NFPA 1451

Standard for a Fire Service Vehicle Operations Training Program

2007 Edition



NFPA, 1 Batterymarch Park, Quincy, MA 02169-7471
An International Codes and Standards Organization

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NFPA 1451

Standard for a

Fire Service Vehicle Operations Training Program

2007 Edition

This edition of NFPA 1451, *Standard for a Fire Service Vehicle Operations Training Program,* was prepared by the Technical Committee on Fire Service Training. It was issued by the Standards Council on December 1, 2006, with an effective date of December 20, 2006, and supersedes all previous editions.

This edition of NFPA 1451 was approved as an American National Standard on December 20, 2006.

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 ". . .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, *Standard on Fire Department Occupational and Health Program*, where it states in the chapter on Vehicles, Drivers, and Equipment: "Fire department vehicles shall be operated only by members who have successfully completed an approved driver training program."

An *NFPA Journal* article, "1995 Fire Fighter Fatalities," added further importance to the subject when it 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.

The first edition of NFPA 1451 was issued in 1997. Subsequently, the committee appointed a task group to review the 1997 edition content and make recommendations to the committee concerning its functionality. As a result of that review, a general updating was suggested.

In the 2002 edition, some of the general updating included revisions representing an evolution of knowledge about vehicle operations. The application of the standard was expanded to include private industrial and contract fire departments and industrial fire brigades that respond off site. New terminology included the use of the word "crash" to replace the word "accident." The term "accident" was perceived by some to mean an unavoidable or chance occurrence beyond the influence of training. Crashes can indeed be avoided and prevented by training.

The numbering of the chapters and the paragraphs of the 2002 edition differed from the previous edition as a result of changes associated with the 2000 edition of the *Manual of Style for NFPA Technical Committee Documents*. The 2007 edition features mainly editorial changes.

In Memoriam, September 11, 2001

We pay tribute to the 343 members of FDNY who gave their lives to save civilian victims on September 11, 2001, at the World Trade Center. They are true American heroes in death, but they were also American heroes in life. We will keep them in our memory and in our hearts. They are the embodiment of courage, bravery, and dedication. May they rest in peace.

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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 all fire service training techniques, operations, and procedures to develop maximum efficiency and proper utilization of available personnel. Such activities can include training guides for fire prevention, fire suppression, and other missions for which the fire service has responsibility.

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Standard for a

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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 Annex A.

A reference in brackets [ ] following a section or paragraph indicates material that has been extracted from another NFPA document. As an aid to the user, the complete title and edition of the source documents for extracts in mandatory sections of the document are given in Chapter 2 and those for extracts in informational sections are given in Annex B. Editorial changes to extracted material consist of revising references to an appropriate division in this document or the inclusion of the document number with the division number when the reference is to the original document. Requests for interpretations or revisions of extracted text shall be sent to the technical committee responsible for the source document.

Information on referenced publications can be found in Chapter 2 and Annex B.

Chapter 1 Administration

1.1 Scope.

1.1.1 This standard shall contain the minimum requirements for a fire service vehicle operations training program.

1.1.2 This standard shall outline the development of a written fire service vehicle training program, which includes the organizational procedures for training personnel, maintaining vehicles, and identifying equipment deficiencies; design; financing; and other areas.

1.1.3 The knowledge and skills required of safety, training, maintenance, and administrative officers charged with developing and implementing the fire service vehicle operations training program shall also be outlined within this standard.

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 procedures for those members that drive or occupy fire service vehicles, respond in private vehicles or unconventional means of transportation, and provide traffic control at the scene of an emergency.

1.2.2* The objective of this standard shall be to help prevent crashes, injuries, and fatalities involving fire service vehicles.

1.3 Application.

1.3.1 These requirements shall apply to organizations providing fire suppression, fire and rescue training, and other emergency services, including public fire brigades and departments, private industrial and contract fire departments, emergency medical vehicles, and industrial fire brigades that respond off site.

1.3.2 This standard shall apply to any fire service vehicle used by any member of the fire department or industrial fire brigade when responding off site.

1.3.3 This document shall not apply to aircraft or watercraft.

1.4 Equivalency. Nothing in this standard is intended to prevent the use of systems, methods, or devices of equivalent or superior quality, strength, fire resistance, effectiveness, durability, and safety over those prescribed by this standard.

1.4.1 Technical documentation shall be submitted to the authority having jurisdiction to demonstrate equivalency.

1.4.2 The system, method, or device shall be approved for the intended purpose by the authority having jurisdiction.

Chapter 2 Referenced Publications

2.1 General. The documents or portions thereof listed in this chapter are referenced within this standard and shall be considered part of the requirements of this document.

2.2 NFPA Publications. National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.

NFPA 414, *Standard for Aircraft Rescue and Fire-Fighting Vehicles,* 2007 edition.

NFPA 1002, *Standard for Fire Apparatus Driver/Operator Professional Qualifications,* 2003 edition.

