

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**

2020



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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

2020 Edition

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 April 28, 2019, with an effective date of May 18, 2019, and supersedes all previous editions.

This edition of NFPA 1710 was approved as an American National Standard on May 18, 2019.

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.

The 2010 edition of NFPA 1710 standardized and refined 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 included recognition that there is a time interval to initiate action or intervene at the end of travel time and before control and mitigation actually begin.

The requirements for time frames for alarm handling were 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 because 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 was changed to an annual report.

The annex material related to the requirement stated for an initial full alarm assignment capability was 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 1710.

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

In the 2016 edition, the committee added three new occupancies and the appropriate response staffing levels for garden-style apartment, open-air strip mall, and high-rise occupancies. In addition, redundant text was removed, and some language was clarified.

For the 2020 edition, the committee has updated the definition for *career fire department* and clarified how to determine if the department would fall under either NFPA 1710 or NFPA 1720. The committee has also added several new definitions relating to geographic areas based on population density, and included the number of responders needed based on type of incident and tasks to accomplish. New requirements have been added for mobile water supply tankers/tenders. Requirements for deployment and training of incident safety officers have been added as well. And material on wildland fire suppression has been expanded.

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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.

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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. 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 and extracted publications can be found in Chapter 2 and Annex E.

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 career fire departments.

1.1.1 The requirements address functions and performance 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 72®, *National Fire Alarm and Signaling Code*®, 2019 edition.

NFPA 403, *Standard for Aircraft Rescue and Fire-Fighting Services at Airports*, 2018 edition.

NFPA 472, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, 2018 edition.

NFPA 1143, *Standard for Wildland Fire Management*, 2018 edition.

NFPA 1221, *Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems*, 2019 edition.

NFPA 1407, *Standard for Training Fire Service Rapid Intervention Crews*, 2015 edition.

NFPA 1500™, *Standard on Fire Department Occupational Safety, Health, and Wellness Program*, 2018 edition.

NFPA 1521, *Standard for Fire Department Safety Officer Professional Qualifications*, 2015 edition.

NFPA 1561, *Standard on Emergency Services Incident Management System and Command Safety*, 2014 edition.

NFPA 1620, *Standard for Pre-Incident Planning*, 2015 edition.

NFPA 1670, *Standard on Operations and Training for Technical Search and Rescue Incidents*, 2017 edition.

2.3 Other Publications.

2.3.1 U.S. Government Publications. U.S. Government Publishing Office, 732 North Capitol Street, NW, Washington, DC 20401-0001.

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*, 2018 edition.

NFPA 1002, *Standard for Fire Apparatus Driver/Operator Professional Qualifications*, 2017 edition.

NFPA 1081, *Standard for Facility Fire Brigade Member Professional Qualifications*, 2018 edition.

NFPA 1142, *Standard on Water Supplies for Suburban and Rural Fire Fighting*, 2017 edition.

NFPA 1221, *Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems*, 2019 edition.

NFPA 1500™, *Standard on Fire Department Occupational Safety and Health Program*, 2018 edition.

NFPA 1521, *Standard for Fire Department Safety Officer Professional Qualifications*, 2015 edition.

NFPA 1561, *Standard on Emergency Services Incident Management System and Command Safety*, 2014 edition.

NFPA 1720, *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Volunteer Fire Departments*, 2020 edition.

NFPA 1901, *Standard for Automotive Fire Apparatus*, 2016 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. An NFPA Standard, the main text of which contains only mandatory provisions using the word "shall" to

indicate requirements and that is in a form generally suitable for mandatory reference by another standard or code or for adoption into law. Nonmandatory provisions are not to be considered a part of the requirements of a standard and shall be located in an appendix, annex, footnote, informational note, or other means as permitted in the NFPA Manuals of Style. When used in a generic sense, such as in the phrase "standards development process" or "standards development activities," the term "standards" includes all NFPA Standards, including Codes, Standards, Recommended Practices, and Guides.

3.3 General Definitions.

3.3.1 Advanced Life Support (ALS). See 3.3.44.1.

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, 2017]

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 3.3.25.1.

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, 2017]

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, 2019]

3.3.6 Alarm Answering Time. See 3.3.64.1.

3.3.7 Alarm Handling Time. See 3.3.64.2.

3.3.8 Alarm Processing Time. See 3.3.64.3.

3.3.9 Alarm Transfer Time. See 3.3.64.4.

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, 2016]

N 3.3.10.2 Mobile Water Supply Apparatus (Tanker, Tender). A vehicle designed primarily for transporting (pickup, transporting, and delivering) water to fire emergency scenes to be applied by other vehicles or pumping equipment. [1901, 2016]

3.3.10.3 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.

3.3.10.4 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 3.3.44.2.

N 3.3.13 Career Fire Department. A fire department that utilizes full-time or full-time-equivalent (FTE) station-based personnel immediately available to comprise at least 50 percent of an initial full alarm assignment.

N 3.3.14* Community Risk Assessment. A systematic approach that identifies, assesses, categorizes, and classifies the probabilities and consequences of a community's fire and nonfire hazards and threats, taking into account all pertinent facts that increase or decrease risks in each first-due response zone.

3.3.15* 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, 2018]

3.3.16 Company Officer. See 3.3.48.1.

3.3.17 Crew. See 3.3.63, Team.

N 3.3.18 Dense Urban. An incorporated or unincorporated area with a population of over 200,000 people and/or a population density of over 3,000 people per square mile.

3.3.19 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, 2014]

3.3.20 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.

3.3.21 Emergency Operations. See 3.3.49.1.

N 3.3.22 Fire Alarm Signal Notification. Activation of an alarm-initiating device from a supervising station alarm system as identified by *NFPA 72*.

3.3.23 Fire Apparatus. See 3.3.10.1.

3.3.24 Fire Department Member. See 3.3.46, Member.

3.3.25 Fire Fighting.

3.3.25.1* 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, 2018]

3.3.25.2* 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.

3.3.25.3 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.

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

3.3.27* Fire Suppression. The activities involved in controlling and extinguishing fires. [1500, 2018]

N 3.3.28 First-Due Response Zone. The geographic area surrounding a fire station in which a company from that station is projected to be the first to arrive on the scene of an incident.

3.3.29* 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.

3.3.30 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.

N 3.3.31* Full-Time Equivalent (FTE). The hours worked by one employee on a full-time basis or a conversion of the hours worked by several part-time employees into the hours worked by full-time employees.

N 3.3.32 Geographical Isolation. A first-due response zone or jurisdiction with staffed resources where over 80 percent of the response area is outside of a 10-minute travel time from the next closest staffed suppression apparatus.

N 3.3.33* Geographical Restriction. A defined condition, measure, or infrastructure design that limits response and/or results in predictable response delays to certain portions of the jurisdiction.

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

3.3.35 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.

3.3.36* 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.

3.3.37 Incident Commander. The member responsible for all incident activities, including the development of strategies and tactics and the ordering and the release of resources. [472, 2018]

3.3.38* 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.

3.3.39 Incident Safety Officer. See 3.3.48.2.

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

3.3.41 Initial Rapid Intervention Crew (IRIC). See 3.3.53.1.

3.3.42 Initiating Action/Intervention Time. See 3.3.64.5.

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

3.3.44 Life Support.

3.3.44.1 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.

