



Belize Department of Civil Aviation

ADVISORY CIRCULAR

Subject: RFF Requirements, Personnel,
Training and Procedures

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1. PURPOSE OF THIS ADVISORY CIRCULAR

This Advisory Circular (AC) provides guidance on the requirements that CFR vehicles and equipment, personnel, protective clothing, respiratory equipment, rescue service headquarters, training, procedures and rescue operations must have according to the National Regulations, and ICAO Doc. 9137 Part 1.

2. WHAT CANCELS THIS A.C?

Because this is the first version of the methodology, this circular does not cancel any previous document.

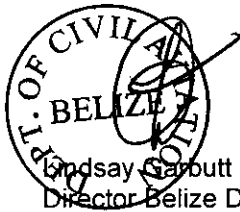
3. WHO DOES IT AFFECT?

This document impacts the responsibilities of operators of international aerodromes of the State and to which the BCAR 139 applies.

4. RELATED READING MATERIAL.

This document is based on the BCAR 139 and 9137 Document part 1 from ICAO.

Approved



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Director Belize Department of Civil Aviation

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Part 1 - CFR Vehicles and Equipment

1. General

Specifications for specialized equipment and vehicles to be used in difficult environments have not been included in this Part 1.

- a. The aerodrome operator or service provider responsible / in charge of the CFR must establish a preventive maintenance and inspection program for the equipment and vehicles of the aerodrome CFR, whether the maintenance of the same is carried out by their own personnel, or a supplier is contracted of the external maintenance service.
- b. In any case, the program must be done in a correct, timely manner and be available to the BDCA Inspectors when they request it.

2. Technical characteristics of CFR vehicles

- a. Vehicles that have to be used for the rescue and extinction of aircraft fires must have at least the characteristics expressed in Table 1.1 and comply with at least the following

characteristics:

Table 1.1 Minimum characteristics of rescue and fire fighting vehicles.

| | <i>RFF vehicles up to 4 500 L</i> | <i>RFF vehicles over 4 500 L</i> |
|--|---|--|
| Monitor | Optional for categories 1 and 2 Required for categories 3 to 9 | Required |
| Design feature | High discharge capacity | High and low discharge capacity |
| Range | Appropriate to longest aeroplane | Appropriate to longest aeroplane |
| Handlines | Required | Required |
| Under truck nozzles | Optional | Required |
| Bumper turret | Optional | Optional |
| Acceleration | 80 km/h within 25 s at the normal operating temperature | 80 km/h within 40 s at the normal operating temperature |
| Top speed | At least 105 km/h | At least 100 km/h |
| All-wheel drive capability | Required | Required |
| Automatic or semi-automatic transmission | Required | Required |
| Single rear wheel configuration | Preferable for categories 1 and 2 Required for categories 3 to 9 | Required |
| Minimum angle of approach and departure | 30° | 30° |
| Minimum angle of tilt (static) | 30° | 28° |

- b. The capacity of the foam concentrate tank should be sufficient to provide the specified concentration for twice the capacity of the water tank.
- c. CFR vehicles should have the characteristic of continuously maintaining foam production while traveling at minimum speeds of 8 km / h.
- d. The CFR vehicle cab should be large enough to accommodate the specified personnel and various equipment items, facilitate rapid access and egress of personnel, considering that each firefighter will be equipped with their protective equipment, and must have adequate insulation against the vibrations and the noise.
- e. CFR vehicles must have safety belts, first aid kit, spare tire, safety triangle, etc.
- f. CFR vehicles must have visual audible devices that allow them to be identified as emergency vehicles, they must comply with national or local legislation, and with any lighting and sound regulations.
- g. The airport's emergency vehicles must be painted with highlighting colors, preferably red or yellowish green.
- h. When the fleet of vehicles is renewed, the technical characteristics of Table 1.1 should be considered.
- i. There should be a provision of spare parts and critical elements of the CFR vehicles, especially the elements of electronic type, in such a way that they ensure an immediate repair before being put out of service, in order to avoid prolonged periods, with the CFR

capacity diminished..

- j. Vehicles that have electronic devices to control the application of extinguishing agents and management of operational capabilities of such vehicles, must have redundant systems to ensure the reliability of the system in critical operating conditions.

3. CFR Tools and Equipment

- a. The aerodrome operator or service provider responsible / in charge of the CFR must provide special tools to the CFR personnel, so that they can penetrate inside the fuselage, which is essential; but its use can only be considered as an extreme measure, when ordinary means of access can not be used, or when, for special reasons.
- b. Based on the CFR category of each aerodrome, at least the following rescue and firefighting equipment must be available.

