NFPA 1081

Standard for Industrial Fire Brigade Member Professional Qualifications

2007 Edition

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

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NFPA 1081

Standard for

Industrial Fire Brigade Member Professional Qualifications

2007 Edition

This edition of NFPA 1081, *Standard for Industrial Fire Brigade Member Professional Qualifications*, was prepared by the Technical Committee on Industrial Fire Brigades Professional Qualifications and released by the Technical Correlating Committee on Professional Qualifications. It was issued by the Standards Council on July 28, 2006, with an effective date of August 17, 2006, and supersedes all previous editions.

This edition of NFPA 1081 was approved as an American National Standard on August 17, 2006.

Origin and Development of NFPA 1081

In 1996, the NFPA Standards Council, after receipt of a request for the development of a standard for the professional qualifications of industrial fire brigade members, approved the establishment of a Technical Committee on Industrial Fire Brigades Member Professional Qualifications under the Professional Qualifications project. The purpose of the document was to develop requirements for personnel who perform as members of organized industrial fire brigades at specific sites or facilities. An organizational meeting of the new committee was held in October 1997 in Tampa, FL. The technical committee met a total of eight times during the development of this document.

The development process was coordinated with other professional qualifications documents and with the Technical Committee on Loss Prevention Procedures and Practices, the committee responsible for NFPA 600, *Standard on Industrial Fire Brigades*. To accommodate the site-specific needs of industrial fire brigades at various locations, the committee developed a core set of job performance requirements, as well as site-specific requirements for each defined level in the document. The intent is that the management of a facility utilizing the requirements of NFPA 1081 would identify those site-specific requirements applicable to the facility and incorporate them into the requirements for their industrial fire brigade members. This departure from the traditional style of other professional qualifications documents was necessary in order to track with the NFPA 600 and OSHA requirements in 29 CFR 1910.156 for fire brigades.

The first edition of NFPA 1081, *Standard for Industrial Fire Brigade Member Professional Qualifications*, adopted at the May 2001 meeting of the National Fire Protection Association, established job performance requirements for the levels of industrial fire brigade operations defined in NFPA 600: Incipient, Advanced Exterior, and Interior Structural. Requirements for the position of Fire Brigade Leader were also provided in the document.

The 2007 edition of NFPA 1081 is a complete revision of the document and includes editorial changes to JPRs, Requisite Knowledge, Requisite Skills statements, and their associated Annex A statements. New material has also been added for "site-specific requirements."

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Committee Scope: This Committee shall have primary responsibility for the management of the NFPA Professional Qualifications Project and documents related to professional qualifications for fire service, public safety, and related personnel.

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

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

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

Chapter 1 Administration

1.1* Scope. This standard identifies the minimum job performance requirements (JPRs) necessary to perform the duties as a member of an organized industrial fire brigade providing services at a specific facility or site.

1.2 Purpose. The purpose of this standard is to specify the minimum JPRs for industrial fire brigade members. It is not the intent of the standard to restrict any jurisdiction from exceeding these requirements.

1.3 Application.

1.3.1* The management of the industrial fire brigade shall establish instructional priority and the training program content to prepare individuals to meet the JPRs of this standard. The JPRs found in Chapters 5 through 8 are not required to be mastered in the order they appear.

1.3.1.1* The management of the industrial fire brigade shall establish an ongoing process to ensure that members continue to meet the JPRs of this standard.

1.3.2 Wherever in this standard the terms *rules, regulations, procedures, supplies, apparatus,* or *equipment* are referred to, it is implied that they are those of the management of the industrial fire brigade.

1.4 Units and Formulas. In this standard, values for measurement are followed by an equivalent in U.S. units, but only the first stated value shall be regarded as the requirement. Equivalent values are not considered as the requirement, as these values can be approximate. *(See Table 1.4.)*

Table 1.4 SI Conversions

Quantity	SI Unit/Symbol	U.S. Unit/Symbol	Conversion Factor
Length	millimeter (mm)	inch (in.)	25.4 mm = 1 in.
	meter (m)	foot (ft)	0.305 m = 1 ft
Area	square meter (m^2)	square foot (ft^2)	0.0929 m^2 = 1 ft^2
Volume	liters per minute (L/min)	gallons per minute (gpm)	3.78 L/min = 1 gpm
Pressure	newtons/$meter^2$ (N/m^2)	pounds per square inch (psi)	0.345 N/m^2 = 1 psi

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 472, *Standard for Professional Competence of Responders to Hazardous Materials Incidents,* 2002 edition.

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

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

NFPA 1561, *Standard on Emergency Services Incident Management System,* 2005 edition.

2.3 Other Publications.

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

Title 29, Code of Federal Regulations, Part 1910.120.

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 Professional Competence of Responders to Hazardous Materials Incidents,* 2002 edition.

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

NFPA 1000, *Standard for Fire Service Professional Qualifications Accreditation and Certification Systems,* 2006 edition.

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

NFPA 1021, *Standard for Fire Officer Professional Qualifications,* 2003 edition.

NFPA 1031, *Standard for Professional Qualifications for Fire Inspector and Plan Examiner,* 2003 edition.

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

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

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

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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,* 2004 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* Listed. Equipment, materials, or services included in a list published by an organization that is acceptable to the authority having jurisdiction and concerned with evaluation of products or services, that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services, and whose listing states that either the equipment, material, or service meets appropriate designated standards or has been tested and found suitable for a specified purpose.

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

3.3 General Definitions.

3.3.1 Certification. An authoritative attestment; specifically, the issuance of a document that states that an individual has demonstrated the knowledge and skills necessary to function in a particular fire service professional field. [**1000,** 2006]

3.3.2 Drill. An exercise involving a credible simulated emergency that requires personnel to perform emergency response operations for the purpose of evaluating the effectiveness of the training and education programs and the competence of personnel in performing required response duties and functions. [**600,** 2005]

3.3.3 Emergency Response Operations. Activities related to emergency incidents, including response to the scene of the incident and specific duties performed at the scene.

3.3.4 Enclosed Structure. A structure with a roof or ceiling and at least two walls that can present fire hazards to employees such as accumulations of smoke, toxic gases, and heat, similar to those found in buildings. [**600,** 2005]

3.3.5 Facility. A structure or building located on a site that serves a particular purpose.

3.3.6 Fire Fighting.

3.3.6.1* *Advanced Exterior Fire Fighting.* Offensive fire fighting performed outside of an enclosed structure when the fire is beyond the incipient stage. *(See also 3.3.8, Incipient Stage.)* [**600,** 2005]

3.3.6.2 *Defensive Fire Fighting.* The mode of manual fire control in which the only fire suppression activities taken are limited to those required to keep a fire from extending from one area to another. [**600,** 2005]

3.3.6.3 *Incipient Fire Fighting.* Fire fighting performed inside or outside of an enclosed structure or building when the fire has not progressed beyond incipient stage.

3.3.6.4* *Interior Structural Fire Fighting.* The physical activity of fire suppression, rescue, or both, inside of buildings or enclosed structures that are involved in a fire situation beyond the incipient stage. [**600,** 2005]

3.3.6.5 *Offensive Fire Fighting.* The mode of manual fire control in which manual fire suppression activities are concentrated on reducing the size of a fire to accomplish extinguishment. [**600,** 2005]

3.3.6.6 *Structural Fire Fighting.* The activities of rescue, fire suppression, and property conservation in buildings, enclosed structures, aircraft interiors, vehicles, vessels, aircraft, or like properties that are involved in a fire or emergency situation. [**1710,** 2004]

3.3.7 Incident Management System (IMS). A system that defines the roles and responsibilities to be assumed by personnel and the operating procedures to be used in the management and direction of emergency operations; the system is also referred to as an incident command system (ICS). [**1021,** 2003]

3.3.8 Incipient Stage. Refers to the severity of a fire where the progression is in the early stage and has not developed beyond that which can be extinguished using portable fire extinguishers or handlines flowing up to 473 L/min (125 gpm). A fire is considered to be beyond the incipient stage when the use of thermal protective clothing or self-contained breathing apparatus is required or an industrial fire brigade member is required to crawl on the ground or floor to stay below smoke and heat.

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

3.3.10 Industrial Fire Brigade Apparatus. An industrial fire brigade emergency response vehicle designed and intended primarily for fire suppression, rescue, or other specialized function that includes pumpers, foam apparatus, aerial ladders, rescue vehicles, and other such apparatus. [**600,** 2005]

3.3.11 Industrial Fire Brigade Leader. An individual responsible for overseeing the performance or activity of other members.

3.3.12 Industrial Fire Brigade Management. The individual designated by top management to be responsible for the organization, management, and functions of the industrial fire brigade. [**600,** 2005]

3.3.13 Industrial Fire Brigade Training Coordinator. The designated company representative with responsibility for coordinating effective, consistent, and quality training within the industrial fire brigade training and education program. [**600,** 2005]

3.3.14 Job Performance Requirement (JPR). A statement that describes a specific job task, lists the items necessary to complete the task, and defines measurable or observable outcomes and evaluation areas for the specific task. [**1000,** 2006]

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3.3.15 Personal Protective Equipment (PPE). Consists of full thermal protective clothing, plus a self-contained breathing apparatus (SCBA) and a personal alert safety system (PASS) device.

3.3.16 Pre-Incident Plan. A document developed by gathering general and detailed data used by responding personnel to determine the resources and actions necessary to mitigate anticipated emergencies at a specific facility. [**1620,** 2003]

3.3.17 Procedure. The series of actions, conducted in an approved manner and sequence, designed to achieve an intended outcome.

3.3.18 Rapid Intervention Crew/Company (RIC). A minimum of two fully equipped members who are on-site and assigned specifically to initiate the immediate rescue of injured or trapped members. [**1500,** 2007]

3.3.19 Requisite Knowledge. Fundamental knowledge one must have in order to perform a specific task. [**1031,** 2003]

3.3.20 Requisite Skills. The essential skills one must have in order to perform a specific task. [**1031,** 2003]

3.3.21 Safely. To perform the assigned tasks without injury to self or others, to the environment, or to property. [**472,** 2002]

3.3.22 Site. The entire premises within the governed property lines that contains one or more facilities.

3.3.23 Site-Specific Hazard. A hazard that is present at the specific facility for which the industrial fire brigade has been organized. [**600,** 2005]

3.3.24 Standard Operating Procedure (SOP). 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,** 2002]

3.3.25* Support Member. Personnel assigned to the industrial fire brigade to perform specific response duties, including those people who have specific technical knowledge or skills or who have been given specific assignments that indirectly support manual fire suppression efforts. [**600,** 2005]

3.3.26 Task. A specific job behavior or activity. [**1002,** 2003]

3.3.27 Team. Two or more individuals 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.

3.3.28* Thermal Protective Clothing. Protective clothing such as helmets, footwear, gloves, hoods, trousers, and coats that are designed and manufactured to protect the fire brigade member from the adverse effects of fire. [**600,** 2005]

3.3.29 Zone.

3.3.29.1 ***Cold Zone.*** The area immediately outside the boundary of the established warm zone where personnel are safe from the adverse effects of a fire. [**600,** 2005]

3.3.29.2 ***Hot Zone.*** The area immediately surrounding the physical location of a fire having a boundary that extends far enough from the fire to protect industrial fire brigade members positioned outside the hot zone from being directly exposed to flames, dense smoke, or extreme temperatures. [**600,** 2005]

3.3.29.3 ***Warm Zone.*** The control area immediately outside the boundary of the established hot zone having a boundary that extends far enough from the hot zone to protect personnel outside the warm zone from the adverse effects of the fire. [**600,** 2005]

Chapter 4 Entrance Requirements

4.1* General. Prior to entering training to meet the requirements of Chapters 5 through 8, the candidate shall meet the entrance and educational requirements established by the management of the industrial fire brigade and the medical- and job-related physical requirements established by NFPA 600, *Standard on Industrial Fire Brigades.*

4.2* Emergency Medical Care. The emergency medical care performance capabilities for industrial fire brigade personnel shall be determined and validated by the management of the industrial fire brigade.

4.3 Job Performance Requirements (JPRs). The JPRs shall be accomplished in accordance with the requirements of the management of the industrial fire brigade and NFPA 600, *Standard on Industrial Fire Brigades.*

4.3.1* In addition to the requirements defined in Chapters 5 through 8, the management of the industrial fire brigade shall define the site-specific requirements for each level of industrial fire brigade membership that are applicable to its employees and shall include those requirements in the evaluation of the employee at the applicable level. The process used to identify the site-specific requirements for a site or facility shall be documented.

4.3.2* Performance of each requirement of this standard shall be evaluated by individuals approved by the management of the industrial fire brigade.

4.3.3 The entrance requirements of Chapter 4 shall be met prior to beginning training at the incipient level.

4.3.4* Prior to being qualified or certified at the incipient level, the candidate shall meet the JPRs defined in Sections 5.1 and 5.2 and the applicable site-specific requirements in Section 5.3 as defined by the management of the industrial fire brigade.

4.3.4.1 The incipient level is the first level of progression for the subsequent levels of progression in this standard.

4.3.5 Prior to being qualified or certified at the advanced exterior level, the industrial fire brigade member shall meet the JPRs of Sections 5.1, 5.2, 6.1, and 6.2 and the applicable site-specific requirements in Sections 5.3 and 6.3 as defined by the management of the industrial fire brigade.

4.3.6 Prior to being qualified or certified at the interior structural level, the industrial fire brigade member shall meet the JPRs of Sections 5.1, 5.2, 7.1, and 7.2 and the applicable site-specific requirements in Sections 5.3 and 7.3 as defined by the management of the industrial fire brigade.

4.3.7 Prior to being qualified or certified at the interior structural/advanced exterior level, the industrial fire brigade member shall meet the JPRs of Chapters 5, 6, and 7 and the applicable site-specific requirements as defined by the management of the industrial fire brigade.

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4.3.8 Prior to being qualified or certified at the fire brigade leader level, the industrial fire brigade member shall meet the JPRs of Chapters 5, 6, or 7 for the level of the industrial fire brigade he or she is leading and the applicable site-specific requirements as defined by the management of the industrial fire brigade.

4.3.9* Industrial fire brigade members who operate industrial fire brigade apparatus in the performance of their duties at any level of qualification defined by this document shall meet the applicable requirements as determined by the management of the industrial fire brigade in Chapters 4 through 10 of NFPA 1002, *Standard for Fire Apparatus Driver/Operator Professional Qualifications*.

4.3.9.1 Prior to operating industrial fire brigade apparatus, the fire apparatus operator/driver shall meet the JPRs of Chapter 4, Sections 5.1 through 5.3, and the applicable site-specific requirements as defined by the management of the industrial fire brigade.

4.3.10* Prior to responding to incidents such as civil unrest, use of weapons of mass destruction, or acts of terrorism, the management of the industrial fire brigade shall provide appropriate training to members that is consistent with their role.

4.3.11 Incident Command Training. The management of the industrial fire brigade shall provide incident management system training to industrial fire brigade members as defined by the National Incident Management System (NIMS) and NFPA 1561, *Standard on Emergency Services Incident Management System*.

Chapter 5 Incipient Industrial Fire Brigade Member

5.1 General. This duty shall involve initiating communications, using facility communications equipment to effectively relay oral or written information, responding to alarms, returning equipment to service, and completing incident reports, according to the JPRs in 5.1.1 through 5.2.3.

