better education.

Approximately 25 percent of the annual fire fighter line of- duty deaths occur as a result of vehicle collision or being struck by a vehicle while operating on the emergency scene. Yet, until recently, the fire service has done remarkably little to address this seemingly obvious problem.

Of all the possible causes of fire fighter injuries and deaths, those that result from vehicle collisions are perhaps the most preventable. Training fire fighter and emergency medical personnel as well as implementing and enforcing Standard Operating Procedures for simple measures, such as slowing down the response, coming to complete stops at intersections, wearing seatbelts, and properly positioning apparatus at roadway incident scenes, can eliminate virtually all of these losses.

The IAFF is extremely pleased to work in conjunction with the United States Fire Administration to bring you this program on reducing vehicle-related injuries and deaths for our members. By using the instructional materials contained in this program, you will make a marked improvement in the safety of our members. The prevention of injuries and deaths from vehicle-related incidents is completely within our control, and we must aggressively seek to mitigate these hazards immediately.

Health and safety is one of the central missions of the International Association of Fire Fighters and we are committed to working with fire department instructors to address this critical issue. This program is a major step in our partnership with you.

Fraternally,

Harold A. Schaitberger
General President

# Acknowledgements

The IAFF Division of Occupational Health, Safety and Medicine would like to lend its appreciation and gratitude to the United States Fire Administration for their commitment to fire fighter health and safety and for providing the funding for the development of this program. Special thanks are due to Fire Service Specialist Bill Troup for his particular efforts towards improving fire fighter safety related to apparatus response and roadway safety.

The IAFF extends its deepest appreciation to all of the fire departments and locals who allowed their stories and photographs to be used as examples and cases studies within this document. These examples are presented not to assess blame or ridicule, but rather to learn from these often difficult lessons so that they may not be repeated in the future.

Special appreciation is extended to the members of the following fire departments who staged numerous photographs that were used in developing this program:

- McKinney, Texas Fire Department Local 4017
- Frisco, Texas Fire Department Local 3732
- Plano, Texas Fire Department Local 2149

McKinney, Texas Fire Department Training Chief Ron Moore, himself a national expert in roadway incident safety, was instrumental in organizing the photo shoots and unselfishly provided numerous photos from his personal collection for use in this program.

We also wish to thank Kevin Roche, Assistant to the Fire Chief, Phoenix Fire Department and Mike Wieder, Assistant Director, IFSTA-Fire Protection Publications, Oklahoma State University for their assistance in developing this program.

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**Assistant to the General President**
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# Introduction

This program, *Improving Apparatus Response and Roadway Operations Safety in the Career Fire Service*, was developed by the Division of Occupational Health, Safety and Medicine of the International Association of Fire Fighters (IAFF) through a cooperative agreement from the United States Fire Administration, part of the U.S. Department of Homeland Security. As a result of this course, emergency responders will be able to apply basic strategies to safeguard their health and safety while responding to and from an incident and operating on roadways. The IAFF has worked to ensure that its Occupational Health and Safety Training programs and instructor materials are the best in the emergency response community. As a result of that effort, the IAFF is recognized nationally as a high-quality training provider.

While this information is intended to be accurate, timely and representative of the latest developments in driving and roadway operations, we are in no way prescribing this information as the final authority in emergency response. Accordingly, the IAFF and the USFA assume no responsibility based on any representations made in these materials. Under federal, provincial and state safety and health regulations, it is the employer's responsibility to ensure that its employees are trained to work in a safe and healthy manner. IAFF sponsored training is provided to assist employers in meeting their obligations. It does not, in any way, relieve the employer of its responsibility or liability for worker health and safety.

Printed copies of this *Guide* as well as the *Participant Guide* cannot be supplied by the IAFF. However, the IAFF authorizes instructors to duplicate both *Guides* exactly and completely from the electronic version included on this CD. In additional, exact and complete copies of this training package may be made for the purpose of increasing distribution of the materials. None of the materials may be sold for a profit under the provisions of public domain. These materials have been copyrighted under the copyright laws of the United States. Permission to duplicate these materials is conditional upon meeting the above criteria and may be rescinded by the IAFF for failure to comply.

To ensure that the program remains of the highest caliber, this *Instructor Guide* has been developed as a reference for those that will be teaching this subject. This *Instructor Guide* provides the instructor with a complete outline of the course, as well as objectives of each part of the program. The actual PowerPoint slides are included and directly correspond to the text outline.

Additionally, this disk contains the PowerPoint presentation, the *Participant Guide*, and the reference manuals that are cited in the program. Instructors are encouraged to review the *Participant Guide* which has a greater level of detail than the *Instuctor Guide*. The disk also contains folders on every case study that is used in this course plus nine additional case studies.

Each case study folder contains the NIOSH incident reports, police crash reports, news stories, additional photographs, and incident summaries. As an instructor, we ask that you utilize these resources to expand your knowledge of the case studies and we also allow you to customize your presentation to include these materials.

# Section 1 - Introduction

## Objectives

**Course**

After completing this course, the fire fighter should have a greater awareness of the issues affecting fire fighter safety relative to riding on fire apparatus and operating at roadway emergency scenes. The fire fighter will also understand basic strategies for improving safety during vehicle and roadway incident operations.

**Instructor Note:** The disk that contains the PowerPoint presentation contains folders on every case study that is used in this course plus nine additional case studies. The folders contain NIOSH incident reports, police crash reports, news stories, additional photographs, and incident summaries. Please use these resources to expand your knowledge of the case studies and customize your presentation to include these resources and other resources that you bring.

**Section**

After completing this section, the fire fighter will show the following competencies by achieving an acceptable score, as defined by your organization, on the written test or by any other means of evaluation deemed acceptable by the organization.

**Specific**

**After completing this section, the fire fighter will be able to:**

1. Identify the approximate percentage of U.S. fire fighters who die in vehicle-related incidents each year.
2. List the three primary areas that will be covered in this program.
3. Discuss the cultural change that is needed by the fire service to reduce injuries and deaths and discuss some of the basic changes that are needed.

**Time**

**20 Minutes**

## Section 1 Outline

**Explain**

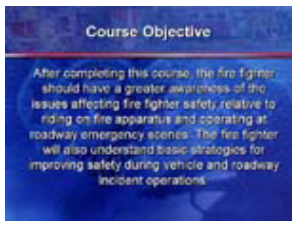
Explain that this program was developed by the International Association of Fire Fighters using funding provided by the United States Fire Administration. The program has been distributed to local unions for the purpose of providing information that will increase the health and safety of all members. The IAFF, the local union, and the administration of the fire department support finding better ways to ensure that all members go home healthy at the end of their shifts.

**Discuss**

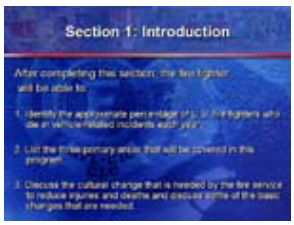
Discuss incidents that are familiar to the instructor or where the departments of members of the class were injured, killed, or survived near-misses in incidents involving responding on the apparatus or operating at a roadway emergency scene.

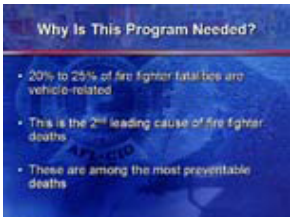
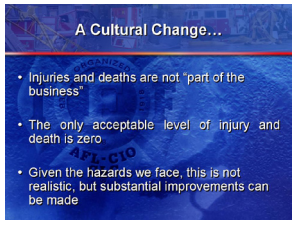
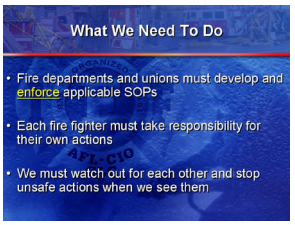
**Review**

Review the specific objectives you plan to cover in this section.





| Objective | Outline | Visuals |
|---|---|---|
| **Objective 1** | **Identify the approximate percentage of U.S. fire fighters who die in vehicle-related incident each year.** | |
| | A. Yearly, 20-25% of fire fighters die in vehicle crashes or when struck by a vehicle while operating at an incident scene. | |
| | B. The second leading cause of fire fighter deaths (cardiacs are first) | |
| | C. Career fire fighters are most likely to die when responding to an incident on the apparatus or when operating on the roadway at an incident | |
| | D. In 1998, The University of Michigan Transportation Research Institute studied fire apparatus collisions in the United States over a three year period and noted that in an average year there were:<br>• 2,472 fire apparatus collisions<br>• 6 occupants of fire apparatus killed in collisions<br>• 413 occupants of fire apparatus injured in collisions<br>• 21 civilians killed in collisions with fire apparatus<br>• 642 civilians injured in collisions with fire apparatus |  <br>  |
| **Objective 2** | **List the three primary areas that will be covered in this program** | |
| | A. The United States Fire Administration has placed specific focus on apparatus and roadway safety. As a follow-up to their *Emergency Vehicle Safety Initiative* report, they are working with the IAFF to identify issues specific to career firefighters. | |
| | B. This program will focus on three primary topics in which the greatest and fastest benefits for improving fire fighter safety may be realized:<br>1. Apparatus occupant safety procedures<br>2. Fire department response policies<br>3. Roadway scene safety procedures |  <br>  |
| **Objective 3** | **Discuss the cultural change that is needed by the fire service to reduce injuries and deaths and discuss some of the basic changes that are needed.** | |
| | A. A major cultural change in attitudes towards injuries and death in the fire service is needed.<br>1. Must eliminate the notion that injuries and deaths are "part of the business"<br>2. The only acceptable level of injury and death is zero<br>3. Given the hazards we face, this is not realistic, but substantial improvements can be made |  |
| | B. Fire departments and unions have an obligation to adopt and enforce standard operating procedures that enhance the safety of fire fighters<br>1. Each fire fighter must take personal responsibility for their safety<br>2. We must also watch out for each other and not be afraid/intimidated to stop an unsafe action |  |

# Section 2 - Apparatus Occupant Safety

## Objectives

**Section**

After completing this section, the fire fighter will show the following competencies by achieving an acceptable score, as defined by your organization, on the written test or by any other means of evaluation deemed acceptable by the organization.

**Specific**

**After completing this section, the fire fighter will be able to:**

1. List the driver/operator's responsibilities towards ensuring apparatus occupant safety.
2. List the company officer's responsibilities towards ensuring apparatus occupant safety.
3. List the fire fighter's responsibilities towards ensuring apparatus occupant safety.
4. List the fire department's responsibilities towards ensuring apparatus occupant safety.
5. Describe the issues related to occupant safety in ambulances.

