

NFPA 405
Recommended Practice
for the Recurring
Proficiency Training
of Aircraft Rescue
and Fire-Fighting
Services

1999 Edition



National Fire Protection Association, 1 Batterymarch Park, PO Box 9101, Quincy, MA 02269-9101
An International Codes and Standards Organization

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NFPA 405

Recommended Practice for the Recurring Proficiency Training of Aircraft Rescue and Fire-Fighting Services

1999 Edition

This edition of NFPA 405, *Recommended Practice for the Recurring Proficiency Training of Aircraft Rescue and Fire-Fighting Services*, was prepared by the Technical Committee on Aircraft Rescue and Fire Fighting and acted on by the National Fire Protection Association, Inc., at its May Meeting held May 17–20, 1999, in Baltimore, MD. It was issued by the Standards Council on July 22, 1999, with an effective date of August 13, 1999.

This edition of NFPA 405 was approved as an American National Standard on August 13, 1999.

Origin and Development of NFPA 405

In 1994, the Standards Council approved the request of the Technical Committee on Aircraft Rescue and Fire Fighting to develop a new document to address the maintaining of proficiency of aircraft rescue and fire-fighting services at airports. This recommended practice evolved from the U.S. Department of Transportation, Federal Aviation Administration, Federal Aviation Regulations (FAR), Part 139, *Certification and Operations: Land Airports Serving Certain Air Carriers*. In NFPA 405, the Committee has expanded the training curriculum provided in Part 139.319 by providing airport authorities with more specific information with which to develop comprehensive programs in order to maintain proficiency of ARFF services at airports.

Technical Committee on Aircraft Rescue and Fire Fighting

Brian Boucher, *Chair*

Air Canada Pilots Assn., Ontario, Canada [L]

John Cedric Black, BAA plc — Heathrow Airport Ltd, England [U]

Ralph Colet, John Russo Industrial Inc., CA [M]

Robert J. Donahue, Massport Fire Dept., MA [U]

David A. Enz, Tuscon Airport Authority, AZ [U]

Rep. Airports Council International, Inc., North America

Kenneth R. Gilliam, Federal Aviation Administration, FL [E]

Fred B. Goodnight, Amerex Corp., AL [M]

Rep. Fire Equipment Mfrs. Assn.

B. V. Hewes, Airport Safety Services, GA [SE]

James R. Johnson Jr., Emergency One, Inc., FL [M]

D. Steve Kiernan, Nat'l Foam, Inc./Williams Holdings, PA [M]

L. M. Krasner, Factory Mutual Research Corp., MA [I]

Dave Lenz, Oshkosh Truck Corp., WI [M]

Paul S. Meyer, Hartsfield Atlanta Int'l Airport, GA [U]

Don Minnis, Air Transport Assn., DC [U]

John J. O'Sullivan, British Airways, England [C]

Gaetan Perron, Nat'l Defense Headquarters (CFFM-2), Canada [U]

Thomas Phillips, Airline Pilots Assn., PA [L]

Hugh A. Pike, U.S. Air Force Fire Protection, FL [U]

Lee W. Prazer, Akron Brass Co., OH [M]

Richard M. Radford, Emirate of Abu Dhabi, United Arab Emirates [E]

Michael D. Reagan, Los Angeles City Fire Dept., CA [U]

Robert G. Relyea, ARFF Working Group, TX [M]

John F. Rooney, Tucson, AZ [SE]

Joseph L. Scheffey, Hughes Assoc., Inc., MD [SE]

John M. Schuster, 3M Co., MN [M]

Bernard Valois, Transport Canada, Canada [E]

Pam Walden-Phillips, The Port Authority of NY & NJ, NY [U]

Rep. American Assn. of Airport Executives

Nigel Wheeler-Osman, United Kingdom Civil Aviation Authority, England [E]

Ronald O. Wikander, Lockheed Martin Aeronautical Systems, GA [M]

Larry E. Williams, Rural/Metro Corp., AZ [SE]

Joseph A. Wright, Federal Aviation Administration Tech Ctr., NJ [RT]

Alternates

Ali Zaid Mohamed Al Balushi, Directorate General of Civil Aviation & Meteorology, Seeb [E]

(Alt. to R. M. Radford)

Charlie L. Duncan, Atlanta Fire Dept., Atlanta Airport, GA [U]

(Alt. to P. S. Meyer)

Roy F. Engelbrecht, Emergency One, Inc., FL [M]

(Alt. to J. R. Johnson, Jr.)

