

NFPA® 1670

Standard on Operations and Training for Technical Search and Rescue Incidents

2014 Edition



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An International Codes and Standards Organization

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NFPA® 1670

Standard on

Operations and Training for Technical Search and Rescue Incidents

2014 Edition

This edition of NFPA 1670, *Standard on Operations and Training for Technical Search and Rescue Incidents*, was prepared by the Technical Committee on Technical Search and Rescue. It was issued by the Standards Council on November 12, 2013, with an effective date of December 2, 2013, and supersedes all previous editions.

This edition of NFPA 1670 was approved as an American National Standard on December 2, 2013.

Origin and Development of NFPA 1670

The responsibility for NFPA 1470, *Standard on Search and Rescue Training for Structural Collapse Incidents*, 1994 edition, was transferred to the Technical Committee on Technical Rescue, which prepared a proposed new NFPA 1670, *Standard on Operations and Training for Technical Rescue Incidents*. That document incorporated the scope of NFPA 1470, expanding it to include identifying and establishing levels of functional capability for safety and effectively conducting operations at technical rescue incidents.

The 2004 edition of NFPA 1670 represented a complete revision and incorporated the reorganization of the chapters to comply with the new *Manual of Style for NFPA Technical Committee Documents*. The title of the document was changed to *Standard on Operations and Training for Technical Search and Rescue Incidents* as a result of a petition by the Technical Committee to the Standards Council to include “search” as part of the scope of the Committee. The search element was also added to each of the disciplines within the document.

The committee acknowledged the valuable contributions of George Howard to the origin and development of this document. Mr. Howard was working as a police officer for the New York and New Jersey Port Authority when he perished in the line of duty on September 11, 2001, at the World Trade Center at the age of 44. He was a 16-year veteran of the department and a founding member of its elite emergency services division and was awarded the New York Police Department’s Medal of Valor for rescuing children trapped in the World Trade Center during the 1993 bombing. Mr. Howard was a charter member of the NFPA Technical Rescue Technical Committee, on which he represented the Nassau County (NY) Fire Academy. His enlightened influence and hard work shall always be a part of this document.

In the third edition of NFPA 1670, the Vehicle and Machinery Search and Rescue component was split into two separate chapters, and new chapters on Cave Search and Rescue, Mine and Tunnel Search and Rescue, and Helicopter Search and Rescue were added, resulting in renumbering of chapters within the document. Annex G was updated with material on the Search Assessment Marking System, and Annex H was revised with guidelines for initial response planning. Annex I was deleted, and the remaining annexes were renumbered.

For the 2014 edition, the committee has added new chapters on Tower Rescue and Animal Technical Rescue. Chapter 16, Tower Rescue, was incorporated into the standard to address the significant hazards posed to technical rescuers associated with the removal of ill or injured persons from manmade tower structures. The adoption of the PETS Act in October 2006 authorized FEMA to provide rescue, care, shelter, and essential needs for individuals with household pets and service animals — and for the household pets and animals themselves — following a major disaster or emergency. This has prompted the committee to incorporate a new Chapter 17, Animal Technical Rescue, and a new Annex K, Animal Technical Rescue, to address the significant hazards posed to technical rescuers associated with the rescue of injured or entrapped animals. Other notable changes to this edition of the standard include the reorganization of Chapter 3, Definitions; changes to confined space rescue team size requirements in Chapter 7, Confined Space Search and Rescue; new requirements specific to

floods in Chapter 9, Water Search and Rescue; and new requirements specific to elevators in Chapter 12, Machinery Search and Rescue.

The NFPA Technical Committee on Technical Search and Rescue would like to recognize the contributions of our colleague, long-time staff liaison, and friend, Frank Florence (1943–2010). Frank passed away on July 27, 2010, after a relatively brief illness. He served with the Salt Lake City Fire Department for 31 years before retiring as Fire Chief. After retiring from SLCFD, Frank joined the NFPA in September of 1998 and served as the staff liaison for the Technical Search and Rescue Committee for twelve years. Frank was a strong advocate for the work of our committee and of the SAR community in general. His memory and contributions will continue to influence this standard, and the committee is forever grateful for his support and assistance.



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

Committee Scope: This Committee shall have primary responsibility for documents on technical search and rescue techniques, operations, and procedures to develop efficient, proper, and safe utilization of personnel and equipment.

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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.

Changes other than editorial are indicated by a vertical rule beside the paragraph, table, or figure in which the change occurred. These rules are included as an aid to the user in identifying changes from the previous edition. Where one or more complete paragraphs have been deleted, the deletion is indicated by a bullet (•) between the paragraphs that remain.

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 L. Extracted text may be edited for consistency and style and may include the revision of internal paragraph references and other references as appropriate. Requests for interpretations or revisions of extracted text shall be sent to the technical committee responsible for the source document.

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

Chapter 1 Administration

1.1 Scope.

1.1.1* This standard shall identify and establish levels of functional capability for conducting operations at technical search and rescue incidents while minimizing threats to rescuers.

1.1.2* The requirements of this standard shall apply to organizations that provide response to technical search and rescue incidents, including those not regulated by governmental mandates.

1.1.3* It is not the intent of this document to be applied to individuals and their associated skills and/or qualifications.

1.2* Purpose.

1.2.1 The purpose of this standard shall be to assist the authority having jurisdiction (AHJ) in assessing a technical search and rescue hazard within the response area, to identify the level of operational capability, and to establish operational criteria.

1.2.2 The functional capabilities of this standard shall be permitted to be achieved in a variety of ways.

1.3 Equivalency. Nothing in this standard shall be intended to prevent the use of systems, methods, or devices of equivalent or superior quality, strength, fire resistance, effectiveness, durability, and safety in place of those prescribed by this standard, provided technical documentation is submitted to the authority having jurisdiction to demonstrate equivalency and the system, method, or device is approved for the intended purpose.

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 Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, 2013 edition.

NFPA 1006, *Standard for Technical Rescuer Professional Qualifications*, 2013 edition.

NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*, 2013 edition.

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

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

2.3 Other Publications.

2.3.1 ANSI Publications. American National Standards Institute, Inc., 25 West 43rd Street, 4th Floor, New York, NY 10036.

ANSI/CGA G7.1, *Commodity Specification for Air*, 2011.

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

National Search and Rescue Committee, *U.S. National Search and Rescue Supplement to the International Aeronautical and Maritime Search and Rescue Manual*, 2000.

National Search and Rescue Committee, *U.S. National Search and Rescue Manual*, 2007.

U.S. Department of Transportation, *First Responder Guidelines*, 2002.

U.S. National Response Framework, 2008.

2.3.3 Other Publications. Basic Crew Member Course offered by the National Association of State Boating Law Administrators

National Association of Tower Erectors — Competent Climber Course

National Cave Rescue Commission — Cave Orientation Course

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

2.4 References for Extracts in Mandatory Sections.

- NFPA 1006, *Standard for Technical Rescuer Professional Qualifications*, 2013 edition.

NFPA 1021, *Standard for Fire Officer Professional Qualifications*, 2014 edition.

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



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

NFPA 1983, *Standard on Life Safety Rope and Equipment for Emergency Services*, 2012 edition.

Chapter 3 Definitions

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

3.2 NFPA Official Definitions.

3.2.1* Approved. Acceptable to the authority having jurisdiction.

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

3.2.3 Shall. Indicates a mandatory requirement.

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

3.2.5 Standard. A document, the main text of which contains only mandatory provisions using the word “shall” to indicate requirements and which is in a form generally suitable for mandatory reference by another standard or code or for adoption into law. Nonmandatory provisions are not to be considered a part of the requirements of a standard and shall be located in an appendix, annex, footnote, informational note, or other means as permitted in the *Manual of Style for NFPA Technical Committee Documents*.

3.3 General Definitions.

3.3.1 Acceptable Entry Conditions. Conditions that must exist in a space to allow entry and to ensure that employees can safely enter into and work within the space.

3.3.2 Alternate Air Source. A secondary air supply source system that involves an alternate second-stage regulator provided by either a separate dedicated second-stage or a multipurpose second-stage regulator coupled with a buoyancy compensator inflator valve.

3.3.3 Anchor Point. A single, structural component used either alone or in combination with other components to create an anchor system capable of sustaining the actual and potential load on the rope rescue system.

3.3.4 Anchor System. One or more anchor points rigged in such a way as to provide a structurally significant connection point for rope rescue system components.

3.3.5 Animal Technical Rescue. Rescuing of an animal requiring technical skills; not to be confused with “animal rescue” which typically refers to abuse or neglect.

3.3.6 Ascending Device. A type of rope grab; auxiliary equipment; a friction or mechanical device utilized to allow ascending a fixed line. [1983, 2012]

3.3.7 Ascending (Line). A means of safely traveling up a fixed line with the use of one or more ascent devices.

3.3.8 Assessment Phase (Size-Up). The process of assessing the conditions, the scene, and the subject's condition and ability to assist in his or her own rescue.

3.3.9 Auxiliary Equipment. Equipment items that are load-bearing and designed to be utilized with life safety rope and harness, such as ascending devices, carabiners, descent control devices, rope grab devices, and snap-links. [1983, 2012]

3.3.10* Avalanche. A mass of snow — sometimes containing ice, water, and debris — that slides down a mountainside.

3.3.11* Belay. The method by which a potential fall distance is controlled to minimize damage to equipment and/or injury to a live load.

3.3.12 Bell-Bottom Pier Hole. A type of shaft or footing excavation, the bottom of which is made larger than the cross-section above to form a bell shape.

3.3.13 Benching or Benching System. A method of protecting employees from cave-ins by excavating the side of an excavation to form one or a series of horizontal levels or steps, usually with vertical or near-vertical surfaces between levels.

3.3.14 Bend. A knot that joins two ropes or webbing pieces together.

3.3.15* Body Substance Isolation. An infection control strategy that considers all body substances potentially infectious. It utilizes procedures and equipment to protect the responder from communicable diseases that are known to be transmitted through blood and other body substances.

3.3.16* Cave. A natural underground void formed by geologic process. [1006, 2013]

3.3.17 Cave-In. The separation of a mass of soil or rock material from the side of an excavation or trench, or the loss of soil from under a trench shield or support system, and its sudden movement into the excavation, either by falling or sliding, in sufficient quantity so that it could entrap, bury, or otherwise injure and immobilize a person.

3.3.18 Collapse Safety Zone. An area around a collapsed structure or structures that is outside the potential collapse zone of falling debris.

3.3.19 Compass. A device that uses the earth's magnetic field to indicate relative direction.

3.3.20 Competent Person. One who is capable of identifying existing and predictable hazards in the surroundings or working conditions that are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them. [1006, 2013]

3.3.21* Confined Space. A space that is large enough and so configured that a person can enter and perform assigned work, that has limited or restricted means for entry or exit (e.g., tanks, vessels, silos, storage bins, hoppers, vaults, and pits), and that is not designed for continuous human occupancy.

3.3.22 Confined Space Rescue Service. The confined space rescue team designated by the AHJ to rescue victims from within confined spaces, including operational and technical levels of industrial, municipal, and private sector organizations.

3.3.23 Confined Space Rescue Team. A combination of individuals trained, equipped, and available to respond to confined space emergencies.

3.3.24* Coverage (sometimes called “coverage factor”). A relative measure of how thoroughly an area has been searched or “covered.”

3.3.25 Cribbing. Short lengths of timber/composite materials, usually 101.60 mm × 101.60 mm (4 in. × 4 in.) and 457.20 mm – 609.60 mm (18 in. – 24 in.) long, that are used in various configurations to stabilize loads in place or while load is moving.

3.3.26* Critical Angle. A deflection in two rope rescue system components that increases any force vector beyond that which is acceptable.

3.3.27 Descending (Line). A means of safely traveling down a fixed line using a descent control device.

3.3.28 Descent Control Device. An auxiliary equipment item; a friction or mechanical device utilized with rope to control descent. [1983, 2012]

3.3.29 Disentanglement. The cutting of a vehicle and/or machinery away from trapped or injured victims.

3.3.30 Dive. An exposure to increased pressure whether underwater or in a hyperbaric chamber.

3.3.31 Dive Operation. A situation requiring divers to complete an assigned task.

3.3.32 Dive Team. An organization of public safety divers and members in training.

3.3.33 Diver. An individual using breathing apparatus that supplies compressed breathing gas at the ambient pressure.

3.3.34 Edge Protection. A means of protecting software components within a rope rescue system from the potentially harmful effects of exposed sharp or abrasive edges.

3.3.35 Emergency Incident. Any situation to which the emergency services organization responds to deliver emergency services, including rescue, fire suppression, emergency medical care, special operations, law enforcement, and other forms of hazard control and mitigation. [1561, 2014]

3.3.36 Emergency Medical Service (EMS). The organization(s) responsible for the care and transport of sick and injured persons to an appropriate emergency care facility. Referred to as Emergency Services in U.S. federal confined space regulations.

3.3.37 Engulfment. The surrounding and effective capture of a person by a fluid (e.g., liquid, finely divided particulate) substance that can be aspirated to cause death by filling or plugging the respiratory system or that can exert enough force on the body to cause death by strangulation, constriction, or crushing.

3.3.38 Entry. The action by which a person passes into a confined space. Entry includes ensuing work or rescue activities in that environment and is considered to have occurred as soon as any part of the entrant’s body breaks the plane of an opening into the space, trench, or excavation.

3.3.39* Entry Permit. A written or printed document, established by an employer, for nonrescue entry into confined spaces.

3.3.40 Entry Team. The group of individuals, with established communications and leadership, assigned to perform work or rescue activities beyond the opening of, and within, the space, trench, or excavation.

3.3.41* Environment. A collection of characteristics such as weather, altitude, and terrain contained in an area that are unique to a location.

3.3.42 Excavation. Any man-made cut, cavity, trench, or depression in an earth surface, formed by the removal of earth.

3.3.43 Extrication. The removal of trapped victims from a vehicle or machinery.

3.3.44 Face(s). The vertical or inclined earth surface formed as a result of excavation work.

3.3.45 Failure. The breakage, displacement, or permanent deformation of a structural member or connection so as to reduce its structural integrity and its supportive capabilities.

3.3.46* FEMA Task Force Search and Rescue Marking System. Distinct markings made with international orange spray paint near a collapsed structure’s most accessible point of entry.

3.3.47* FEMA Task Force Structure/Hazard Evaluation Marking System. Distinct markings made with international orange spray paint, after performing a building hazard identification, near a collapsed structure’s most accessible point of entry.

3.3.48* FEMA Task Force Structure Marking System, Structure Identification Within a Geographic Area. Distinct markings made with international orange spray paint to label buildings with their street number so that personnel can differentiate one building from another.

3.3.49 Fixed Line (Fixed Line System). A rope rescue system consisting of a nonmoving rope attached to an anchor system.

3.3.50 Force Multiplier. Any load, object, environmental factor, or system configuration that increases the load on the anchor system(s).

3.3.51 Full-Face Mask. A diving mask that covers the diver’s entire face, includes a regulator for breathing, has separate inhalation and exhalation chambers, provides for defogging, free flow if the seal is broken, and provides for a communication module.

3.3.52* General Area. An area surrounding the incident site (e.g., collapsed structure or trench) whose size is proportional to the size and nature of the incident. Within the general area, access by people, heavy machinery, and vehicles is limited and strictly controlled.

3.3.53 Grade Pole. A wood or fiberglass pole, either cut to a certain length or provided with markings, used by workers when setting pipes on grade.