**Time**

**40 minutes**

## Section 2 Outline

**Explain**

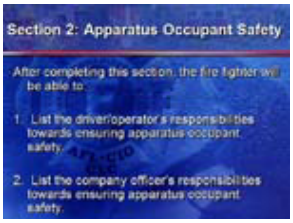
Explain that injuries and deaths as a result of apparatus collisions are among the easiest type to prevent. Safe driving practices and occupants wearing their seatbelts will eliminate the vast majority of collisions resulting in injuries and deaths. This is one area where some of the cultural changes are most needed and most difficult for some fire fighters to accept. We must eliminate the tendency to operate fire apparatus in a reckless manner under the guise of the urgency of the response. Rather, we must realize that we cannot solve someone's problem it we become part of it ourselves. We must also realize that some of the practices we have adopted over the years in the name of efficiency (such as donning SCBA's in the cab while en route) are actually placing us in a vulnerable position that is not justified by the tactical gains they permit.

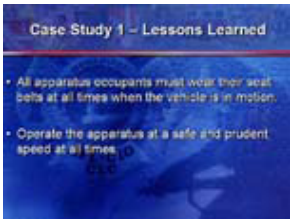
**Discuss**

Discuss hazardous situations involving the apparatus response that are commonly encountered in your jurisdiction (intersections, heavy traffic, rural roads with farm vehicles, aggressive traffic, high normal street speeds, etc).

**Review**

Review the specific objectives you plan to cover in this section.




| Objective | Outline | Visuals |
|---|---|---|
| Case Study 1 | **Las Vegas Engine 6 Incident (IAFF Local 1285)**<br>**October 31, 2003; 23:38 hours**<br>Las Vegas Engine 6 (a pumper equipped with an elevating master stream device) and a ladder company were responding together to a report of smoke in an apartment complex. The route of response to this incident included a section of freeway. The exit ramp from the freeway to the surface street in the vicinity of the reported fire had a posted speed limit of 25 miles-per-hour. The engine was staffed with an engineer, a Captain, and two fire fighters.<br><br>As Engine 6 traveled through a right-hand curve on the exit ramp, the engineer lost control of the vehicle. The apparatus fell onto its left side and slid approximately 50 yards into impact absorption barriers. The apparatus crushed the impact absorption barriers and came to rest just short of concrete barriers they were guarding. The ladder company responding with Engine 6 was less than a minute behind the engine and provided immediate treatment to the injured fire fighters in the engine.<br><br>The engineer on the engine was the only member of the four-person crew that was wearing a seat belt. The fire fighter seated behind the officer fell onto the fire fighter riding behind the engineer. The fire fighter seated behind the engineer was held in place by his partially donned SCBA. These fire fighters received minor injuries.<br><br>The Captain tumbled over the center hump in the front of the cab and landed on the engineer. The engineer sustained a broken nose and facial injuries. The 39-year-old Captain suffered a spinal cord injury and was left paralyzed from the neck down.<br><br>The engineer was charged with driving too fast for conditions. A law enforcement report on the incident estimated the speed of the apparatus prior to the crash at 45 miles-per-hour. The engineer was convicted and fined $250. Evidence was submitted at the engineer's trial that the engine's speedometer was broken.<br><br>The apparatus suffered severe damage. The reported apartment fire to which the units were responding proved to be a false call.<br><br>**Lessons To Be Learned**<br>1. **All apparatus occupants must wear their seat belts at all times when the vehicle is in motion.** In this incident three of the four occupants were not wearing seat belts at the time of the collision. All three of these occupants received injuries because of their failure to wear seat belts and the engineer, who was wearing a seat belt, was injured when the unbelted Captain fell on top of him when the apparatus turned over. The Captain received life-altering injuries as a result of his failure to be properly belted in.<br>2. **Operate the apparatus at a safe and prudent speed at all times.** The subsequent police investigation determined that the apparatus entered the curve on the exit ramp at a minimum of 20 miles-per-hour above the posted speed limit. Keep in mind that these posted speed limits are determined based on the safe speed of a passenger vehicle operating on a dry road surface. Even the posted speed limit may be too fast for a fire apparatus. |  <br>  <br>  <br>  |

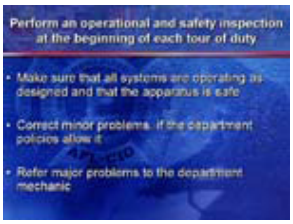
| Objective | Outline | Visuals |
|---|---|---|
| **Objective 1** | **List the driver/operator's responsibilities towards ensuring apparatus occupant safety.** | |

A. Perform an operational and safety inspection at the beginning of each tour of duty.
   1. Make sure that all systems are operating as designed and that the apparatus is safe
   2. The driver/operator may correct minor problems, if the department policies allow it
   3. Refer major problems to the department mechanic
   4. **Do not operate an apparatus found to have serious maintenance or safety issues!**

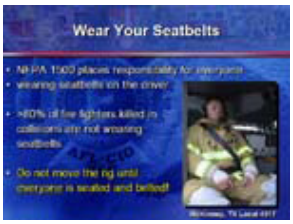
B. Ensure all occupants are seated and wearing the seatbelts.
   1. NFPA 1500 places this responsibility on the driver/operator
   2. 80% of fire fighters killed in apparatus collisions are not wearing their seatbelts
   3. Do not move the apparatus until everyone has mounted it, are seated, and have fastened their seatbelts.

C. Have proper training to drive the apparatus.
   1. Must meet the requirements of the appropriate chapters in NFPA 1002, Standard on Fire Apparatus Driver/Operator Professional Qualifications. Each chapter in the standard details a different type of fire apparatus
   2. Must be a formal training program; allowing the fire fighter to drive the apparatus around a few blocks in the response district is not training
   3. Must be trained on the type of apparatus they will be expected to operate. (Don't train only on pumpers and then expect the driver/operator to drive a large water tender)
   4. Department's should consider requiring all driver/operators to have commercial driver's licenses (CDL).
   5. CDLs have been required of other truck drivers since 1992
   6. CDL requires driver to pass a written, driving skills, and pre-trip inspection test
   7. Standard fire department training should already prepare drivers to pass the CDL test.
   8. Provides an added measure of safety and credibility to fire apparatus drivers.
   9. Some complications/benefits of CDL's include physicals and drug testing.

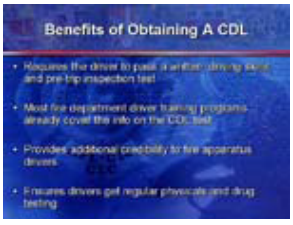
D. Operate the vehicle in a safe and prudent manner.
   1. Always follow applicable traffic laws, departmental standard operating procedures, and rules of common sense.
   2. Adding 10 seconds to a response time is better than not arriving at all because of a collision caused by indiscretion and/or foolishness.












| Objective | Outline | Visuals |
|---|---|---|

**Case Study 2**

## Texas City Incident (IAFF Local 1259)

**October 5, 1999; 09:38 hours**

A Texas City Fire Department engine company was responding with lights and siren activated to a report of a medical emergency. As the northbound engine approached an intersection adjacent to a highway overpass, the engine's driver proceeded into the intersection against a red light without stopping. As the engine passed through the intersection, the apparatus driver detected an eastbound passenger car headed toward the intersection. The engine's driver attempted to avoid the impact but was unable to do so and the passenger car impacted the engine on the driver's side.

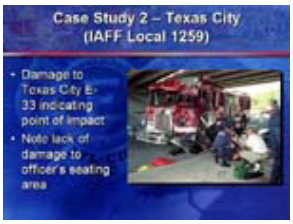
The force of the collision propelled the engine to the right where it struck a concrete bridge support. The point of impact on the apparatus with the bridge support was directly in front of the apparatus driver. The driver and the fire fighter riding in the rear of the cab were both wearing seat belts. The 54-year-old Captain was not wearing a seatbelt and was ejected through the front windshield of the pumper. He struck the pavement and received severe injuries. Despite being provided with immediate medical care at the scene and being life-flighted to a trauma center, the Captain was pronounced dead on arrival. The cause of death was listed as blunt trauma to the head.

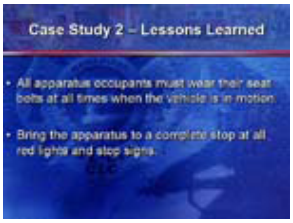
The driver of the pumper also was severely injured; the fire fighter riding in the back of the cab sustained only minor injuries. A police investigation of the incident attributed the cause of the crash to the failure of the passenger car to yield to a responding emergency vehicle. The driver of the passenger car acknowledged that he had seen the responding engine approaching but thought that he could get through the intersection before the engine got there. The police report also concluded that the Captain's failure to wear a seatbelt was a major factor in his death.

## Lessons To Be Learned

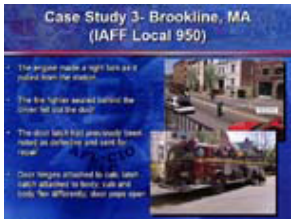
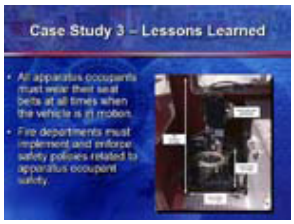
1. **All apparatus occupants must wear their seat belts at all times when the vehicle is in motion.** In this incident the Captain's failure to wear his safety belt resulted in his ejection from the apparatus and his subsequent death from those injuries. Both of the belted occupants of the vehicle, including the driver/operator who was closest to the point of impact, survived the incident. Company officers must set a positive example for their crews.
2. **Bring the apparatus to a complete stop at all red lights and stop signs.** Though not cited in the police reports, clearly this incident could have been avoided altogether had the driver/operator brought the apparatus to a complete stop and account for all lanes of traffic before proceeding through the intersection. NFPA 1500 requires all apparatus to be brought to a complete stop in these situations.

