CERTIFICATION CURRICULUM MANUAL

CHAPTER TWO

BASIC AIRCRAFT RESCUE FIRE SUPPRESSION

NFPA 1003, 2015 Edition

EFFECTIVE JANUARY 1, 2017

Texas Commission on Fire Protection
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CHAPTER TWO
BASIC AIRCRAFT RESCUE FIRE SUPPRESSION
CURRICULUM OUTLINE

SECTION	SUBJECT	RECOMMENDED HOURS
200 – 4.1	General	18
200 – 4.2	Response	20
200 – 4.3	Fire Suppression	48
200 – 4.4	Rescue	34
	TOTAL RECOMMENDED HOURS*	**120**

* The recommended hours for training include time for skills evaluation and are based on 12 students. Hours needed depend on the actual number of students.

REFERENCE LIST FOR THE BASIC AIRCRAFT RESCUE FIRE SUPPRESSION CURRICULUM

This Reference List is provided as a general guide for both instructors and students to locate information pertaining to the specific objectives in the TCFP Curriculum. This list is not all inclusive and does not in any way limit TCFP development and use of questions to test the objectives of the curriculum:

Required References

AC 150/5200-12C, Fire Department Responsibility in Protecting Evidence at the Scene of an Aircraft Accident. September 28, 2009: www.airweb.faa.gov

AC 150/5200-31C, Federal Aviation Administration Airport Emergency Plan. June 30, 2011: www.airweb.faa.gov

AC 150/5210-6D, Aircraft Fire Extinguishing Agents. July 8, 2004: www.airweb.faa.gov

AC 150/5210-14 B, Aircraft Rescue Fire Fighting Equipment, Tools and Clothing. September 30, 2008: www.airweb.faa.gov

AC 150/5210-17C, Programs for Training of Aircraft Rescue and Firefighting Personnel. June 12, 2015: www.airweb.faa.gov

Aircraft Rescue and Fire Fighting. (6th edition) (2015). Stillwater, OK: Fire Protection Publications. International Fire Service Training Association (IFSTA)

Code of Federal Regulations, 14 CFR, Part 139, Subpart A, Certification of Airports: General. (Amended January 16, 2013). U.S. Department of Transportation, Federal Aviation Administration http://www.ecfr.gov/cgi-bin/text-idx?c=ecfr;sid=18b73eada8afcb53ac77dc25df9390cb;rgn=div5;view=text;node=14%3A3.0.1.1.14;idno=14;cc=ecfr

Code of Federal Regulations, 14 CFR, Part 139, Subpart D, Certification of Airports: Operations. (Amended January 16, 2013). U.S. Department of Transportation, Federal Aviation Administration http://www.ecfr.gov/cgi-bin/text-idx?c=ecfr;sid=18b73eada8afcb53ac77dc25df9390cb;rgn=div5;view=text;node=14%3A3.0.1.1.14;idno=14;cc=ecfr

Code of Federal Regulations, 14 CFR, Part 139.311 Marking, signs and lighting. (Amended January 16, 2013). U.S. Department of Transportation, Federal Aviation Administration http://www.ecfr.gov/cgi-bin/text-idx?c=ecfr;sid=18b73eada8afcb53ac77dc25df9390cb;rgn=div5;view=text;node=14%3A3.0.1.1.14;idno=14;cc=ecfr

Code of Federal Regulations, 14 CFR, Part 139.325 Airport emergency plan. (Amended January 16, 2013). U.S. Department of Transportation, Federal Aviation Administration http://www.ecfr.gov/cgi-bin/text-idx?c=ecfr;sid=18b73eada8afcb53ac77dc25df9390cb;rgn=div5;view=text;node=14%3A3.0.1.1.14;idno=14;cc=ecfr

Code of Federal Regulations, 14 CFR, Part 139.329, Pedestrians and ground vehicles. (Amended January 16, 2013). U.S. Department of Transportation, Federal Aviation Administration http://www.ecfr.gov/cgi-bin/text-idx?c=ecfr;sid=18b73eada8afcb53ac77dc25df9390cb;rgn=div5;view=text;node=14%3A3.0.1.1.14;idno=14;cc=ecfr

Code of Federal Regulations, 49 CFR, Part 175.310 Transportation of flammable liquid fuel; aircraft only means of transportation. (October 1, 2011 edition). U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration https://www.gpo.gov/fdsys/granule/CFR-2011-title49-vol2/CFR-2011-title49-vol2-sec175-310

*Code of Federal Regulations, 49 CFR, Part 830.10 Preservation of aircraft wreckage, mail, cargo, and records. (*October 1, 2006 edition). U.S. Department of Transportation, National Transportation Safety Board https://www.gpo.gov/fdsys/granule/CFR-2006-title49-vol7/CFR-2006-title49-vol7-sec830-10

Essentials of Fire Fighting and Fire Department Operations. (6th edition) (2013). Stillwater, OK: Fire Protection Publications. International Fire Service Training Association (IFSTA)

National Transportation Safety Board Accident Reports, http://www.ntsb.gov.

NFPA 402: Aircraft Rescue and Fire-Fighting Operations. (2013 edition). NFPA Publications Quincy, MA. National Fire Protection Association

NFPA 1003: Standard for Airport Fire Fighter Professional Qualifications. (2015 edition). NFPA Publications Quincy, MA: NFPA Publications. National Fire Protection Association

NFPA 1403: Standard on Live Fire Training Evolutions. (2012 edition). NFPA Publications Quincy, MA. National Fire Protection Association

NFPA 1500: Standard on Fire Department Occupational Safety and Health Program. (2013 edition). NFPA Publications Quincy, MA: NFPA Publications. National Fire Protection Association

Recommended References

The most current edition of the following publications is recommended (not required) supplemental material for program use.

150/5230-4B – Aircraft Fuel Storage, Handling, Training, and Dispensing on Airports. Sept. 28, 2012.
http://www.faa.gov/documentLibrary/media/Advisory_Circular/150_5230_4b.pdf

ARFF Vehicle and High Reach Extendable Turret AC 150/5210-23. Sept 30, 2010
http://www.faa.gov/documentLibrary/media/Advisory_Circular/150_5210_23.pdf

Ballistic recovery systems (BRS) FAA 13-04 cert alert "Additional Precautions for Approaching Aircraft with Ballistic Parachutes, Ejection Seats, and Airbags." July 29, 2013. https://www.faa.gov/airports/airport_safety/certalerts/media/cert1304.pdf

Commercial Aviation Alternative Fuels Initiative. Information on biodiesel/alternative fuels: http://www.caafi.org/

Department of Defense Nuclear Accident National Defense Area guidance
http://www.au.af.mil/au/awc/awcgate/dod/d523016p.pdf

Diesel particulate filter (DPF) regeneration
https://www.iafc.org/files/1EVM/FAMA_EmerVehEmissionsSysGuide.pdf

FAA Advisory Circular AC120-60B (anti-icing, de-icing isolation). December 20, 2004.
https://www.faa.gov/regulations_policies/advisory_circulars/index.cfm/go/document.information/documentID/23199

International Association for Disaster Preparedness and Response (DERA) guide for responding to a military aircraft crash
http://www.disasters.org/dera/library/ACCIDENT.PDF

National Defense Area (Department of Defense)
Official definition: http://www.dtic.mil/doctrine/new_pubs/jp1_02.pdf

Pumping and Aerial Apparatus Driver/Operator Handbook. (3rd edition) (2014). Stillwater, OK: Fire Protection Publications. International Fire Service Training Association.

