NFPA 1451
Standard for a Fire Service Vehicle Operations Training Program

1997 Edition

National Fire Protection Association, 1 Batterymarch Park, PO Box 9101, Quincy, MA 02269-9101
An International Codes and Standards Organization

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Standard for a

Fire Service Vehicle Operations Training Program

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This edition of NFPA 1451, *Standard for a Fire Service Vehicle Operations Training Program*, was prepared by the Technical Committee on Fire Service Training and acted on by the National Fire Protection Association, Inc., at its Fall Meeting held November 18–20, 1996, in Nashville, TN. It was issued by the Standards Council on January 17, 1997, with an effective date of February 7, 1997, and supersedes all previous editions.

This edition of NFPA 1451 was approved as an American National Standard on February 7, 1997.

Origin and Development of NFPA 1451

In response to a request by the National Transportation Safety Board (NTSB) in 1991, the Technical Committee on Fire Service Training started work on a new standard for a training program for fire service vehicle operations. The NTSB specifically requested NFPA to "... emphasize that the safe arrival of the apparatus at the scene of the emergency is the first priority."

The committee also wanted to produce an NFPA standard to meet the intent of NFPA 1500, 4-2.1, "Fire department vehicles shall be operated only by members who have successfully completed an approved driver training program...." The *NFPA Journal* in its article, "1995 Fire Fighter Fatalities," reported that "...23.9 percent of those who died last year, died in motor vehicle accidents."

The committee's intent was to create a document outlining a training program that produces drivers who are able to prevent vehicle accidents.

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NOTE: Membership on a committee shall not in and of itself constitute an endorsement of the Association or any document developed by the committee on which the member serves.

Committee Scope: This Committee shall have primary responsibility for documents on all fire service training techniques, operations, and procedures to develop maximum efficiency and proper utilization of available personnel. Such activities may include training guides for fire prevention, fire suppression, and other missions for which the fire service has responsibility.

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NOTICE: An asterisk (*) following the number or letter designating a paragraph indicates that explanatory material on the paragraph can be found in Appendix A.

Information on referenced publications can be found in Chapter 9 and Appendix B.

Chapter 1 Introduction

1-1 Scope.

1-1.1 This standard contains the minimum requirements for a fire service vehicle operations training program.

1-1.2 This standard outlines the development of a written training program including the organizational procedures for training, vehicle maintenance, and identifying equipment deficiencies and for design, financing, and other areas. The knowledge and skills required of safety, training, maintenance, and administrative officers charged with developing and implementing the operations training program are also outlined within this standard.

1-1.3 These requirements shall apply to organizations providing fire suppression, fire and rescue training, and other emergency services, including public and private fire departments and emergency medical services.

1-1.4 This document shall not apply to aircraft or watercraft.

1-2 Purpose.

1-2.1 The purpose of this standard shall be to specify the minimum requirements for a fire service vehicle operations training program, including safety procedures for those members that drive or occupy fire service vehicles.

1-2.2* The achievement of the objectives of this performance standard is intended to help prevent accidents, injuries, and fatalities involving fire service vehicles. Compliance with this standard can also help to reduce the cost of replacement, repairs, and out-of-service time of vehicles.

1-2.3 Nothing herein is intended to restrict any jurisdiction from exceeding any of the minimum requirements of this standard.

1-3 Definitions.

Aerial Apparatus. A fire apparatus with a permanently mounted, power-operated elevating device, including aerial ladders, aerial ladder platforms, telescoping aerial platforms, articulating aerial platforms, as well as elevating water delivery systems.

Approved.* Acceptable to the authority having jurisdiction.

Authority Having Jurisdiction.* The organization, office, or individual responsible for approving equipment, an installation, or a procedure.

Fire Apparatus. A fire department emergency vehicle used for rescue, fire suppression, or other specialized function.

Fire Apparatus Driver/Operator. A fire department member who is authorized by the authority having jurisdiction to drive, operate, or both drive and operate fire department vehicles.

Fire Department. An organization providing rescue, fire suppression, and related activities. The term "fire department" shall include any public, governmental, private, or industrial organization engaging in such activities.

Fire Service Vehicle. Any vehicle operated by a fire department.

Hazard. The potential for harm or damage to people, property, or the environment. Hazards include the characteristics of facilities, equipment systems, property, hardware, or other objects and the actions and inactions of people who create such hazards.

Instructor. An individual deemed qualified by the authority having jurisdiction to deliver training in the operation of fire apparatus used in that jurisdiction.

Member. A person involved in performing the duties and responsibilities of a fire department under the auspices of that organization. A fire department member can be a full-time or part-time employee or a paid or unpaid volunteer, can occupy any position or rank within the fire department, and might or might not engage in emergency operations.

Member Assistance Program. A generic term used to describe the various methods used in the fire department for the control of alcohol and other substance abuse, stress, and personal problems that adversely affect member performance.

Qualified Person. A person who by possession of a recognized degree, certificate, professional standing, or skill, and who by knowledge, training, and experience, has demonstrated the ability to deal with problems associated with the subject matter, the work, or the project.

Risk. A measure of the probability and severity of adverse effects. These adverse effects result from exposure to a hazard.

Shall. Indicates a mandatory requirement.

Should. Indicates a recommendation or that which is advised but not required.

Chapter 2 General Rules and Administrative Considerations

2-1 General.

2-1.1 This standard shall apply to any fire service vehicle used by any member of the fire department.

2-1.2 All fire service vehicles shall meet the minimum safety standards outlined in NFPA 11C, *Standard for Mobile Foam Apparatus,* NFPA 414, *Standard for Aircraft Rescue and Fire Fighting Vehicles,* and NFPA 1901, *Standard for Automotive Fire Apparatus,* for fire apparatus; U.S. General Service Administration KKK-A-1822-D, "Star of Life Ambulance Specifications," for ambulance specifications; and DOT regulations as applicable on the date of construction.