Christopher Farnaby, United Kingdom Civil Aviation Authority, England [E]

(Alt. to N. Wheeler-Osman)

James Hotell, U.S. Air Force Fire Protection, FL [U]

(Alt. to H. A. Pike)

Frank M. E. Hughes, British Airways, England [C]

(Alt. to J. J. O'Sullivan)

Richard B. Mills, Akron Brass Co., OH [M]

(Alt. to L. W. Prazer)

Gaetan Morinville, Canadian Forces Dept. of National Defence, Canada [U]

(Alt. to G. Perron)

James F. O'Regan, O'Regan Consulting, MA [M]

(Alt. to R. Colet)

Richard E. Ottman, 3M Co., MN [M]

(Alt. to J. M. Schuster)

Michelle Peatross, Hughes Assoc., Inc., MD [SE]

(Alt. to J. L. Scheffey)

Lawrence V. Powers, Massport Fire Dept., MA [U]

(Alt. to R. J. Donahue)

Paul R. Robinson, Chattanooga, TN [L]

(Alt. to T. Phillips)

William Savage, BAA plc — Heathrow Airport Ltd, England [U]

(Alt. to J. C. Black)

Gary T. Schott, Omaha Airport Authority, NE [M]

(Alt. to R. G. Relyea)

Bonnie Wilson, Airports Council Int'l North America, DC [U]

(Alt. to D. A. Enz)

Nonvoting

Mark Day, Carmichael Int'l Ltd, England

Gary Hammack, U.S. Nat'l Transportation Safety Board (TE-10), DC

(Alt. to L. D. Roman)

Paul O. Huston, Paul Huston & Assoc., AL

Thomas J. Lett, Albuquerque Fire & Safety Assoc., NM [SE]
(Member Emeritus)

Mark T. Conroy, NFPA Staff Liaison

John E. Lodge, Lodge Fire Protection Consultancy Ltd, England

(Member Emeritus)

Lawrence D. Roman, U.S. Nat'l Transportation Safety Board, DC

David F. Short, Charlton Kings, Cheltenham, England

This list represents the membership at the time the Committee was balloted on the text of this edition. Since that time, changes in the membership may have occurred. A key to classifications is found at the back of this document.

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 aircraft rescue and fire-fighting services and equipment, for procedures for handling aircraft fire emergencies, and for specialized vehicles used to perform these functions at airports, with particular emphasis on saving lives and reducing injuries coincident with aircraft fires following impact or aircraft ground fires. This Committee also shall have responsibility for documents on aircraft hand fire extinguishers and accident prevention and the saving of lives in future aircraft accidents involving fire.

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NFPA 405

Recommended Practice for the Recurring Proficiency Training of Aircraft Rescue and Fire-Fighting Services

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

Information on referenced publications can be found in Chapter 17 and Appendix B.

Chapter 1 Administration

1-1 Scope. This recommended practice contains the recommended performance criteria by which an authority having jurisdiction over aircraft rescue and fire fighting (ARFF) maintains proficiency and effective ARFF at airports.

1-2 Purpose. This recommended practice is intended for the use of those charged with maintaining ARFF services at airports and establishes the basis for a recurring training program that focuses on measurable performance criteria. This recommended practice addresses the development of effective, coordinated aircraft rescue and fire control operations with a minimum exposure to risk for participants and the environment. Results of evaluations conducted in accordance with the recommendations of this recommended practice should be recorded and maintained by means of a documented management system. Continuous broad based training is fundamental to maintaining a proficient ARFF delivery system at airports.

ARFF personnel at airports should meet the performance objectives and requirements contained in NFPA 1003, *Standard for Airport Fire Fighter Professional Qualifications*, prior to assignment and thereafter should receive necessary recurring training that will enable them to consistently meet the recommendations of this recommended practice.

1-3 Application. The provisions of this document should be considered fundamental to maintaining levels of professional competence of ARFF services at airports.

This document is intended to be adopted as a model for the development of a proficient in-service training program for ARFF personnel at airports.

1-4 General. Each evaluation of skills and knowledge recommended by this recommended practice should be conducted at regular intervals by a designated qualified evaluator(s) appointed by the authority having jurisdiction.

All evaluations should be performed in a competent manner, and each objective should be met in its entirety.

1-5 Definitions.

Aircraft Accident. An occurrence, associated with the operation of an aircraft, that takes place between the time any person boards the aircraft with the intention of flight and until all such persons have disembarked and in which any person suffers death or serious injury or in which the aircraft receives substantial damage.

Aircraft Incident. An occurrence, other than an accident, that is associated with the operation of an aircraft and that affects or could affect continued safe operation if not corrected, but one that does not result in serious injury to persons or substantial damage to the aircraft.

ARFF Personnel. Personnel under the operational jurisdiction of the chief of the airport fire department assigned to aircraft rescue and fire fighting.