5.1.1 Qualification or Certification. For qualification or certification at the incipient industrial fire brigade level, the industrial fire brigade member shall meet the JPRs of Chapter 4, Sections 5.1 and 5.2, and the site-specific requirements in Section 5.3 as defined by the management of the industrial fire brigade and the requirements defined in Chapter 4 of NFPA 472, *Standard for Professional Competence of Responders to Hazardous Materials Incidents*.

5.1.2 Basic Incipient Industrial Fire Brigade Member JPRs. All industrial fire brigade members shall have a general knowledge of basic fire behavior, operation within an incident management system, operation within the emergency response operations plan for the site, the standard operating and safety procedures for the site, and site-specific hazards.

5.1.2.1 Initiate a response to a reported emergency, given the report of an emergency, facility standard operating procedures, and communications equipment, so that all necessary information is obtained and communications equipment is operated properly.

(A) Requisite Knowledge. Procedures for reporting an emergency.

(B) Requisite Skills. The ability to operate facility communications equipment, relay information, and record information.

5.1.2.2* Transmit and receive messages via the facility communications system, given facility communications equipment and operating procedures, so that the information is promptly relayed and is accurate, complete, and clear.

(A) Requisite Knowledge. Facility communications procedures and etiquette for routine traffic, emergency traffic, and emergency evacuation signals.

(B) Requisite Skills. The ability to operate facility communications equipment and discriminate between routine and emergency communications.

5.1.2.3 Respond to a facility emergency, given the necessary equipment and facility response procedures, so that the team member arrives in a safe manner.

(A) Requisite Knowledge. Facility layout, special hazards, and emergency response procedures.

(B) Requisite Skills. The ability to recognize response hazards and to safely use each piece of response equipment provided.

5.1.2.4* Return equipment to service, given an assignment, policies, and procedures, so that the equipment is inspected, damage is noted, the equipment is clean, and the equipment is placed in a ready state for service or is reported otherwise.

(A) Requisite Knowledge. Types of cleaning methods for various equipment, correct use of cleaning materials, and manufacturer's or facility guidelines for returning equipment to service.

(B) Requisite Skills. The ability to clean, inspect, and maintain equipment and to complete recording and reporting procedures.

5.1.2.5* Complete a basic incident report, given the report forms, guidelines, and incident information, so that all pertinent information is recorded, the information is accurate, and the report is complete.

(A) Requisite Knowledge. Content requirements for basic incident reports, the purpose and usefulness of accurate reports, consequences of inaccurate reports, and how to obtain necessary information.

(B) Requisite Skills. The ability to collect necessary information, proof reports, and operate facility equipment necessary to complete reports.

5.2 Manual Fire Suppression. This duty shall involve tasks related to the manual control of fires and property conservation activities by the incipient industrial fire brigade member.

5.2.1* Extinguish incipient fires, given an incipient fire and a selection of portable fire extinguishers, so that the correct extinguisher is chosen, the fire is completely extinguished, proper extinguisher-handling techniques are followed, and the area of origin and fire cause evidence are preserved.

(A) Requisite Knowledge. The classifications of fire; risks associated with each class of fire; and the types, rating systems, operating methods, and limitations of portable fire extinguishers.

(B) Requisite Skills. The ability to select, carry, and operate portable fire extinguishers, using the appropriate extinguisher based on the size and type of fire.

5.2.2* Conserve property, given special tools and equipment and an assignment within the facility, so that the facility and its contents are protected from further damage.

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(A) Requisite Knowledge. The purpose of property conservation and its value to the organization, methods used to protect property, methods to reduce damage to property, types of and uses for salvage covers, and operations at properties protected with automatic sprinklers or special protection systems.

(B) Requisite Skills. The ability to deploy covering materials, control extinguishing agents, and cover building openings, including doors, windows, floor openings, and roof openings.

5.2.3 Exit hazardous area, given that the fire has progressed beyond the incipient stage, so that a safe haven is found and the team members' safety is maintained.

(A) Requisite Knowledge. Communication procedures, emergency evacuation methods, what constitutes a safe haven, and elements that create or indicate a hazard.

(B) Requisite Skills. The ability to follow facility evacuation routes, evaluate areas for hazards, and identify a safe haven.

5.3* Site-Specific Requirements. The management of the industrial fire brigade shall determine the site-specific requirements that are applicable to the incipient industrial fire brigade members operating on their site. The process used to determine the site-specific requirements shall be documented, and these additional JPRs added to those identified in Sections 5.1 and 5.2.

5.3.1* Attack an incipient stage fire, given a handline flowing up to 473 L/min (125 gpm), appropriate equipment, and a fire situation, so that the fire is approached safely, exposures are protected, the spread of fire is stopped, agent application is effective, the fire is extinguished, and the area of origin and fire cause evidence are preserved.

(A) Requisite Knowledge. Types of handlines used for attacking incipient fires, precautions to be followed when advancing handlines to a fire, observable results that a fire stream has been properly applied, dangerous building conditions created by fire, principles of exposure protection, and dangers such as exposure to products of combustion resulting from fire condition.

(B) Requisite Skills. The ability to recognize inherent hazards related to the material's configuration; operate handlines; prevent water hammers when shutting down nozzles; open, close, and adjust nozzle flow; advance charged and uncharged hose; extend handlines; operate handlines; evaluate and modify water application for maximum penetration; assess patterns for origin determination; and evaluate for complete extinguishment.

5.3.2* Activate a fixed fire protection system, given a fixed fire protection system, a procedure, and an assignment, so that the steps are followed and the system operates.

(A) Requisite Knowledge. Types of extinguishing agents, hazards associated with system operation, how the system operates, sequence of operation, system overrides and manual intervention procedures, and shutdown procedures to prevent damage to the operated system or to those systems associated with the operated system.

(B) Requisite Skills. The ability to operate fixed fire protection systems via electrical or mechanical means.

5.3.3* Utilize master stream appliances, given an assignment, an extinguishing agent, and a master stream device, so that the agent is applied to the fire as assigned.

(A) Requisite Knowledge. Safe operation of master stream appliances, uses for master stream appliances, tactics using fixed master stream appliances, and property conservation.

(B) Requisite Skills. The ability to put into service a fixed master stream appliance, and to evaluate and forecast a fire's growth and development.

5.3.4* Establish a water supply for fire-fighting operations, given an assignment, a water source, and tools, so that a water supply is established and maintained.

(A) Requisite Knowledge. Water sources, operation of site water supply components, hydraulic principles, and the effect of mechanical damage and temperatures on the operability of the water supply source.

(B) Requisite Skills. The ability to operate the site water supply components and to identify damage or impairment.

5.3.5 Perform a fire safety survey in a facility, given an assignment, survey forms, and procedures, so that fire and life safety hazards are identified, recommendations for their correction are made, and unresolved issues are referred to the proper authority.

(A) Requisite Knowledge. Organizational policy and procedures, common causes of fire and their prevention, the importance of fire safety, and referral procedures.

(B) Requisite Skills. The ability to complete forms, recognize hazards, match findings to preapproved recommendations, and effectively communicate findings to the proper authority.

Chapter 6 Advanced Exterior Industrial Fire Brigade Member

6.1* General.

6.1.1 Qualification or Certification. For qualification or certification at the advanced exterior industrial fire brigade member level, the industrial fire brigade member shall meet the JPRs of Chapter 4, Sections 5.1, 5.2, 6.1, and 6.2, and the site-specific requirements in Sections 5.3 and 6.3 as defined by the management of the industrial fire brigade.

6.1.2 Basic Advanced Exterior Industrial Fire Brigade Member JPRs.

6.1.2.1 Utilize a pre-incident plan, given pre-incident plans and an assignment, so that the industrial fire brigade member implements the responses detailed by the plan.

(A) Requisite Knowledge. The sources of water supply for fire protection or other fire-extinguishing agents, site-specific hazards, the fundamentals of fire suppression and detection systems including specialized agents, and common symbols used in diagramming construction features, utilities, hazards, and fire protection systems.

(B) Requisite Skills. The ability to identify the components of the pre-fire plan such as fire suppression and detection systems, structural features, site-specific hazards, and response considerations.

6.1.2.2* Interface with outside mutual aid organizations, given standard operating procedures (SOPs) for mutual aid response and communication protocols, so that a unified command is established and maintained.

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(A) Requisite Knowledge. Mutual aid procedures and the structure of the mutual aid organization, site SOPs, and incident management systems.

(B) Requisite Skills. The ability to communicate with mutual aid organizations and to integrate operational personnel into teams under a unified command.

6.2 Manual Fire Suppression.

6.2.1* Use thermal protective clothing during exterior fire-fighting operations, given thermal protective clothing, so that the clothing is correctly donned, worn, and doffed.

(A) Requisite Knowledge. Conditions that require personal protection, uses and limitations of thermal protective clothing, components of thermal protective clothing ensemble, and donning and doffing procedures.

(B) Requisite Skills. The ability to correctly don and doff thermal protective clothing and to perform assignments while wearing thermal protective clothing.

6.2.2* Use SCBA and PASS device during exterior fire-fighting operations, given SCBA, PASS, thermal protective clothing, and other personal protective equipment, so that the SCBA and PASS device is correctly donned and activated, the equipment is correctly worn, controlled breathing techniques are used, emergency procedures are enacted if the SCBA fails, all low-air warnings are recognized, respiratory protection is not intentionally compromised, hazardous areas are exited prior to air depletion, and the SCBA is correctly doffed.

(A) Requisite Knowledge. Conditions that require respiratory protection, uses and limitations of SCBA, components of SCBA, donning and doffing procedures, breathing techniques, indications for and emergency procedures used with SCBA, and physical requirements of the SCBA wearer.

(B) Requisite Skills. The ability to control breathing, use SCBA in limited visibility conditions, replace SCBA air cylinders, use SCBA to exit through restricted passages, initiate and complete emergency procedures in the event of SCBA failure or air depletion, and donning and doffing procedures.

6.2.3* Attack an exterior fire operating as a member of a team, given a water source, a handline, personal protective equipment, tools, and an assignment, so that team integrity is maintained, the attack line is correctly deployed for advancement, access is gained into the fire area, appropriate application practices are used, the fire is approached in a safe manner, attack techniques facilitate suppression given the level of the fire, hidden fires are located and controlled, the correct body posture is maintained, hazards are avoided or managed, and the fire is brought under control.

(A) Requisite Knowledge. Principles of fire streams; types, design, operation, nozzle pressure effects, and flow capabilities of nozzles; precautions to be followed when advancing handlines to a fire; observable results that a fire stream has been correctly applied; dangerous conditions created by fire; principles of exposure protection; potential long-term consequences of exposure to products of combustion; physical states of matter in which fuels are found; the application of each size and type of attack line; the role of the backup team in fire attack situations; attack and control techniques; and exposing hidden fires.

(B) Requisite Skills. The ability to prevent water hammers when shutting down nozzles; open, close, and adjust nozzle flow and patterns; apply water using direct, indirect, and combination attacks; advance charged and uncharged 38 mm (1½ in.) diameter or larger handlines; extend handlines; replace burst hose sections; operate charged handlines of 38 mm (1½ in.) diameter or larger; couple and uncouple various handline connections; carry hose; attack fires; and locate and suppress hidden fires.

6.2.4 Conduct search and rescue operations as a member of a team, given an assignment, obscured vision conditions, personal protective equipment, a flashlight, forcible entry tools, handlines, and ladders when necessary, so that all equipment is correctly used, all assigned areas are searched, all victims are located and removed, team integrity is maintained, and team members' safety, including respiratory protection, is not compromised.

(A) Requisite Knowledge. Use of appropriate tools and equipment, psychological effects of operating in obscured conditions and ways to manage them, methods to determine if an area is tenable, primary and secondary search techniques, team members' roles and goals, methods to use and indicators of finding victims, victim removal methods, and considerations related to respiratory protection.

(B) Requisite Skills. The ability to use SCBA to exit through restricted passages, use tools and equipment for various types of rescue operations, rescue an industrial fire brigade member with functioning respiratory protection, rescue an industrial fire brigade member whose respiratory protection is not functioning, rescue a person who has no respiratory protection, and assess areas to determine tenability.

6.2.5* Conserve property operating as a member of a team, given special tools and equipment and an assignment within the facility, so that exposed property and the environment are protected from further damage.

(A) Requisite Knowledge. The purpose of property conservation and its value to the organization, methods used to protect property, methods to reduce damage to property, types of and uses for salvage covers, operations at properties protected with automatic sprinklers or special protection systems, understanding the impact of using master streams and multiple hose streams on property conservation, particularly as it can relate to the impact on outside facilities.

(B) Requisite Skills. The ability to deploy covering materials, control extinguishing agents, and cover building openings, including doors, windows, floor openings, and roof openings.

6.2.6 Overhaul a fire scene, given personal protective equipment, a handline, hand tools, a flashlight, and an assignment, so that structural integrity is not compromised, all hidden fires are discovered, fire cause evidence is preserved, and the fire is extinguished.

(A) Requisite Knowledge. Types of fire handlines and water application devices most effective for overhaul, water application methods for extinguishment that limit water damage, types of tools and methods used to expose hidden fire, dangers associated with overhaul, obvious signs of area of origin or signs of arson, and reasons for protection of fire scene.

(B) Requisite Skills. The ability to deploy and operate a handline, expose void spaces without compromising structural integrity, apply water for maximum effectiveness, expose and extinguish hidden fires, recognize and preserve obvious signs of area of origin and fire cause, and evaluate for complete extinguishment.

6.2.7* Establish a water supply for fire-fighting operations, given a water source and tools, so that a water supply is established and maintained.

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(A) Requisite Knowledge. Water sources, correct operation of site water supply components, hydraulic principles, and the effect of mechanical damage and temperatures on the operability of the water supply source.

(B) Requisite Skills. The ability to operate the site water supply components and identify damage or impairment.

6.2.8* Exit a hazardous area as a team, given vision-obscured conditions, so that a safe haven is found before exhausting the air supply, others are not endangered, and the team integrity is maintained.

(A) Requisite Knowledge. Personnel accountability systems, communication procedures, emergency evacuation methods, what constitutes a safe haven, elements that create or indicate a hazard, and emergency procedures for loss of air supply.

(B) Requisite Skills. The ability to operate as a team member in vision-obscured conditions, locate and follow a guideline, conserve air supply, evaluate areas for hazards, and identify a safe haven.

6.2.9* Operate as a member of a rapid intervention crew, given size-up information, basic rapid intervention tools and equipment, and an assignment, so that strategies to effectively rescue the industrial brigade member(s) are identified and implemented; hazard warning systems are established and understood by all participating personnel; incident-specific personal protective equipment is identified, provided, and utilized; physical hazards are identified; and confinement, containment, and avoidance measures are discussed.

(A) Requisite Knowledge. Identification and care of personal protective equipment; specific hazards associated with the facility; strategic planning for rescue incidents; communications and safety protocols; atmospheric monitoring equipment needs; identification, characteristics, expected behavior, type, causes, and associated effects of personnel becoming incapacitated or trapped; and recognition of, potential for, and signs of impending building collapse.

(B) Requisite Skills. The ability to use personal protective equipment, determine resource needs, select and operate basic and specialized tools and equipment, implement communications and safety protocols, and mitigate specific hazards associated with rescue of trapped or incapacitated personnel.