3.3.44.2* 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.

3.3.45 Marine Rescue and Fire Fighting. See 3.3.25.2.

3.3.46* Member. A person involved in performing the duties and responsibilities of a fire department, under the auspices of the organization. [1500, 2018]

3.3.47 Mutual Aid. See 3.3.2.2.

3.3.48 Officer.

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

3.3.48.2 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.

3.3.48.3* 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.

3.3.49 Operations.

3.3.49.1 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, 2018]

3.3.49.2* Special Operations. Those emergency incidents to which the fire department responds that require specific and advanced training and specialized tools and equipment. [1500, 2018]

N 3.3.50 Performance Objective. The specific requirement or end result of a work activity.

3.3.51 Public Safety Answering Point (PSAP). A facility in which 9-1-1 calls are answered. [1221, 2019]

3.3.52 Quint Apparatus. See 3.3.10.3.

3.3.53* Rapid Intervention Crew (RIC). A dedicated crew of at least one officer and three members, positioned outside the IDLH, trained and equipped as specified in NFPA 1407, who are assigned for rapid deployment to rescue lost or trapped members.

3.3.53.1 Initial Rapid Intervention Crew (IRIC). Two members of the initial attack crew, positioned outside the IDLH, trained and equipped as specified in NFPA 1407, who are assigned for rapid deployment (i.e., two in/two out) to rescue lost or trapped members.

3.3.54 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, 2018]

N 3.3.55 Rural. An area with fewer than 500 people per square mile.

3.3.56 Special Operations. See 3.3.49.2.

3.3.57 Specialized Apparatus. See 3.3.10.4.

3.3.58* 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.

3.3.59 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, 2015]

3.3.60 Structural Fire Fighting. See 3.3.25.3.

N 3.3.61 Suburban. An incorporated or unincorporated area with a population between 500 and 1,000 people per square mile.

3.3.62 Supervisory Chief Officer. See 3.3.48.3.

3.3.63 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, 2018]

3.3.64 Time.

3.3.64.1 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.

3.3.64.2 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.

3.3.64.3 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).

3.3.64.4 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.

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

3.3.64.6* 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.

3.3.64.7 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.

3.3.64.8 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.

3.3.65 Total Response Time. See 3.3.64.6.

3.3.66 Travel Time. See 3.3.64.7.

3.3.67 Turnout Time. See 3.3.64.8.

N 3.3.68 Urban. An incorporated or unincorporated area with a population of over 30,000 people and/or a population density over 1,000 people per square mile but less than 2,999.

N 3.3.69 Wildland. An area in which development is essentially nonexistent except for roads, railroads, powerlines, and similar transportation facilities with structures widely scattered.

N 3.3.70 Wildland Urban Interface (WUI). The line or zone where structures and other development meet or intermingle with undeveloped wildland or vegetative fuels and the area within or adjacent to private and public property where mitigation actions can prevent damage or loss from wildfire.

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.

Δ 4.1.2.1 The fire department shall establish the following performance objectives for the first-due response zones that are identified by the AHJ:

- (1) Alarm handling time **completion** in accordance with 4.1.2.3
- (2) 80 seconds 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 engine company at a fire suppression incident
- (4) 360 seconds or less travel time for the arrival of the second company with a minimum staffing of 4 personnel at a fire suppression incident
- (5) For other than high-rise, 480 seconds or less travel time for the deployment of an initial full alarm assignment at a fire suppression incident
- (6) For high-rise, 610 seconds or less travel time for the deployment of an initial full alarm assignment at a fire suppression incident
- (7) 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
- (8) 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 an 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.

Δ 4.1.2.3.1.1 Any call not answered within 20 seconds shall be routed to a secondary answering (alternate) center if the primary center is full.

N 4.1.2.3.1.2 An alarm shall sound if a call is not answered (not processed, just answered) within 60 seconds.

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 64 seconds for at least 90 percent of the alarms and not more than 106 seconds for at least 95 percent of the alarms, as specified by NFPA 1221.

4.1.2.3.3.1 Emergency alarm processing for the following call types shall be completed within 90 seconds 90 percent of the time and within 120 seconds 99 percent of the time:

- (1) Calls requiring emergency medical dispatch questioning and pre-arrival medical instructions
- (2) Calls requiring language translation
- (3) Calls requiring the use of a TTY/TDD device or audio/video relay services
- (4) Calls of criminal activity that require information vital to emergency responder safety prior to dispatching units

- (5) Hazardous material incidents
- (6) Technical rescue
- (7) Calls that require determining the location of the alarm due to insufficient information
- (8) Calls received by text message

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 **performance** 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 **performance** 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 travel time **performance** 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.

N 4.1.2.6.3 The annual report shall identify any deficiencies that are anticipated to develop in the next 3 years and address the steps necessary to continue to achieve compliance to this standard.

N 4.1.2.7 Incident Reports.

N 4.1.2.7.1 The fire department shall maintain a standardized reporting system that collects specific information on each incident. [1720:4.4.1]

N 4.1.2.7.1.1 The incident report shall include the location and nature of the fire or emergency and describe the circumstances of the incident and the operations performed. [1720:4.4.1.1]

N 4.1.2.7.1.2 This report shall identify the members responding to the incident. [1720:4.4.1.2]

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 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 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 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 Based on a formal community risk assessment, 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.

N 5.2.1.2 Response personnel shall be trained in their assigned positions in accordance with Sections 5.2 and 5.3 of NFPA 1500.

5.2.1.3 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 members 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 members assigned to fire suppression shall be organized into company units and shall have appropriate apparatus and equipment assigned to such companies.

Δ 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 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.

N 5.2.2.3 An incident safety officer shall be deployed upon confirmation of a structural fire, at special operation incidents, or when significant risk is present to the member due to the nature of an incident.

N 5.2.2.3.1 The incident safety officer, meeting the requirements as specified for the incident safety officer in NFPA 1521, shall have the expertise to evaluate hazards and provide direction with respect to the overall safety of personnel.

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 Engine Companies. 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 members.

5.2.3.1.2 In first-due response zones with a high number of incidents, geographical restrictions, geographical isolation, or urban areas, as identified by the AHJ, these companies shall be staffed with a minimum of five on-duty members.

5.2.3.1.2.1 In first-due response zones with tactical hazards, high-hazard occupancies, or dense urban areas, as identified by the AHJ, these fire companies shall be staffed with a minimum of six on-duty members.

5.2.3.2 Ladder/Truck Companies. 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 fire companies shall be staffed with a minimum of four on-duty members.

5.2.3.2.2 In first-due response zones with a high number of incidents, geographical restrictions, geographical isolation, or urban areas, as identified by the AHJ, these fire companies shall be staffed with a minimum of five on-duty members.

5.2.3.2.2.1 In first-due response zones with tactical hazards, high-hazard occupancies, or dense urban areas, as identified by the AHJ, these fire companies shall be staffed with a minimum of six on-duty members.

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 members 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.

N 5.2.3.5 Mobile Water Supply Tanker/Tender.

N 5.2.3.5.1 A mobile water supply apparatus whose primary function is to pick up, transport, and deliver water to the scene of a fire or other incident that requires a dedicated water supply shall be known as either a tanker or tender.