NFPA 1003, *Standard for Airport Fire Fighter Professional Qualifications,* 2005 edition.

NFPA 1041, *Standard for Fire Service Instructor Professional Qualifications,* 2007 edition.

NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program,* 2007 edition.

NFPA 1521, *Standard for Fire Department Safety Officer,* 2002 edition.

NFPA 1901, *Standard for Automotive Fire Apparatus,* 2003 edition.

NFPA 1914, *Standard for Testing Fire Department Aerial Devices,* 2002 edition.

2.3 Other Publications.

2.3.1 U.S. Government Publications. U.S. Government Printing Office, Washington, DC 20402.

Title 49, Code of Federal Regulations, Part 383, "Commercial Motor Vehicle Safety Act," 2003.

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

2.3.2 Other Publications. *Merriam-Webster's Collegiate Dictionary,* 11th edition, Merriam-Webster, Inc., Springfield, MA, 2003.

2.4 References for Extracts in Mandatory Sections.

NFPA 600, *Standard on Industrial Fire Brigades,* 2005 edition.

NFPA 921, *Guide for Fire and Explosion Investigations,* 2004 edition.

NFPA 1002, *Standard for Fire Apparatus Driver/Operator Professional Qualifications,* 2003 edition.

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NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program,* 2007 edition.

NFPA 1901, *Standard for Automotive Fire Apparatus,* 2003 edition.

Chapter 3 Definitions

3.1 General. The definitions contained in this chapter shall apply to the terms used in this standard. Where terms are not defined in this chapter or within another chapter, they shall be defined using their ordinarily accepted meanings within the context in which they are used. *Merriam-Webster's Collegiate Dictionary,* 11th edition, shall be the source for the ordinarily accepted meaning.

3.2 NFPA Official Definitions.

3.2.1* Approved. Acceptable to the authority having jurisdiction.

3.2.2* Authority Having Jurisdiction (AHJ). An organization, office, or individual responsible for enforcing the requirements of a code or standard, or for approving equipment, materials, an installation, or a procedure.

3.2.3 Shall. Indicates a mandatory requirement.

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

3.2.5 Standard. A document, the main text of which contains only mandatory provisions using the word "shall" to indicate requirements and which is in a form generally suitable for mandatory reference by another standard or code or for adoption into law. Nonmandatory provisions shall be located in an appendix or annex, footnote, or fine-print note and are not to be considered a part of the requirements of a standard.

3.3 General Definitions.

3.3.1 Fire Apparatus. A vehicle designed to be used under emergency conditions to transport personnel and equipment, and to support the suppression of fires and mitigation of other hazardous situations. [**1901,** 2003]

3.3.2 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.

3.3.3 Fire Department. An organization providing rescue, fire suppression, and related activities, including any public, governmental, private, industrial, or military organization engaging in this type of activity. [**1002,** 2003]

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

3.3.5* Hazard. Any arrangement of materials and heat sources that presents the potential for harm, such as personal injury or ignition of combustibles. [**921,** 2004]

3.3.6 Industrial Fire Brigade. An organized group of employees within an industrial occupancy who are knowledgeable, trained, and skilled in at least basic fire fighting operations, and whose full-time occupation might or might not be the provision of fire suppression and related activities for their employer. [**600,** 2005]

3.3.7 Instructor. An individual deemed qualified by the authority having jurisdiction to deliver training in the operation of fire service vehicles.

3.3.8* Member. A person involved in performing the duties and responsibilities of a fire department, under the auspices of the organization. [**1500,** 2007]

3.3.9 Member Assistance Program (MAP). 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. [**1500,** 2007]

3.3.10 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 related to the subject matter, the work, or the project.

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

3.3.12 Unconventional Means of Transportation. Can include, but are not limited to, bicycles, motorcycles, scooters, skateboards, and rollerblades.

Chapter 4 General Rules and Considerations

4.1 General.

4.1.1 All fire service vehicles shall meet the minimum safety standards outlined in 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 U.S. Department of Transportation (DOT) regulations as applicable on the date of construction.

4.1.2 The intent of this standard shall be 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.

4.1.3 The intent of this standard shall be to meet all of the applicable requirements of NFPA 1002, *Standard for Fire Apparatus Driver/Operator Professional Qualifications,* and NFPA 1003, *Standard for Airport Fire Fighter Professional Qualifications,* regarding the training and education of fire apparatus drivers/operators.

4.1.4* The fire 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.

4.1.5 The fire department shall institute a program of post-crash drug and alcohol testing for the drivers of vehicles involved in crashes.

4.2 Operations Training Program.

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

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

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4.2.1.2* The risk management plan shall include at least the following components:

(1)*Risk identification
(2)*Risk evaluation
(3)*Risk control techniques
(4)*Risk management monitoring

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

4.2.3 The fire department shall evaluate the effectiveness of its vehicle operations training program at least once every 3 years.

4.2.4 An audit report of the findings shall be submitted to the fire chief and to the members of the occupational safety and health committee.

4.2.5* 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.