6.3* Site-Specific Requirements. The JPRs in 6.3.1 through 6.3.11 shall be considered as site-specific functions of the advanced exterior industrial fire brigade member. The management of the industrial fire brigade shall determine the site-specific requirements that are applicable to the advanced exterior industrial fire brigade member operating on their site. The process used to determine the site-specific requirements shall be documented, and these additional JPRs added to those identified in Sections 6.1 and 6.2. Based on the assessment of the site-specific hazards of the facility and the duties that industrial fire brigade members are expected to perform, the management of the industrial fire brigade shall determine the specific requirements of Chapters 5 or 6 of NFPA 472, *Standard for Professional Competence of Responders to Hazardous Materials Incidents*, or the corresponding requirements in OSHA 29 CFR 1910.120(q) that apply.

6.3.1 Perform a fire safety survey in a facility, given an assignment, survey forms, and procedures, so that fire and life safety hazards are identified, recommendations for their correction are made, and unresolved issues are referred to the proper authority.

(A) Requisite Knowledge. Organizational policy and procedures, common causes of fire and their prevention, and the importance of fire safety and referral procedures.

(B) Requisite Skills. The ability to complete forms, recognize hazards, match findings to pre-approved recommendations, and effectively communicate findings to the proper authority.

6.3.2* Gain access to facility locations, given keys, forcible entry tools (e.g., bolt cutters, small hand tools, and ladders), and an assignment, so that areas are accessed and remain accessible during advanced exterior industrial fire brigade operations.

(A) Requisite Knowledge. Site drawing reading, access procedures, forcible entry tools and procedures, and site-specific hazards, such as access to areas restricted by railcar movement, fences, and walls. Procedures associated with special hazard areas such as electrical substation, radiation hazard areas, and other areas specific to the site if needed.

(B) Requisite Skills. The ability to read site drawings, identify areas of low overhead clearance, identify areas on roadways having load restrictions, identify access routes to water supplies, identify hazardous materials locations, identify electrical equipment locations (overhead and belowgrade equipment), ability to open gates by manual and/or automatic means, ability to forcibly gain access to areas, and the ability to identify site hazards.

6.3.3 Utilize master stream appliances, given an assignment, an extinguishing agent, and a master stream device and supply hose, so that the appliance is set up correctly and the agent is applied as assigned.

(A) Requisite Knowledge. Correct operation of master stream appliances, uses for master stream appliances, tactics using master stream appliances, selection of the master stream appliance for different fire situations, the effect of master stream appliances on search and rescue, ventilation procedures, and property conservation.

(B) Requisite Skills. The ability to correctly put in service a master stream appliance and evaluate and forecast a fire's growth and development.

6.3.4* Extinguish an ignitible liquid fire operating as a member of a team, given an assignment, a handline, personal protective equipment, a foam proportioning device, a nozzle, foam concentrates, and a water supply, so that the correct type of foam concentrate is selected for the given fuel and conditions, a correctly proportioned foam stream is applied to the surface of the fuel to create and maintain a foam blanket, fire is extinguished, re-ignition is prevented, and team protection is maintained.

(A) Requisite Knowledge. Methods by which foam prevents or controls a hazard; principles by which foam is generated; causes for poor foam generation and corrective measures; difference between hydrocarbon and polar solvent fuels and the concentrates that work on each; the characteristics, uses, and limitations of fire-fighting foams; the advantages and disadvantages of using fog nozzles versus foam nozzles for foam application; foam stream application techniques; hazards associated with foam usage; and methods to reduce or avoid hazards.

(B) Requisite Skills. The ability to prepare a foam concentrate supply for use, assemble foam stream components, master various foam application techniques, and approach and retreat from fires and spills as part of a coordinated team.

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6.3.5* Control a flammable gas fire operating as a member of a team, given an assignment, a handline, personal protective equipment, and tools, so that crew integrity is maintained, contents are identified, the flammable gas source is controlled or isolated, hazardous conditions are recognized and acted upon, and team safety is maintained.

(A) Requisite Knowledge. Characteristics of flammable gases, components of flammable gas systems, effects of heat and pressure on closed containers, boiling liquid expanding vapor explosion (BLEVE) signs and effects, methods for identifying contents, water stream usage and demands for pressurized gas fires, what to do if the fire is prematurely extinguished, alternative actions related to various hazards, and when to retreat.

(B) Requisite Skills. The ability to execute effective advances and retreats, apply various techniques for water application, assess gas storage container integrity and changing conditions, operate control valves, and choose effective procedures when conditions change.

6.3.6* Extinguish an exterior fire using special extinguishing agents other than foam operating as a member of a team, given an assignment, a handline, personal protective equipment, and an extinguishing agent supply, so that fire is extinguished, re-ignition is prevented, and team protection is maintained.

(A) Requisite Knowledge. Methods by which special agents, such as dry chemical, dry powder, and carbon dioxide, prevent or control a hazard; principles by which special agents are generated; the characteristics, uses, and limitations of fire-fighting special agents; the advantages and disadvantages of using special agents; special agents application techniques; hazards associated with special agents usage; and methods to reduce or avoid hazards.

(B) Requisite Skills. The ability to operate a special agent supply for use, master various special agents application techniques, and approach and retreat from hazardous areas as part of a coordinated team.

6.3.7* Interpret alarm conditions, given an alarm signaling system, a procedure, and an assignment, so that the alarm condition is correctly interpreted and a response is initiated.

(A) Requisite Knowledge. The different alarm detection systems within the facility; difference between alarm, trouble, and supervisory alarms; hazards protected by the detection systems; hazards associated with each type of alarm condition; knowledge of the emergency response plan; and communication procedures.

(B) Requisite Skills. The ability to understand the different types of alarms, to implement the response, and to provide information through communications.

6.3.8* Activate a fixed fire suppression system, given personal protective equipment, a fixed fire protection system, a procedure, and an assignment, so that the correct steps are followed and the system operates.

(A) Requisite Knowledge. Different types of extinguishing agents, hazards associated with system operation, how the system operates, sequence of operation, system overrides and manual intervention procedures, and shutdown procedures to prevent damage to the operated system or to those systems associated with the operated system.

(B) Requisite Skills. The ability to operate fixed fire suppression systems via electrical or mechanical means and shutdown procedures for fixed fire suppression systems.

6.3.9* Extinguish a Class C (electrical) fire as a member of a team, given an assignment, a Class C fire-extinguishing appliance/extinguisher, and personal protective equipment, so that the proper type of Class C agent is selected for the condition, selected agent is correctly applied to the fuel, fire is extinguished, re-ignition is prevented, team protection is maintained, and the hazard is faced until retreat to safe haven is reached.

(A) Requisite Knowledge. Methods by which Class C agent prevents or controls a hazard; methods by which Class C fires are de-energized; causes of injuries from Class C fire fighting on live Class C fires with Class A agents and the Class C agents; the extinguishing agents' characteristics, uses, and limitations; the advantages and disadvantages of de-energizing as using water fog nozzles on a Class A or Class B fire; and methods to reduce or avoid hazards.

(B) Requisite Skills. The ability to operate Class C fire extinguishers or fixed systems and approach and retreat from Class C fires as part of a coordinated team.

6.3.10* Utilize tools and equipment assigned to the industrial fire brigade, given an assignment and specific tools, so that tools are selected and correctly used under adverse conditions in accordance with manufacturer's recommendations and the policies and procedures of the industrial fire brigade.

(A) Requisite Knowledge. Available tools and equipment, their storage locations, and their correct use in accordance with recognized practices, and selection of tools and equipment given different conditions.

(B) Requisite Skills. The ability to select and use the correct tools and equipment for various tasks, follow guidelines, and restore tools and equipment to service after use.

6.3.11 Set up and use portable ladders, given an assignment, single and extension ladders, and team members as appropriate, so that hazards are assessed, the ladder is stable, the angle is correct for climbing, extension ladders are extended to the correct height with the fly locked, the top is placed against a reliable structural component, and the assignment is accomplished.

(A) Requisite Knowledge. Parts of a ladder, hazards associated with setting up ladders, what constitutes a stable foundation for ladder placement, different angles for various tasks, safety limits to the degree of angulation, and what constitutes a reliable structural component for top placement.

(B) Requisite Skills. The ability to carry ladders, raise ladders, extend ladders and lock flies, determine that a wall and roof will support the ladder, judge extension ladder height requirements, and place the ladder to avoid obvious hazards.

Chapter 7 Interior Structural Industrial Fire Brigade Member

7.1 General.

7.1.1 Qualification or Certification. For qualification or certification at the interior structural industrial fire brigade member level, the member shall meet the JPRs of Chapter 4, Sections 5.1, 5.2, 7.1, and 7.2, and the site-specific requirements in Sections 5.3 and 7.3 as defined by the management of the industrial fire brigade.

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7.1.2* Basic Interior Structural Fire Brigade Member JPRs.

7.1.2.1 Use thermal protective clothing during structural firefighting operations, given thermal protective clothing, so that the clothing is correctly donned, worn, and doffed.

(A) Requisite Knowledge. Conditions that require personal protection, uses and limitations of thermal protective clothing, components of thermal protective clothing ensemble, and donning and doffing procedures.

(B) Requisite Skills. The ability to correctly don and doff thermal protective clothing and perform assignments while wearing thermal protective clothing.

7.1.2.2* Use SCBA and PASS device during interior firefighting operations, given SCBA, PASS, thermal protective clothing, and other personal protective equipment, so that the SCBA and PASS device is correctly donned and activated, the equipment is correctly worn, controlled breathing techniques are used, emergency procedures are enacted if the SCBA fails, all low-air warnings are recognized, respiratory protection is not intentionally compromised, and hazardous areas are exited prior to air depletion and correctly doffed.

(A) Requisite Knowledge. Conditions that require respiratory protection, uses and limitations of SCBA, components of SCBA, donning and doffing procedures, breathing techniques, indications for and emergency procedures used with SCBA, and physical requirements of the SCBA wearer.

(B) Requisite Skills. The ability to control breathing, use SCBA in limited visibility conditions, replace SCBA air cylinders, use SCBA to exit through restricted passages, initiate and complete emergency procedures in the event of SCBA failure or air depletion, and complete donning and doffing procedures.

7.1.2.3 Utilize a pre-incident plan, given pre-incident plans and an assignment, so that the industrial fire brigade member implements the pre-incident plan.

(A) Requisite Knowledge. The sources of water supply for fire protection or other fire-extinguishing agents, site-specific hazards, the fundamentals of fire suppression and detection systems including specialized agents, and common symbols used in diagramming construction features, utilities, hazards, and fire protection systems.

(B) Requisite Skills. The ability to identify the components of the pre-incident plan such as fire suppression and detection systems, structural features, site-specific hazards, and response considerations.

7.2 Manual Fire Suppression.

7.2.1* Attack an interior structural fire operating as a member of a team, given a water source, a handline, personal protective equipment, tools, and an assignment, so that team integrity is maintained, the handline is deployed for advancement, access is gained into the fire area, correct application practices are used, the fire is approached safely, attack techniques facilitate suppression given the level of the fire, hidden fires are located and controlled, the correct body posture is maintained, hazards are avoided or managed, and the fire is brought under control.

(A) Requisite Knowledge. Principles of conducting initial fire size-up; principles of fire streams; types, design, operation, nozzle pressure effects, and flow capabilities of nozzles; precautions to be followed when advancing hose lines to a fire; observable results that a fire stream has been correctly applied; dangerous building conditions created by fire; principles of exposure protection; potential long-term consequences of exposure to products of combustion; physical states of matter in which fuels are found; common types of accidents or injuries and their causes; and the application of each size and type of handlines, the role of the backup team in fire attack situations, attack and control techniques, and exposing hidden fires.

(B) Requisite Skills. The ability to prevent water hammers when shutting down nozzles; open, close, and adjust nozzle flow and patterns; apply water using direct, indirect, and combination attacks; advance charged and uncharged 38 mm (1½ in.) diameter or larger handlines; extend handlines; replace burst hose sections; operate charged handlines of 38 mm (1½ in.) diameter or larger; couple and uncouple various handline connections; carry hose; attack fires; and locate and suppress hidden fires.

7.2.2 Force entry into a structure, given personal protective equipment, tools, and an assignment, so that the tools are used, the barrier is removed, and the opening is in a safe condition and ready for entry.

(A) Requisite Knowledge. Basic construction of typical doors, windows, and walls within the facility; operation of doors, windows, and their associated locking mechanisms; and the dangers associated with forcing entry through doors, windows, and walls.

(B) Requisite Skills. The ability to transport and operate site-specific tools to force entry through doors, windows, and walls using assorted methods and tools.

7.2.3* Perform ventilation on a structure operating as a member of a team, given an assignment, personal protective equipment, and tools, so that a sufficient opening is created, all ventilation barriers are removed, structural integrity is not compromised, and products of combustion are released from the structure.

(A) Requisite Knowledge. The principles, advantages, limitations, and effects of horizontal and vertical ventilation; safety considerations when venting a structure; the methods of heat transfer; the principles of thermal layering within a structure on fire; fire behavior in a structure; the products of combustion found in a structure fire; the signs, causes, effects, and prevention of backdrafts; and the relationship of oxygen concentration to life safety and fire growth.

(B) Requisite Skills. The ability to transport and operate tools and equipment to create an opening and implement ventilation techniques.

7.2.4* Overhaul a fire scene, given personal protective equipment, attack line, hand tools, a flashlight, and an assignment, so that structural integrity is not compromised, all hidden fires are discovered, fire cause evidence is preserved, and the fire is extinguished.

(A) Requisite Knowledge. Types of fire handlines and application devices most effective for overhaul, application methods for extinguishing agents that limit damage, types of tools and methods used to expose hidden fire, dangers associated with overhaul, obvious signs of area of origin and signs of arson, and reasons for protection of fire scene.

(B) Requisite Skills. The ability to deploy and operate handlines, expose void spaces without compromising structural integrity, apply extinguishing agents for maximum effectiveness, expose and extinguish hidden fires, recognize and preserve obvious signs of area of origin and fire cause, and evaluate for complete extinguishment.

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7.2.5* Exit a hazardous area as a team, given vision-obscured conditions, so that a safe haven is found before exhausting the air supply, others are not endangered, and the team integrity is maintained.

(A) Requisite Knowledge. Personnel accountability systems, communication procedures, emergency evacuation methods, what constitutes a safe haven, elements that create or indicate a hazard, and emergency procedures for loss of air supply.

(B) Requisite Skills. The ability to operate as a team member in vision-obscured conditions, locate and follow a guideline, conserve air supply, and evaluate areas for hazards and identify a safe haven.

7.2.6* Establish a water supply for fire-fighting operations, given a water source and tools, so that a water supply is established and maintained.

(A) Requisite Knowledge. Water sources, correct operation of site water supply components, hydraulic principles, and the effect of mechanical damage and temperatures on the operability of the water supply source.

(B) Requisite Skills. The ability to operate the site water supply components and take action to address damage or impairment.

7.2.7 Interface with outside mutual aid organizations, given SOPs for mutual aid response and communication protocols, so that a unified command is established and maintained.

(A) Requisite Knowledge. Mutual aid procedures and the structure of the mutual aid organization, site SOPs, and incident management systems.

(B) Requisite Skills. The ability to communicate with mutual aid organizations and to integrate operational personnel into teams under a unified command.

7.2.8 Conduct search and rescue operations as a member of a team, given an assignment, obscured vision conditions, personal protective equipment, a flashlight, forcible entry tools, handlines, and ladders when necessary, so that all equipment is correctly used, all assigned areas are searched, all victims are located and removed, team integrity is maintained, and team members' safety, including respiratory protection, is not compromised.