3.3.54 Hardware (Rope Rescue). Rigid mechanical auxiliary equipment that can include, but is not limited to, anchor plates, carabiners, and mechanical ascent and descent control devices.

3.3.55 Hasty Search. An initial deployment of search resources that involves a quick search of areas or segments likely to contain survivors.

3.3.56 Hazard Identification. The process of identifying situations or conditions that have the potential to cause injury to people, damage to property, or damage to the environment.

3.3.57 Hazardous Atmospheres. Any atmosphere that can expose personnel to the risk of death, incapacitation, injury, acute illness, or impairment of ability to self-rescue.



3.3.58 Heavy Object. An item of such size and weight that it cannot be moved without the use of power tools (e.g., hydraulic lifting devices) or complex mechanical advantage systems.

3.3.59 High Angle. Refers to an environment in which the load is predominantly supported by the rope rescue system.

3.3.60 Hitch. A knot that attaches to or wraps around an object so that when the object is removed, the knot will fall apart.

3.3.61* Household Pet. A domesticated animal, such as a dog, cat, bird, rabbit, rodent, or turtle, that is traditionally kept in the home for pleasure rather than for commercial purposes, can travel in commercial carriers, and be housed in temporary facilities; thus, household pets do not include reptiles (except turtles), amphibians, fish, insects/arachnids, farm animals (including horses), and animals kept for racing purposes.

3.3.62 Immediately Dangerous to Life or Health (IDLH). Any condition that would pose an immediate or delayed threat to life, cause irreversible adverse health effects, or interfere with an individual's ability to escape unaided from a hazardous environment.

3.3.63 Imminent Hazard. An act or condition that is judged to present a danger to persons or property and is so immediate and severe that it requires immediate corrective or preventive action.

3.3.64 Incident Command System (ICS). The combination of facilities, equipment, personnel, procedures, and communications operating within a common organizational structure that has responsibility for the management of assigned resources to effectively accomplish stated objectives pertaining to an incident or training exercise.

3.3.65 Incident Commander. The person who is responsible for all decisions relating to the management of the incident and is in charge of the incident site.

3.3.66 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, 2014]

3.3.67 Incident Response Plan. Written procedures, including standard operating guidelines, for managing an emergency response and operation.

3.3.68* Incident Scene. The location where activities related to a specific incident are conducted.

3.3.69* Isolation System (or Isolation Devices). An arrangement of devices, applied with specific techniques, that collectively serve to isolate a victim of a trench or excavation emergency from the surrounding product (e.g., soil, gravel, or sand).

3.3.70* Knot. A fastening made by tying rope or webbing in a prescribed way.

3.3.71* Large Animal. Domesticated livestock including, but not limited to, horses, cows, mules, donkeys, goats, llamas, alpacas, pigs, and excluding wild animals and household pets.

3.3.72 Large Machinery. Complex machines (or machinery systems) constructed of heavy materials, not capable of simple disassembly, and presenting multiple concurrent hazards (e.g., control of energy sources, HAZMAT, change in elevation, multiple rescue disciplines, etc.), complex victim entrapment, or partial or complete amputation, and requiring the

direct technical assistance of special experts in the design, maintenance, or construction of the device or machine.

3.3.73 Laser Target. A square or rectangular plastic device used in conjunction with a laser instrument to set the line and grade of pipe.

3.3.74 Life Safety Harness. A system component that is an arrangement of materials secured about the body and used to support a person during rescue.

3.3.75 Life Safety Rope. Rope dedicated solely for the purpose of supporting people during rescue, fire fighting, other emergency operations, or during training evolutions.

3.3.76 Litter. A transfer device designed to support and protect a victim during movement.

3.3.77 Litter Tender. A person who both accompanies and physically manages the litter.

3.3.78* Lockout. A method for keeping equipment from being set in motion and endangering workers. (See also 3.3.151, *Tagout*.)

3.3.79 Low Angle. Refers to an environment in which the load is predominantly supported by itself and not the rope rescue system (e.g., flat land or mild sloping surface).

3.3.80* Lowering System. A rope rescue system used to lower a load under control.

3.3.81 Machine. Human-made system or device made up of fixed and moving parts that perform a task.

3.3.82 Machinery. The moving parts of a particular machine.

3.3.83 Maximum Working Load. Weight supported by the life safety rope and system components that must not be exceeded.

3.3.84* Mechanical Advantage (M/A). A force created through mechanical means including, but not limited to, a system of levers, gearing, or ropes and pulleys usually creating an output force greater than the input force and expressed in terms of a ratio of output force to input force.

3.3.85 Member. A person performing the duties and responsibilities of an emergency response organization on a full-time or part-time basis, with or without compensation.

3.3.86* Mine. Underground series of tunnels and shafts used to obtain something from the soil through which they are excavated.

3.3.87* Multiple-Point Anchor System. System configuration providing load distribution over more than one anchor point, either proportionally or disproportionately. (See also 3.3.4, *Anchor System*.)

3.3.88* National Response Framework. An overview of key response principles, roles, and structures that guides the U.S. national response and that describes (a) how communities, states, the federal government, and private sector and nongovernmental partners apply these principles for a coordinated, effective national response; (b) special circumstances where the federal government exercises a larger role, including incidents where federal interests are involved and catastrophic incidents where a state would require significant support; and (c) how these elements come together and are implemented by first responders, decision makers, and supporting entities to provide a unified national response in the United States.

3.3.89* National Search and Rescue Plan. A document that identifies responsibilities of U.S. federal agencies and serves as the basis for the *U.S. National Search and Rescue Manual*, which discusses search and rescue organizations, resources, methods, and techniques utilized by the federal government.

3.3.90 One-Call Utility Location Service. A service from which contractors, emergency service personnel, and others can obtain information on the location of underground utilities in any area.

3.3.91 Oxygen-Deficient Atmosphere. Air atmospheres containing less than 19.5 percent oxygen by volume at one standard atmosphere pressure.

3.3.92 Oxygen-Enriched Atmosphere. Air atmospheres containing more than 23.5 percent oxygen by volume at one standard atmosphere pressure.

3.3.93 Packaging (Patient Packaging). The process of securing a subject in a transfer device, with regard to existing and potential injuries/illness, so as to avoid further harm during movement.

3.3.94 Panel Team. The group of individuals, with established communications and leadership, assigned to construct (if necessary), move, place, and manage panels (traditional sheeting panels) both inside and outside the space, trench, or excavation.

3.3.95* Personal Protective Equipment (PPE). The equipment provided to shield or isolate personnel from infectious, chemical, physical, and thermal hazards.

3.3.96 Personnel. Any individual participating within the incident scene.

3.3.97 Pre-Entry Briefing. Information passed to all personnel prior to entry into a confined space or trench/excavation environment.

3.3.98 Primary Access. The existing opening of doors and/or windows that provide a pathway to the trapped and/or injured victim(s).

3.3.99* Primary Search. A quick search of the structures likely to contain survivors.

3.3.100* Protective System. A method of protecting employees from cave-ins, from material that could fall or roll from an excavation face or into an excavation, or from the collapse of adjacent structures.

3.3.101 Public Safety Diver. An individual who performs public safety diving.

3.3.102 Public Safety Diving. Underwater diving, related to team operations and training, performed by any member, group, or agency of a community or government-recognized public safety diving or water rescue team.

3.3.103 Pulley. A device with a free-turning, grooved metal wheel (sheave) used to reduce rope friction. Side plates are available for a carabiner to be attached.

3.3.104* Raising System. A rope rescue system used to raise a load under control.

3.3.105 "Reach, Throw, Row, Go." The four sequential steps in water rescue with progressively more risk to the rescuer. Specifically, a "go" rescue involves physically entering the medium (e.g., in the water or on the ice).

3.3.106* Reconnaissance (Recon). A preliminary examination or survey; specifically, an examination of an area for the purpose of obtaining information necessary for directing search and rescue operations.

3.3.107 Recovery. Nonemergency operations carried out by responders to retrieve property or remains of victims.

3.3.108 Recumbent Animal. An animal laying down.

3.3.109 Redundant Air System. An independent secondary underwater breathing system (i.e., a pony bottle with first and second stage or a pony bottle supplying a bailout block).

3.3.110* Registered Professional Engineer. A person who is registered as a professional engineer in the state where the work is to be performed.

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

3.3.112* Rescue Area. An area surrounding the incident site (e.g., collapsed structure or trench) whose size is proportional to the hazards that exist.

3.3.113 Rescue Attendant. A person who is qualified to be stationed outside a confined space to monitor rescue entrants, summon assistance, and perform nonentry rescues.

3.3.114 Rescue Entrant. A person entering a confined space for the specific purpose of rescue.

3.3.115 Rescue Incident. An emergency incident that primarily involves the rescue of persons subject to physical danger and that could include the provision of emergency medical care, but not necessarily.

3.3.116* Rescue Shoring. The temporary stabilization or re-support of any part of, section of, or structural element within a structure which is physically damaged, missing, or where the structure itself is partially or totally collapsed or in danger of collapsing.

3.3.117* Rescue Team. A combination of rescue-trained individuals who are equipped and available to respond to and perform technical rescues.

3.3.118 Rescue Team Leader. The person designated within the incident command system as rescue group/division officer responsible for direct supervision of the rescue team operations.

3.3.119 Resource Assessment. The component of the assessment phase that involves the determination for the need for additional resources. Resource assessment can be ongoing throughout the entire incident.

3.3.120 Resources. All personnel and equipment that are available, or potentially available, for assignment to incidents.

3.3.121* Retrieval System. Combinations of rescue equipment used for nonentry (external) rescue of persons from confined spaces.

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

3.3.123 Risk Assessment. An assessment of the likelihood, vulnerability, and magnitude of incidents that could result from exposure to hazards.

3.3.124* Risk/Benefit Analysis. A decision made by a responder based on a hazard identification and situation assessment that weighs the risks likely to be taken against the benefits to be gained for taking those risks.

3.3.125 Rope. A compact but flexible, torsionally balanced, continuous structure of fibers produced from strands that are twisted, plaited, or braided together and that serve primarily to support a load or transmit a force from the point of origin to the point of application. [1983, 2012]

3.3.126 Rope-Based Mechanical Advantage System. A rope rescue system component incorporating the reeving of rope through moving pulleys (or similar devices) to create mechanical advantage.

3.3.127 Rope Rescue Equipment. Components used to build rope rescue systems including life safety rope, life safety harnesses, and auxiliary equipment.

3.3.128 Rope Rescue System. A system comprised of rope rescue equipment and an appropriate anchor system intended for use in the rescue of a subject.

3.3.129 Safety Officer. An individual appointed by the AHJ as qualified to maintain a safe working environment.

3.3.130 Search Marking System. A separate and distinct marking system used to identify information related to the location of a victim(s).

3.3.131 Secondary Access. Openings created by rescuers that provide a pathway to trapped and/or injured victims.

3.3.132* Secondary Search. A detailed, systematic search of an area.

3.3.133 Sheeting. The members of a shoring system that support the sides of an excavation and are in turn supported by other members of the shoring system.

3.3.134* Shield (or Shield System). A structure that is able to withstand the forces imposed on it by a cave-in and thereby protect employees within the structures.

3.3.135 Shoring Team. The group of individuals, with established communications and leadership, assigned to construct, move, place, and manage the shoring or shoring system inside a structure, space, trench, or excavation.

3.3.136 Single-Point Anchor System. An anchor system configuration utilizing a single anchor point to provide the primary support for the rope rescue system. A single-point anchor system includes those anchor systems that utilize one or more additional nonloaded anchor points as backup to the primary anchor point.

3.3.137 Size-Up. A mental process of evaluating the influencing factors at an incident prior to committing resources to a course of action.

3.3.138 Small Machine. Machinery or equipment capable of simple disassembly, or constructed of lightweight materials, presenting simple hazards, which are capable of being controlled by the rescuer(s).

3.3.139 Software. A flexible fabric component of rope rescue equipment that can include, but is not limited to, anchor straps, pick-off straps, and rigging slings.

3.3.140 Special Operations. Those emergency incidents to which the responding agency responds that require specific

and advanced technical training and specialized tools and equipment.

3.3.141 Standard Operating Guideline. An organizational directive that establishes a course of action or policy.

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

3.3.143* Strongback. The vertical members of a trench shoring system placed in contact with the earth, usually held in place against sections of sheeting with shores and positioned so that individual members do not contact each other.

3.3.144* Supplemental Sheeting and Shoring. Sheeting and shoring operations that involve the use of commercial sheeting/shoring systems and/or isolation devices or that involve cutting and placement of sheeting and shoring when greater than 0.61 m (2 ft) of shoring exists below the bottom of the strongback.

3.3.145 Support System. A structure, such as underpinning, bracing, or shoring, that provides support to an adjacent structure, underground installation, or the sides of an excavation.

3.3.146 Surcharge Load. Any weight near the lip of the trench that increases the likelihood of instability or secondary cave-in.

3.3.147 Swift Water. Water moving at a rate greater than one knot [1.85 km/hr (1.15 mph)].

3.3.148* System Safety Factor. The weakest point within a system, expressed as a ratio between the minimum breaking strength of that point (component) as compared to the force placed upon it.

3.3.149 System Stress. Any condition creating excessive force (i.e., exceeding the maximum working load of any component) to components within a rope rescue system that could lead to damage or failure of the system.

3.3.150* Tabulated Data. Any set of site-specific design data used by a professional engineer to design a protective system at a particular location.

3.3.151 Tagout. A method of tagging, labeling, or otherwise marking an isolation device during hazard abatement operations to prevent accidental removal of the device. (See also 3.3.78, *Lockout*.)

3.3.152 Technical Rescue. The application of special knowledge, skills, and equipment to safely resolve unique and/or complex rescue situations.

3.3.153* Technical Rescue Incident. Complex rescue incidents requiring specially trained personnel and special equipment to complete the mission.

3.3.154 Tender. An individual trained in the responsibilities of diver safety who provides control of search patterns from the surface of the water.

3.3.155 Termination. That portion of incident management in which personnel are involved in documenting safety procedures, site operations, hazards faced, and lessons learned from the incident. Termination is divided into three phases: debriefing the incident, postincident analysis, and critiquing the incident.

3.3.156* Terrain. Specific natural and topographical features within an environment.

3.3.157* Terrain Hazard. Specific terrain feature, or feature-related condition, that exposes one to danger and the potential for injury and/or death.

3.3.158 Testing. The process by which the hazards that could confront entrants of a trench or excavation are identified and evaluated, including specifying tests that are to be performed in a trench or excavation.

3.3.159* Traditional Sheeting and Shoring. The use of 1.2 m × 2.4 m (4 ft × 8 ft) sheet panels, with a strongback attachment, supplemented by a variety of conventional shoring options such as hydraulic, screw, and/or pneumatic shores.

3.3.160 Transfer Device. Various devices, including litters and harnesses, used with rope rescue systems to package and allow safe removal of a subject from a specific rescue environment.

3.3.161* Trench (or Trench Excavation). A narrow (in relation to its length) excavation made below the surface of the earth.

3.3.162 Trench Box (or Trench Shield). A manufactured protection system unit made from steel, fiberglass, or aluminum that is placed in a trench to protect workers from cave-in and that can be moved as a unit. [See also 3.3.134, *Shield (or Shield System)*.]

3.3.163* Trench Shoring. A component or group of connected components, designed, constructed and installed in a trench to prevent collapse of the exposed walls of the excavation by applying pressure to the surrounding materials.

3.3.164* Tunnel. A covered excavation used for the conveyance of people or materials, typically no smaller than 0.91 m (36 in.) in diameter and within 20 degrees of horizontal.