4.3 Coordinated Administrative Policies.

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

4.3.2* The fire department shall establish written policies for variations from standard operations.

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

4.3.4 The fire department shall provide fire fighters, including junior fire fighters, with hazard awareness training that includes unique hazards that can be encountered when responding to alarms in privately owned vehicles or unconventional means of transportation.

4.3.5 The fire department shall develop, implement, and enforce a policy that requires the use of approved personal protective equipment (PPE) including helmets and appropriate clothing when using unconventional means of transportation while responding to or returning from alarms.

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

4.3.7 The fire department shall establish written standard operating procedures for driving and operating fire department vehicles during a non-emergency response.

4.3.8 The fire department shall establish written standard operating procedures for a traffic incident management system (TIMS) to enhance responder safety at roadside emergency scenes.

4.3.9 Members shall be trained to operate specific vehicles or classes of vehicles before being authorized to drive or operate such vehicles.

4.3.9.1 Members shall not be expected to or permitted to drive or operate any vehicles for which they have not received training.

4.3.9.2 Members shall be reauthorized annually for all vehicles they are expected to operate.

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

4.3.11* Drivers/operators of fire department vehicles shall be required to notify the authority having jurisdiction of any changes that can affect their driving privileges.

Chapter 5 Training and Education

5.1 General.

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

5.1.2 The fire department shall provide all members with driver training and education 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.

5.1.3 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.

5.2 Training Frequency.

5.2.1* 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.

5.2.2 Annual driver training shall include hands-on exercises, excluding virtual reality driver training simulator (DTS), using actual fire apparatus.

5.2.3 Whenever changes in driving procedures or technology are introduced in the work environment, training and education shall be provided for all affected members.

5.2.4 Whenever new or unfamiliar vehicles are placed into service, training and education relating to those vehicles shall be provided for all affected members.

5.2.5 New vehicle training shall identify vehicle limitations, manufacturers' operating recommendations, and any differences between new vehicles and vehicles previously operated by the affected members.

5.3 Basic Training and Education Requirements.

5.3.1* All members shall be trained in and shall exercise the applicable principles of defensive driving techniques under both emergency and non-emergency conditions.

5.3.2* All members who drive fire service vehicles shall meet the objectives specified in Chapter 4 of NFPA 1002, *Standard for Fire Apparatus Driver/Operator Professional Qualifications*.

5.3.3* Fire apparatus drivers/operators shall meet the requirements of Chapters 4 through 10 of NFPA 1002, *Standard for Fire Apparatus Driver/Operator Professional Qualifications*, and Section 4.2 of NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*, prior to being assigned as a fire apparatus driver/operator.

5.3.4* Fire apparatus drivers/operators shall be familiar with the requirements of 49 CFR 383, 2003 Commercial Motor Vehicle Safety Act, and its relevance to state requirements for obtaining a commercial driver's license (CDL) and to the requirements of the authority having jurisdiction.

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5.3.5* Fire department apparatus drivers/operators shall be trained to perform the routine tests, inspections, and servicing functions specified in Section 10.2.

5.3.6 Members who are authorized to respond or proceed to the scene of emergencies under non-emergency procedures, but for the purpose of official business, shall be required to complete a training class that shall, at a minimum, state the department's procedures, limits, and applicable local, state, and federal regulations regarding non-emergency response to incidents.

5.3.7* 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.

5.3.8* The fire department driver training program shall include information on the potential hazards of driving unconventional or specialized units and shall develop written standard operating procedures listing conditions that justify responding to the scene of an emergency.

5.3.9 Fire departments shall train operators for inclement weather driving conditions with emphasis on handling of apparatus, particularly where auxiliary braking devices are to be used.

5.3.10 Where applicable, the fire department driver training program shall include information on the potential hazards of retarders, such as engines, transmissions, driveline retarders, and antilock braking system (ABS) brakes, and shall develop written standard operating procedures pertaining to the use of such devices.

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

5.4 Instructor Qualifications.

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

5.4.2* 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*.

5.5 Training Program Safety.

5.5.1 The fire department safety officer shall monitor the driver training program to ensure the enforcement of departmental safety rules.

5.5.2 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.

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

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

5.5.5 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 crash or injury.

5.5.6 All field exercises shall be conducted under the supervision of a qualified driving instructor meeting the requirements set forth in Section 5.4.

5.5.7 One instructor shall be assigned to each vehicle during the field exercises.

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

5.5.8.1 Safety procedures shall be established to address the following:

(1) Segregation of apparatus on the training course during multiple vehicle use
(2) Backing practices and standard hand signals
(3) Control of personnel and apparatus in the driver training area
(4) Number of supervisory personnel present during training and testing activities
(5) Pre-trip safety inspections prior to moving vehicles

5.5.8.2 Vehicles not participating in the training session shall be restricted from the training area.

5.5.8.3 All field exercises shall be conducted in an area that is secure.

5.5.8.4 Only those personnel involved in the exercise shall be permitted in the field exercise area, and all other participants and observers shall be restricted to a designated safe area.