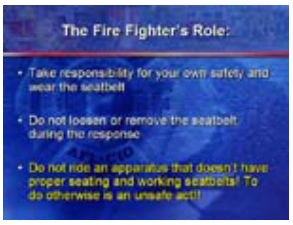
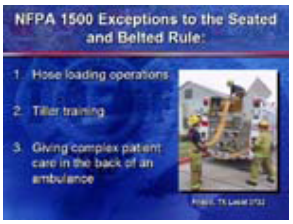




| Objective | Outline | Visuals |
|---|---|---|
| **Objective 2** | **List the company officer's responsibilities towards ensuring apparatus occupant safety.**<br>A. The company officer has ultimate responsibility for the entire crew.<br>B. The company officer is responsible for supervising the driver/operator.<br>C. The company officer may tell the driver/operator to slow down, but must never tell him/her to speed up.<br>D. Serves as a second set of eyes for the driver/operator while the apparatus is in motion. Acts as a "co-pilot."<br>E. Also responsible for ensuring that all members are seated and belted before the apparatus is in motion.<br>1. May have a mirror mounted above the windshield<br>2. High-visibility, contrasting color seat belts make this task easier<br>3. Set a good example by wearing your seatbelt |  <br>  |

| Objective | Outline | Visuals |
|---|---|---|
| **Case Study 3** | **Brookline, MA Incident (IAFF local 950)**<br>**April 30, 2004; 09:05 hours**<br>An engine company from the Brookline Fire Department was responding to a report of a gas odor in a structure. The company was responding in a 1976 Pirsch pumper that served as a spare apparatus. The rear of the cab was provided with doors that were installed after the apparatus was delivered by the manufacturer.<br><br>As the engine made a right-hand turn from the fire station, the fire fighter seated behind the driver was ejected from the vehicle. Other fire fighters on the engine reported that the ejected fire fighter was seen in a seated position and was engaged in preparing a gas meter for use on the incident. Another witness to the incident told police that the fire fighter was standing inside of the vehicle. The fire fighter who was ejected sustained a severe head injury and was transported to the hospital. He died on May 3, 2004 as a result of his injuries.<br><br>None of the four-crew members on board the engine at the time of the incident was using a seatbelt. Police investigators found a seatbelt tucked under the seat used by the fire fighter who was fatally injured. They noted that the seatbelt appeared as though it had not been used for quite some time. There were also news reports of problems with the door latch on the rear door closest to fatally injured fire fighter.<br><br>It has been theorized that differences in the flexion of the cab and the body routinely caused this door to open. Many times before the fatal incident, a firefighter would have to walk along next to this apparatus as it was backed into the station. The firefighter would close the door after it popped open as the body and cab twisted as a result of the inclined ramp in front of the station.<br><br>Ironically and tragically, this fire department experienced a similar incident in 1982. In that incident a fire fighter was ejected *from the same* apparatus involved in the 2004 incident. That fire fighter remained in a coma until his death in 2002. The 1982 incident resulted in a lawsuit that was alleged to have caused the Peter Pirsch Fire Apparatus Company to go out of business. The incident and resultant lawsuit have also been cited as one of the prime motivators for the fire service's change to fully enclosed fire apparatus riding compartments.<br><br>**Lessons To Be Learned**<br>1. **All apparatus occupants must wear their seat belts at all times when the vehicle is in motion.** In this incident the fire fighter's failure to remain seated and belted resulted in his ejection from the apparatus during the negotiation of a normal turn when leaving the fire station. Reportedly, the fire fighter killed in the 2004 incident was one of the first fire fighters to reach and render aid to the fire fighter involved in the 1982 incident. |  <br>  |

| Objective | Outline | Visuals |
|---|---|---|
| | **2. Fire departments must implement and enforce safety policies related to apparatus occupant safety.** Fire fighters riding in a seated and belted position has been an industry standard since the late 1980's. It is mandated by NFPA 1500. There is absolutely no excuse for fire departments failing to enforce this practice in today's fire service. This case is especially tragic in that the fire department had previously suffered a fire fighter fatality as a result of a similar incident and still failed to enforce a "seated and belted" policy. | |
| **Objective 3** | **List the fire fighter's responsibilities towards ensuring apparatus occupant safety.**<br>A. Must take personal responsibility for wearing the seatbelt and remaining seated.<br>1. Do not loosen the belt for any reason, including donning the SCBA<br>**2. Refuse to ride an apparatus that does not have a seat and seatbelt for each member.**<br>3. Use an alternative response vehicle if the primary vehicle is not properly equipped.<br>B. NFPA 1500 provides only three exceptions to the seated and belted rule:<br>1. Hose loading operations<br>2. Tiller training<br>3. Giving complex patient care in the back of an ambulance<br>C. Additional personal protective equipment may be required.<br>1. Wear helmet and eye protection when in unenclosed cabs<br>2. Wear hearing protection if exposed to noise above 90 dB |  <br>  <br>  |

| Objective | Outline | Visuals |
|---|---|---|

**Case Study 4**

## Columbus, OH Ladder X-33 Incident (IAFF Local 67)

**July 15, 2002; 17:45 hours**

Ladder Company 13 was responding with lights and siren activated to an automatic fire alarm. Ladder 13's regular apparatus was out of service for maintenance so the vehicle that the company was operating was an 11 year-old, reserve, tractor-drawn aerial ladder truck. This incident was the first emergency run for the apparatus after the Ladder 13 crew had changed out from their regular apparatus.

During the course of the response, the apparatus responded down a steep hill in preparation for a 90-degree left-hand turn. As the vehicle descended the hill, the tractor driver found that the brakes were not working and turned the apparatus to avoid hitting waiting cross-street traffic or going into a gorge. As the apparatus was turned, it rolled over and slid into a tavern. The cab of the apparatus smashed through the wall of the business, sending building materials and contents flying.

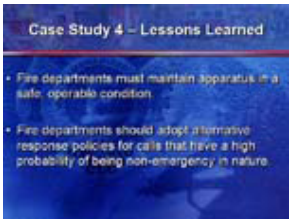
All four members of Ladder 13's crew were injured, as well as five of the twenty patrons inside the tavern at the time of the crash. The most seriously injured members of Ladder 13's crew were the company officer, who was hospitalized with a broken leg, and the tillerman who was hospitalized in serious condition.

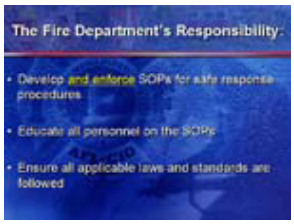
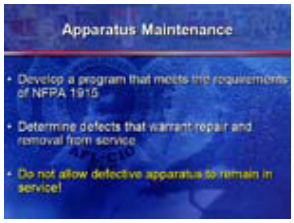
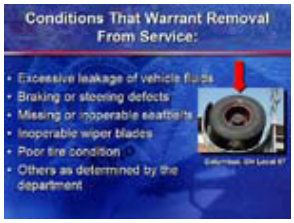
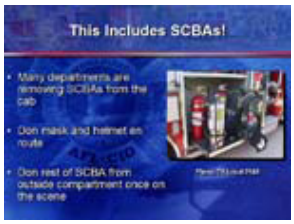
A law enforcement report on the crash cited improperly adjusted brakes as the cause of the crash. The investigating officer's report also stated that he believed the tractor driver could not have stopped the crash from occurring. Further investigation revealed that the reserve ladder truck had been in the shop for brake problems 13 days prior to the crash. The brake problems were never addressed and the apparatus was released back for emergency use.
The incident to which Ladder 13 was responding at the time of the crash turned out to be a false alarm.

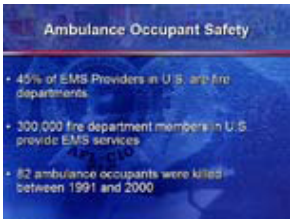
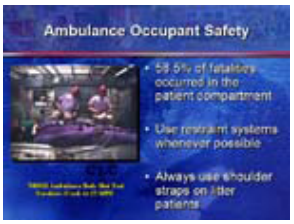



## Lessons To Be Learned

1. **Fire departments must maintain apparatus in a safe, operable condition.** In this incident fire fighters were given a reserve apparatus to operate on emergency calls that clearly was not mechanically sound. Of all the systems related to occupant safety, the braking system is among the most important. It is unacceptable for a piece of apparatus to be taken to the repair shop for brakes problems and then for that apparatus to be released for service without those problems being addressed/corrected.
2. **Fire departments should adopt alternative response policies for calls that have a high probability of being non-emergency in nature.** This crash occurred while operating in the emergency, lights and siren mode in response to an activated automatic fire alarm system. These responses have an extremely high probability of being a non-emergency situation. Had the apparatus been operated at lesser speeds there would have been a greater chance of minimizing the impact of collision as a result of the mechanical failure.



| Objective | Outline | Visuals |
|---|---|---|
| **Objective 4** | **List the fire department's responsibilities towards ensuring apparatus occupant safety.**<br>A. Must develop and enforce SOPs relative to apparatus and scene safety.<br>1. Must follow applicable laws, ordinances, and standards, such as NFPA 1500, the Manual on Uniform Traffic Control Devices (MUTCD), and state motor vehicle codes<br>2. Personnel must be educated on the SOPs<br>3. SOPs must be consistently enforced<br>B. Follow NFPA 1915, *Standard for Fire Apparatus Maintenance Program* for maintenance SOPs.<br>1. Details responsibilities for all parties<br>2. Information on timetables and procedures<br>3. List defects that warrant apparatus removal from service<br>**4. Do not operate the apparatus until serious defects are corrected.**<br>C. Examples of conditions that warrant removal from service:<br>1. Excessive leakage of vehicle fluids<br>2. Braking or steering defects<br>3. Missing or inoperable seatbelts<br>4. Inoperable wiper blades<br>5. Poor tire condition<br>D. Establish policies that limit the storage of tools and equipment in the occupant riding area.<br>1. Has little overall effect on operational speed<br>2. Creates more of a hazard when involved in a collision<br>3. Any tools that must be stored in this area must be in compartments or fastened with positive locking devices<br>4. This includes SCBA's. Keep masks in cab and cylinders in outside compartments |  <br>  <br>  <br>  <br>  |

| Objective | Outline | Visuals |
|---|---|---|
| **Objective 5** | **Describe the issues related to occupant safety in ambulances.**<br><br>A. 45 % of EMS providers in the United States are fire departments.<br>B. 300,000 of 770,000 total EMS workers in the U.S. are in fire department-based systems.<br>C. 82 ambulance occupants were killed in collisions between 1991 and 2000<br>D. The most deadly position in the ambulance is the patient compartment: 58.5 % of fatalities occur here<br>E. Must use available restraint systems whenever possible.<br>F. Always use shoulder straps on litter patients.<br>G. More research into effective restraint systems is needed.<br><br>**Instructor Note:** Click on the video in the slide to set it in motion if it does not automatically start. The video files must be in the same location on the computer (folder) as the PowerPoint presentation for the video to run. The left-hand passenger is not wearing a seat belt.<br><br>Additional resources are available on the disk that address the NIOSH and USFA partnership project on Evaluation of Emergency Services Vehicle Occupant Safety Project which addresses ambulance and EMS vehicle safety.<br><br>This project involves the continued analysis of crash data of Ambulance and EMS vehicles utilized by fire fighters and emergency responders, the review of data on ambulance crash statistics; hazard identification and task analysis; determination of appropriate crash testing methodologies; development of occupant restraint systems; and modeling of ambulance crash scenarios. The file contains additional multimedia crash test resources. |  <br>  |

# Section 3 - Fire Department Response Policies

## Objectives

**Section**

After completing this section, the fire fighter will show the following competencies by achieving an acceptable score, as defined by your organization, on the written test or by any other means of evaluation deemed acceptable by the organization.