3.3.165 Vehicle. A device or structure for transporting persons or things; a conveyance.

3.3.166 Watermanship Skills. Capabilities that include swimming, surface diving, treading water, and staying afloat with a reasonable degree of comfort appropriate to the required task.

3.3.167 Webbing. Woven material of flat or tubular weave in the form of a long strip.

3.3.168* Wilderness. A setting in which the delivery of services including search, rescue, and patient care by response personnel is adversely affected by logistical complications, such as an environment that is physically stressful or hazardous to the patient, response personnel, or both; remoteness of the patient's location, such that it causes a delay in the delivery of care to the patient; anywhere the local infrastructure has been compromised enough to experience wilderness-type conditions, such as lack of adequate medical supplies, equipment, or transportation; remoteness from public infrastructure support services; poor to no medical services or potable water; compromised public safety buildings, public utilities or communications systems; city, county, state or national recreational areas or parks with mountains, trails; areas they define as wilderness.

3.3.169 Wire Rope. Rope made of twisted strands of wire.

Chapter 4 General Requirements

4.1 General.

4.1.1* The authority having jurisdiction (AHJ) shall establish levels of operational capability needed to conduct operations at technical search and rescue incidents, based on hazard identification, risk assessment, training level of personnel, and availability of internal and external resources.

4.1.2 At a minimum, all technical search and rescue organizations shall meet the awareness level for each type of search and rescue incident for which the AHJ has identified a potential hazard (see 4.2.1).

4.1.3* In jurisdictions where identified hazards might require a search and rescue capability at a level higher than awareness, a plan to address this situation shall be written.

4.1.3.1 The AHJ shall determine distribution of roles and responsibilities in order to focus training and resources at the designated level to maintain proficiency.

4.1.3.2 Where an advanced level of search and rescue capability is required in a given area, organizations shall have a system in place to utilize the most appropriate resource(s) available, through the use of local experts, agreements with specialized resources, and mutual aid.

4.1.4 The AHJ shall establish written standard operating procedures (SOPs) consistent with one of the following operational levels for each of the disciplines defined in this document:

- (1) *Awareness Level.* This level represents the minimum capability of organizations that provide response to technical search and rescue incidents.
- (2) *Operations Level.* This level represents the capability of organizations to respond to technical search and rescue incidents and to identify hazards, use equipment, and apply limited techniques specified in this standard to support and participate in technical search and rescue incidents.
- (3) *Technician Level.* This level represents the capability of organizations to respond to technical search and rescue incidents and to identify hazards, use equipment, and apply advanced techniques specified in this standard necessary to coordinate, perform, and supervise technical search and rescue incidents.

4.1.5* It is not the intent of this document to have an organization deem itself capable of an advanced skill level in any of the disciplines defined herein simply by training or adhering to the requirements set forth. Maintaining an operations- or technician-level capability in any discipline shall require a combination of study, training, skill, and frequency of operations in that discipline.

4.1.6 The AHJ shall establish operational procedures consistent with the identified level of operational capability to ensure that technical search and rescue operations are performed in a manner that minimizes threats to rescuers and others.

4.1.7 The same techniques used in a search and rescue operation shall be considered equally useful for training, body recovery, evidence search, and other operations with a level of urgency commensurate with the risk/benefit analysis.

4.1.8 Operational procedures shall not exceed the identified level of capability established in 4.1.4.



4.1.9* At a minimum, medical care at the basic life support (BLS) level shall be provided by the organization at technical search and rescue incidents.

4.1.10 Training.

4.1.10.1 The AHJ shall provide for training in the responsibilities that are commensurate with the operational capability of the organization.

4.1.10.1.1 The minimum training for an organization shall be at the awareness level.

4.1.10.1.2 Organizations expected to perform at a higher operational level shall be trained to that level.

4.1.10.2* The AHJ shall provide for the continuing education necessary to maintain all requirements of the organization's identified level of capability.

4.1.10.3 An annual performance evaluation of the organization based on requirements of this standard shall be performed.

4.1.10.4* The AHJ shall evaluate its training program to determine whether the current training has prepared the organization to function at the established operational level under abnormal weather conditions, extremely hazardous operational conditions, and other difficult situations.

4.1.10.5* Documentation.

4.1.10.5.1 The AHJ shall be responsible for the documentation of all required training.

4.1.10.5.2 This documentation shall be maintained and available for inspection by individual team members and their authorized representatives.

4.1.11 Prior to operating at a technical search and rescue incident, an organization shall meet the requirements specified in Chapter 4 as well as all relevant requirements of Chapters 5 through 17 for the specific technical rescue incident.

4.1.12 Standard Operating Procedure.

4.1.12.1 The AHJ shall ensure that there is a standard operating procedure to evacuate members from an area and to account for their safety when an imminent hazard condition is discovered.

4.1.12.2 This procedure shall include a method to notify all members in the affected area immediately by any effective means, including audible warning devices, visual signals, and radio signals.

4.1.13* The AHJ shall comply with all applicable local, state, and federal laws.

4.1.14* The AHJ shall train responsible personnel in procedures for invoking, accessing, and using relevant components of the *U.S. National Search and Rescue Plan*, the *U.S. National Response Framework*, and other national, state, and local response plans, as applicable.

4.2 Hazard Identification and Risk Assessment.

4.2.1* The AHJ shall conduct a hazard identification and risk assessment of the response area and shall determine the feasibility of conducting technical search and rescue operations.

4.2.2 The hazard identification and risk assessment shall include an evaluation of the environmental, physical, social, and cultural factors influencing the scope, frequency, and magni-

tude of a potential technical search and rescue incident and the impact they might have on the ability of the AHJ to respond to and to operate while minimizing threats to rescuers at those incidents.

4.2.3* The AHJ shall identify the type and availability of internal resources needed for technical search and rescue incidents and shall maintain a list of those resources.

4.2.4* The AHJ shall identify the type and availability of external resources needed to augment existing capabilities for technical search and rescue incidents and shall maintain a list of these resources, which shall be updated at least once a year.

4.2.5* The AHJ shall establish procedures for the acquisition of those external resources needed for technical search and rescue incidents.

4.2.6 The hazard identification and risk assessment shall be documented.

4.2.7 The hazard identification and risk assessment shall be reviewed and updated on a scheduled basis and as operational or organizational changes occur.

4.2.8 At intervals determined by the AHJ, the AHJ shall conduct surveys in the organization's response area for the purpose of identifying the types of technical search and rescue incidents that are most likely to occur.

4.3 Incident Response Planning.

4.3.1 The procedures for a technical search and rescue emergency response shall be documented in the special operations incident response plan.

4.3.1.1 The plan shall be a formal, written document.

4.3.1.2 Where external resources are required to achieve a desired level of operational capability, mutual aid agreements shall be developed with other organizations.

4.3.2 Copies of the technical search and rescue incident response plan shall be distributed to agencies, departments, and employees having responsibilities designated in the plan.

4.3.3 A record shall be kept of all holders of the technical search and rescue incident response plan, and a system shall be implemented for issuing all changes or revisions.

4.3.4 The technical search and rescue incident response plan shall be approved by the AHJ through a formal, documented approval process and shall be coordinated with participating agencies and organizations.

4.4 Equipment.

4.4.1 Operational Equipment.

4.4.1.1* The AHJ shall ensure that equipment commensurate with the respective operational capabilities for operations at technical search and rescue incidents and training exercises is provided.

4.4.1.2 Training shall be provided to ensure that all equipment is used and maintained in accordance with the manufacturers' instructions.

4.4.1.3 Procedures for the inventory and accountability of all equipment shall be developed and used.

4.4.2 Personal Protective Equipment (PPE).

4.4.2.1* The AHJ shall ensure that the protective clothing and equipment are supplied to provide protection from those hazards to which personnel are exposed or could be exposed.

4.4.2.2 Personnel shall be trained in the care, use, inspection, maintenance, and limitations of the protective clothing and equipment assigned or available for their use.

4.4.2.3 The AHJ shall ensure that all personnel wear and use PPE while working in known or suspected hazardous areas during technical search and rescue incidents and training exercises.

4.4.2.4 The AHJ shall ensure that atmosphere-supplying respirators in the form of supplied air respirators (SAR) or self-contained breathing apparatus (SCBA) are available when required for technical search and rescue operations and that they meet the requirements specified in Chapter 7 of NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*.

4.4.2.4.1 Breathing apparatus shall be worn in accordance with the manufacturer's recommendations.

4.4.2.4.2 A supply source of breathing air meeting the requirements of ANSI/CGA G7.1, *Commodity Specification for Air*, with a minimum air quality of Grade D shall be provided for all atmosphere-supplying respirators.

4.4.2.4.3 A supply source of breathing air meeting the requirements of ANSI/CGA G7.1, *Commodity Specification for Air*, with a minimum air quality of Grade E shall be provided for all atmosphere-supplying respirators used for dive operations.

4.4.2.4.4 Supplied air respirators shall be used in conjunction with a self-contained breathing air supply capable of providing enough air for egress in the event of a primary air supply failure.

4.5 Safety.

4.5.1 General.

4.5.1.1 All personnel shall receive training related to the hazards and risks associated with technical search and rescue operations.

4.5.1.2 All personnel shall receive training for conducting search and rescue operations while minimizing threats to rescuers and using PPE.

4.5.1.3 The AHJ shall ensure that members assigned duties and functions at technical search and rescue incidents and training exercises meet the relevant requirements of the following chapters and sections of NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*:

- (1) Section 5.4, Special Operations Training
- (2) Chapter 7, Protective Clothing and Protective Equipment
- (3) Chapter 8, Emergency Operations

4.5.1.4* Where members are operating in positions or performing functions at an incident or training exercise that pose a high potential risk for injury, members qualified in BLS shall be standing by.

4.5.1.5* Rescuers shall not be armed except when it is required to meet the objectives of the incident as determined by the AHJ.

4.5.2 Safety Officer. At technical search and rescue training exercises and in actual operations, the incident commander shall assign a member to fulfill the duties of a safety officer with the specific technical knowledge and responsibility for the identification, evaluation, and, where possible, correction

of hazardous conditions and unsafe practices specific to the operational capabilities employed.

4.5.3 Incident Management System.

4.5.3.1* The AHJ shall provide for and utilize training on the implementation of an incident management system that meets the requirements of NFPA 1561, *Standard on Emergency Services Incident Management System and Command Safety*, with written SOPs applying to all members involved in emergency operations. All members involved in emergency operations shall be familiar with the system.

4.5.3.2 The AHJ shall provide for training on the implementation of an incident accountability system that meets the requirements of NFPA 1561, *Standard on Emergency Services Incident Management System and Command Safety*.

4.5.3.3 The incident commander shall ensure rotation of personnel to reduce stress and fatigue.

4.5.3.4 The incident commander shall ensure that all personnel are aware of the potential impact of their operations on the safety and welfare of rescuers and others, as well as on other activities at the incident site.

4.5.3.5 At all technical search and rescue incidents, the organization shall provide supervisors who possess skills and knowledge commensurate with the operational level identified in 4.1.4.

4.5.4* Fitness. The AHJ shall ensure that members are psychologically, physically, and medically capable to perform assigned duties and functions at technical search and rescue incidents and to perform training exercises in accordance with Chapter 10 of NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*.

4.5.5 Nuclear, Biological, and Chemical Response.

4.5.5.1* The AHJ, as part of its hazard identification and risk assessment, shall determine the potential to respond to technical search and rescue incidents that might involve nuclear or biological weapons, chemical agents, or weapons of mass destruction, including those with the potential for secondary devices.

4.5.5.2 If the AHJ determines that a valid risk exists for technical search and rescue response into a nuclear, biological, and/or chemical environment, it shall provide training and equipment for response personnel.

Chapter 5 Rope Rescue

5.1 General Requirements.

5.1.1 Organizations operating at rope rescue incidents shall meet the requirements specified in Chapter 4.

5.1.2* The AHJ shall evaluate the need for missing person search where rope rescues might occur within its response area and shall provide a search capability commensurate with the identified needs.

5.1.3* All techniques required of the rope rescue team within this standard shall be demonstrated by the team and/or team members on at least an annual basis to a level that assures their ability to perform the practice in a manner that will result in rapid access to and successful rescue



of the victim while minimizing further injury and without sacrificing the safety of rescue team members.

5.2 Awareness Level.

5.2.1 Organizations operating at the awareness level for rope rescue incidents shall meet the requirements specified in Section 5.2.

5.2.2 Organizations operating at the awareness level for rope rescue incidents shall develop and implement procedures for the following:

- (1) Recognizing the need for a rope rescue
- (2)*Identifying resources necessary to conduct rope rescue operations
- (3)*Carrying out the emergency response system where rope rescue is required
- (4)*Carrying out site control and scene management
- (5)*Recognizing general hazards associated with rope rescue and the procedures necessary to mitigate these hazards
- (6)*Identifying and utilizing PPE assigned for use at a rope rescue incident

5.3 Operations Level.

5.3.1 Organizations operating at the operations level for rope rescue incidents shall meet the requirements specified in Sections 5.2 and 5.3.

5.3.2* Organizations operating at the operations level for rope rescue incidents shall, commensurate with the identified needs of the organization, develop and implement procedures for rescues involving movement of persons from one stable location to another, including, but not limited to, the following:

- (1) Sizing up existing and potential conditions at incidents where rope rescue operations will be performed
- (2) Assuring safety in rope rescue operations
- (3) Establishing the need for, selecting, and placing edge protection
- (4) Selecting, using, and maintaining rope rescue equipment and rope rescue systems
- (5) Configuring all knots, bends, and hitches used by the organization
- (6) Selecting anchor points and equipment to construct anchor systems
- (7) Constructing and using single-point anchor systems
- (8)*Constructing and using multiple-point anchor systems with regard to the potential increase in force that can be associated with their use
- (9) Selecting, constructing, and using a belay system
- (10) Selecting and using methods necessary to negotiate an edge or other obstacle that includes protecting all personnel working nearby from accidental fall
- (11) Ascending and descending a fixed line
- (12)*Self rescue
- (13) Selecting, constructing, and using a lowering system in both the low- and high-angle environments
- (14) Securing a patient in a litter
- (15) Attaching a litter to a rope rescue system and managing its movement
- (16) Selecting, constructing, and using rope-based mechanical advantage haul systems in both the low- and high-angle environments
- (17)*Negotiating a loaded litter over an edge during a raising and lowering operation

5.4 Technician Level.

5.4.1 Organizations operating at the technician level for rope rescue incidents shall meet the requirements specified in Sections 5.2, 5.3, and 5.4.

5.4.2* Organizations operating at the technician level for rope rescue incidents shall develop and implement procedures, commensurate with the identified needs of the organization, for the following:

- (1)*Accessing a patient using techniques that require rescuers to climb up or down natural or man-made structures, which can expose the climber to a significant fall hazard
- (2)*Using rope rescue systems to move a rescuer and a patient along a horizontal path above an obstacle or projection
- (3)*Performing a high-angle rope rescue of a person suspended from, or stranded on, a structure or landscape feature
- (4) Understanding and applying the principles of the physics involved in constructing rope rescue systems, including system safety factors, critical angles, and the causes and effects of force multipliers
- (5) Performing a high-angle rope rescue with a litter using tender(s) to negotiate obstacles, manipulate or position the patient, or provide medical care while being raised and lowered

Chapter 6 Structural Collapse Search and Rescue

6.1 General Requirements. Organizations operating at structural collapse incidents shall meet the requirements specified in Chapter 4.