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

5.6.1 Individual driver training records shall include a list of vehicles that the driver is qualified to operate.

5.6.2* The individual driver's activity operating each vehicle shall be documented.

Chapter 6 Laws and Liabilities

6.1 General.

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

6.1.2* Fire department vehicle drivers/operators shall become familiar with all applicable U.S. Department of Transportation (DOT) regulations.

6.1.3* 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 or their designated representatives of the permitted limits.

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

6.2 Financial Protection.

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

6.2.2* All fire service vehicle drivers/operators or their personal representatives 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 crashes involving fire service vehicles.

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6.3 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 7 Emergency Response

7.1 General.

7.1.1* The authority having jurisdiction shall have written policies governing speed and the limitations to be observed during inclement weather and under various road and traffic conditions.

7.1.2 At no time shall driving regulations be less restrictive than state motor vehicle laws.

7.1.3* The driver/operator of a fire department vehicle encountering any of the following situations shall bring the vehicle to a complete stop and shall not proceed until it is confirmed that it is safe to do so:

(1) Any "stop" signal (i.e., sign, light, or traffic officer)
(2) Blind intersections
(3) Intersections where the operator cannot see all lanes of traffic
(4) Stopped school bus with flashing warning lights

7.1.4* Responding emergency vehicles shall stop at all unguarded railroad crossings to ensure that a safe crossing can be made.

7.1.4.1 The driver/operator shall obey all railroad crossing signals even when responding to emergencies.

7.1.4.2 Fire department vehicles and apparatus shall not be driven around railroad crossing gates.

7.1.5* The driver/operator shall maintain a distance in front of the vehicle that is at least equal to the minimum travel distance necessary to stop the vehicle without contacting another object.

7.1.6* Fire department vehicles and apparatus following each other in queue shall maintain an adequate distance to avoid rear-end collisions.

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

7.1.8 While en route to move-ups or to fill an empty station, apparatus shall be operated in a non-emergency mode, and the driver/operator shall obey all traffic laws.

7.1.9* The fire department shall identify the types of responses that will be made in a non-emergency mode.

7.2 Emergency Response Considerations.

7.2.1 The authority having jurisdiction shall establish emergency response procedures to minimize travel times, optimize response safety, and minimize the chances of emergency vehicles meeting at traffic intersections.

7.2.2 When multiple fire service vehicles are responding to an emergency incident from different locations, the vehicle operators shall coordinate their intended response routes to prevent the response vehicles from colliding at road intersections.

Chapter 8 Crash and Injury Prevention

8.1 General.

8.1.1 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.

8.1.1.1 The fire department shall have a procedure in place for implementing the corrective action.

8.1.1.2 Documentation shall be established to record the following:

(1) Date and time that the risk was discovered
(2) Brief description of the risk found
(3) Any action taken at the time the risk was discovered
(4) Date and time that the corrective action was taken

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

8.1.2* Whenever possible, fire service vehicles shall not be operated in reverse.

8.1.3 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.

8.1.4 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 8.4.25 of NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program.*

8.1.4.1 Fire service vehicles shall be utilized as a shield from oncoming traffic wherever possible.

8.1.4.2* Where a fire service vehicle acts as a shield, the fire service vehicle's warning lights shall remain on, and fluorescent and retro-reflective warning devices such as traffic cones, illuminated warning devices such as highway flares, or other warning devices shall be used to warn oncoming traffic of the emergency operations and the hazards to members operating at the incident.

8.1.5* 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.

8.1.6 No member shall be allowed to stand on the tail step, side steps, running boards, or any other location on the apparatus while the apparatus is in motion, except when loading hose provided all provisions of 8.1.7 have been met.

8.1.7 Hose-loading procedures shall be specified in written standard operating procedures that include at least the safety conditions stated in 8.1.7.1 and 8.1.7.2.

8.1.7.1 All members involved in the hose-loading procedures shall have been trained in these procedures.

8.1.7.2 Hose-loading operations shall be permitted to be performed on moving fire apparatus only where all of the conditions in 8.1.7.2.1 through 8.1.7.2.3 are met.

8.1.7.2.1 A member, other than those members loading hose, shall be assigned as a safety observer.

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8.1.7.2.2 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.

8.1.7.2.3 Vehicular traffic other than fire department vehicles shall be excluded from the area or shall be under the control of authorized traffic control persons.

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

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

8.1.7.5 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.

8.1.7.6 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.

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

8.2 Fire Service Vehicle Drivers/Operators' Responsibility.

8.2.1 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.

8.2.2* The driver/operator of a fire service vehicle shall be directly responsible for the safe and prudent operation of the vehicle under all conditions.

8.2.3* Where the driver/operator is under the direct supervision of an officer, that officer shall assume responsibility for the actions of the driver/operator.

8.2.4 During non-emergency 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.

8.2.5* During non-emergency travel, emergency warning lights shall not be used.