Sustainable Alternative Jet Fuels

https://www.faa.gov/about/office_org/headquarters_offices/apl/research/alternative_fuels/

Unmanned aircraft/drones UAV/UAS
https://www.faa.gov/uas/

USAF TO 00-105E-9
http://legacy.dodffcert.com/00-105e-9/

[For additional information on solid fuels]
Fire Investigator: Principles and Practices. (4th edition) (2016). Burlington, MA: Jones and Bartlett Learning. pp. 371-372. See also: *Essentials of Fire Fighting and Fire Department Operations.* (6th edition) (2013). Stillwater, OK: Fire Protection Publications. International Fire Service Training Association (IFSTA) pp. 228-230.

COURSE INSTRUCTOR INFORMATION
BASIC AIRCRAFT RESCUE FIRE SUPPRESSION

Overview

The Basic Aircraft Rescue Fire Suppression curriculum is designed to provide clear guidance that ensures adequate presentation of the information required to meet the Job Performance Requirements (JPRs) of National Fire Protection Association (NFPA) 1003, *Standard for Airport Fire Fighter Professional Qualifications*, 2015 edition.

The Basic Aircraft Rescue Fire Suppression curriculum is Chapter 2 of the Texas Commission on Fire Protection (TCFP) Curriculum Manual.

Certification Level	TCFP Section Number	NFPA 1003 Chapter
Basic Aircraft Rescue Fire Suppression	200	4

Layout

The NFPA numbering sequence is mirrored to allow easy correlation between this document and the NFPA Standard. For example, 200-4.2.1 identifies the section in Basic Aircraft Rescue Fire Suppression that corresponds to NFPA section 4.2.1.

TCFP Standards Manual

It is critical that the Course Instructor review the chapters in the TCFP Standards Manual that apply to this curriculum. Of primary importance are the following chapters: Chapter 421, Standards for Certification; Chapter 437, Fees; Chapter 423, Subchapter B - Minimum Standards for Aircraft Rescue Fire Fighting Personnel. These chapters do not address every issue that could impact this curriculum; therefore, the Course Instructor is encouraged to become familiar with the TCFP Standards Manual.

Supplemental Information

Instructors are expected to provide supplemental information if the main reference text does not provide adequate information to ensure successful completion of the Job Performance Requirements (JPRs) as listed in the curriculum.

Components of the Curriculum

Each section of the curriculum identifies the NFPA Job Performance Requirement (JPR) and subdivides the requisite knowledge requirements into learning components. For example:

	Curriculum	Explanation
200 – 4.2.4	Perform an airport operation, given an assignment, a hazardous condition, and the airport policies and procedures, so that unsafe conditions are detected and reduced in accordance with the airport policies and procedures.	**Section Number and NFPA JPR**

Requisite Knowledge: Airport and aircraft policies and procedures for hazardous conditions.	**Requisite Knowledge Statement**
1. Airport policies and procedures for hazardous conditions	**First part of Requisite Knowledge**
a. Airport certification manual b. Airport emergency plan c. Notification of the emergency … etc.	**Associated learning components**
2. Aircraft policies and procedures for hazardous conditions	**Second part of Requisite Knowledge**
a. Airport emergency plan (AHJ) b. Standardized response c. Coordination with flight crew … etc.	**Associated learning components**

Skills
NFPA Requisite Skill requirements are addressed in the corresponding Skill Sheets.

Description of Certification Level
Basic Aircraft Rescue Fire Fighting Personnel

An Airport/Aircraft Rescue Fire Fighter (ARFF) shall meet all of the job performance requirements and certification requirements of Fire Fighter II as detailed in NFPA 1001 *Standard for Fire Fighter Professional Qualifications* and NFPA 1003 *Standard for Airport Fire Fighter Professional Qualifications*, Code of Federal Regulations (CFR) Title 14, Part 139, and US Department of Transportation (US DOT) Federal Aviation Administration (FAA) Advisory Circulars (AC) specific to the role of ARFF Personnel.

SECTION 200

BASIC AIRCRAFT RESCUE FIRE SUPPRESSION

Basic Aircraft Rescue Fire Fighting Personnel

The Fire Fighter II who has demonstrated the skills and knowledge necessary to function as an integral member of an aircraft rescue and fire fighting (ARFF) team.

200-4.1 General

200-4.1.1 Qualifications

To be qualified as an airport fire fighter, the candidate shall meet the requirements for Texas Commission on Fire Protection (TCFP) certification as Fire Fighter II, as defined in NFPA 1001, *Standard for Fire Fighter Professional Qualifications*; and TCFP certification standards as defined in NFPA 1003, *Standard for Airport Fire Fighter Professional Qualifications*.

200-4.1.1.1 Duties

These requirements shall be divided into three major duties: response, fire suppression and rescue.

200-4.1.1.2 Function

The primary function of the airport fire fighter shall be to execute fire suppression and rescue activities.

200-4.1.1.3 General Knowledge Requirements

Fundamental aircraft fire-fighting techniques, including the approach, positioning, initial attack, and selection, application, and management of the extinguishing agents; limitations of various sized hand lines; use of personal protective equipment (PPE); fire behavior; fire-fighting techniques in oxygen-enriched atmospheres; reaction of aircraft materials to heat and flame; critical components and hazards of civil aircraft construction and systems related to ARFF operations; special hazards associated with military aircraft systems; a national defense area and limitations within that area; characteristics of different aircraft fuels; hazardous areas in and around aircraft; aircraft fueling systems (hydrant/vehicle); aircraft egress/ingress (hatches, doors, and evacuation chutes); hazards associated with aircraft cargo, including dangerous goods; hazardous areas, including entry control points, crash scene perimeters, and requirements for operations within the hot, warm, and cold zones; and critical stress management policies and procedures.

1) Fundamental aircraft fire-fighting techniques of approach
    a. Size up
        i. Weather
        ii. Terrain
        iii. Debris trail
        iv. Exposures
        v. Aircraft
            1. Size/type
            2. Fire
                a) Absence
                b) Presence
            3. Souls on Board (SOB)
            4. Fuel on board

2) Fundamental aircraft fire-fighting techniques of positioning
    a. Weather
    b. Terrain
    c. Exposures
    d. Aircraft
        i. Size/Type
        ii. Fire
            1. Absence
            2. Presence
    e. Impact
        i. High
        ii. Low
    f. Non-impact
        i.Fire
            1. Interior
            2. Exterior
        ii.No fire
    g. Egress routes
    h. Wreckage
        i. Intact
        ii. Fragmented
        iii. Debris trail
        iv. Upside down
    i. Scene preservation
    j. Hazardous areas
        i. Fuel

1. Jet fuels
2. AVGAS
3. Other fuels

ii. Engines
1. Jet turbine
2. Propellers
3. Rotors

iii. Military ordnance/armament
iv. Collapse zones
v. Dangerous goods

3) Fundamental aircraft fire-fighting techniques of initial attack
   a. Rescue of occupants
      i. Isolation
      ii. Insulation
   b. Fire control
      i. Interior
      ii. Exterior
   c. Loss control