(A) Requisite Knowledge. Use of appropriate tools and equipment, psychological effects of operating in obscured conditions and ways to manage them, methods to determine if an area is tenable, primary and secondary search techniques, team members' roles and goals, methods to use and indicators of finding victims, victim removal methods, and considerations related to respiratory protection.

(B) Requisite Skills. The ability to use SCBA to exit through restricted passages, use tools and equipment for various types of rescue operations, rescue an industrial fire brigade member whose respiratory protection is not functioning, rescue a person who has no respiratory protection, and assess areas to determine tenability.

7.2.9* Conserve property operating as a member of a team, given special tools and equipment and an assignment within the facility, so that exposed property and the environment are protected from further damage.

(A) Requisite Knowledge. The purpose of property conservation and its value to the organization, methods used to protect property, methods to reduce damage to property, types of and uses for salvage covers, operations at properties protected with automatic sprinklers or special protection systems, and understanding the impact of using master streams and multiple hose streams on property conservation, particularly as it can relate to the impact on outside facilities.

(B) Requisite Skills. The ability to deploy covering materials, control extinguishing agents, and cover building openings, including doors, windows, floor openings, and roof openings.

7.2.10* Operate as a member of a rapid intervention crew, given size-up information, basic rapid intervention tools and equipment, and an assignment, so that strategies to effectively rescue the brigade member(s) are identified and implemented; hazard warning systems are established and understood by all participating personnel; incident-specific personal protective equipment is identified, provided, and utilized; physical hazards are identified; and confinement, containment, and avoidance measures are discussed.

(A) Requisite Knowledge. Identification and care of personal protective equipment; specific hazards associated with the facility; strategic planning for rescue incidents; communications and safety protocols; atmospheric monitoring equipment needs; identification, characteristics, expected behavior, type, causes, and associated effects of personnel becoming incapacitated or trapped; and recognition of, potential for, and signs of impending building collapse.

(B) Requisite Skills. The ability to use personal protective equipment, determine resource needs, select and operate basic and specialized tools and equipment, implement communications and safety protocols, and mitigate specific hazards associated with rescue of trapped or incapacitated personnel.

7.3* Site-Specific Requirements. The management of the industrial fire brigade shall determine the site-specific requirements that are applicable to the interior structural industrial fire brigade member operating on their site. The process used to determine the site-specific requirements shall be documented, and these additional JPRs added to those identified in Sections 7.1 and 7.2. Based on the assessment of the site-specific hazards of the facility and the duties that industrial fire brigade members are expected to perform, the management of the industrial fire brigade shall determine the specific requirements of Chapters 5 or 6 of NFPA 472, *Standard for Professional Competence of Responders to Hazardous Materials Incidents*, or the corresponding requirements in OSHA 29 CFR 1910.120(q) that apply.

7.3.1* Interpret alarm conditions, given an alarm signaling system, a procedure, and an assignment, so that the alarm condition is correctly interpreted and a response is initiated.

(A) Requisite Knowledge. The different alarm detection systems within the facility; difference between alarm, trouble, and supervisory alarms; hazards protected by the detection systems; hazards associated with each type of alarm condition; the emergency response plan; and communication procedures.

(B) Requisite Skills. The ability to understand the different types of alarms, to implement the response, and to provide information through communications.

7.3.2* Activate a fixed fire protection system, given required personal protective equipment, a fixed fire protection system, a procedure, and an assignment, so that the procedures are followed and the system operates.

(A) Requisite Knowledge. Different types of extinguishing agents on site, manual fire suppression activities within areas covered by fixed fire suppression systems, hazards associated with

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system operation, how the system operates, sequence of operation, system overrides and manual intervention procedures, and shutdown procedures to prevent damage to the operated system or to those systems associated with the operated system.

(B) Requisite Skills. The ability to operate fixed fire suppression systems via electrical or mechanical means and to shut down fixed fire suppression systems.

7.3.3 Utilize master stream appliances, given an assignment, an extinguishing agent, a master stream device, and supply hose, so that the appliance is set up correctly and the agent is applied as assigned.

(A) Requisite Knowledge. Correct operation of master stream appliances, uses for master stream appliances, tactics using master stream appliances, selection of the master stream appliances for different fire situations, and the effect of master stream appliances on search and rescue, ventilation procedures, and property conservation.

(B) Requisite Skills. The ability to correctly put in service a master stream appliance and to evaluate and forecast a fire's growth and development.

7.3.4* Extinguish an ignitible liquid fire operating as a member of a team, given an assignment, a handline, personal protective equipment, a foam proportioning device, a nozzle, foam concentrates, and a water supply, so that the correct type of foam concentrate is selected for the given fuel and conditions, a correctly proportioned foam stream is applied to the surface of the fuel to create and maintain a foam blanket, fire is extinguished, re-ignition is prevented, and team protection is maintained.

(A) Requisite Knowledge. Methods by which foam prevents or controls a hazard; principles by which foam is generated; causes for poor foam generation and corrective measures; difference between hydrocarbon and polar solvent fuels and the concentrates that work on each; the characteristics, uses, and limitations of fire-fighting foams; the advantages and disadvantages of using fog nozzles versus foam nozzles for foam application; foam stream application techniques; hazards associated with foam usage; and methods to reduce or avoid hazards.

(B) Requisite Skills. The ability to prepare a foam concentrate supply for use, assemble foam stream components, master various foam application techniques, and approach and retreat from fires and spills as part of a coordinated team.

7.3.5* Control a flammable gas fire operating as a member of a team, given an assignment, a handline, personal protective equipment, and tools, so that team integrity is maintained, contents are identified, the flammable gas source is controlled or isolated, hazardous conditions are recognized and acted upon, and team safety is maintained.

(A) Requisite Knowledge. Characteristics of flammable gases, components of flammable gas systems, effects of heat and pressure on closed containers, BLEVE signs and effects, methods for identifying contents, water stream usage and demands for pressurized gas fires, what to do if the fire is prematurely extinguished, alternative actions related to various hazards, and when to retreat.

(B) Requisite Skills. The ability to execute effective advances and retreats, apply various techniques for water application, assess gas storage container integrity and changing conditions, operate control valves, and choose effective procedures when conditions change.

7.3.6* Extinguish a fire using special extinguishing agents other than foam operating as a member of a team, given an assignment, a handline, personal protective equipment, and an extinguishing agent supply, so that fire is extinguished, re-ignition is prevented, and team protection is maintained.

(A) Requisite Knowledge. Methods by which special agents, such as dry chemical, dry powder, and carbon dioxide, prevent or control a hazard; principles by which special agents are generated; the characteristics, uses, and limitations of fire-fighting special agents; the advantages and disadvantages of using special agents; special agents application techniques; hazards associated with special agents usage; and methods to reduce or avoid hazards.

(B) Requisite Skills. The ability to operate a special agent supply for use, master various special agents application techniques, and approach and retreat from hazardous areas as part of a coordinated team.

7.3.7* Utilize tools and equipment assigned to the industrial fire brigade, given an assignment and specific tools, so that tools are selected and correctly used under adverse conditions in accordance with manufacturer's recommendations and the policies and procedures of the industrial fire brigade.

(A) Requisite Knowledge. Available tools and equipment, their storage locations, and their correct use in accordance with recognized practices; and selection of tools and equipment given different conditions.

(B) Requisite Skills. The ability to select and use the correct tools and equipment for various tasks, follow guidelines, and restore tools and equipment to service after use.

7.3.8 Set up and use portable ladders, given an assignment, single and extension ladders, and team members as appropriate, so that hazards are assessed, the ladder is stable, the angle is correct for climbing, extension ladders are extended to the correct height with the fly locked, the top is placed against a reliable structural component, and the assignment is accomplished.

(A) Requisite Knowledge. Parts of a ladder, hazards associated with setting up ladders, what constitutes a stable foundation for ladder placement, different angles for various tasks, safety limits to the degree of angulation, and what constitutes a reliable structural component for top placement.

(B) Requisite Skills. The ability to carry ladders, raise ladders, extend ladders and lock flies, determine that a wall and roof will support the ladder, judge extension ladder height requirements, and place the ladder to avoid obvious hazards.

7.3.9* Interface with outside mutual aid organizations, given SOPs for mutual aid response and communication protocols, so that a unified command is established and maintained.

(A) Requisite Knowledge. Mutual aid procedures and the structure of the mutual aid organization, site SOPs, and incident management systems.

(B) Requisite Skills. The ability to communicate with mutual aid organizations and to integrate operational personnel into teams under a unified command.

7.3.10 Perform a fire safety survey in a facility, given an assignment, survey forms, and procedures, so that fire and life safety hazards are identified, recommendations for their correction are made, and unresolved issues are referred to the proper authority.

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(A) Requisite Knowledge. Organizational policy and procedures, common causes of fire and their prevention, and the importance of fire safety and referral procedures.

(B) Requisite Skills. The ability to complete forms, recognize hazards, match findings to pre-approved recommendations, and effectively communicate findings to the proper authority.

7.3.11* Extinguish a Class C (electrical) fire as a member of a team, given an assignment, a Class C fire-extinguishing appliance/extinguisher, and personal protective equipment, so that the type of Class C agent is selected for the condition, a selected agent is correctly applied to the fuel, fire is extinguished, re-ignition is prevented, team protection is maintained, and the hazard is faced until retreat to safe haven is reached.

(A) Requisite Knowledge. Methods by which Class C agent prevents or controls a hazard; methods by which Class C fires are de-energized; causes of injuries from Class C fire fighting on live Class C fires with Class A agents and the Class C agents; the extinguishing agents' characteristics, uses, and limitations; the advantages and disadvantages of de-energizing using water fog nozzles on a Class A or Class B fire; and methods to reduce or avoid hazards.

(B) Requisite Skills. The ability to operate Class C fire extinguishers or fixed systems and approach and retreat from Class C fires as part of a coordinated team.

Chapter 8 Industrial Fire Brigade Leader

8.1 General.

8.1.1 This duty shall involve establishing command, using emergency response procedures, and overseeing the emergency response and other administrative duties as outlined in Chapter 4 of NFPA 600, *Standard on Industrial Fire Brigades*, depending on the site organizational statement.

8.1.2 Qualification or Certification. For qualification or certification as an industrial fire brigade leader, the member shall meet the JPRs of the level of the industrial fire brigade in which they are leading in accordance with the requirements of Chapters 5, 6, or 7 and the JPRs as defined in Sections 8.1 and 8.2.

8.1.3 General Requisite Knowledge. The organizational structure of the industrial fire brigade; operating procedures for administration, emergency operations, and safety; information management and record keeping; incident management system; methods used by leaders to obtain cooperation within a group of subordinates; and policies and procedures regarding the operation of the industrial fire brigade.

8.2 Supervisory Functions.

8.2.1 Assign tasks or responsibilities to members, given an emergency situation, so that the instructions are complete, clear, and concise; safety considerations are addressed; and the desired outcomes are conveyed.

(A) Requisite Knowledge. Verbal communications during emergency situations, techniques used to make assignments under stressful situations, and methods of confirming understanding of assigned tasks.

(B) Requisite Skills. The ability to condense instructions for frequently assigned unit tasks based upon training and SOPs.

8.2.2 Develop an initial action plan, given size-up information for an incident and assigned emergency response resources, so that resources are deployed to control the emergency.

(A)* Requisite Knowledge. Elements of a size-up, SOPs for emergency operations, and fire behavior.

(B) Requisite Skills. The ability to analyze emergency scene conditions, to allocate resources, and to communicate verbally.

8.2.3* Implement an action plan at an emergency situation, given assigned resources, type of incident, preliminary plan, and industrial fire brigade safety policies and procedures, so that resources are deployed to mitigate the situation and team safety is maintained.

(A) Requisite Knowledge. SOPs, resources available, basic fire control and emergency operation procedures, an incident management system, rapid intervention crew (RIC) procedures, personnel accountability system, common causes of personal injury during industrial fire brigade activities, safety policies and procedures, and basic industrial fire brigade member safety.

(B)* Requisite Skills. The ability to implement an incident management system, to communicate verbally, to supervise and account for assigned personnel under emergency conditions, and to identify safety hazards.

8.2.4* Coordinate multiple resources, such as in-house and mutual aid, during emergency situations, given an incident requiring multiple resources and a site incident management system, so that the site incident management system is implemented and the required resources, their assignments, and safety considerations for successful control of the incident are identified.

(A) Requisite Knowledge. SOPs and local resources available for the handling of the incident under emergency situations, basic fire control and emergency operation procedures, an incident management system, and a personnel accountability system.

(B) Requisite Skills. The ability to implement the site incident management system, to communicate verbally, and to supervise and account for assigned personnel under emergency conditions.

8.2.5 Implement support operations at an incident, given an assignment and available resources, so that scene lighting is adequate for the tasks to be undertaken, personnel rehabilitation is facilitated, and the support operations facilitate the incident objectives.

(A) Requisite Knowledge. Resource management protocols, principles for establishing lighting, and rescuer rehabilitation practices and procedures.

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 This standard is intended to comply with the industrial fire brigade–related requirements of 29 CFR 1910.156, Subpart L and the industrial fire brigade–related requirements of 29 CFR 1910.134 (2 in/2 out rule). Further, this standard is intended to ensure the industrial fire brigade member has the appropriate degree of occupational safety and health while performing industrial fire brigade duties,

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just as NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*, ensures an appropriate degree of occupational safety and health for municipal fire department members.

For support functions beyond the scope of this document, see Annex B.

A.1.3.1 See Annex C for additional information regarding the use of JPRs for training and evaluation. For support functions beyond the scope of this document, see Annex B.

A.1.3.1.1 Management should define the industrial fire brigades' training requirements to maintain competency for assigned emergency duties that management expects their personnel are to perform. After initial training, recurring training should be required for the industrial fire brigade member to maintain a level of proficiency to perform their duties. 29 CFR 1910 Subpart A paragraphs 1910.120(q), 1910.134(k), 1910.156(c), NFPA 600, *Standard on Industrial Fire Brigades*, Section 4.3, and NFPA 472, *Standard for Professional Competence of Responders to Hazardous Materials Incidents* define some of the requirements for maintaining proficiency.

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 Listed. The means for identifying listed equipment may vary for each organization concerned with product evaluation; some organizations do not recognize equipment as listed unless it is also labeled. The authority having jurisdiction should utilize the system employed by the listing organization to identify a listed product.

A.3.3.6.1 Advanced Exterior Fire Fighting. Advanced exterior fire fighting often requires industrial fire brigade members to contain, control, and extinguish exterior fires involving site-specific hazards, such as flammable and combustible liquid spills or leaks, liquefied petroleum gas releases, and electrical substations. Advanced exterior fire fighting is usually performed using handlines flowing up to 1140 L/min (300 gpm), master streams, or similar devices for the manual application of specialized agents. Thermal protective clothing is required, and the use of self-contained breathing apparatus (SCBA) could be required. [**600,** 2005]

A.3.3.6.4 Interior Structural Fire Fighting. This definition is taken from OSHA 29 CFR 1910. Rescue is the activity of removing victims by an industrial fire brigade as part of fire-fighting activities. Rescue activities requiring specialized equipment and training, such as confined space and high angle rescue, are not included in this standard. **[600,** 2000]

A.3.3.25 Support Member. When organizing the industrial fire brigade, management should take into consideration the need for specialized duties required in the event of a fire or related emergency and should assign personnel to the industrial fire brigade to ensure that these duties are accomplished. In most cases, personnel are not expected to perform manual fire suppression activities in the event of an emergency but are expected to perform only those specialized tasks for which they have been chosen. *(See B.2.1 through B.2.9 for a list of specialized tasks.)*

A.3.3.28 Thermal Protective Clothing. For the purpose of this standard, full protective clothing for industrial fire brigade members above the incipient level is considered to include a turnout coat, protective trousers, fire-fighting boots, fire-fighting gloves, a protective hood, and a fire-fighting helmet. All equipment should be compliant with NFPA or applicable standards.