2-1.3 It is the intent of this standard to meet all requirements of NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program,* regarding the training and education of fire department drivers and the operation of fire department vehicles.

2-1.4 It is the intent of this standard to meet all of the applicable requirements of NFPA 1002, *Standard for Fire Department Vehicle Driver/Operator Professional Qualifications,* and NFPA 1003, *Standard for Airport Fire Fighter Professional Qualifications,* regarding the training and education of fire apparatus drivers/operators.

2-1.5* The fire department apparatus driver/operator shall be subject to periodic medical evaluations, as required by NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program,* to determine whether the driver/operator is medically fit to perform the duties of an operator of fire department vehicles.

2-1.6 The fire department shall institute a program of post-accident drug and alcohol testing for the drivers of vehicles involved in accidents.

2-2 Operations Training Program.

2-2.1* The fire department shall adopt an official written risk management plan dealing with fire service vehicles.

2-2.2 The fire service vehicle risk management plan shall cover administration, facilities, training, vehicle operations, protective clothing and equipment, operations at emergency incidents, operations at nonemergency incidents, and other related activities.

2-2.3* The risk management plan shall include at least the following components:

(a) *Risk Identification.* Potential problems

(b) *Risk Evaluation.* Likelihood of the occurrence of a given problem and severity of its consequences

(c) *Risk Control Techniques.* Solutions for the elimination or mitigation of potential problems and the implementation of the best solution

(d) **Risk Management Monitoring.* Evaluation of the effectiveness of risk control techniques.

2-2.4 The fire department shall incorporate the provisions of this standard into the vehicle operations training program.

2-2.5 The fire department shall evaluate the effectiveness of its vehicle operations training program at least once every 3 years. An audit report of the findings shall be submitted to the fire chief and to the members of the occupational safety and health committee.

2-2.6* The operations training program shall address all types of fire service vehicles from a broad perspective, including risk determination, design, training, maintenance, and record-keeping.

2-3 Coordinated Administrative Policies.

2-3.1 The fire department shall establish and enforce rules, regulations, and standard operating procedures to reach the objectives of this standard.

2-3.2* The fire department shall establish written policies for variations from standard operations.

2-3.3 The fire department shall establish written standard operating procedures for safely driving, riding within, and operating fire department vehicles during an emergency response.

Such procedures for emergency response shall emphasize the safe arrival of fire department vehicles and occupants at the emergency scene as the first priority.

2-3.4 The fire department shall establish written standard operating procedures for safely driving and operating fire department vehicles during a nonemergency response.

2-3.5 Fire department members shall be trained to operate specific vehicles or classes of vehicles before being authorized to drive or operate such vehicles. Members shall not be expected to or permitted to drive or operate any vehicles for which they have not received training. Fire department members shall be reauthorized annually for all vehicles they are expected to operate.

2-3.6* The authority having jurisdiction shall ensure that all vehicle drivers/operators possess a valid and appropriate vehicle operator's license as required by the particular state.

Chapter 3 Training and Education

3-1 General.

3-1.1 The fire department shall establish and maintain a driver training and education program with the goal of preventing vehicular accidents, deaths, and injuries to members, employees, and the public.

3-1.2 The fire department shall provide, to all fire department members, driver training and education that are commensurate with the duties and functions members are expected to perform in order to ensure that they are able to perform their assigned duties in a manner that does not pose a hazard to themselves, other members, or the general public.

3-1.3 Members shall be provided with driver training and education appropriate for their duties and responsibilities before being permitted to operate fire department vehicles or apparatus.

3-2 Training Frequency.

3-2.1 Driver training shall be provided for all members as often as necessary to meet the applicable requirements of this chapter, but not less than twice each year.

3-2.2 Whenever changes in procedures or technology are introduced in the work environment, appropriate training and education shall be provided for all affected members.

3-2.3 Whenever new or unfamiliar vehicles are placed into service, appropriate training and education shall be provided for all affected members. The training shall identify vehicle limitations, manufacturers' operating recommendations, and any differences between new vehicles and vehicles previously operated by the affected members.

3-3 Basic Training and Education Requirements.

3-3.1* All fire department members shall be trained in, and shall exercise the applicable principles of, defensive driving techniques under both emergency and nonemergency conditions.

3-3.2* All fire department members who drive fire service vehicles shall meet the objectives specified in Chapter 2 of NFPA 1002, *Standard for Fire Department Vehicle Driver/Operator Professional Qualifications.*

3-3.3* Fire apparatus driver/operators shall meet the requirements of the appropriate sections of NFPA 1002, *Standard for Fire Department Vehicle Driver/Operator Professional Qualifications,* Chapters 3 through 7, and NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program,* Section 4-2, prior to being assigned as a fire apparatus driver/operator.

3-3.4* Fire apparatus driver/operators shall be familiar with the requirements of the 1992 Federal Commercial Motor Vehicle Act, and its relevance to state requirements for obtaining a commercial driver's license (CDL) and the requirements of the authority having jurisdiction.

3-3.5* Fire department apparatus drivers/operators shall be trained to perform the routine tests, inspections, and servicing functions specified in Section 8-2.

3-3.6 Following nonemergency procedures, fire department members who are authorized to respond or proceed to the scene of emergencies for the purpose of official business shall be required to complete a training class deemed appropriate by the authority having jurisdiction. This class shall, at a minimum, state the department's procedures, limits, and applicable local, state, and federal regulations regarding nonemergency response to incidents.

3-3.7* The fire department driver training program shall include information on the potential hazards of off-road driving and shall develop written standard operating procedures listing conditions that justify driving on other than paved or hard surface roads.

3-3.8 Fire departments shall train operators for inclement weather driving conditions and the proper handling of apparatus, particularly where auxiliary braking devices are to be used.

