Aircraft Rescue and Fire Fighting ARFF



NFPA 1001 FIRE FIGHTER PROFESSIONAL QUALIFICATIONS





3-3 FIREGROUND OPERATIONS

This duty involves performing activities necessary to ensure life safety, fire control, and property conservation

4-4 RESCUE OPERATIONS

This duty involves performing activities related to accessing and disentangling victims ... and helping special rescue teams

NFPA 1003 AIRPORT FIRE FIGHTER QUALIFICATIONS

3-1.1

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



Responding:

3-2.2.1 Airport familiarization :

Runway and taxiway designations, gate locations, airport markings, lights, signage, vehicular traffic controls, access points, aircraft traffic patterns, fuel storage and distribution, topographic layout and drainage, maintenance facilities

Suppression and Rescue

3-3.1.1 Aircraft familiarization:

Aircraft construction, terminology, hazardous areas in and around aircraft, fuels and fueling, aircraft shutdown, extinguishing systems, egress/ingress (doors, hatches, evacuation chutes), military systems and hazards

3-3.1.1 Strategy and tactics:

Types of emergencies, approach, positioning, initial attack, extinguishing agents, tools, hazards, water runoff

NFPA 402 Guide for Aircraft Rescue and Firefighting Operations

Chapter 12 STRUCTURAL FIRE DEPARTMENT OPERATIONS

12-1.2

IT IS <u>IMPERATIVE</u> THAT FIRE DEPARTMENTS LOCATED NEAR AIRPORTS OR AIRCRAFT FLIGHT PATHS BE THOROUGHLY FAMILIAR WITH THE RECOMMENDATIONS SET FORTH IN THIS GUIDE.

[*IMPERATIVE = absolutely necessary; urgent]

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PRE-INCIDENT PLANNING & TRAINING

12-2.2

At an aircraft incident, <u>teamwork is so important</u> that fire department officers should review **pre-incident planning** as **the one indispensable element** in aircraft rescue and firefighting.

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VFR: Visual Flight Rules Pilots operate by sight

IFR: Instrument Flight Rules Pilots contact the Control Tower

Runways: designation, markings, lights, signs

Taxiways: designation, markings, lights, signs

Airport Markings

Runways - Numbered to as to compass heading

- Signs are red w/ white lettering,
- White centerline with white lights
- High speed areas
- Taxiways Numbered when parallel to runways and lettered when they cross runways
 - Signs are yellow with black lettering
 - Yellow centerline with blue lights
 - Low speed areas

Airport Markings

Taxiways Markings to be Highly Aware of:

2 solid lines followed by 2 broken lines Indicates



REMEMBER : Aircraft have the ultimate right of way

Airport Lighting

- WHITE
 - Runway lights placed 200 ft. apart
- BLUE
 - Taxiway lighting placed 100 ft. apart
- GREEN
 - Threshold lights usually 5 equal distance apart marking the end of runway
- RED
 - Used to mark obstructions (i.e. Bldg..)
- AMBER
 - Used to mark the approach to the end of the runway, spaced 200 ft. apart..



Vehicular Traffic and Access Points



Fuel Storage Tanks - Above Ground



Mobile Fuel Delivery





AV Gas - high octane gasoline

- Flashpoint of 50 degrees
- Flammability 1.4% 6.7%
- Flame spread of 700 800 ft/min.
- Jet A refined kerosene
 - Flashpoint of +95 to + 145 degrees
 - Flammability 0.74% 5.32%
 - Flame Spread of 100 ft/min
- Jet B combination of AV gas and kerosene
 - Flashpoint of -10 to +30 degrees
 - Flammability 1.16 7.63%
 - Flame spread of 700-800 ft./min



- Small aircraft have fuel capacities ranging from 21 to 3310 gals of fuel
- REMEMBER :
 - When dealing with large fuel spills of this nature vapors always seek out a source of ignition.
- Examples of ignition sources:
 - Static electric discharge from plane itself
 - Electrical short circuits
 - Hot engines or exhausts
 - Dropped tools, flashlights
 - Fire apparatus, lights, electrical systems
 - Telephones, radios
 - Flares, smoking materials
 - Support Equip. Aircraft Aux.. Power units, heaters
 - Flash and video cameras

Flight School 2 Planes: Average 15 Students

∗^{*}Trainer: Cessna 152



PAY ATTENTION TO:

Engine Locations Openings – doors and windows

Single Engine



Helicopters



■ Twin Engine



Turbo-props



Turbo-prop side view



Jets





Dangerous Aspects of Aircraft

Wheels

Fragmentation is normally at a 90 degree angle to the fuselage

Propellers

Treat as loaded guns when still attached to the engine.