A.4.1 For information on medical requirements, see OSHA requirements in 29 CFR 1910.156, 29 CFR 1910.134, or NFPA 1582, *Standard on Comprehensive Occupational Medical Program for Fire Departments*.

A.4.2 Where management determines that emergency medical care capability is required to be provided by the industrial fire brigade personnel, programs such as the Department of Transportation First Responder and American Red Cross curricula offer models that can be followed.

A.4.3.1 See Annex D.

A.4.3.2 It is recommended, where practical, that evaluators be individuals who are not directly involved as instructors for the requirement being evaluated.

A.4.3.4 The Technical Committee on Industrial Fire Brigades Professional Qualifications uses the phrase "qualified or certified" throughout the standard because the industrial fire brigade management should determine whether industrial fire brigade members will be certified or qualified to perform emergency response activities. Many different factors are part of the industrial fire brigade management's decision-making process for certification or qualification. These factors can include company policy, local or state statutes, and training agency policy. It is not the intent of this standard to determine if industrial fire brigade members will be certified or qualified upon the completion of applicable JPRs.

A.4.3.9 NFPA 1002, *Standard for Fire Apparatus Driver/Operator Professional Qualifications*, provides the framework for an industrial fire brigade apparatus driver/operator qualification program. Each fire brigade should develop a similar program that ensures that JPRs are developed for the functions that driver/operators will be expected to perform.

It is recognized that some of the JPRs listed in NFPA 1002 do not apply, such as the requirement that driver/operators should meet the requirements of NFPA 1001, *Standard for Fire Fighter Professional Qualifications*, Sections 5.1 and 5.2. In addition, when a practical driving test is developed, it should incorporate situations that industrial fire brigade vehicle operator/drivers will experience, which might not include all of the situations listed in NFPA 1002, Section 4.3.

A.4.3.10 The management of the industrial fire brigade should determine the response they expect from the industrial fire brigade during civil unrest, events involving weapons of mass destruction, or other acts of terrorism. At a minimum, industrial fire brigade members should receive basic awareness training on explosives, chemical and biological agents, and radiation, which are often associated with weapons of mass destruction or acts of terrorism as part of NFPA 472, *Standard for Professional Competence of Responders to Hazardous Materials Incidents*, awareness level training *(see 5.1.1)*. This training will allow them to take limited defensive actions such as evacuation and isolation. If the fire brigade members are going to

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respond offensively, they should be provided with training that describes the types of hazards and protection from them that they might encounter. These hazards include, but are not limited to, rioting, gunfire, chemical and/or biological agents, radiation, improvised explosive devices (IEDs), and so forth. Training is available from several local, county, state, and federal agencies on these hazards. Additional procedures should also be written for these types of events to clearly document the expected response.

A.5.1.2.2 The industrial fire brigade member should be familiar with the communication systems and understand how the industrial fire brigade transmits and receives messages on the site. Management of the industrial fire brigade has the responsibility to ensure that industrial fire brigade members are trained to site operating procedures. Facility communications equipment can include, but not be limited to, public address systems, intercom systems, radios, pagers, sirens, beacons, and messengers. All industrial fire brigade members should understand the site procedures to address the intent of 4.4.6 of NFPA 600, *Standard on Industrial Fire Brigades.*

A.5.1.2.4 The incipient level industrial fire brigade member should be able to determine equipment operability and to ensure that equipment is returned to service as per site policy or procedure. Industrial fire brigade members could or could not be required by the management of the industrial fire brigade to perform inspections, maintenance, cleaning, or otherwise to service emergency response equipment, but it is incumbent upon the employer to ensure that the equipment is maintained per manufacturer requirements and appropriate codes and standards (e.g., NFPA 10, *Standard for Portable Fire Extinguishers*; NFPA 14, *Standard for the Installation of Standpipe and Hose Systems*; and NFPA 1962, *Standard for the Inspection, Care, and Use of Fire Hose, Couplings, and Nozzles and the Service Testing of Fire Hose*). The responsibilities for the maintaining, servicing, and cleaning of emergency response equipment should be identified in the industrial fire brigade organizational statement.

A.5.1.2.5 The incident report could only entail contacting a supervisor and letting the supervisor know there was a fire, what agent was used, and any damage that occurred. The intent is to ensure that the management of the industrial fire brigade trains employees to provide all pertinent information for reporting fire incidents at the site. The report assists the management of the industrial fire brigade to accomplish the incident documentation.

A.5.2.1 The incipient industrial fire brigade member should be able to extinguish fires in stacked or piled materials such as hay bales, pallets, lumber, piles of mulch, sawdust, other bulk Class A materials, or small, unattached structures that are attacked from the exterior. The tactics for extinguishing each of these types of fires are similar enough to be included in one JPR. Live fire evolutions should be conducted in accordance with the requirements of NFPA 1403, *Standard on Live Fire Training Evolutions.* In areas where environmental or other concerns restrict the use of normal fuels for training evolutions, properly installed and monitored gas-fueled fire simulators can be substituted.

With regard to Class D fires, some facilities utilize pyrophoric, water-reactive dry chemicals, and reactive metals such as magnesium, aluminum, and sodium in their facilities and catalysts. Industrial fire brigade members need to know that ordinary extinguishing agents such as water, foam, and carbon dioxide can react with these materials. Members should be trained in recognizing these site-specific hazards and should be trained in the use of Class D and other extinguishing agents. Members need to know that automatic fire protection systems can need to be shut down; therefore, members should be trained in the proper procedures for shutting them down.

Class K fires are fires in cooking appliances that involve combustible cooking media such as vegetable or animal oils and fats. Some facilities have cooking facilities that can have fires involving Class K–type fires. Members should be trained in recognizing these site-specific hazards and should also be trained in the use of Class K fire protection systems and extinguishers.

A.5.2.2 Industrial fire brigade members should be aware of the environmental concerns associated with fire extinguishment and runoff. Brigade members should be familiar with site-specific areas where these types of issues pose potential problems. Areas could include storm drains, sumps, bodies of water, terrain, and other areas where pollution could cause environmental concerns for the facility/site. Depending on the material(s) burning, the brigade members need to deal with concerns regarding flammable liquids or chemicals as well as the foam or other extinguishing agents, including water. The extinguishing agents need to be accounted for in the event of an environmental issue.

A.5.3 Each site can vary significantly in the amount and types of fire protection systems, tools, and equipment that are specific to that site. The management of the industrial fire brigade should document in the site SOPs the types of fire protection systems, tools, and equipment that are available for industrial fire brigade use. If the fire protection system, tool, or equipment is available for use by the industrial fire brigade, the authority having jurisdiction should ensure that the appropriate section knowledge and skills are tested. *(See Annex D.)*

A.5.3.1 When possible, incipient industrial fire brigade members should attack a fire as a team to enhance the safety of the fire-fighting operation. Each incipient industrial fire brigade member should maintain correct body posture when attacking a fire with a handline. Caution should be taken when advancing a handline during a fire attack.

Incipient industrial fire brigade members can handle various-sized handlines during offensive and defensive operations. The handline diameter should be determined by the management of the industrial fire brigade and is site specific. Water pressure and flow rate depend on the water supply and the type of facility operation.

A.5.3.2 The incipient industrial fire brigade member needs to have an understanding of fire protection systems provided. Members need to know how to manually activate systems, their impact on other plant systems and safety of personnel, and policies and procedures for notification of the industrial fire brigade when systems are out of service.

A.5.3.3 Incipient industrial fire brigades who are expected to utilize master stream appliances should be able to perform defensive actions, utilizing master stream appliances safely and effectively.

A.5.3.4 The industrial fire brigade member should understand hydraulic principles and their effect on water flow. Operation of site water supplies could consist of opening valves or hydrants, starting pumps, drafting from static sources, and utilizing standpipes. The fire brigade member should also understand the specific requirements of the site water supply components and their operation (e.g., correct hydrant operation, including drainage and shutdown, and operation of pressure control devices).

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A.6.1 Advanced exterior fire fighting is offensive fire fighting performed outside of an enclosed structure when the fire is beyond the incipient stage. Advanced exterior fire fighting often requires industrial fire brigade members to contain, control, and extinguish exterior fires involving site-specific hazards, such as flammable and combustible liquid spills or leaks, liquefied petroleum gas releases, and electrical equipment. Advanced exterior fire fighting is usually performed using handlines flowing up to 1140 L/min (300 gpm), master streams, or similar devices for the manual application of specialized agents. Thermal protection is required, and the use of SCBA could be required.

A.6.1.2.2 Personnel accountability systems vary from site to site and should be incorporated into the site incident management system/SOPs. This system should include the interface between the site personnel and the outside mutual aid personnel, recognizing that the personnel accountability system for the site can be different from the system of the outside mutual aid organization.

A.6.2.1 The management of the industrial fire brigade should establish time requirements for the donning of thermal protective clothing by industrial fire brigade members.

A.6.2.2 The management of the industrial fire brigade should establish time requirements for the donning of thermal protective clothing by industrial fire brigade members. The SCBA donning process should be completed while wearing full thermal protective clothing. The physical and medical requirements associated with wearing SCBA are outlined in Section 4.5 of NFPA 600, *Standard on Industrial Fire Brigades*, and 29 CFR 1910.134(c).

A.6.2.3 Exterior fires can involve Class A materials, such as finished goods, raw materials, bulk materials, and pallets or waste materials stored in various containers and configurations that can be stacked, piled, rolled, baled, or stored in racks or shelving. Industrial fire brigade members need to understand the effects of fire and extinguishing agents and the collapse potential on those types of high-piled storage.

Industrial fire brigade members also need to understand the exposure problem associated with these types of fires, which usually produce flying brands that easily spread fire from one area to another. The industrial fire brigade member should be proficient at deploying and using 38 mm (1½ in.) and 65 mm (2½ in.) hose line and portable and fixed master stream appliances for offensive and defensive fire attack and exposure protection.

The industrial fire brigade member should also understand hose streams and use of straight nozzles for exterior fire fighting. Live fire training can be either Class A or B fires.

Class C fires become Class A or B fires when isolated. The industrial fire brigade member should understand the potential shock hazard associated with Class C fires. The member should understand that high-voltage wiring and equipment can have an electrical field that can create a shock hazard without actually having direct contact with the wire or equipment.

Industrial fire brigade members should understand the company policies for lockout, tagout, and testing equipment to verify that the equipment has been de-energized and that the fire area or component is safe before entering locked electrical rooms or touching electrical equipment. The industrial fire brigade member should understand the safe method of using hose streams on electrical equipment.

A.6.2.5 Combustible or flammable liquids could spread to other areas, exposing additional facilities. Spread could be enhanced by application of water. Environmental impact can result from spread. Actions such as diking or rerouting runoff can be effective means to control exposure to additional facilities.

A.6.2.7 See A.5.3.4.

A.6.2.8 Personnel accountability systems vary from site to site and should be incorporated into the site incident management system/SOPs. When training exercises are intended to simulate emergency conditions, smoke-generating devices that do not create a hazard are required by NFPA 1404, *Standard for Fire Service Respiratory Protection Training*. Several accidents have occurred when smoke bombs or other smoke-generating devices that produce a toxic atmosphere have been used for training exercises.

A.6.2.9 To be in compliance with OSHA 29 CFR 1910.134(g)(4)(ii), a minimum of two industrial fire brigade members should be on-scene with personal protective equipment when industrial fire brigade members are operating in an immediately dangerous to life and health (IDLH) or potentially IDLH atmosphere. Industrial fire brigade members assigned to this function are generally known as a rapid intervention crew (RIC). Their primary purpose is the rescue of injured, lost, or trapped industrial fire brigade members, and they should not be assigned other duties that would delay or impede their rescue effort. It is recognized that industrial fire brigades, utilizing an incident management system along with a personnel accountability system, have incorporated an RIC into their management system. Further, it is the intent of this section to have the rapid intervention personnel standing by in full personal protective equipment (PPE) with RIC equipment immediately available. This state of readiness should be maintained until the incident management structure authorizes de-escalation.

A.6.3 Each site can vary significantly in the amount and types of systems, tools, and equipment that are specific to that site. The management of the industrial fire brigade should document in the site SOPs the types of systems, tools, and equipment that are available for industrial fire brigade use. If the system, tool, or equipment is available for use by the industrial fire brigade, the authority having jurisdiction should ensure that the appropriate section knowledge and skills are tested. *(See Annex D.)*

A.6.3.2 The industrial fire brigade member should understand site safety and security practices as identified by local laws, regulations, procedural instructions, and standards of care. Each site can vary significantly as to the duties industrial fire brigade members can be expected to perform when making entry into restricted areas. Entry into these areas can be accomplished by utilizing either forcible entry tools or routine access techniques. It is the intent of the NFPA 1081 technical committee to suggest that industrial fire brigade members are to be trained commensurate with the duties assigned.

A.6.3.4 The industrial fire brigade member should understand the use of various types of foam and other extinguishing agent applications for flammable and combustible liquid fires. Members should understand the various methods of extinguishment and the hazards associated with the various types of flammable and combustible liquid spills, leaks, and fires. Industrial fire brigade members need to review and understand the storage containers, configuration, and processes where flammable and combustible liquids are stored, manufactured, and used. Plans need to be available that show piping layout, isolation valves, and remote shutdown locations.

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Industrial fire brigade members should review and understand boilover and slopover hazards associated with flammable and combustible liquid fires. Members should also understand the high-heat release associated with flammable and combustible liquid fires and the impact on exposed processes, equipment, and facilities. The potential for structural collapse of equipment and facilities involved or exposed to this type of fire should be recognized, as well as the possible impact on personnel safety. Industrial fire brigade members should extinguish a Class B fire commensurate with the size of fire that they are or can be expected to extinguish at their facility.

A.6.3.5 Industrial fire brigade members need to understand that most flammable gas fires have a high-heat release, which impacts burning and exposed processes, equipment, and facilities. The potential for structural collapse of equipment and facilities involved or exposed to this type of fire should be recognized, as well as the possible impact on personnel safety.

Industrial fire brigade members also need to review specific flammable gases manufactured, stored, and used at their facilities, and the associated hazards (fire and explosion). Some flammable gas fires such as hydrogen can burn with an invisible flame, which creates a serious hazard to personnel.

A.6.3.6 Industrial fire brigade members at sites that have dry chemical or carbon dioxide hose line systems require specialized training to become competent in the use of these devices. The industrial fire brigade member should be thoroughly knowledgeable in the operation of the system, how to activate the system, how to stop system flow, and procedures for restoring the system to full operational condition or reporting to the proper authority that the system has been discharged and needs to be returned to service by competent and authorized personnel. Furthermore, the industrial fire brigade member should understand the proper application techniques and effects of air movement on these types of systems. Special procedures for utilizing these systems and standing by until the hazard is completely mitigated are paramount in effectively managing hazards protected by these systems.

