



Aircraft Rescue and Fire Fighting Awareness

Course Plan

Course Details

Description:	This course provides an awareness-level overview of aircraft rescue and fire fighting.
Designed For:	Non-ARFF trained fire fighters who support aircraft rescue and fire fighting operations
Authority:	Code of Federal Regulations, Title 14, Part 139, Subpart D, Section 139.319, Aircraft Rescue and Firefighting Operational Requirements
Prerequisites:	None
Corequisites:	None
Standard:	Attend all class sessions and complete all activities and assignments
Hours:	Lecture: 6:30
Hours (Total):	6:30
Maximum Class Size:	30
Instructor Level:	Primary Instructor
Instructor/Student Ratio:	1 to 30
Restrictions:	None
SFT Designation:	FSTEP

Required Resources

Instructor Resources

To teach this course, instructors need:

- *Aircraft Rescue and Fire Fighting* (6th edition, Fire Protection Publications: Oklahoma State University)

Additional resources:

- NFPA 402 *Guide for Aircraft Rescue and Fire-Fighting Operations* (2013)
 - Chapter 14 Structural Fire Department Operations at ARFF Incidents

Online Instructor Resources

The following instructor resources are available online at

<http://osfm.fire.ca.gov/training/SFTCurriculum>

- Ground Vehicle Guide to Airport Signs & Markings
(available at www.faa.gov/go/runwaysafety)

Student Resources

There are no required student resources for this course.

For further study, students may wish to review:

- *Aircraft Rescue and Fire Fighting* (6th edition, Fire Protection Publications: Oklahoma State University)

Facilities, Equipment, and Personnel

The following facilities, equipment, or personnel are required to deliver this course:

Facilities

- Standard classroom equipped for 30 students
- Whiteboards or easel pads with appropriate writing implements
- Projector with appropriate laptop connections
- Wifi/Internet access (recommended)

Unit 1: Introduction

Topic 1-1: Orientation and Administration

Terminal Learning Objective

At the end of this topic, a student will be able to identify facility and classroom requirements and identify course objectives, events, requirements, assignments, activities, resources, evaluation methods, and participation requirements in the course syllabus.

Enabling Learning Objectives

1. Identify facility requirements
 - Restroom locations
 - Food locations
 - Smoking locations
 - Emergency procedures
2. Identify classroom requirements
 - Start and end times
 - Breaks
 - Electronic device policies
 - Special needs and accommodations
 - Other requirements as applicable
3. Review course syllabus
 - Course objectives
 - Calendar of events
 - Course requirements
 - Student evaluation process
 - Assignments
 - Activities
 - Required student resources
 - Class participation requirements

Discussion Questions

1. Determined by instructor

Activities

1. Determined by instructor

Instructor Notes

1. None

Topic 1-2: Goals and Objectives

Terminal Learning Objective

At the end of this topic, a student, given goals and objectives, will be able to identify the goals and objectives of aircraft rescue and fire fighting (ARFF) awareness for structural (non-ARFF/N-ARFF) fire fighters.

Enabling Learning Objectives

1. Identify the goals of ARFF awareness training for N-ARFF fire fighters
 - Understand N-ARFF impact on incident outcomes
 - Safely operate during an aircraft incident
 - Provide support for aircraft incidents
 - Reduce actions that may impede or create adverse impacts for ARFF operations during an aircraft incident
2. Identify the objectives of this Aircraft Rescue and Fire Fighting course
 - Identify airport facilities and visual indicators critical to aircraft incidents
 - Identify aircraft types, components, and hazards
 - Identify command and primary response entities
 - Identify communication methods
 - Identify ARFF apparatus components, features, and hazards
 - Identify extinguishing agents commonly used during aircraft incidents
 - Identify how to support ARFF crews during aircraft incidents
3. Identify the importance of effective and timely ARFF operations
 - Life safety
 - Passengers
 - Crew
 - Fire service personnel
 - Property conservation
 - Airport structures
 - Aircraft
 - Surrounding property
 - Societal restoration (return airport to normal operating state as quickly as possible)
 - Flight groundings or delays create
 - National and/or international ripple effect in air travel
 - Impacts to other transportation systems
 - Financial loss for the airport
 - Financial loss for impacted industries and organizations
 - Aircraft incidents impact airport reputation

Discussion Questions

1. What impact do N-ARFF have on an aircraft incident?
2. What “ripple effects” can be triggered by an aircraft incident?
3. What experience do you have with aircraft incidents?