N 5.2.3.5.2 This tanker/tender shall be staffed with a minimum of two on-duty members.

N 5.2.3.6 Emergency Medical Care. Where emergency medical care is provided by outside agencies or organizations, those personnel shall be included in the deployment plan and meet the requirements as stated.

5.2.4 Deployment.

5.2.4.1 Single-Family Dwelling Initial Full Alarm Assignment Capability.

5.2.4.1.1* 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 member dedicated to this task (1)
- (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 (1)
- (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 members to effectively and safely maintain the line (4)
- (4) Provision of one support member for each attack and backup line deployed to provide hydrant hookup and to assist in laying of hose lines, utility control, and forcible entry (2)
- (5) Provision of at least one victim search and rescue team with each such team consisting of a minimum of two members (2)
- (6) Provision of at least one team, consisting of a minimum of two members, to raise ground ladders and perform ventilation (2)
- (7) If an aerial device is used in operations, one member to function as an aerial operator to maintain primary control of the aerial device at all times (1)
- (8) At a minimum, an initial rapid intervention crew (IRIC) assembled from the initial attack crew and, as the initial alarm response arrives, a full and sustained rapid intervention crew (RIC) established (4)
- (9) Total effective response force with a minimum of 16 (17 if an aerial device is used)

5.2.4.1.2 When an incident escalates beyond an initial full alarm assignment, or when significant risk is present to the member due to the magnitude of the incident, the incident commander shall request an EMS crew consisting of a minimum of two members to provide treatment and transport for injured members and civilians.

• 5.2.4.2 Open-Air Strip Shopping Center Initial Full Alarm Assignment Capability.

5.2.4.2.1* The initial full alarm assignment to a structure fire in a typical open-air strip shopping center ranging from 13,000 ft² to 196,000 ft² (1203 m² to 18,209 m²) in size shall provide for the following:

- (1) Establishment of incident command outside the hazard area for the overall coordination, direction, and safety of the initial full alarm assignment with a minimum of two members dedicated to managing this task (2)
- (2) Establishment of two uninterrupted water supplies at a minimum of 500 gpm (1892 L/min), with each supply line maintained by an operator (2)
- (3) Establishment of an effective water flow application rate of 500 gpm (1892 L/min) from three handlines, each of which has a minimum flow rate of 150 gpm (568 L/min), with each handline operated by a minimum of two members to effectively and safely maintain each handline (6)
- (4) Provision of one support member for each attack, backup, and exposure line deployed to provide hydrant hookup and to assist in laying of hose lines, utility control, and forcible entry (3)
- (5) Provision of at least two victim search-and-rescue teams, each team consisting of a minimum of two members (4)
- (6) Provision of at least two teams, each team consisting of a minimum of two members, to raise ground ladders and perform ventilation (4)
- (7) If an aerial device(s) is used in operations, one member to function as an aerial operator and maintain primary control of the aerial device at all times (1)
- (8) At a minimum, an initial rapid intervention crew (IRIC) assembled from the initial attack crew and, as the initial alarm response arrives, a full and sustained rapid intervention crew (RIC) established (4)
- (9) The establishment of an initial medical care component consisting of at least two members capable of providing immediate on-scene emergency medical support and transport that provides rapid access to civilians or members potentially needing medical treatment (2)
- (10) Total effective response force a minimum of 27 (28 if an aerial device is used)

5.2.4.3 Apartment Initial Full Alarm Assignment Capability.

5.2.4.3.1 The initial full alarm assignment to a structure fire in a typical 1200 ft² (111 m²) apartment within a three-story, garden-style apartment building shall provide for the following:

- (1) Establishment of incident command outside the hazard area for the overall coordination, direction, and safety of the initial full alarm assignment with a minimum of two members dedicated to managing this task (2)
- (2) Establishment of two uninterrupted water supplies at a minimum of 400 gpm (1520 L/min), with each supply line maintained by an operator (2)

- (3) Establishment of an effective water flow application rate of 300 gpm (1140 L/min) from three handlines, each of which has a minimum flow rate of 100 gpm (380 L/min), with each handline operated by a minimum of two members to effectively and safely maintain each handline. (6)
- (4) Provision of one support member for each attack, backup, and exposure line deployed to provide hydrant hookup and to assist in laying of hose lines, utility control, and forcible entry. (3)
- (5) Provision of at least two victim search-and-rescue teams, each team consisting of a minimum of two members. (4)
- (6) Provision of at least two teams, each team consisting of a minimum of two members, to raise ground ladders and perform ventilation. (4)
- (7) If an aerial device is used in operations, one member to function as an aerial operator and maintain primary control of the aerial device at all times. (1)
- (8) At a minimum, an initial rapid intervention crew (IRIC) assembled from the initial attack crew and, as the initial alarm response arrives, a full and sustained rapid intervention crew (RIC) established. (4).
- (9) The establishment of an initial medical care component consisting of at least two members capable of providing immediate on-scene emergency medical support, and transport that provides rapid access to civilians or members potentially needing medical treatment. (2)
- (10) Total effective response force a minimum of 27 (28 if an aerial device is used)
- (7) Provision of one officer, with an aide, dedicated to establishing an oversight at or near the entry point on the fire floor(s). (2)
- (8) Provision of one officer, with an aide, dedicated to establishing an oversight at or near the point of entry on the floor above the fire. (2)
- (9) Provision of two or more evacuation management teams to assist and direct building occupants with evacuation or sheltering actions, with each team consisting of a minimum of two members. (4)
- (10) Provision of one or more members to account for and manage elevator operations. (1)
- (11) Provision of a minimum of one trained incident safety officer. (1)
- (12) Provision of a minimum of one officer two floors below the fire floor to manage the interior staging area. (1)
- (13) Provision of a minimum of two members to manage member rehabilitation and at least one of the members to be trained to the ALS level. (2)
- (14) Provision of an officer and a minimum of three members to conduct vertical ventilation operations. (4)
- (15) Provision of a minimum of one officer to manage the building lobby operations. (1)
- (16) Provision of a minimum of two members to transport equipment to a location below the fire floor. (2)
- (17) Provision of one officer to manage external base operations. (1)
- (18) The establishment of an initial medical care component consisting of a minimum of two crews with a minimum of two members each with one member trained to the ALS level capable of providing immediate on-scene emergency medical support, and transport that provides rapid access to civilians or members potentially needing medical treatment. (4)
- (19) Total effective response force a minimum of 42 (43 if the building is equipped with a fire pump).

5.2.4.4* High-Rise Initial Full Alarm Assignment Capability.

