

NFPA® 1710

Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments

2010 Edition



NFPA, 1 Batterymarch Park, Quincy, MA 02169-7471
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This edition of NFPA 1710, *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments*, was prepared by the Technical Committee on Fire and Emergency Service Organization and Deployment—Career. It was issued by the Standards Council on May 26, 2009, with an effective date of June 15, 2009, and supersedes all previous editions.

This edition of NFPA 1710 was approved as an American National Standard on June 15, 2009.

Origin and Development of NFPA 1710

In 2001, the first edition of NFPA 1710 was issued. The development of that benchmark standard was the result of a considerable amount of hard work and tenacity by the Technical Committee members and the organizations they represented. That standard was the first organized approach to defining levels of service, deployment capabilities, and staffing levels for substantially career fire departments. Research work and empirical studies in North America were used by the Committee as a basis for developing response times and resource capabilities for those services, as identified by the fire department.

Following the issuance of the first edition, the NFPA Standards Council asked the Technical Committee to begin the revision process for a 2004 edition of the standard. The Committee formed several Task Groups to look at various aspects of the document. However, recognizing that the standard had not been fully field tested, the extent of the changes proposed were minimal with a cleanup of definitions, the addition of wording regarding equivalency in the annex, and clarification that the discussion on rate of fire propagation in the annex involved unsprinklered rooms.

This edition of NFPA 1710 standardizes and refines terminology and definitions used in the document. Particular attention was paid to terminology for time frames for the various events that occur from event initiation to the end of the fire department's involvement with the incident. This includes recognition that there is a time interval to initiate action or intervene at the end of travel time and before control and mitigation actually begins. The requirements for time frames for alarm handling have been revised to correspond to changes being made to NFPA 1221. The time allowance for turnout for fires and special operations was lengthened to 80 seconds but the time measurement was defined to start at the beginning of the transmission of response data to the emergency response units or emergency response facilities. All times shown as both minutes and seconds were changed to seconds only as that is the level of precision in which the committee intends time to be measured.

An application section was added in Chapter 1. The travel times for units responding on the first alarm were clarified to indicate the first unit must arrive within 4 minutes travel time and all units must arrive within 8 minutes travel time. The quadrennial report required to be provided to the AHJ in the previous edition has been changed to an annual report.

The annex material related to the requirement stated for an initial full alarm assignment capability has been moved to the body of the standard to clarify that the requirement applies to a structure fire in a typical 2000 ft² (186 m²), two-story single-family dwelling without basement and with no exposures. In addition, wording was added to require additional resources be deployed on fires in occupancies that present hazards greater than the two-story single-family dwelling.

The community-wide risk management model that has been in an annex to NFPA 1720 has been added as an annex to NFPA 1710.

The work done by the Committee provides the user with a template for developing an implementation plan on the standard. Most important, it provides the body politic and the citizens a true picture of the risks in their community and the fire department's capabilities to respond to and manage those risks.

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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 the organization, operation, deployment, and evaluation of substantially all career public fire protection and emergency medical services.



Contents

Chapter 1 Administration	1710- 4	4.7 Wildland Fire Suppression Services	1710- 8
1.1 Scope	1710- 4	4.8 Intercommunity Organization	1710- 8
1.2 Purpose	1710- 4	Chapter 5 Fire Department Services	1710- 8
1.3 Application	1710- 4	5.1 Purpose	1710- 8
1.4 Equivalency	1710- 4	5.2 Fire Suppression Services	1710- 8
Chapter 2 Referenced Publications	1710- 4	5.3 Emergency Medical Services (EMS)	1710-10
2.1 General	1710- 4	5.4 Special Operations Response	1710-10
2.2 NFPA Publications	1710- 4	5.5 Airport Rescue and Fire-Fighting (ARFF) Services	1710-11
2.3 Other Publications	1710- 4	5.6 Marine Rescue and Fire-Fighting (MRFF) Services	1710-11
2.4 References for Extracts in Mandatory Sections	1710- 4	5.7 Wildland Fire Suppression Services	1710-12
Chapter 3 Definitions	1710- 5	Chapter 6 Systems	1710-13
3.1 General	1710- 5	6.1 Safety and Health System	1710-13
3.2 NFPA Official Definitions	1710- 5	6.2 Incident Management System	1710-13
3.3 General Definitions	1710- 5	6.3 Training Systems	1710-13
Chapter 4 Organization	1710- 7	6.4 Communications Systems	1710-13
4.1 Fire Department Organizational Statement	1710- 7	6.5 Pre-Incident Planning	1710-13
4.2 Fire Suppression Services	1710- 8	Annex A Explanatory Material	1710-13
4.3 Emergency Medical Services	1710- 8	Annex B Community Wide Risk Management Model	1710-18
4.4 Special Operations	1710- 8	Annex C Informational References	1710-20
4.5 Airport Rescue and Fire-Fighting Services	1710- 8	Index	1710-22
4.6 Marine Rescue and Fire-Fighting Services ...	1710- 8		

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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 C. Extracted text may be edited for consistency and style and may include the revision of internal paragraph references and other references as appropriate. 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 C.

Chapter 1 Administration

1.1* Scope. This standard contains minimum requirements relating to the organization and deployment of fire suppression operations, emergency medical operations, and special operations to the public by substantially all career fire departments.

1.1.1 The requirements address functions and objectives of fire department emergency service delivery, response capabilities, and resources.

1.1.2 This standard also contains general requirements for managing resources and systems, such as health and safety, incident management, training, communications, and pre-incident planning.

1.1.3 This standard addresses the strategic and system issues involving the organization, operation, and deployment of a fire department and does not address tactical operations at a specific emergency incident.

1.2 Purpose.

1.2.1* The purpose of this standard is to specify the minimum criteria addressing the effectiveness and efficiency of the career public fire suppression operations, emergency medical service, and special operations delivery in protecting the citizens of the jurisdiction and the occupational safety and health of fire department employees.

1.2.2 Nothing herein is intended to restrict any jurisdiction from exceeding these minimum requirements.

1.3 Application.

1.3.1 This standard applies to the deployment of resources by a fire department to emergency situations when operations can be implemented to save lives and property.

1.3.2 The standard is a benchmark for most common responses and a platform for developing the appropriate plan for deployment of resources for fires in higher hazard occupancies or more complex incidents.

1.4* Equivalency. Nothing in this standard is intended to prohibit the use of systems, methods, or approaches of equivalent or superior performance to those prescribed by this standard, provided technical documentation is submitted to the authority having jurisdiction to demonstrate equivalency.

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 403, *Standard for Aircraft Rescue and Fire-Fighting Services at Airports*, 2009 edition.

NFPA 472, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, 2008 edition.

NFPA 1143, *Standard for Wildland Fire Management*, 2009 edition.

NFPA 1221, *Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems*, 2010 edition.

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

NFPA 1561, *Standard on Emergency Services Incident Management System*, 2008 edition.

NFPA 1670, *Standard on Operations and Training for Technical Search and Rescue Incidents*, 2009 edition.

2.3 Other Publications.

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

Title 29, Code of Federal Regulations, Part 1910.120, "Hazardous Waste Operations and Emergency Response."

Title 29, Code of Federal Regulations, Part 1910.146, "Permit-Required Confined Space."

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 472, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, 2008 edition.

NFPA 1002, *Standard for Fire Apparatus Driver/Operator Professional Qualifications*, 2009 edition.

NFPA 1081, *Standard for Industrial Fire Brigade Member Professional Qualifications*, 2007 edition.

NFPA 1142, *Standard on Water Supplies for Suburban and Rural Fire Fighting*, 2007 edition.

NFPA 1221, *Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems*, 2010 edition.

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



NFPA 1521, *Standard for Fire Department Safety Officer*, 2008 edition.

NFPA 1561, *Standard on Emergency Services Incident Management System*, 2008 edition.

NFPA 1901, *Standard for Automotive Fire Apparatus*, 2009 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 Advanced Life Support (ALS). See 3.3.36.1.

3.3.2 Aid.

3.3.2.1* Automatic Aid. A plan developed between two or more fire departments for immediate joint response on first alarms. [1142, 2007]

3.3.2.2 Mutual Aid. A written intergovernmental agreement between agencies and/or jurisdictions that they will assist one another on request by furnishing personnel, equipment, and/or expertise in a specified manner.

3.3.3 Aircraft Rescue and Fire Fighting. See 3.3.21.1.

3.3.4* Aircraft Rescue and Fire-Fighting (ARFF) Vehicle. A vehicle intended to carry rescue and fire-fighting equipment for rescuing occupants and combating fires in aircraft at, or in the vicinity of, an airport. [1002, 2009]

3.3.5* Alarm. A signal or message from a person or device indicating the existence of an emergency or other situation that requires action by an emergency response agency. [1221, 2010]

3.3.6 Alarm Answering Time. See 3.3.53.1.

3.3.7 Alarm Handling Time. See 3.3.53.2.

3.3.8 Alarm Processing Time. See 3.3.53.3.

3.3.9 Alarm Transfer Time. See 3.3.53.4.

3.3.10 Apparatus.

3.3.10.1 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, 2009]

3.3.10.2 Quint Apparatus. A fire apparatus with a permanently mounted fire pump, a water tank, a hose storage area, an aerial device with a permanently mounted waterway, and a complement of ground ladders.

3.3.10.3 Specialized Apparatus. A fire apparatus or vehicle that is used for support or specialized equipment and services at emergency scenes for functions such as, but not limited to, command, technical rescue, hazardous materials mitigation, urban search and rescue, air supply, electrical generation and lighting, or transport of equipment and personnel.