3-3.9 Where applicable, the fire department driver training program shall include information on the potential hazards of retarders, such as engines, transmissions, driveline retarders, and ABS brakes, and shall develop written standard operating procedures pertaining to the use of such devices.

3-3.10* The training program shall include a review and critique of fire service vehicle accident scenarios, both local and national, to serve as an objective learning experience.

3-4 Instructor Qualifications.

3-4.1* The authority having jurisdiction shall be responsible for ensuring that only qualified persons are assigned as instructors in the driver training program.

3-4.2* Fire department training instructors shall, at a minimum, meet the qualifications for Instructor I as specified in NFPA 1041, *Standard for Fire Service Instructor Professional Qualifications.*

3-4.3 Any driving instructor who loses their driver's license shall be reevaluated on their ability to continue driver training classes successfully.

3-5 Training Program Safety.

3-5.1 The fire department safety officer shall monitor the driver training program to ensure the enforcement of safe practices.

3-5.2 The fire department safety officer or designee shall review all driver training activities, including the lesson plan and field training area, prior to the exercise.

3-5.3 The fire department safety officer or designee shall monitor the use of all safety equipment during training exercises.

3-5.4 The fire department safety officer or designee shall notify the lead instructor of any situations that could be unsafe.

3-5.5 The fire department safety officer or designee shall have the authority to stop operations immediately where an event or condition poses an imminent threat of accident or injury.

3-5.6 All field exercises shall be conducted under the supervision of a qualified driving instructor meeting the requirements set forth in Section 3-4.

3-5.7* The field exercise training area shall be designed for the maximum safety of all participating personnel, apparatus, and bystanders.

3-5.7.1 Safety procedures shall be established to address the following:

(a) The segregation of apparatus on the training course during multiple vehicle use

(b) Safe backing practices and standard hand signals

(c) The proper control of personnel and apparatus in the driver training area

(d) The proper number of supervisory personnel present during training and testing activities

(e) Pre-trip safety inspections prior to moving vehicles

3-5.7.2 Vehicles not participating in the training session shall be restricted from the training area.

3-5.7.3 All field exercises shall be conducted in an area that is secure. Only those personnel involved in the exercise shall be permitted in the field exercise area. All other participants and observers shall be restricted to a designated safe area.

3-6* Training Records. Individual driver training records that indicate dates, subjects covered, satisfactory completion, and any certificates achieved shall be maintained.

Chapter 4 Laws and Liabilities

4-1 General.

4-1.1* Fire department vehicle drivers/operators shall have a thorough knowledge of applicable federal, state, provincial, and local regulations governing the operation of fire service vehicles.

4-1.2* Fire department vehicle drivers/operators shall become familiar with all applicable DOT regulations.

4-1.3* While certain state, provincial, and local laws governing the response of emergency vehicles shall be permitted to be waived, the fire department shall maintain a written policy informing all fire department vehicle drivers/operators of the permitted limits.

4-1.4 Members who are under the influence of alcohol or drugs shall not drive or operate fire department vehicles under any circumstances.

4-2 Financial Protection.

4-2.1* The authority having jurisdiction shall have in place sufficient financial protection to ensure against potential losses from accidents that can occur during training or actual operations, or both.

4-2.2 All fire service vehicle drivers/operators shall be informed in writing of the conditions and limitations of their personal and civil liability and to what degree the authority having jurisdiction extends protection for personal liability for accidents involving fire service vehicles.

4-3 Member Assistance Program. A member assistance program shall be available to render assistance and treatment to all fire department vehicle drivers/operators as required in NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program.*

Chapter 5 Emergency Response

5-1 General.

5-1.1* The authority having jurisdiction shall have written policies governing speed and the limitations to be observed during inclement weather and various road and traffic conditions. At no time should driving regulations be less restrictive than state motor vehicle laws.

5-1.2* Drivers/operators of fire department vehicles shall bring the vehicle to a complete stop and shall not proceed until it is confirmed that it is safe to do so for any of the following situations:

(a) Any "stop" signal (i.e., sign, light, or traffic officer)

(b) Blind intersections

(c) Intersections where all lanes of traffic cannot be seen by the operator

(d) Where encountering a stopped school bus with flashing warning lights

5-1.3* Responding emergency vehicles shall stop at all unguarded railroad crossings to ensure that a safe crossing can be made. The driver shall obey all railroad crossing signals even when responding to emergencies. Fire apparatus shall not be driven around railroad crossing gates.

5-1.4* The driver/operator shall maintain an operating space in front of the vehicle that is at least equal to the minimum travel distance necessary to stop the vehicle without contacting another object. Fire department vehicles and apparatus following each other in queue shall maintain an adequate distance to avoid rear-end collisions.

5-1.5* Overtaking and passing other vehicles during emergency response shall be accomplished with extreme caution.

5-1.6 While enroute to move-ups or to fill an empty station, apparatus shall be operated in a nonemergency mode, and the driver/operator shall obey all traffic laws.

5-2 Emergency Response Routes.

5-2.1* The authority having jurisdiction shall establish emergency response routes to minimize travel times, optimize response safety, and minimize the chances of emergency vehicles meeting at traffic intersections.

5-2.2 When a responding unit is forced to deviate from a prescribed emergency response route, the operator shall communicate this information so other responding vehicles are aware of the operator's new location and intended route of travel.

Chapter 6 Accident and Injury Prevention

6-1 General.

6-1.1 Unsafe conditions shall be corrected immediately by the identifying personnel or shall be reported immediately to personnel with the capability and responsibility of correcting or assessing the condition. The department shall have in place a procedure for implementing the corrective action. Documentation shall be established to record the following:

(a) The date and time that the risk is discovered

(b) A brief description of the risk found

(c) Any action taken at the time the risk was discovered

(d) The date and time that the corrective action was taken

Copies of all risk-related correspondence and documentation shall be forwarded to the department's safety officer.