6.2 Awareness Level.

6.2.1 Organizations operating at the awareness level for structural collapse incidents shall meet the requirements specified in Sections 6.2 and 7.2 (awareness level for confined space search and rescue).

6.2.2 Organizations operating at the awareness level for structural collapse incidents shall implement procedures for the following:

- (1) Recognizing the need for structural collapse search and rescue
- (2)*Identifying the resources necessary to conduct structural collapse search and rescue operations
- (3)*Initiating the emergency response system for structural collapse incidents
- (4)*Initiating site control and scene management
- (5)*Recognizing the general hazards associated with structural collapse incidents, including the recognition of applicable construction types and categories and the expected behaviors of components and materials in a structural collapse
- (6)*Identifying the 13 types of collapse patterns and potential victim locations
- (7)*Recognizing the potential for secondary collapse
- (8)*Conducting visual and verbal searches at structural collapse incidents, while using approved methods for the specific type of collapse
- (9)*Recognizing and implementing a search and rescue/search assessment marking system, building marking system (structure/hazard evaluation), victim location

marking system, and structure marking system (structure identification within a geographic area), such as the ones used by the FEMA Urban Search and Rescue System

- (10) Removing readily accessible victims from structural collapse incidents
- (11)*Identifying and establishing a collapse safety zone
- (12)*Conducting reconnaissance (recon) of the structure(s) and surrounding area

6.3 Operations Level.

6.3.1 Organizations operating at the operations level for structural collapse incidents shall meet the requirements specified in Sections 6.2 and 6.3 as well as those in the following sections:

- (1) Section 5.3 (operations level for rope rescue)
- (2) Section 7.3 (operations level for confined space search and rescue)
- (3) Section 8.3 (operations level for vehicle search and rescue)
- (4) Section 9.2 (awareness level for water search and rescue)
- (5) Section 11.3 (operations level for trench and excavation search and rescue)
- (6) Section 12.3 (operations level for machinery search and rescue)

6.3.2 The organization shall have members capable of recognizing hazards, using equipment, and implementing techniques necessary to operate at structural collapse incidents involving the collapse or failure of ordinary construction (light frame, unreinforced masonry construction, and reinforced masonry construction).

6.3.3 Organizations operating at the operations level for structural collapse incidents involving light frame ordinary construction and reinforced and unreinforced masonry construction shall develop and implement procedures for the following:

- (1)*Sizing up existing and potential conditions at structural collapse incidents
- (2)*Recognizing unique collapse or failure hazards
- (3)*Conducting hasty primary and secondary search operations (low and high coverage) intended to locate victims trapped on, inside, and beneath collapse debris
- (4)*Accessing victims trapped inside and beneath collapse debris
- (5)*Performing extrication operations involving packaging, treating, and removing victims trapped within and beneath collapse debris
- (6) Stabilizing the structure and performing rescue shoring operations in order to stabilize the structure, if necessary.

6.4 Technician Level.

6.4.1 Organizations operating at the technician level for structural collapse incidents shall meet the requirements specified in this chapter and the following sections:

- (1) Section 5.4 (technician level for rope rescue)
- (2) Section 7.4 (technician level for confined space search and rescue)
- (3) Section 8.4 (technician level for vehicle search and rescue)
- (4) Section 11.4 (technician level for trench and excavation search and rescue)
- (5) Section 12.4 (technician level for machinery search and rescue)

6.4.2 The organization shall have members capable of recognizing hazards, using equipment, and implementing techniques necessary to operate at structural collapse incidents involving all types of construction.

6.4.3 Organizations operating at the technician level for structural collapse incidents for all types of construction shall develop and implement procedures for the following:

- (1) Evaluating existing and potential conditions at structural collapse incidents
- (2) Recognizing unique collapse or failure hazards
- (3)*Conducting search operations intended to locate victims trapped inside and beneath collapse debris
- (4)*Accessing victims trapped inside and beneath collapse debris
- (5)*Performing extrication operations involving packaging, treating, and removing victims trapped within and beneath collapse debris
- (6) Stabilizing the structure and performing rescue shoring operations in order to stabilize the structure

Chapter 7 Confined Space Search and Rescue

7.1 General Requirements.

7.1.1 Organizations operating at confined space incidents shall meet the requirements specified in Chapter 4.

7.1.2* The requirements of this chapter shall apply to organizations that provide varying degrees of response to confined space emergencies.

7.1.3 All confined space rescue services shall meet the requirements defined in 7.1.3.1 through 7.1.3.12.

7.1.3.1 Each member of the rescue service shall be provided with, and trained to use properly, the PPE and rescue equipment necessary for making rescues from confined spaces according to his or her designated level of competency.

7.1.3.2 Each member of the rescue service shall be trained to perform the assigned rescue duties corresponding to his or her designated level of competency.

7.1.3.3 Each member of the rescue service shall also receive the training required of authorized rescue entrants.

7.1.3.4* Each member of the rescue service shall practice making confined space rescues once every 12 months, in accordance with the requirements of 4.1.10 of this document, by means of simulated rescue operations in which he or she removes dummies, mannequins, or persons from actual confined spaces or from representative confined spaces resembling all those to which the rescue service could be required to respond in an emergency within their jurisdiction.

7.1.3.5 Representative confined spaces should — with respect to opening size, configuration, and accessibility — simulate the types of confined spaces from which rescue is to be performed.

7.1.3.6 Each member of the rescue service shall be certified to the level of first responder or equivalent according to U.S. Department of Transportation (DOT) *First Responder Guidelines*.

7.1.3.7 Each member of the rescue service shall successfully complete a course in cardiopulmonary resuscitation (CPR) taught through the American Heart Association (AHA) to the level of a “Health Care Provider,” through the American Red Cross (ARC) to the “CPR for the Professional Rescuer” level, or through the National Safety Council’s equivalent course of study.



7.1.3.8* The rescue service shall be capable of responding in a timely manner to rescue summons.

7.1.3.9 Each member of the rescue service shall be equipped, trained, and capable of functioning to perform confined space rescues within the area for which they are responsible at their designated level of competency.

7.1.3.10 The requirements of 7.1.3.9 shall be confirmed by an annual evaluation of the rescue service's capabilities to perform confined space rescues in terms of overall timeliness, training, and equipment and to perform safe and effective rescue in those types of spaces to which the team must respond.

7.1.3.11 Each member of the rescue service shall be aware of the hazards he or she could confront when called on to perform rescue within confined spaces for which the service is responsible.

7.1.3.12 If required to provide confined space rescue within U.S. federally regulated industrial facilities, the rescue service shall have access to all confined spaces from which rescue could be necessary so that they can develop rescue plans and practice rescue operations according to their designated level of competency.

7.1.4* The role of a Confined Space Rescue Team is intended to include entry into the space to perform a rescue and, as a minimum, shall be staffed to provide sufficient members with the following exclusive functions:

- (1)*Entrant/Entry team of sufficient size and capability to perform the rescue
- (2)*Backup team of sufficient size to provide immediate assistance to, or rescue of, entry team members who become ill or injured and are unable to perform self-rescue
- (3) Rescue attendant whose function is to deny unauthorized persons access, monitor the conditions in the space and the status of all entrants
- (4) Supervisor who shall maintain control of the entire operation and be knowledgeable in all team functions

7.2 Awareness Level.

7.2.1 Organizations operating at the awareness level for confined space search and rescue incidents shall meet the requirements specified in Sections 7.2 and 5.2 (awareness level for rope rescue).

7.2.2 The organization shall have an appropriate number of personnel meeting the requirements of Chapter 4 of NFPA 472, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, commensurate with the organization's needs.

7.2.3 Organizations at the awareness level shall be responsible for performing certain nonentry rescue (retrieval) operations.

7.2.4 Organizations operating at the awareness level for confined space search and rescue incidents shall implement procedures for the following:

- (1) Recognizing the need for confined space search and rescue
- (2) Initiating contact and establishing communications with victims where possible
- (3)*Recognizing and identifying the hazards associated with nonentry confined space emergencies
- (4)*Recognizing confined spaces

(5)*Performing a nonentry retrieval

(6)*Implementing the emergency response system for confined space emergencies

(7)*Implementing site control and scene management

7.3 Operations Level.

7.3.1 Organizations operating at the operations level for confined space search and rescue incidents shall meet the requirements specified in Sections 7.2, 7.3, and 5.3 (operations level for rope rescue).

7.3.2 The organization operating at this level shall be responsible for the development and training of a confined space rescue team that is trained, equipped, and available to respond to confined space emergencies of a type and complexity that require an operations level organization.

7.3.3 Organizations operating at the operations level shall develop and implement procedures for the following:

- (1)*Sizing up existing and potential conditions at confined space emergencies
- (2)*Protecting personnel from hazards within the confined space
- (3)*Ensuring that personnel are capable of managing the physical and psychological challenges that affect rescuers entering confined spaces
- (4)*Identifying the duties of the rescue entrant(s) and backup rescue entrant(s), rescue attendant, and rescue team leader as defined herein
- (5)*Monitoring continuously, or at frequent intervals, the atmosphere in all parts of the space to be entered for oxygen content, flammability [lower explosive limit/lower flammable limit (LEL/LFL)], and toxicity, in that order
- (6)*Performing entry-type rescues into confined spaces meeting all of the following specific qualifying characteristics:
 - (a)*The internal configuration of the space is clear and unobstructed so retrieval systems can be utilized for rescuers without possibility of entanglement.
 - (b)*The victim can be easily seen from the outside of the space's primary access opening.
 - (c)*Rescuers can pass easily through the access/egress opening(s) with room to spare when PPE is worn in the manner recommended by the manufacturer.
 - (d)*The space can accommodate two or more rescuers in addition to the victim.
 - (e)*All hazards in and around the confined space have been identified, isolated, and controlled.
- (7)*Using victim packaging devices that could be employed in confined space rescue
- (8)*Selecting, constructing, and using a rope-lowering and -raising system in the high-angle environment

7.4 Technician Level.

7.4.1 Organizations operating at the technician level for confined space search and rescue emergencies shall meet the requirements of this chapter and Section 12.2 (awareness level for machinery search and rescue).

7.4.2 The organization operating at this level shall be responsible for the development of a confined space rescue team that is trained, equipped, and available to respond to confined space emergencies of a type and complexity that requires a technician level organization.

7.4.3 Organizations operating at the technician level for confined space search and rescue emergencies shall develop and implement procedures for the following:

- (1) Developing hazard isolation and control requirements
- (2)*Ensuring that rescue team members take part in a medical surveillance program
- (3)*Planning response for entry-type confined space rescues in hazardous environments
- (4)*Implementing the planned response

Chapter 8 Vehicle Search and Rescue

8.1* General Requirements. Organizations operating at vehicle search and rescue incidents shall meet the requirements specified in Chapter 4.

8.2 Awareness Level.

8.2.1 Organizations operating at the awareness level for vehicle emergencies shall meet the requirements specified in Section 8.2.

8.2.2 All members of the organization shall meet the requirements specified in Chapter 4 of NFPA 472, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, commensurate with the organization's needs.

8.2.3 Organizations operating at the awareness level for vehicle emergencies shall implement procedures for the following:

- (1) Recognizing the need for a vehicle search and rescue
- (2)*Identifying the resources necessary to conduct operations
- (3)*Initiating the emergency response system for vehicle search and rescue incidents
- (4)*Initiating site control and scene management
- (5)*Recognizing general hazards associated with vehicle search and rescue incidents
- (6) Initiating traffic control

8.3 Operations Level.

8.3.1 Organizations operating at the operations level for vehicle emergencies shall meet the requirements specified in Sections 8.2 and 8.3.

8.3.2 All members of the organization shall meet the requirements of Chapter 5 of NFPA 472, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, commensurate with the organization's needs.

8.3.3* The organization shall have members capable of recognizing hazards, using equipment, and implementing techniques necessary to operate safely and effectively at incidents involving persons injured or entrapped in a typical vehicle commonly found in the jurisdiction.

8.3.4 Organizations operating at the operations level for vehicle emergencies shall develop and implement procedures for the following:

- (1)*Sizing up existing and potential conditions at vehicle search and rescue incidents
- (2) Identifying probable victim locations and survivability
- (3)*Making the search and rescue area safe, including identifying and controlling the hazards presented by the vehicle, its position, or its systems
- (4)*Identifying, containing, and stopping fuel release
- (5) Protecting a victim during extrication or disentanglement
- (6) Packaging a victim prior to extrication or disentanglement

- (7)*Accessing victims trapped in a typical vehicle commonly found in the jurisdiction
- (8)*Performing extrication and disentanglement operations involving packaging, treating, and removing victims trapped in a typical vehicle commonly found in the jurisdiction through the use of hand and power tools
- (9)*Mitigating and managing general and specific hazards associated with vehicle search and rescue incidents that involve vehicles typically found in the jurisdiction
- (10) Procuring and utilizing the resources necessary to conduct vehicle search and rescue operations
- (11) Maintaining control of traffic at the scene of vehicle search and rescue incidents

8.4 Technician Level.

8.4.1 Organizations operating at the technician level for vehicle emergencies shall meet the requirements specified in Chapter 8.

8.4.2 Organizations operating at the technician level for vehicle emergencies shall develop and implement procedures for the following:

- (1) Evaluating existing and potential conditions at vehicle search and rescue incidents
- (2)*Performing extrication and disentanglement operations involving packaging, treating, and removing victims injured or trapped in vehicles that present unique, exotic, or unfamiliar hazards or extrication challenges
- (3)*Stabilizing in advance of unusual vehicle search and rescue situations
- (4)*Using all specialized search and rescue equipment immediately available and in use by the organization

Chapter 9 Water Search and Rescue

9.1 General Requirements. Organizations operating at water search and rescue incidents shall meet the requirements specified in Chapter 4.

9.2 Awareness Level.

9.2.1 Organizations operating at the awareness level at water search and rescue incidents shall meet the requirements specified in Section 9.2.

9.2.2 Each member of an organization operating at the awareness level shall be a competent person as defined in 3.3.20.

9.2.3 Organizations operating at the awareness level at water search and rescue incidents shall implement procedures for the following:

- (1) Recognizing the need for water search and rescue
- (2)*Implementing the assessment phase
- (3)*Identifying the resources necessary to conduct safe and effective water operations
- (4)*Implementing the emergency response system for water incidents
- (5)*Implementing site control and scene management
- (6)*Recognizing general hazards associated with water incidents and the procedures necessary to mitigate these hazards within the general search and rescue area
- (7) Determining rescue versus body recovery



9.3 Operations Level.

9.3.1 Organizations operating at the operations level at water search and rescue incidents shall meet the requirements specified in Section 9.2 and in 9.3.1 through 9.3.6.

9.3.2 Watercraft Operations. Organizations that employ powered watercraft as part of their water rescue program shall implement procedures for the following:

- (1) Identifying the types of watercraft available to the agency
- (2) Identifying the capabilities of the types of watercraft available and their limitations based on capacities, water conditions, and function
- (3) Identifying conditions and circumstances that can require the agency to operate boats and any hazards or challenges specific to those conditions
- (4) Identifying members of the organization who are expected to operate watercraft at water search and rescue incidents
- (5) Providing training on water craft operations to those members from 9.3.2(4) using widely accepted or recognized curricula consistent with the Basic Crew Member Course offered by the National Association of State Boating Law Administrators.

9.3.3 For the purposes of this standard, there shall be six separate water-related disciplines for the operations level: dive, ice, surf, surface, swift water, and flood.

9.3.4* Organizations operating at the operations level of one or more specific disciplines shall meet the requirements defined in 9.3.7, 9.3.8, 9.3.9, 9.3.10, 9.3.11, or 9.3.11.2 for that discipline.