4) Fundamental aircraft fire-fighting techniques of fire extinguishing agents
   a. Selection
      i. Water
      ii. Foaming agents
      iii. Dry chemicals
      iv. Halogenated agents and halon replacements
      v. Dry powders
   b. Application
      i. Turret
      ii. Hand line
      iii. Hand held extinguishers
      iv. Special appliance(s)
   c. Management
      i. Conservation of agent
      ii. Replenishment

5) Limitations of various sized hand lines
   a. Diameter
   b. Discharge
   c. Length of hand line

d. Reach of agent application

6) Use of personal protective equipment (PPE)
   a. Personal Protective Clothing
      i. Station/work uniform
      ii. Structural fire-fighting protective clothing
      iii. Proximity fire-fighting protective clothing
      iv. Chemical protective clothing
   b. Respiratory protection (SCBA)
      i. Conditions that require respiratory protection
         1. Oxygen deficiency
         2. Elevated temperatures
         3. Toxic environments
         4. Smoke (by-products of combustion)
   c. Donning of PPE
   d. Doffing of PPE
   e. Care of PPE
   f. Cleaning of PPE
   g. Inspections of PPE
   h. Limitations of PPE
   i. Maintenance of PPE
      i. Replacement
      ii. Storage

7) Conditions that require respiratory protection
   a. Oxygen deficiency
   b. Elevated temperatures
   c. Toxic environments
   d. Smoke (by-products of combustion)

8) Fire behavior
   a. Class A fires
      i. Aircraft interior
      ii. Aircraft cargo
      iii. Airport structures
   b. Class B fires
      i. Pooled fuel
      ii. Three-dimensional
   c. Class C fires
      i. Avionics
      ii. Wiring
   d. Class D fires

i. Landing gear
ii. Engine components

9) Fire-fighting techniques in oxygen-enriched atmospheres
   a. Recognizing an oxygen enriched atmosphere
   b. Defensive tactics to reduce oxygen concentration

10) Reaction of aircraft materials to heat and flame
   a. Aluminum and aluminum alloy
   b. Steel
   c. Magnesium and magnesium alloy
   d. Titanium
   e. Advance aerospace (composite) materials
   f. Wood

11) Critical components and hazards of civil aircraft construction and systems related to ARFF operations
   a. Pinching and limb severing hazards
   b. Propeller dangers
   c. Helicopter hazards
   d. Jet-Engine hazards
   e. Evacuation hazards
   f. Ballistic recovery systems
   g. Landing gear
   h. Wheel assemblies
   i. Electrical systems
   j. Hydraulic systems
   k. Advanced aircraft composite materials
   l. Fuel systems
   m. Radar systems
   n. Pressurized cylinders
   o. Oxygen supply systems
   p. Protruding devices
   q. Ram Air Turbine (RAT)

12) Special hazards associated with military aircraft systems
   a. Pinching and limb severing hazards
   b. Propeller dangers
   c. Helicopter hazards
   d. Jet-engine hazards
   e. Evacuation hazards

f. Ejection seats
g. Landing gear
h. Wheel assemblies
i. Electrical systems
j. Hydraulic systems
k. Advanced aircraft composite materials
l. Fuel systems
m. Special or exotic fuels
n. Radar systems
o. Pressurized cylinders
p. Oxygen supply systems
q. Protruding devices
r. RAT (Ram Air Turbine)
s. Weapons and weapon systems
t. Aircraft emergency systems

13) A national defense area and limitations within that area
    a. Department of Defense (DOD) designation
    b. Exclusion area for ARFF

14) Characteristics of different aircraft fuels
    a. Civilian
    b. Military

15) Hazardous areas in and around aircraft
    a. Hazard areas in the aircraft
        i. Cockpit/flight deck
        ii. Cargo area
        iii. Galley
        iv. Avionics area
        v. Energized electrical area
    b. Hazardous areas around the aircraft
        i. Propellers
        ii. Engines
        iii. Military armament
        iv. Collapse zones
        v. Wheel assembly
        vi. Aircraft radar
        vii. RAT (Ram Air Turbine)
        viii. Ballistic Recovery System

16) Aircraft egress/ingress (hatches, doors, and evacuation chutes)
    a. Aircraft egress
        i. Doors
        ii. Hatches
        iii. Slides
        iv. Door height
        v. Stairs
        vi. Emergency exits
        vii. Emergency rafts
        viii. Flight deck windows
    b. Aircraft ingress
        i. Doors
        ii. Hatches
        iii. Door height
        iv. Stairs
        v. Ladders
        vi. Emergency exits
        vii. Air stairs

17) Hazards associated with aircraft cargo, including dangerous goods
    a. Laws and regulations
        i. Classifications of dangerous goods
        ii. Shipment of dangerous goods
    b. Product identification
        i. Identification
        ii. Verification
        iii. Information gathering
    c. Personal Protective Equipment (PPE)
        i. NFPA levels of protection
            1. Structural gear
            2. Proximity gear (PrPPE)
            3. Chemical protective clothing
                a) Vapor protective
                b) Liquid splash protective
        ii. Environmental Protection Agency (EPA) levels of protection
            1. Level A
            2. Level B
            3. Level C
            4. Level D
    d. Dangerous goods operations

e. Agricultural applications

18) Hazardous areas, including entry control points, crash scene perimeters, and requirements for operations within the hot, warm, and cold zones
    a. Hazardous areas
    b. Entry control points
    c. Crash scene perimeters
    d. Operational Zones
        i. Hot Zone (Restricted Zone)
        ii. Warm Zone (Limited Access Zone)
        iii. Cold Zone (Support Zone)

19) Critical stress management policies and procedures
    a. Policies
        i. Authority Having Jurisdiction (AHJ)
    b. Procedures
        i. Coping with stress
        ii. Critical Incident Stress Debriefing (CISD)

200-4.1.1.4 General Skills Requirements

Don PPE; operate hatches, doors, and evacuation chutes; approach, position, and initially attack an aircraft fire; select, apply, and manage extinguishing agents; shut down aircraft systems, including engine, electrical, hydraulic, and fuel systems; operate aircraft extinguishing systems, including cargo area extinguishing systems.

200-4.1.2 The job performance requirements of this chapter shall be accomplished in accordance with the requirements of the authority having jurisdiction and NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*.

200-4.2 Response

This duty involves the timely arrival at an incident or accident and the capability to perform emergency functions. The duty also includes responding to hazardous conditions and performing standby operations.

200-4.2.1 Respond to day and night incidents or accidents on and adjacent to the airport, given an assignment, operating conditions, a location, a grid map, a vehicle, and a prescribed response time, so that the route selected and taken provides access to the site within the allotted time.

Requisite Knowledge: Airport familiarization, including runway and taxiway designations, frangible gate locations, airport markings, lights, Instrument Landing System (ILS) critical areas, and critical rescue and fire-fighting access areas, recognize the impact of low-visibility conditions on movement areas and areas of response in and close to the airport; designated isolation areas; vehicular traffic controls on airfield; bridge load limits; controlled access points; aircraft traffic patterns and taxi routes; fuel storage and distribution locations; airport and immediate local area topographic layout, drainage systems, water supplies, airport facilities and security.