Table 1-2 Rescue equipment that each CFR vehicle must have

| <i>Equipment Scope</i> | <i>Equipment Item</i> | <i>Airport Category</i> | | | |
|--|--|---------------------------------|------------|------------|-------------|
| | | 1-2 | 3-5 | 6-7 | 8-10 |
| Forcible entry tools | Prying Tool (Hooligan, Biel type) | 1 | 1 | 1 | 2 |
| | Crowbar 95 cm | 1 | 1 | 1 | 2 |
| | Crowbar 1.65 m | 1 | 1 | 1 | 2 |
| | Axe, rescue large non wedge type | 1 | 1 | 1 | 2 |
| | Axe, rescue small non wedge or aircraft type | 1 | 2 | 2 | 4 |
| | Cutter Bolt 61 cm | 1 | 1 | 2 | 2 |
| | Hammer 1.8 kg Lump or Club type | 1 | 1 | 2 | 2 |
| | Chisel cold 2.5 cm | 1 | 1 | 2 | 2 |
| A suitable range of rescue/cut in equipment including powered rescue tools | Hydraulic/Electrical (or combination) portable rescue equipment | 1 | 1 | 1 | 2 |
| | Powered rescue saw complete with minimum 406mm diameter spare blades | 1 | 1 | 1 | 2 |
| | Reciprocating/Oscillating saw | 1 | 1 | 1 | 2 |
| A range of equipment for the delivery of firefighting agent | Delivery hose 30 m lengths x 50 & 64 mm diameters | 6 | 10 | 16 | 22 |
| | Foam Branches (Nozzles) | 1 | 1 | 2 | 3 |
| | Water Branches (Nozzles) | 1 | 2 | 4 | 6 |
| | Coupling adaptors | 1 | 1 | 2 | 3 |
| | Portable fire extinguishers | | | | |
| | | | 1 | 1 | 2 |
| | CO ² | 1 | 1 | 2 | 3 |
| | DCP | | | | |
| Self-Contained Breathing Apparatus – <i>sufficient to maintain prolonged internal operations</i> | Breathing Apparatus (BA) set c/w facemask and air cylinder | | | | |
| | BA spare air cylinder | | | | |
| | BA spare facemask | | | | |
| <i>Note: Ideally one BA set per crew member.</i> | | | | | |
| Respirators | Full faced respirators c/w filters | One per responding fire fighter | | | |
| A range of ladders | Extension Ladder, Rescue & suitable for critical aircraft | - | 1 | 2 | 3 |
| | Ladder General Purpose – rescue capable | 1 | 1 | 1 | 2 |

| | | |
|---------------------|--|------------------------------|
| Protective clothing | Firefighting helmet, coats, over trousers (c/w | One set per operational fire |
|---------------------|--|------------------------------|

| | | | | | |
|--|---|-----------------------------------|-------|-------|-------|
| | braces), boots & gloves as a minimum | fighter plus a % of reserve stock | | | |
| Additional items for personal protection | Protective goggles | 1 | 1 | 2 | 3 |
| | Flash hoods | One per operational fire fighter | | | |
| | Surgical gloves | 1 box | 1 box | 1 box | 1 box |
| | Blanket Fire Resisting | 1 | 1 | 2 | 2 |
| Rope lines | Rope Line Rescue 45 m | 1 | 1 | 2 | 2 |
| | Rope Line General Use 30 m | 1 | 1 | 2 | 2 |
| | Rope Line Pocket 6 m | One per operational fire fighter | | | |
| Communication Equipment | Portable transceivers (hand held & intrinsically safe) | 1 | 2 | 2 | 3 |
| | Mobile transceivers (vehicle) | One for each fire vehicle | | | |
| A range of hand held/portable lighting equipment | Hand held flashlight (intrinsically safe) | 1 | 2 | 4 | 4 |
| | Portable lighting – spot or flood (intrinsically safe) | 1 | 1 | 2 | 3 |
| A range of general hand tools | Shovel overhaul | 1 | 1 | 2 | 2 |
| Rescue Tool Box & contents | | 1 | 1 | 2 | 3 |
| | Hammer, claw 0.6 kg | | | | |
| | Cutters, cable 1.6 cm | | | | |
| | Socket set | | | | |
| | Hacksaw, heavy duty c/w spare blades | | | | |
| | Wrecking bar 30 cm | | | | |
| | Screwdriver set – Slotted & Phillips heads | | | | |
| | Pliers, insulated Combination 20 cm Side Cutting 20 cm Slip Joint – Multi Grip 25 cm | | | | |
| | Seat Belt/Harness cutting tool | | | | |
| | Wrench , adjustable 30cm | | | | |
| | Spanners, combination 10mm – 21 mm | | | | |
| First aid equipment | Medical First Aid Kit | 1 | 1 | 2 | 3 |
| | Automated External Defibrillator (AED) | 1 | 1 | 2 | 3 |
| | Oxygen Resuscitation Equipment (ORE) | 1 | 1 | 2 | 3 |
| Miscellaneous equipment | Chocks & Wedges – various sizes | | | | |
| | Tarpaulin - lightweight | 1 | 1 | 2 | 3 |
| | Thermal Imaging Camera | - | - | 1 | 2 |