Approved.* Acceptable to the authority having jurisdiction.

Authority Having Jurisdiction.* The organization, office, or individual responsible for approving equipment, materials, an installation, or a procedure.

Critical Rescue and Fire-Fighting Access Area. The rectangular area that surrounds a runway within which aircraft movements can be expected to occur on airports and whose width extends 500 ft (150 m) from each side of the runway centerline and whose length is 3300 ft (1000 m) beyond each runway threshold.

1-6* Evaluation Criteria. The authority having jurisdiction should establish the evaluation criteria for each objective or task to be evaluated in accordance with Chapters 2 through 16 to ensure competency for each person assigned aircraft rescue and fire-fighting duties.

1-6.1 Simulations, explanations, and illustrations should be substituted when actual operation is not feasible.

1-6.2 Whenever in this recommended practice any of the terms *rules, regulations, procedures, supplies, apparatus, and equipment* are referred to, it should be implied that they are the terms of the authority having jurisdiction.

1-7 Record Keeping. Records sections, including "general" individual training records, should be maintained for each ARFF employee and should include the following:

- (1) Name of the individual
- (2) Date of training
- (3) Subject covered and course methodology
- (4) Climatic conditions
- (5) Duration of training
- (6) Instructor comments
- (7) Performance evaluation
- (8) Name of instructor
- (9) Signature of student

Chapter 2 Airport Familiarization

2-1 General. This chapter identifies the knowledge and skills recommended to maintain proficiency in airport familiarization. ARFF personnel should have a thorough knowledge of the airport and its immediate surrounding area under all operating conditions. Such knowledge is fundamental in achieving a rapid response by ARFF personnel and equipment to the critical rescue and firefighting area.

2-2 Maps. The ARFF personnel, given a map of the airport and vicinity, should identify the following features:

- (1) All runways, their designations and associated aircraft travel direction, and lengths and width
- (2) Access roads
- (3) Taxiways and their designations
- (4) Aircraft ramps/ parking areas
- (5) Frangible gate locations

- (6) Instrument landing system (ILS) critical areas
- (7) Designated aircraft isolation areas
- (8) Controlled access points
- (9) Predesignated staging areas
- (10) Airport facilities (terminals, hangars, and so forth)
- (11) Water supplies

2-3 Scenarios. Given a simulated incident or accident scenario, a radio, and a destination on the airport, ARFF personnel should safely perform the following:

- (1) Communicate with ground control.
- (2) Obtain all necessary clearances.
- (3) Select the shortest and safest response route by safely arriving at the designated point within specified times required in 7-1.3 of NFPA 403, *Standard for Aircraft Rescue and Fire-Fighting Services at Airports*.
- (4) Discharge agent.
- (5) Communicate directly by radio with a flight crew regarding the aircraft emergency situation.

2-4 Airport Markings. ARFF personnel, given a diagram of the runway and taxiway system, should identify the following airport markings:

- (1) Color of runway markings
- (2) Color of taxiway markings
- (3) Hold bars (lines)
- (4) Displaced thresholds
- (5) Aiming point/landing zone bars

2-5 Lighting. ARFF personnel should identify the color code system, location, or both for the following:

- (1) Runway center line and edge lighting
- (2) Taxiway center line and edge lighting
- (3) Runway threshold lights
- (4) Runway departure end lights
- (5) Obstruction lighting
- (6) Visual slope indicator lights

2-6 Signage. ARFF personnel should identify the signage system for the airport.

2-7 Airport Traffic. Given a map of the airport, ARFF personnel should identify all motor vehicle traffic routes and the traffic flow system of the airport, including vehicle parking and storage areas.

Chapter 3 Aircraft Familiarization

3-1 General. This chapter identifies the skill and knowledge necessary to maintain aircraft familiarization competence. ARFF personnel should have a thorough knowledge of all types of aircraft utilizing the airport.

3-2 Criteria. ARFF personnel should continuously demonstrate proficiency in the following behaviors pertinent to the types of aircraft regularly operating at the airport:

- (1) Identify the various types and models of aircraft including the approximate number of passengers each is designed to carry.
- (2) Identify the categories of aircraft propulsion systems and their associated hazards.
- (3) Identify major aircraft structural components using the correct terms and nomenclature.