**Specific**

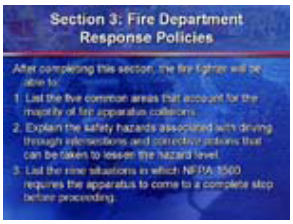
**After completing this section, the fire fighter will be able to**:

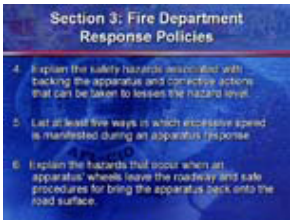
1. List the five common areas that account for the majority of fire apparatus collisions.
2. Explain the safety hazards associated with driving through intersections and corrective actions that can be taken to lessen the hazard level.
3. List the nine situations in which NFPA 1500 requires the apparatus to come to a complete stop before proceeding.
4. Explain the safety hazards associated with backing the apparatus and corrective actions that can be taken to lessen the hazard level.
5. List at least five ways in which excessive speed is manifested during an apparatus response.
6. Explain the hazards that occur when an apparatus' wheels leave the roadway and safe procedures for bringing the apparatus back onto the road surface.
7. Discuss the hazards associated with driving the apparatus on curves in the roadway and how these hazards can be reduced.
8. Discuss the benefits of fire departments establishing alternative response policies.
9. List at least five types of incidents that may warrant the response of apparatus under non-emergency conditions.

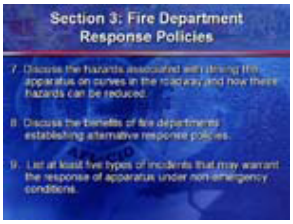
**Time**

**45 minutes**

**NOTE: The Case Studies in this section are numbered as they were covered in the student manual. They are not numbered in sequential order as they appear in this section.**




## Section 3 Outline

**Explain**

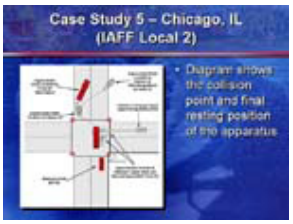
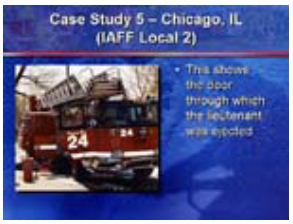
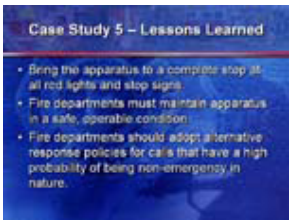
Explain that, although there are an almost endless number of reasons that fire apparatus are involved in collisions, the vast majority of collisions can be avoided by concentrating on five areas of apparatus response. In this section we will review these five common causes of fire apparatus collisions and will provide strategies for ensuring that all of them can be avoided in the future.

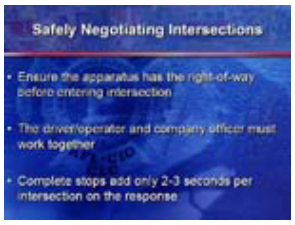
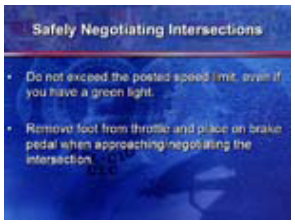
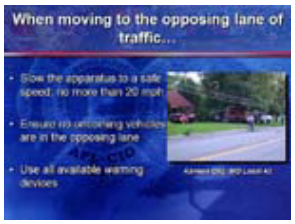
**Discuss**

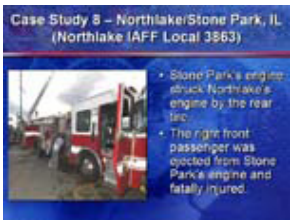
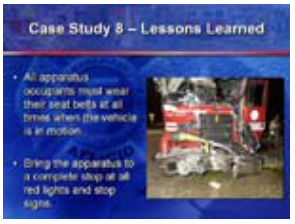
Discuss the fact that everyone is aware of the hazards associated with intersections. Have the fire fighters list some of the more hazardous intersections within their response districts and tell why they are particularly hazardous.

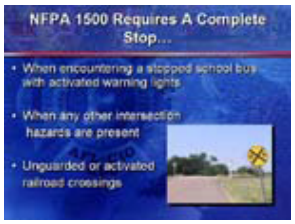
**Review**

Review the specific objectives you plan to cover in this section.

| Objective | Outline | Visuals |
|---|---|---|
| **Objective 1** | **List the five common areas that account for the majority of fire apparatus collisions.**<br>A. Intersections<br>B. Apparatus backing operations<br>C. Excessive speed<br>D. Keeping apparatus wheels on the road surface<br>E. Negotiating curves |  |
| **Case Study 5** | **Chicago, IL Intersection Collision (IAFF Local 2)**<br>**April 29, 2000; 11:51 hours**<br>Truck Company 24 was part of a multiple company response to an automatic fire alarm in a residence. The 30 year-old rear-mounted aerial ladder truck was being operated with lights and sirens activated. The 43 year-old lieutenant was riding in the right front officer's seat of the apparatus and was not wearing a seat belt.<br>During the course of the response the ladder truck entered a four-way stop intersection without coming to a complete stop. As the truck proceeded northbound through the intersection it was struck on the right-front corner of the cab by a westbound Ford F-150 pickup truck. The pickup also failed to stop prior to entering the intersection despite the presence of a stop sign.<br>As a result of the impact, the officer's door opened and the lieutenant was thrown through the opening and received severe injuries when he struck the pavement. Other fire fighters and responding medical personnel provided immediate medical care, but the lieutenant was pronounced dead on arrival at the hospital. The cause of death was listed as multiple traumatic injuries. Four other fire fighters and 9 civilians were injured in the crash.<br>The door latch for the officer's door had been reported as defective and had been serviced prior to the crash. Despite this service, the door was still not secure. When the crash was investigated, the officer's seat belt was found to be inoperative. The Chicago Fire Commissioner was quoted as saying that the lieutenant could have survived the crash had he been wearing a seat belt. The driver of the pickup was ticketed for speeding and failure to stop.<br>The automatic fire alarm that Ladder 24 was responding to at the time of the crash turned out to be a false alarm. |  <br>  |
| | **Lessons To Be Learned**<br>1. **Bring the apparatus to a complete stop at all red lights and stop signs.** This incident could have been avoided had the driver/operator brought the apparatus to a complete stop and accounted for all lanes of traffic before proceeding through the intersection. NFPA 1500 requires all apparatus to be brought to a complete stop in these situations.<br>2. **Fire departments must maintain apparatus in a safe, operable condition.** In this incident fire fighters were riding in an apparatus that was not mechanically sound. The door latch had allegedly been repaired, yet it still was not properly securing the door. Fire fighters should refuse to operate apparatus that are not in sound mechanical condition. |  |

| Objective | Outline | Visuals |
|---|---|---|
| | 3. Fire departments should adopt alternative response policies for calls that have a high probability of being non-emergency in nature. This crash occurred while operating in the emergency, lights and siren mode in response to an activated automatic fire alarm in a residence. These responses have an extremely high probability of being a non-emergency situation. Had the apparatus been operated in a non-emergency mode, they would have likely stopped at the stop sign and the collision would have been avoided. | |
| **Objective 2** | **Explain the safety hazards associated with driving through intersections and corrective actions that can be taken to lessen the hazard level.**<br>A. This is the most likely place to be involved in a collision.<br>B. The driver/operator and company officer must work together during all parts of the response, but especially when going through intersections (the officer is the driver's 2nd set of eyes)<br>C. Slowing to a complete stop at negative right-of-way intersections only adds 2-3 seconds per stop. This has little overall affect on the incident.<br>D. Must ensure that the apparatus has the right of way before proceeding.<br>E. Use caution when approaching all intersections, including those where the apparatus has the right-of-way.<br>F. Do not exceed the posted speed limit, even if you have a green light.<br>G. The driver may choose to remove foot from throttle and place on break pedal when approaching/negotiating the intersection.<br>H. Use extreme care when moving to the opposing lane of traffic.<br>1. Slow the apparatus to a safe speed; no more than 20 mph<br>2. Ensure no oncoming vehicles are in the opposing lane<br>3. Use all available warning devices<br>I. Traffic control devices may be used to gain control of a traffic signal and get the right-of-way.<br>1. These may be operated by strobe lights on the apparatus, the apparatus siren, or GPS devices<br>2. They do not guarantee the right-of-way. If the signal does not change in your direction apparatus may be approaching from another direction<br>J. Apparatus leaving the same station must follow each other at a distance of 300-500 feet. |  <br>  <br>  <br>  <br>  <br>  |

| Objective | Outline | Visuals |
|---|---|---|
| Case Study 8 | **Northlake and Stone Park Collision (Northlake IAFF Local 3863)**<br>**April 27, 2004; 17:41 hours**<br>Units from the Northlake and Stone Park Fire departments were among those dispatched by an automatic aid agreement to a reported structure fire. During the course of the response one engine company each from the two fire departments approached the same intersection from different directions. The Northlake engine approached the intersection traveling eastbound, while the Stone Park engine was northbound. This intersection was controlled by a traffic signal that was equipped with an emergency vehicle preemption system.<br>As the Northlake engine approached the intersection, the preemption system gave them a green signal and the apparatus entered the intersection. The Stone Park engine entered the intersection at nearly the same time, without stopping for the red signal in their direction of travel, and struck the Northlake engine near the right rear tire. After the collision, the Stone Park engine entered into a clockwise rotation and the engine came to rest on its right side. The 34 year-old, part-time fire fighter/paramedic riding in the right front seat of the Stone Park engine was ejected from the vehicle during the rotation. He died as the result of a head injury. This fire fighter/paramedic was not wearing a seat belt at the time of the collision. In addition to being a part-time fire fighter/paramedic for Stone Park, the fire fighter who was killed was also a paramedic for the Chicago Fire Department.<br>The driver of the Stone Park engine received severe injuries, the rear passenger received minor injuries, and the 3 occupants of the Northlake engine received minor injuries. A computer log of the operation of the intersection confirmed that the Northlake engine had the green light at the time of the crash.<br>**Lessons To Be Learned**<br>In reviewing the information contained in this case study, the reader should recognize that incident could have been avoided or its severity lessened if the following measures had been taken:<br>1. **All apparatus occupants must wear their seat belts at all times when the vehicle is in motion.** Had this fire fighter been wearing a seat belt it is highly unlikely that he would have been ejected from the apparatus. Correspondingly, it is likely that the injuries he would have been received if he had stayed in the apparatus would have been non-life threatening. |  <br>  <br>  |