Activities

1. Determined by instructor

Instructor Notes

1. None

Unit 2: Airport and Aircraft Familiarization

Topic 2-1: Airport Familiarization

Terminal Learning Objective

At the end of this topic, a student, given an overview of airport components, will be able to identify airport facilities and visual indicators critical to aircraft incidents.

Enabling Learning Objectives

1. Identify types and classifications of airports
 - Controlled vs. non-controlled
 - Index vs. non-index
2. Identify common airport facilities and components
 - Terminals
 - Baggage areas
 - Hangars
 - Fuel storage and distribution
 - Fixed Base Operators (FBO)
 - Access points
 - Engineered Material Arresting System (EMAS)
 - Instrument Landing System (ILS)
 - ARFF fire station
 - Underground/subsurface hydrants
3. Identify runways and taxiways
 - Locations
 - Purpose
4. Identify airport ground lighting systems
 - Blue lights
 - White lights
 - Green lights
 - Yellow/amber lights
 - Red lights
5. Identify airport ground marking and signage systems critical to safe travel on the airport operations area (AOA)
 - Location (to identify where you are)
 - Direction (to get to where you need to be)
 - Hold Position (to know where you can and cannot drive)

Discussion Questions

1. What types of airport classifications are present in your jurisdiction?
2. How is an understanding of ground markings critical to incident success?
3. What makes an airport environment different from other potential incident environments?

Activities

1. Determined by instructor

Instructor Notes

1. Provide students with a copy of the FAA's Ground Vehicle Guide to Airport Signs & Markings, available at <http://www.faa.gov/go/runwaysafety>.
2. Corresponds to 14 CFR 139.319 (i)(2)(i) and (iii).

Topic 2-2: Aircraft Familiarization

Terminal Learning Objective

At the end of this topic, a student, given an overview of aircraft, will be able to identify aircraft types, components, and hazards commonly involved in aircraft incidents.

Enabling Learning Objectives

1. Identify common aircraft types
 - General aviation
 - Commercial
 - Cargo
 - Military
 - Rotor wing
2. Identify basic aircraft components
 - Fuselage
 - Wings
 - Nose
 - Tail
 - Landing gear
 - Doors
 - Engines
3. Identify hazards associated with aircraft
 - General aviation, commercial aircraft
 - Intake and exhaust hazards
 - Rotors
 - Radar system
 - Hot brakes/wheels
 - Exotic metals
 - Composite materials
 - Escape slides
 - Seatbelt airbags
 - Batteries
 - Ballistic recovery systems
 - Cargo
 - Hydraulic hazards
 - Military aircraft
 - Munitions

ARFFA Course Plan

- Ordnance
- Ejection seat/canopy
- Hazardous materials
- Classified or unknown cargo
- Cargo aircraft
 - Unknown contents
 - Access limitations
- 4. Identify orientation language associated with aircraft
 - Forward and aft
 - All directions orient from pilot seat perspective
 - Clock method using nose as 12 and tail as 6
 - Engine numbering runs left to right
 - Door numbering runs nose to tail, identifying left and right

Discussion Questions

1. What types of aircraft operate in your jurisdiction?
2. How do you determine the left and right side of an aircraft?
3. What hazards might be associated with a:
 - Commercial or general aviation aircraft incident?
 - Military aircraft incident?
 - Cargo aircraft incident?