Training in using these systems should cover all operational issues with the devices as well as discharging of these or similar systems so that members have a true understanding and feel for how to use these systems. Live fire training using similar devices to the plant system should be performed for accurate assessment of industrial fire brigade members' ability. Such fire training can be done on Class B fuels of at least 4.65 m^2 (50 ft^2) size and 76.2 mm (3 in.) depth. Emphasizing team approach and importance of backup personnel is also essential.

A.6.3.7 There are facilities that employ fixed fire protection and detection systems, and thus the industrial fire brigade member operates in concert with these systems. Understanding these systems and their uses and limitations makes the industrial fire brigade more effective in handling emergency procedures. Because of the many different types of systems and number of facilities that do not have fixed fire protection systems, the requirements for training the industrial fire brigade member are covered as a site-specific hazard.

For fixed detection systems for fire, the industrial fire brigade member needs to understand the different types of systems on the site as well as signals generated by the system such as alarm, trouble, and supervisory. This understanding is important to determining how to respond to the appropriate situation upon arrival at the control panel or annunciation device. First-arriving industrial fire brigade members can then effectively communicate the indications on the control panel to other responding personnel per site procedures. As additional knowledge requirements, industrial fire brigade members should be intimately familiar with system operations such as activate, silence, and reset procedures, as well as possibly releasing a specialized fire protection system such as deluge spray, FM200®, Inergen®, carbon dioxide, or foam.

For fixed gas detection systems, the industrial fire brigade member should understand the different types of gas detection systems at the site. The industrial fire brigade member should also understand the different signals of gas detection systems, which typically include low, medium, and high concentrations of gas as well as fault indications. Other important knowledge for industrial fire brigade members is the understanding of the use of parts per million (ppm) reading and percent of lower flammable and explosive limit readings.

For portable gas monitoring devices, industrial fire brigade members should be thoroughly trained in the safe use of these devices. Further, they should understand flammable and explosive atmospheres and readings. Lastly, they should have an understanding of areas that can accumulate gases and of correct entry and exit procedures.

A.6.3.8 Many sites have fixed fire suppression systems, including sprinkler systems, foam systems, total flooding and local application carbon dioxide systems, dry chemical systems, clean agent systems (e.g., FM200® and Inergen®), and halon systems. These systems are installed to provide a first line of defense of fire protection of areas or specific equipment. Operating with these systems is essential to all industrial fire brigade members. Failure of a system to operate by automatic means can be cause for operating the equipment manually to achieve the desired result of fire control or extinguishment. Further, the shutting down of these systems prematurely can cause the fire to intensify and spread. In the case of the total flooding agents such as carbon dioxide, FM200®, Inergen®, and halon, interrupting the integrity of the enclosing structure can cause the system to be ineffective.

Industrial fire brigade members should know how the specific systems at their site are intended to perform so that the brigade does not unintentionally interfere with the operation of these systems. The industrial fire brigade member should know by which means they can control the system using electrical and mechanical means. Closing a valve or de-energizing a solenoid as well as performing the opposite functions to initiate the system can be one way to shut down a system. Understanding the system overrides such as bypasses, valve opening, and mechanical overrides of electrical devices allows the industrial fire brigade member to institute the system operation in the event of automatic system failure. An industrial fire brigade member should also recognize that operating a damaged fixed fire protection system, such as one damaged by explosion, can create a more dangerous situation by wasting resources; for example, damaged piping flowing water away from the fire and depleting the water supply to other members or agencies working at the emergency.

Understanding the hazard associated with these systems is essential to industrial fire brigade and personnel safety. Discharging carbon dioxide into an occupied area can be life threatening. Large-volume water flow from monitors or deluge systems can present injury hazards to personnel operating in the area of the discharge from both the effects of the agent as well as moving the fire and smoke into areas occupied by personnel.

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A.6.3.9 Class C fires become Class A or B fires when de-energized. The industrial fire brigade member should understand the potential shock hazard associated with Class C fires. The member should understand that high-voltage wiring and equipment can have an electrical field that can create a shock hazard without actually having direct contact with the wire or equipment.

Industrial fire brigade members should understand the company policies for lockout, tagout, and testing equipment to verify that the equipment has been de-energized and that the fire area or component is safe before entering locked electrical rooms or touching electrical equipment. The industrial fire brigade member should understand the safe method of using hose streams on electrical equipment.

A.6.3.10 Site-specific tools and equipment can include ropes, handlights, power tools, hand tools, power plants, portable lighting equipment, hose and hose accessories, salvage and overhaul tools and equipment, and special-purpose equipment such as special agent appliances.

A.7.1.2 See A.6.2.1.

A.7.1.2.2 See A.6.2.2.

A.7.2.1 Site-specific hazards should be identified and itemized for the industrial fire brigade, along with a detailed explanation of each hazard. Special hazards can involve operations or materials. Typical operations are data processing and electronic control equipment, where the discharge of a special extinguishing agent can present a hazard to the industrial fire brigade members; engine test areas; paint dip, mix, and storage rooms; spray booths; flammable liquid tank farms; machinery operations; energized electrical equipment; hazardous materials; and combustible dusts.

Fire hose should be in accordance with NFPA 1961, *Standard on Fire Hose*. Hose should be maintained in accordance with NFPA 1962, *Standard for the Inspection, Care, and Use of Fire Hose, Couplings, and Nozzles and the Service Testing of Fire Hose*.

Handline should be commensurate with the size and type of fires that the members are expected to extinguish in their normal duties.

Radios can be used for communications on the fireground; however, they cannot be the sole tool for accounting for one's partner in the interior of a structure fire *[see 29 CFR 1910.134(g)(4)(i)]*.

A.7.2.3 Some sites have fixed smoke removal systems already installed for ventilation of products of combustion. The management of the industrial fire brigade should ensure that appropriate education and training are provided on these systems.

A.7.2.4 The industrial fire brigade member should be able to recognize important evidence as to a fire's cause and maintain the evidence so that further testing can be done without contamination or chain-of-custody problems. Evidence should be left in place (when possible; otherwise, chain of custody should be established); not altered by improper handling, walking, and so forth; and not destroyed. Possible means to protect evidence is to avoid touching, to protect with salvage covers during overhaul, or to rope off the area where the evidence lies. The industrial fire brigade member is not intended to be highly proficient at origin and cause determination.

A.7.2.5 Personnel accountability systems vary from site to site and should be incorporated into the site incident management system/SOPs. When training exercises are intended to simulate emergency conditions, smoke-generating devices that do not create a hazard are required by NFPA 1404, *Standard for Fire Service Respiratory Protection Training*. Several accidents have occurred when smoke bombs or other smoke-generating devices that produce a toxic atmosphere have been used for training exercises.

A.7.2.6 See A.5.3.4.

A.7.2.9 See A.6.2.5.

A.7.2.10 See A.6.2.9.

A.7.3 See Annex D.

A.7.3.1 See A.6.3.7.

A.7.3.2 See A.6.3.8.

A.7.3.4 See A.6.3.4.

A.7.3.5 See A.6.3.5.

A.7.3.6 See A.6.3.6.

A.7.3.7 Site-specific tools and equipment can include ropes, hand lights, power tools, hand tools, power plants, portable lighting equipment, hose and hose accessories, salvage and overhaul tools and equipment, and special-purpose equipment such as special agent appliances.

A.7.3.9 Personnel accountability systems vary from site to site and should be incorporated into the site incident management system/SOPs. This system should include the interface between the site personnel and the outside mutual aid personnel, recognizing that the personnel accountability system for the site can be different from the system of the outside mutual aid organization.

A.7.3.11 See A.6.3.9.

A.8.2.2(A) Size-up includes the many variables that the industrial fire brigade leader collects from the time of the alarm, during response, and upon arrival, in order to develop an initial action plan to control an emergency incident. These observations can include structural type and occupancy, fire involvement, number of occupants, materials spilled or involved in fire, wind direction, topography, and other observations relevant to the incident.

A.8.2.3 An incident safety officer should be included as part of the incident management system as a command staff member, as specified in NFPA 1561, *Standard on Emergency Services Incident Management System*. The incident commander should appoint an incident safety officer for most events. If an incident safety officer is not appointed, the incident commander also functions as the incident safety officer. Personnel accountability systems vary and should be incorporated into the site incident management system/SOPs. This system should include the interface between the site personnel and the outside mutual aid personnel, recognizing that the personnel accountability system for the site can be different from that of the outside mutual aid. The industrial fire brigade leader can assign additional RICs based on the size and complexity of the incident scene.

A.8.2.3(B) This requirement takes into consideration the industrial fire brigade leader's ability to give orders, direct personnel, evaluate information, and allocate resources to respond to the wide variety of emergency situations the industrial fire brigade encounters.

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A.8.2.4 One of the industrial fire brigade leader's primary responsibilities is safety during industrial fire brigade activities. This standard defines the minimum requirements for the industrial fire brigade leader. Applicable OSHA regulations define additional requirements for those who could be assigned those duties.

Annex B Industrial Fire Brigade Support Member

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

B.1 General Considerations. When organizing an industrial fire brigade, management should take into consideration the need for specialized duties required in the event of a fire or related emergency. Personnel resources should be assigned to support the industrial fire brigade to ensure that these duties are accomplished. These personnel are not industrial fire brigade members but are personnel who perform specific duties to assist the operations of the industrial fire brigade as part of the incident management system. Such actions performed in the cold zones do not require industrial fire brigade training but specific training on the function being performed. Support functions are those functions that are beyond the normal duties assigned to employees as part of the facility emergency action plan.

B.2 Support Area Needs. Support personnel are not expected to perform manual fire suppression activities in the event of an emergency but are expected to perform only those specialized tasks for which they have been chosen. Some of these specialized assignments include the systems and functions in B.2.1 through B.2.9.

B.2.1 Building Evacuation. Support personnel are expected to perform specialized duties to ensure that personnel are safely evacuated from an enclosed structure or the facility in the event of fire. They are known as fire wardens or by a variety of other titles.

B.2.2 Sprinkler System Control. Support personnel are assigned to perform specialized duties to ensure that control of the automatic sprinkler protection system within the fire area or the facility is maintained in the event of fire. They are known as sprinkler valve operators or by a variety of other titles.

B.2.3 Electrical Power Control. Support personnel are expected to perform specialized duties to ensure the control of electrical power within the fire area or the facility in the event of fire. They are known as electricians or by a variety of other titles.

B.2.4 Utility Control. Support personnel are expected to perform specialized duties to ensure the control of plant utilities (e.g., heating, ventilation, and air conditioning; steam, water, LP-Gas or natural gas, and other liquid or vapor piping systems) within the fire area in the event of fire. They are known as utility control technicians or by a variety of other titles.

B.2.5 Process Control. Support personnel are expected to perform specialized duties to ensure the control of process equipment within the fire area or the facility in the event of a fire. They are known as process operators or by a variety of other titles.

B.2.6 Fire Pump Operation. Support personnel are expected to perform specialized duties to ensure that stationary fire pumps are placed into operation or are operating properly in the event of fire. They are known as fire pump operators or by a variety of other titles.

B.2.7 Salvage. Support personnel are expected to perform specialized duties to ensure that actions are taken during and after manual fire suppression activities to minimize the resultant damage from the fire. They are known as salvage personnel or by a variety of other titles.

B.2.8 Traffic Control. Support personnel are expected to perform specialized duties to ensure that control of foot and vehicular traffic in and around the fire area or the facility is maintained in the event of fire and to ensure that any responding agency is directed to the fire area. Facility security or other personnel who have been assigned to assist the fire brigade can accomplish these operations.

B.2.9 Escort. Support personnel are expected to escort industrial fire brigade members or other emergency responders to the area of a fire without entering into the warm or hot zones.

Annex C Job Performance Requirements

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

C.1 Explanation of the Standard and Concepts of Job Performance Requirements (JPRs). The primary benefit of establishing national professional qualification standards is to provide both public and private sectors with a framework of the job requirements for the fire service. Other benefits include enhancement of the profession, individual as well as organizational growth and development, and standardization of practices.

NFPA professional qualification standards identify the minimum JPRs for specific fire service positions. The standards can be used for training design and evaluation, certification, measuring and critiquing on-the-job performance, defining hiring practices, and setting organizational policies, procedures, and goals. (Other applications are encouraged.)

Professional qualification standards for a specific job are organized by major areas of responsibility defined as duties. For example, the fire fighter's duties might include fire suppression, rescue, and water supply; and the public fire educator's duties might include education, planning and development, and administration. Duties are major functional areas of responsibility within a job.

The professional qualification standards are written as JPRs. JPRs describe the performance required for a specific job. JPRs are grouped according to the duties of a job. The complete list of JPRs for each duty defines what an individual must be able to do in order to successfully perform that duty. Together, the duties and their JPRs define the job parameters; that is, the standard as a whole is a description of a job.

C.2 Breaking Down the Components of a JPR. The JPR is the assembly of three critical components. *(See Table C.2.)* These components are as follows:

(1) Task that is to be performed
(2) Tools, equipment, or materials that must be provided to successfully complete the task
(3) Evaluation parameters and/or performance outcomes

C.2.1 The Task to Be Performed. The first component is a concise, brief statement of what the person is supposed to do.

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Table C.2 Example of a JPR

Component	Example
(1) Task	(1) Ventilate a pitched roof
(2) Tools, equipment, or materials	(2) Given an ax, a pike pole, an extension ladder, and a roof ladder
(3) Evaluation parameters and performance outcomes	(3) So that a 1.22 m × 1.22 m (4 ft × 4 ft) hole is created; all ventilation barriers are removed; ladders are properly positioned for ventilation; ventilation holes are correctly placed; and smoke, heat, and combustion by-products are released from the structure

C.2.2 Tools, Equipment, or Materials that Must Be Provided to Successfully Complete the Task. This component ensures that all individuals completing the task are given the same minimal tools, equipment, or materials when being evaluated. By listing these items, the performer and evaluator know what must be provided in order to complete the task.

C.2.3 Evaluation Parameters and/or Performance Outcomes. This component defines how well one must perform each task for both the performer and the evaluator. The JPRs guide performance towards successful completion by identifying evaluation parameters and/or performance outcomes. This portion of the JPRs promotes consistency in evaluation by reducing the variables used to gauge performance.

C.2.4 In addition to these three components, the JPRs contain prerequisite knowledge and skills. Just as the term *prerequisite* suggests, these are the necessary knowledge and skills one must have prior to being able to perform the task. Prerequisite knowledge and skills are the foundation for task performance.

Once the components and prerequisites are put together, the job performance requirements might read as follows.

C.2.4.1 Example 1. The Fire Fighter I shall ventilate a pitched roof, given an ax, a pike pole, an extension ladder, and a roof ladder, so that a 1.22 m × 1.22 m (4 ft × 4 ft) hole is created, all ventilation barriers are removed, ladders are properly positioned for ventilation, and ventilation holes are correctly placed.

(A) Prerequisite Knowledge. Pitched roof construction, safety considerations with roof ventilation, the dangers associated with improper ventilation, knowledge of ventilation tools, the effects of ventilation on fire growth, smoke movement in structures, signs of backdraft, and the knowledge of vertical and forced ventilation.