6-1.2* Whenever possible, fire service vehicles shall not be operated in reverse.

6-1.3 The fire department shall develop written standard operating procedures requiring drivers/operators to discontinue the use of manual brake limiting valves, frequently labeled "wet/dry road switch," and requiring that the valve/switch remain in the "dry road" position, where provided on fire department vehicles.

6-1.4 Where members are operating at an emergency incident that places them in potential conflict with motor vehicle traffic, they shall wear personal protective equipment as outlined in NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program,* 6-4.7.

6-1.4.1 Fire department apparatus shall be utilized as a shield from oncoming traffic wherever possible.

6-1.4.2 Where acting as a shield, fire department apparatus warning lights shall remain on, and fluorescent and retroreflective warning devices such as traffic cones, illuminated warning devices such as highway flares, or other appropriate warning devices shall be used to warn oncoming traffic of the emergency operations and the hazards to members operating at the incident.

6-1.5* Helmets and eye protection shall be provided for the use of members riding in cabs or tiller seats that are not enclosed on at least three sides and at the top.

6-1.6 Hose loading procedures shall be specified in written standard operating procedures that include at least these safety conditions. All members involved in the hose loading procedures shall have been trained in these procedures. Hose loading operations shall be permitted to be performed on moving fire apparatus only where all of the following conditions are met:

(a) There shall be a member, other than those members loading hose, assigned as a safety observer. The safety observer shall have an unobstructed view of the hose loading operation and shall be in visual and voice contact with the apparatus driver/operator.

(b) Non-fire department vehicular traffic shall be excluded from the area or shall be under the control of authorized traffic control persons.

(c) The fire apparatus shall be driven only in a forward direction at a speed of 5 mph (8 kph) or less.

(d) No member shall be allowed to stand on the tailstep, sidesteps, running boards, or any other location on the apparatus while the apparatus is in motion.

(e) Members shall be permitted to be in the hose bed but shall not be permitted to stand while the apparatus is in motion.

(f) Prior to the beginning of each hose loading operation, the situation shall be evaluated to ensure compliance with all provisions of the standard operating procedure. Where compliance with the standard operating procedure is not possible, or where there is any question as to the safety of the operation for the specific situation, the hose shall not be loaded onto the moving fire apparatus.

6-1.7* Hearing protection shall be utilized wherever noise levels exceed those specified in NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program.*

6-2 Fire Service Vehicle Drivers/Operators' Responsibility.

6-2.1 Fire service vehicles shall be operated only by members who have successfully completed an approved driver training program or by student drivers who are under the direct supervision of a qualified driver.

6-2.2* Drivers/operators of fire service vehicles shall be directly responsible for the safe and prudent operation of the vehicle under all conditions. Where the driver/operator is under the direct supervision of an officer, that officer shall assume responsibility for the actions of the driver/operator.

6-2.3 During nonemergency travel, drivers/operators of fire service vehicles shall obey all traffic control signals and signs and all the laws and rules of the road in the jurisdiction for the operation of motor vehicles.

6-2.4* During nonemergency travel, emergency warning lights shall not be used.

6-2.5* All fire service vehicle drivers/operators shall adhere to fire department rules, regulations, orders, and standard operating procedures appropriate to the authority having jurisdiction, even where operating in a jurisdiction other than their own.

6-2.6 Drivers/operators shall not move fire department vehicles until all persons on the vehicle are seated and secured with seat belts in approved riding positions, other than as specifically allowed in 6-3.3.

6-3 Responsibility of Persons Riding in or on Fire Service Vehicles.

6-3.1* All persons riding in or on fire department vehicles or apparatus shall be seated in approved riding positions and shall be secured to the vehicle by seat belts whenever the vehicle is in motion. Riding on tail steps, sidesteps, running boards, or in any other exposed position shall be specifically prohibited. Standing while the vehicle is in motion shall be specifically prohibited.

6-3.2* The number of members riding on a piece of apparatus shall be limited by the number of seats and seat belts that are provided in approved locations.

6-3.3* Members actively performing necessary emergency medical care while the vehicle is in motion shall be secured to the vehicle by a seat belt, or by a safety harness designed for occupant restraint, to the extent consistent with the efficient provision of such emergency medical care. All other persons in the vehicle shall be seated and belted in approved riding positions while the vehicle is in motion.

6-3.4 Members riding in fire department vehicles shall remain seated and secured until the vehicle comes to a complete stop.

6-3.5 While in motion, the donning or doffing of equipment and personal protective clothing that requires removal of any safety restraining belt or other device shall be prohibited.

Chapter 7 Accidents and Accident Review

7-1 General.

7-1.1 The authority having jurisdiction shall be responsible for developing and implementing an accident investigation procedure.

7-1.2* All accidents, injuries, fatalities, and violations of rules, regulations, laws, and orders involving fire service vehicles shall be investigated, the root causes shall be determined, and full documentation shall be provided.

7-1.3 The authority having jurisdiction shall take whatever appropriate corrective action is necessary to avoid repetitive occurrences of incidents identified in 7-1.2.

7-1.4* The training program shall include a review and critique of accident scenarios, both local and national, to serve as an objective learning experience.

7-2 Accident and Injury Reports and Records.