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

8.2.7 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 8.3.3.

8.3 Responsibility of Persons Riding in or on Fire Service Vehicles.

8.3.1* All persons riding in or on a fire service vehicle 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.

8.3.1.1* Riding on tail steps, side steps, running boards, or in any other exposed position shall be specifically prohibited.

8.3.1.2 Standing while the vehicle is in motion shall be specifically prohibited.

8.3.2 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.

8.3.3* 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 care.

8.3.4 All persons in the vehicle, other than those covered in 8.3.3, shall be seated and belted in approved riding positions while the fire service vehicle is in motion.

8.3.5 Members riding in a fire service vehicle shall remain seated and secured until the vehicle comes to a complete stop.

8.3.6 While the vehicle is in motion, the donning or doffing of equipment and personal protective clothing that requires removal of any restraining belt or other device shall be prohibited.

Chapter 9 Crash Review

9.1 General.

9.1.1 The authority having jurisdiction shall be responsible for developing and implementing a crash investigation procedure.

9.1.2* All crashes, 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.

9.1.3 The authority having jurisdiction shall take whatever corrective action is necessary to avoid repetitive occurrences of incidents identified in 9.1.2.

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

9.2 Crash and Injury Reports and Records.

9.2.1 The authority having jurisdiction shall establish a data collection system and shall maintain permanent records of all on-duty crashes and injuries involving fire service vehicles in accordance with NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program.*

9.2.2 The safety officer shall manage the collection and analysis of this information as specified in NFPA 1521, *Standard for Fire Department Safety Officer.*

9.2.3* The data collection system also shall maintain individual employee records of all on-duty crashes and injuries involving motor vehicles, service vehicles, and fire apparatus.

9.2.3.1 Individual employee records shall include, but not be limited to, the following:

(1) On-duty motor vehicle crash history
(2) Preventable versus nonpreventable crashes
(3) Remedial training recommended/received as a result of previous crashes
(4) Safety/crash review committee recommendations
(5) All investigative/review committee reports of crashes
(6) Transcripts of state driver's license records

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9.2.4 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 crashes and injuries involving vehicles owned or leased by the fire department, fire apparatus or heavy equipment, and personal vehicles that are used to transport members.

9.2.5 Records shall be maintained on all crash 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 10 Vehicle and Apparatus Care

10.1 Fire Department and Aircraft Rescue/Fire-Fighting Vehicles and Apparatus.

10.1.1 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.

10.1.2 All new fire apparatus shall be specified and ordered in accordance with the fire apparatus standards specified in Section 4.1.

10.1.3 Where tools, equipment, or self-contained breathing apparatus (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 items in stowed positions or in a compartment with a positive latching door.

10.1.4 The means of holding the items 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 a crash, a rapid deceleration, or a rapid acceleration.

10.2 Inspection, Maintenance, and Repair of Vehicles.

10.2.1* A member assigned by the authority having jurisdiction shall be responsible for the readiness of the vehicle prior to operation of the vehicle.

10.2.2* To identify and correct unsafe conditions, fire apparatus shall be inspected at least weekly and within 24 hours after being used in emergency response.

10.2.2.1 If repairs are required, the apparatus shall be placed out of service until repairs are completed.

10.2.2.2 The apparatus shall be re-inspected prior to being placed in emergency service.

10.2.3* A preventive maintenance program shall be established, and records shall be maintained as specified in Section 10.3.

10.2.3.1 Maintenance, inspections, and repairs shall be performed by qualified persons in accordance with the manufacturer's instructions.

10.2.3.2 Operating and maintenance instructions and manuals shall be provided and maintained for those performing routine tests, inspections, and servicing functions.

10.2.4 The authority having jurisdiction shall establish a procedure to remove unsafe vehicles from service.

10.2.4.1* 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.

10.2.4.2 Any fire service vehicle found to be unsafe shall be taken out of service immediately until repaired.

10.2.5 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.*

10.3 Vehicle Records.

10.3.1 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.

10.3.2 The record shall include the date and description of all maintenance, repairs, and state, provincial, or local inspections performed on the vehicle.

Annex A Explanatory Material

Annex A is not a part of the requirements of this NFPA document but is included for informational purposes only. This annex contains explanatory material, numbered to correspond with the applicable text paragraphs.

A.1.2.1 Unconventional means of transportation include bicycles, motorcycles, motor scooters, and so forth.

A.1.2.2 Compliance should help to reduce the cost of replacement, repairs, and out-of-service time of vehicles. Compliance can also reduce insurance premiums and civil liability and can enhance public relations.

A.3.2.1 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.3.2.2 Authority Having Jurisdiction (AHJ). The phrase "authority having jurisdiction," or its acronym AHJ, 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.

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A.3.3.5 Hazard. Hazards include the characteristics of facilities, equipment systems, property, hardware, or other objects and the actions and inactions of people who create such hazards.