(B) Prerequisite Skills. The ability to remove roof covering; properly initiate roof cuts; use the pike pole to clear ventilation barriers; use the ax properly for sounding, cutting, and stripping; position ladders; and climb and position self on ladder.

C.2.4.2 Example 2. The fire investigator shall interpret burn patterns, given standard equipment and tools and some structural/content remains, so that each individual pattern is evaluated with respect to the burning characteristics of the material involved.

(A) Prerequisite Knowledge. Knowledge of fire development and the interrelationship of heat release rate, form, and ignitability of materials.

(B) Prerequisite Skill. The ability to interpret the effects of burning characteristics on different types of materials.

C.3 Examples of Potential Uses. JPRs can be used to establish the evaluation criteria for certification at a specific job level. When used for certification, evaluation must be based on the successful completion of JPRs.

First, the evaluator would verify the attainment of prerequisite knowledge and skills prior to JPRs evaluation. This might be through documentation review or testing.

Next, the candidate would be evaluated on completing the JPRs. The candidate would perform the task and be evaluated based on the evaluation parameters and/or performance outcomes. This performance-based evaluation can be either practical (for psychomotor skills such as "ventilate a roof") or written (for cognitive skills such as "interpret burn patterns").

Psychomotor skills are those physical skills that can be demonstrated or observed. Cognitive skills (or mental skills) cannot be observed but are rather evaluated on how one completes the task (process oriented) or the task outcome (product oriented).

Using Example 1, a practical performance-based evaluation would measure one's ability to "ventilate a pitched roof." The candidate passes this particular evaluation if the standard was met; that is, a 4 ft hole was created, all ventilation barriers were removed, ladders were properly positioned for ventilation, ventilation holes were correctly placed, and smoke, heat, and combustion by-products were released from the structure.

For Example 2, when evaluating the task "interpret burn patterns," the candidate could be given a written assessment in the form of a scenario, photographs, and drawings, and then be asked to respond to specific written questions related to the JPR's evaluation parameters.

Remember, when evaluating performance, you must give the person the tools, equipment, or materials listed in the job performance requirements; for example, an ax, a pike pole, an extension ladder, and a roof ladder, before he or she can be properly evaluated.

C.4 Curriculum Development/Training Design and Evaluation. The statements contained in this document that refer to job performance were designed and written as JPRs. While a resemblance to instructional objectives might be present, these statements should not be used in a teaching situation until after they have been modified for instructional use.

JPRs state the behaviors required to perform specific skill(s) on the job as opposed to a learning situation. These statements should be converted into instructional objectives with behaviors, conditions, and standards that can be measured within the teaching/learning environment. A JPR that requires a fire fighter to "ventilate a pitched roof" should be converted into a measurable instructional objective for use when teaching the skill. *[See Figure C.4(a).]*

Using Example 1, a terminal instructional objective might read as follows: The learner will ventilate a pitched roof, given a simulated roof, an ax, a pike pole, an extension ladder, and a roof ladder, so that 100 percent accuracy is attained on a skills checklist. (At a minimum, the skills checklist should include each of the measurement criteria from the JPRs.)

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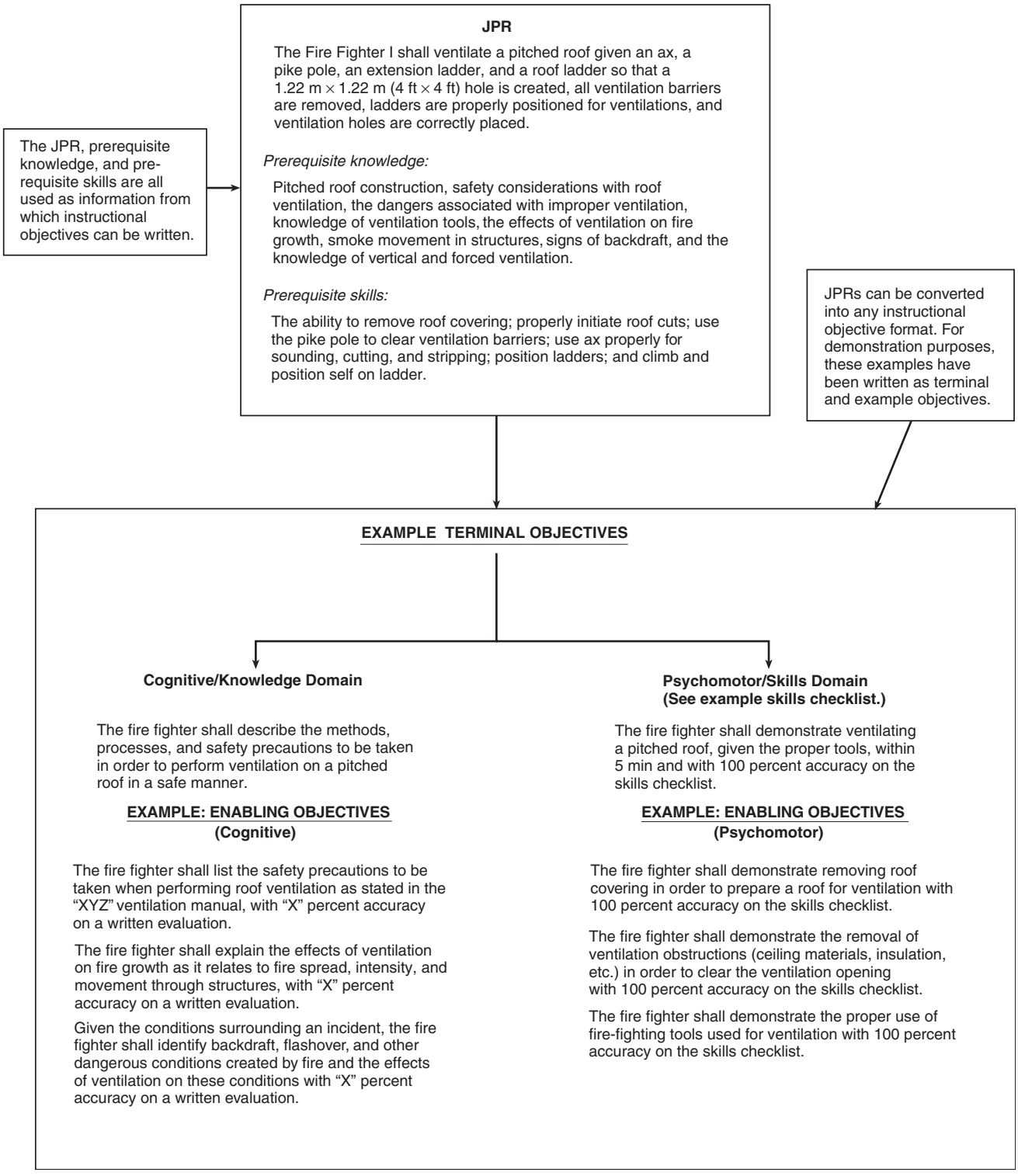

FIGURE C.4(a) Converting JPRs into Instructional Objectives.

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OBJECTIVE: The fire fighter shall demonstrate ventilating a pitched roof, given the proper tools, within 5 min and with 100 percent accuracy on the skills checklist.

YES	NO	
❑	❑	1. 1.22 m × 1.22 m (4 ft × 4 ft) hole was created.
❑	❑	2. All ventilation barriers were removed.
❑	❑	3. Ladders were properly positioned.
❑	❑	4. Ventilation holes were correctly placed (directly over fire, at highest point, and so forth).
❑	❑	5. Task completed within 5 min. (Time to complete task: _____)

FIGURE C.4(b) Skills Checklist.

Figure C.4(b) is a sample checklist for use in evaluating this objective.

While the differences between job performance requirements and instructional objectives are subtle in appearance, the purpose of each statement differs greatly. JPRs state what is necessary to perform the job in the real world. Instructional objectives, however, are used to identify what students must do at the end of a training session and are stated in behavioral terms that are measurable in the training environment.

By converting JPRs into instructional objectives, instructors will be able to clarify performance expectations and avoid confusion related to using statements designed for purposes other than teaching. Additionally, instructors will be able to add local/state/regional elements of performance into the standards as intended by the developers.

Prerequisite skills and knowledge should be converted into enabling objectives. These help to define the course content. The course content would include each of the prerequisite knowledge and skills. Using the example in Figure C.4(b), the enabling objectives would be pitched roof construction, safety considerations with roof ventilation, removal of roof covering, properly initiated roof cuts, and so on. This ensures that the course content supports the terminal objective.

It is assumed that the reader is familiar with curriculum development or training design and evaluation.

C.5 Other Uses. While the professional qualifications standards are principally used to guide the development of training and certification programs, there are a number of other potential uses for the documents. Because the documents are written using terms specific to JPRs, they lend themselves well to any area of the profession where a level of performance or expertise must be determined. These areas might include the following described in C.5.1 through C.5.5.

C.5.1 Employee Evaluation/Performance Critiquing. The JPRs can be used as a guide by both the supervisor and the employee during an evaluation. The JPRs for a specific job define tasks that are essential to perform on the job as well as the evaluation criteria to measure when those tasks are completed.

C.5.2 Establishing Hiring Criteria. The professional qualifications standards can be used in a number of ways to further the establishment of hiring criteria. The authority having jurisdiction could simply require certification at a specific job level; for example, Fire Fighter I. The JPRs could also be used as the basis for pre-employment screening by establishing essential minimal tasks and the related evaluation criteria. An added benefit is that individuals interested in employment can work towards the minimal hiring criteria at local colleges.

C.5.3 Employee Development. The professional qualifications standards can be useful to both the employee and the employer in developing a plan for the individual's growth within the organization. The JPRs and the associated prerequisite knowledge and skills can be used as a guide to determine additional training and education required for the employee to master his or her job or profession.

C.5.4 Succession Planning. Succession planning or career pathing addresses the efficient placement of people into jobs in response to current needs and anticipated future needs. A career development path can be established for targeted individuals to prepare them for growth within the organization. The JPRs and prerequisite knowledge and skills could then be used to develop an educational path to aid in the individual's advancement within the organization or profession.

C.5.5 Establishing Organizational Policies, Procedures, and Goals. The JPRs can be incorporated into organizational policies, procedures, and goals where employee performance is addressed.

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Annex D Management Review of Site-Specific Job Requirement Process

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

D.1 Management's Responsibility. Subsection 4.3.1 of this standard requires that the management of the industrial fire brigade define the site-specific requirements for each level of industrial fire brigade membership. The following are examples of a process that could be used to complete this required review.

D.2 Example 1. A small hospital in a rural community creates an in-house fire brigade to respond to fire until the local fire department can arrive. Each shift has four people from maintenance and security personnel who respond to the fire as a fire brigade. The problem is to determine what type of hazards the facility has and what type of fire brigade duties the management wants the fire brigade to perform.

D.2.1 A risk assessment of the fire hazards of the hospital was performed by the fire brigade leader, and the leader determined that an incipient industrial fire brigade would be the appropriate level of responder. The leader conducted a site-specific requirement review, which was incorporated into the hospital fire brigade organizational statement and manual as required by OSHA. The fire brigade leader, as the person in management who determines the site-specific requirements, selected the following JPRs for the brigade.

The assessment that was made was consistent with the guidance in NFPA 600, *Standard on Industrial Fire Brigades*. It determined what type of fire brigade would be used by the hospital: an incipient industrial fire brigade.

The following JPRs are required for the hospital fire brigade:

(1) "Attack an incipient-stage fire" — The fire brigade is going to use fire extinguishers and fixed standpipe hose streams to attack incipient-stage fires. They call the local fire department immediately to handle all other fires and to assist with incipient-stage fires *(see 5.3.1)*.
(2) "Activate a fixed fire protection system" — The hospital has a wet pipe sprinkler system that the fire brigade supports *(see 5.3.2)*.

The fire brigade leader determined that the following site-specific requirements are not needed for the hospital fire brigade:

(1) "Utilize master stream appliances" — The hospital has no master stream appliances *(see 5.3.3)*.
(2) "Establish a water supply for fire-fighting operations" — The fire brigade is looking to the local fire department to provide this type of service to them *(see 5.3.4)*.
(3) "Perform a fire safety survey" — The security officers and the risk manager conduct this survey outside their duties as fire brigade members *(see 5.3.5)*.

D.2.2 The apparatus operator training requirements were evaluated as required by 4.3.9. None of the fire brigade members complete an apparatus driver training program that meets the JPR outlined in NFPA 1002, *Standard for Fire Apparatus Driver/Operator Professional Qualifications*, since the facility does not have a fire apparatus.

D.2.3 The first aid and medical training review was conducted as required by Section 4.2, and the fire brigade leader determined that none of the fire brigade members need to be trained in CPR and basic first aid, since the hospital has medical personnel on site.

D.3 Example 2. A major oil refinery establishes an advanced exterior fire brigade that operates three foam engines. They are going to provide all fire suppression services except interior structural fire fighting. They receive mutual aid assistance from a local industry/government mutual aid group when the fire brigade requests it. The problem is to determine what type of hazards the facility has and what type of fire brigade duties the management wants the fire brigade to perform.

D.3.1 The full-time fire chief, as a member of management, in developing the fire brigade organizational statement, reviewed the site hazards and the site-specific requirements and included the assessment documentation as required in Section 6.3.

The assessment that was made was consistent with the guidance in NFPA 600, *Standard on Industrial Fire Brigades*. It determined what type of fire brigade would be used by the refinery: an advanced exterior industrial fire brigade.

The following JPRs are required for the oil refinery fire brigade:

(1) "Gain access to facility locations" — This is a required site-specific requirement, since the advanced exterior fire brigade is expected to gain access to fenced storage yards, elevators, and similar areas in the refinery *(see 6.3.2)*.
(2) "Utilize master stream appliances" — This is a required site-specific requirement, since each foam engine carries four 3785 L/min (1000 gpm) portable monitors for the brigade to use *(see 6.3.3)*.
(3) "Operating as a member of a team, extinguish an ignitible liquid fire" — This is a required site-specific requirement, since it is one of the main hazards that the fire brigade handles in a refinery *(see 6.3.4)*.
(4) "Operating as a member of a team, control a flammable gas fire" — This is a required site-specific requirement, since it is one of the main hazards that the fire brigade handles in a refinery *(see 6.3.5)*.
(5) "Operating as a member of a team, extinguish an exterior fire using special extinguishing agents other than foam" — This is a required site-specific requirement, since the fire brigade is trained in the use of 70 kg (150 lb) and 153 kg (300 lb) dry chemical units to extinguish pressure fires under special situations *(see 6.3.6)*.
(6) "Activate a fixed fire protection system" — This is a site-specific requirement, since the refinery has several fixed water and foam systems that the fire brigade members are expected to be able to operate *(see 6.3.8)*.
(7) "Operating as a member of a team, extinguish a Class C (electrical) fire" — This is a site-specific requirement, since the refinery has electrical switch gear and motors that the fire brigade is expected to be able to extinguish *(see 6.3.9)*.
(8) "Utilize tools and equipment assigned to the industrial fire brigade" — This is a site-specific requirement for all of the tools carried on the apparatus and used in the JPRs *(see 6.3.10)*.

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The fire chief also determined the following:

(1) "Perform a fire safety survey" — This is not a site-specific requirement for the advanced exterior fire brigade because these activities are performed by the refinery's safety department and fire protection engineer *(see 6.3.1)*.
(2) "Interpret alarm conditions" — This is not a site-specific requirement for the fire brigade, since these activities are performed by the refinery instrument technicians *(see 6.3.7)*.
(3) "Set up and use portable ladders" — This is not a site-specific requirement for the fire brigade, since they have no ladders on their fire apparatus *(see 6.3.11)*.