Airport familiarization, including:

1) Runway and taxiway designations
    a. Runway identification
        i. Designation
            1. Compass heading
            2. Numbers and letters
        ii. Markings
            1. White
            2. Yellow
        iii. Signage
        iv. Lighting
            1. White
            2. Amber
            3. Red
            4. Green
    b. Taxiway identification
        i. Designation
            1. Phonetic alphabet
            2. Name
        ii. Markings
        iii. Signage
        iv. Lighting
            1. Blue
            2. Green

2) Frangible gate locations
    a. AHJ
    b. Gate controlled access
    c. Alternate response route
        i. Weather
        ii. Location

iii. Terrain
iv. Topography

3) Airport markings
   a. Aircraft operations area (AOA)
      i. Pavement markings
         1. White
         2. Red
         3. Yellow
      ii. Signs
         1. Mandatory instruction
         2. Runway hold position
         3. Location signs
         4. Direction signs
         5. Destination signs
         6. Information signs
         7. Runway distance remaining signs
   b. Non aircraft operations area
      i. AHJ
      ii. Department of Transportation (DOT)
      iii. Designated diesel vehicle regeneration area

4) Lights
   a. Surface lighting
      i. Blue lights
      ii. White lights
      iii. Green lights
      iv. Red lights
      v. Amber or yellow lights

5) Instrument landing system (ILS) critical areas
   a. Locations per AHJ
   b. Identification
   c. Interference
   d. Alternate response routes
   e. Hazards

6) Critical rescue and fire-fighting access areas (CRFFAA)
   a. Location in relation to grid map (AHJ)
   b. Size
      i. Departure and approach area

ii. Distance from runway centerline

7) Recognize the impact of low-visibility conditions on movement areas and areas of response in and close to the airport
    a. Driver's Enhanced Vision systems (DEVs)
        i. Night vision
        ii. Navigation
        iii. Tracking

8) Designated isolation areas (AHJ)
    a. Predetermined area designed for temporary parking for aircraft experiencing hazardous cargo problems
    b. Know isolation location for your airport (AHJ)
        i. Hijacking
        ii. Bomb threat
        iii. Terrorist attack
        iv. Weapons of Mass Destruction (WMD)
        v. Bio-Hazards
            1. Cargo
            2. Passengers
    c. Military

9) Vehicular traffic controls on airfield
    a. Navigational Aids (NAVAIDS)
    b. Construction
    c. Airport markings
        i. Hold bars
        ii. Safety zones
    d. Airport ramps
    e. Fences and gates
    f. All weather roads

10) Bridge load limit/overpass clearance (AHJ)
    a. Road weight limits
    b. ARFF apparatus weight and height
    c. Local area bridges in the response area covered by AHJ
    d. Alternate routes

11) Controlled access points
    a. Solid red marking
    b. Fences and gates

c. Mandatory signs

12) Aircraft traffic patterns and taxi routes (AHJ)
    a. Patterns used by aircraft in the vicinity of the airport
    b. Emergency declarations for aircraft
    c. Components of the pattern
        i. Crosswind leg
        ii. Downwind leg
        iii. Base leg
        iv. Final approach
    d. Designated routes for aircraft to final destinations

13) Fuel storage and distribution locations (AHJ)
    a. Airport fuel operations
        i. Fuel storage
        ii. Supply methods
        iii. Fuel distribution systems
        iv. Aircraft fueling methods
    b. Airport fuel operation locations
    c. Emergency fuel operation shut-down
    d. Preplanning for emergencies
    e. Fire fighting systems

14) Airport and immediate local area topographic layout
    a. Airport layout
    b. Airport markings
    c. Length and width of runways
    d. Taxiway identification
    e. Streets and highway within the emergency response area on airport, and off airport
    f. Grid map
    g. Local terrain features
    h. Response area off airport property
    i. Bodies of water
    j. Airport structures

15) Drainage systems (AHJ)
    a. Drainage system dynamics
    b. Drainage system openings
    c. Fuel/water separator
    d. Containment for drainage

e. Run off locations
f. Airport without drainage system
    i. Pre-planning for the event
    ii. Confinement
    iii. Containment
    iv. Clean up and recovery efforts

16) Water supplies (AHJ)
    a. Sources
        i. Wells
        ii. Tanks
        iii. Domestic supply
    b. Hydrant locations
    c. Mobile supply types
        i. Fire apparatus
        ii. Tankers/tenders
    d. Mutual aid response for water supply
    e. Pre-planning for water supply strategies

17) Airport facilities
    a. Terminals
        i. Life safety concerns
        ii. Jetways
        iii. Baggage handling areas
        iv. Mass transportation equipment
        v. Hotels
        vi. Parking garages
        vii. Controlled access
    b. Aircraft Maintenance Facilities
        i. Fuel system repair
        ii. Painting facilities
        iii. Hazardous materials storage
        iv. Aircraft electrical, avionics and radar systems repair locations
        v. Welding and cutting locations
        vi. Office locations and high occupancy areas
        vii. Fire prevention

18) Airport Security and Controlled Access Points
    a. Airfield perimeter fencing/protection
    b. Controlled access points (already stated)

i. Manned access points
ii. Unmanned access points - Radio Frequency Identification (RFID) or remote control
iii. Manually operated gates
iv. Frangible gates

c. Vehicle incursion prevention systems
i. Tiger teeth (tire damaging systems)
ii. Barriers

d. Airfield vehicle eligibility markings
i. Decals
ii. Lighting

e. Airfield personnel eligibility identification
i. SIDA (Security Identification Display Area)

Requisite Skills: Read, interpret, and take correct action related to grid maps, water distribution maps, airport markings, and lights.

200-4.2.2 Communicate critical incident information regarding an incident on or adjacent to an airport, given an assignment involving an incident and an incident management system (IMS) protocol, so that the information provided is accurate for the incident commander.

Requisite Knowledge: Incident management system (IMS) protocol, the airport emergency plan, airport and aircraft familiarization, communications equipment and procedures, and incident communications procedures.

1) Incident management system (IMS) protocol
a. IMS and the functional responsibilities (AHJ)
b. Strategic goals
c. Tactical objectives
d. IMS Organizational Chart (AHJ)
e. Chain of command (AHJ)

2) The airport emergency plan (AHJ)
a. Mutual aid resources
b. Fire rescue resources
c. Emergency medical resources
d. Law enforcement resources
e. Other airport personnel
f. Critical stress management
g. Mitigation

3) Airport familiarization (AHJ)
    a. Airport traffic flow systems
        i. Aircraft
        ii. Vehicular
    b. Location of incident
        i. Runways
        ii. Taxiways
        iii. Grid map
    c. Access control points
    d. Approach safety areas
    e. Departure safety areas
    f. National Defense area limitations

4) Aircraft familiarization
    a. Aircraft types
        i. Commercial
        ii. General aviation
        iii. Military aircraft
        iv. Unmanned aircraft
    b. Aircraft systems
    c. Hazards of aircraft
    d. Aircraft fuels
    e. Aircraft evacuation