Activities

1. Determined by instructor

Instructor Notes

1. Corresponds to 14 CFR 139.319 (i)(2)(ii), (iii), and (x).

Unit 3: Command and Communications

Topic 3-1: Command and Primary Response Entities

Terminal Learning Objective

At the end of this topic, a student, given agency lists and N-ARFF roles, will be able to identify the agencies and organizations involved in aircraft incident and the N-ARFF fire fighter's role within the unified command structure.

Enabling Learning Objectives

1. Identify the agencies that make up aircraft incident unified command
 - Fire service
 - Law enforcement
 - Emergency medical services
 - Airport operations
2. Identify additional agencies that may be part of aircraft incident operations
 - Airline company
 - Aircraft manufacturer

ARFFA Course Plan

- Government entities
 - NTSB (National Transportation Safety Board)
 - FAA (Federal Aviation Administration)
 - TSA (Transportation Security Administration)
 - FBI (Federal Bureau of Investigation)
 - ATF (Bureau of Alcohol, Tobacco, and Firearms)
- 3. Identify the N-ARFF fire fighter's role in an aircraft incident
 - Carry out a tactical assignment within a branch, group, division, or unit
 - Assist with the incident
 - Do not impede or create adverse impacts for ARFF operations

Discussion Questions

1. Who might be involved in incident command for an aircraft incident in your jurisdiction?
2. What is the N-ARFF fire fighters role in an aircraft incident?

Activities

1. Determined by instructor

Instructor Notes

1. Corresponds to 14 CFR 139.319 (i)(2)(xi).

Topic 3-2: Communications

Terminal Learning Objective

At the end of this topic, a student, given notification methods, alerts, and frequency types, will be able to identify communication methods utilized during aircraft incident.

Enabling Learning Objectives

1. Identify notification methods
 - "Crash" phone (direct line from air traffic control tower)
 - Radio system
 - Pager
2. Identify types of aircraft alerts
 - Alert I (Local Standby Alert)
 - In-flight emergency that if left unchecked will not negatively impact the aircraft, crew, and passengers
 - Alert II (Full Emergency Alert)
 - In-flight emergency that if left unchecked may negatively impact the aircraft, crew, and passengers
 - Alert III (Aircraft Accident Alert)
 - Actual crash on or around the airport
 - N-ARFF personnel likely to be assigned tasks
3. Identify information communicated during initial notification
 - Type of alert
 - Aircraft make and model
 - Air carrier and flight or tail number
 - Emergency situation

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- Number of personnel on board
 - Amount of fuel on board
 - Other known relevant information
4. Identify frequencies commonly used during an aircraft incident
 - Command channel (dispatch)
 - Tactical channel (other units assigned to incident)
 - Tower channel (in-flight aircraft communicating with tower)
 - Ground channel (ground aircraft communicating with tower)
 - Discreet emergency frequency (DEF) (communicate with pilot)

Discussion Questions

1. How is your agency notified of an aircraft emergency?
2. What do the three types of airport alerts mean for a N-ARFF?
3. What type of information is typically provided during an initial notification?

Activities

1. Determined by instructor

Instructor Notes

1. Corresponds to 14 CFR 139.319 (i)(2)(iv).

Unit 4: ARFF Apparatus and Extinguishing Agents

Topic 4-1: ARFF Apparatus

Terminal Learning Objective

At the end of this topic, a student, given an ARFF apparatus overview, will be able to identify components, features, and hazards unique to ARFF apparatus in order to work collaboratively with all available resources during aircraft incidents.

Enabling Learning Objectives

1. Identify equipment and components unique to ARFF apparatus
 - Turrets/HRET (high reach extendable turret)
 - Hand lines
 - Ground sweep nozzles
 - Undertruck nozzles
 - Medical supplies
 - Ladders
 - Rescue tools and equipment
2. Identify vehicle features unique to ARFF apparatus
 - Operate effectively on both paved and unpaved areas
 - Carry large quantities of extinguishing agents on board
 - May have two types of intakes
 - Water fill (direct intake to tank)
 - Water suction (direct intake to pump)
 - Designed for one-person operation