D.3.2 The apparatus operator training requirements were evaluated as required by 4.3.9.

All of the fire brigade members are apparatus operators and completed a training program that meets the JPRs outlined in NFPA 1002, *Standard for Fire Apparatus Driver/Operator Professional Qualifications*, that apply to the facility's conditions and apparatus.

D.3.3 The first aid and medical training review was conducted as required by Section 4.2, and the fire chief determined that all of the fire brigade members need to be trained in CPR and basic first aid.

D.4 Example 3. A 3700-employee automotive manufacturing plant with a full-time fire brigade in a major city has a large career fire department responding into the facility as mutual aid when needed. The facility has standpipes throughout and is fully sprinklered. The problem is to determine what type of hazards the facility has and what type of fire brigade duties the management wants the fire brigade to perform.

D.4.1 The full-time fire chief, as a member of management, in developing the fire brigade organizational statement, reviewed the site-specific requirements and included the assessment documentation as required in Section 7.3.

An assessment that was made was consistent with the guidance in NFPA 600, *Standard on Industrial Fire Brigades*. It determined what type of fire brigade would be used by the auto manufacturing facility: an incipient fire brigade with portions of the brigade to be trained as an interior structural industrial fire brigade.

The following JPRs will be required for the auto manufacturing incipient fire brigade members:

(1) "Attack an incipient stage fire" — The fire brigade is going to use fire extinguishers and fixed standpipe hose streams *(see 5.3.1)*.
(2) "Activate a fixed fire protection system" — This is a site-specific requirement for the incipient fire brigade members, since the manufacturing plant has a wet pipe sprinkler system *(see 5.3.2)*.
(3) "Establish a water supply for fire-fighting operations" — This is a site-specific requirement for the incipient fire brigade members *(see 5.3.4)*.

The fire chief determined that the following site-specific requirements are not needed for the incipient fire brigade:

(1) "Utilize master stream appliances" — Since the plant has only portable master stream appliances that are used by the interior fire brigade *(see 5.3.3)*.
(2) "Perform a fire safety survey" — Since the security officers and the risk manager conduct these surveys outside their duties as fire brigade members *(see 5.3.5)*.

The fire chief determined that the following site-specific requirements are needed for the interior fire brigade members:

(1) "Interpret alarm conditions" — This is a site-specific interior fire brigade requirement, since the full-time fire brigade members also service the fire alarm system when a trouble alarm occurs and enters the building to investigate and reset alarm signaling systems *(see 7.3.1)*.
(2) "Activate a fixed fire protection system" — This is a site-specific requirement, since the interior fire brigade enters the building to activate specialized fire protection systems *(see 7.3.2)*.
(3) "Utilize master stream appliances" — This is a site-specific requirement, as the interior brigade uses 1892 L/min (500 gpm) ground monitors inside the buildings *(see 7.3.3)*.
(4) "Operating as a member of a team, extinguish an ignitible liquid fire" — This is a site-specific requirement, since the interior fire brigade enters the building to extinguish paint and paint solvents that can be ignited *(see 7.3.4)*.
(5) "Operating as a member of a team, control a flammable gas fire" — This is a site-specific requirement, since the interior fire brigade enters the building to extinguish flammable gas fires in the dryer areas *(see 7.3.5)*.
(6) "Operating as a member of a team, extinguish a fire using special extinguishing agents other than foam" — This is a site-specific requirement, since the interior fire brigade uses Class D agents to extinguish special engine alloy material that can be on fire in the machine shop *(see 7.3.6)*.
(7) "Utilize tools and equipment assigned to the industrial fire brigade" — This is a site-specific requirement for the tools that the interior fire brigade has to use *(see 7.3.7)*.
(8) "Interface with outside mutual aid organizations" — This is a site-specific requirement, since the interior fire brigade can work with the outside fire department during mutual aid operations *(see 7.3.9)*.
(9) "Perform a fire safety survey in a facility" — This is a site-specific requirement for the interior fire brigade *(see 7.3.10)*.

The fire chief also determined that 7.3.8 is not a site-specific requirement: "Set up and use portable ladders" — This is not a site-specific requirement for the brigade, since they have no ladders on their fire apparatus *(see 7.3.8)*.

D.4.2 The apparatus operator training requirements were evaluated as required by 4.3.9.

The facility has one minipumper with 1136 L (300 gal) of water and a pick-up truck with 757 L (200 gal) of water. In addition, they have several scooter-type quick-response vehicles for inside building use. All of the fire apparatus operators need to complete a training program that meets the JPRs outlined in NFPA 1002, *Standard for Fire Apparatus Driver/Operator Professional Qualifications*, that apply to the facility.

D.4.3 The first aid and medical training review was conducted as required by Section 4.2, and the fire chief determined that all of the fire brigade members need to be trained in CPR and First Responder Medical Training.

D.5 Example 4. This example illustrates the development of new JPRs to support a site-specific hazard or process. The paper manufacturing process is used as the example.

D.5.1 Site-Specific Requirements. The following JPRs are to be considered site-specific functions of interior structural fire brigade members assigned the responsibility of fighting fires involving paper machines. The management of the industrial fire brigade determines the requirements that are applicable to the

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interior structural fire brigade member operating on their site. The process used to determine the site-specific requirements needs to be documented, and the JPRs identified are added to those identified by this standard.

D.5.2 Operating as a team and given a water source, an attack line, personal protective equipment, and an assignment, attack a paper machine fire so that team integrity is maintained, the attack line is deployed for advancement, access is gained to the fire area, the fire is approached safely, attack techniques are appropriate for the given level of fire, hidden fires are located and controlled, correct body posture is maintained, hazards are avoided or managed, and the fire is brought under control.

(A) Requisite Knowledge. The basic function and design characteristics of site-specific paper machines; the dangers associated with fighting fires in close proximity to paper machines to include nip points on the machine; fire-fighting tactics relating to pressure vessels (dryers); the hazards of steam, lube/hydraulic oil, and paper dust in the machine area; an understanding of when (and when not) to shut down a paper machine during fire attack operations; an understanding of emergency shutdown procedures for the machine; an understanding of flame spread characteristics of materials in and around the paper machine roof and basement areas; and site-specific standard operating guidelines (SOGs) and local emergency procedures for fighting fires in and around site-specific paper machines.

(B) Requisite Skills. The ability to attack a fire on the paper machine while limiting or preventing fire spread to other areas of the machine or other exposures and while limiting thermal shock, which can create stresses in the dryer shell; check sprinkler control valves for the affected area; monitor fire pumps for operation; work with operators to apply a predeveloped written procedure for the orderly and controlled shutdown of the paper machine (to include shutting off steam or other sources of heat to the dryers, notifying personnel responsible for the operation of boilers, shutting off ventilation fans in the exhaust system), use ventilation equipment as appropriate for fire and smoke control; protect roof and basement exposures; and extinguish remote fires.

D.6 Example 5. This example illustrates the development of requirements to support a major petrochemical industry association or industry mutual aid group that determines they have common expectation for their industrial fire brigades. They form a joint consortium with a local fire training program.

D.6.1 The leaders of the consortium, representing the management of the individual fire brigades, worked to establish a common fire brigade organizational statement, reviewed the respective site hazards and the site-specific requirements and included the following assessment documentation as required in Section 6.3.

The assessment that was made was consistent with the guidance in NFPA 600, *Standard on Industrial Fire Brigades*. It determined what type of fire brigade would be used by the members of the trade association or mutual aid group. It was decided that a common training and certification program would be presented at the local university fire training program, with the graduates being certified as advanced exterior and interior fire brigade members by the consortium.

The following JPRs are required for the oil refinery fire brigade:

(1) "Gain access to facility locations" — This is a required site-specific requirement, since the advanced exterior fire brigade is expected to gain access to fenced storage yards, elevators, and similar areas in the refinery *(see 6.3.2)*.
(2) "Utilize master stream appliances" — This is a required site-specific requirement, since each of the mutual aid companies has at least one foam engine that carries one 3785 L/min (1000 gpm) portable monitor for the brigade to use *(see 6.3.3)*.
(3) "Extinguish an ignitible liquid fire" — This is a required site-specific requirement, since it is one of the main hazards that the fire brigade handles in a refinery *(see 6.3.4)*.
(4) "Control a flammable gas fire" — This is a required site-specific requirement, since it is one of the main hazards that the fire brigade handles in a refinery *(see 6.3.5)*.
(5) "Extinguish an exterior fire using special extinguishing agents other than foam" — This is a required site-specific requirement, since the fire brigade is trained in the use of 63 kg (150 lb) and 136 kg (300 lb) dry chemical units to extinguish pressure fires under special situations *(see 6.3.6)*.
(6) "Activate a fixed fire protection system" — This is a site-specific requirement, since the refinery has several fixed water and foam systems that the fire brigade members are expected to be able to operate *(see 6.3.8)*.
(7) "Extinguish a Class C (electrical) fire" — This is a site-specific requirement, since the refinery has electrical switch gear and motors that the fire brigade is expected to be able to extinguish *(see 6.3.9)*.
(8) "Utilize tools and equipment assigned to the industrial fire brigade" — This is a site-specific requirement for all of the tools carried on the apparatus and used in the JPRs *(see 6.3.10)*.
(9) "Interface with outside mutual aid organizations" — this is a common site-specific requirement, since the interior fire brigade can work with the outside fire department during mutual aid operations *(see 7.3.9)*.

D.6.2 The apparatus operator training requirements were evaluated as required by 4.3.9. All of the fire brigade members will not be apparatus operators and will not complete a training program that meets the JPRs outlined in NFPA 1002, *Standard for Fire Apparatus Driver/Operator Professional Qualifications*, that apply to the facility's conditions and apparatus.

D.6.3 The first aid and medical training review was conducted as required by Section 4.2, and the consortium determined that all of the fire brigade members need to be trained in CPR and basic first aid, but that they would bring this documentation to the consortium school from other training programs.

D.7 Example 6. This example details the development process for the development of industry-specific JPRs for a fictitious, medium-size facility, referred to here as the ABC Electric Generating Facility. The ABC Electric Generating Facility is a multi-unit electric generating facility. The facility employs approximately 200 employees. Four 12-hour production shifts, each with approximately 30 employees, provide coverage 24/7/365, with employees on a traditional work week. There is an automatic fire alarm system and multiple fire detection and suppression systems. The facility has an advance exterior and interior structural industrial fire brigade.

D.7.1 In developing the site's industrial fire brigade organizational statement, management reviewed the site-specific requirements and included the following assessment documentation as required in Sections 6.3 and 7.3 *(see Figure D.7.1)*.

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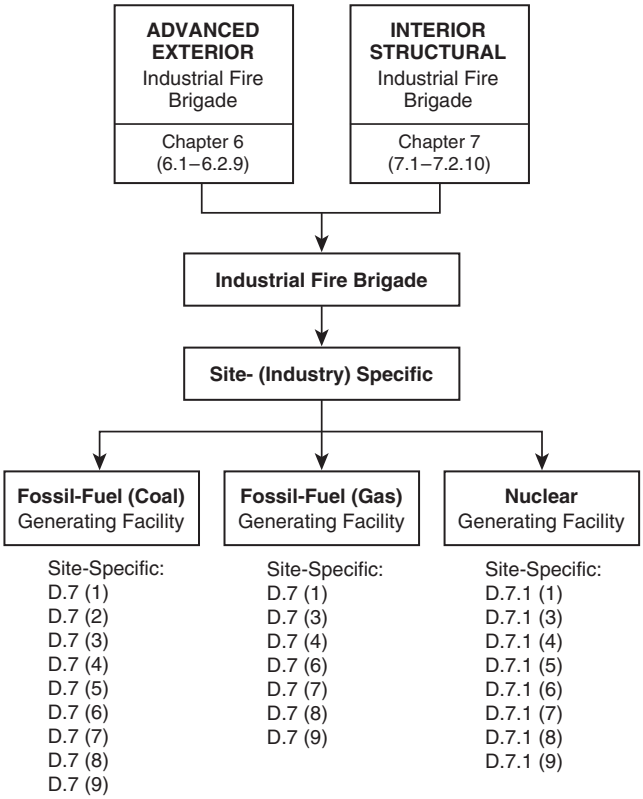

FIGURE D.7.1 Example of Site- (Industry) Specific JPRs.

(1) Perform a fire safety survey of a facility, given an assignment, survey forms, and procedures, so that fire and life safety hazards are identified, recommendations for their correction made, and unresolved issues are referred to the proper authority *(see 6.3.1)*.
(2) Utilize master stream appliances, given an assignment, an extinguishing agent, and a master stream and supply hose, so that the appliance is set up correctly and the agent is applied as assigned *(see 6.3.3)*.
(3) Extinguish an ignitable liquid fire, operating as a member of a team, given an assignment, a handline, personal protective equipment, a foam proportioning device, a nozzle, foam concentrates, and a water supply, so that the correct type of foam concentrate is selected for the given fuel and conditions, a correctly proportioned foam stream is applied to the surface of the fuel to create and maintain a foam blanket, fire is extinguished, re-ignition is prevented, and team protection is maintained *(see 6.3.4)*.
(4) Control a flammable gas fire, operating as a member of a team, given an assignment, a handline, personal protective equipment, and tools, so that crew integrity is maintained, contents are identified, the flammable gas source is controlled or isolated, hazardous conditions are recognized and acted upon, and team safety is maintained *(see 6.3.5)*.
(5) Interpret alarm conditions, given an alarm signaling system, a procedure, and an assignment, so that the alarm condition is correctly interpreted and a response is initiated *(see 6.3.7)*.
(6) Activate a fixed fire protection system, given required personal protective equipment, a fixed fire protection system, a procedure, and an assignment, so that the correct steps are followed and the system operates *(see 6.3.8)*.
(7) Extinguish a fire involving Class C (electrical) equipment, operating as a member of a team, given an assignment, personal protective equipment, method to verify equipment has been de-energized or a Class C fire extinguishing agent, so that the equipment is verified de-energized or correct extinguishing agent is applied to the fuel, fire is extinguished, re-ignition is prevented, and team protection is maintained *(see 6.3.9)*.
(8) Interface with outside mutual aid organizations, given SOPs for mutual aid response and communication protocols, so that a unified command is established and maintained *(see 7.3.9)*.
(9) Extinguish a coal-related fire, operating as a member of a team, given an assignment, a handline, personal protective equipment, and a water supply, so that fire is extinguished and team protection is maintained *(see 7.2.1 and 6.2.3)*.

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.

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

NFPA 10, *Standard for Portable Fire Extinguishers*, 2007 edition.

NFPA 14, *Standard for the Installation of Standpipe and Hose Systems*, 2007 edition.

NFPA 472, *Standard for Professional Competence of Responders to Hazardous Materials Incidents*, 2002 edition.

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

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

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

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

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E.1.2 Other Publications.

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

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E.3 References for Extracts in Informational Sections. NFPA 600, *Standard on Industrial Fire Brigades*, 2005 edition.

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- Committee meets to act on Proposals, to develop its own Proposals, and to prepare its Report.
- Committee votes by written ballot on Proposals. If two-thirds approve, Report goes forward. Lacking two-thirds approval, Report returns to Committee.
- Report on Proposals (ROP) is published for public review and comment.

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

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