- (4) Describe materials used in aircraft construction and their effects on fire and rescue operations.
- (5) Demonstrate the proper use of an aircraft familiarization chart by identifying and describing the following:
 - a. Location of normal entry doors, emergency exits, and evacuation slides
 - b. Fuel tanks
 - c. Passenger and flight crew compartments
 - d. Oil tanks
 - e. Hydraulic reservoirs
 - f. Oxygen cylinders
 - g. Batteries
 - h. Fuselage break-in points
- (6) Demonstrate the ability to properly open and operate emergency exits.
- (7) Demonstrate the ability to locate and operate various compartment and access doors.
- (8) Locate and identify the following systems and components:
 - a. Various on-board fire protection warning and extinguishing systems
 - b. Auxiliary power unit (APU)
 - c. Flight data recorder and cockpit voice recorder
 - d. Brake and wheel systems
- (9) Identify and describe particular hazards unique to particular aircraft.

Chapter 4 ARFF Personnel Safety

4-1 General. This chapter identifies the knowledge and skills necessary to ensure ARFF personnel safety. Most ARFF operations involve an element of risk. To reduce this risk, ARFF personnel should have in-depth knowledge of the exposure to the hazards associated with their occupation through training and periodic testing of their knowledge and skills.

4-2 Criteria. ARFF personnel should possess the knowledge to articulate accident prevention and safe work practices in the following areas:

- (1) Most frequent types of fireground accidents
- (2) Cause of injuries in specific incidents
- (3) Proper lifting techniques
- (4) How to avoid falls and tripping accidents
- (5) Inherent dangers associated with striking stationary or moving objects
- (6) Hazards associated with horseplay
- (7) Injuries occurring from overexertion or other physiological factors
- (8) Proper donning and wearing of protective clothing and equipment
- (9) Safe mounting, dismounting, and riding on apparatus
- (10) Basic driving safety
- (11) Critical stress management
- (12) Water safety (where located near water)

Chapter 5 Personal Protective Equipment

5-1 General. This chapter identifies the knowledge and skills necessary to properly identify, maintain, and utilize personal protective equipment. ARFF personnel should have an intimate knowledge of personal protective equipment on which their lives and those of others depend.

5-2 Protective Clothing and Equipment. ARFF personnel should be able to articulate the proper wearing, maintenance, and purpose of the following protective clothing and equipment:

- (1) Boots
- (2) Gloves
- (3) Turnout coat
- (4) Turnout pants
- (5) Helmet
- (6) Eye protection
- (7) Self-contained breathing apparatus (SCBA)
- (8) Protective hoods
- (9) Specialized clothing
- (10) Hearing protection

5-3 Breathing Apparatus. ARFF personnel should be able to demonstrate and articulate the various systems and their purpose relative to their assigned breathing apparatus:

- (1) The physiology of respiration
 - a. The respiratory system
 - b. The need for respiratory protection
 - c. Threshold limit values
 - d. Short-term exposure limits
- (2) Types of breathing apparatus assigned
- (3) Breathing apparatus procedures
 - a. Donning and doffing procedures
 - b. Safety precautions and emergency procedures
 - c. Decontamination/cleaning methods and procedures
 - d. Routine testing and maintenance
 - e. Care and maintenance of air cylinders
 - f. Breathing apparatus control procedures
 - g. Cylinder removal and replacement
 - h. Cylinder recharging

Chapter 6 Aircraft Cargo Hazards

6-1* General. This chapter identifies the knowledge, skills, and procedures recommended for ARFF personnel to properly identify and safely mitigate cargo hazards during emergencies. ARFF personnel should demonstrate familiarity with the level of personal protection required for dealing with specific incidents.

6-2 Criteria. ARFF personnel should demonstrate the following:

- (1) A comprehensive knowledge of the airport dangerous cargo response plan
- (2) The use of available reference materials to identify dangerous goods and determine the appropriate action to safely and effectively manage the incident
- (3) The procedures for the identification, risk assessment, isolation, rescue, and evacuation requirements for a given dangerous goods incident
- (4) The correct utilization of personal protective equipment and monitoring devices as they relate to the airport dangerous goods response plan

6-3 Decontamination. ARFF personnel should, for a given dangerous goods incident, identify the proper decontamination procedures required for personnel, equipment, and the incident site.

Chapter 7 Emergency Communications Systems

7-1 General. This chapter identifies the knowledge and skills ARFF should demonstrate to properly identify and operate airport communications systems available for fire department use. ARFF personnel should demonstrate the knowledge and operational skills pertaining to the proper use and required maintenance of communications systems used by the airport fire department.