7-2.1 The authority having jurisdiction shall establish a data collection system and shall maintain permanent records of all on-duty accidents and injuries involving fire service vehicles in accordance with NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program.* The safety officer shall manage the collection and analysis of this information as specified in NFPA 1521, *Standard for Fire Department Safety Officer.*

7-2.2* The data collection system also shall maintain individual employee records of all on-duty accidents and injuries involving motor vehicles, service vehicles, and fire apparatus. Such records shall include, but shall not be limited to:

(a) On-duty motor vehicle accident history

(b) Preventable vs. nonpreventable accidents

(c) Remedial training recommended/received as a result of previous accidents

(d) Safety/accident review committee recommendations

(e) All investigative/review committee reports of accidents

(f) Transcripts of state driver's license records

7-2.3 Reports shall be issued to the fire chief on a recurring basis to summarize the status, disposition, and subsequent corrective actions relative to on-duty accidents and injuries involving fire department owned or leased vehicles, fire apparatus or heavy equipment, and personal vehicles that are used to transport members.

7-2.4 Records shall be maintained on all accident and injury prevention recommendations made and actions taken to correct unsafe conditions or practices involving the usage or operation of fire department vehicles or apparatus as specified in NFPA 1521, *Standard for Fire Department Safety Officer.*

Chapter 8 Vehicle and Apparatus Care

8-1 Fire Department and Aircraft Rescue/Fire-Fighting Vehicles and Apparatus.

8-1.1 The fire department shall consider the safety and health of vehicle occupants as primary concerns in the specification, design, construction, acquisition, operation, maintenance, inspection, and repair of all fire department vehicles.

8-1.2 All new fire apparatus shall be specified and ordered in accordance with the appropriate fire apparatus standards specified in Section 2-1.

8-1.3 Where tools, equipment, or SCBA are stored within enclosed seating areas of fire department vehicles, such items shall be secured by either a positive mechanical means that holds the item in its stowed position or in a compartment with a positive latching door. The means of holding the item in place or the compartment shall be designed to minimize injury, during travel, to persons in the enclosed area of the vehicle resulting from loose equipment that moves in the event of an accident, a rapid deceleration, or a rapid acceleration.

8-2 Inspection, Maintenance, and Repair of Vehicles.

8-2.1* A member assigned by the authority having jurisdiction shall be responsible for the readiness of the vehicle prior to operating the vehicle.

8-2.2* To identify and correct unsafe conditions, fire service apparatus shall be inspected at least weekly and within 24 hours after being used in emergency response. If repairs are required, the apparatus shall be placed out of service until repairs are completed. The apparatus shall be reinspected prior to being placed in emergency service.

8-2.3* A preventive maintenance program shall be established, and records shall be maintained as specified in Section 8-3. Maintenance, inspections, and repairs shall be performed by qualified persons in accordance with the manufacturer's instructions. Operating and maintenance instructions and manuals shall be provided and maintained for those performing routine tests, inspections, and servicing functions.

8-2.4* The authority having jurisdiction shall establish a procedure to remove unsafe vehicles from service. This procedure shall include a list of defects considered unsafe by the authority having jurisdiction and the individual with the responsibility and authority to remove a unit from service. Any fire service vehicle found to be unsafe shall be taken out of service until repaired.

8-2.5 All aerial devices shall be inspected and service tested in accordance with the applicable requirements of NFPA 1914, *Standard for Testing Fire Department Aerial Devices.*

8-3 Vehicle Records. A complete inspection, maintenance, and repair record of every vehicle used by the authority having jurisdiction shall be maintained by a responsible person or persons. This record shall include the date and description of all maintenance, repairs, and state, provincial, or local inspections performed on the vehicle.

Chapter 9 Referenced Publications

9-1 The following documents or portions thereof are referenced within this standard as mandatory requirements and shall be considered part of the requirements of this standard. The edition indicated for each referenced mandatory document is the current edition as of the date of the NFPA issuance of this standard. Some of these mandatory documents might also be referenced in this standard for specific informational purposes and, therefore, are also listed in Appendix B.

9-1.1 NFPA Publications. National Fire Protection Association, 1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269-9101.

NFPA 11C, *Standard for Mobile Foam Apparatus*, 1995 edition.

NFPA 414, *Standard for Aircraft Rescue and Fire Fighting Vehicles*, 1995 edition.

NFPA 1002, *Standard for Fire Department Vehicle Driver/Operator Professional Qualifications*, 1993 edition.

NFPA 1003, *Standard for Airport Fire Fighter Professional Qualifications*, 1994 edition.

NFPA 1041, *Standard for Fire Service Instructor Professional Qualifications*, 1996 edition.

NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*, 1992 edition.

NFPA 1521, *Standard for Fire Department Safety Officer*, 1992 edition.

NFPA 1901, *Standard for Automotive Fire Apparatus*, 1996 edition.

NFPA 1914, *Standard for Testing Fire Department Aerial Devices*, 1991 edition.

9-1.2 Other Publications.

U.S. Government Publications.

U.S. Government Printing Office, Superintendent of Documents, Washington, DC 20402.

U.S. General Service Administration, KKK-A- 1822-D, "Star of Life Ambulance Specifications," November 1994.

Title 49, *Code of Federal Regulations*, Part 383, 1992 Federal Commercial Motor Vehicle Act, Federal Highway Administration, Commercial Driver's License Standards: Requirements and Penalties, revised June 22, 1990.

Appendix A Explanatory Material

This appendix is not a part of the recommendations of this NFPA document but is included for informational purposes only.

A-1-2.2 Compliance can also reduce insurance premiums and civil liability and can enhance public relations.

A-1-3 Approved. The National Fire Protection Association does not approve, inspect, or certify any installations, procedures, equipment, or materials; nor does it approve or evaluate testing laboratories. In determining the acceptability of installations, procedures, equipment, or materials, the authority having jurisdiction may base acceptance on compliance with NFPA or other appropriate standards. In the absence of such standards, said authority may require evidence of proper installation, procedure, or use. The authority having jurisdiction may also refer to the listings or labeling practices of an organization that is concerned with product evaluations and is thus in a position to determine compliance with appropriate standards for the current production of listed items.