A.3.3.8 Member. 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.[**1500,** 2007]

A.4.1.4 Although the frequency of the medical evaluation is not specified, it is recommended that the medical evaluation be made at least annually.

A.4.2.1 Section 4.2 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.4.2.1.2 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.

A.4.2.1.2(1) For every aspect of the operation of the fire department, a list of potential problems should be compiled in the identification of risks. 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 crashes, illnesses, and injuries, both locally and nationally
(3) Information from sources such as facility and apparatus surveys and inspections

A.4.2.1.2(2) Each item specified in the risk identification process should be evaluated using the following two questions, which 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 occurrence?

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

(1) Safety audits and inspection reports
(2) Prior crash, illness, and injury statistics
(3) Application of national data to the local circumstances
(4) Professional judgment in evaluating risks unique to the jurisdiction

A.4.2.1.2(3) 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.4.2.1.2(3)(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

A.4.2.1.2(4) 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.4.2.5 Departments with unique vehicles such as, but not limited to, the following should ensure that all risks are reviewed:

(1) Amphibious vehicles
(2) Bulldozers
(3) Buses
(4) Cranes
(5) Graders
(6) Mobile water supply apparatus
(7) Off-road vehicles
(8) Tractors
(9) Tractor trailers
(10) Rescues
(11) Staff and command vehicles
(12) Utility vehicles

A.4.3.2 Situations requiring such variations can include, but are not limited to, responding in congested areas, driving in adverse weather conditions, natural disasters, and civil unrest or disorders.

A.4.3.10 All fire departments are recommended to encourage all vehicle drivers/operators to obtain the appropriate CDL operator's license as required by the federal government for commercial vehicle drivers.

A.4.3.11 Such changes might include revocation or suspension of driver's license or other driving restriction, the development of a medical condition, or changes in eyesight. The authority having jurisdiction might also consider an accumulation of "points" to be sufficient to re-evaluate the driver status.

A.5.2.1 Driver training can include the use of virtual reality driver training simulators (DTS) that simulate fire department response conditions, provided the requirement of 5.2.2 is strictly enforced.

A.5.3.1 Defensive driving means doing all that can be done to prevent a crash 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 crash 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:

(1) Aiming high in steering
(2) Getting the big picture
(3) Maintaining eye movement
(4) Leaving an "out"
(5) Making sure others see you

A.5.3.2 The committee's intent is that this standard be applied to all fire service vehicles. Drivers of vehicles not specifically addressed in Chapters 5 through 10 of NFPA 1002, *Standard for Fire*

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Apparatus Driver/Operator Professional Qualifications (e.g., staff or command vehicles, rescue or utility vehicles, buses), are expected to meet the requirements of Chapter 4 of NFPA 1002. Agencies operating unique or special vehicles (e.g., tractors, bulldozers, cranes, graders) should develop job performance requirements and training programs for those vehicles.

A.5.3.3 The committee's intent is not to restrict training opportunities for fire department vehicle trainees under the provisions of this paragraph. However, the committee's intent is that all drivers/operators who have been approved by the authority having jurisdiction comply with this requirement.

A.5.3.4 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.5.3.5 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 resulting from the improper testing or "jumping" of batteries, flammability and toxicity of fumes associated with fuels, and scalding resulting from improper opening of radiators.

A.5.3.7 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 those conditions.

A.5.3.8 Examples of unconventional and specialized units could include fabricated water tankers that can or cannot have baffling, heavy-duty rescue units, towing vehicles, cranes, etc., that due to unique road-handling characteristics can warrant additional training and certification.

A.5.3.11 A common training method used in the fire service is a critique of fire suppression activities. Whenever a vehicular crash occurs, the incident should be investigated thoroughly and critiqued to ensure that preventive measures are used in the future. Crash reports should be used as training tools, and care should be taken not to embarrass those involved in the crash.

A.5.4.1 While requirements and regulations can vary by jurisdiction, the following should be considered when selecting an instructor:

(1) Possession of a valid license for the type and class of vehicle
(2) Approval of the official with overall responsibility for the authority having jurisdiction's training program
(3) Prior demonstration of the ability to operate the type and class of vehicle properly and safely
(4) Availability of a professional instructor employed by a private sector driver training program

A.5.4.2 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.5.5.8 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 9 m and 12 m (30 ft and 38 ft). 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 that for large vehicles, such as aircraft rescue and fire-fighting (ARFF) apparatus, this course could need to be modified.

A.5.6 See NFPA 1401, *Recommended Practice for Fire Service Training Reports and Records*, for further information and guidance.

A.5.6.2 A log of the driver's experience should be maintained that includes whether the activity is non-emergency, training, or emergency driving experience.

A.6.1.1 Most motor vehicle laws and regulations are governed by the appropriate state or province; however, there could 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.6.1.2 In addition to state and local regulations on most vehicles, the DOT establishes specifications and operating requirements by weight and application for buses, trucks, and trailers.

A.6.1.3 These waivers pertain to restrictions such as responding and returning speed limits, driving in adverse weather conditions, direction signs, and traffic signals.