| Objective | Outline | Visuals |
|---|---|---|
| | 2. **Bring the apparatus to a complete stop at all red lights and stop signs.** This incident could have been avoided had the northbound driver/operator brought the apparatus to a complete stop and accounted for all lanes of traffic before proceeding through the intersection. NFPA 1500 requires all apparatus to be brought to a complete stop in these situations. Failure to obtain a green signal when approaching an intersection equipped with an emergency vehicle preemption system is generally a good sign that either another vehicle is approaching the same intersection from a different direction or the system is inoperable. In either case the resultant red signal in your direction of travel must be respected and adhered to. | |
| **Objective 3** | **List the nine situations in which NFPA 1500 requires the apparatus to come to a complete stop before proceeding.**<br>A. NFPA 1500 lists nine specific situations in which the apparatus must be brought to a complete stop:<br>1. When directed to stop by a law enforcement officer<br>2. Red traffic signals<br>3. Stop signs<br>4. Negative right-of-way intersections<br>5. Blind intersections<br>6. When the driver/operator cannot account for all lanes of traffic in an intersection<br>7. When any other intersection hazards are present<br>8. When encountering a stopped school bus with activated warning lights<br>9. Unguarded or activated railroad crossings<br>B. State or local laws may supercede these requirements if they are stricter.<br>C. In the case of a stopped school bus or when directed by a law enforcement officer, do not proceed until the bus driver or officer waves the apparatus on.<br>**Instructor Note:** Click on the video in the slide to set it in motion if it does not automatically start. The video files must be in the same location on the computer (folder) as the PowerPoint presentation for the video to run. The crash occurs when the timer in the video shows 1:21:27.<br>D. FDNY Engine 94 was involved in a fatal intersection collision on July 10, 2004.<br>1. Engine 94 traveled against a red light, striking an SUV who legally entered the intersection.<br>2. One SUV occupant was killed. 5 civilians and 5 fire fighters were injured.<br>3. FDNY policy at the time required complete stops, as does NFPA 1500.<br>4. The fire department brought the officer and driver up on disciplinary charges, an unprecedented event following an apparatus collision. |  <br>  <br>  <br>  |

5. Local 94 and 854 officials implored personnel to follow the policy in the name of safety.
6. Response times increased slightly. FDNY administrators who had been under pressure because of company closings and out of service times, accused personnel of using the collision issue to increase response times and dramatize the company closure issue. FDNY administration issued a new response policy that did not require apparatus to stop at red lights or stop signs.
7. Union officials disagreed with the new policy and continued to encourage safe responses.
8. Apparatus collisions were reduced by 52% because of increased caution by drivers.
9. FDNY administration again complained about response times in May 2005.
10. Media attention continues on issue.

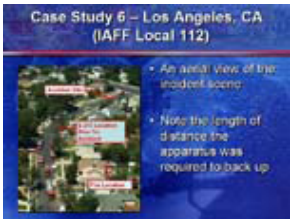
**Instructor Note:** The disk contains a folder called "New York, NY - IAFF Locals 94 & 854" that includes additional information about this incident and its aftermath.

**Case Study 6**

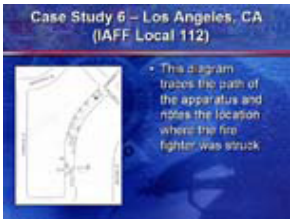
## Los Angeles, CA Backing Incident (IAFF Local 112)

**August 14, 2004; 13:42 hours**

A 25 year-old fire fighter, who was working overtime at her regularly assigned station, and the members of her company responded to a working fire in a residence. Once fire fighting operations were completed, this engine company was returned to service and released from the scene. In order to leave the scene the apparatus had to back out of a side street onto another street.




Following departmental procedure, the fire fighter described above took a position on the tailboard, or back step, of the apparatus near a buzzer used to signal the apparatus driver. The company officer was on the ground behind the apparatus in view of the driver's rear view mirror. Upon receiving the standard signal from tailboard fire fighter, the apparatus driver began to back up at a speed estimated at 2 1/2 miles-per-hour.



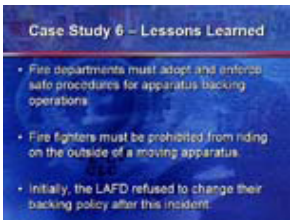

The company officer turned away to control traffic as the apparatus neared the intersection. When the officer turned back to look at the engine, the fire fighter was no longer seen on the back of the apparatus. The officer ran toward the apparatus and, upon seeing the fire fighter on the ground, yelled for the apparatus driver to stop.

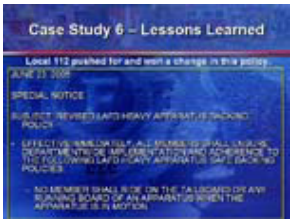
Fire fighters on the scene provided immediate medical attention to the fire fighter who had been run over. An ambulance that had responded to the original incident returned to the scene and transported the injured fire fighter to the hospital. The total time between being struck by the apparatus and arrival at the hospital was 12 minutes. Unfortunately, the fire fighter was pronounced dead at the hospital. The cause of death was listed as multiple blunt trauma injuries.

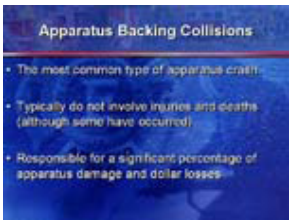
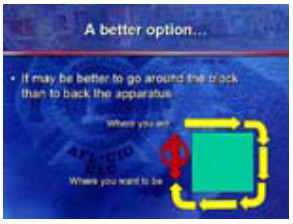
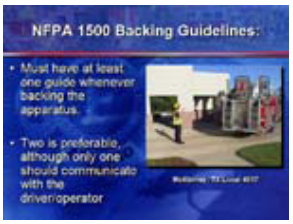
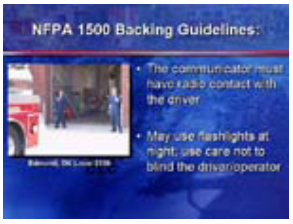
## Lessons To Be Learned

1. **Fire departments must adopt and enforce safe procedures for apparatus backing operations.** Apparatus backing operations account for the greatest percentage of apparatus collisions and a significant portion of monetary damages. NFPA 1500 provides outstanding guidance on how to perform safe backing operations. The procedures used in this incident did not follow the recommendations of NFPA 1500.
2. **Fire fighters must be prohibited from riding on the outside of a moving apparatus.** Again, in general the practice on riding on the outside of a moving fire apparatus is strictly forbidden by NFPA 1500. There are only three exceptions listed by NFPA 1500 to the rule of riding seated and belted within the cab of the apparatus and backing operations are not one of them. In this case the fire fighter was riding on the rear of a moving apparatus and was not visible to the apparatus driver. The driver had no way of knowing when the fire fighter fell off the back of the apparatus and no opportunity to stop before running over the fire fighter.

**Instructor Note:** The LAFD reaffirmed its policy of riding a firefighter on the back step of backing apparatus after this incident. A member of IAFF Local 112's Executive Board wrote to the city council group that oversees the fire department and registered his objections to this situation. The policy was subsequently changed to prohibit back step riding in these situations. Captain Steve Norris, the Local 112 Board Member and Safety Officer, wrote the letter. Captain Norris started his career as a member of the Brookline Fire Department (Case Study 3). One person can make a difference!



| Objective | Outline | Visuals |
|---|---|---|
| **Objective 4** | **Explain the safety hazards associated with backing the apparatus and corrective actions that can be taken to lessen the hazard level.**<br>A. The most common type of apparatus crash.<br>1. Typically do not involve injuries and deaths (although some have occurred)<br>2. Responsible for a significant percentage of apparatus damage and dollar losses<br>B. When possible, drive around the block rather than back up.<br>C. NFPA 1500 requires at least one guide whenever backing the apparatus.<br>1. Two is preferable, although only one must communicate with the driver/operator<br>2. The communicator must have radio contact with the driver<br>3. May use flashlights at night; use care not to blind the driver/operator<br>D. The apparatus may be equipped with back-up safety devices; these are not a substitute for guides.<br>1. Rearview mirrors<br>2. Back-up camera's and monitors<br>3. Braking devices |  <br>  <br>  <br>  <br>  |

| Objective | Outline | Visuals |
|---|---|---|

**Case Study 9**

## Phoenix, AZ Ladder 9 Incident (IAFF Local 493)

**September 29, 2003; 13:58 hours**

Ladder 9, a large aerial apparatus equipped with a 118-foot articulating ladder tower, was returning to quarters from an EMS call. The apparatus was staffed with a captain, engineer, and two fire fighters, all of whom were wearing seat belts. The apparatus was southbound and made a left-hand turn at an intersection only a few blocks from their fire station. As the apparatus went through the turn, it slowly tipped over to the right. The vehicle fell completely over onto its right side and slid along a sidewalk, narrowly missing a building, prior to coming to rest.

The apparatus was totally destroyed. The captain received some road rash abrasions after the window in the door next to him shattered as the apparatus slid. All four fire fighters were assessed at a local hospital and released.

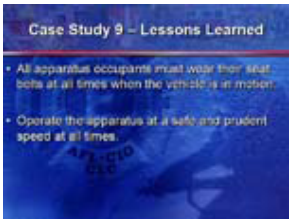
The law enforcement report on the crash cited excessive speed by the driver. The speed of the apparatus as it entered the turn was estimated to be in excess of 30 miles-per-hour.

### Lessons To Be Learned

1. **All apparatus occupants must wear their seat belts at all times when the vehicle is in motion.** As with the Charlotte incident cited later in Case Study #7, a positive outcome of this incident was the fact that although Ladder 9 was totaled, the fire fighters on the apparatus escaped relatively unharmed because they were all properly seated and belted. This incident clearly exemplifies why seated and belted policies must be enforced.
2. **Operate the apparatus at a safe and prudent speed at all times.** The subsequent police investigation determined that the apparatus entered the intersection doing at least 30 miles-per-hour. That is much too fast for an apparatus of that size. It is tragic enough when an apparatus crashes as a result of excess speed while en route to an emergency. It is inexcusable for the same thing to happen when returning to the station.