- c. The rescue equipment specified in **Table 3-2** must be transported in a vehicle or in the vehicle (s) that begin to attend the accident of the aircraft.

Part 2 - PERSONNEL, PROTECTIVE CLOTHING AND RESPIRATORY PROTECTION.

1. Personnel

- a. The aerodrome operator or service provider responsible / in charge of the CFR The responsible person must be designated to direct the CFR services of the airport. The responsibilities of this person should include general administrative supervision of the service, control of effective personnel training and operational control of the role assigned to the CFR in the aerodrome emergency response plan and those other responsibilities assigned by the organization. , for the fulfillment of its mission.
- b. During air operations, the aerodrome operator must have sufficient, competent and properly trained personnel in the CFR service, so that it can intervene immediately, with rescue and fire fighting vehicles, and manage the equipment to its maximum capacity. This personnel must be able to deploy itself in such a way that it can intervene in a minimum response time and achieve the continuous application of extinguishing agents to a regime according to the level of protection of the aerodrome established in Table 4 of BCAR 139.315 and meeting the operational goal of response times.
- c. The CFR of the aerodrome must be composed of a minimum staff of firefighters, in each shift, according to or indicated in the letter d. and that are available to operate the vehicles and equipment of the CFR at its maximum capacity, and cover the schedules of aerodrome operation according to its category. The number of personnel must be adequate to equip the CFR vehicles in their extinction tasks and ensure the evacuation in the shortest possible time of the largest aircraft that uses the Aerodrome..
- d. In determining the minimum number of personnel necessary for rescue and firefighting operations, the aerodrome operator or service provider responsible / in charge of the CFR must perform an analysis of the resources required for the task and document in the Aerodrome Manual the staffing level, according to the CFR category of the aerodrome. The minimum necessary personnel must not be less than that indicated in the following table:

| Category Airport | Núm. of Vehicles | Núm. of Personnel per Vehicle | Total No. of Personnel |
|--------------------------------|-------------------------|--------------------------------------|-------------------------------|
| Category 1, 2, 3, 4 y 5 | 1 | 3 | 3 |
| Category 6 y 7 | 2 | 3 | 6 |
| Category 8 | 3 | 3 | 9 |
| Category 9 y 10 | 3 | 4 | 12 |

| MINIMUM NUMBER OF CFR PERSONNEL PER AERODROME | | | | |
|--|--------------------------------|-----------------------|-------------------|------------------------|
| Cantidad de Personal CFR | Category 1, 2, 3, 4 y 5 | Category 6 y 7 | Category 8 | Category 9 y 10 |
| Experienced and trained Chief | 1 | 1 | 1 | 1 |
| Communication Center | 1 | 1 | 1 | 1 |
| Drivers | 1 | 2 | 3 | 3 |
| Firefighters | 2 | 4 | 6 | 9 |
| Paramedic | 1 | 1 | 1 | 1 |
| TOTAL | 6 | 9 | 12 | 15 |

- e. CFR personnel must be trained and certified in aircraft rescue and firefighting, first aid, incident response with hazardous materials and rescues in confined spaces, the aerodrome operator must demonstrate to the BDCA that said personnel have passed examinations and aptitude tests with the corresponding certifications. You must possess the personal records which must be in the CFR available when requested by the BDCA, basic and advanced life support, cardio-pulmonary resuscitation, aerodrome operator must demonstrate to the BDCA that said personnel has passed exams and aptitude tests ..
- f. The personnel that carries out operative tasks in the CFR of an aerodrome, must be graduated from the Aeronautical Technical School, with the title of Higher Level Technician in Safety Rescue and Fire Extinction..
- g. The personnel assigned to the CFR service must demonstrate a good psychophysiological condition that allows them to exercise their functions in an unlimited way, considering the great physical effort required.
- h. The aerodrome operator must provide all CFR personnel and other authorized personnel with suitable uniforms and corresponding identification.