Approach

All initial approaches should be made at a 45 degree angle

Residual Heat

Can cause fuel vapor ignition for up to 30 min. after shut down Radar

Emits signal which can cause burns or start fires 90 ft, away



Aircraft Storage



HANGERS

Aircraft Storage



TIE-DOWNS

Aircraft Emergencies

80% of all aircraft incidents occur on or within 3000ft. of the runway.

15% occur on the approach or within a 15 Mile radius of the airport.

5% occur during normal flight

If 80% occur on or within 3000 ft

CONSIDER THE IMMEDIATE AREA

Buildings Farm fields Reservoir Highways

HAZARD TO LIFE

1810 HOMES or UNITS

6000 RESIDENTS*

2700 DOGS, CATS, FISH*

(*Estimated by the Kirch-Haston Method)

Accident Data



Types of Aircraft Incidents

Ground Emergencies High Impact Crashes - LOW Survivability Low Impact Crashes - High Survivability **Runway overshoots or undershoots** Fuel or hazardous material spills **De-fuelling or fueling problems** Ground support vehicle fires Landing gear collapse Wheel or brake fires Structure Fires Grass fires

- In-flight Emergencies
- 1. Smoke or Fire in cabin, crew, passenger, or baggage compartment.
- 2. Smoke detector
- 3. Loss of hydraulics or oil
- 4. Engine out, fire, rough, trouble light
- 5. Faulty landing gear indicator
 - 6. Low fuel
- 7. Rapid depressurization

Objective



NO SECOND CHANCE

90 T0 120 SECONDS FOR FIRE TO BURN THRU FUSELAGE

Fire Command

- Command at aircraft incidents shall be initiated by the emergency priority needs.
 - As priority needs change so may command change from one agency to another.
 - Command will become the responsibility of the agency <u>Best</u> equipped to handle the needs
- Fire Department will be in command of the rescue phase.
 - May consists of fire control, rescue & medical care, and shall be the <u>First</u> priority consideration.

- All aviation emergencies shall require the close cooperation of all agencies involved.
 - Fire Department
 - Rescue
 - Fire control
 - Medical care
 - Law Enforcement shall be responsible for:
 - Scene security
 - Traffic and crowd control
 - Evacuation
 - Aviation Agencies shall be responsible for:
 - Specialized Equipment
 - Technical Assistance
 - Investigation





Command Responsibilities

- Initial strategy, tactics and objectives
 - Assignment of sectors
 - **Determine site safety parameters**
 - **Establish Safety Sector**
 - To include an observer to monitor for possible incoming aircraft
 - Establish liaison with other agencies involved in incident
 - Provide cooperation & support to other agencies following the initial phases of the emergency

Strategic Determination

- Aircraft Type
 - Fuel, # of souls onboard, Cargo type, Tail numbers, Military
- Structural Makeup of Aircraft
 - Entry points, forcible entry, structural hazards & integrity hazard exposures, weapons on board.
- Engine Hazard
 - Propellers, turboprop, jet
- Electrical Systems Hazard
 - Fuel vapors, battery system accessibility
- Evacuation
 - Status and Needs
- Safety

- Strategic Determination (cont..)
 - Resources
 - Manpower, outside agencies, water supply, foam agent
 - Existing Conditions
 - Time of day, day of week, weather conditions, environment, wreckage location





- **Tactical Priorities**
 - Rescue
 - Immediate Hazard Control

Move fire away from fuselage and/or escape routes

- Apply Foam to Rescue Paths
 - Maintain blanket to provide protection for personnel and victims
- Property Conservation
 - Extinguish fires
 - Disconnect electrical systems
 - Do not move or remove anything that does not need to be, unless it interferes with rescue or extinguishment.

Sectors to include but not limited to:

- Rescue
- Fire or Hazard control
- Safety
- Triage
- Treatment
- Transport
- Staging
- Rehab
- Public Information
- Morgue
- Liaison for outside agencies



AGENCIES

Manager of Reliever Airports **Director of Operations Director of Public Safety Director of Airfield** Maintenance B.A.A. **Commanding Shift Officer** National Trans. Safety Board Federal Aviation Admin. **F.B.I.** Indiana State Police **Marion County Sheriff U.S. Postal Inspector**

Entry Points

- Only ONE controlled entry point should be used.
- Control scene access to only emergency personnel and apparatus having a legitimate reason to be in the incident area.
- Advise ALL personnel of the need of security when dealing with this type of incident



- Items to remember when dealing with aircraft incidents:
 - Life safety yours and theirs
 - This is a high profile media event
 - It will be chaotic incident
 - Do not move or remove any part or piece of aircraft
 - Do not move bodies or body parts unless to prevent further destruction
 - Note position mark placement and photograph if at all possible
 - This type of incident will necessitate Critical Incident Stress Debriefing