9.3.5* For personnel operating in the hazard zone, the minimum PPE provided shall include the following:

- (1) Personal flotation device (PFD)
- (2) Thermal protection
- (3)*Helmet appropriate for water rescue
- (4) Cutting device
- (5) Whistle
- (6) Contamination protection (as needed)

9.3.6 Organizations operating at the operations level at water search and rescue incidents shall develop and implement procedures for the following:

- (1)*Sizing up existing and potential conditions at incidents where water search and rescue will be performed
- (2)*Ensuring personal safety at water operations
- (3)*Assessing water conditions in terms of hazards to the victim and the rescuer
- (4) Separating, isolating, securing, and interviewing witnesses
- (5)*Determining the method of victim entrapment
- (6)*Evaluating the progress of the planned response to ensure the objectives are being met
- (7)*Conducting shore-based rescue operations
- (8)*Using throw bags
- (9)*Providing assistance to organizations operating at the technician level
- (10) Deploying, operating, and recovering any watercraft used by the organization
- (11)*Performing survival swimming and self-rescue
- (12)*Identifying and managing heat and cold stress to the rescuer while utilizing PPE
- (13) Using victim packaging devices that could be employed by the organization for water rescue

(14)*Transferring victim information including location, surroundings, condition when found, present condition, and other pertinent information to emergency medical services personnel

(15)*Using boat-assisted and boat-based operations if boats are used by the organization

(16) Planning to meet operational objectives

(17)*Performing rapid extrication of accessible victims

(18) Performing water-based search operations that do not require the rescuer to enter the water

9.3.7 Dive. Organizations operating at the operations level at dive incidents shall develop and implement procedures for the following:

- (1)*Recognizing the unique hazards associated with dive operations
- (2)*Serving as surface support personnel
- (3) Identifying water characteristics
- (4)*Operating surface support equipment used in water operations
- (5) Procuring the necessary equipment to perform dive operations
- (6) Employing techniques for water access, entry and egress for divers
- (7)*Participating in dive operations in any climate the organization encounters
- (8) Recognizing the need for initiating contingency procedures in the event of the primary diver needing assistance

9.3.8 Ice. Organizations operating at the operations level at ice rescue incidents shall develop and implement procedures for the following:

- (1)*Recognizing the unique hazards associated with ice rescue operations
- (2)*Identifying water and ice characteristics
- (3)*Operating surface support equipment used in water or ice rescue operations
- (4) Procuring the necessary equipment to perform ice rescue operations
- (5)*Recognizing and dealing with a victim's hypothermia
- (6) Employing techniques for access, entry, and egress of divers into the water through an ice hole, if ice diving is performed by the organization

9.3.9 Surf. Organizations operating at the operations level at surf search and rescue incidents shall develop and implement procedures for the following:

- (1)*Recognizing the unique hazards associated with surf rescue operations
- (2) Operating surface support equipment used in surf rescue operations
- (3) Procuring the necessary equipment to perform surf rescue operations
- (4)*Performing self-rescue and survival swimming in surf

9.3.10 Surface.

9.3.10.1 Organizations operating at the operations level at surface search and rescue incidents shall develop and implement procedures for the following:

- (1) Assessing water conditions, characteristics, and features in terms of hazards to the victim and rescuer
- (2) Determining the method of victim entrapment
- (3) Performing self-rescue and survival swimming
- (4) Performing search operations

9.3.11 Swift Water.

9.3.11.1 Organizations operating at the operations level at swift water search and rescue incidents shall meet the requirements specified in Section 6.3 (operations level for rope rescue).

9.3.11.2 Organizations operating at the operations level at swift water search and rescue incidents shall develop and implement procedures for the following:

- (1)*Assessing moving water conditions, characteristics, and features in terms of hazards to the victim and rescuer
- (2) Determining the method of victim entrapment
- (3)*Using tag lines and tension diagonals (zip lines)
- (4)*Performing self-rescue and survival swimming in swift water
- (5) Performance search operations

9.3.12* Flood. Organizations operating at the operations level at floodwater rescue incidents shall develop and implement procedures for the following:

- (1) Recognizing the unique hazards associated with floodwater operations
- (2) Identifying floodwater characteristics specific to the cause of the flooding and the geographic area flooded
- (3) Operating surface support equipment used in floodwater rescue operations
- (4) Identifying and operating watercraft appropriate for use in the floodwater environment
- (5) Providing training for all rescuers expected to operate in a floodwater environment to Level I Surface Water Rescue as defined in Chapter 11 of NFPA 1006, *Standard for Technical Rescuer Professional Qualifications*
- (6) Providing training to members expected to operate in floodwater environments that present swift water hazards to the requirements of Level I of Chapter 12 of NFPA 1006, *Standard for Technical Rescuer Professional Qualifications*
- (7) Identifying potential sources of floodwater contamination
- (8) Implementing decontamination procedures for personnel and equipment

9.4 Technician Level.

9.4.1 Organizations operating at the technician level at water search and rescue incidents shall meet the requirements specified in 9.3.1 through 9.3.6 and 9.4.1 through 9.4.5.

9.4.2 All members of the organization shall meet the requirements specified in Chapter 4 of NFPA 472, *Standard for Competence of Responders to Hazardous Material Incidents*.

9.4.3 For the purposes of this standard, there shall be six separate water-related disciplines for the technician level: dive, ice, surf, surface, swift water, and food.

9.4.3.1 Organizations operating at the technician level at dive search and rescue incidents shall meet the requirements specified in 9.3.7 and 9.4.6.

9.4.3.2 Organizations operating at the technician level at ice search and rescue incidents shall meet the requirements specified in 9.3.8 and 9.4.7.

9.4.3.3 Organizations operating at the technician level at surf search and rescue incidents shall meet the requirements specified in 9.3.9 and 9.4.8.

9.4.3.4 Organizations operating at the technician level at surface search and rescue incidents shall meet the requirements specified in 9.3.10 and 9.4.9.

9.4.3.5 Organizations operating at the technician level at swift water search and rescue incidents shall meet the requirements specified in 9.3.11 and 9.4.10.

9.4.3.6 Organizations operating at the technician level at flood search and rescue incidents shall meet the requirements specified in 9.3.12 and 9.4.11.

9.4.4 Personnel operating within an organization at the technician level shall possess a level of watermanship skill and comfort applicable to the required task.

9.4.5 Organizations operating at the technician level at water search and rescue incidents shall develop and implement procedures for the following:

- (1) Evaluating existing and potential conditions at incidents where water search and rescue will be performed
- (2) Planning a response within the capabilities of available resources
- (3) Implementing a planned response consistent with the organization's capabilities
- (4)*Conducting both boat-assisted and boat-based rescues
- (5)*Conducting a "go" rescue
- (6) Evaluating basic swimming skills, including the ability to perform the following:
 - (a) Swim and float different water conditions with and without flotation aids or swimming aids as required
 - (b) Apply water survival skills

9.4.6 Dive.

9.4.6.1* Certification. For all diving members of a technician level organization, the AHJ shall ensure provision of certification by a nationally recognized agency whose curricula meet the provisions of Chapter 13, Dive Rescue, of NFPA 1006.

9.4.6.2* For all diving members of a technician level organization, an annual fitness test, watermanship/skills test, and basic scuba skills evaluation supplied by the International Association of Dive Rescue Specialists (IADRS) shall be conducted to maintain public safety diver capability.

9.4.6.3 Organizations operating at the technician level at dive incidents shall develop and implement procedures for the following:

- (1)*Performing skin and SCUBA diving, including the use of any associated equipment
- (2) Applying an understanding of physics and physiology as it relates to the underwater environment
- (3)*Using dive tables
- (4) Dealing with the various underwater environments with which the rescue diver could come into contact
- (5) Avoiding and dealing with underwater plants and animals
- (6) Conducting and supervising dive operations
- (7) Using accepted search techniques
- (8)*Identifying and managing dive-related maladies, including psychological and physiological stress, air embolism, and decompression sickness
- (9) Recognizing and managing the impact of near-drowning in cold water
- (10)*Utilizing electronic communications within full-face mask equipment during operations
- (11)*Utilizing redundant and alternate air sources during low-air or out-of-air emergencies
- (12)*Utilizing full-body encapsulation equipment, including dry suits, dry hoods, and dry gloves, with full-face mask in contaminated water



- (13)*Rescuing an entangled diver
- (14)*Performing medical monitoring of divers
- (15)*Recovering evidence, including locating, securing, and packaging evidence, documenting and maintaining the chain of custody, and documenting the scene
- (16) Carrying out contingency procedures for rescue operations in the event of primary diver injury, entrapment, loss of communication, and/or disconnect

9.4.7 Ice. Organizations operating at the technician level at ice rescue incidents shall develop and implement procedures for the following:

- (1)*Performing self-rescue unique to ice rescue
- (2) Using the reach, throw, row, and go rescue technique unique to ice rescue
- (3) Using watercraft, specialty craft, and specialty equipment unique to ice rescue
- (4) Providing training that meets the requirements of Level II Ice Rescuer as defined by NFPA 1006 for all members expected to enter the water at an ice rescue incident

9.4.8 Surf. Organizations operating at the technician level at surf rescue incidents shall develop and implement procedures for the following:

- (1) Using the reach, throw, row, and go rescue technique unique to surf rescue
- (2) Using watercraft, specialty craft, and specialty equipment unique to surf rescue
- (3) Providing training that meets the requirements of Level II Surf Rescuer as defined by NFPA 1006 for all members expected to enter the water at a surf rescue incident

9.4.9 Surface. Organizations operating at the technician level at surface water rescue incidents shall develop and implement procedures for providing training that meets the requirements of Level II Surface Water Rescuer as defined by NFPA 1006 for all members expected to enter the water at a surface rescue incident

9.4.10 Swift Water.

9.4.10.1 Organizations operating at the technician level at swift water rescue incidents shall meet the requirements specified in Section 5.4 (technician level for rope rescue).

9.4.10.2 Organizations operating at the technician level at swift water rescue incidents shall develop and implement procedures for applying rope rescue techniques in the swift water environment.

9.4.10.3* Organizations operating powered watercraft in a swift-water environment shall develop and implement procedures for the use of powered watercraft in the swiftwater environment.

9.4.11 Flood.

9.4.11.1 Organizations operating at the technician level at floodwater rescue incidents shall develop and implement procedures for the following:

- (1) Providing training for all rescuers expected to enter the water in a floodwater environment to Level II Surface Water Rescue as defined in Chapter 11, Surface Water Rescue, of NFPA 1006
- (2) Providing training to members expected to operate in flood water environments that present swift water hazards to the requirements of Level II of Chapter 12, Swiftwater Rescue, of NFPA 1006

9.4.11.2 Organizations operating at the technician level at floodwater rescue incidents in areas where swiftwater hazards are present shall meet the requirements of 9.4.10

Chapter 10 Wilderness Search and Rescue

10.1 General Requirements. Organizations operating at wilderness search and rescue incidents shall meet the requirements specified in Chapter 4.

10.1.1* The AHJ, as part of its hazard identification and risk assessment (*see* 4.2.2), shall identify all locations and situations in the jurisdiction that meet the definition of *wilderness*.

10.2 Awareness Level.

10.2.1 Organizations operating at the awareness level at wilderness search and rescue incidents shall meet the requirements specified in Section 10.2.

10.2.2 Members of organizations at the awareness level shall be permitted to assist in support functions on a wilderness search and rescue operation but shall not be deployed into the wilderness.

10.2.3 Organizations operating at the awareness level at any wilderness search and rescue incident shall have the following capabilities:

- (1) Recognizing the need for a wilderness search and rescue-type response
- (2)*Initiating the emergency response system for wilderness search and rescue
- (3)*Initiating site control and scene management
- (4)*Recognizing the general hazards associated with wilderness search and rescue incidents
- (5) Recognizing the type of terrain involved in wilderness search and rescue incidents
- (6)*Recognizing the limitations of conventional emergency response skills and equipment in various wilderness environments
- (7)*Initiating the collection and recording of information necessary to assist operational personnel in a wilderness search and rescue
- (8)*Identifying and isolating any reporting parties and witnesses

10.3 Operations Level.

10.3.1 Organizations operating at the operations level at wilderness search and rescue incidents shall meet the requirements specified in Sections 10.2 and 10.3, as well as those in Section 5.3 (operations level for rope rescue).

10.3.2* The AHJ shall establish standard operating procedures (SOPs) that identify the specific environments in which operations-level organizations shall be permitted to operate.

10.3.3 Organizations operating at the operations level at wilderness search and rescue incidents shall be trained and equipped to operate in the wilderness environment.

10.3.4 Organizations operating at the operations level at wilderness search and rescue incidents shall be capable of the following:

- (1)*Sizing up existing and potential conditions at incidents where wilderness search and rescue will be performed
- (2)*Requesting and interfacing with wilderness search and rescue resources

- (3) Providing the specialized medical care and protocols that are unique to the wilderness environment
- (4)*Using personal survival, body management, and preparedness skills for the specific wilderness environments in which the rescuer could become involved
- (5) Recognizing the need for, and procedures and equipment for the provision of, environmental protection through clothing systems applicable to the specific wilderness environments in which the rescuer could become involved
- (6)*Selecting, caring for, and using personal medical and support equipment and packing it with due regard to how it will be carried
- (7)*Traveling through various wilderness environments in which the rescuer could become involved while minimizing threats to safety
- (8)*Using land navigation techniques that use map and compass as well as any methods of navigation and position reporting utilized by the responding organizations with which the responder could become involved
- (9) Procuring the necessary maps and navigational and topographical information
- (10) Modifying actions and urgency as applicable to a rescue versus a recovery
- (11) Acquiring information on current and forecast environmental factors, including weather, temperature, precipitation, winds, avalanche risk, and tide levels
- (12)*Participating in and supporting wilderness search operations intended to locate victims whose exact location is unknown
- (13) Accessing and extricating individuals from wilderness environments and terrain encountered in the response area
- (14) Recognizing, identifying, and utilizing the rescue hardware and software used by the responding organizations with which the organization could become involved
- (15) Working in and around any aircraft, watercraft, and special vehicles used for SAR operations while minimizing threats to rescuers
- (16)*Recognizing the team's limitations regarding accessing and/or evacuating a victim

10.4 Technician Level.

10.4.1 Organizations operating at the technician level at wilderness search and rescue incidents shall meet the requirements specified in this chapter and the following sections:

- (1) Section 5.4 (technician level for rope rescue)
- (2) Section 9.2 (awareness level for water search and rescue)
- (3) Section 15.2 (awareness level for helicopter)

10.4.2* Each member of the wilderness search and rescue organization at the technician level shall be trained to, as a minimum, a Mountain Rescue Association team member or the equivalent.

10.4.3 Organizations operating at the technician level shall be capable of performing and supervising all aspects of wilderness search and rescue operations with which the organization could become involved.

10.4.4 Wilderness search and rescue organizations at the technician level shall not be required to develop and maintain capabilities in all types of wilderness search and rescue operations (e.g., search, cave, alpine). The ability of the organiza-

tion to respond at the technician level in one type of wilderness search and rescue operation shall not imply the ability to respond at the technician level in all types of wilderness search and rescue operations.

10.4.5 Organizations operating at the technician level at wilderness search and rescue incidents shall be capable of operating in an environment in which special search and rescue training and equipment are required or where the capabilities of operations-level equipment and training are exceeded.