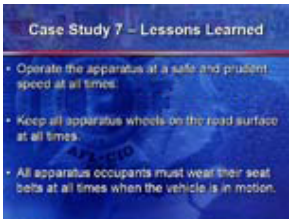


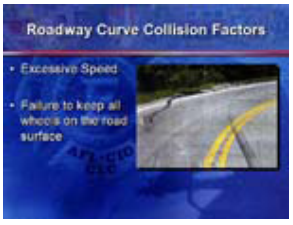


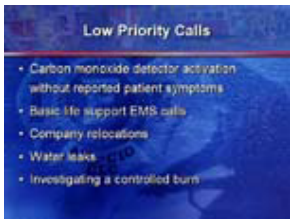
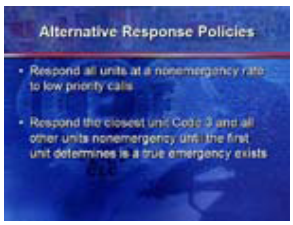
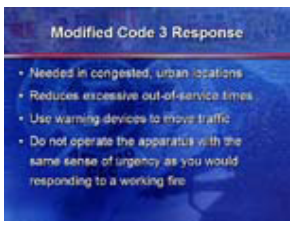
| Objective | Outline | Visuals |
|---|---|---|
| **Objective 5** | **List at least five ways in which excessive speed is manifested during an apparatus response.**<br>A. The vehicle is unable to negotiate a curve in the road.<br>B. The vehicle is unable to stop before hitting another vehicle or object.<br>C. The vehicle is unable to stop before entering an intersection or railroad crossing.<br>D. A weight shift occurs when the vehicle is slowed, causing it to skid or overturn.<br>E. Control of the vehicle is lost after hitting a pothole, speed bump, or similar defect in the driving surface.<br>F. Control of the vehicle is lost as a result of swaying outside the lane of travel and striking a median or curb, or the tires on one side of the vehicle (usually the right side) leave the road surface.<br>G. Tire traction is lost on wet, icy, snowy, or unpaved road surfaces. |  <br>  |
| **Case Study 7** | **Charlotte, NC Incident (IAFF Local 660)**<br>**July 28, 2004; 18:01 hours**<br>Engine 23 was responding to an EMS call in a rural area of eastern Mecklenburg County with lights and siren activated. Engine 23 was providing mutual aid assistance to a volunteer fire department that was also en route to this call.<br>Engine 23 was being driven on a two-lane asphalt roadway without a dividing median. As the apparatus negotiated a slight left-hand curve in the roadway, the right wheels of the apparatus left the paved surface of the roadway and traveled on the soft shoulder. In attempting to bring the right side wheels back up onto the road surface, the driver overcorrected to the left and the vehicle began to rotate counter-clockwise. The pumper left the left-hand side of the road, passed through a fence, sideswiped a tree with the left side of the apparatus, and came to rest in a field approximately 240 feet from the roadway.<br>The officer and three fire fighters that were riding in the pumper were all wearing lap and shoulder belts. Despite the fact that the apparatus sustained severe damage, the fire fighters and the officer received little or no injuries. They were checked by medical personnel at the scene and released from duty for the balance of the shift.<br>A law enforcement investigation of the crash and an analysis of on-board computers on the pumper found that the apparatus was traveling at approximately 65 miles-per-hour in a 45 mile-per-hour zone when control was lost. Unsafe speed for conditions was cited as a contributing factor in the crash |  <br>  <br>  |

## Lessons To Be Learned

1. **Operate the apparatus at a safe and prudent speed at all times.** The subsequent police investigation determined that the apparatus entered the curve at a minimum of 20 miles-per-hour above the posted speed limit. Keep in mind that these posted speed limits are determined based on the safe speed of a passenger vehicle operating on a dry road surface. Even the posted speed limit may be too fast for a fire apparatus.
2. **Keep all of the apparatus wheels on the road surface at all times.** Studies have shown that a high percentage of collisions involving large fire apparatus occur as a result of the vehicle's right side wheel(s) leaving the road surface. This generally occurs because of driver inattention or excessive speeds. The initial mistake is then compounded by an inappropriate response that leads to loss of control of the apparatus. Apparatus driver training programs must cover the proper procedures for reacting to situations where the apparatus wheels leave the road surface.
3. **All apparatus occupants must wear their seat belts at all times when the vehicle is in motion.** One of the positive outcomes of this incident was the fact that although the apparatus sustained severe damage, the fire fighters on the apparatus escaped relatively unharmed because they were all properly seated and belted. This incident clearly exemplifies why seated and belted policies must be enforced.



| Objective | Outline | Visuals |
|---|---|---|
| **Objective 6** | **Explain the hazards that occur when an apparatus wheels leave the roadway and safe procedures for bringing the apparatus back onto the road surface**<br>A. The vehicle may sink in soft ground or otherwise be pulled further off the road, striking an object or overturning.<br>B. The vehicle shoots across the roadway as a result of overcorrection.<br>1. May cause the vehicle to roll over<br>2. May strike another vehicle head-on<br>3. May exit the roadway on the opposite side of the road and overturn or strike an object<br>C. Tips for keeping the vehicle from drifting off the right side of the road:<br>1. First and foremost, operate the vehicle at a safe and reasonable speed. This will minimize swaying and drifting. It will also avoid loss of control on curves in the road.<br>2. Do not operate warning devices, read map books or computer monitors, or perform other activities while driving the vehicle that may result in drifting due to lack of attention. The driver should just drive<br>3. If possible, never pass slowed or stopped vehicles on their right side.<br>D. What to do when the right side wheels drop off the edge of the road:<br>1. Try to bring the vehicle to a complete stop and creep back up on the road<br>2. Slow to 20 mph or less if you can't come to a complete stop. |  <br>  <br>  <br>  |
| **Objective 7** | **Discuss the hazards associated with driving the apparatus on curves in the roadway and how these hazards can be reduced.**<br>A. Collisions on curves are typically a result of a combination of two factors:<br>1. Excessive speed<br>2. Failure to keep all wheels on the road surface<br>B. Fire apparatus are heavy and typically have a high center of gravity. When combined with excessive speed on a curve this can result in loss of control and/or overturning of the vehicle.<br>C. Excessive speed may also force the vehicle into opposing lanes of traffic, causing a head-on collision.<br>D. Posted, recommended speeds on road signs approaching curves are based on passenger vehicles on dry roads. Probably not appropriate for fire apparatus even in good weather conditions.<br>E. The best way to avoid collisions on curves is to operate the vehicle at a safe speed and keep all the wheels on the road. |  <br>  |

| Objective | Outline | Visuals |
|---|---|---|
| **Objective 8** | **Discuss the benefits of fire departments establishing alternative response policies.**<br>A. Apparatus are most likely to be involved in a collision when responding with lights and siren operating (Code 3)<br>B. We have historically treated every response as an emergency. This is unnecessary and creates unreasonable dangers.<br>C. Each jurisdiction must look at developing policies that require a non-emergency response on low priority calls.<br>D. By lessening the number of Code 3 responses, in theory the collision rate will also be reduced.<br>E. Some jurisdictions have noted an 80-90% drop in Code 3 collisions since adopting these types of policies. |  |
| **Objective 9** | **List at least five types of incidents that may warrant the response of apparatus under non-emergency conditions.**<br>A. Typical types of calls that may be considered low priority are:<br>1. Activated fire alarm, without an additional call reporting fire conditions<br>2. Trash fire<br>3. Small brush fire inside the city limits<br>4. Wires down/hanging<br>5. Smoke/gas odor in the vicinity<br>6. Carbon monoxide detector activation without reported patient symptoms<br>7. Basic life support EMS calls<br>8. Company relocations<br>9. Water leaks<br>10. Investigating a controlled burn<br>B. If the jurisdiction is not comfortable with all units responding Code 1 (non-emergency), have the first due run Code 3 (emergency) and all other units run Code 1 until the first unit gets on the scene and determines if an emergency response is required.<br>C. May need to use a modified Code 3 response in congested urban situations. This will reduce excessive out-of-service times on routine calls. Use warning devices to move traffic, but do not operate the apparatus with the same sense of urgency as you would when responding to an actual incident. |  <br>  <br>  <br>  |

# Section 4 - Roadway Incident Scene Safety

## Objectives

**Section**

After completing this section, the fire fighter will show the following competencies by achieving an acceptable score, as defined by your organization, on the written test or by any other means of evaluation deemed acceptable by the organization.

**Specific**

After completing this section, the fire fighter will be able to:

1. Explain the hazards associated with working on incident scenes that occur on a roadway.
2. Describe the terms “surface streets” and “highways.”
3. List the three primary concerns when determining where to park the apparatus on a roadway emergency scene.
4. Describe the safety principles for positioning fire apparatus on surface streets.
5. Describe the safety principles for positioning fire apparatus on highways.
6. Describe the purpose of the *Manual on Uniform Traffic Control Devices* (MUTCD) and how it applies to emergency responders.
7. List the three main goals of emergency traffic control (ETC) as outlined in the MUTCD.
8. Explain the five main parts of Section 6I of the MUTCD.
9. Explain the MUTCD requirements for performing size-up at a roadway incident scene.
10. Describe the main parts of a traffic incident management area (TIMA) as outlined in the MUTCD.
11. Explain the effective use of emergency vehicle lighting at roadway incident scenes.
12. List the requirements for proper protective clothing to be worn at roadway incident scenes.
13. List at least 6 agencies, other than the fire service, that may have official duties at a roadway incident scene.
14. Describe how the various agencies that respond to roadway incidents can work together effectively.

**Time**

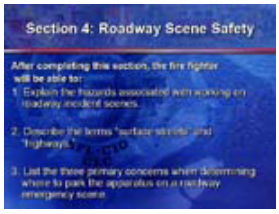
**45 minutes**

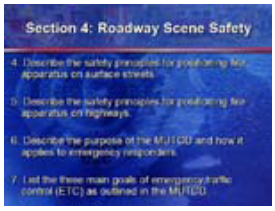
## Section 4 Outline

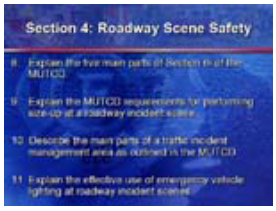
**Explain** Explain that fire fighters tend to focus primarily on the dangers associated with working on a fire or emergency medical scene, however roadways are perhaps the most dangerous location in which fire fighters operate. Fire departments need to focus on training fire fighters to operate on roadways safely just as much as they do at fire or hazardous materials scenes. Only by implementing better SOPs and training relative to roadway incident scenes will we reduce the significant number of injuries and deaths that occur there to both fire fighters and the public. Records kept by the U.S. Department of Transportation show that 18% of all roadway fatalities occur as a result of secondary collisions.