5) Communications equipment and procedures
    a. Airport communication systems
    b. Communication protocols
        i. Radio communications
            1. International Civil Aviation Organization (ICAO)
            2. ICAO phonetic alphabet
        ii. Computers
            1. Mobile Data Terminals (MDT)
            2. Mobile Computer Terminals (MCT)
            3. Global Positioning Systems (GPS)
        iii. Air Traffic Control Tower (ATCT) Light-gun signals and their meanings
            1. Steady green
            2. Steady red
            3. Flashing red
            4. Flashing white

5. Alternating red/green

iv. Aircraft Hand signals
1. Recommend evacuation
2. Recommend stop
3. Emergency contained

v. Other fire-fighting audible/visible signals
1. Back out or retreat
2. Apparatus is running out of agent
3. Open or close hand line
4. Change hand line nozzle/stream pattern
5. Advance with hand line
6. Back out with hand line

6) Incident communications procedures
a. Emergency response notification methods (AHJ)
i. Categories of emergency alerts (FAA – Federal Aviation Administration)
b. Pilot/ARFF (Discrete Emergency Frequency - DEF)
c. Agency operations frequencies
d. Mutual aid frequencies

Requisite Skills: Operate communications systems, communicate an accurate situation report, implement incident management system (IMS) protocol and airport emergency plan, and recognize aircraft types.

200-4.2.3 Communicate with applicable air traffic control facilities, given a response destination on or adjacent to an airport and radio equipment, so that all required clearances are obtained.

Requisite Knowledge: Airfield familiarization, airport operational procedures, avoiding runway/aircraft movement area incursion, communications equipment and frequencies, tower light signals, aviation phraseology, and phonetic alphabet.

1) Airfield familiarization

2) Airport operational procedures

3) Avoiding runway/aircraft movement area incursion

4) Communications equipment and frequencies
a. ATCT (Air Traffic Control Tower)

i. Ground control
ii. Local control or tower frequencies
iii. Discrete Emergency Frequency (DEF) (AHJ)

b. Aviation radio
i. Procedures
ii. Terminology

c. Fire frequency radio (AHJ)

5) ATCT light-gun signals
a. Used in the event of communication failure with ATCT
b. Colors
i. Steady green
ii. Steady red light
iii. Flashing red light
iv. Flashing white light
v. Alternating red and green light

6) Aviation phraseology

7) Phonetic alphabet

Requisite Skills: Operate communications equipment and use aviation phraseology and phonetic alphabet.

200-4.2.4 Perform an airport operation, given an assignment, a hazardous condition, and the airport policies and procedures, so that unsafe conditions are detected and reduced in accordance with the airport policies and procedures.

Requisite knowledge: Airport and aircraft policies and procedures for hazardous conditions.

1) Airport policies and procedures for hazardous conditions
a. Airport certification manual
b. Airport emergency plan
c. Notification of the hazardous condition
i. Accident
ii. Incident
iii. Emergency
d. Response
e. Initiation of IMS
f. ARFF safety
g. Airport structure emergencies

i. Terminals
ii. Hangars

h. Fuel storage and distribution
i. Fuel spills
j. Aircraft fueling operations
k. Aircraft maintenance areas
i. Welding
ii. Painting
l. Airport Environment
i. Construction
ii. Traffic
iii. Drainage
iv. Airport Topography
v. Review wildlife management plan
m. Designated isolation areas
i. Bomb threats
ii. Terrorists
iii. Hazardous materials
iv. Hijacking
v. Weapons of Mass Destruction (WMD)
vi. Bio-Hazards

2) Aircraft policies and procedures for hazardous conditions
a. Airport emergency plan (AHJ)
b. Standardized response
c. Coordination with flight crew
d. Aircraft familiarization
e. Aircraft emergencies
i. Ground emergencies
ii. In-flight emergencies

Requisite Skills: Recognize hazardous conditions and initiate corrective action.

200-4.3 Fire Suppression

This duty involves the attack, control, and extinguishment of fires involving aircraft, aircraft cargo, airport facilities, and other equipment related to airport operations and property conservation. The primary purpose of this duty is to protect lives and property.

200-4.3.1 Extinguish an aircraft fuel spill fire, given approved PPE, an assignment, agent application procedures, a fire-fighting vehicle hand line flowing a minimum of 95 gpm (359 L/min) of approved foam extinguishing agent,

and a fire sized to the flow rate used, so that the agent is applied using the prescribed techniques and the fire is extinguished as required by the AHJ.

Requisite Knowledge: The fire behavior of aircraft fuels in pools, physical properties and characteristics of aircraft fuel, and agent application rates and densities.

1) Fire behavior of aircraft fuels in pools
    a. Flame spread
    b. Flashback (re-ignition)
    c. Vapors
    d. Flammability

2) Physical properties of aircraft fuels
    a. Aviation gasoline (AVGAS)
        i. Weight
        ii. Specific gravity
        iii. Vapor density
    b. Jet-A (grade of kerosene)
        i. Weight
        ii. Specific gravity
        iii. Vapor density
    c. Other fuels
        i. Blends
        ii. Military grade

3) Characteristics of aircraft fuels
    a. Flashpoint
    b. Auto ignition temperature
    c. Explosive limits
        i. Upper
        ii. Lower
    d. Flame spread
    e. Vapor pressure

4) Agent application rates and densities
    a. Agent application - minimum 95 gpm @ at nozzle pressure specified by manufacturer
    b. Agent application and proportioning (in accordance with manufacturer's specifications) approved foam extinguishing agent and a fire sized to the flow rate used

Requisite Skills: Operate fire streams and apply agent.

200-4.3.2 Extinguish an aircraft fuel spill fire, given an assignment, approved PPE, an ARFF vehicle turret flowing the approved minimum required flow, a fire sized to the approved flow rate used, and the procedures for agent application, so that the agent is applied according to procedures and the fire is extinguished as required by the AHJ.

Requisite Knowledge: Operation of ARFF vehicle agent delivery systems, the fire behavior of aircraft fuels in pools, physical properties and characteristics of aircraft fuel, the procedures for agent application, and agent application rates and densities.

1) Operation of ARFF vehicle agent delivery systems
    a. As per manufacturer operating procedures
    b. Per AHJ

2) Fire behavior of aircraft fuels in pools
    a. Flame Spread
    b. Flashback (re-ignition)
    c. Vapors
    d. Flammability

3) Physical properties of aircraft fuels
    a. Aviation gasoline (AVGAS)
        i. Weight
        ii. Specific gravity
        iii. Vapor density
    b. Jet-A (grade of kerosene)
        i. Weight
        ii. Specific gravity
        iii. Vapor density
    c. Other fuels
        i. Blends
        ii. Military grade
        iii. Alternative fuels

4) Characteristics of aircraft fuels
    a. Flashpoint
    b. Auto ignition temperature
    c. Explosive limits

i. Upper
ii. Lower

d. Flame spread
e. Vapor pressure

5) Agent application rates and densities
   a. Agent application rate - minimum 250 gpm @ at nozzle pressure specified by manufacturer
   b. Agent application and proportioning (in accordance with manufacturer's specifications) approved foam extinguishing agent and a fire sized to the flow rate used

Requisite Skills: Apply fire-fighting agents and streams using ARFF vehicle turrets.