▲ 5.2.4.4.1 Initial full alarm assignment to a fire in a building with the highest floor greater than 75 ft (23 m) above the lowest level of fire department vehicle access shall provide for the following:

- (1) Establishment of a stationary incident command post outside the hazard area for overall coordination and direction of the initial full alarm assignment with a minimum of one officer with an aide dedicated to these tasks and all operations are to be conducted in compliance with the incident command system. (2)
- (2) Establishment of an uninterrupted water supply to the building standpipe/sprinkler connection sufficient to support fire attack operations maintained by an operator and if the building is equipped with a fire pump, one additional member with a radio to be sent to the fire pump location to monitor and maintain operation. (1/1)
- (3) Establishment of an effective water flow application rate on the fire floor at a minimum of 500 gpm (1892 L/m) from two handlines, each operated by a minimum of two members to safely and effectively handle the line. (4)
- (4) Establishment of an effective water flow application rate on the floor above the fire floor at a minimum of 250 gpm (946 L/m) from at least one handline, with each deployed handline operated by a minimum of two members to safely and effectively handle the line. (2)
- (5) At a minimum, an initial rapid intervention crew (IRIC) assembled from the initial attack crew and, as the initial alarm response arrives, a full and sustained rapid intervention crew (RIC) established. (4)
- (6) Provision of two or more search-and-rescue teams consisting of a minimum of two members each. (4)

■ 5.2.4.5* Fire Alarm Notification Assignment. Initial alarm assignment to a fire alarm signal notification, without confirmation of a suspected fire condition and without multiple detection signals, shall be a minimum of one four-person company to investigate the cause of the fire alarm signal notification.

5.2.4.6 Additional Alarm Assignments.

5.2.4.6.1* Fire departments that respond to fires in occupancies that present hazards greater than those found in the occupancy described in 5.2.4.1 shall deploy additional resources on the initial alarm.

5.2.4.6.2* The fire department shall have the capability to deploy additional alarm assignments that can provide for additional command staff, members, 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.

• 5.3* 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 document its role, responsibilities, functions, and performance 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 members, 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 members 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 members 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 members 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 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 the time performance 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 members, 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, consisting of personnel trained and equipped as specified in NFPA 1407, during all special operations incidents that would subject members 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 members 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 members, 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 performance 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 performance objective requirements of 4.1.2.

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 5.3.3.2.

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 A member shall be dedicated to the task of incident commander.

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 members, 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 members 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 members
- (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 Members.

5.6.4.2.1 On-duty members 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 members 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. Wildland fire suppression operations shall be organized to ensure that the fire department's wildland fire suppression capability includes members, 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.

5.7.1 Organization.

5.7.1.1 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.

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

5.7.1.3 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.

5.7.2 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.

5.7.2.1 On-duty wildland fire-fighting members' 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 members
- (3) The number of trained response members 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)

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

5.7.2.2.1 The fire department shall identify minimum crew 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 crew.

5.7.2.2.2 Each crew shall be led by an officer who shall be considered a part of the crew.

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

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

N 5.7.2.3 Additional Staffing.

N 5.7.2.3.1 At least two wildland fire fighters shall be dispatched to a wildland fire and be referred to as a team.

N 5.7.2.3.2 For the purposes of dispatching wildland fire-fighting resources, a team shall be defined as a minimum of two certified wildland fire-fighting personnel.

N 5.7.2.3.3 One fire fighter shall be capable of performing as an IAIC on scene at the incident.

N 5.7.2.3.4 The second separate fire fighter dispatched shall perform fire-fighting operations under the supervision of the IAIC.

N 5.7.2.3.5 The IAIC shall conduct an initial assessment and size-up of the incident.

N 5.7.2.3.6 The IAIC shall use his or her judgment based on training and experience in deciding whether to safely engage the incident with the crew on scene or request additional resources.

N 5.7.2.3.7 The IAIC shall assume the duties of command and incident safety officer until relieved on the incident.

N 5.7.2.3.8 Members shall not be dispatched or respond to a wildfire alone without additional personnel on scene to perform the duties of IAIC.

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

5.7.3.1 These crews shall be staffed with a minimum of four on-duty members.

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

Δ 5.7.3.3 Other Types of Crews.

5.7.3.3.1 Other types of crews 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.

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

5.7.4 Deployment.

5.7.4.1 Required Number of Vehicles.

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

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

5.7.4.2 Direct Attack.

Δ 5.7.4.2.1 The fire department shall have the capability to initiate a direct wildland attack within 10 minutes after arrival of the initial crew at the fire scene.

▲ 5.7.4.2.2 One member in the first-arriving crew shall be assigned as the incident commander for the overall coordination and direction of the direct attack activities.

5.7.4.2.3 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.

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

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

▲ 5.7.4.2.6 A wildland crew leader shall be provided with each crew, to be responsible for overall supervision of each of the crew members and for maintaining personnel accountability and crew safety.

5.7.4.3 Indirect Attack.

5.7.4.3.1 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.

5.7.5 Non-Wildland Emergencies.

5.7.5.1 Wildland crews that deploy to structure fire incidents shall meet the time performance objective requirements of 4.1.2.

5.7.5.2 Wildland crews that deploy to emergency medical incidents shall meet the time performance 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.

6.3.1 The fire department shall have a training program and policy that ensure that members 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.

6.3.2 The agency shall demonstrate in its annual report that it has ensured competency for necessary knowledge, skills, and

abilities based on the community's specific hazards and risks, to include at least the hazards specifically addressed in this standard, for each member that is considered part of the effective response force.

6.3.3 The agency shall adopt training standards based on the cited hazards and risks, set performance objectives to achieve those standards, and demonstrate training and competency by meeting the performance objectives.

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, in accordance with NFPA 1620.

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 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. The equivalency statement contained in this standard allows jurisdictions to use other “systems, methods, or approaches” to meet requirements of the standard if they can validate and document in writing that such are equal or superior to the requirements contained in the standard. This equivalency statement is not intended to allow any jurisdiction or fire department to reduce the requirements in the standard and still claim compliance. Moreover, it specifically requires any jurisdiction relying on “equivalent” systems, methods, or approaches to validate, demonstrate, and document in writing that the standard is equal or superior to the requirements contained in this standard.

The authority having jurisdiction (AHJ) determines what systems, methods, or approaches are equivalent or superior in performance. The 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.3.3.14 Community Risk Assessment. Community risk assessment begins with identification of the hazards present in the community. Given that a particular hazard exists in a community, the consequences of an emergency event (e.g., fire) in such a hazard are ultimately determined by the mitigation efforts. In other words, the consequences are the results of the combination of the risk level of the hazard, the duration and nature of the event, property loss (e.g., building damage or collapse), personal injury or loss of life, economic losses, interruption of business and related operations, and damage to the environment. These consequences are often grouped into the following four categories:

- (1) Human impacts (e.g., civilian and firefighter injuries and deaths)
- (2) Economic impacts (e.g., property loss — both direct and indirect effects)
- (3) Psychological impacts (e.g., public confidence)
- (4) Functional impacts (e.g., continuity of operations)

A.3.3.15 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 members, 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.3.3.25.1 Aircraft Rescue and Fire Fighting. Such rescue and fire-fighting actions are performed both inside and outside of the aircraft.

A.3.3.25.2 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.3.3.27 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, 2018]

A.3.3.29 First Responder (EMS). A first responder also assists higher level EMS providers.

A.3.3.31 Full-Time Equivalent (FTE). Full-time equivalent calculations for fire departments can vary based on the work week established for the department. Typical fire department work weeks include, but are not limited to, 42-, 48-, and 56-hour weeks. The weeks are calculated based on a seven-day period.

A.3.3.33 Geographical Restriction. In this sense, a geographical restriction should be a condition, measure, or infrastructure design such as a railroad crossing, drawbridge, narrow street that is inaccessible by fire apparatus, traffic demand pattern, long supply line lay, or other similar circumstance that impedes an apparatus' travel to an incident.