3.3.11 Automatic Aid. See 3.3.2.1.

3.3.12 Basic Life Support (BLS). See 3.3.36.2.

3.3.13* Company. A group of members: (1) under the direct supervision of an officer; (2) trained and equipped to perform assigned tasks; (3) usually organized and identified as engine companies, ladder companies, rescue companies, squad companies, or multi-functional companies; (4) operating with one piece of fire apparatus (pumper, aerial fire apparatus, elevating platform, quint, rescue, squad, ambulance) except where multiple apparatus are assigned that are dispatched and arrive together, continuously operate together, and are managed by a single company officer; (5) arriving at the incident scene on fire apparatus. [1500, 2007]

3.3.14 Company Officer. See 3.3.40.1.

3.3.15 Crew. See 3.3.52, Team.

3.3.16 Emergency Incident. Any situation to which an emergency services organization responds to deliver emergency services, including rescue, fire suppression, emergency medical care, special operations, law enforcement, and other forms of hazard control and mitigation. [1561, 2008]

3.3.17 Emergency Medical Care. The treatment of patients using first aid, cardiopulmonary resuscitation, basic life support, advanced life support, and other medical procedures prior to arrival at a hospital or other health care facility.

3.3.18 Emergency Operations. See 3.3.41.1.

3.3.19 Fire Apparatus. See 3.3.10.1.

3.3.20 Fire Department Member. See 3.3.38, Member.

3.3.21 Fire Fighting.

3.3.21.1* Aircraft Rescue and Fire Fighting. The fire-fighting actions taken to rescue persons and to control or extinguish fire involving or adjacent to aircraft on the ground. [1500, 2007]

3.3.21.2* Marine Rescue and Fire Fighting. The fire-fighting action taken to prevent, control, or extinguish fire involved in or adjacent to a marine vessel and the rescue actions for occupants using normal and emergency routes for egress.

3.3.21.3 Structural Fire Fighting. The activities of rescue, fire suppression, and property conservation in buildings or other structures, vehicles, rail cars, marine vessels, aircraft, or like properties.

3.3.22 Fire Protection. Methods of providing fire detection, control, and extinguishment.

3.3.23* Fire Suppression. The activities involved in controlling and extinguishing fires. [1500, 2007]

3.3.24* First Responder (EMS). Functional provision of initial assessment (i.e., airway, breathing, and circulatory systems) and basic first-aid intervention, including CPR and automatic external defibrillator (AED) capability.

3.3.25 Forcible Entry. Techniques used by fire personnel to gain entry into buildings, vehicles, aircraft, or other areas of confinement when normal means of entry are locked or blocked.

3.3.26* Hazard. A condition that presents the potential for harm or damage to people, property, or the environment.

3.3.27 Hazardous Material. A substance that is capable of creating harm to people, the environment, or property due to its toxicity, chemical reactivity, decomposition, or corrosivity; is capable of explosion or detonation; or presents etiological hazards, whether used for its intended purpose or as a weapon of mass destruction (WMD) or for illicit labs purposes, environmental crimes, or industrial sabotage.

3.3.28* High-Hazard Occupancy. An occupancy that presents a high life hazard or large fire potential due to its construction, configuration, or the presence of specific materials, processes, or contents.

3.3.29 Incident Commander. The individual responsible for all incident activities, including the development of strategies and tactics and the ordering and the release of resources. [472, 2008]

3.3.30* Incident Management System (IMS). An organized system that defines the roles and responsibilities to be assumed by responders and the standard operating procedures to be used in the management and direction of emergency incidents and other functions.

3.3.31 Incident Safety Officer. See 3.3.40.2.

3.3.32 Initial Full Alarm Assignment. Those personnel, equipment, and resources ordinarily dispatched upon notification of a structure fire.

3.3.33 Initial Rapid Intervention Crew (IRIC). See 3.3.44.1.

3.3.34 Initiating Action/Intervention Time. See 3.3.53.5.

3.3.35 Intergovernmental Agreement. A written formal authorization for services between two or more jurisdictions.

3.3.36 Life Support.

3.3.36.1 Advanced Life Support (ALS). Emergency medical treatment beyond basic life support that provides for advanced airway management including intubation, advanced cardiac monitoring, defibrillation, establishment and maintenance of intravenous access, and drug therapy.

3.3.36.2* Basic Life Support (BLS). A specific level of pre-hospital medical care provided by trained responders, focused on rapidly evaluating a patient's condition; maintaining a patient's airway, breathing, and circulation; controlling external bleeding; preventing shock; and preventing further injury or disability by immobilizing potential spinal or other bone fractures.

3.3.37 Marine Rescue and Fire Fighting. See 3.3.21.2.

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

3.3.39 Mutual Aid. See 3.3.2.2.

3.3.40 Officer.

3.3.40.1* Company Officer. A supervisor of a crew/company of personnel.

3.3.40.2 Incident Safety Officer. A member of the command staff responsible for monitoring and assessing safety hazards or unsafe situations and for developing measures for ensuring personnel safety.

3.3.40.3* Supervisory Chief Officer. A member whose responsibility is to assume command through a formalized transfer of command process and to allow company officers to directly supervise personnel assigned to them.

3.3.41 Operations.

3.3.41.1 Emergency Operations. Activities of the fire department relating to rescue, fire suppression, emergency medical care, and special operations, including response to the scene of the incident and all functions performed at the scene. [1500, 2007]

3.3.41.2* Special Operations. Those emergency incidents to which the fire department responds that require specific and advanced training and specialized tools and equipment. [1500, 2007]

3.3.42 Public Safety Answering Point (PSAP). A facility in which 9-1-1 calls are answered. [1221, 2010]

3.3.43 Quint Apparatus. See 3.3.10.2.

3.3.44* Rapid Intervention Crew (RIC). A dedicated crew of fire fighters who are assigned for rapid deployment to rescue lost or trapped members.

3.3.44.1 Initial Rapid Intervention Crew (IRIC). Two members of the initial attack crew who are assigned for rapid deployment to rescue lost or trapped members.

3.3.45 Rescue. Those activities directed at locating endangered persons at an emergency incident, removing those persons from danger, treating the injured, and providing for transport to an appropriate health care facility. [1500, 2007]

3.3.46 Special Operations. See 3.3.41.2.

3.3.47 Specialized Apparatus. See 3.3.10.3.

3.3.48* Staff Aide. A fire fighter or fire officer assigned to a supervisory chief officer to assist with the logistical, tactical, and accountability functions of incident, division, or sector command.

3.3.49 Standard Operating Procedure. A written organizational directive that establishes or prescribes specific operational or administrative methods to be followed routinely for the performance of designated operations or actions. [1521, 2008]

3.3.50 Structural Fire Fighting. See 3.3.21.3.

3.3.51 Supervisory Chief Officer. See 3.3.40.3.

3.3.52 Team. Two or more members who have been assigned a common task and are in communication with each other, coordinate their activities as a work group, and support the safety of one another. [1081, 2007]



3.3.53 Time.

3.3.53.1 Alarm Answering Time. The time interval that begins when the alarm is received at the communication center and ends when the alarm is acknowledged at the communication center.

3.3.53.2 Alarm Handling Time. The time interval from the receipt of the alarm at the primary PSAP until the beginning of the transmittal of the response information via voice or electronic means to emergency response facilities (ERFs) or the emergency response units (ERUs) in the field.

3.3.53.3 Alarm Processing Time. The time interval from when the alarm is acknowledged at the communication center until response information begins to be transmitted via voice or electronic means to emergency response facilities (ERFs) and emergency response units (ERUs).

3.3.53.4 Alarm Transfer Time. The time interval from the receipt of the emergency alarm at the PSAP until the alarm is first received at the communication center.

3.3.53.5* Initiating Action/Intervention Time. The time interval from when a unit arrives on the scene to the initiation of emergency mitigation.

3.3.53.6* Total Response Time. The time interval from the receipt of the alarm at the primary PSAP to when the first emergency response unit is initiating action or intervening to control the incident.

3.3.53.7 Travel Time. The time interval that begins when a unit is en route to the emergency incident and ends when the unit arrives at the scene.

3.3.53.8 Turnout Time. The time interval that begins when the emergency response facilities (ERFs) and emergency response units (ERUs) notification process begins by either an audible alarm or visual annunciation or both and ends at the beginning point of travel time.

3.3.54 Total Response Time. See 3.3.53.6.

3.3.55 Travel Time. See 3.3.53.7.

3.3.56 Turnout Time. See 3.3.53.8.

Chapter 4 Organization

4.1 Fire Department Organizational Statement.

4.1.1* The authority having jurisdiction (AHJ) shall maintain a written statement or policy that establishes the following:

- (1) Existence of the fire department
- (2) Services that the fire department is required to provide
- (3) Basic organizational structure
- (4) Expected number of fire department members
- (5) Functions that fire department members are expected to perform

4.1.2* The fire department organizational statement shall provide service delivery objectives, including specific time objectives for each major service component [i.e., fire suppression, emergency medical services (EMS), special operations, aircraft rescue and fire fighting, marine rescue and fire fighting, and/or wildland fire fighting] and objectives for the percentage of responses that meet the time objectives.

4.1.2.1 The fire department shall establish the following objectives:

- (1) Alarm handling time to be completed in accordance with 4.1.2.3.
- (2) 80 seconds for turnout time for fire and special operations response and 60 seconds turnout time for EMS response
- (3)*240 seconds or less travel time for the arrival of the first arriving engine company at a fire suppression incident and 480 seconds or less travel time for the deployment of an initial full alarm assignment at a fire suppression incident
- (4) 240 seconds or less travel time for the arrival of a unit with first responder with automatic external defibrillator (AED) or higher level capability at an emergency medical incident
- (5) 480 seconds or less travel time for the arrival of an advanced life support (ALS) unit at an emergency medical incident, where this service is provided by the fire department provided a first responder with AED or basic life support (BLS) unit arrived in 240 seconds or less travel time

4.1.2.2 The fire department shall document the initiating action/intervention time.

4.1.2.3 Alarm Handling.

4.1.2.3.1 The fire department shall establish a performance objective of having an alarm answering time of not more than 15 seconds for at least 95 percent of the alarms received and not more than 40 seconds for at least 99 percent of the alarms received, as specified by NFPA 1221.