200-4.3.3 Extinguish a three-dimensional aircraft fuel fire as a member of a team, given a team, approved PPE, an assignment, fire-fighting vehicle hand line(s) using primary and secondary agents, and agent application procedures, so that a dual-agent attack is used, the agent is applied according to procedures, the fire is extinguished, and the fuel source is secured.

Requisite Knowledge: The fire behavior of aircraft fuels in solid, pressurized, and atomized states; physical properties and characteristics of aircraft fuel; advantages and limitations of agents; agent application rates and densities, agent application procedures; and methods of controlling fuel sources.

1) Fire behavior of aircraft fuels in solid, pressurized, and atomized states
   a. Explosive atmosphere
   b. Higher proliferation of vapors

2) Physical properties of aircraft fuels
   a. Aviation gasoline (AVGAS)
      i. Weight
      ii. Specific gravity
      iii. Vapor density
   b. Jet fuel
      i. Weight
      ii. Specific gravity
      iii. Vapor density

c. Other fuels
    i. Blends
    ii. Military grade
    iii. Alternative fuels

3) Characteristics of aircraft fuels
    a. Flashpoint
    b. Auto ignition temperature
    c. Explosive limits
        i. Upper
        ii. Lower
    d. Flame spread
    e. Vapor pressure

4) Advantages of agents

5) Limitations of agents

6) Agent application rates and densities
    a. Agent application rate
        i. Minimum 95 gpm @ at nozzle pressure specified by manufacturer
        ii. Minimum 5 lbs/second dry chemical
    b. Agent application densities
        i. Agent application and proportioning (in accordance with manufacturer's specifications) approved foam extinguishing agent and a fire sized to the flow rate used
        ii. Amount of dry chemical proportionate to hazard

7) Agent application procedures
    a. Rapid knock down
    b. Vapor suppression

8) Methods of controlling fuel sources
    a. Shut off source
    b. Control ignition source
    c. Suppress vapors
    d. Prevent run-off

Requisite Skills: Operate fire streams and apply agents; and secure fuel sources.

200-4.3.4 Attack a fire on the interior of an aircraft while operating as a member of a team, given a team, approved PPE, an assignment, a fire-fighting vehicle hand line, an extinguishing agent, and a ladder or other means of accessing the aircraft, so that team integrity is maintained, the attack line is deployed for advancement, ladders or other means are used, access is gained into the fire area, effective agent application practices are used, the fire is approached, attack techniques facilitate suppression given the level of the fire, hidden fires are located and controlled, hazards are avoided or managed, and the fire is brought under control.

Requisite Knowledge: Techniques for accessing the aircraft interior according to the aircraft type, methods for advancing hand lines from an fire-fighting vehicle, precautions to be followed when advancing hose lines to a fire, observable results that a fire stream has been applied, dangerous structural conditions created by fire, principles of exposure protection, potential long-term consequences of exposure to products of combustion, physical states of matter in which fuels are found, common types of accidents or injuries and their causes, the role of the backup team in fire attack situations, attack and control techniques, and techniques for exposing hidden fires.

1) Techniques for accessing the aircraft interior according to aircraft type
    a. Assessing the exterior prior to entry
        i. Blistering or peeling of paint
        ii. Visible signs of heavy interior fire
        iii. Exterior is very hot to the touch
        iv. Engine fires
        v. Wheel assembly fires
        vi. HVAC system fires
    b. Access points
        i. Doors
            1. Cabin
            2. Cargo
        ii. Emergency exits
        iii. Rear stairs
        iv. Hatches
        v. Windows
        vi. Fuselage breach
    c. Access equipment
        i. Ladders
            1. Ground ladders
            2. Specialty ladders

ii. Elevated platforms
iii. Mobile air stairs
iv. Forcible entry tools

2) Methods for advancing hand lines from the fire-fighting vehicle
   a. Proper PPE and SCBA
   b. Deployment of hand line(s)
   c. Advancement of hand line(s)
   d. Two-person team
   e. Two in/two out rule
   f. Awareness of hazards

3) Precautions to be followed when advancing hose lines to a fire
   a. Do not impede passenger evacuation
   b. Deploy hand line(s) in a safe area
   c. Watch for sharp objects
   d. Avoid flammable liquids
   e. Be aware of hazards present
   f. Potential backdraft, flashover, rollover, and smoke explosion occurrences

4) Observable results that fire stream has been applied
   a. Steam from hose line application on a hot object (steam conversion)
   b. Cooling
   c. Fire knock down
   d. Displacement of products of combustion
   e. Smoke transformation

5) Dangerous structural conditions created by fire
   a. Missing structural components
   b. Fire/flame spread to concealed areas
   c. Instability
   d. Molten metals
   e. Collapses
   f. Weakened structural components

6) Principles of exposure protection
   a. Hand line(s) should be in place to protect unburned portions
   b. Protection of exposed or surrounding objects
   c. Adequate water supply
   d. Proper coverage to ensure cooling effect
   e. Wind direction

7) Potential long–term consequences of exposure to products of combustion
    a. Carcinogenic effects
    b. Respiratory damage
    c. Dermatological
    d. Product specific effects
        i. Composites
        ii. Fuels
        iii. Aircraft fluids

8) Physical states of matter in which fuels are found
    a. Solid
    b. Liquid
    c. Vapor

9) Common types of accidents or injuries and their causes
    a. Types
        i. Physical
        ii. Psychological
    b. Causes
        i. Inadequate training
        ii. Lack of critical incident stress management
        iii. Failure to comply with safety standards
        iv. Dangerous conditions

10) The role of the backup team in fire attack situations
    a. Two in/two out rule
        i. Rescue of primary entry team (Rapid Intervention Team/RIT)
        ii. Exterior support operations
    b. Observing and communicating conditions

11) Attack and control techniques
    a. Point of entry
    b. Never impede egress of passengers
    c. Observe hottest area of fire
    d. Direct fire attack
    e. Indirect fire attack
    f. Cool exterior if entry is delayed
    g. Piercing appliances

12) Techniques for exposing hidden fires
    a. Ventilation
    b. Overhaul

c. Thermal imagers
d. Interior inspection
    i. Light ballasts
    ii. Galley area
    iii. Lavatories
    iv. Flight deck area
    v. Avionics
    vi. Cargo compartments
    vii. Electrical components

Requisite Skills: Deploy fire-fighting vehicle hand line on an interior aircraft fire; gain access to aircraft interior; open, close, and adjust nozzle flow and patterns; apply agent using direct, indirect and combination attacks; advance charged and uncharged hose lines up ladders and up and down interior and exterior stairways; and locate and suppress interior fires.

200-4.3.5 Attack an engine or auxiliary power unit/emergency power unit (APU/EPU) fire on an aircraft while operating as a member of a team, given approved PPE, an assignment, fire-fighting vehicle hand line or turret, a correct agent, and agent application procedures, so that agent application procedures are followed, the fire is extinguished, and the engine or APU/EPU is shut down.

Requisite Knowledge: Techniques for accessing the aircraft engines and APU/EPUs, operation of on-board aircraft fire-fighting systems and potential hazards, safety procedures, methods for advancing hand line from a fire-fighting vehicle, methods for operating turrets, and methods for shutting down engine and APU/EPU operation.