A.3.3.34 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.3.3.36 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.3.3.38 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.3.3.44.2 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.3.3.46 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, 2018]

A.3.3.48.1 Company Officer. This person can be someone appointed in an acting capacity. The rank structure could be either sergeant, lieutenant, or captain.

A.3.3.48.3 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.3.3.49.2 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, 2018]

A.3.3.53 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.3.3.58 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.3.3.64.5 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.3.3.64.6 Total Response Time. A "cascade of events" chart, shown as Figure A.3.3.64.6, 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

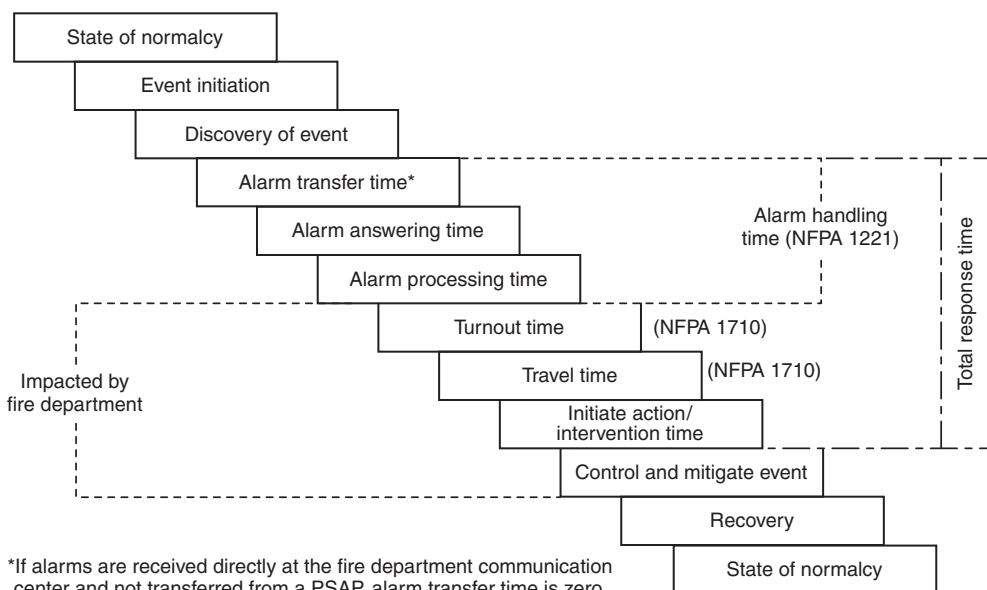


FIGURE A.3.3.64.6 Cascade of Events Chart.

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.

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 members 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; for other than high-rise, a 480-second travel time for the full alarm fire response assignment; and for high-rise, a 610-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 circumstan-

ces 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 (FIREDAPE)."

A.5.2.2.2 For further information on companies, see 3.3.15 and A.3.3.15.

Δ A.5.2.2.2.1 Important elements in limiting fire spread are the quick arrival of sufficient personnel and equipment to attack and extinguish the fire as close to the point of its origin as possible. For more information, see the National Fire Academy's "Fire Risk Analysis: A Systems Approach," and, from the Office of the Ontario Fire Marshal, *Shaping the Future of Fire Ground Staffing and Delivery Systems Within a Comprehensive Fire Safety Effectiveness Model*. For additional information see the Underwriters Laboratory Firefighter Safety Research Institute's website at www.ulfirefightersafety.org; as well as NIST Technical Note 1797, April 2013; and NIST Technical Note 1661, April 2010.

The ability of adequate fire suppression forces to significantly 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.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 3.3.58 and A.3.3.58.

A.5.2.4.1.1 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.5.2.4.2.1 The open-air strip shopping center represents more than 67 percent of types of shopping centers, as described by the International Council of Shopping Centers (ICSC). The ICSC describes these centers as "usually configured in a straight line as a strip, or may be laid out in an L or U shape, depending on the site and design. They consist of an attached row of stores or service outlets managed as a coherent retail entity, with on-site parking usually located in front of the stores. Open canopies may connect the store fronts, but a strip center does not have enclosed walkways linking the stores. The open air strip shopping center may contain between five and 40 stores of varying occupancy types and hazards with three or more being larger, anchor stores such as a discount store, supermarket, drug, or large specialty discount store."

Δ A.5.2.4.4 See NIST Technical Note 1797, *Report on High-Rise Fireground Field Experiments*, for more information.

N A.5.2.4.5 Some examples of a suspected fire condition could be, but are not limited to, additional calls reporting smoke and odor of something burning. Also, examples of multiple detection signals could be, but are not limited to, heat detection, smoke detection, and water flow detection.

Table A.5.2.2.2.1 Loss Rates by Fire Spread in 2012–2016
Home Structure Fires

Flame Spread	Rate per 1000 Fires		Average Dollar Loss per Fire
	Civilian Deaths	Civilian Injuries	
Confined fires or contained fire identified by incident type*	0.0	8.7	\$200
Confined fire or fire spread confined to object of origin	0.4	11.1	\$1,200
Confined to room of origin, including confined fires and fires confined to object	1.8	23.8	\$4,000
Spread beyond the room of origin but confined to floor of origin	16.2	76.3	\$35,000
Spread beyond the floor of origin	24.6	55.0	\$65,900

Note: Homes include one- and two-family homes (including manufactured housing) and apartments or other multifamily housing. These statistics are national estimates based on fires reported to local U.S. fire departments and so exclude fires reported only to federal or state agencies. 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.

* The National Fire Incident Reporting System (NFIRS) has six categories of confined structure fires: cooking fires confined to the cooking vessel; confined chimney or flue fires; confined incinerator fires; confined fuel burner or boiler fires, including delayed ignitions; confined commercial compactor fires; and trash or rubbish fires in a structure with no flame damage to the structure or its contents.

Source: NFIRS and NFPA annual fire experience survey.

A.5.2.4.6.1 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

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.5.2.4.6.2 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.5.5.6.2 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.5.7.4.1.2 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 member 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 Assessment 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 an example of how a community-wide risk assessment plan can be used to protect both citizens and property. While NFPA 1710 is scoped to focus strictly on deployment, staffing, and service levels, it is one component of a total community fire protection planning process. An AHJ can determine other components that could reduce the risks of fire and adopt stronger building and fire prevention codes, enforce those more vigorously, and enhance public life safety education components. This model is included for that purpose. Figure B.1 illustrates a fire department process map.

Chapter 5 of NFPA 1730 establishes a process to identify and analyze community risks to assist in the development and implementation of a community risk reduction (CRR) plan.

Detailed guidance on conducting a CRR plan is provided in Annex B of NFPA 1730.

For other documents on community risk assessment and community risk reduction, see: *Fire Service Deployment: Assessing Community Vulnerability*, Urban Fire Forum; *ISO Fire Suppression Rating Schedule*, *Community Risk Assessment: Standards of Cover*, *IFE V2020 CRR 2009 Project Report*, *IFE V2020 CRR Symposium Report*, and *Washington Association of State Fire Marshals CRR Project Report*.

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.

B.1.3.1 As outlined in NFPA 1, 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.