- i. At international airports, at least one member of the CFR service on duty should have a reasonable command of the Spanish language to facilitate communication with the flight crew and survivors of the accident.
- j. If it is deemed necessary to assign other functions to the CFR, during its working hours, the aerodrome operator or service provider responsible / in charge of the CFR must ensure that they do not affect the availability and capacity to respond to the emergency, nor hinder its essential activity of instruction, inspections and equipment maintenance.

2. Personal Protection Equipment.

- a. All personnel involved in the rescue and firefighting operations of an aircraft must be equipped with the corresponding personal protective equipment and respiratory protection equipment so that they can safely perform the functions entrusted to them.
- b. The aerodrome operator or service provider responsible / in charge of the CFR must provide each CFR staff with the corresponding personal protection equipment, as well as sufficient respiratory protection equipment (See Section 3 of this chapter) for the allocation of each shift, that must be kept and available for immediate use, in case of an emergency.

3. Respiratory Protection Equipment.

- c. Firefighters who in an accident / incident have to enter an environment contaminated with smoke or other toxic products must be equipped with the appropriate respiratory equipment, which must have the approval of the governmental or non-governmental body designated by the state and must be maintained in force and demonstrated to the BDCA when it requests it..
- d. The respiratory protection equipment must be:
- e. Autonomous.
- f. Suitable for performing its basic function of respiratory support and durable for the required jobs.
- g. The respiratory protection team must additionally have a security system that alerts in case of detecting lack of movement (as in case of fading) on the fireman who uses it, known as "dead man" or PASS in its acronym in English (Personal Alert Safety System).
- h. Personnel who employ respiratory protection equipment must be adequately trained with the appropriate means and competent instructors to ensure initial and recurrent training. Said training must be included in the Instruction Program.
- i. The appropriate means to recharge the cylinders with air It must be provided, also having spare cylinders in order for the equipment to always be available.
- j. The aerodrome operator must have a Program of Inspection and Maintenance for Respiratory Protection Equipment which must be available to the inspectors of the BDCA.

Part 3. CFR HEADQUARTERS

1. Site

- a. The CFR headquarters should be located, so as to ensure compliance with the expected response time.
- b. When it is not possible to achieve the response time with a single CFR headquarters, "satellite" headquarters should be built.
- c. The location of the CFR headquarters should allow the rescue and fire fighting vehicles to have immediate access to the movement area, be able to reach the ends of this area within the response time established in BCAR 139.319 (i) and have designed routes and marked in such a way that the access to the emergency is as direct as possible.
- d. The CFR headquarters must have a guard room which must be located in such a way as to provide the widest possible vision of the movement area..
- e. When the CFR station does not have a view of the sectors furthest from the movement area, a watch tower or a closed circuit television (CCTV) should be installed.

- f. When a new barrack is to be installed, the aerodrome operator must perform response tests on CFR vehicles in order to determine the optimal location in relation to potential accident locations.
- g. Plans for the future expansion of the airport should be taken into account, as these can increase the distances to be traveled in case of intervention.
- h. All CFR headquarters must have access roads to the emergency, which are adequate and which allow safe and fast access to the movement area and to the possible accident zones of the aerodrome and outside them. This condition must be taken into account when determining the location of a CFR headquarters.

2. Characteristics

- a. The Fire Headquarters of an airport must constitute an autonomous unit, which meets the necessary conditions to protect the vehicles, brigades and operational services that are considered necessary, and allow an immediate and effective response in case of emergency.
- b. The area designated to house the vehicles must meet the necessary conditions to protect and house firefighting vehicles, ambulances, special vehicles, multipurpose vehicles, among others; and additionally allow to carry out the current (minor) maintenance operations and have appropriate lighting.
- c. The parking of the vehicles must be done in such a way that the failure of one of them does not prevent the departure of the other vehicles.
- d. The floor should slope toward the doors, where a drain should be installed to allow water to run off the surface of the CFR headquarters.
- e. The doors must be operated manually or by an automatic device, if possible with remote control, from the guard room or together with the operation of the alarm bells. A system that allows manual operation should be provided in case the automatic device fails.
- f. The doors of the premises for the vehicles must be of fast action and reduced robustness in their construction, in order to allow that they do not cause damages to the vehicles in their race towards the emergency before a failure of the opening system. So they must also have windows that allow adequate natural light.
- g. The CFR headquarters must have administrative facilities,

dormitories (male and female staff), kitchen, dining room, locker room and restrooms for staff, classrooms, spaces for physical training, practice areas, areas for the communications center.