7-2 Criteria. ARFF personnel should maintain a proficiency and should demonstrate the following on a prescribed periodic basis:

- (1) A thorough knowledge of and ability to operate all primary and alternate airport emergency communication systems that connect the fire department with the following:
 - a. Control tower or flight service station
 - b. Airport administrative offices
 - c. Airlines
 - d. Fixed-base operators
 - e. Mutual aid agencies
 - f. Airport service vehicles (in accordance with 5-1.2 of NFPA 403, *Standard for Aircraft Rescue and Fire-Fighting Services at Airports*)
- (2) An operating knowledge of the fire department's standby power source (or alternate communications system), its testing sequence, procedure, test recording, and proper routine maintenance
- (3) A working knowledge of the proper function of all emergency and backup alarm systems and their devices, and the ability to reinstate all systems that have been activated
- (4) An awareness of all possible ways of reporting emergencies and the steps required to ensure that proper and complete notification occurs
- (5) A thorough knowledge and application of the international phonetic alphabet and standard airport communications terminology
- (6) A complete knowledge of and ability to operate all fire department, ground control, mutual aid, and airport radio frequencies using prescribed procedures, discipline, and protocol
- (7) An ability to initiate and operate all communications features contained in the fire department alarm room, its emergency vehicles, and any vehicle dedicated for use as a communications or command unit
- (8) The ability to communicate with flight deck personnel by means of an aircraft's interphone system, by control tower relay, by direct radio contact, or by use of standard international ground-to-aircraft hand signals. The location of the aircraft inter-phone system jack should be defined and located on each aircraft type using the airport (in accordance with 3-2.1 of NFPA 402, *Guide for Aircraft Rescue and Fire Fighting Operations*).
- (9) The ability to locate, for purposes of emergency use, vital telephone numbers so that calls can be directed to individuals and agencies as required
- (10) A working knowledge of alternate means of communications; the location and use of special equipment such as cellular and hard-wired field phones, power megaphones, and flashlights for hand signaling; and the ability to interpret light signals from the control tower

Chapter 8 ARFF Vehicles and Equipment

8-1 General. This chapter identifies the knowledge and skills that should be demonstrated by designated ARFF personnel who are required to operate ARFF vehicles and special equipment under all operating conditions.

8-2 Tools and Equipment. ARFF personnel should be able to describe the individual tools and equipment on each ARFF vehicle on the airport. The description should include the equipment's designed use, required maintenance, proper storage, and a demonstration of its use. ARFF personnel should also be able to describe with complete accuracy the equipment storage location on each vehicle.

8-3 Vehicle Inspection and Maintenance. ARFF personnel should be able to demonstrate their knowledge and skills relative to routine inspection and maintenance of vehicles in accordance with fire department policy and manufacturers' specifications and maintenance manuals.

8-4 Operation of Equipment and Devices. ARFF personnel should be able to demonstrate that they have sufficient knowledge and skill to efficiently and safely operate the following systems of assigned emergency vehicles:

- (1) Communications equipment
- (2) Pump operation
- (3) Proportioning system
- (4) Turret(s)
- (5) Vehicle positioning and maneuvering
- (6) Elevated devices (where provided)
- (7) Skin penetrating tools (where provided)
- (8) Various nozzles (types and applications)
- (9) Lighting systems (for accident site)
- (10) Driver enhanced vision system (DEVS)
- (11) Rescue tools (forcible entry, cutting, lifting, and so forth)
- (12) Ladder evolutions
- (13) Ventilation equipment

8-5 ARFF Vehicle Operation. Designated ARFF personnel should have sufficient knowledge and skill to efficiently and safely operate the assigned vehicle(s), including the following:

- (1) Operation of a vehicle that has its agent tanks fully loaded, semiloaded, and unloaded
- (2) Operation of a vehicle in all climatic conditions experienced at the airport
- (3) Operation of a vehicle within safe limits while negotiating high-speed tight turns and high-speed braking
- (4) Operation of a vehicle that is operating in an environment that has no signage
- (5) Operation of a vehicle in various conditions of lighting
- (6) Operation of a vehicle in off-road conditions

Chapter 9 Extinguishing Agents

9-1 General. This chapter identifies the knowledge and skills recommended for ARFF personnel relative to the proper selection and application of extinguishing agents to be used on fires involving aircraft.

9-2 Selection and Application. Given all the extinguishing agents used at the airport, ARFF personnel should be able to describe the proper choice and application for the following types of fires:

- (1) Aviation gasoline (AvGas)

- (2) Jet fuel
- (3) Interior aircraft combustibles
- (4) Magnesium
- (5) Electrically energized
- (6) Composite materials
- (7) Engine
- (8) Cargo
- (9) Wheel fires
- (10) Other

9-3 Descriptions of Effects. Given all the extinguishing agents used at the airport, ARFF personnel should be able to describe the effects of agent application when the following conditions exist:

- (1) Wind
- (2) Rain
- (3) Freezing weather
- (4) Use of more than one agent (compatibility)
- (5) Fuel-soaked sod and flowing fuel or pressurized fuel
- (6) Other

Chapter 10 Emergency Aircraft Evacuation Assistance

10-1 General. Because saving lives is the first priority in aircraft rescue and fire fighting, ARFF personnel should possess comprehensive knowledge and should be highly skilled in emergency aircraft evacuation procedures for all those types of aircraft using the airport.