1) Techniques for accessing the aircraft engines and APU/EPUs
    a. Assessing the exterior prior to entry
        a. Blistering or peeling of paint
        b. Visible signs of compartment fire
        c. Engine fires
    b. Gaining access
        a. Hatches
        b. Cowlings
        c. Fire ports
    c. Access equipment
        a. Ladders
            i. Ground ladders
            ii. Specialty ladders
        b. Elevated platforms

c. Mobile air stairs
d. Forcible entry tools

2) Safety procedures
   a. Avoid intake
   b. Avoid exhaust
   c. Avoid propellers
   d. Engine/APU shut down

3) Methods for advancing hand line from a fire-fighting vehicle
   a. Proper PPE and SCBA
   b. Deployment of hand line(s)
      i. Reel lines
      ii. Preconnected hose lines
   c. Advancement of hand line(s)
   d. Two-person team
   e. Two in/two out rule
   f. Awareness of hazards

4) Methods for operating turrets
   a. Per manufacturer specification
   b. As per AHJ

5) Methods for shutting down engine and APU/EPU operation
   a. Engine
      i. By flight crew
         1. Fuel (throttles)
         2. On board extinguishing systems (bottles)
         3. Electrical (batteries)
      ii. By ARFF crew
         1. Fuel (throttles)
         2. On board extinguishing systems (bottles)
         3. Electrical (batteries)
   b. Auxiliary power unit (APU/EPU)
      i. By flight crew
         1. Fuel (throttles)
         2. On board extinguishing systems (bottles)
         3. Electrical (batteries)
      ii. By ARFF crew
         1. Flight deck
            a) Fuel (throttles)
            b) On board extinguishing systems (bottles)

c) Electrical (batteries)

2. External controls
   a) Engine shut down
   b) Extinguishing systems

Requisite Skills: Deploy and operate fire-fighting vehicle hand line, operate turrets, gain access to aircraft engine and APU/EPU, and shut down engine and APU.

200-4.3.6 Attack a wheel assembly fire, as a member of a team, given PPE, a team, an assignment, an ARFF vehicle hand line, and correct agent, so that the fire is extinguished.

Requisite Knowledge: Agent selection and application procedure, special safety considerations, and the characteristics of combustible metals.

1) Agent selection and application procedure
   a. Agent selection
      i. Water
      ii. Class D extinguishing agents
      iii. Dry chemical
   b. Application procedure
      i. Mass application of water
      ii. Adequate amount of class D agent for encapsulation
      iii. Adequate amount of dry chemical for extinguishment
      iv. Conservation of agent

2) Special safety considerations
   a. Fusible plugs
   b. Proper approach
   c. Tire disintegration
   d. Wheel fragmentation
   e. Aircraft collapse
   f. Appropriate utilization of PPE with SCBA
   g. Hazardous or flammable fluid release
   h. Engine intake
   i. Engine exhaust

3) The characteristics of combustible metals
   a. High ignition point
   b. Intense pyrolysis

c. Extreme heat
d. Reactivity

Requisite Skills: Approach the fire in accordance with safety procedures; and select and apply agent.

200-4.3.7 Ventilate an aircraft through available doors and hatches while operating as a member of a team, given PPE an assignment, tools, and mechanical ventilation devices, so that openings are created, all ventilation barriers are removed, and the heat and other products of combustion are released.

Requisite Knowledge: Aircraft access points; principles, advantages, limitations, and effects of mechanical ventilation; the methods of heat transfer; the principles of thermal layering within an aircraft on fire; and the techniques and safety precautions for venting aircraft.

1) Aircraft access points
    a. Normal door operations
    b. Over wing access
    c. Cargo doors
    d. Hatches
    e. Breaks in structure of aircraft

2) Principles, advantages, limitations, and effects of mechanical ventilation
    a. Negative pressure ventilation
        i. Hydraulic
        ii. Gas powered fans
        iii. Electrical powered fans
    b. Positive pressure ventilation
        i. Gas powered fans
        ii. Electrical powered fans

3) The methods of heat transfer
    a. Conduction
    b. Convection
    c. Radiation
    d. Direct flame impingement

4) The principles of thermal layering within an aircraft on fire
    a. Smoke stratification
    b. Heat travel

i. Vertical
ii. Horizontal

5) The techniques and safety precautions for venting aircraft
   a. Techniques for venting aircraft
      i. Mechanical
         1. Positive pressure
         2. Negative pressure
      ii. Natural
         1. Horizontal
         2. Vertical
   b. Safety considerations for venting aircraft
      i. Flashover
      ii. Rollover
      iii. Backdraft
      iv. Smoke explosion

Requisite Skills: Operate doors, hatches, and forcible entry tools; operate mechanical ventilation devices; and remove barriers.

200-4.3.8 Replenish extinguishing agents while operating as a member of a team, given an assignment, a fire-fighting vehicle, a fixed or mobile water source, a supply of agent, and supply lines and fittings, so that agents are available for application by the fire-fighting vehicle within the time established by the authority having jurisdiction (AHJ).

Requisite Knowledge: Re-supply procedures during an incident and operation procedures for fire-fighting vehicle replenishment.

1) Re-supply procedures during an incident
   a. Water sources
      i. Airport water distribution system.
      ii. Mobile water supply
      iii. Additional water supplies
   b. Water refill methods
      i. Direct connection
      ii. Overhead fill
   c. Foam re-supply
      i. Overhead gravity
      ii. Mechanical or hand foam concentrate transfer pump
      iii. 5-gallon container direct fill

d. Auxiliary agent refill
    i. Knowledge of agent type
    ii. Follow manufacturers procedures
    iii. Service in well ventilated areas and utilize respiratory protection

2) Operation procedures for fire-fighting vehicle replenishment
    a. Per manufacturer specifications
    b. Procedures per AHJ

Requisite Skills: Connect hose lines and operate valves.

200-4.3.9 Preserve the aircraft accident scene, given an assignment and procedures, so that evidence is identified, protected, and reported according to procedures.

Requisite Knowledge: Airport emergency plan requirements for preservation of the scene, evidence identification, evidence protection, and evidence reporting procedures.

1) Airport emergency plan requirements for preservation of the scene
    a. Scene security
    b. Photographs
    c. Sketches or drawings
    d. Marking evidence locations

2) Evidence identification
    a. During the primary search of an aircraft accident site
        i. Life safety is the priority during this phase of the incident
        ii. Evidence protection is secondary
    b. During the secondary search of an aircraft accident site
        i. Protection of evidence should have priority
        ii. Since all the survivors should be rescued, slow down the search and protect evidence

3) Evidence protection
    a. National Transportation Safety Board (NTSB) regulations
        i. Removal of persons trapped or injured
        ii. Protect the aircraft from further damage
        iii. Protect the public from injury
    b. Secure the scene
    c. Document the moving of evidence

d. Secure and protect the flight data recorder (FDR) or cockpit voice recorder (CVR)
e. Special care should be taken in certain areas
    i. In the cockpit or control areas
    ii. Areas of primary structural failure or damage

4) Evidence reporting procedures
    a. Documentation
        i. Responder statements
        ii. Witness statements
        iii. Incident reporting
        iv. Photographs
        v. Maps
    b. Discuss the relationships between various aircraft parts and occupants

Requisite Skills: Preserve the scene for investigators, and identify, protect, and report evidence.