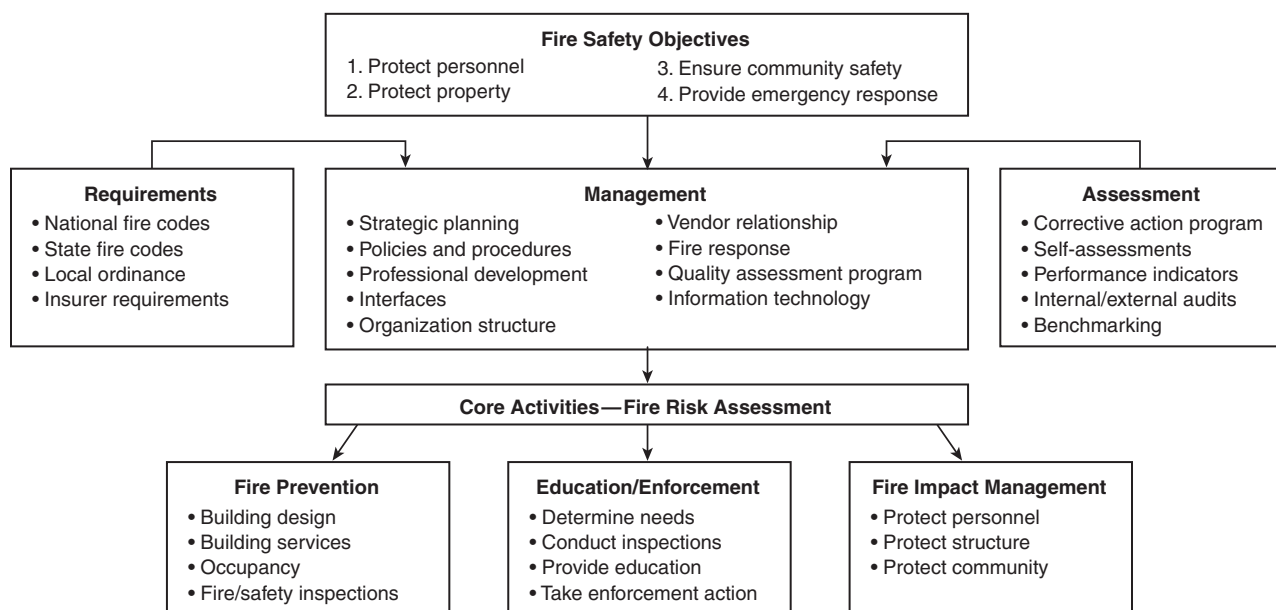


FIGURE B.1 Fire Department Process Map.

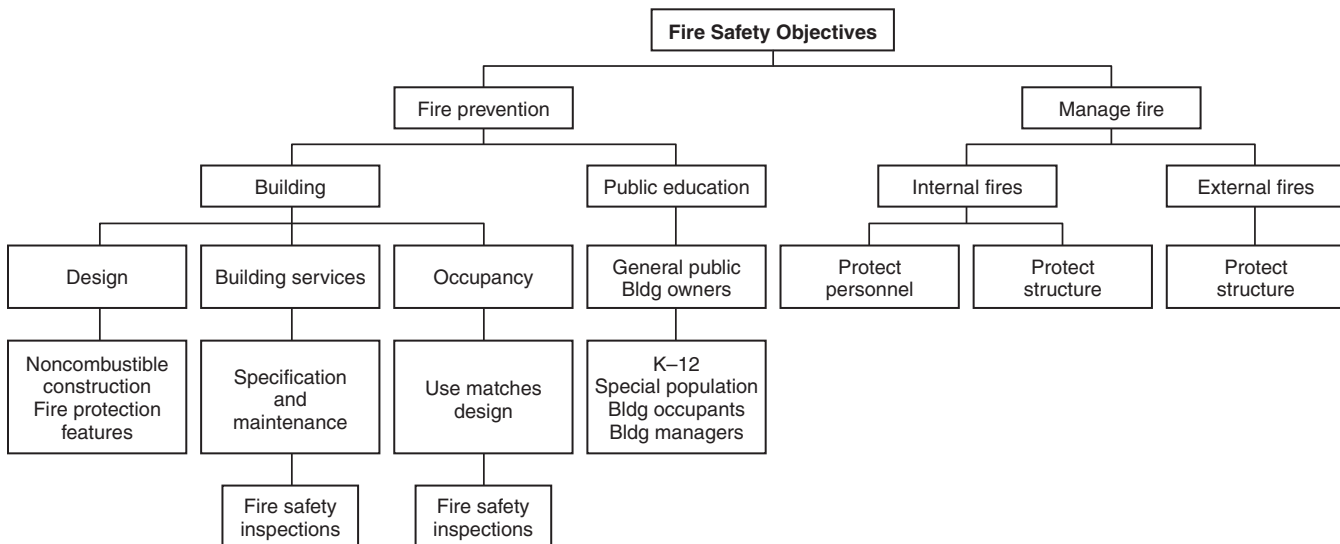


FIGURE B.1.2 Fire Safety Concepts for Fire Department Operations.

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.

N B.1.5 Decision Algorithms.

N B.1.5.1 Based on the geographic composition of the response district, the AHJ should take into account any geographic restrictions or areas of geographic isolation when determining response times and responding apparatus. (See Figure B.1.5.1.)

N B.1.5.2 Along with taking into account any geographical restrictions, the AHJ also has to develop an algorithm to address the deployment of staff based on the initial alarm size as well as the known hazards/risks that will be encountered. (See Figure B.1.5.2.)

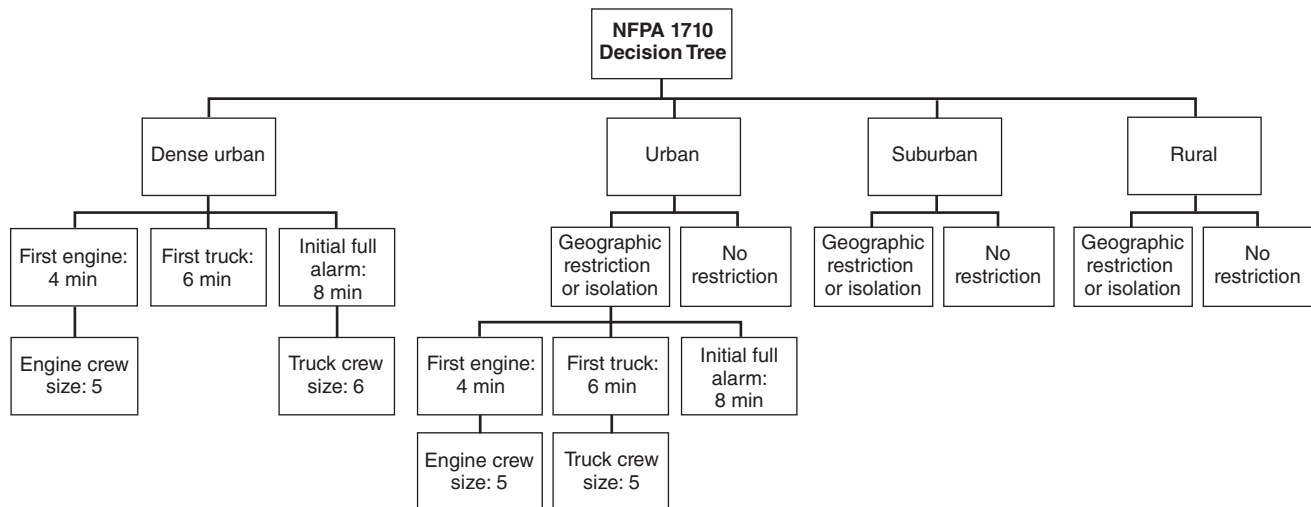


FIGURE B.1.5.1 Decision Algorithm.