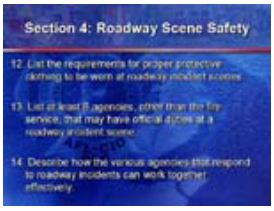
**Discuss** Discuss incidents that the fire fighters in the class have encountered were they confronted safety hazards while operating on a roadway incident.

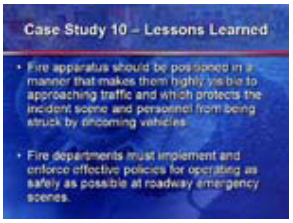
**Review** Review the specific objectives you plan to cover in this section.

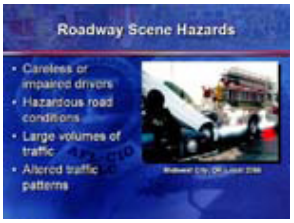
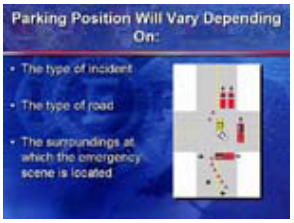


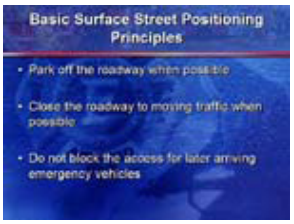
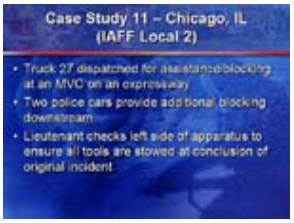
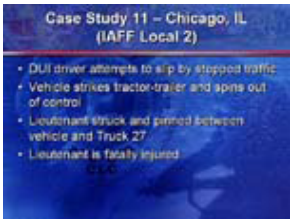



| Objective | Outline | Visuals |
|---|---|---|
| **Case Study 10** | **Midwest City, Oklahoma Incident (IAFF Local 2066)**<br>**August 5, 1999; 19:20 hours**<br>A Ladder 2 (a quint) and a Squad 2 (a rescue) were dispatched to assist EMS units at the scene of a reported motor vehicle collision with injuries on Interstate 40. The roads were wet from recent rainfall and rain had begun to fall again during the response.<br><br>Squad 2 arrived on the scene first and discovered that the reported collision was minor in nature. Ladder 2 arrived shortly thereafter and was positioned upstream of the squad to divert traffic away from the incident scene; all of the unit's emergency lights were operating. Ladder 2's members remained inside the vehicle.<br><br>Approximately two minutes after arriving on the scene, a passenger vehicle struck Ladder 2 from behind. Ladder 2 company members dismounted their apparatus to check on the condition of the passenger vehicle driver. One of Squad 2's members who had heard the collision also joined the ladder company fire fighters.<br><br>After the patient from the second collision was moved to an area that was thought to be safe (between the Ladder 2 and the median wall), Ladder 2's company officer walked further upstream in traffic in an attempt to wave traffic away from the scene of both collisions. At this point, another passenger vehicle lost control and spun into the space between Ladder 2 and the retaining wall where the other fire fighters were treating the driver of the car that had struck the ladder truck. The Squad 2 fire fighter placed himself between the oncoming car and the injured driver. This fire fighter was struck by the out-of-control vehicle and was thrown over the top of Ladder 2, landing approximately 47 feet from the point of impact.<br><br>Two other fire fighters and the driver of the car that hit the ladder apparatus were injured. The injured received immediate medical care on the scene, en route to the hospital, and after arriving at the hospital. The squad company fire fighter who was tossed over the top of the ladder truck died three days after the incident as the result of head injuries.<br><br>The subsequent investigation revealed that, among other things, there was a curve in the highway upstream from where the ladder truck was positioned. Vehicles traveling at a high rate of speed were unable to stop in time upon rounding the curve and seeing the fire apparatus.<br><br>**Lessons To Be Learned**<br>1. Fire apparatus should be positioned in a manner that makes them highly visible to approaching traffic and which protects the incident scene and personnel from being struck by oncoming vehicles. In this case the ladder apparatus did prevent the first car that struck it from barreling into the original accident scene and the people who were present there. However, had another apparatus or the ladder truck been parked further downstream, prior to the curve in the highway, it is highly possible |  <br>  |

| Objective | Outline | Visuals |
|---|---|---|
| **Objective 1** | that the second and third collisions would not have occurred. The fatally injured fire fighter received his injuries in the third collision. A fourth collision would occur later when another passenger vehicle drove into the car that had struck the back of the ladder.<br>2. Fire department must implement and enforce effective policies for operating as safely as possible at roadway emergency scene. Fire departments should consult documents such as NFPA 1500, the USDOT *Manual on Uniform Traffic Control Devices (MUTCD)*, and other pertinent publications in establishing their policies and training program. These policies must be enforced on every single response. |  |
| **Objective 2** | **Describe the terms "surface streets" and "highways."**<br>A. Surface streets are regular streets, avenues, lanes, alleys, and roads found in rural, suburban, and urban jurisdictions.<br>B. Highways are typically limited access roadways such as interstates and turnpikes.<br>C. The term *roadway* is the generic term that applies to both surface streets and highways. |  <br>  |
| **Objective 3** | **List the three primary concerns when determining where to park the apparatus on a roadway emergency scene.**<br>A. The three main concerns are:<br>1. Park the apparatus in a manner that reduces the chance of the vehicle being struck by oncoming traffic.<br>2. Park the apparatus in a manner that shields fire fighters and the operational work area from being exposed to oncoming traffic.<br>3. Park the apparatus in a location that allows for effective deployment of equipment and resources to handle the incident.<br>B. The procedures for performing each of these options will differ depending on:<br>1. The type of incident<br>2. The type of road<br>3. The surroundings at which the emergency scene is located. |  <br>  |

| Objective | Outline | Visuals |
|---|---|---|
| **Objective 4** | **Describe the safety principles for positioning fire apparatus on surface streets.**<br>A. Park the apparatus off the street in a parking lot or driveway, when possible.<br>B. When possible, close the street that the emergency is located on to through traffic.<br>C. Do not block access to the scene for later-arriving emergency vehicles.<br>D. If the street may not be closed to all traffic, park the apparatus in a manner that uses it as a shield between the scene and oncoming traffic.<br>E. On EMS calls, use the apparatus to shield the patient loading area behind the ambulance.<br>F. Never park the apparatus on railroad tracks. Keep the apparatus far enough away from the tracks so that a passing train will not strike it.<br>G. Position pumping apparatus so that the pump panel is located on the opposite side of the vehicle from oncoming traffic.<br>H. In intersections it may be necessary to shield the incident from more than one direction. |  <br>  |
| **Case Study 11** | **Chicago, IL Incident (IAFF Local 2)**<br>**December 23, 2000; 02:45 hours**<br>Truck 27 was dispatched to the site of a motor vehicle collision on an expressway to provide a traffic shield with their apparatus and to assist ambulance personnel. Two state police cars were positioned upstream (behind the ladder truck) in a further attempt to divert traffic from the work zone.<br>As the original incident was being concluded, the 37-year-old lieutenant (who had just been promoted to that rank two weeks previously) walked around the Truck 27 to make sure that everything was ready to go. As the lieutenant walked on the downstream side of the truck, a passenger car ran over a line of flares in an attempt to slip by traffic. The car then struck a tractor-trailer, spun, and pinned the lieutenant between the car and the ladder truck. The lieutenant was treated at the scene and then airlifted to the hospital. His legs were crushed in the collision and he had lost a substantial amount of blood. He died 10 hours later.<br>The driver of the car that struck the lieutenant was determined to be under the influence of alcohol and driving on a suspended driver's license. He was later charged with reckless homicide. There were no injuries in the original collision. The Chicago fire commissioner was quoted as saying "I have a hard time calling this an accident, this was a crime, an absolute crime." |  <br>  |

| Objective | Outline | Visuals |
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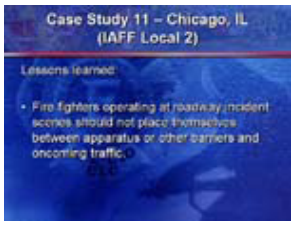
## Lessons To Be Learned

In reviewing the information contained in this case study, the reader should recognize that incident could have been avoided or its severity lessened if the following measure had been taken:

1. Fire fighters operating at roadway incident scenes should not place themselves between apparatus or other barriers and oncoming traffic. In this incident, the lieutenant was between the apparatus and on coming traffic when he was struck and mortally wounded. Apparatus should be designed and positioned to avoid the need to retrieve equipment from exposed areas when at all possible.




**Objective 5**

## Describe the safety principles for positioning fire apparatus on highways.

A. The response itself may be difficult.
   1. Stopped traffic
   2. Long distances between exits or turnarounds
   3. May need to proceed against the normal flow of traffic (only after ensuring the road has been closed)

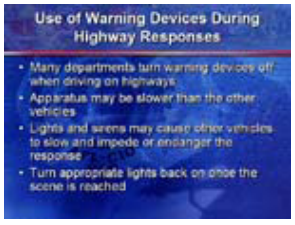
B. Many departments require apparatus to turn warning lights and sirens off until the reach the scene.
   1. Apparatus may be slower than the other vehicles
   2. Lights and sirens may cause other vehicles to slow and impede or endanger the response
   3. Turn appropriate lights back on once the scene is reached

C. Close at least one lane next to the incident lane.

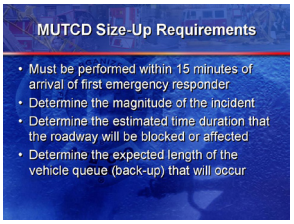
D. Close additional lanes if needed for safety purposes.

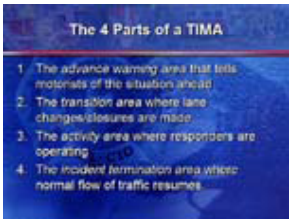
E. Coordinate lanes closings with police and/or highway department personnel.