A.6.2.1 The fire department should have, as a minimum, the following insurance protection:

(1) Worker's compensation/employer's liability coverage meeting the state's legal requirements
(2) Automobile liability coverage on all owned, non-owned, or hired vehicles covering both injury and property damage
(3) Commercial liability coverage for both bodily injury and property damage caused by or arising out of the department's operations, which can be either through the purchase of traditional commercial insurance, a self-funded program, or a combination of both

A.6.2.2 Acts of gross negligence can void any tort protection afforded by the authority having jurisdiction.

A.7.1.1 Each jurisdiction or fire department could have its own rules governing the speed of fire service vehicles when responding to emergencies. Some jurisdictions permit fire apparatus 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 fire service vehicles in their own jurisdictions and the jurisdictions of their mutual aid partners.

A.7.1.3 Crashes 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

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intersection hazards and proceeding only when the driver can do so safely can reduce crashes 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.7.1.4 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 graded crossing.

A.7.1.5 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.7.1.5(a) through Table A.7.1.5(c) were developed for educational rather than legal or engineering purposes. They provide recommended following distances based on vehicle.

A.7.1.6 A rule of thumb established by some training organizations standardizes the traveling distance for vehicles and apparatus traveling in queue as a 5-second interval for nonresponding and 8-second interval for responding apparatus and vehicles. This margin would provide adequate safe separation during speed-up and braking maneuvers.

A.7.1.7 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.7.1.9 Many fire department responses can be done in a nonemergency mode. Such responses can include the following:

(1) Lock-outs
(2) Dumpster fires (no exposures)
(3) Investigation of unknown odors
(4) Assisting police
(5) Standby for bomb scare

A.8.1.2 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.8.1.4.2 The United States Fire Administration (USFA) has initiated a partnership with the Society of Automotive Engineers (SAE) to research the effects and effective mitigation of the disorientation of motorists caused by the day and nighttime use of emergency warning lights, including the effects on normal, impaired, and drowsy drivers (also known as the "moth effect"). Part of this research involves examining collisions between fire apparatus and related emergency vehicles, as well as incidents where fire fighters have been struck and killed while operating at emergency incidents where the use of emergency lighting could have been a factor.

A.8.1.5 Helmets and eye protection (e.g., goggles, safety glasses, or face shields) should be worn by all members riding in positions that do not provide 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.8.1.8 NFPA 1500, *Standard on Fire Department 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 dB. 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 should install adequate protective equipment to shield employees from overexposure.

A.8.2.2 The driver of any vehicle has a legal responsibility for its safe and prudent operation at all times.

A.8.2.3 While the driver is responsible for the operation of the vehicle, the officer is responsible for the actions of the driver.

A.8.2.5 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 non-emergency 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.8.2.6 As is the case with most mutual aid arrangements, the rules governing that jurisdiction designated for emergency operations and response should be observed.

A.8.3.1 For more specific information concerning this subsection, the reader should refer to Section 6.3 of NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program.*

A.8.3.1.1 See 8.1.6.

A.8.3.3 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, could include performing chest compressions during CPR. If a vehicle crash were to occur while an unsecured member was performing necessary medical care, there could be substantial risk of injury to the member.

A.9.1.2 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.9.1.4 A common training method used in the fire service is a critique of fire suppression activities. Whenever a vehicular crash occurs, the incident should be investigated thoroughly and critiqued to ensure that preventive measures are used in the future. Crash reports should be used as training tools, and care should be taken not to embarrass those involved in the crash.

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Table A.7.1.5(a) Recommended Following Distances for Light Two-Axle Trucks

Speed				Driver Reaction Distance		Vehicle Braking Distance		Total Stopping Distance	
kph	mph	m/sec	ft/sec	m	ft	m	ft	m	ft
16	10	5	15	3	11	2	7	6	18
24	15	7	22	5	17	5	17	10	34
32	20	9	29	7	22	9	30	16	52
40	25	11	37	9	28	14	46	23	74
48	30	13	44	10	33	20	67	31	100
56	35	16	51	12	39	28	92	40	131
64	40	18	59	13	44	38	125	52	169
72	45	20	66	15	50	50	165	66	215
80	50	22	73	17	55	69	225	85	280
89	55	25	81	19	61	84	275	102	336
96	60	27	88	20	66	110	360	130	426

Table A.7.1.5(b) Recommended Following Distances for Heavy Two-Axle Trucks

Speed				Driver Reaction Distance		Vehicle Braking Distance		Total Stopping Distance	
kph	mph	m/sec	ft/sec	m	ft	m	ft	m	ft
16	10	5	15	3	11	2	10	6	21
24	15	7	22	5	17	7	22	12	39
32	20	9	29	7	22	12	40	19	62
40	25	11	37	9	28	20	64	28	92
48	30	13	44	10	33	28	92	38	125
56	35	16	51	12	39	38	125	50	164
64	40	18	59	13	44	50	165	64	209
72	45	20	66	15	50	64	210	79	260
80	50	22	73	17	55	78	255	99	310
89	55	25	81	19	61	99	310	113	371
96	60	27	88	20	66	113	370	133	436