10-2 Criteria. ARFF personnel should be able to demonstrate a comprehensive knowledge of the following emergency evacuation systems and devices:

- (1) Emergency exits
- (2) Stairways
- (3) Evacuation slides
- (4) Military aircraft evacuation and ejection systems and canopy ejection systems

Chapter 11 Rescue and Fire-Fighting Operations

11-1 General. ARFF personnel should be familiar with their responsibilities during an emergency involving aircraft. Rescue and fire-fighting operations involve a multitude of tasks, many of which occur simultaneously. All of these tasks need to be considered in "sizing-up" an emergency.

11-2 Considerations. ARFF personnel should be able to describe how each of the following items might affect an emergency response:

- (1) Nature of the emergency
- (2) Type of aircraft
- (3) Number of passengers and crew
- (4) Amount of fuel on board
- (5) Location of the accident
- (6) Nature and location of cargo
- (7) Wind direction and velocity
- (8) Weather conditions and terrain
- (9) ARFF vehicle status
- (10) Time of day or night
- (11) Other

11-3 Emergency Alerts. ARFF personnel should be able to identify the types of emergency alerts that occur on the airport and the actions of the fire department required for each type.

11-4 Vehicle Routes. Given several locations on and off the airport, ARFF personnel should be able to describe the most direct response routes, alternate routes, and problems or hazards that they could present.

11-5 Size-Up Procedures. Given an accident situation, ARFF personnel should describe proper “size-up” procedures.

11-6 Factors Affecting Fire Attack. Given a fire situation, ARFF personnel should describe how the following factors could affect the fire attack:

- (1) Wind
- (2) Terrain
- (3) Wreckage
- (4) Survivors
- (5) Hazardous areas

11-7 Response Considerations. ARFF personnel should be able to define the following factors in regard to an aircraft fire and their relationships as exposures:

- (1) Survivors
- (2) Other aircraft
- (3) Structures
- (4) Unaffected parts of the involved aircraft

11-8 Tactical Considerations. ARFF personnel should be able to define and prioritize the following tactical fire suppression categories:

- (1) Rescue
- (2) Exposure protection
- (3) Fire confinement
- (4) Interior attack and ventilation
- (5) Ventilation
- (6) Overhaul
- (7) Fire extinguishment

11-9 ARFF Vehicle Positioning. Given a scenario, ARFF personnel should explain proper vehicle positioning of ARFF vehicles to assist in a given strategy. The following factors should be considered:

- (1) Ground slope
- (2) Wind direction
- (3) Movement of other vehicles
- (4) Most effective use of turrets and hand lines

11-10 Agent Application. ARFF personnel should be able to describe those factors to be considered that will affect proper extinguishing agent application pertinent to water or agent conservation.

11-11 Ventilation Considerations. ARFF personnel should be able to identify the following ventilation factors as they relate to an aircraft fire:

- (1) Backdraft considerations
- (2) Flashover considerations
- (3) Ventilation locations
- (4) Methods of ventilation

11-12 Structural Apparatus. ARFF personnel should be able to define the structural apparatus expected to respond to the airport on mutual aid assignments and how the vehicles and equipment are most effectively deployed.

11-13 Extinguishing Agent Resupply. ARFF personnel should be able to explain extinguishing agent resupply procedures established by the airport fire department.

11-14 Fire Department Supply and Resupply. ARFF personnel should be able to identify fire department supply and resupply sources on and adjacent to the airport.

11-15 Post-Fire Considerations. ARFF personnel should be able to explain post-fire operations policy established by their fire department as they relate to the following:

- (1) Biological hazards or hazardous materials considerations
- (2) Site security
- (3) Site photographs and documentation
- (4) Body removal
- (5) Movement of wreckage

Chapter 12 Live Fire Fighting

12-1 General. This chapter identifies the various types and sizes of fires associated with aircraft accidents. ARFF personnel should regularly demonstrate, individually and as teams, their ability to safely and effectively control and extinguish these fires.

12-2 Criteria.