F. Use apparatus as shield from oncoming traffic.
   1. Place apparatus between the scene and normal flow of traffic.
   2. Park the apparatus at a 45° angle.




| Objective | Outline | Visuals |
|---|---|---|
| **Objective 6** | **Describe the purpose of the Manual on Uniform Traffic Control Devices (MUTCD) and how it applies to emergency responders.**<br>A. Title 23 of the United States Code of Federal Regulations charges the DOT with developing a manual on uniform traffic control standards.<br>1. Each state is required to adopt these standards.<br>2. The document is called the *Manual on Uniform Traffic Control Devices (MUTCD)*<br>B. In the past, emergency scenes were not explicitly covered by the MUTCD.<br>C. The 2003 edition of the MUTCD has a section (6I – the number six and the letter "i") on *The Control of Traffic Through Incident Management Areas*.<br>D. This applies to all incidents fire fighters encounter on or near the roadway.<br>E. These are federal laws, not standards. They must be followed. |  |
| **Objective 7** | **List the three main goals of emergency traffic control (ETC) as outlined in the MUTCD.**<br>A. Improving responder safety on the incident scene.<br>B. Keeping traffic flowing as smoothly as possible.<br>C. Preventing the occurrence of secondary crashes. |  |
| **Objective 8** | **Explain the five main parts of Section 6I of the MUTCD.**<br>A. *General* – Contains requirements for interagency coordination, training, visibility, estimating incident scope and length, ETC sign colors, and use of initial control devices, such as road flares and traffic cones.<br>B. *Major Traffic Incidents* – These are incidents whose duration will exceed two hours. If the incident will exceed 24 hours, full MUTCD work zone requirements will need to be implemented.<br>C. *Intermediate Traffic Incidents* – These incidents range from 30 minutes to two hours in duration. They typically require lane closures. Typical vehicle collisions with injuries fall into this category.<br>D. *Minor Traffic Incidents* – These are incidents whose duration are less than 30 minutes. Simple actions, such as the use of initial control devices will be sufficient to handle the incident. Minor, non-injury collisions and stalled vehicles are examples of minor traffic incidents.<br>E. *Use of Emergency Vehicle Lighting* – Provides direction on the appropriate types of lighting for use at nighttime roadway incidents. |  <br>  |

| Objective | Outline | Visuals |
|---|---|---|
| **Objective 9** | **Explain the MUTCD requirements for performing size-up at a roadway incident scene.**<br>A. The MUTCD places a significant amount of emphasis on doing a proper estimation (size-up) of the scope and severity of the incident within 15 minutes of the arrival of the first emergency responder.<br>B. Requires the initial responders to determine:<br>1. The magnitude of the incident<br>2. The estimated time duration that the roadway will be blocked or affected<br>3. The expected length of the vehicle queue (back-up) that will occur as a result of the incident.<br>C. This information must then be used to set up appropriate ETC measures to handle the incident.<br>D. For every one minute a lane of traffic is blocked, four minutes of back-up are developed. | |
| **Objective 10** | **Describe the main parts of a traffic incident management area (TIMA) as outlined in the MUTCD.**<br>A. The TIMA includes four main parts:<br>1. The advance warning area that tells motorists of the situation ahead<br>2. The transition area where lane changes/closures are made<br>3. The activity area where responders are operating<br>4. The incident termination area where normal flow of traffic resumes.<br>B. The distances for the advance warning and transition areas will differ depending on the speed limit in the area of the incident.<br>1. Higher speed limits require longer advance warning and transition areas.<br>2. The MUTCD contains charts that detail the appropriate length based on the speed limit in the area.<br><br>**Instructor Note:** The Transportation Association of Canada (TAC) publishes a Manual of Uniform Traffic Control Devices for use by Canadian jurisdictions. Although it serves a similar role to the FHWA MUTCD, it has been independently developed and has a number of key differences with U.S. manual, most notably the inclusion of bilingual (English/French) signage and a much heavier reliance on symbols rather than text legends. However, some provincial departments of transportation have developed secondary sources for guide signage design and installation that are being used in conjunction with local practices, either formulated in writing or applied on a rule-of-thumb basis. |  <br>  |

| Objective | Outline | Visuals |
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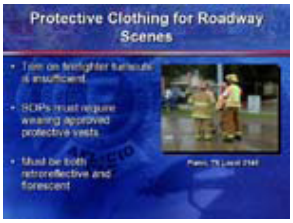
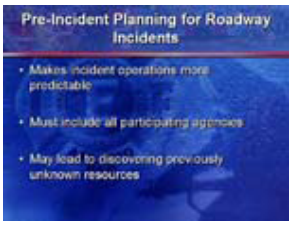
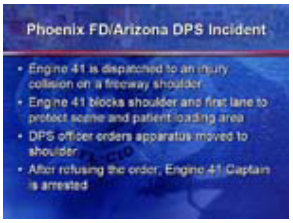
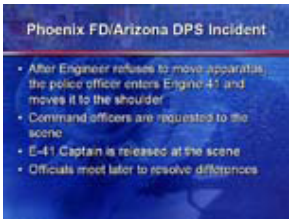
| **Objective 11** | **Explain the effective use of emergency vehicle lighting at roadway incident scenes.**<br>A. The use of emergency lighting at roadway incidents is essential.<br>1. Is intended for the safety of responders and motorists<br>2. Provides only warning, but no traffic control<br>3. May be confusing/blinding to motorists, especially at night<br>B. Emergency lighting may be reduced if proper emergency traffic control procedures are used.<br>1. Is safer to divert traffic with advanced placement of signs and cones rather than relying on warning lights and vehicles.<br>C. Reduce lighting at the scene as much as possible, without compromising the safety of responders.<br>1. Turn off all forward lighting, such as headlights, that may blind oncoming drivers.<br>2. Many departments turn off all warning lights, except for selected amber lights, especially at nigh.t<br>3. Some apparatus are designed so that all lights but the amber ones turn off when the apparatus is parked.<br>4. An override switch allows all lights to be turned on if necessary.<br>D. Use caution in the use of floodlights at nighttime roadway incident scenes.<br>1. Must be raised and deployed in a manner that is not blinding motorists driving past the incident scene.<br>2. When floodlights are used, they must be raised to a height that allows light to be directed down on the scene. |  <br>  <br>  <br>  <br>  |

| Objective | Outline | Visuals |
|---|---|---|
| **Objective 12** | **List the requirements for proper protective clothing to be worn at roadway incident scenes.**<br>A. The reflective trim that is found on most fire fighter turnout clothing is insufficient for proving adequate safety on the roadway.<br>1. Must be supplemented with additional garments that make the fire fighter more visible.<br>2. SOPs must clearly dictate that all personnel wear appropriate reflective vests when operating on the roadway.<br>3. All personnel must police themselves to ensure that their fellow fire fighters are following this policy.<br>B. Reflective vests must be used to increase worker visibility, regardless of the use of turnout gear.<br>1. Must have both retroreflective and florescent properties. Retroreflective material returns the majority of light from the light source back to the observer.<br>2. Florescent material absorbs UV light of a certain wavelength and regenerates it into visual energy.<br>3. ANSI/ISEA Standard 107-1999 American National Standard for High-Visibility Safety Apparel specifies the minimum amount of fabric and reflective materials to be placed onto safety garments that are worn by workers near vehicular traffic. |  <br>  |
| **Objective 13** | **List at least 6 agencies, other than the fire service, that may have official duties at a roadway incident scene.**<br>A. Emergency medical services<br>B. Local, county, and/or state law enforcement agencies<br>C. Local, county, and/or state highway or transportation officials<br>D. Towing and recovery operators<br>E. Hazardous materials clean-up organizations<br>F. Public utility companies<br>G. Medical examiners<br>H. Animal control agencies |  |

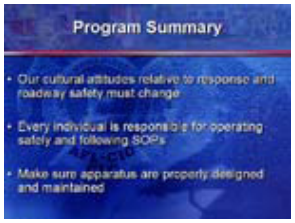
| Objective | Outline | Visuals |
|---|---|---|
| **Objective 14** | **Describe how the various agencies that respond to roadway incidents can work together effectively.**<br>A. It is best to preplan roadway incidents and establish SOPs that all responders can follow.<br>1. This leads to predictable actions on the incident scene.<br>2. Representatives of all roadway incident response agencies in a given jurisdiction must form coalitions for the purpose of combined planning and training for roadway operations.<br>B. Failure to preplan can result in destructive disputes.<br>1. Phoenix, Arizona (Local 493) Engine 41 responds to single vehicle injury crash on freeway on November 29, 2004.<br>2. Vehicle is on right shoulder, against retaining wall.<br>3. Department of Public Safety (state highway patrol trooper) officer directs apparatus to park on shoulder.<br>4. Apparatus is angled to block shoulder and outside lane so patients can safely be removed on backboards.<br>5. DPS officer orders PFD Captain to move apparatus to shoulder.<br>6. Captain refuses until the incident is stabilized and is arrested by the DPS officer.<br>7. After the Engineer refuses to move the apparatus, the DPS officer gets in and moves it himself.<br>8. Captain is released after senior PFD and DPS officials arrive and confer.<br>9. Meeting is later held to resolve issues.<br>B. Must identify resources other agencies can bring to an incident.<br>1. In many cases fire and law enforcement officials are unaware of the resources that highway department officials can bring to an incident.<br>2. Includes things such as initial control devices, signage, barrier trucks, trained flaggers, and personnel who can assist with developing alternative traffic patterns for motorists in the incident area.<br>3. Allows fire and law enforcement officials to focus on handling the incident itself.<br>C. Some highway departments located in metropolitan jurisdictions have patrol and response units that are dedicated solely to watching for incipient roadway incidents and taking action to improve the safety of the scene and keep traffic flowing efficiently.<br>1. Can also be dispatched to reported fire and collisions on the roadway to assist emergency personnel with traffic control duties.<br>2. Manned by trained responders.<br>3. Carry a variety of initial control devices, lights, barriers, and signage. |  <br>  <br>  <br>  <br>  |

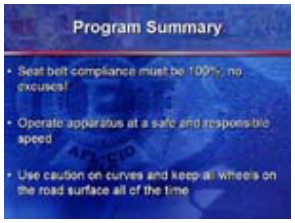
D. If it appears that the incident will be large in magnitude or will extend over a significant period of time, these initial response units will request a larger highway department response.
   1. This may then include the response of barrier trucks, more signage, and electronic message boards.
   2. All of these resources dramatically improve the safety of responders on the incident scene and minimize the impact on the motoring public in the vicinity of the incident.

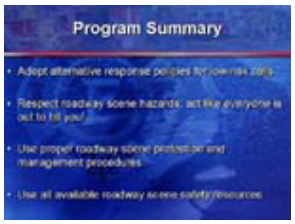

## Course Summary

**Instructor Note:** At the end of the course, use the following points to bring home the main message of the class to your students. These should be the take home messages.

1. Our cultural attitudes relative to response and roadway safety must change
2. Every individual is responsible for operating safely and following SOPs.
3. Make sure apparatus are properly designed and maintained.
4. Seat belt compliance must be 100%; no excuses!
5. Operate apparatus at a safe and responsible speed
6. Use caution on curves and keep all wheels on the road surface all of the time
7. Adopt alternative response policies for low-risk calls
8. Respect roadway scene hazards; act like everyone is out to hit you!
9. Use proper roadway scene protection and management procedures




**Instructor Note:** This is final slide, again note that the program was developed by the IAFF in partnership with the United States Fire Administration.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