3. Identify potential hazards unique to ARFF apparatus
 - Operator
 - Usually only one
 - Limited visibility
 - Multitasking on multiple systems
 - Apparatus
 - Moves quickly and often throughout an incident
 - Poor turning radius and high center of gravity
 - High volume turret streams
4. Identify other support vehicles and equipment unique to aircraft incidents
 - Stair truck (interior access vehicle)
 - Foam supply vehicles and trailers
 - Mass casualty vehicles and trailers
 - Airport operations vehicles
5. Identify structural apparatus tools and equipment that can be used on an aircraft incident
 - Extrication tools
 - Forcible entry tools
 - Ground ladders
 - Thermal imagers
 - Other tools as appropriate

Discussion Questions

1. How do ARFF apparatus differ from structural fire fighting apparatus?
2. What safety concerns are associated with ARFF apparatus?
3. What tools and equipment from a structural apparatus might be used during an aircraft incident?

Activities

1. Determined by instructor

Instructor Notes

1. Corresponds to 14 CFR 139.319 (i)(2)(iii), (v), and (ix).

Topic 4-2: Extinguishing Agents

Terminal Learning Objective

At the end of this topic, a student, given an overview of extinguishing agents, will be able to identify extinguishing agents commonly used during aircraft incidents in order to take appropriate safety precautions.

Enabling Learning Objectives

1. Identify extinguishing agents used in ARFF operations
 - Water
 - Foam agents
 - Dry chemicals
 - Halogenated agents and halon replacements

ARFFA Course Plan

- Dry powders
 - CO₂
 - Often used in combination
2. Identify safety precautions associated with ARFF extinguishing agents
 - Always maintain situational awareness
 - Always protect against skin absorption and inhalation
 - Aqueous Film Forming Foam (AFFF) has high concentration of fluorine and requires gross decontamination after exposure
 - Maintain foam blanket integrity
 - Breaking surface tension can reignite fire
 - Avoid kneeling, stomping, straight streams, dropping equipment
 - Foam blankets may obscure hazards and debris

Discussion Questions

1. What are the most common extinguishing agents used during aircraft incidents?
2. What extinguishing agents does your jurisdiction use for aircraft incidents?
3. What precautions do you need to take when working in and around foam blankets?

Activities

1. Determined by instructor

Instructor Notes

1. Corresponds to 14 CFR 139.319 (i)(2)(iii) and (vi).

Unit 5: Aircraft Rescue and Fire Fighting Operations

Topic 5-1: Aircraft Rescue and Fire Fighting Operations

Terminal Learning Objective

At the end of this topic, a student, given sample operational goals and objectives, will be able to identify how to support ARFF crews during aircraft incident.

Enabling Learning Objectives

1. Identify the types of incidents associated with aircraft at an airport
 - In-flight vs. ground emergencies
 - Low-impact vs. high-impact crashes
2. Identify the correct way to access an airport operation area
 - Use approved gates or access points
 - Carry proper credentialing
 - Wait for an escort unless otherwise instructed
 - Report to staging area for instruction
3. Identify the best way to approach an aircraft incident
 - Aircraft always have the right of way
 - Watch for signs of landing aircraft or ground aircraft preparing to move
 - Follow an escort if provided
 - Follow all signage and markings

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- Avoid runway and taxiway incursion
 - Keep emergency lights on
 - Approach uphill and upwind when possible
 - Be aware of repositioning ARFF apparatus
 - Be aware of foreign object debris (FOD)
 - Bodies
 - Aircraft parts
 - Hazardous materials
4. Identify the proper way to position an apparatus at an aircraft incident
- Position in accordance with assignment
 - Utilize aircraft orientation terminology
 - Forward and aft
 - All directions orient from pilot seat perspective
 - Clock method using nose as 12 and tail as 6
 - Engine numbering runs left to right
 - Door numbering runs nose to tail, identifying left and right
5. Identify factors to consider when working with ARFF crews
- Maintain constant awareness of ARFF apparatus positions and movement
 - Make eye contact with operator before approaching an ARFF vehicle
 - ARFF apparatus hose lines operate at a higher pressure
 - Follow direction of Incident Command (IC) or ARFF personnel
6. Identify the main roles of a N-ARFF at an aircraft incident
- Goal of fire suppression is to create a fire-free evacuation and rescue path
 - Fire suppression
 - Interior fire suppression carried out in support of search and rescue, not to save the aircraft
 - Hand lines
 - Water supply
 - Spot fires
 - Evacuation
 - Unassisted passenger evacuation
 - Agency-supported evacuation
 - Stabilize emergency slide
 - Direct passengers to holding location
 - Search and rescue
 - Check all cabins, compartments, and spaces
 - Check surrounding areas
 - Extrication
 - Patient management/multi-casualty incident (MCI)
 - Triage
 - Treatment
 - Transport