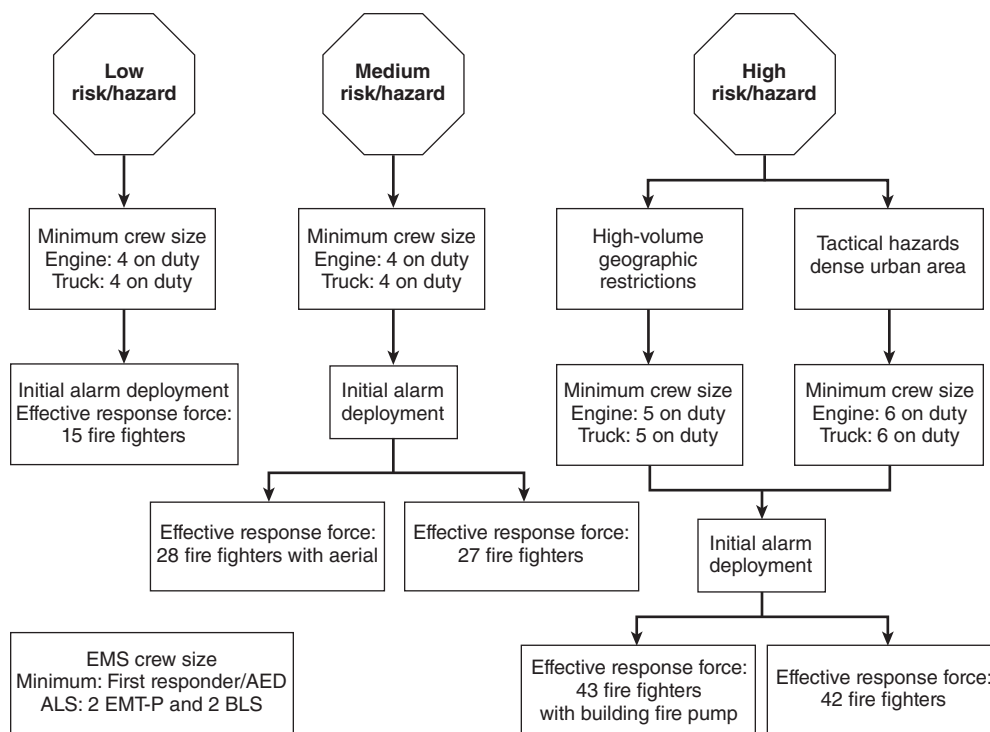


FIGURE B.1.5.2 Deployment Algorithm.

N Annex C NFPA 1710 at a Glance

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

N C.1 Fire Suppression and Special Operations Provisions. The term *company* is defined as a group of members who are:

- (1) Under direct supervision
- (2) Trained and equipped to perform assigned tasks
- (3) Organized and identified as engine, ladder, rescue, squad, or multifunctional companies
- (4) Operating at the scene with one apparatus

N C.2 Exception. An exception to a company arriving on one apparatus is as follows:

- (1) Multiple apparatuses are assigned, dispatched, and arrive together.
- (2) The apparatuses continuously operate together.
- (3) The apparatuses are managed by a single officer.

An initial alarm is personnel, equipment, and resources ordinarily dispatched upon notification of a structure fire.

N C.3 Performance Objectives.

N C.3.1 Alarm answering time:

- 15 sec (95 percent)
- 40 sec (99 percent)

N C.3.2 Alarm processing time:

- 64 sec (90 percent)
- 106 sec (95 percent)

N C.3.3 Turnout time:

- 60 sec EMS
- 80 sec Fire

N C.3.4 First-arriving engine on scene time:

- 240 sec (4 min)

N C.3.5 Second-arriving company on scene time:

- 300 sec (5 min)

N C.3.6 Initial full alarm (low and medium hazard) time:

- 480 sec (8 min)

N C.3.7 Initial full alarm — high hazard/high-rise time:

- 610 sec (10 min 10 sec)

N C.4 Fire Department Response to Certain Incidents.

N C.4.1 Fire departments should set forth criteria for various types of incidents to which they are required/expected to respond. These types of incidents should include, but not be limited to, the following:

- (1) Natural disasters
- (2) Acts of terrorism
- (3) Weapons of mass destruction (WMD)
- (4) Large-scale mass casualties

N C.4.2 Given expected fire-fighting conditions, the number of on-duty members should be determined through task analysis considering the following criteria:

- (1) Life hazard protected population
- (2) Safe and effective performance
- (3) Potential property loss
- (4) Hazard levels of properties
- (5) Fireground tactics employed

N C.5 Company Staffing (Crew Size) On Duty.

Engine: 4 minimum

High-volume/geographic restrictions: 5 minimum

Tactical hazards dense urban area: 6 minimum

Truck: 4 minimum

High-volume/geographic restrictions: 5 minimum

Tactical hazards dense urban area: 6 minimum

N C.5.1 Initial alarm deployment (number of firefighters including officers):

Low hazard: 15

Medium hazard: 28

High hazard: 43

N C.6 Emergency Medical Services (EMS) Provisions. The fire department should clearly document its role, responsibilities, functions, and objectives for the delivery of EMS. EMS operations should be organized to ensure the fire department's capability and includes members, equipment, and resources to deploy the initial-arriving company and additional alarm assignments.

N C.6.1 EMS treatment levels include the following:

- (1) First responder
- (2) Basic life support (BLS)
- (3) Advanced life support (ALS)

N C.6.2 Minimum EMS provision is same as first responder/AED.

The authority having jurisdiction (AHJ) should determine if the fire department provides BLS, ALS, and/or transport. Patient treatment associated with each level of EMS should be determined by the AHJ based on requirements and licensing within each state/province.

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

N C.6.3 Personnel deployed to ALS emergency responses must include the following:

- (1) A minimum of two members trained at the emergency medical technician-paramedic level
- (2) Two members trained at the BLS level arriving on scene within the established travel time

All fire departments with ALS services should have a named medical director with the responsibility to oversee and ensure quality medical care in accordance with state or provincial laws or regulations, and must have a mechanism for immediate communication with EMS supervision and medical oversight.