Table A.7.1.5(c) Recommended Following Distances for Three-Axle Trucks and Combinations

Speed				Driver Reaction Distance		Vehicle Braking Distance		Total Stopping Distance	
kph	mph	m/sec	ft/sec	m	ft	m	ft	m	ft
16	10	5	15	3	11	4	13	7	24
24	15	7	22	5	17	9	29	14	46
32	20	9	29	7	22	15	50	22	72
40	25	11	37	9	28	24	80	33	108
48	30	13	44	10	33	35	115	45	148
56	35	16	51	12	39	49	160	61	199
64	40	18	59	13	44	63	205	76	249
72	45	20	66	15	50	79	260	99	310
80	50	22	73	17	55	98	320	114	375
89	55	25	81	19	61	119	390	138	451
96	60	27	88	20	66	142	465	162	531

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A.9.2.3 As part of a crash 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 4.2.3 of NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*.

A.10.2.1 The fire department driver/operator is not expected to be a mechanic. However, the driver/operator 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:

(1) Windshield and all windows are clean.
(2) Driver's seat is adjusted properly.
(3) Mirrors are adjusted properly.
(4) Seat belts are easily accessed.
(5) Lights and warning devices are in working order.
(6) All compartments and vehicle doors are closed.

A.10.2.2 The purpose of the requirements in 10.2.2 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 reference provides for situations where a vehicle can be used within the period preceding a scheduled inspection, although any deficiencies noted during use should be corrected without delay.

A.10.2.3 Fire service vehicle drivers/operators should perform routine tests, inspections, and servicing functions on the specified systems and components, according to manufacturer's specifications, so that the safe operational status of the vehicle is verified. Areas to be checked include the following:

(1) Batteries
(2) Braking system
(3) Coolant system
(4) Electrical system
(5) Fuel
(6) Hydraulic fluids
(7) Lubrication
(8) Oil
(9) Tires
(10) Steering system
(11) Belts
(12) Tools, appliances, and equipment

The preventive maintenance program should further build on the inspections with monthly, semiannual, and annual servicing and testing. This should be done in accordance with existing NFPA testing standards, manufacturer's recommendations, local experience, and accepted good maintenance practices. The manufacturer's instructions should be considered as minimum criteria for the maintenance, inspection, and repair of equipment.

A.10.2.4.1 The authority having jurisdiction should establish, in writing, the conditions in the following vehicle equipment systems that require the vehicle to be placed out of service:

(1) Brakes
(2) Steering
(3) Emergency warning lights
(4) Audible warning devices
(5) Tires/wheels
(6) Fuel system
(7) Hydraulic system
(8) Air system
(9) Crankcase oil
(10) Running lights
(11) Electrical system
(12) Coolant system
(13) Drive train
(14) Suspension

Note that this list should not be considered all-inclusive. The authority having jurisdiction should review and expand it as appropriate.

Annex B Informational References

B.1 Referenced Publications. The documents or portions thereof listed in this annex are referenced within the informational sections of this standard and are not part of the requirements of this document unless also listed in Chapter 2 for other reasons.

B.1.1 NFPA Publications. National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.

NFPA 1002, *Standard for Fire Apparatus Driver/Operator Professional Qualifications*, 2003 edition.

NFPA 1401, *Recommended Practice for Fire Service Training Reports and Records*, 2006 edition.

NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*, 2007 edition.

NFPA 1901, *Standard for Automotive Fire Apparatus*, 2003 edition.

B.1.2 Other Publications.

B.1.2.1 U.S. Government Publications. U.S. Government Printing Office, Washington, DC 20402.

Title 49, Code of Federal Regulations, Part 383, 1986 Federal Commercial Motor Vehicle Safety Act, Federal Highway Administration, Commercial Driver's License Standards: Requirements and Penalties, revised October 1, 2003.

B.2 Informational References. The following documents or portions thereof are listed here as informational resources only. They are not a part of the requirements of this document.

NFPA 600, *Standard on Industrial Fire Brigades*, 2005 edition.

NFPA 1001, *Standard for Fire Fighter Professional Qualifications*, 2002 edition.

B.3 References for Extracts in Informational Sections.

NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*, 2007 edition.

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- Report on Proposals (ROP) is published for public review and comment.

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Revise definition of effective ground-fault current path to read:

3.3.78 Effective Ground-Fault Current Path. An intentionally constructed, permanent, low impedance electrically conductive path designed and intended to carry ~~underground~~ electric fault current ~~conditions~~ from the point of a ground fault on a wiring system to the electrical supply source.

4. Statement of Problem and Substantiation for Proposal: (Note: State the problem that would be resolved by your recommendation; give the specific reason for your Proposal, including copies of tests, research papers, fire experience, etc. If more than 200 words, it may be abstracted for publication.)

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