10.4.6 Organizations operating at the technician level at wilderness search and rescue incidents shall develop and implement procedures for the following:

- (1) Evaluating existing and potential conditions at incidents where wilderness search and rescue will be performed and determining the need for technician-level teams
- (2) Acquiring, utilizing, and coordinating technician-level wilderness search and rescue resources
- (3) Providing input to standard operating procedures for anticipated wilderness responses
- (4)*Initiating and, where qualified, coordinating and performing technician-level wilderness search and rescue operations
- (5)*Writing and utilizing an operational plan for search and rescue in the extreme environment

10.4.7* The AHJ shall base the specialized training and equipment that is required for its jurisdiction on the following factors:

- (1) Temperature
- (2) Weather
- (3) Terrain
- (4) Flora and fauna
- (5) Altitude
- (6) Travel time
- (7) Patient care issues
- (8) Duration of incident
- (9) Logistics
- (10) Communications
- (11) Navigation
- (12) Management needs

Chapter 11 Trench and Excavation Search and Rescue

11.1 General Requirements. Organizations operating at trench and excavation search and rescue incidents shall meet the requirements specified in Chapter 4.

11.2 Awareness Level.

11.2.1 Organizations operating at the awareness level at trench and excavation emergencies shall meet the requirements specified in Sections 11.2 and 7.2 (awareness level for confined space search and rescue).

11.2.2 Each member of the organization shall meet the requirements specified in Chapter 4 of NFPA 472, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, and shall be a competent person as defined in 3.3.20.



11.2.3 Organizations operating at the awareness level at trench and excavation emergencies shall implement procedures for the following:

- (1) Recognizing the need for a trench and excavation rescue
- (2)*Identifying the resources necessary to conduct safe and effective trench and excavation emergency operations
- (3)*Initiating the emergency response system for trenches and excavations
- (4)*Initiating site control and scene management
- (5)*Recognizing general hazards associated with trench and excavation emergency incidents and the procedures necessary to mitigate these hazards within the general rescue area
- (6)*Recognizing typical trench and excavation collapse patterns, the reasons trenches and excavations collapse, and the potential for secondary collapse
- (7)*Initiating a rapid, nonentry extrication of noninjured or minimally injured victim(s)
- (8)*Recognizing the unique hazards associated with the weight of soil and its associated entrapping characteristics

11.3 Operations Level.

11.3.1 Organizations operating at the operations level at trench and excavation emergencies shall meet the requirements specified in Sections 11.2 and 11.3, as well as the following sections:

- (1) Section 5.3 (operations level for rope rescue)
- (2) Section 7.3 (operations level for confined space search and rescue)
- (3) Section 8.3 (operations level for vehicle and machinery search and rescue)

11.3.2* Members shall be capable of recognizing the hazards of using equipment and operating at trench and excavation emergencies that include the collapse or failure of individual, nonintersecting trenches with an initial depth of 2.4 m (8 ft) or less under the following conditions:

- (1) No severe environmental conditions exist.
- (2) Digging operations do not involve supplemental sheeting and shoring.
- (3) Only traditional sheeting and shoring are used.

11.3.3 Organizations operating at the operations level at trench and excavation emergencies shall develop and implement procedures for the following:

- (1)*Sizing up existing and potential conditions at trench and excavation emergencies
- (2) Initiating entry into a trench or excavation rescue area
- (3)*Recognizing unstable areas associated with trench and excavation emergencies and adjacent structures
- (4)*Identifying probable victim locations and survivability
- (5)*Making the rescue area safe, including the identification, construction, application, limitations, and removal of traditional sheeting and shoring using tabulated data and approved engineering practices
- (6)*Initiating a one-call utility location service
- (7)*Identifying soil types using accepted visual or manual tests
- (8) Ventilating the trench or excavation space
- (9) Identifying and recognizing a bell-bottom pier hole excavation and its associated unique hazards
- (10) Placing ground pads and protecting the “lip” of a trench or excavation
- (11)*Providing entry and egress paths for entry personnel
- (12)*Conducting a pre-entry briefing

- (13)*Initiating record keeping and documentation during entry operations
- (14) Selecting, utilizing, and applying shield systems
- (15)*Selecting, utilizing, and applying sloping and benching systems
- (16) Identifying the duties of panel teams, entry teams, and shoring teams
- (17) Assessing the mechanism of entrapment and the method of victim removal
- (18)*Performing extrication

11.4 Technician Level.

11.4.1 Organizations operating at the technician level at trench and excavation emergencies shall meet the requirements specified in this chapter and the following sections:

- (1) Section 7.4 (technician level for confined space search and rescue)
- (2) Section 8.4 (technician level for vehicle and machinery search and rescue)

11.4.2* Members shall be capable of recognizing hazards, using equipment, and operating at trench and excavation emergencies that include the collapse or failure of individual or intersecting trenches with an initial depth of more than 2.4 m (8 ft) or where severe environmental conditions exist, digging operations involve supplemental sheeting and shoring, or manufactured trench boxes or isolation devices would be used.

11.4.3 Organizations operating at the technician level at trench and excavation emergencies shall develop and implement procedures for the following:

- (1) Evaluating existing and potential conditions at trench and excavation emergencies
- (2)*Identifying, constructing, and removing manufactured protective systems consistent with the application and limitations of such systems using tabulated data and approved engineering practices
- (3)*Monitoring continuously or at frequent intervals the atmosphere in all parts of the trench to be entered for oxygen content, flammability (LEL/LFL), and toxicity, in that order
- (4) Identifying the construction, application, limitations, and removal of supplemental sheeting and shoring systems designed to create approved protective systems
- (5) Adjusting the protective systems based on digging operations and environmental conditions
- (6)*Rigging and placement of isolation systems

Chapter 12 Machinery Search and Rescue

12.1* General Requirements. Organizations operating at machinery search and rescue incidents shall meet the requirements specified in Chapter 4.

12.2 Awareness Level.

12.2.1 Organizations operating at the awareness level for machinery emergencies shall meet the requirements specified in Section 12.2.

12.2.2 All members of the organization shall meet the requirements specified in Chapter 4 of NFPA 472, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, commensurate with the organization's needs.

12.2.3 Organizations operating at the awareness level for machinery emergencies shall implement procedures for the following:

- (1) Recognizing the need for a machinery search and rescue
- (2)*Identifying the resources necessary to conduct operations
- (3)*Initiating the emergency response system for machinery search and rescue incidents
- (4)*Initiating site control and scene management
- (5)*Recognizing general hazards associated with machinery search and rescue incidents

12.3 Operations Level.

12.3.1 Organizations operating at the operations level for machinery emergencies shall meet the requirements specified in Sections 12.2 and 12.3.

12.3.2 All members of the organization shall meet the requirements of Chapter 5 of NFPA 472, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, commensurate with the organization's needs.

12.3.3 The organization shall have members capable of recognizing hazards, using equipment, and implementing techniques necessary to operate safely and effectively at incidents involving persons injured or entrapped in a small machine. (Refer to the definition *small machine* in NFPA 1006, *Standard for Technical Rescuer Professional Qualifications*.)

12.3.4 Organizations operating at the operations level for machinery emergencies shall develop and implement procedures for the following:

- (1)*Sizing up existing and potential conditions at machinery search and rescue incidents
- (2) Identifying probable victim locations and survivability
- (3)*Making the search and rescue area safe, including the stabilization and isolation (e.g., lockout/tagout) of all machinery involved
- (4)*Identifying and controlling the hazards presented by the release of fluids as gases associated with the machinery, which include, but are not limited to, fuel, cutting or lubricating oil, and cooling water
- (5) Protecting a victim during extrication or disentanglement
- (6) Packaging a victim prior to extrication or disentanglement
- (7) Accessing victims trapped in machinery
- (8)*Performing extrication and disentanglement operations involving packaging, treating, and removing victims trapped in machinery where the entrapment is limited to digits or where the machine can be simply disassembled, or is constructed of lightweight materials that can be cut, spread, or lifted and has only simple hazards that are readily controlled
- (9)*Mitigating and managing general and specific hazards associated with machinery search and rescue incidents
- (10) Procuring and utilizing the resources necessary to conduct machinery search and rescue operations
- (11)*Identifying potential emergency events in buildings where mechanical equipment exists, such as elevators, and developing preplans

12.3.5 Rescue members shall make provisions for fall prevention or protection for both rescuers and subjects when working in areas where potential falls can occur.

12.4 Technician Level.

12.4.1 Organizations operating at the technician level for machinery emergencies shall meet the requirements specified in this chapter.

12.4.2 Organizations operating at the technician level for machinery emergencies shall develop and implement procedures for the following:

- (1) Evaluating existing and potential conditions at machinery search and rescue incidents
- (2)*Performing extrication and disentanglement operations from large machines
- (3)*Stabilizing machines and their components at machinery search and rescue incidents
- (4)*Using all specialized search and rescue equipment immediately available and in use by the organization
- (5)*Removing the occupants of a stranded elevator by way of the car doors when the floor of the elevator is more than 91.44 cm (3 ft) from any floor served, the top hatch, or a service door or when occupants or rescuers are otherwise exposed to the hazards of the inside of the shaft or the machinery to propel the elevator

12.4.3* In elevator rescue, when there are other elevators operating in a common hoistway, all adjacent elevator(s) shall be cleared of passenger(s) and positioned alongside of the stalled elevator.

12.4.4* Adjacent elevators that share a common hoistway shall be secured and prevented from unintentional movement whenever rescuers or victims are exposed to the movement of cars or counterweights in the shaft.

Chapter 13 Cave Search and Rescue

13.1 General Requirements. Organizations operating at cave search and rescue incidents shall meet the requirements specified in Chapter 4.

13.2 Awareness Level.

13.2.1 Organizations operating at the awareness level at cave search and rescue incidents shall meet the requirements specified in Section 13.2.

13.2.2 Members of organizations at the awareness level shall be permitted to assist in support functions on a cave search and rescue operation but shall not be deployed into the cave.

13.2.3 Organizations operating at the awareness level at any cave incident shall implement procedures for the following:

- (1) Recognizing the need for a cave search and rescue
- (2)*Recognizing the limitations of conventional emergency response skills and equipment in various cave environments
- (3)*Initiating the emergency response system for cave search and rescue
- (4) Initiating site control and scene management
- (5)*Recognizing the general hazards associated with cave search and rescue incidents
- (6)*Establishing control of all cave entrances
- (7)*Initiating the collection and recording of information necessary to assist operational personnel in a cave search and rescue
- (8)*Identifying and isolating any reporting parties and witnesses



13.2.4 Each member of the cave rescue organization at the awareness level shall train to a minimum of Orientation to Cave Rescue as defined by the National Cave Rescue Commission of the National Speleological Society or equivalent.

13.3 Operations Level.

13.3.1 Organizations operating at the operations level at cave search and rescue incidents shall meet the requirements specified in Sections 13.2 and 13.3, as well as those in Section 5.3 (operations level for rope rescue).

13.3.2 Organizations operating at the operations level in cave search and rescue shall be under the supervision of organizations at the technician level when operating in a cave environment.

13.3.2.1* The AHJ shall establish SOPs that identify the specific cave environments in which operations-level organizations shall be permitted to operate.

13.3.2.2 Outside of the specific environments identified by the AHJ, personnel from technician-level cave search and rescue organizations or special cave search and rescue resources shall be utilized when operating in a cave environment.

13.3.3 Organizations operating at the operations level at cave search and rescue incidents shall develop and implement procedures for the following:

- (1)*Sizing up existing and potential conditions at incidents where cave search and rescue will be performed
- (2)*Requesting and interfacing with cave search and rescue resources
- (3)*Recognizing the types of cave passages and the vertical and horizontal extent of those passages as well as restrictions and water hazards involved in cave search and rescue incidents
- (4)*Providing the specialized medical care and protocols that are unique to the cave environment
- (5) Recognizing the need for, and procedures and equipment for the provision of, environmental protection through clothing systems applicable to the specific cave environments in which the rescuer could become involved
- (6)*Selecting, caring for, and using personal, medical, and support equipment and packing it with due regard to how it will be carried and for protection from the cave environment
- (7)*Traveling expeditiously through various cave environments in which the rescuer could become involved, while minimizing threats to safety
- (8) Using cave navigation techniques using map and compass, trail markers, balls of string, as well as any methods of navigation and position reporting utilized by the responding organizations with which the rescuer could become involved
- (9) Procuring the necessary cave maps and navigational and topographical information
- (10) Modifying actions and urgency as applicable to a rescue versus a recovery
- (11) Acquiring information on current and forecast weather, including temperature, precipitation, and winds
- (12)*Mitigating dangers from weather outside the cave on the rescue operation within the cave
- (13)*Participating in and supporting cave search operations intended to locate victims whose exact location is unknown

- (14) Accessing and extricating individuals from all cave environments and terrain encountered in the response area *while under the supervision of a cave search and rescue technician*
- (15) Recognizing, identifying, and utilizing all rescue hardware and software used by the responding organizations with which the rescuer could become involved
- (16)*Recognizing the team's limitations regarding accessing and/or evacuating a victim
- (17)*Deploying and operating in-cave wired and wireless communications systems that allow direct communication from in-cave rescue operations personal to incident command
- (18) Establishing an accountability system for all persons and equipment entering or leaving any and all of the cave's entrances
- (19) Recognizing and understanding the unique characteristics of search segmentation using a two-dimensional map for a three-dimensional cave

13.3.4 Each member of the cave rescue organization at the operational level shall train to a minimum of Level 2 Cave Rescuer as defined by the National Cave Rescue Commission of the National Speleological Society or equivalent.

13.4 Technician Level.

13.4.1 Organizations operating at the technician level at cave search and rescue incidents shall meet the requirements specified in this chapter and the following sections:

- (1) Section 5.4 (technician level for rope rescue)
- (2) Section 9.2 (awareness level for water search and rescue)
- (3) Section 10.3 (operations level for wilderness search and rescue)

13.4.2 Organizations operating at the technician level shall be capable of performing and supervising all aspects of cave search and rescue operations with which the organization could become involved.

13.4.3* The ability of the organization to respond at the technician level in one type of cave search and rescue operation shall not imply the ability to respond at the technician level in all types of cave search and rescue operations.

13.4.4 Organizations operating at the technician level at cave search and rescue incidents shall develop and implement procedures for the following:

- (1) Evaluating existing and potential conditions at incidents where cave search and rescue will be performed
- (2) Acquiring, utilizing, and coordinating search and rescue resources with which the rescuers could become involved
- (3) Providing input to standard operating procedures for anticipated cave responses
- (4)*Initiating and performing all aspects of search and rescue operations in the cave
- (5)*Writing and utilizing an operational plan for cave search and rescue

13.4.5 Each member of the cave rescue organization at the technical level shall train to a minimum of Level 3 Cave Rescuer as defined by the National Cave Rescue Commission of the National Speleological Society or equivalent.

Chapter 14 Mine and Tunnel Search and Rescue

14.1 General Requirements.

14.1.1 Organizations operating at mine and tunnel incidents shall meet the requirements specified in Chapter 4.

14.1.2* The requirements of this chapter shall apply to agencies that provide varying degrees of response to tunnels under construction or other underground excavations previously classified as mines or tunnels.

14.1.2.1 The requirements of this chapter shall not apply to operating mines, tourist mines, basements, or subterranean structures that are complete and in use (active).

14.1.2.2* The requirements of the confined space chapter shall not apply to underground structures and excavations addressed in this chapter.

14.1.3* All mine and tunnel rescue services shall meet the requirements in 14.1.3.1 through 14.1.4.

14.1.3.1 Each member of the search and rescue organization shall be provided with, and be trained to properly use, the personal protective and rescue equipment necessary for making rescues from mines and tunnels according to his or her assignment and designated level of competency.