A-1-3 Authority Having Jurisdiction. The phrase "authority having jurisdiction" is used in NFPA documents in a broad manner, since jurisdictions and approval agencies vary, as do their responsibilities. Where public safety is primary, the authority having jurisdiction may be a federal, state, local, or other regional department or individual such as a fire chief; fire marshal; chief of a fire prevention bureau, labor department, or health department; building official; electrical inspector; or others having statutory authority. For insurance purposes, an insurance inspection department, rating bureau, or other insurance company representative may be the authority having jurisdiction. In many circumstances, the property owner or his or her designated agent assumes the role of the authority having jurisdiction; at government installations, the commanding officer or departmental official may be the authority having jurisdiction.

A-2-1.5 Although the frequency of the medical evaluation is not specified, it is recommended that the medical evaluation be made at least annually.

A-2-2.1 Section 2-2 of NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program,* requires that the fire department adopt an official written risk management plan that addresses all fire department policies and procedures, including those pertaining to vehicle operations.

A-2-2.3 Essentially, a risk management plan serves as documentation that risks have been identified and evaluated and that a reasonable control plan has been implemented and followed.

The following are some factors to consider for each step of the process:

(a) *Risk Identification.* For every aspect of the operation of the fire department, a list of potential problems should be compiled. The following are examples of sources of information that can be useful in this process:

1. A list of risks to which the members are or can be exposed

2. Records of previous accidents, illnesses, and injuries, both locally and nationally

3. Information from sources such as facility and apparatus surveys and inspections

(b) *Risk Evaluation.* Each item specified in the risk identification process should be evaluated using the following two questions. These can help to set priorities in the control plan.

1. What is the potential frequency of occurrence?

2. What is the potential severity and expense of its occurrence?

Some sources of information that can be useful include the following:

a. Safety audits and inspection reports

b. Prior accident, illness, and injury statistics

c. Application of national data to the local circumstances

d. Professional judgment in evaluating risks unique to the jurisdiction

(c) *Risk Control Techniques.* Once risks are identified and evaluated, a control for each should be implemented and documented. The two primary methods of controlling risk, in order of preference, are as follows:

1. Wherever possible, the risk or the activity that presents the risk should be totally eliminated or avoided. For example, if falling on the ice is the risk, members should not be permitted outside when icy conditions are present.

2. Where it is not possible or practical to avoid or eliminate the risk, steps should be taken to control it. For the example in A-2-2.3(c)1, some methods of control would include sand or salt procedures and the use of proper footwear.

Other methods of control to consider are the following:

a. Safety program development, adoption, and enforcement

b. Standard operating procedures development, dissemination, and enforcement

c. Training

d. Inspections

(d) *Risk Management Monitoring and Follow-Up.* As with any program, it is important to evaluate whether the plan is working. Periodic evaluations should be made and, if the program elements are not working satisfactorily, modifications should be made.

A-2-2.3(d) For further information on this topic, see NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*, 2-2.3.

A-2-2.6 Departments with unique vehicles such as, but not limited to, the following should ensure that all risks are reviewed:

(a) Amphibious	(b) Bulldozers
(c) Buses	(d) Cranes
(e) Graders	(f) Mobile water supply apparatus
(g) Off-road vehicles	(h) Tractors
(i) Tractor trailers	(j) Rescues
(k) Staff and command	(l) Utility vehicles

A-2-3.2 These variations include, but are not limited to, responding in congested areas, driving in adverse weather conditions, natural disasters, civil unrest or disorders, and other appropriate conditions.

A-2-3.6 It is recommended that all fire departments encourage all vehicle drivers/operators to obtain the appropriate CDL operator's license as required by the federal government for commercial vehicle drivers.

A-3-3.1 Defensive driving means doing all that can be done to prevent an accident from occurring. The defensive driver adjusts his or her driving to fit the weather conditions and the actions of other drivers and pedestrians. Where a dangerous situation is identified, the defensive driver takes preventive action. The defensive driver does not assume that the accident will be prevented by another driver.

Driver trainees should think about what can happen when approaching a potentially dangerous situation. For example, where children are playing by the side of the road, the defensive driver should be prepared if a child runs into the street. A ball rolling onto the roadway is often followed by a child.

It is important to see and be seen. Driver trainees should avoid driving in the blind spots of other vehicles and should scan the sides and rear of the vehicle continually to prevent tunnel vision.

The keys to defensive driving include the following:

(a) Aiming high in steering

(b) Getting the big picture

(c) Maintaining eye movement

(d) Leaving an "out"

(e) Making sure others see you

A-3-3.2 It is the committee's intent that this standard be applied to all fire service vehicles. Drivers of vehicles not specifically addressed in Chapters 3 through 7 of NFPA 1002, *Standard for Fire Department Vehicle Driver/Operator Professional Qualifications* (e.g., staff or command vehicles, rescue or utility vehicles, buses) are expected to meet the requirements of Chapter 2. Agencies operating unique or special vehicles (e.g., tractors, bulldozers, cranes, graders) should develop job performance requirements and training programs for those vehicles.

A-3-3.3 It is not the committee's intent to restrict training opportunities for fire department vehicle trainees under the provisions of this paragraph. It is, however, the committee's intent that all driver/operators who have been approved by the authority having jurisdiction comply with this requirement.

A-3-3.4 In 1986, the United States Congress passed the Commercial Motor Vehicle Safety Act. This act requires that states adopt uniform minimum licensing and testing standards for drivers of commercial vehicles. Although waivers have been granted for the operation of some emergency vehicles equipped with audible and visual signals while operated by a member of a volunteer or paid fire or rescue organization, the committee feels that those members should be knowledgeable of their state requirements.

A-3-3.5 Hazards associated with preventive maintenance procedures should be included in training sessions. Some examples of these hazards include hydrogen gas explosions and sulfuric acid burns from improperly testing or "jumping" batteries; flammability and toxicity of fumes associated with fuels; and scalding from improperly opening radiators.