200-4.3.10 Overhaul the accident scene, given PPE, an assignment, hand lines, and property conservation equipment, so that all fires are located, exposed, and extinguished and all property is protected from further damage.

Requisite Knowledge: Methods of complete extinguishment and prevention of re-ignition, reasons for conservation, operating procedures for property conservation equipment, overhaul procedures, signs of a hidden fire, methods of detecting hidden fires, and tools and equipment used for overhaul.

1) Methods of complete extinguishment and prevention of re-ignition
    a. Thermal imaging cameras/Forward Looking Infra-Red (TIC/FLIR)
    b. Overhaul
    c. Secure aircraft operating systems
    d. Vapor suppression

2) Reasons for conservation
    a. Scene stabilization
    b. Evidence protection
    c. NTSB investigation

3) Operating procedures for property conservation equipment

a. Deployment of loss control systems
b. As per manufacturer's specifications

4) Overhaul procedures
   a. Appropriate agency authorization
   b. Use of PPE including SCBA
   c. Aircraft stabilization
   d. Air quality monitoring
   e. Hazardous materials considerations
   f. Hand line protection
   g. Evidence protection
   h. Hot spots located
   i. Extinguishment and cooling
   j. Pressurized systems identified
   k. Void spaces opened or pierced

5) Signs of a hidden fire
   a. Smoke
   b. Steam
   c. Thermal imaging cameras/Forward Looking Infra-Red (TIC/FLIR)

6) Methods of detecting hidden fires
   a. Smoke
   b. Steam
   c. Thermal imaging cameras/Forward Looking Infra-Red (TIC/FLIR)

7) Tools and equipment used for overhaul
   a. PPE/SCBA
   b. Hand line
   c. Thermal imaging cameras/Forward Looking Infra-Red (TIC/FLIR)
   d. Forcible entry tools
   e. Air monitors

Requisite Skills: Use property conservation equipment; detect hidden fires, and use tools and equipment to expose hidden fires.

200-4.4 Rescue

This duty involves gaining access to an aircraft and assisting in the evacuation process, performing disentanglement, and initial triage.

200-4.4.1 Gain access into and out of an aircraft through normal entry points and emergency hatches, secure and shut down the aircraft, and assist in the evacuation process while operating as a member of a team, given PPE and an assignment, so that passenger evacuation and rescue can be accomplished.

Requisite Knowledge: Aircraft familiarization, including materials used in construction, aircraft terminology, automatic explosive devices, hazardous areas in and around aircraft, aircraft egress/ingress (hatches, doors, and evacuation chutes), military aircraft systems and associated hazards; capabilities and limitations of manual and power rescue tools and specialized high-reach devices, aircraft shutdown and safety procedures.

1) Aircraft familiarization
    a. General aviation
    b. Commercial
    c. Military

2) Materials used in construction
    a. Aluminum/aluminum alloys
    b. Steel
    c. Magnesium/magnesium alloys
    d. Titanium
    e. Advanced aerospace (composite) materials
    f. Wood

3) Aircraft terminology
    a. Fixed wing
    b. Rotary wing

4) Automatic explosive devices
    a. Ejection seats
    b. Canopy removers
    c. Initiators
    d. Rotary actuators
    e. Thrusters
    f. Explosive squibs
    g. Seat catapults
    h. Ballistic recovery system (BRS)

5) Hazardous areas in and around aircraft
    a. Wings
        i. Fuel leaks and spills
        ii. Weapons/missiles/rockets
        iii. Pinching hazards
        iv. No step areas – flight control surfaces
        v. Anti-icing systems
    b. Engines
        i. Fuel leaks and spills
        ii. Propellers
        iii. Jet engines
            1. intake
            2. exhaust
    c. Fuselage
        i. Radar systems
        ii. Appendages
        iii. Overheated wheel assemblies
        iv. Tire/wheel failures
        v. Evacuation slides
    d. Tail
        i. Engine or APU fires
        ii. Tail cones
        iii. Evacuation slides
    e. General hazards
        i. Electrocution hazards
        ii. Composites
        iii. Aircraft hazardous materials
        iv. Aircraft cargo hazards

6) Aircraft egress/ingress (hatches, doors, and evacuation chutes)
    a. Aircraft doors
    b. Aircraft hatches
    c. Rear stairs
    d. Tail-cone jettison
    e. Escape slides
    f. Emergency exits
    g. Hatches
    h. Windows
    i. Fuselage breach

7) Military aircraft systems and associated hazards
    a. Fire protection/detection systems
    b. Ejection systems
    c. Weapon systems
    d. Exotic fuels

8) Capabilities and limitations of manual and power rescue tools and specialized high-reach devices
    a. Flammable atmosphere
    b. Stability of aircraft
    c. Hands-on training
    d. Safety standards apply
    e. Hand tools
    f. Power tools
        i. Electric
        ii. Hydraulic
        iii. Pneumatic
    g. Lifting and pulling tools

9) Aircraft shutdown and safety procedures
    a. Fuel cutoff/throttle
    b. Fire shutoff “T” or “L” handles
    c. Battery switch/disconnect

Requisite Skills: Operate power saws and cutting tools, hydraulic devices, pneumatic devices, and pulling devices; operate specialized ladders and high-reach devices; secure aircraft safety and shutdown.

200-4.4.2 Locate and disentangle an entrapped person from an aircraft as a member of a team, given approved PPE, a team, an assignment, and rescue tools, so that the person is freed from entrapment without undue further injury and hazards are managed.

Requisite Knowledge: Capabilities and limitations of rescue tools, search procedures, hazard identification, and control methods.

1) Capabilities and limitations of rescue tools
    a. Flammable atmosphere
    b. Stability of aircraft
    c. Hands-on training
    d. Safety standards apply
    e. Hand tools

f. Power tools
    i. Electric
    ii. Hydraulic
    iii. Pneumatic
g. Lifting and pulling tools

2) Search procedures
    a. Exterior search
    b. Interior search
    c. Two in/two out rule
    d. Rescue of survivors
    e. Primary search
    f. Secondary search
    g. Preservation of evidence

3) Hazard identification
    a. Aircraft hazardous/flammable materials
    b. Aircraft dangerous goods
    c. Post-crash aircraft hazards
        i. Fire
        ii. Electrical
        iii. Disrupted aircraft systems
        iv. Biohazard
        v. Debris
        vi. Hazardous materials
        vii. Military aircraft hazards

4) Control methods
    a. Safety
    b. Isolation
    c. Insulation
    d. Extinguishment

Requisite Skills: Perform search procedures, control hazards, remove victims, and operate rescue tools.

200-4.4.3 Implement initial triage of the victims of an aircraft accident, given PPE, an assignment, and the triage protocol of the AHJ, so that each victim is evaluated and correctly categorized according to protocol.

Requisite Knowledge: Categories of triage according to the triage protocol of the AHJ, and methods of assessment.

1) Categories of triage according to the triage protocol of the AHJ

2) Methods of assessment
    a. START – simple triage and rapid treatment
    b. As per AHJ

Requisite Skills: Triage patients per protocol.