4.1.2.3.2 When the alarm is received at a public safety answering point (PSAP) and transferred to a secondary answering point or communication center, the agency responsible for the PSAP shall establish a performance objective of having an alarm transfer time of not more than 30 seconds for at least 95 percent of all alarms processed, as specified by NFPA 1221.

4.1.2.3.3 The fire department shall establish a performance objective of having an alarm processing time of not more than 60 seconds for at least 90 percent of the alarms and not more than 90 seconds for at least 99 percent of the alarms, as specified by NFPA 1221.

4.1.2.4 The fire department shall establish a performance objective of not less than 90 percent for the achievement of each turnout time and travel time objective specified in 4.1.2.1.

4.1.2.5 Evaluations.

4.1.2.5.1* The fire department shall evaluate its level of service and deployment delivery and alarm handling time, turnout time, and travel time objectives on an annual basis.

4.1.2.5.2* The evaluations shall be based on emergency incident data relating to level of service, deployment, and the achievement of each time objective in each geographic area within the jurisdiction of the fire department.

4.1.2.6 The fire department shall provide the AHJ with a written report annually.

4.1.2.6.1 The annual report shall define the geographic areas and/or circumstances in which the requirements of this standard are not being met.

4.1.2.6.2 The annual report shall explain the predictable consequences of these deficiencies and address the steps that are necessary to achieve compliance.

4.2 Fire Suppression Services. The fire department organizational statement shall set forth the criteria for the various types of fire suppression incidents to which the fire department is required to respond.

4.3 Emergency Medical Services.

4.3.1 The fire department organizational statement shall set forth the criteria for the various types of emergency medical incidents to which the fire department is required and/or expected to respond.

4.3.2 The fire department organizational statement shall ensure that the fire department's emergency medical response capability includes personnel, equipment, and resources to deploy at the first responder level with AED or higher treatment level.

4.3.3 Where emergency medical services beyond the first responder with AED level are provided by another agency or private organization, the AHJ, based on recommendations from the fire department, shall include the minimum staffing, deployment, and response criteria as required in Section 5.3 in the following:

- (1) The fire department organizational statement
- (2) Any contract, service agreement, governmental agreement, or memorandum of understanding between the AHJ and the other agency or private organization

4.4 Special Operations.

4.4.1 The fire department organizational statement shall set forth the criteria for the various types of special operations response and mitigation activities to which the fire department is required and/or expected to respond.

4.4.2* The fire department organizational statement shall ensure that the fire department's hazardous materials response capability includes personnel, equipment, and resources to deploy at the first responder operational level as required by 29 CFR 1910.120.

4.4.3 The fire department organizational statement shall ensure that the fire department's confined space response capability includes personnel, equipment, and resources to deploy at the confined space operational level as required by 29 CFR 1910.146.

4.4.4 The fire department organizational statement shall set forth the criteria for the various types of fire department response during natural disasters or terrorism incidents, weapons of mass destruction incidents, or large-scale or mass casualty events.

4.5 Airport Rescue and Fire-Fighting Services. The fire department organizational statement shall set forth the criteria for the various types of airport rescue and fire-fighting incidents to which the fire department is required and/or expected to respond.

4.6 Marine Rescue and Fire-Fighting Services. The fire department organizational statement shall set forth the criteria for the various types of marine rescue and fire-fighting incidents to which the fire department is required and/or expected to respond.

4.7 Wildland Fire Suppression Services. The fire department organizational statement shall set forth the criteria for the various types of wildland fire suppression incidents to which the fire department is required and/or expected to respond.

4.8 Intercommunity Organization.

4.8.1* Mutual aid, automatic aid, and fire protection agreements shall be through a written intergovernmental agreement and shall address issues such as liability for injuries and deaths, disability retirements, cost of service, authorization to respond, staffing, and equipment, including the resources to be made available, availability of interoperable communications, and the designation of the incident commander.

4.8.2 Procedures and training of personnel for all fire departments in mutual aid, automatic aid, and fire protection agreement plans shall be comprehensive to produce an effective fire force and to ensure uniform operations.

Chapter 5 Fire Department Services

5.1 Purpose.

5.1.1 The services provided by the fire department shall include those activities identified by the organizational statement developed as required by Chapter 4.

5.1.2 The procedures involved in providing these services, including operations and deployment, shall be established through written administrative regulations, standard operating procedures (SOPs), and departmental orders.

5.2* Fire Suppression Services.

5.2.1 Fire Suppression Capability.

5.2.1.1 Fire suppression operations shall be organized to ensure that the fire department's fire suppression capability encompasses deployment of personnel, equipment, and resources for an initial arriving company, the initial full alarm assignment, and additional alarm assignments.

5.2.1.2 The fire department shall be permitted to use established automatic aid and mutual aid agreements to comply with the requirements of Section 5.2.

5.2.2* Staffing. The number of on-duty fire suppression personnel shall be sufficient to perform the necessary fire-fighting operations given the expected fire-fighting conditions.

5.2.2.1 These numbers shall be determined through task analyses that take the following factors into consideration:

- (1) Life hazard to the populace protected
- (2) Provisions of safe and effective fire-fighting performance conditions for the fire fighters
- (3) Potential property loss
- (4) Nature, configuration, hazards, and internal protection of the properties involved
- (5) Types of fireground tactics and evolutions employed as standard procedure, type of apparatus used, and results expected to be obtained at the fire scene

5.2.2.2* On-duty personnel assigned to fire suppression shall be organized into company units and shall have appropriate apparatus and equipment assigned to such companies.

5.2.2.2.1* The fire department shall identify minimum company staffing levels as necessary to meet the deployment criteria required in 5.2.4 to ensure that a sufficient number of members are assigned, on duty, and available to safely and effectively respond with each company.



5.2.2.2.2 Each company shall be led by an officer who shall be considered a part of the company.

5.2.2.2.3* Supervisory chief officers shall be dispatched or notified to respond to all full alarm assignments.

5.2.2.2.4 The supervisory chief officer shall ensure that the incident management system is established as required in Section 6.2.

5.2.2.2.5* Supervisory chief officers shall have staff aides deployed to them for purposes of incident management and accountability at emergency incidents.

5.2.3 Operating Units. Fire company staffing requirements shall be based on minimum levels necessary for safe, effective, and efficient emergency operations.

5.2.3.1 Fire companies whose primary functions are to pump and deliver water and perform basic fire fighting at fires, including search and rescue, shall be known as engine companies.

5.2.3.1.1 These companies shall be staffed with a minimum of four on-duty personnel.

5.2.3.1.2 In jurisdictions with tactical hazards, high-hazard occupancies, high incident frequencies, geographical restrictions, or other pertinent factors as identified by the AHJ, these companies shall be staffed with a minimum of five or six on-duty members.

5.2.3.2 Fire companies whose primary functions are to perform the variety of services associated with truck work, such as forcible entry, ventilation, search and rescue, aerial operations for water delivery and rescue, utility control, illumination, overhaul, and salvage work, shall be known as ladder or truck companies.

5.2.3.2.1 These companies shall be staffed with a minimum of four on-duty personnel.

5.2.3.2.2 In jurisdictions with tactical hazards, high-hazard occupancies, high incident frequencies, geographical restrictions, or other pertinent factors as identified by the AHJ, these companies shall be staffed with a minimum of five or six on-duty personnel.

5.2.3.3 Other Types of Companies.

5.2.3.3.1 Other types of companies equipped with specialized apparatus and equipment shall be provided to assist engine and ladder companies where necessary to support the fire departments' SOPs.

5.2.3.3.2 These companies shall be staffed with the minimum number of on-duty personnel required to deal with the tactical hazards, high-hazard occupancies, high incident frequencies, geographical restrictions, or other pertinent factors as identified by the AHJ.

5.2.3.4 Fire Companies with Quint Apparatus.

5.2.3.4.1 A fire company that deploys with quint apparatus, designed to operate as either an engine company or a ladder company, shall be staffed as specified in 5.2.3.

5.2.3.4.2 If the company is expected to perform multiple roles simultaneously, additional staffing, above the levels specified in 5.2.3, shall be provided to ensure that those operations can be performed as required.

5.2.4 Deployment.

5.2.4.1 Initial Arriving Company.

5.2.4.1.1 The fire department's fire suppression resources shall be deployed to provide for the arrival of an engine company within a 240-second travel time to 90 percent of the incidents as established in Chapter 4.

5.2.4.1.2* Personnel assigned to the initial arriving company shall have the capability to implement an initial rapid intervention crew (IRIC).

5.2.4.2 Initial Full Alarm Assignment Capability.

5.2.4.2.1 The fire department shall have the capability to deploy an initial full alarm assignment within a 480-second travel time to 90 percent of the incidents as established in Chapter 4.

5.2.4.2.2* The initial full alarm assignment to a structure fire in a typical 2000 ft² (186 m²), two-story single-family dwelling without basement and with no exposures shall provide for the following:

- (1) Establishment of incident command outside of the hazard area for the overall coordination and direction of the initial full alarm assignment with a minimum of one individual dedicated to this task
- (2) Establishment of an uninterrupted water supply of a minimum of 400 gpm (1520 L/min) for 30 minutes with supply line(s) maintained by an operator
- (3) Establishment of an effective water flow application rate of 300 gpm (1140 L/min) from two handlines, each of which has a minimum flow rate of 100 gpm (380 L/min) with each handline operated by a minimum of two individuals to effectively and safely maintain the line
- (4) Provision of one support person for each attack and backup line deployed to provide hydrant hookup and to assist in laying of hose lines, utility control, and forcible entry
- (5) Provision of at least one victim search and rescue team with each such team consisting of a minimum of two individuals
- (6) Provision of at least one team, consisting of a minimum of two individuals, to raise ground ladders and perform ventilation
- (7) If an aerial device is used in operations, one person to function as an aerial operator and maintain primary control of the aerial device at all times
- (8) Establishment of an IRIC consisting of a minimum of two properly equipped and trained individuals

5.2.4.2.3* Fire departments that respond to fires in high-, medium-, or low-hazard occupancies that present hazards greater than those found in the low-hazard occupancy described in 5.2.4.2.2 shall deploy additional resources on the initial alarm.