14.1.3.2* Each member of the search and rescue organization shall be equipped, trained, and capable of performing the assigned search and rescue duties corresponding to the member's assignment and designated level of competency.

14.1.3.3 Emergency services that are the designated primary provider of rescue services for operational mines and tunnels under construction shall comply with applicable regulations.

14.1.3.4* As part of a search and rescue organization, each member shall practice making mine or tunnel rescues, in accordance with the requirements of 4.1.10 (General Requirements, Training) of this document, by means of simulated rescue operations in which the member removes dummies, mannequins, or persons from actual mines and tunnels or from representative mines and tunnels.

14.1.3.5* The search and rescue organization shall be capable of responding in a timely manner to rescue summons.

14.1.3.6 Each member of the search and rescue organization shall be aware of the hazards he or she could confront when called on to perform rescue within mines or tunnels for which the organization is responsible.

14.1.3.7 The search and rescue organization shall have access to all identified mines and tunnels from which it is required to provide search and rescue services, in order to develop search and rescue plans and practice search and rescue operations according to its designated level of competency.

14.1.4* A mine and tunnel search and rescue team shall be made up of a minimum of five individuals.

14.2 Awareness Level.

14.2.1 Organizations operating at the awareness level for mine and tunnel search and rescue incidents shall meet the requirements specified in Sections 14.2, 7.2 (awareness level for confined space rescue), 11.2 (awareness level for trench and excavation rescue), and 5.2 (awareness level for rope rescue).

14.2.2 All members of the organization shall meet the requirements of Chapter 4 of NFPA 472, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, commensurate with the organization's needs.

14.2.3 Organizations operating at the awareness level for mine and tunnel search and rescue incidents shall implement procedures for the following:

- (1) Recognizing the need for mine and tunnel search and rescue
- (2) Initiating contact and establishing communications with victims where possible
- (3)*Recognizing and identifying the hazards associated with non-entry mine and tunnel emergencies
- (4)*Recognizing mines and tunnels
- (5)*Implementing the emergency response system for mine and tunnel emergencies
- (6)*Implementing site control and scene management

14.3 Operations Level.

14.3.1 Organizations operating at the operations level for mine and tunnel search and rescue incidents shall meet the requirements specified in Sections 14.2 and 14.3, as well as in the following sections:

- (1) Section 5.3 (operations level for rope rescue)
- (2) Section 11.3 (operations level for trench and excavation search and rescue)
- (3) Section 7.3 (operations level for confined space rescue)

14.3.2 The organization operating at this level shall be responsible for the development and training of a mine and tunnel rescue team of at least five individuals who are trained, equipped, and available to respond to mine and tunnel emergencies of a type and complexity that requires an operations level organization.

14.3.3 Organizations operating at the operations level shall develop and implement procedures for the following:

- (1)*Sizing up existing and potential conditions at mine and tunnel emergencies
- (2) Protecting personnel from hazards within the mine and tunnel
- (3)*Ensuring that personnel are capable of managing the physical and psychological challenges that affect rescuers entering mines and tunnels
- (4)*Identifying the duties of the entry team, backup team, and search and rescue team leader as defined herein
- (5)*Monitoring continuously, or at frequent intervals, the atmosphere in all parts of the space to be entered for oxygen content, flammability (LEL/LFL), and toxicity, in that order
- (6)*Entering into a tunnel under construction, a mine, or any related shaft or excavation, with a means of emergency egress respiratory protection with no less than a 30-minute-rated service life immediately available, regardless of whether an atmospheric hazard is detected
- (7)*Performing entry-type rescues into mines and tunnels meeting all of the following specific qualifying characteristics:
 - (a) The internal configuration of the space is clear and unobstructed and rescue can be effected without possibility of entanglement.
 - (b) The victim can be easily seen from the outside of the space's primary access opening.

- (c)*Rescuers can pass easily through the access/egress opening(s) with room to spare when PPE is worn in the manner recommended by the manufacturer.
- (d)*The space can accommodate two or more rescuers in addition to the victim.
- (e)*All hazards in and around the mine and tunnel have been identified, isolated, and controlled.
- (8)*Using victim packaging devices that could be employed in mine and tunnel rescue
- (9) Transferring victim information, including location, surroundings, condition when found, present condition, and other pertinent information to emergency medical services personnel
- (10) Planning and implementing a mine and tunnel rescue operation
- (11)*Selecting, constructing, and using a rope-lowering and -raising system in the high-angle environment

14.4 Technician Level.

14.4.1 Organizations operating at the technician level for mine and tunnel search and rescue emergencies shall meet the requirements of this chapter and Sections 12.3 (operations level for machinery search and rescue), 7.4 (technician level for confined space search and rescue), 11.3 (operations level for trench and excavation search and rescue), and 5.3 (operations level for rope rescue).

14.4.2* The organization operating at this level shall be responsible for the development of a mine and tunnel rescue team of at least five individuals who are trained, equipped, and available to respond to mine and tunnel emergencies of a type and complexity that requires a technician-level organization.

14.4.2.1 A backup team with similar size and capabilities as the entry team shall be immediately available to enter the space.

14.4.2.2* The need for egress only respiratory protection shall be satisfied for members of an entry team who have selected and donned appropriate duration SCBA as part of an entry plan to enter a space with a recognized atmospheric hazard provided the conditions of 14.4.2.5 and 14.4.2.6 have been met.

14.4.2.2.1 There shall be at least one respirator unit per member in the tunnel.

14.4.2.3 Each entry team shall, as a minimum, have the ability to continuously monitor the air for oxygen, carbon monoxide, hydrogen sulfide, and combustible gases as well as any other atmospheric contaminants that are known or suspected.

14.4.2.4* The entry team shall have at least one method of verbal communication with the surface.

14.4.2.5 Entry teams that enter a mine or tunnel with a known atmospheric hazard shall have a clearly defined “turn-around” benchmark to ensure adequate egress to an area of refuge or safety.

14.4.2.6* Each entry team that enters a mine or tunnel with a known atmospheric hazard shall have at least one source of breathable air per team, independent of each wearer’s SCBA, to be used in the event of an SCBA failure or “out of air” emergency, that is adequate to ensure egress of the wearer and that is independent of any device brought in for the use of the victim.

14.4.3 Organizations operating at the technician level for mine and tunnel search and rescue emergencies shall develop and implement procedures for the following:

- (1) Providing all members who are designated as part of the technician level team with training in accordance with Level II Rescuer for Mine and Tunnel Rescue described in Chapter 17 of NFPA 1006
- (2) Providing members of the entry team access to specialized tools required to lift loads, move patients, cut steel, break concrete, or other tasks identified as associated with performing rescue operations in a mine or tunnel
- (3) Providing members of the entry team with access to and training in SCBA commensurate with the size and configuration of the spaces and travel distances associated with mines and tunnels
- (4)*Evaluating existing and potential conditions at mine and rescue emergencies
- (5)*Ensuring that rescue team members take part in a medical surveillance program
- (6)*Planning response for entry-type mine and tunnel rescues in hazardous environments
- (7)*Implementing the planned response

Chapter 15 Helicopter Search and Rescue

15.1 General Requirements.

15.1.1 Organizations operating at helicopter search and rescue incidents shall meet the requirements specified in Chapter 4.

15.1.2* The AHJ shall evaluate the need for helicopter search and rescue within its response area and shall provide a search and rescue capability commensurate with the identified needs.

15.2 Awareness Level.

15.2.1 Organizations operating at the awareness level for helicopter search and rescue shall meet the requirements specified in Section 15.2.

15.2.2 Organizations operating at the awareness level for helicopter search and rescue shall develop and implement procedures for the following:

- (1) Recognizing the need for helicopter search and rescue
- (2) Identifying the resources necessary to conduct helicopter search and rescue
- (3) Identifying a landing zone or helispot in accordance with the AHJ
- (4) Sizing up potential conditions where helicopter search and rescue will be performed
- (5) Initiating the emergency response system for helicopter search and rescue
- (6) Initiating site control and scene management
- (7) Ensuring safety in and around landing zones and helicopters in support of helicopter search and rescue
- (8)*Recognizing general hazards associated with helicopters and procedures necessary to mitigate these hazards within the operational area
- (9)*Identifying PPE required by awareness level personnel assigned to work in the vicinity of helicopters
- (10) Identifying the general uses of helicopters with which the organization could become involved

- (11) Establishing communications with the helicopter crew or their agency according to procedures established by the AHJ
- (12)*Prior to flying as a passenger on a search and rescue helicopter, ensuring that a pre-flight safety briefing has been received from the pilot or his designate
- (13) Communicating outside the helicopter in accordance with the AHJ

15.3 Operations Level.

15.3.1 Organizations operating at the operations level for helicopter search and rescue incidents shall meet the requirements specified in Section 15.2 (helicopter search and rescue awareness).

15.3.2 Organizations operating at the operations level for helicopter search and rescue incidents shall develop and implement procedures commensurate with the identified needs of the organization for the following:

- (1) Ensuring safety in and around the helicopter
- (2)*Identifying the minimum required crew complement and functions needed for helicopter search and rescue operations
- (3) Identifying and selecting the kind and type of helicopter required to perform a specific mission
- (4) Maintaining proficiency in procedures involved with in-flight emergencies
- (5)*Maintaining proficiency in post-crash egress and survival training appropriate to the environment likely to be encountered
- (6) Communicating inside the helicopter in accordance with the AHJ
- (7) Performing search observation techniques in accordance with the AHJ
- (8) Managing a landing zone or helispot in accordance with the AHJ
- (9) Developing an alternate helicopter operational plan in case the primary plan cannot be accomplished

15.4 Technician Level.

15.4.1 Organizations operating at the technician level for helicopter search and rescue shall meet the requirements specified in this chapter and Section 5.3 (rope operations).

15.4.2 Organizations operating at the technician level for helicopter search and rescue shall develop and implement procedures for the following:

- (1) Evaluating existing and potential conditions at incidents where helicopter search and rescue operations will be performed
- (2) Facilitating operational communications
- (3) Performing helicopter search operations, including the provision of trained search observer(s) in a helicopter in accordance with the needs of the AHJ
- (4) Performing helicopter rescue operations in accordance with the needs of the AHJ
- (5) Identifying, selecting, and utilizing PPE in any environment in which the organization might become involved
- (6)*Applying an understanding of the effects of flight on the human body
- (7)*Identifying and managing a temporary landing zone or a helispot
- (8) Recognizing the factors affecting weight and balance calculations on the aircraft used by the search and rescue organization.

- (9) Performing emergency procedures in the aircraft used by the organization
- (10) Selecting, constructing, and utilizing both single-point and multiple-point load-sharing anchor systems, both inside and outside the helicopter(s) used by the organization
- (11) Reporting information that has the potential to affect helicopter operations or safety
- (12) Inspecting and using search and rescue equipment in, on, or attached to the helicopter used by the organization

Chapter 16 Tower Rescue

16.1 Prerequisites.

16.1.1* The requirements of this chapter shall apply to organizations that provide varying degrees of response to emergencies involving guyed, self-supporting, monopoles and non-standard tower structures.

16.1.2 Organizations operating at tower rescue incidents shall, as a prerequisite, meet the requirements specified in Chapter 4.

16.1.3 Each member of the rescue organization shall be certified at least to the level of first responder or equivalent according to U.S. Department of Transportation (DOT) First Responder Guidelines.

16.1.4 Each member of the rescue organization shall successfully complete a course in cardiopulmonary resuscitation (CPR) taught through a recognized course of study.

16.1.5 The AHJ, as part of its hazard identification and risk assessment (*see Section 4.2*), shall identify all locations and situations in the jurisdiction that meet the definition of *towers* and shall make reasonable effort to pre-plan with the tower owner, manager, operator, or other AHJ for potential tower emergencies.

16.2 General Requirements.

16.2.1* The rescue organization shall be capable of responding in a timely manner to rescue summons.

16.2.2* Each member of the rescue organization shall be equipped, trained, and capable of functioning to perform tower rescues within the area for which they are responsible at their designated level of competency.

16.2.2.1 Any member who ascends a tower in the course of a rescue must be protected from a potential fall with equipment and methods that provide protection that is at least equivalent to the protection that might be expected for a worker on the same tower.

16.2.2.2 Each member of the rescue organization shall be provided with, and trained to use properly, the PPE and rescue equipment necessary for performing rescue from towers according to the designated level of competency.

16.2.2.3 Personnel responding to tower incidents in remote or wilderness environments shall also meet at least the operations level requirements of Chapter 10.

16.2.2.4 Personnel responding to tower incidents in or over water environments shall also meet at least operations level requirements of the water section of this document.



16.2.3* Each member of the rescue organization shall be aware of the hazards that could be confronted when called upon to perform rescue in or on towers within the response area of the AHJ, including (but not limited to) RF.

16.2.3.1* The AHJ shall ensure that each member of the tower rescue organization who might be called upon to climb the tower shall be trained in accordance with the outlined requirements described in 16.4.4 for Operations-level organizations or 16.5.4 for Technician-level organizations.

16.2.3.2 Each member of the tower rescue organization shall be trained to identify, avoid, and protect against hazards involved with electrical hazards.

16.2.3.3 Each member of the tower rescue organization shall be trained to identify, avoid, and protect against hazards involved with RF radiation.

16.2.3.4 Any member of the rescue organization that works in a position where they could be exposed to RF radiation (such as on a telecommunications tower) shall be equipped with and carry on their person an RF monitor and shall receive training on lockout/tagout procedures for telecommunications and broadcast towers.

16.2.4 Responders who could be exposed to AC or DC current, or the magnetic fields generated by AC or DC current, shall be trained to avoid exposure to such hazards.

16.2.5 Each member of the tower rescue organization designated to perform tower rescue shall practice performing tower rescues at least once every 12 months, by means of simulated rescue operations in which dummies, mannequins, or persons are removed from actual towers or representative structures resembling the type(s), configuration(s), and accessibility of towers to which the tower rescue organization could be required to respond.

16.2.6* Responders shall establish a preplan for working with the utility personnel in their area, and during any incident involving transmission towers shall consult with utility companies to identify and mitigate electrical hazards before attempting rescue on these or related structures.

16.2.7 All responders shall be familiar with the medical conditions likely to exist in a tower rescue emergency (including but not limited to suspension intolerance, electrical burns, and RF exposure), and how to treat for it during the operation.

16.3 Awareness Level.

16.3.1 Organizations operating at the awareness level for tower rescue incidents shall meet the requirements specified in Sections 16.2 and 5.2 (awareness level for rope rescue).

16.3.1.1 Members of organizations at the awareness level shall be permitted to assist in support functions on a tower rescue operation (such as ground support) but shall not be deployed onto the tower.

16.3.1.2* Organizations at the awareness level shall be responsible for removal or retrieval of the subject only in cases where climbing the tower is not required and the hazards are limited to potential falls.

16.3.2 Organizations operating at the awareness level for tower rescue incidents shall implement procedures for the following:

- (1) Recognizing the need for tower rescue
- (2) Initiating contact and establishing communications with a subject(s) where possible

- (3) Initiating the emergency response system for tower rescue
- (4) Recognizing different types and purposes of towers with consideration to the information covered in 16.2.3
- (5) Performing a retrieval without ascending the structure or tower
- (6) Initiating site control and scene management
- (7)*Recognizing and identifying the hazards associated with tower emergencies
- (8) Recognizing the limitations of conventional emergency response skills and equipment in various tower environments
- (9) Initiating the collection and recording of information necessary to assist operational personnel in a tower rescue
- (10) Identifying and securing any reporting parties and witnesses
- (11) Establishing familiarity with lockout/tagout procedures

16.4 Operations Level.

16.4.1 Organizations operating at the operations level for tower rescue incidents shall meet the requirements specified in Sections 16.2, 16.3, 16.4, and 5.3 (operations level for rope rescue).