A-3-3.7 Drivers who could be required to drive or operate emergency response vehicles under off-road driving conditions should be familiar with the dangers unique to these conditions.

A-3-3.10 A common training method used in the fire service is a critique of fire suppression activities. Whenever a vehicular accident occurs, the incident should be investigated thoroughly and critiqued to ensure that preventive measures are used in the future. Accident reports should be used as training tools, and care should be taken not to embarrass those involved in the accident.

A-3-4.1 While requirements and regulations can vary by jurisdiction, the following should be considered when selecting an instructor:

(a) Possession of a valid license for the type and class of vehicle

(b) Approval of the official with overall responsibility for the authority having jurisdiction's training program

(c) Prior demonstration of the ability to operate the type and class of vehicle properly and safely

(d) Selection of a professional instructor employed by a private sector driver training program

(e) Law enforcement personnel

A-3-4.2 A particular training class or session can be conducted by an individual who has special expertise or abilities in the subject area, whether or not the instructor is a member of the fire department or a qualified fire service instructor.

A-3-5.7 Field testing should be conducted in an isolated area away from public vehicular or pedestrian traffic.

The serpentine exercise can be used as practice for or in the evaluation of a driver's ability to steer the apparatus in close clearances without stopping. The exercise should be conducted with the apparatus moving first backward and then forward. The course or path of travel for this exercise can be established by placing a minimum of three markers in a line, each spaced between 30 ft and 38 ft (9 m and 12 m). The spacing of the markers should be based on the wheel base of the vehicle used. Adequate space should be provided on each side of the markers so the apparatus can move freely. The driver should drive the apparatus along the left side of the markers in a straight line and stop just beyond the last marker. The driver then should back the apparatus between the markers by passing to the left of marker No. 1, to the right of marker No. 2, and to the left of marker No. 3. At this point, the driver should stop the vehicle and then drive forward between the markers by passing to the right of marker No. 3, to the left of marker No. 2, and to the right of marker No. 1.

NOTE: For large vehicles, such as ARFF apparatus, this course might need to be modified.

A-3-6 See NFPA 1401, *Recommended Practice for Fire Service Training Reports and Records*, for further information and guidance.

A-4-1.1 Most motor vehicle laws and regulations are governed by the appropriate state or province; however, there might be certain local ordinances regarding the operation of motor vehicles with which the fire department driver should be familiar. Weight and height restrictions on certain highways, local parking plazas, bridges, and overpasses should be observed.

A-4-1.2 In addition to state and local regulations on most vehicles, the U.S. Department of Transportation establishes specifications and operating requirements by weight and application for buses, trucks, and trailers.

A-4-1.3 These waivers pertain to restrictions such as responding and returning speed limits, driving in adverse weather conditions, direction signs, and traffic signals.

A-4-2.1 The fire department should have, as a minimum, the following insurance protection:

(a) Worker's compensation/employer's liability coverage meeting the state's legal requirements

(b) Automobile liability coverage on all owned, nonowned, or hired vehicles covering both injury and property damage

(c) Commercial liability coverage for both bodily injury and property damage caused by, or arising out of, the department's operations

Such protection can be either through the purchase of traditional commercial insurance, a self-funded program, or a combination of both.

A-5-1.1 Each jurisdiction or fire department could have its own rules governing the speed of emergency vehicles when responding to emergencies. Some jurisdictions permit emergency vehicles to exceed posted speed limits, while others limit emergency vehicles to the posted speed limit. All drivers should have a thorough knowledge of the rules governing speed for emergency vehicles in their own jurisdictions and the jurisdictions of their mutual aid partners.

A-5-1.2 Accidents at intersections can contribute to both civilian and fire department personnel deaths and injuries while fire department vehicles are responding to or returning from an emergency incident. Coming to a complete stop where there are any intersection hazards and proceeding only when the driver can do so safely can reduce accidents and risk of injury or death. It is recommended that intersection control devices be installed that allow emergency vehicles to control traffic lights at intersections.

A-5-1.3 It is recommended that where railroad crossings are unguarded or where visibility is limited for any reason, including geography or weather, the fire apparatus should come to a complete stop before entering the crossing and should not proceed to cross until a crew member on foot outside the vehicle has signaled that it is safe to cross.

Where the vehicle driver is responding alone or where, due to patient care, the crew member is unable to assist, the vehicle driver should idle the engine; turn off all radios, fans, wipers, and other noise-producing equipment in the cab; lower the windows; and listen for a train's horn before entering a grade crossing.

A-5-1.4 Operating space is that area around the vehicle that enables the driver to stop or turn in order to avoid another vehicle or object. The necessary following distance varies depending on the type of pavement and whether the roadway is wet or dry; the speed of the vehicle; the condition of the braking system; and the reaction time of the driver. Rear-end collisions often occur because of inadequate operating space.

Table A-5-1.4 provides recommended following distances based on vehicle speed, driver reaction time, and vehicle weight.

Table A-5-1.4 Recommended Following Distances (ft)

Light Two-Axle Trucks

Speed		Driver Reaction Distance	Vehicle Braking Distance	Total Stopping Distance
(mi/hr)	(ft/sec)			
10	15	11	7	18
15	22	17	17	34
20	29	22	30	52
25	37	28	46	74
30	44	33	67	100
35	51	39	92	131
40	59	44	125	169
45	66	50	165	215
50	73	55	225	280
55	81	61	275	336
60	88	66	360	426

Heavy Two-Axle Trucks

Speed		Driver Reaction Distance	Vehicle Braking Distance	Total Stopping Distance
(mi/hr)	(ft/sec)			
10	15	11	10	21
15	22	17	22	39
20	29	22	40	62
25	37	28	64	92
30	44	33	92	125
35	51	39	125	164
40	59	44	165	209
45	66	50	210	260
50	73	55	255	310
55	81	61	310	371
60	88	66	370	436

Three-Axle Trucks and Combinations

Speed		Driver Reaction Distance	Vehicle Braking Distance	Total Stopping Distance
(mi/hr)	(ft/sec)			
10	15	11	13	24
15	22	17	29	46
20	29	22	50	72
25	37	28	80	108
30	44	33	115	148
35	51	39	160	199
40	59	44	205	249
45	66	50	260	310
50	73	55	320	375
55	81	61	390	451
60	88	66	465	531

This table was developed for educational rather than legal or engineering purposes.