7. Identify other considerations associated with an aircraft incident
 - Scene preservation
 - Flight data recorder and cockpit voice recorder (“black box”)
 - It’s orange, not black
 - Avoid moving it
 - Protect it
 - Notify incident command (IC)
 - Overhaul
 - Extended operational periods
 - Investigation
 - Aircraft removal
 - Media presence
 - Professional conduct
 - Critical incident stress debriefing (CISD)
 - After action report (AAR)

Discussion Questions

1. How could different factors impact incident approach?
 - Time of day
 - Weather
 - Terrain
2. What type of aircraft ground emergencies might you encounter in your jurisdiction?
3. Who has the right of way during an aircraft incident?
4. What type of activities do structural fire fighters carry out during an aircraft incident?
5. What type of debris might you encounter during an aircraft incident?

Activities

1. Determined by instructor

Instructor Notes

1. Corresponds to 14 CFR 139.319 (i)(2)(iii), (vii), and (viii).

ARFFA Course Plan

Time Table

Segment	Lecture Time	Activity Time	Total Unit Time
Unit 1: Introduction			
Topic 1-1: Orientation and Administration			
Lecture	00:30		
Activity 1-1: Determined by instructor		00:00	
Topic 1-2: Goals and Objectives			
Lecture	00:30		
Activity 1-2: Determined by instructor		00:00	
Unit 1 Totals	1:00	00:00	1:00
Unit 2: Airport and Aircraft Familiarization			
Topic 2-1: Airport Familiarization			
Lecture	00:45		
Activity 2-1: Determined by instructor		00:00	
Topic 2-2: Aircraft Familiarization			
Lecture	00:45		
Activity 2-2: Determined by instructor		00:00	
Unit 2 Totals	1:30	00:00	1:30
Unit 3: Command and Communications			
Topic 3-1: Command Structure			
Lecture	00:30		
Activity 3-1: Determined by instructor		00:00	
Topic 3-2: Communications			
Lecture	00:30		
Activity 3-2: Determined by instructor		00:00	
Unit 3 Totals	1:00	00:00	1:00
Unit 4: Apparatus and Extinguishing Agents			
Topic 4-1: ARFF Apparatus			
Lecture	00:30		
Activity 4-1: Determined by instructor		00:00	
Topic 4-2: Extinguishing Agents			
Lecture	00:30		
Activity 4-2: Determined by instructor		00:00	
Unit 4 Totals	1:00	00:00	1:00
Unit 5: Aircraft Rescue and Fire Fighting Operations			
Topic 5-1: Aircraft Rescue and Fire Fighting Operations			

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Segment	Lecture Time	Activity Time	Total Unit Time
Lecture	2:00		
Activity 5-1: Determined by instructor		00:00	
Unit 5 Totals	2:00	00:00	2:00
Lecture, Activity, and Unit Totals:	6:30	00:00	6:30

Course Totals

Total Lecture Time (LT)	6:30
Total Activity Time (AT)	00:00
Total Testing Time (TT)	00:00
Total Skill Exercise Time (ST)	00:00
Total Course Time	6:30

The Course Totals time reflects actual teaching/lecture time. With an additional one-hour meal period and 30 minutes allotted for breaks, the total scheduled time for this course is 8 hours.

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