16.4.2 The organization operating at this level shall be responsible for the development and training of a tower rescue team that is trained, equipped, and available to respond to tower emergencies of a type and complexity where all of the following are true:

- (1) A climbing ladder, integrated tower safety system, or both, is present, and rescuers can access the subject using available PPE and tower climbing techniques consistent with the requirements set forth within this chapter.
- (2) The tower is not structurally compromised.
- (3) The site is not affected by hazards other than those related to working at height.
- (4) The climb path is not obstructed.
- (5) A rescue pre-plan exists for that particular tower site and advance preparation/planning has been performed with the tower owner/operator.
- (6) The subject can be reached and evacuation performed in accordance with the pre-plan in such a manner so as to avoid additional hazards, entanglement, or restrictions to the rescue effort.
- (7) The tower can accommodate two or more rescuers in addition to the victim.
- (8) All hazards in and around the tower have been identified, isolated, and controlled.
- (9) The operation is feasible using the equipment or systems with which the organization has been trained.
- (10) The height of the tower does not exceed 91.44 m (300 ft).

16.4.3* Organizations operating at the operations level shall ensure that at least four individuals who are trained and capable of ensuring an operations level response are available to respond to a tower incident at any given time, and shall develop and implement procedures for the following:

- (1)*Sizing up existing and potential conditions at tower incident sites
- (2)*Protecting personnel from hazards on and around the tower environment
- (3) Ensuring that personnel are capable of managing the physical and psychological challenges that affect rescuers accessing and climbing towers

- (4)*Performing ongoing assessment of conditions affecting the tower rescue operation
- (5)*Requesting and interfacing with specialized resources applicable to tower safety
- (6) Placing a team of two rescuers on a tower where existing ladder or step bolts and climb protection is present, using accepted tower safety methods and procedures consistent with the requirements of 16.4.4
- (7) Performing the following basic rescue techniques with two rescuers on the tower:
 - (a) Releasing a subject from fall protection
 - (b) Lowering a subject vertically down an unobstructed path
 - (c) Performing a rescue of a subject where methods require up to a 15-degree deviation from plumb and can be performed with a tag line
- (8) Performing selection, care, and use of personal tower climbing equipment
- (9) Procuring the necessary tower-site information, including owner and lessor information, site plan, and specific hazard information
- (10) Modifying actions and urgency as applicable to a rescue versus a recovery
- (11) Acquiring information on current and forecast weather, including temperature, precipitation, lightning potential, and winds
- (12) Recognizing, identifying, and utilizing typical fall protection and safety hardware and software used by tower climbers
- (13)*Recognizing the team's limitations regarding accessing a subject, evacuating a subject, or both
- (14) Recognizing and using engineered anchor points for the rescue operation
- (15) Developing of and adhering to contingency plans for when weather or other factors make operations level response ineffective or dangerous to rescuers

16.4.4 Each member of the operations level tower rescue organization who might be responsible for ascending a tower for rescue shall demonstrate competency in the principles and use of the following:

- (1) Job hazard analysis used on tower sites
- (2) 100 percent fall protection
- (3) Tower anchorages
- (4)*Use of energy-absorbing lanyards
- (5)*Use of work-positioning lanyards
- (6)*Self-retracting lifelines
- (7)*Vertical lifelines for fall arrest
- (8)*Ladder climbing safety systems (cable and rail)
- (9)*Horizontal lifelines
- (10)*Use of a pre-climb checklist
- (11)*Tower ladder/peg climbing techniques
- (12) Transferring between the ladder and the tower structure
- (13)*Selection and use of appropriate rescue equipment and techniques for a given tower rescue situation

16.5 Technician Level.

16.5.1* Organizations operating at the technician level shall be capable of performing and supervising all aspects of any tower rescue operation with which the organization could become involved.

16.5.1.1 Organizations operating at the technician level for tower rescue emergencies shall meet all of the requirements

of this chapter plus the requirements of Section 5.4 (technician level for rope rescue).

16.5.2 The organization operating at this level shall be responsible for the development of a tower rescue team of at least four individuals who are trained, equipped, and available to respond to tower emergencies of a type and complexity that requires a technician level organization, including where any one or more of the following conditions exist:

- (1) A climbing ladder or climbing pegs are not present.
- (2) An integrated tower safety system is not present.
- (3) The tower is structurally compromised.
- (4) The site is affected by hazards other than those directly related to the tower or fall protection.
- (5) The climb path is obstructed.
- (6) A rescue pre-plan does not exist, has been compromised, is infeasible, and/or is not sufficient to resolve the problem at hand.
- (7) The tower cannot accommodate more than one rescuer in addition to the victim.
- (8) Use of standard subject packaging devices, systems, and/or procedures is infeasible.
- (9) The capabilities of operations-level skills are exceeded.
- (10) The height of the tower exceeds 300 ft.

16.5.3* Organizations operating at the technician level for tower rescue emergencies shall be capable of developing and implementing procedures for the following:

- (1) Evaluating hazards and establishing a climb plan for an unfamiliar tower
- (2) Isolating and controlling electrical hazards on an unfamiliar tower
- (3) Identifying and controlling EMF/Rf hazards on an unfamiliar tower
- (4)*Accessing and rescuing from a tower using non-standard anchorages
- (5) Planning and implementing response for tower rescues on unfamiliar towers where ascent of the tower is required
- (6)*Placing at least one rescuer on the tower without the benefit of a ladder, step bolts, or integrated fall protection while maintaining 100 percent fall protection at all times
- (7) Performing basic rescue techniques, including at least the following, with only one rescuer on the tower:
 - (a) Releasing a subject from common types of fall protection including a vertical lifeline (cable), vertical lifeline (rope), fall arrest lanyard, and SRL
 - (b) Lowering a subject vertically down an obstructed path
 - (c)*Performing a rescue where the subject must be moved horizontally as well as vertically

16.5.4 Each member of the technician level tower rescue organization who might be responsible for ascending a tower for rescue shall demonstrate competency in all of the capabilities outlined for operations level, plus the following:

- (1)*Use of energy absorbing lanyards
- (2)*Horizontal lifelines
- (3)*Use of a pre-climb checklist
- (4)*Tower structure climbing techniques
- (5) Transferring between different parts of the structures, and between the structure and the rescue system
- (6)*Selection and use of rescue equipment and techniques for a tower rescue situation that has not been preplanned



Chapter 17 Animal Technical Rescue

17.1* General Requirements.

17.1.1 Organizations operating at animal technical rescue incidents shall meet the requirements specified in Chapter 4.

17.1.2 Each member of an organization operating at the awareness level shall be a competent person as defined in 3.3.20.

17.2 Awareness Level.

17.2.1 Organizations operating at the awareness level for animal technical rescue incidents shall meet the requirements specified in Section 17.2.

17.2.2 Organizations at the awareness level p for animal technical rescues in situations covered within this document shall also meet the requirements of those specific chapters at the awareness level.

17.2.3 Organizations operating at the awareness level for animal technical rescue incidents shall develop and implement procedures for the following:

- (1) Recognizing the need for an animal technical rescue
- (2) Identifying resources necessary to conduct animal technical rescue operations
- (3) Carrying out the emergency response system where animal technical rescue operations are required
- (4) Carrying out site control and scene management; to include mitigating hazards presented by animals and how to contain them in all phases of the incident; to include portable fencing, cages, traps, or other equipment as available
- (5) Recognizing general hazards associated with animal technical rescue operations and the procedures necessary to mitigate these hazards
- (6) Identifying and utilizing PPE assigned for use at an animal technical rescue incident
- (7) Requesting the appropriate assistance to determine if a technical rescue vs. recovery will be conducted
- (8) Recognizing and identifying the special equipment and personnel used in animal technical rescue incidents
- (9) Understanding the social, political, and public safety issues related to effective animal rescue services
- (10) Recognizing hazmat considerations involving animal technical rescue and requesting resources to deal with those issues

17.3 Operations Level.

17.3.1 Organizations performing animal technical rescue at the operations level shall meet all requirements of Sections 5.3 (operations level for rope rescue), 17.2, and 17.3.

17.3.2 Organizations at the operations level performing animal technical rescue in situations covered within this document shall also meet the requirements of those specific chapters at the operations level.

17.3.3 Organizations operating at the operations level for animal technical rescue incidents shall, commensurate with the identified needs of the organization, develop and implement procedures for the following:

- (1) Identifying hazards to rescuers posed by the animal (perform risk assessment)

- (2) Identifying behavioral body posture cues to determine the disposition of the animal
- (3) Creating an improvised restraint device (to include an improvised muzzle) to establish physical restraint/control of an animal, both ambulatory and non-ambulatory
- (4) Identifying appropriate attachment points to the animal, and appropriate positioning of the animal for extrication with minimal injury to the animal and responders
- (5) Using a harness, halter, leash, webbing, sack, or cage, whether improvised, custom, or commercially manufactured, to assist in the movement of an ambulatory animal from one stable location to another in a low-angle environment
- (6) Using an animal packaging device or system to move a recumbent animal from one stable location to another in a low-angle environment
- (7) Performing a low-angle and high-angle lower and raise of an animal using an improvised, custom, or commercially manufactured system, to include safely accessing, managing, and packaging the patient
- (8) Recognizing and calling for when chemical restraint is needed or contraindicated
- (9) In mud rescue or other adhesive material environments, recognizing the need to alleviate suction on an animal's limbs
- (10) Using behavioral cues and "fight or flight" or "tipping point" behavior characteristics to assist in a rescue
- (11) Using containment techniques for animals that cannot be immediately handled or which require greater control and attention to behavior
- (12) Operate ladder to access animals from a location below or above grade
- (13) Perform basic first aid to animal using species-appropriate techniques
- (14) Utilize auxiliary equipment to facilitate the safe placement of rescue devices on the animal

17.4 Technician Level.

17.4.1 Organizations performing animal technical rescue at the technician level shall meet all requirements of Sections 5.4 (technician level for rope rescue), 17.2, 17.3, and 17.4.

17.4.2 Organizations at the technician level performing animal technical rescue in situations covered within this document shall also meet the requirements of those specific chapters at the level appropriate for the situation.

17.4.3 Organizations operating at the technician level for animal technical rescue incidents shall develop and implement procedures, commensurate with the identified needs of the organization, for the following:

- (1) Using a designed and tested harness device designed for animals and extended use in the high-angle environment to include helicopter rescue
- (2) Performing a high-angle rope rescue of an animal suspended from, or stranded on, a structure or landscape feature
- (3) Using rope rescue systems to move an animal along a horizontal path above an obstacle or projection
- (4) Understanding and applying the principles of the physics involved in constructing rope rescue systems, including system safety factors, critical angles, and the causes and effects of force multipliers

- (5) Performing a high-angle rope rescue with an animal litter or sling system using tender(s) to negotiate obstacles, or manipulate or position the animal
- (6) Moving an animal packaged in an animal litter or sling system up and over an edge during a raising or vertical lift operation with a rope system
- (7) If performing rescue of animals that have broken through ice on frozen bodies of water, the animal rescue team at the technician level shall develop and implement procedures for cutting a path through ice and providing water rescue, or performing a sideways drag with edge protection or cantilevering of the animal to safety
- (8) Understanding all dynamic loads associated with animal behaviors in a rope rescue system, and recognizing small livestock and smaller animals will be within the two-person rescue load normally used for human rescue
- (9) Understanding the hazards to animals and responders in trailer extrication, and it meeting the OSHA definition of a confined space
- (10) Performing helicopter rescue with a specifically designed and tested extended lift harness
- (11) Performing animal decontamination as a component of a rescue (sewers, canals, or other hazards) with recognition of hazmat issues

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.1.1.1 This standard was developed to define levels of preparation and operational capability that should be achieved by any authority having jurisdiction (AHJ) that has responsibility for technical rescue operations. These defined levels provide an outline of a system used to manage an incident efficiently and effectively, to maximize personnel safety, and to bring about the successful rescue of victims and the eventual termination of the event. The system should be followed to increase the capabilities of the AHJ to deal successfully with even the most complex incident. The system progresses from the simple basic awareness level to the operations level, and, finally, to the technician level. It should be understood that, as the system expands, the requirements for training, operational skills, management ability, and types and amounts of equipment also expand.

A.1.1.2 Organizations providing such rescue, fire suppression, and emergency services can include fire departments, law enforcement, emergency medical services, and utility, public works, and rescue organizations.

A.1.1.3 While organizations can meet the requirements of this standard, individuals and their skills and qualifications are outside of the scope of this document and are addressed in NFPA 1006, *Standard for Technical Rescuer Professional Qualifications*.

A.1.2 An organization can achieve its desired level of operational capability through the use of external resources that operate at that desired level.

A.3.2.1 Approved. The National Fire Protection Association does not approve, inspect, or certify any installations, procedures, equipment, or materials; nor does it approve or evaluate

testing laboratories. In determining the acceptability of installations, procedures, equipment, or materials, the authority having jurisdiction may base acceptance on compliance with NFPA or other appropriate standards. In the absence of such standards, said authority may require evidence of proper installation, procedure, or use. The authority having jurisdiction may also refer to the listings or labeling practices of an organization that is concerned with product evaluations and is thus in a position to determine compliance with appropriate standards for the current production of listed items.

A.3.2.2 Authority Having Jurisdiction (AHJ). The phrase “authority having jurisdiction,” or its acronym AHJ, is used in NFPA documents in a broad manner, since jurisdictions and approval agencies vary, as do their responsibilities. Where public safety is primary, the authority having jurisdiction may be a federal, state, local, or other regional department or individual such as a fire chief; fire marshal; chief of a fire prevention bureau, labor department, or health department; building official; electrical inspector; or others having statutory authority. For insurance purposes, an insurance inspection department, rating bureau, or other insurance company representative may be the authority having jurisdiction. In many circumstances, the property owner or his or her designated agent assumes the role of the authority having jurisdiction; at government installations, the commanding officer or departmental official may be the authority having jurisdiction.

A.3.3.10 Avalanche. A small, and often harmless, avalanche is called a “sluff.”

A.3.3.11 Belay. This method can be accomplished by a second line in a raising or lowering system or by managing a single line with a friction device in fixed-rope ascent or descent. Belays also protect personnel exposed to the risk of falling who are not otherwise attached to the rope rescue system.

A.3.3.15 Body Substance Isolation. This equipment usually includes the use of fluid impervious gloves, goggles, masks, and gowns/coveralls.

A.3.3.16 Cave. Caves can breathe in and out, often creating a wind that can have a chilling effect on patients and rescuers. Caves can also include water features, including rivers, streams, or lakes and can have deep drops, some as deep as 152.4 m (500 ft).

A.3.3.21 Confined Space. This definition excludes mines and caves or other natural formations, all of which must be addressed by other specialized training and equipment.

In addition to those characteristics noted in 3.3.21, a confined space also has one or more of the following characteristics:

- (1) Contains or has a potential to contain a hazardous atmosphere
- (2) Contains a material that has the potential for engulfing an entrant
- (3) Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor that slopes downward and tapers to a smaller cross-section
- (4) Contains any other recognized serious safety or health hazards (including falling, environmental, and equipment hazards)

A.3.3.24 Coverage (sometimes called “coverage factor”). Defined as the ratio of the area effectively swept to the physical