5.2.4.3 Additional Alarm Assignments.

5.2.4.3.1* The fire department shall have the capability to deploy additional alarm assignments that can provide for additional command staff, personnel, and additional services, including the application of water to the fire; engagement in search and rescue, forcible entry, ventilation, and preservation of property; safety and accountability for personnel; and provision of support activities for those situations that are beyond the capability of the initial full alarm assignment.

5.2.4.3.2 When an incident escalates beyond an initial full alarm assignment or when significant risk is present to the fire fighters due to the magnitude of the incident, the incident commander shall upgrade the IRIC to a full rapid intervention

crew(s) (RIC) that consists of an officer and at least three fire-fighters who are fully equipped and trained in RIC operations.

5.2.4.3.3 An incident safety officer shall be deployed to all incidents that escalate beyond an initial full alarm assignment or when significant risk is present to fire fighters.

5.2.4.3.4 The incident safety officer shall ensure that the safety and health system is established as required in Section 6.1.

5.3* Emergency Medical Services (EMS). The purpose of this section shall be to provide standards for the delivery of EMS by fire departments.

5.3.1 The fire department shall clearly document its role, responsibilities, functions, and objectives for the delivery of EMS.

5.3.1.1 EMS operations shall be organized to ensure that the fire department's emergency medical capability includes personnel, equipment, and resources to deploy the initial arriving company and additional alarm assignments.

5.3.1.2 The fire department shall be permitted to use established automatic aid or mutual aid agreements to comply with the requirements of Section 5.3.

5.3.2* System Components.

5.3.2.1 Treatment Levels.

5.3.2.1.1 The basic treatment levels within an EMS system, for the purposes of this standard, shall be categorized as first responder, basic life support (BLS), and advanced life support (ALS).

5.3.2.1.2 The specific patient treatment capabilities associated with each level shall be determined by the AHJ based on the requirements for approval and licensing of EMS providers within each state or province.

5.3.2.2 Training Levels.

5.3.2.2.1 The minimal level of training for all fire fighters that respond to emergency incidents shall be to the first responder/AED level.

5.3.2.2.2 The AHJ shall determine if further training is required.

5.3.3 EMS System Functions.

5.3.3.1 The AHJ shall determine which of the following components of an EMS system the fire department shall be responsible for providing:

- (1) Initial response to provide medical treatment at the location of the emergency (first responder with AED capability or higher)
- (2) BLS response
- (3) ALS response
- (4) Patient transport in an ambulance or alternative vehicle designed to provide for uninterrupted patient care at the ALS or BLS level while en route to a medical facility
- (5) Assurance of response and medical care through a quality management program

5.3.3.2 Staffing.

5.3.3.2.1 On-duty EMS units shall be staffed with the minimum personnel necessary for emergency medical care relative to the level of EMS provided by the fire department.

5.3.3.2.2 EMS staffing requirements shall be based on the minimum levels needed to provide patient care and member safety.

5.3.3.2.2.1 Units that provide emergency medical care shall be staffed at a minimum with personnel trained to the first responder/AED level.

5.3.3.2.2.2 Units that provide BLS transport shall be staffed and trained at the level prescribed by the state or provincial agency responsible for providing EMS licensing.

5.3.3.2.2.3 Units that provide ALS transport shall be staffed and trained at the level prescribed by the state or provincial agency responsible for providing EMS licensing.

5.3.3.3 Service Delivery Deployment.

5.3.3.3.1 The fire department shall adopt service delivery objectives based on time standards for the deployment of each service component for which it is responsible.

5.3.3.3.2 The fire department's EMS for providing a first responder with AED shall be deployed to provide for the arrival of a first responder with AED company within a 240-second travel time to 90 percent of the incidents as established in Chapter 4.

5.3.3.3.3* When provided, the fire department's EMS for providing ALS shall be deployed to provide for the arrival of an ALS company within a 480-second travel time to 90 percent of the incidents provided a first responder with AED or BLS unit arrived in 240 seconds or less travel time as established in Chapter 4.

5.3.3.3.4 Personnel deployed to ALS emergency responses shall include a minimum of two members trained at the emergency medical technician-paramedic level and two members trained at the emergency medical technician-basic level arriving on scene within the established travel time.

5.3.4 Quality Management.

5.3.4.1 The fire department shall institute a quality management program to ensure that the service has met time objectives as required in 4.1.2 for all medical responses.

5.3.4.2 Fire Department Medical Personnel Review.

5.3.4.2.1 All first responder and BLS medical care provided by the fire department shall be reviewed by the fire department medical personnel.

5.3.4.2.2 This review process shall be documented.

5.3.4.3 Medical Director Review.

5.3.4.3.1 All fire departments with ALS services shall have a named medical director with the responsibility to oversee and ensure quality medical care in accordance with state or provincial laws or regulations.

5.3.4.3.2 This review process shall be documented.

5.3.4.4 Fire departments providing ALS services shall provide a mechanism for immediate communications with EMS supervision and medical oversight.

5.4 Special Operations Response. Special operations shall be organized to ensure that the fire department's special operations capability includes personnel, equipment, and resources to deploy the initial arriving company and additional alarm assignments providing such services.



5.4.1 The fire department shall be permitted to use established automatic aid or mutual aid agreements to comply with the requirements of Section 5.4.

5.4.2 The fire department shall adopt a special operations response plan and SOPs that specify the roles and responsibilities of the fire department and the authorized functions of members responding to hazardous materials emergency incidents.

5.4.3 All fire department members expected to respond to emergency incidents beyond the first responder operations level for hazardous materials response shall be trained to the applicable requirements of NFPA 472.

5.4.4 All fire department members expected to respond to emergency incidents beyond the confined space operations level for confined space operations shall be trained to the applicable requirements of NFPA 1670.

5.4.5 The fire department shall have the capacity to implement an RIC during all special operations incidents that would subject fire fighters to immediate danger or injury in the event of equipment failure or other sudden events, as required by NFPA 1500.

5.4.6 If a higher level of emergency response is needed beyond the capability of the fire department for special operations, the fire department shall determine the availability of outside resources that deploy these capabilities and the procedures for initiating their response.

5.4.7 The fire department shall limit its activities to only those specific special operations functions for which its personnel have been trained and are correctly equipped.

5.5 Airport Rescue and Fire-Fighting (ARFF) Services.

5.5.1 Airport fire departments shall adopt operations response plans and SOPs that specify the roles and responsibilities for nonaircraft incidents as required by 5.1.2.

5.5.2 ARFF operations shall be organized to ensure that the fire department's capability includes personnel, equipment, and resources to deploy the initial arriving company, the initial full alarm assignment, and additional alarm assignments as required in 5.2.4.

5.5.3 Airport fire departments shall have access to special tools, equipment, supplies, personal protective equipment (PPE), and other airport resources that are required to perform operations in their assigned roles and responsibilities.

5.5.4 Deployment.

5.5.4.1 The airport fire department shall deploy the required number of ARFF vehicles required for the airport's assigned category as established by NFPA 403.

5.5.4.2 Airport fire department companies equipped with specialized apparatus and equipment shall be provided to assist ARFF companies where deemed necessary as identified in 5.5.1.

5.5.4.3 Airport fire department companies that deploy to structure fire incidents on airport property shall meet the time objective requirements of 4.1.2.

5.5.4.4 Airport fire department companies that deploy to emergency medical incidents on airport property shall meet the time objective requirements of 5.3.3.3.

5.5.4.5 The airport fire department shall be permitted to use established automatic aid or mutual aid agreements to comply with the requirements of Section 5.5.

5.5.5 Staffing.

5.5.5.1 Airport fire department ARFF companies shall be staffed as required by NFPA 403.

5.5.5.2 Airport fire department companies that deploy to structure fire incidents on airport property shall meet the staffing requirements of 5.2.2.

5.5.5.3 Airport fire department companies that deploy to emergency medical incidents on airport property shall meet the staffing requirements of 5.3.3.3.

5.5.6 Emergency Operations.

5.5.6.1 At all emergency scene operations, an incident management system shall be used that meets the requirements of Section 6.2.

5.5.6.2* Incident command shall be established outside of the hazard area for the overall coordination and direction of the initial full alarm assignment.

5.5.6.3 An individual shall be dedicated to the task of incident commander.

5.5.6.4 Incident Safety Officer.

5.5.6.4.1 An incident safety officer shall be deployed to all incidents that escalate beyond a full alarm assignment or when fire fighters face significant risk.

5.5.6.4.2 The incident safety officer shall ensure that the safety and health system is established as required in Section 6.1.

5.6* Marine Rescue and Fire-Fighting (MRFF) Services.

5.6.1 MRFF operations shall be organized to ensure that the fire department's marine capability includes personnel, equipment, and resources to deploy to the alarm assignments associated with a marine emergency incident.

5.6.2 Response Plan.

5.6.2.1 The fire department shall adopt a marine operations response plan and SOPs that specify the roles and responsibilities of the fire department and the authorized functions of members responding to marine emergencies.

5.6.2.2 Fire department marine operations response plans and SOPs shall be coordinated with the applicable agencies, such as the port or harbor authority and supporting agencies.

5.6.3 Marine fire departments shall have access to special tools, equipment, supplies, PPE, and other marine resources that are required to perform operations in their assigned roles and responsibilities.

5.6.4 Staffing.

5.6.4.1 Numbers of On-Duty Marine Personnel.

5.6.4.1.1 On-duty marine personnel shall consist of the number necessary for fire-fighting performance relative to the expected MRFF conditions.

5.6.4.1.2 On-duty marine personnel numbers shall be determined through task analyses as required for types of marine vessels and through additional task analyses that take the following factors into consideration:

- (1) Life hazard to the populace protected
- (2) Provisions of safe and effective fire-fighting performance conditions for the fire fighters
- (3) Potential property loss

- (4) Nature, configuration, hazards, and internal protection of the properties involved
- (5) Types of tactics and evolutions employed as standard procedure, type of marine vessel used, and results expected to be obtained at the fire scene
- (6) Requirements of the regulatory AHJs over navigable waters, ports, and harbors

5.6.4.2 Organization of On-Duty Personnel.

5.6.4.2.1 On-duty personnel assigned to marine fire fighting shall be organized into company units and shall have required vessels and equipment assigned to such companies.