12-2.1 ARFF personnel should be able to extinguish the following:

- (1) An aircraft fuel fire or simulation utilizing an appropriate fire extinguisher
- (2) *An aircraft fuel fire or simulation utilizing ARFF vehicle hand lines and appropriate extinguishing agent while using proper technique. The size of the fire should be appropriate for the agent flow of the hand lines.
- (3) *An aircraft fuel fire or simulation using ARFF vehicle turrets and appropriate extinguishing agent and proper technique. The size of the fire should be appropriate for the class or index of the airport.
- (4) A simulated three-dimensional fire, using ARFF vehicle hand lines, appropriate extinguishing agent(s), and proper technique.
- (5) A simulated aircraft cabin fire, using ARFF vehicle hand lines and water spray. Hand lines should be properly advanced and coordinated with ventilation operations.
- (6) A simulated auxiliary power unit fire on an aircraft, utilizing ARFF vehicle hand lines or turrets that apply appropriate extinguishing agent and using proper technique.
- (7) A simulated aircraft wheel/brake area fire, utilizing an ARFF vehicle hand line and appropriate agent and proper technique
- (8) A simulated electrical fire, utilizing the appropriate extinguishing agent and proper procedures and technique
- (9) A simulated engine fire, using an ARFF vehicle hand line and appropriate extinguishing agent and the proper technique

12-2.2 Measurable standards of highly skilled performance should be established for each of the fire situations listed in 12-2.1(1) through (9) by the authority having jurisdiction for the airport.

Chapter 13 Airport Emergency Plan

13-1 General. ARFF personnel are key members of a team organized to deal with airport emergencies. It is fundamental that they understand their duties and responsibilities as defined in the airport emergency plan.

13-2 Fire Department Response. ARFF personnel should be able to identify and describe each type of emergency listed in the plan (including alert procedures) that requires a response of the fire department.

13-3 Incident Command. For each emergency involving the fire department, ARFF personnel should provide descriptions or identify the following:

- (1) Describe the chain of command and command authority at incidents both on and off the airport.
- (2) Identify the personnel associated with each responsibility in the incident management system.
- (3) Describe the procedures for the change of command during any phase of the emergency.
- (4) Identify and describe other agencies involved, including each individual role, responsibility, and authority.
- (5) Describe in general various ARFF personnel duties and responsibilities under the plan.

Chapter 14 Emergency Medical Services (EMS)

14-1 General. This chapter identifies the critical knowledge and skills that ARFF personnel should have in order to provide basic emergency medical service (EMS) at the airport. ARFF personnel should have the knowledge and skills necessary to operate in an emergency environment until additional medical resources become available.

14-2 Criteria. ARFF personnel should be able to do the following:

- (1) Define the accepted method of infection control and universal blood and body fluid precautions as prescribed for public safety workers.
- (2) Demonstrate proper methods of decontamination, disinfection, and disposal of personal protective equipment that has become contaminated.
- (3) Explain or demonstrate the accepted procedures for single-rescuer and two-rescuer CPR, including adult, child, and infant procedures.
- (4) Demonstrate proper management of an obstructed airway for a conscious and an unconscious adult, child, and infant.
- (5) Demonstrate the use of a resuscitation mask in the performance of single-rescuer and two-rescuer CPR.
- (6) Demonstrate a primary survey for life-threatening injuries.
- (7) Identify three types of external bleeding and the characteristics of each.
- (8) Demonstrate three approved methods to control external bleeding.
- (9) According to severity, identify characteristics and demonstrate treatment of thermal and chemical burns.
- (10) Describe and demonstrate the proper techniques for managing the following:
 - a. Head injuries
 - b. Chest injuries
 - c. Fractures
 - d. Spinal injuries
- (11) Describe the symptoms and demonstrate emergency treatment of the following:
 - a. Shock
 - b. Fainting
 - c. Allergies
 - d. Convulsions

- e. Heart attack
- f. Stroke
- (12) Identify the symptoms and demonstrate emergency treatment for the following:
 - a. Ingested poisons
 - b. Drug overdose
- (13) Identify the method of contacting the poison control center that serves the airport.
- (14) Demonstrate knowledge and skill in performing the Heimlich maneuver.
- (15) Demonstrate the proper method of splinting.
- (16) Demonstrate proper precautions and procedures for childbirth and care of the newborn.
- (17) Demonstrate recognition of common medical conditions that affect medical treatment (e.g., diabetics, pacer-maker).
- (18) Demonstrate approved measures for handling emotionally disturbed persons.
- (19) Demonstrate techniques for moving the injured.
- (20) Demonstrate an understanding of the concept of medical triage.
- (21) Demonstrate an understanding of the treatment of fatalities.
- (22) Be familiar with the parameters of a simple triage and rapid transport (START) system.

Chapter 15 Administration and Standards

15-1 General. This chapter covers general administrative requirements and responsibilities.