A-5-1.5 When it is necessary to pass other vehicles, the pass should be made to the left side of the other vehicle. Passing on the right side of other vehicles should be avoided.

A-5-2.1 Emergency response routes enable all department personnel to know each other's travel patterns to emergency incidents. Predetermined routes prevent responding vehicles from unknowingly meeting at traffic intersections. It might be possible to route responding primary and secondary units to the same emergency scene without their crossing each other's travel paths. Emergency response routes that are the less congested routes to emergency scenes may be permitted to be designated.

A-6-1.2 In general, when drivers position fire apparatus, the vehicles should be positioned so that they are not required to back up. Where vehicles need to be backed up, at least one person (spotter) should be positioned at the rear of the vehicle to assist the driver. In the event an apparatus needs to be backed up without assistance, the driver should come to a complete stop, secure the apparatus, and walk completely around the unit to identify any potential obstacles or problems. All fire apparatus should be equipped with a backup alarm.

A-6-1.5 Helmets and eye protection (goggles, safety glasses, or face shields) should be worn by all members riding in positions that do not provide for the protection of an enclosed cab. Helmets are also recommended for members riding in enclosed areas where seats are not designed to provide head and neck protection in the event of a collision. Properly designed seats with head and neck protection alleviate the need for helmets and, in some cases, helmets can compromise the safety provided by the seats.

A-6-1.7 NFPA 1500, *Standard on Fire epartment Occupational Safety and Health Program,* requires that hearing protection be provided and used by all members riding on fire apparatus where subjected to a noise level in excess of 90 dBA. In order to meet this requirement, it is the responsibility of the fire department to conduct surveys and measure sound levels in each vehicle under all operating conditions. Where necessary, the fire department shall install adequate protective equipment to shield employees from overexposure.

A-6-2.2 The driver of any vehicle has a legal responsibility for its safe and prudent operation at all times. While the driver is responsible for the operation of the vehicle, the officer is responsible for the actions of the driver.

A-6-2.4 Emergency lights should be used only when responding to and operating at the scene of an emergency. Their use at other times can be confusing to other motorists and can create apathy by the public. The use of identification lights or nonemergency warning lights such as amber flashers on the rear of apparatus can be appropriate, depending on the circumstances. This standard is not intended to contradict the requirements of federal, state, or provincial laws or the provisions of NFPA 1901, *Standard for Automotive Fire Apparatus.*

A-6-2.5 As is the case with most mutual aid arrangements, the rules governing that jurisdiction designated for emergency operations and response shall be observed.

A-6-3.1 For more specific information concerning this section, the reader should refer to 4-3.1 and A-4-3.1 of NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program.*

A-6-3.2 Alternate means of transportation may be permitted to include, but should not be limited to, other fire apparatus, automobiles, or vans.

A-6-3.3 There are some instances in which members need to provide emergency medical care while the vehicle is in motion. In some situations, the provision of such care does not allow the members to remain seated and secured to the vehicle. Such situations, while they occur infrequently, might include performing chest compressions during CPR. If a vehicle accident were to occur while an unsecured member was performing necessary medical care, there could be substantial risk of injury to the member.

A-7-1.2 The responsibility for establishing and enforcing safety rules and regulations is that of the management of the fire department. Enforcement implies that appropriate action, including disciplinary measures, if necessary, is to be taken to ensure compliance. A standard approach to enforcement should address both sanctions for violations and rewards for accomplishments.

A-7-1.4 A common training method used in the fire service is a critique of fire suppression activities. Whenever a vehicular accident occurs, the incident should be investigated thoroughly and critiqued to ensure that preventive measures are used in the future. Accident reports should be used as training tools, and care should be taken not to embarrass those involved in the accident.

A-7-2.2 As part of an accident prevention program, the fire department should maintain on a permanent basis a copy of a state driver's license transcript for all fire department vehicle drivers/operators. These records should detail, at a minimum, a 3-year driving history that is updated at least annually. These records should be reviewed by the safety officer for potential safety and risk exposure as specified in 2-2.3 of NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program.*

A-8-2.1 The fire department driver/operator is not expected to be a mechanic. However, he or she is expected to perform routine maintenance such as replacing light bulbs, checking and maintaining fluid levels and tire pressures, and keeping vehicles clean. Additional items that should be checked include the following:

(a) Windshield and all windows are clean
(b) Driver's seat is adjusted properly
(c) Mirrors are adjusted properly
(d) Seat belts are easily accessed
(e) Lights and warning devices are in working order
(f) All compartments and vehicle doors are closed

A-8-2.2 The purpose of the requirements in 8-2.2 is to ensure that all vehicles are inspected on a regular basis and checked for the proper operation of all safety features. This inspection should include tires, brakes, warning lights and devices, headlights and clearance lights, windshield wipers, mirrors, and seat belts. Apparatus should be started and the operations of pumps and other equipment should be verified. Fluid levels should be checked regularly.

Where apparatus is in regular daily use, these checks should be performed daily. Apparatus stored in unattended stations that might not be used for extended periods should be checked weekly. Any time such a vehicle is used, it should be checked before being placed back in service. The 24-hour ref-