5.6.4.2.2 Each marine company shall be led by an officer who shall be considered a part of the company.

5.6.5 Operating Units.

5.6.5.1* Fire companies whose primary function is to deliver and pump water and extinguishing agents at the scene of a marine incident shall be known as marine companies.

5.6.5.2 These companies shall be staffed with a minimum number of on-duty personnel as required by the tactical and occupancy hazards to which the marine vessel responds and by the regulatory AHJs over navigable waters, ports, and harbors.

5.7 Wildland Fire Suppression Services.

5.7.1 Wildland fire suppression operations shall be organized to ensure that the fire department's wildland fire suppression capability includes personnel, equipment, and resources to deploy wildland direct operations that can address marginal situations before they get out of control and wildland indirect fire-fighting operations that can be assembled and placed into operation against major wildland fires.

5.7.2 Organization.

5.7.2.1 Fire departments performing wildland operations shall adopt a wildland fire-fighting operations response plan and SOPs that specify the roles and responsibilities of the fire department and the authorized functions of members responding to wildland fire emergencies.

5.7.2.2 All wildland fire suppression operations shall be organized to ensure compliance with NFPA 1143.

5.7.3 Fire departments performing wildland operations shall have access to special tools, equipment, supplies, PPE, and other wildland resources that are required to perform operations in their assigned roles and responsibilities.

5.7.4 Staffing. The number of on-duty wildland fire-fighting personnel shall be sufficient to perform the necessary fire-fighting operations given the expected wildland fire-fighting conditions.

5.7.4.1 On-duty wildland fire-fighting personnel numbers shall be determined through task analyses that take the following factors into consideration:

- (1) Life hazard to the populace protected
- (2) Provisions of safe and effective fire-fighting performance conditions for the fire fighters
- (3) The number of trained response personnel available to the department, including mutual aid resources
- (4) Potential property loss
- (5) Nature, configuration, hazards, and internal protection of the properties involved

- (6) Types of wildland tactics and evolutions employed as standard procedure, type of apparatus used, and results expected to be obtained at the fire scene
- (7) Topography, vegetation, and terrain in the response area(s)

5.7.4.2 On-duty personnel assigned to wildland operations shall be organized into company units and shall have required apparatus and equipment assigned to such companies.

5.7.4.2.1 The fire department shall identify minimum company staffing levels necessary to meet the deployment criteria to ensure that a sufficient number of members are assigned, on duty, and available to respond with each company.

5.7.4.2.2 Each company shall be led by an officer who shall be considered a part of the company.

5.7.4.2.3 Supervisory chief officers shall be dispatched or notified to respond to all full alarm assignments.

5.7.4.2.4 The supervisory chief officer shall ensure that the incident management system is established as required in Section 6.2.

5.7.5 Operating Units. Fire companies whose primary function is to deliver and pump water and extinguishing agents at the scene of a wildland fire shall be known as wildland companies.

5.7.5.1 These companies shall be staffed with a minimum of four on-duty personnel.

5.7.5.2 Engine and ladder (truck) companies that respond to wildland fire fighting and/or urban interface wildland fire fighting incidents shall be staffed as required by 5.2.3.

5.7.5.3 Other Types of Companies.

5.7.5.3.1 Other types of companies equipped with specialized apparatus and equipment for wildland fire fighting, including aircraft, heavy equipment, mini pumpers, and fast attack vehicles, shall be provided to assist wildland engine and ladder companies where deemed necessary as part of established practice.

5.7.5.3.2 These companies shall be staffed with a minimum number of on-duty personnel as required by the tactical, topographical, environmental, fuel (vegetation), and occupancy hazards.

5.7.6 Deployment.

5.7.6.1 Required Number of Vehicles.

5.7.6.1.1 The fire department shall deploy from its wildland resources the number of vehicles required for a direct and/or indirect attack.

5.7.6.1.2* Prior to the initiation of any wildland fire attack, the fire department shall have the capacity to establish a lookout(s), communications with all crew members, escape route(s), and safety zone(s) for vehicles and personnel.

5.7.6.2 Direct Attack.

5.7.6.2.1 The fire department shall have the capability to initiate a direct wildland attack within 10 minutes after arrival of the initial company or crew at the fire scene.

5.7.6.2.2 One individual in the first arriving company or crew shall be assigned as the incident commander for the overall coordination and direction of the direct attack activities.



5.7.6.2.3 The direct wildland attack shall include the establishment of an effective water flow application rate of 30 gpm (114 L/min) from at least two 500 ft (150 m) 1½ in. (38 mm) diameter attack handlines from two engines.

5.7.6.2.4 Each attack handline shall be operated by a minimum of two individuals to deploy and maintain the line.

5.7.6.2.5 One operator shall remain with each fire apparatus supplying water flow to ensure uninterrupted water flow application.

5.7.6.2.6 A wildland crew leader or company officer shall be provided with each crew to be responsible for overall supervision of each of the crew and for maintaining personnel accountability and crew safety.

5.7.6.3 Indirect Attack.

5.7.6.3.1 The fire department providing wildland fire suppression operations shall have the capability to deploy an indirect attack, including application of water to the fire, engagement in search and rescue and preservation of property, accountability for personnel, and provision of support activities for those situations that are beyond the capability of the direct attack.

5.7.6.3.2 An incident safety officer shall be deployed to all incidents that escalate beyond a direct attack alarm assignment or when fire fighters face significant risk.

5.7.7 Non-Wildland Emergencies.

5.7.7.1 Wildland companies that deploy to structure fire incidents shall meet the time objective requirements of 4.1.2.

5.7.7.2 Wildland companies that deploy to emergency medical incidents shall meet the time objective requirements of 4.1.2.

Chapter 6 Systems

6.1 Safety and Health System. A fire-fighter occupational safety and health program shall be provided in accordance with NFPA 1500.

6.2* Incident Management System.

6.2.1 An incident management system shall be provided in accordance with NFPA 1561 to form the basic structure of all emergency operations of the fire department, regardless of the scale of the department or the emergency.

6.2.2* An incident management system shall be designed to manage incidents of different types, including structure fires, wildland fires, hazardous materials incidents, emergency medical operations, and other types of emergencies that could be encountered by the department.

6.3 Training Systems. The fire department shall have a training program and policy that ensures that personnel are trained and competency is maintained to execute all responsibilities consistent with the department's organization and deployment as addressed in Chapters 4 and 5.

6.4 Communications Systems.

6.4.1 The fire department shall have a reliable communications system to facilitate prompt delivery of public fire suppression, EMS, and special operations.

6.4.2 All communications facilities, equipment, staffing, operating procedures, performance objectives, and reporting shall comply with NFPA 1221.

6.4.3 Operating procedures for radio communications shall provide for the use of standard protocols and terminology at all types of incidents.

6.4.4 Standard terminology, in compliance with NFPA 1561, shall be established to transmit information, including strategic modes of operation, situation reports, and emergency notifications of imminent hazards.

6.5* Pre-Incident Planning.

6.5.1 The fire department shall set forth operational requirements to conduct pre-incident planning.

6.5.2 Particular attention shall be provided to all target hazards.

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.1.1 The standard includes minimum requirements that are intended to provide effective, efficient, and safe protective services that operate on a sound basis to prevent fires, reduce risk to lives and property, deal with incidents that occur, and prepare for anticipated incidents. It sets minimum standards considered necessary for the provision of public fire protection by career fire departments. It addresses the structure and operation of organizations providing such services, including fire suppression and other assigned emergency response responsibilities, which include EMS and special operations.

A.1.2.1 A fundamental concept of fire risk is associated with modern society. Public fire service organizations are expected to reduce the risk within their areas of jurisdiction by taking measures to prevent the outbreak of fires, limit the extent and severity of fires, provide for the removal or rescue of endangered persons, control and extinguish fires that occur within the jurisdiction, and perform other emergency response operations and delivery of EMS.

The cumulative effects of preventive efforts, risk reduction and control, and fire suppression capabilities result in variable levels of risk to the jurisdictions and their residents.

The risk remaining after deducting the cumulative effect of the public fire service organization's efforts is the responsibility of each individual, including owners, operators, occupants, and casual visitors to properties. It should be noted that fire risk cannot be completely avoided or eliminated.

A.1.4 The authority having jurisdiction (AHJ) determines what systems, methods, or approaches are equivalent or superior in performance. An AHJ should approach the assessment by reviewing the overall public fire protection and EMS system performance.

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.

A.3.3.2.1 Automatic Aid. Automatic aid is established through a written intergovernmental agreement that provides for the simultaneous dispatch of a predetermined response of personnel and equipment to a neighboring jurisdiction upon receipt of an alarm and is included as part of a communication center’s dispatch protocols.

A.3.3.4 Aircraft Rescue and Fire-Fighting (ARFF) Vehicle. The apparatus is typically equipped with a large water tank [commencing at 1000 gal (3800 L) and extending to over 6000 gal (22,800 L)]; a supply of fire-fighting extinguishing agents; remote-controlled large roof turret(s), extendable turret nozzle(s), and bumper turret(s) (ground sweep nozzles) that are used for the discharge of extinguishing agent; and pre-connected handlines.

A.3.3.5 Alarm. In some jurisdictions, an alarm is referred to as an incident or call for service.