15-2 Criteria. ARFF personnel should demonstrate a comprehensive knowledge of the following:

- (1) Airport and fire department standard operating procedures
- (2) Local instructions, bylaws, and regulations
- (3) Individual responsibilities as they relate to the maintenance and operational effectiveness of ARFF
- (4) Record-keeping requirements, including personal records related to professional competency
- (5) Organizational structure
- (6) Occupational health and safety regulations
- (7) Emergency planning, including personal roles and responsibilities structured within the plan

Chapter 16 Water Rescue Operations

16-1* General. This chapter identifies the knowledge and skill required by ARFF personnel in maintaining levels of competency required in water rescue operations. Because saving lives is the first priority in aircraft rescue and fire fighting, ARFF personnel should possess the comprehensive knowledge of water safety and should be highly skilled in water rescue operations for all airports with the need for potential water rescue operations.

16-2 Criteria. ARFF personnel should be able to demonstrate the following:

- (a) Practical boat handling, including maneuvering in confined water, high-speed maneuvering, steering a compass course and taking rough bearings, berthing and unberthing, coming to and weighing anchor, and making fast to and leaving a buoy.

(b) A sound understanding of chartwork, including the meaning of common chart symbols, the use of tidal diamonds, position fixing course correction allowing for currents and leeway, and dangers to navigation including rules and regulations for collision prevention.

(c) Comprehensive local knowledge of signals and regulations, including local marks, buoyage lights, leading lights and marks, dangers to navigation, minimum and maximum depths over banks, obstructions, currents, and abnormal tidal conditions. A general knowledge of the times and heights of tides and safe landing places in differing weather conditions together with safe compass courses in and out of local harbors is also required.

(d) The recovery of an injured or incapacitated person from the water, towing astern and alongside, righting capsized dinghies, working with helicopters, pacing alongside under way, recognizing search patterns and techniques.

(e) A sound understanding of distress signals, including the regulations for preventing collision; signs of approaching bad weather; effects of craft stability, freeboard, and trim; together with the loading and discharging of occupants.

(f) A sound understanding of the care and maintenance of rescue craft, including engines, hull, and electrical system, together with day-to-day routine inspections. Life-saving equipment and devices together with associated protective clothing should be incorporated in these inspections.

Chapter 17 Referenced Publications

17-1 The following documents or portions thereof are referenced within this recommended practice and should be considered as part of its recommendations. The edition indicated for each referenced document is the current edition as of the date of the NFPA issuance of this recommended practice. Some of these documents might also be referenced in this recommended practice for specific informational purposes and, therefore, are also listed in Appendix B.

17-1.1 NFPA Publications. National Fire Protection Association, 1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269-9101.

NFPA 402, *Guide for Aircraft Rescue and Fire Fighting Operations*, 1996 edition.

NFPA 403, *Standard for Aircraft Rescue and Fire-Fighting Services at Airports*, 1998 edition.

NFPA 1003, *Standard for Airport Fire Fighter Professional Qualifications*, 1994 edition.

Appendix A Explanatory Material

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

A-1-5 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-1-5 Authority Having Jurisdiction. The phrase “authority having jurisdiction” 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-1-6 Each authority having jurisdiction should establish an ongoing program to evaluate personnel assigned ARFF duties. All ARFF personnel should be evaluated on each objective and task that is applicable to the ARFF operation at their airports as recommended under the provisions of this recommended practice. The pass/fail criteria for performance task-based competencies and minimum test scores on knowledge-based objectives will be established by the authority having jurisdiction based on the operational functions required. In some cases the authority having jurisdiction might establish a minimum requirement of 100 percent for some knowledge-based areas (such as airport familiarization) and might establish a minimum passing score of 75 percent for other knowledge-based areas (based on the local requirements and needs).

A-6-1 The term *mitigate* as it is used in this context means to lessen in severity — that is, emergency response personnel are expected to perform duties, as they relate to aircraft cargo hazards, only to the extent to which they are trained, equipped, and qualified. It might be necessary to utilize an outside response or professional firm to perform activities beyond the capabilities of the on-airport response.

A-12-2.1(2) and (3) For burn area structures and agent discharge rates, see U.S. FAA Advisory Circular 150/5220/17A.

A-16-1 Personnel who can be called upon to effect rescue from an aircraft that has crashed and/or ditched in water must have a sound understanding of seamanship and water safety if rescue of the aircrafts’ occupants is to succeed.

Appendix B Referenced Publications

B-1 The following documents or portions thereof are referenced within this recommended practice for informational purposes only and are thus not considered part of its recommendations. The edition indicated here for each reference is the current edition as of the date of the NFPA issuance of this recommended practice.

B-1.1 Federal Aviation Administration Publication. Department of Transportation, Distribution Unit, Washington, DC 20590.

FAA Advisory Circular 150/5220/17A.