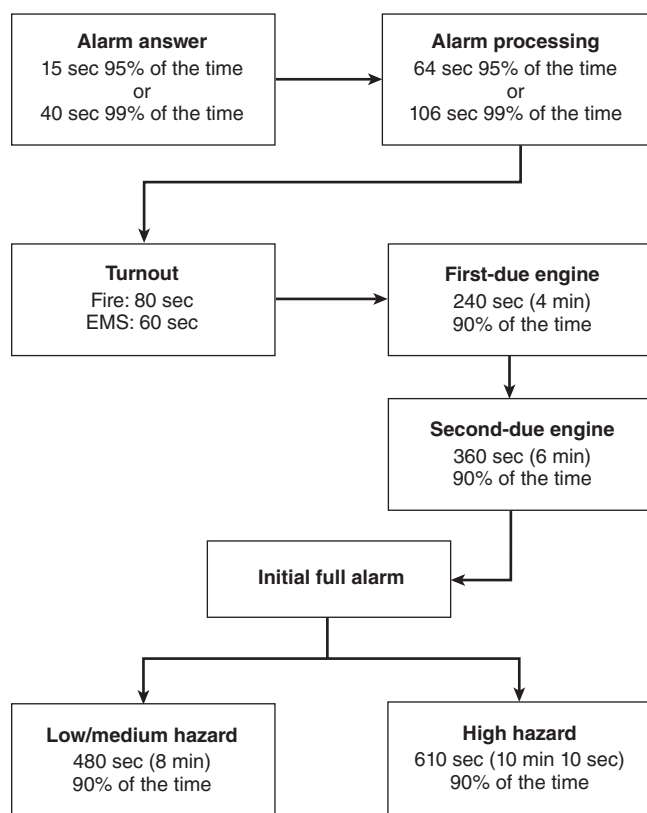
N C.7 Other Factors. The following factors should also be taken into consideration:

- (1) RIC and IRIC
- (2) Geographic isolation

N Annex D Response Objectives

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

N D.1 General. Documenting the benchmarks and response objectives that make up NFPA 1710 is crucial to capturing and tracking data that would be helpful in ensuring the necessary allocation of resources. (See Figure D.1.)



N FIGURE D.1 Response Objectives.

Annex E Informational References

E.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.

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

NFPA 1, *Fire Code*, 2018 edition.

NFPA 1221, *Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems*, 2019 edition.

NFPA 1250, *Recommended Practice in Fire and Emergency Service Organization Risk Management*, 2015 edition.

NFPA 1405, *Guide for Land-Based Fire Departments That Respond to Marine Vessel Fires*, 2016 edition.

NFPA 1620, *Standard for Pre-Incident Planning*, 2015 edition.

NFPA 1730, *Standard on Organization and Deployment of Fire Prevention Inspection and Code Enforcement, Plan Review, Investigation, and Public Education Operations*, 2019 edition.

NFPA 1925, *Standard on Marine Fire-Fighting Vessels*, 2018 edition.

Fire Protection Handbook, 20th edition, 2008.

E.1.2 Other Publications.

Δ E.1.2.1 CPSE Publications. Center for Public Safety Excellence, Inc., 4501 Singer Court, Suite 180, Chantilly, VA 20151.

Community Risk Assessment: Standards of Cover, 6th edition, 2016.

E.1.2.2 FEMA Publications. Federal Emergency Management Agency, 500 C Street, SW, Washington, DC 20472.

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

Δ E.1.2.3 NIST Publications. National Institute of Standards and Technology, 100 Bureau Drive, Stop 1070, Gaithersburg, MD 20899.

NIST Technical Note 1661, *Report on Residential Fireground Field Experiments*, April 2010.

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E.1.2.4 U.S. Government Publications. U.S. Government Publishing Office, 732 North Capitol Street, NW, Washington, DC 20401-0001.

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N E.1.2.5 Vision 20/20 Publications. Vision 20/20, 35 Horner Street, Suite 120, Warrenton, VA 20186.

IFE V2020 Community Risk Reduction (CRR) 2009 Project Report.

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▲ E.1.2.6 Other Publications.

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Gerard, John C., and Jacobsen, A. Terry, “Reduced Staffing: At What Cost?,” *Fire Service Today*, pp. 15–21, September 1981.

Fire Service Deployment: Assessing Community Vulnerability, Urban Fire Forum, 2011.

ISO Fire Suppression Rating Schedule.

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

Washington Association of State Fire Marshals CRR Project Report.

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

E.2.1 AMA Publications. American Medical Association, AMA Plaza, 330 N. Wabash Avenue, Suite 39300, Chicago, IL 60611-5885.

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

E.2.2 CPSE Publications. Center for Public Safety Excellence, Inc., 4501 Singer Court, Suite 180, Chantilly, VA 20151.

Fire and Emergency Service Self-Assessment Manuals (FESSAM), 9th edition, Commission on Fire Accreditation International, (CFAI), 2015.

E.2.3 Government Accounting Standards Board. Government Accounting Standards Board, 401 Merritt 7, P.O. Box 5116, Norwalk, CT 06856-5116.

▲ E.2.4 IAFC/IAFF Publications. International Association of Fire Chiefs/International Association of Fire Fighters. International Association of Fire Chiefs, 4025 Fair Ridge Drive, Suite 300, Fairfax, VA 22033-2868. International Association of Fire Fighters, 1750 New York Avenue, Suite 300, NW, Washington, DC 20006-5395.

NFPA 1710 Implementation Guide, August 2002.

▲ E.2.5 IAFF Publications. International Association of Fire Fighters, 1750 New York Avenue, NW, Suite 300, Washington, DC 20006.

Emergency Medical Services, A Guidebook for Fire-Based Systems, 4th edition.

Fire Department Based EMS Whitepaper, <http://www.iaff.org/tech/PDF/FB%20EMS%20Whitepaper%20FINAL%20July%205%202007%20.pdf>.

“Fire Service Deployment: Assessing Community Vulnerability,” *High-Rise Implementation Guide*, second edition.

NFPA 1710 Summary Sheet, <http://services.prod.iaff.org/ContentFile/Get/30541>.

NFPA 1710 Explainer Video, <https://www.youtube.com/watch?v=f42S9TRc634>.

▲ E.2.6 ICMA Publications. International City/County Management Association, 777 North Capitol Street, NE, Suite 500, Washington, DC 20002-4201.

“Managing Fire and Rescue Services,” June 2002.

“Interim Report of the Tricom Consortium.”

E.2.7 IFSTA/FPP Publications. IFSTA/FPP, 930 N. Willis, Stillwater, OK 74078.

“Systems Approach to Managing Fire and Life Safety Services,” Dennis Compton.

▲ E.2.8 ISO Publications. Insurance Services Office Customer Service Division, 150 West 30th Street, Suite 1101, New York, NY 10001.

“Public Protection Classification Service”; Fire Suppression Rating Schedule.

■ E.2.9 UL Publications. Underwriters Laboratories Inc., 333 Pfingsten Road, Northbrook, IL 60062-2096, www.ul.com.

https://ulfirefightersafety.org/docs/Analysis_of_Changing_Residential_Fire_Dynamics_and_Its_Implications_on_Firefighter_Operational_Timeframes.pdf.

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

“Pediatric Advanced Life Support,” American Heart Association, Besson (ed), 1997.

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

Title 29, Code of Federal Regulations, Part 1910.156, “Fire Brigades.”

E.2.11 Other Publications.

“Emergency Care and Transportation of the Sick and Injured,” American Association of Orthopedic Surgeons, Browner (ed), 1999.

“Fire Department Evaluation System (FIREDAPE),” Phoenix, AZ Fire Department, December 1991.

“Performance Measurement and Benchmarking Project,” Office of the Ontario Fire Marshal, 2003.

E.3 References for Extracts in Informational Sections.

NFPA 1500™, *Standard on Fire Department Occupational Safety and Health Program*, 2018 edition.