A.3.3.13 Company. For fire suppression and other emergency operations, in some jurisdictions, the response capability of the initial arriving company is configured with two apparatus operating together. This can be a result of apparatus not being configured with seated and belted positions for four personnel, therefore requiring a second vehicle to carry additional personnel. It can also be the result of the fire department’s SOPs, which require two apparatus operating together to complete the operational procedures. The objective is to ensure that a minimum of four personnel are assigned to and deployed as a company. The two (or more) pieces of apparatus would always be dispatched and respond together as a single company. Some examples of this include the following:

- (1) A pumper and tanker/tender that would be responding together outside a municipal water district
- (2) A multiple-piece company, specified as such in a fire department’s SOPs, such as an engine or ladder company that responds with a rescue unit, water tender, or other type of apparatus
- (3) A company that consists of a pumper with an additional vehicle as a personnel carrier
- (4) A pumper and an ambulance or rescue unit that always respond together

A.3.3.21.1 Aircraft Rescue and Fire Fighting. Such rescue and fire-fighting actions are performed both inside and outside of the aircraft.

A.3.3.21.2 Marine Rescue and Fire Fighting. Marine companies can be utilized for special operations, including a platform for dive and scuba operations and for providing a secure water supply for land-based operations.

A.3.3.23 Fire Suppression. Fire suppression includes all activities performed at the scene of a fire incident or training exercise that expose fire department members to the dangers of heat, flame, smoke, and other products of combustion, explosion, or structural collapse. [1500, 2007]

A.3.3.24 First Responder (EMS). A first responder also assists higher level EMS providers.

A.3.3.26 Hazard. Hazards include the characteristics of facilities, equipment systems, property, hardware, or other objects; and the actions and inactions of people that create such hazards.

A.3.3.28 High-Hazard Occupancy. These occupancies include schools, hospitals, and other special medical facilities, nursing homes, high-risk residential occupancies, neighborhoods with structures in close proximity to one another, high-rise buildings, explosives plants, refineries, and hazardous materials occupancies.

A.3.3.30 Incident Management System (IMS). The system should be consistent with NIMS and the National Response Framework. The system is also referred to as an incident command system (ICS).

A.3.3.36.2 Basic Life Support (BLS). Basic life support could also include expediting the safe and timely transport of the patient to a hospital emergency department for definitive medical care.

A.3.3.38 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 can engage in emergency operations. [1500, 2007]

A.3.3.40.1 Company Officer. This person can be someone appointed in an acting capacity. The rank structure could be either sergeant, lieutenant, or captain.

A.3.3.40.3 Supervisory Chief Officer. The position of supervisory chief officer is above that of a company officer, who responds automatically and/or is dispatched to an alarm beyond the initial alarm capabilities, or other special calls. In some jurisdictions, this is the rank of battalion chief, district chief, deputy chief, assistant chief, or senior divisional officer (U.K. fire service).

A.3.3.41.2 Special Operations. Special operations include water rescue, extrication, hazardous materials, confined space entry, high-angle rescue, aircraft rescue and fire fighting, and other operations requiring specialized training. [1500, 2007]

A.3.3.44 Rapid Intervention Crew (RIC). The RIC reports directly to the incident commander or operations chief. This dedicated crew is not to be confused with the IRIC.

A.3.3.48 Staff Aide. This member is assigned to a supervisory chief officer who assists at incident scene operations, which can include personnel accountability, communications, and other logistical and administrative support. In addition, this member can assist in coordinating training activities, respond to citizen inquiries, coordinate staffing issues and sick leave

follow-up, and assign resource allocations for facilities and apparatus under the supervisory chief officer's jurisdiction. Staff aides can be known as field incident technician, staff assistant, battalion fire fighter, or battalion adjutant.

A.3.3.53.5 Initiating Action/Intervention Time. A benchmark time frame isn't set to initiate a mitigating action or take other steps to intervene in resolving the issue that created the incident. Fire departments should track these times based on their SOPs and evaluate the data based on the nature of the incident.

A.3.3.53.6 Total Response Time. A "cascade of events" chart, shown as Figure A.3.3.53.6, is provided to assist understanding the relationship between NFPA 1221, NFPA 1710, and Initiating Time/Intervention Time (currently not addressed by a single NFPA standard). Three phases are included in total response time. They are as follows:

- (1) Phase One — Alarm Handling Time, which includes alarm transfer time, alarm answering time, and alarm processing time (addressed by NFPA 1221)
- (2) Phase Two — Turnout Time and Travel Time (addressed by NFPA 1710)
- (3) Phase Three — Initiating Action/Intervention Time

A.4.1.1 The AHJ generally has the responsibility to determine the following:

- (1) Scope and level of service provided by the fire department
- (2) Necessary level of funding
- (3) Necessary level of personnel and resources, including facilities

To provide service, the AHJ should have the power to levy taxes or solicit funding, to own property and equipment, and to cover personnel costs. The authority necessary is conveyed by law to a local jurisdiction.

In addition, the governing body also should monitor the achievement of the management goals of the department, such as fire prevention, community life safety education, fire suppression, employee training, communications, maintenance, and department administration.

The organizational statement is a very important basis for many of the provisions of this standard. The statement sets forth the legal basis for operating a fire department, the organizational structure of the fire department, number of members, training requirements, expected functions, and authorities and responsibilities of various members or defined positions.

A key point is to clearly set out the specific services the fire department is authorized and expected to perform. Most fire departments are responsible to a governing body. The governing body has the right and should assert its authority to set the specific services and the limits of the services the fire department will provide. It also has the responsibility to furnish the necessary resources for delivery of the designated services. The fire department should provide its governing body with a specific description of each service, with options or alternatives and an accurate analysis of the costs and resources needed for each service.

Such services could include structural fire fighting, wildland fire fighting, airport/aircraft fire fighting, emergency medical services, hazardous materials response, high-angle rescue, heavy rescue, and others.

Spelling out the specific parameters of services to be provided allows the fire department to plan, staff, equip, train, and deploy members to perform these duties. It also gives the governing body an accounting of the costs of services and allows it to select those services it can afford to provide. Likewise, the governing body should identify services it cannot afford to provide and cannot authorize the fire department to deliver, or it should assign those services to another agency.

The factors that should be included in the AHJ's risk assessment process include adopted building codes, required fire/life safety related engineering controls, accepted service delivery performance objectives, complexity of facilities, and occupancy hazards (low, medium, and high) within the jurisdiction.

The fire department should be no different than any other government agency that has the parameters of its authority and services clearly defined by the governing body.

Legal counsel should be used to ensure that any statutory services and responsibilities are being met.

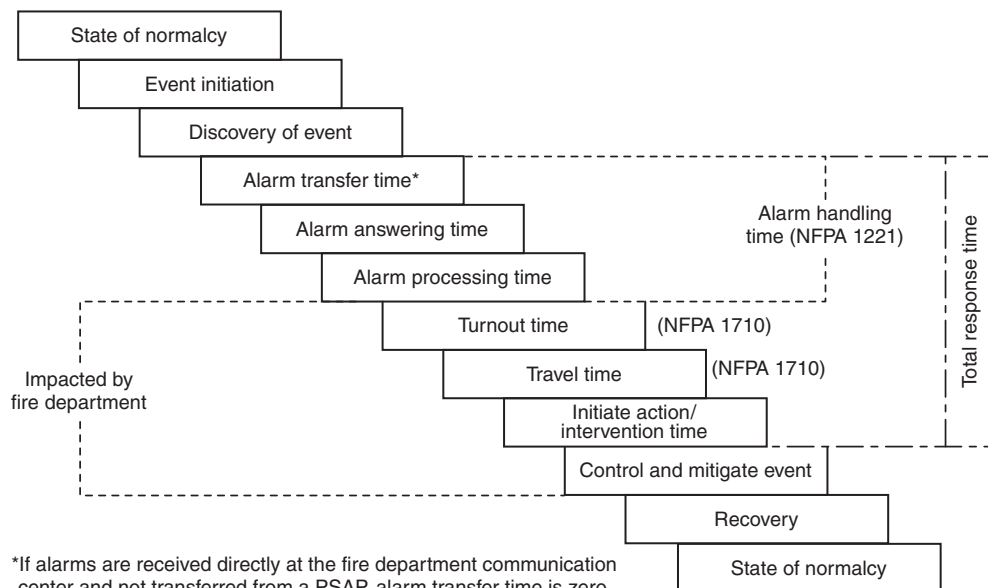


FIGURE A.3.3.53.6 Cascade of Events Chart.

The majority of public fire departments are established under the charter provisions of their governing body or through the adoption of statutes. These acts define the legal basis for operating a fire department, the mission of the organization, the duties that are authorized and expected to be performed, and the authority and responsibilities that are assigned to certain individuals to direct the operations of the fire department.

The documents that officially establish the fire department as an identifiable organization are necessary to determine specific responsibilities and to determine the parties responsible for compliance with the provisions of this standard.

In many cases, these documents can be part of state laws, a municipal charter, or an annual budget. In such cases, it would be appropriate to make these existing documents part of the organizational statement, if applicable.

A.4.1.2 There can be incidents or areas where the response criteria are affected by circumstances such as response personnel who are not on duty, unstaffed fire station facilities, natural barriers, traffic congestion, insufficient water supply, and density of population or property. The reduced level of service should be documented in the written organizational statement by the percentage of incidents and geographical areas for which the total response time criteria are achieved.

Additional service delivery performance objectives should be established by the AHJ for occupancies other than those identified within the standard for benchmark single-family dwellings. Factors to be considered include specific response areas (i.e., suburban, rural, and wilderness) and occupancy hazards.

A.4.1.2.1(3) This service delivery requirement is intended to have a fire department plan and situate its resources to consistently meet a 240-second travel time for the initial company fire suppression response and a 480-second travel time for the full alarm fire response assignment.

A.4.1.2.5.1 The evaluation of the fire department's provided level of service needs to be performed against the AHJ's established service delivery performance objectives. These objectives should be based on a jurisdictional risk assessment. The objectives established within this standard are based on a 2000 ft² (186 m²), two-story, single-family home without a basement and having no exposures. The AHJ's response objectives should be established based on numerous factors such as the circumstances affecting response personnel, adopted building codes, required fire/life safety-related engineering controls, accepted turnout/travel times, complexity of facilities, and occupancy hazards within the jurisdiction.

A.4.1.2.5.2 The collection of data is required to determine the organization's ability to meet its locally determined objectives and the performance objectives contained in the standard with regard to emergency incidences (warning lights and sirens). Organizations respond to numerous types of emergency and nonemergency incidents. While the collection and analysis of all of the response data is important, attainment of the 90 percent objective is only to be evaluated against emergency incident responses.

A.4.4.2 Occupational Safety and Health Administration (OSHA) regulations require that all fire departments be trained to respond to hazardous materials incidents at the first responder operations level.

Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA), known as the Emergency Planning and Community Right-to-Know Act, established requirements for federal, state, and local governments and industrial facilities

regarding emergency planning for spills or other releases, community right-to-know, and reporting of hazardous and toxic chemicals.

The Emergency Planning and Community Right-to-Know Act covers the following four major areas that provide the fire service and communities with a broad perspective on the chemical hazards within the local area and those at individual facilities:

- (1) Sections 301 through 303 — emergency planning
- (2) Section 304 — emergency release notification
- (3) Sections 311 and 312 — community right-to-know reporting requirements
- (4) Section 313 — toxic chemical release inventory

A.4.8.1 Where appropriate, the mutual aid agreement should include automatic responses on first alarms (automatic aid). This concept contemplates joint response of designated apparatus and personnel on a predetermined running assignment basis.

Mutual aid concepts should be considered on a regional basis. In an effective mutual aid arrangement, each fire department should retain reserves of personnel and apparatus. Traditionally and legally, overall command of the incident is vested with the senior officer of the jurisdiction experiencing the emergency.

Some areas use consolidated dispatching to coordinate the response of fire companies to assist an outside fire department. The management of responses can be made easier by utilizing computerization, "running cards," and other advance planning.

A.5.2 Suppression capability is an expression of how much fire-fighting power can be put into action when there is a fire. It includes the amount of apparatus, equipment, and personnel available; the time needed to respond and place equipment in action; the water supply; the application of strategy and tactics; the level of training; and all of the components that add up to effective fireground operations.

A.5.2.2 For more information, see NFPA 1250; FEMA, National Fire Academy, "Fire Risk Analysis: A Systems Approach"; and Phoenix, AZ, Fire Department, "Fire Department Evaluation System (FIRECAP)."

A.5.2.2.2 For further information on companies, see 3.3.13 and A.3.3.13.

A.5.2.2.2.1 An early, aggressive, and offensive primary interior attack on a working fire, where feasible, is usually the most effective strategy to reduce loss of lives and property damage. In Figure A.5.2.2.1, the line represents a rate of fire propagation in an unsprinklered room, which combines temperature rise and time. It roughly corresponds to the percentage of property destruction. At approximately 10 minutes into the fire sequence, the hypothetical room of origin flashes over. Extension outside the room begins at this point.

Consequently, given that the progression of a structure fire to the point of flashover (i.e., the very rapid spreading of the fire due to superheating of room contents and other combustibles) generally occurs in less than 10 minutes, two of the most important elements in limiting fire spread are the quick arrival of sufficient numbers of personnel and equipment to attack and extinguish the fire as close to the point of its origin as possible. For more information, refer to *Fire Service Today*, "Reduced Staffing: At What Cost," and NIST, "Hazard I Fire Hazard Assessment Method." Also, refer to National Fire Academy, "Fire Risk Analysis: A Systems Approach," and Office of the Ontario Fire Marshal, *Shaping the Future of Fire Ground Staffing and Delivery Systems within a Comprehensive Fire Safety Effectiveness Model*.



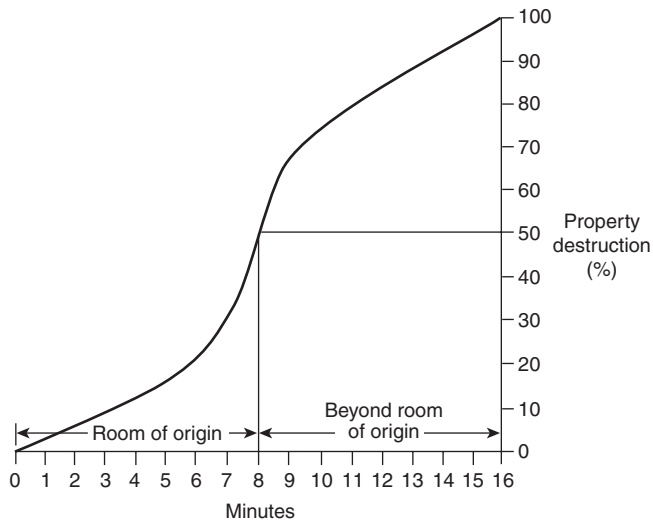


FIGURE A.5.2.2.2.1 Fire Propagation Curve.

The ability of adequate fire suppression forces to greatly influence the outcome of a structure fire is undeniable and predictable. Data generated by NFPA and used by the committee in developing this standard provide empirical data that rapid and aggressive interior attack can substantially reduce the human and property losses associated with structure fires [see Table A.5.2.2.2.1(a) and Table A.5.2.2.2.1(b)].

The NFPA Fire Analysis and Research Division provided the data in Table A.5.2.2.2.1(b) as an update of Table A.5.2.2.2.1(a).

A.5.2.2.2.3 The assignment of specific response districts to command officers should be based on the number of companies, workload, and response distances. Department administrative procedures should indicate clearly the jurisdiction of command officers.

A.5.2.2.2.5 For further information on staff aides, see 3.3.48 and A.3.3.48.

A.5.2.4.1.2 NFPA 1500, 29 CFR 1910.134, and *Memorandum for Regional Administrators; Response to IDLH or Potential IDLH Atmo-*

Table A.5.2.2.2.1(a) Fire Extension in Residential Structures, 1994–1998

Extension	Rate per 1000 Fires		
	Civilian Deaths	Civilian Injuries	Average Dollar Loss per Fire
Confined to room of origin	2.32	35.19	3,185
Beyond the room, but confined to floor of origin	19.68	96.86	22,720
Beyond floor of origin	26.54	63.48	31,912

Note: Residential structures include dwellings, duplexes, manufactured homes (also called mobile homes), apartments, row houses, townhouses, hotels and motels, dormitories, and barracks.

Source: NFPA Annual Fire Experience Survey and National Fire Incident Reporting System (NFIRS).

Table A.5.2.2.2.1(b) Fire Extension in Residential Structures, 2002–2005

Extension	Rate per 1000 Fires		
	Civilian Deaths	Civilian Injuries	Average Dollar Loss per Fire
Confined fires (identified by incident type)	0.08	9.25	313
Confined to room of origin	4.99	47.00	8,948
Confined to room of origin, including confined fires by incident type*	2.15	25.18	3,958
Beyond the room, but confined to floor of origin	17.62	80.45	34,011
Beyond floor of origin	27.48	59.38	58,820

Note: Residential occupancies include homes, hotels and motels, dormitories, and residential board and care facilities. These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to federal or state agencies or industrial fire brigades. National estimates are projections. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Property damage has not been adjusted for inflation.

*NFIRS 5.0 has six categories of confined structure fires, including cooking fires confined to the cooking vessel, confined chimney or flue fire, confined incinerator fire, confined fuel burner or boiler fire or delayed ignition, confined commercial compactor fire, and trash or rubbish fire in a structure with no flame damage to the structure or its contents. Although causal information is not required for these incidents, it is provided in some cases. In this analysis, all confined fires were assumed to be confined to the room of origin.

Source: NFIRS 5.0 and NFPA survey.

spheres provide further information. The IRIC and the rapid intervention crew (RIC) members are equipped with the fire fighters' protective ensemble, including protective clothing and equipment as required by NFPA 1500.

A.5.2.4.2.2 The hazards presented by this scenario are not unusual, as all communities respond to fire incidents in this type of structure on a regular basis.

A.5.2.4.2.3 Other occupancies and structures in the community that present greater hazards should be addressed by additional fire fighter functions and additional responding personnel on the initial full alarm assignment. The NFPA *Fire Protection Handbook* categorizes occupancies in three broad groups:

- (1) High-hazard occupancies: schools, hospitals, nursing homes, explosives plants, refineries, high-rise buildings, and other high life hazard or large fire potential occupancies
- (2) Medium-hazard occupancies: apartments, offices, mercantile, and industrial occupancies not normally requiring extensive rescue or fire-fighting forces
- (3) Low-hazard occupancies: one-, two- or three-family dwellings and scattered small businesses and industrial occupancies. The NFPA 1710 benchmark occupancy fits into this low-hazard category.

In determining the initial responding force to these occupancies, AHJs must consider the additional potential of fire spread, types of combustibles, increased life hazard, and various tasks that must be accomplished to achieve their mission.

A.5.2.4.3.1 Once units arrive, or a determination is made that other resources are required, additional alarms should be called for and dispatched. Departments should have predetermined procedures for additional alarms. Many departments send the same number and type of units on the second alarm as on the first alarm. Incident commanders can always request unique resources when required. Many departments will only be able to handle additional alarms through automatic or mutual aid agreements that have been previously established.

A.5.3 An EMS system is defined as a comprehensive, coordinated arrangement of resources and functions that are organized to respond in a timely, staged manner to medical emergencies, regardless of their cause. The term *system* can be applied locally or at the state, provincial, or national level. The fundamental functions of an EMS system are the following:

- (1) System organization and management
- (2) Medical direction
- (3) Human resources and training
- (4) Communications
- (5) Emergency response
- (6) Transportation
- (7) Care facilities
- (8) Quality assurance
- (9) Public information and education
- (10) Disaster medical services
- (11) Research
- (12) Special populations

A.5.3.2 The following four functions do not necessarily exist as separate elements in a particular system:

- (1) The first responding unit can be an advanced life support (ALS) ambulance that can provide ALS treatment and ambulance transportation.
- (2) The first responding unit can be a fire suppression unit that can provide both initial and advanced-level medical care.
- (3) ALS can be provided by the ambulance or by an additional fire suppression unit or a unit that is dedicated to ALS response only.
- (4) The system might not have ALS treatment capability — only a fire apparatus with fire fighters trained as first responder AED can respond.

A.5.3.3.3 The American Heart Association recommends the minimum required personnel for an emergency cardiac care response. In those systems that have attained survival rates higher than 20 percent for patients with ventricular fibrillation, response teams include, as a minimum, two ALS providers and two BLS providers. See “Guidelines 2000 for Cardiopulmonary Resuscitation and Emergency Cardiac Care,” “Basic Trauma Life Support for Paramedics and Other Providers,” “Pre-Hospital Trauma Life Support,” “Pediatric Advanced Life Support,” and “Emergency Care and Transportation of the Sick and Injured.”

A.5.5.6.2 The U.S. Air Force has defined the areas involved in the emergency within 75 ft (23 m) of the aircraft as immediately dangerous to life and health (IDLH).

A.5.6 For additional information on marine fire fighting, see NFPA 1405.

A.5.6.5.1 For additional information on marine rescue and fire-fighting vessels, see NFPA 1925.

A.5.7.6.1.2 A system developed by Chief Paul Gleason of the United States Forest Service addresses specific mandatory fire orders in a system termed *LCES*, which stands for lookout(s), communication(s), escape route(s), and safety zone(s). These four items are to be implemented as an integrated system by a single resource unit, a strike team, or a full assignment. The implementation of LCES is a minimum safety requirement prior to the initiation of any wildland fire-fighting operations.

A.6.2 Emergency incidents can involve operations that vary considerably in their complexity and scale. The control of these incidents depends on the planned, systematic implementation of an effective fireground organization to accomplish identified objectives. Every fire department, regardless of size, needs a proper system to regulate and direct emergency forces and equipment at both routine and major incidents. The incident management system forms the basic structure of operations, regardless of scale. An effective system is designed to manage incidents of different types, including structure fires, wildland fires, hazardous materials incidents, and medical and other emergencies.

A.6.2.2 Unlike fire incidents where command is normally predicated by rank structure, EMS patient care is based on statutory recognition of the individual with the highest level of medical certification. The recommendation is that departments adopt protocols that define the degree of both member and nonmember involvement in direct patient care based on local standards, medical control, and statutory requirements.

A.6.5 For additional information, see NFPA 1620.

Annex B Community Wide Risk Management Model

This annex is not a part of the requirements of this NFPA document but is included for information purposes only.

B.1 This model is used as an example of how a community wide risk management plan can be utilized to protect both citizens and property. While NFPA 1710 is scoped strictly to focus on deployment, staffing, and service levels, the realization is that this is one component of a total community fire protection planning process. An AHJ can determine that other components could reduce the risks of fire and therefore adopt stronger building and fire prevention codes, enforce those more vigorously, and enhance their public life safety education components. These models are included for that purpose. Figure B.1 illustrates a fire department process map.

B.1.1 This annex addresses the need for fire departments to develop an overall “defense-in-depth” strategy for the delivery of fire services. The development of such a strategy should include an assessment of the tools available to the fire service for accomplishing the goals of fire safety.

B.1.2 Fire safety objectives can be defined as those ideas that a department aspires to deliver. For example, fire department objectives could include such statements as “Maintain injuries and life/property losses as low as reasonably achievable (community and department).” The accomplishment of this objective should not be left to fire-fighting operations alone. See Figure B.1.2 for fire safety concepts.

B.1.3 Fire prevention is not simply preventing fire. It is the systematic application of codes, standard, engineering principles, and an understanding of human behavior to achieve the objective of limiting the loss of life and property.





FIGURE B.1 Fire Department Process Map.

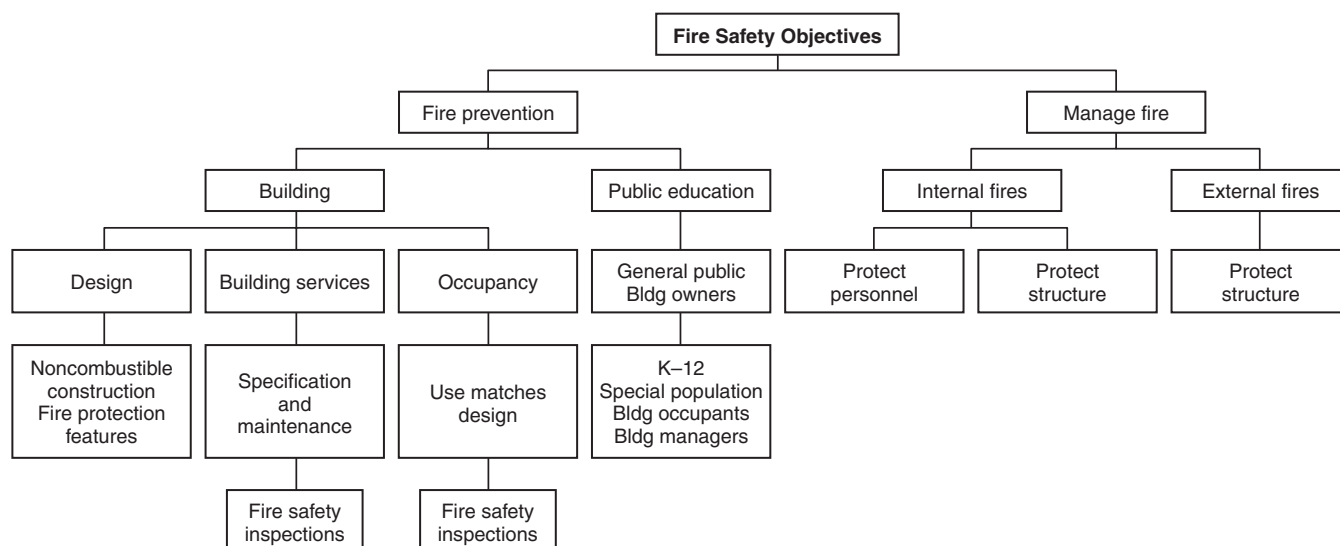


FIGURE B.1.2 Fire Safety Concepts for Fire Department Operations.

B.1.3.1 As outlined in NFPA 1, *Fire Code*, fire prevention includes egress, construction design, building services, fire protection, and occupancy. All of these elements work together to provide the occupants and fire department personnel with a level of fire safety not otherwise available.

B.1.3.2 By ensuring that each of these elements is balanced, the fire department can maintain a reasonable level of risk for the community and the department.

B.1.3.3 To provide risk management, the fire department must utilize all of the tools available. In order of preference, those tools are as follows:

- (1) Fire-safe design and construction
- (2) Suppression systems
- (3) Detection systems

- (4) Occupant fire prevention practices
- (5) Fire department-conducted fire-safety inspections
- (6) Fire rescue response

B.1.3.4 A structure designed and constructed to withstand the effects of fire is the most important asset in achieving fire risk management. A structure relying solely on fire rescue response offers the greatest challenge to the occupants and fire department personnel.

B.1.4 Fire impact management is the ability to manage the impact of a fire on occupants and structures. The participation of the fire department in the design, construction, maintenance, and use of a structure provides defense-in-depth against fire losses.

B.1.4.1 Structures that are designed with noncombustible construction, are protected with fire protection systems, and are routinely inspected to ensure appropriate occupant use are most likely to provide the lowest risk levels and therefore are the least difficult to manage.

B.1.4.2 Fire-fighting operations on fully compliant structures for which the fire fighters know the occupancy conditions can be conducted with a plan that commits resources only as necessary to accomplish the pre-established goals.

B.1.4.3 Pre-established goals for each structure define the commitment of resources in order to limit risk to occupants, the structure, and fire department personnel.

Annex C Informational References

C.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.

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

NFPA 1, *Fire Code*, 2009 edition.

NFPA 1221, *Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems*, 2010 edition.

NFPA 1250, *Recommended Practice in Emergency Service Organization Risk Management*, 2004 edition.

NFPA 1405, *Guide for Land-Based Fire Fighters Who Respond to Marine Vessel Fires*, 2006 edition.

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

NFPA 1620, *Recommended Practice for Pre-Incident Planning*, 2003 edition.

NFPA 1925, *Standard on Marine Fire-Fighting Vessels*, 2008 edition.

Fire Protection Handbook, 20th edition, 2008.

Fire Service Today, Gerard, J.C. and A.T. Jacobsen, "Reduced Staffing: At What Cost," September 1981.

C.1.2 Other Publications.

C.1.2.1 AMA Publications. American Medical Association, 515 North State Street, Chicago, IL 60610.

"Guidelines 2000 for Cardiopulmonary Resuscitation and Emergency Cardiac Care." 1992. *Journal of the American Medical Association*, 268(16) (October 28).

C.1.2.2 FEMA Publications. Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472.

"Fire Risk Analysis: A Systems Approach," NFA-SM-FRAS, National Emergency Training Center, National Fire Academy, July 20, 1984.

C.1.2.3 NIST Publications. National Institute of Standards and Technology, 100 Bureau Drive, Bldg. 820, Rm. 164, Gaithersburg, MD 20899.

"Hazard I Fire Hazard Assessment Method," U.S. Department of Commerce, June 1991.

C.1.2.4 U.S. Government Publications. U.S. Government Printing Office, Washington, DC 20402.

Memorandum for Regional Administrators; Response to IDLH or Potential IDLH Atmospheres, Department of Labor, Occupational

Safety and Health Administration, May 1, 1995 corrected to November 30, 2006.

Title 29, Code of Federal Regulations, Part 1910.134, "Respiratory protection," 2006.

Title 42, U.S. Code, Chapter 116, Emergency Planning and Community Right-to-Know Act, 1986.

C.1.2.5 Other Publications. "Basic Trauma Life Support for Paramedics and Other Providers," American College of Emergency Physicians, John Campbell (ed), 1997.

Office of the Ontario Fire Marshal, *Shaping the Future of Fire Ground Staffing and Delivery Systems within a Comprehensive Fire Safety Effectiveness Model*, 1993.

"Pre-Hospital Trauma Life Support," American College of Surgeons, Paturaas, Wertz and McSwain (eds), 1999.

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