- h. It must have communications and alarm systems that provide liaison with air traffic and security services, which, in case of emergency, guarantee the immediate and effective deployment of vehicles.
- i. All CFR headquarters must have a water supply station, which allows quick supply / recharge of the units.
- j. All CFR quarters must have an area for the adequate storage of reserve supplies, which must ensure that the appropriate storage and preservation conditions of the different elements are maintained, as well as that they have appropriate security measures and with the due access for the recharging of vehicles.

Part 4 – TRAINING

1. General

- a. The aerodrome operator must implement and develop a training program, and an annual training and instruction plan, to provide CFR service personnel with the necessary physical and technical training to efficiently carry out rescue and firefighting operations on aircraft operation, maintenance and inspection of portable and rolling extinguishers, equipment, tools and vehicles for firefighting.
- b. The instruction must be done using standardized didactic material accepted by the BDCA and the training, which may be face-to-face or blended, must include at least instruction related to human performance, understanding in the operation of equipment and coordination for emergency care, specializations and recurrences according to the program of instruction that is established.
- c. All rescue and firefighting personnel must be properly trained to perform their duties efficiently and must participate in real firefighting exercises that correspond to the types of aircraft and the type of rescue and firefighting equipment that is used at the aerodrome, including fires fed by pressurized fuel.
- d. The aerodrome operator must maintain individualized and updated records of the instruction and training of each CFR staff, which must be available to the BDCA when requested.
- e. The practices or drills must be done according to a program established in the Emergency Plan, previously accepted and coordinated with the BDCA.

2. Thematic content.

- f. The curriculum for the instruction of CFR service personnel should include refresher instruction that covers at least the following aspects:
 - 1. Familiarization with the Aerodrome.
 - 2. Familiarization with aircraft and systems.
 - 3. Safety of Rescue and Fire Fighting Personnel.
 - 4. Aerodrome emergency communications systems, including alarms related to aircraft fires.
 - 5. Aerodrome fire rescue and firefighting equipment and tools.
 - 6. Fire Extinguishing Agents and Combustion Chemistry.
 - 7. Assistance for the evacuation of emergencies in aircraft.
 - 8. Clothing and respiratory protection equipment.
 - 9. Adaptation and use of the equipment of structural fire brigades for the rescue and extinction of fires in aircraft.
 - 10. Operations with the salvage vehicle and fire extinguishing..
 - 11. Fire Extinguishing Operations in Aircraft.
 - 12. Aerodrome emergency plan.
 - 13. Human Factor.
 - 14. Practices with real fire and pressure fire.
 - 15. Basic and Advanced Life Support and CPR.
 - 16. Emergency response with dangerous goods.

- g. The training plan must be submitted to the BDCA, for its evaluation and subsequent approval / acceptance, prior to its implementation and subject to periodic reviews as required by that Authority.

Part 5 – RESCUE AND FIREFIGHTING PROCEDURES.

1. General

- a. The CFR service must have a Manual of Rescue and Fire Fighting Procedures, which must be submitted acceptance by the BDCA-

- b. The Manual must describe the organization of the CFR service of the aerodrome, for which it will designate a person responsible for the service.
- c. In addition, the CFR Procedures Manual should include procedures to act, at a minimum, on the following types of emergencies:
 - 1. Emergency Evacuation.
 - 2. Location of CFR Service.
 - 3. Rescue and Firefighting operations.
 - 4. Fuel spills.
 - 5. Aircraft with landing gear problems..
 - 6. Aircraft with hydraulic problems.
 - 7. Overheated brakes and fires in the brake system.
 - 8. Aircraft with engine problems.
 - 9. Aircraft with problems in the cabin.
 - 10. Emergencies with military aircraft (when applicable).
 - 11. Acts of unlawful interference.
 - 12. Emergencies with Helicopters.
 - 13. Structural fires.
 - 14. Emergencies related to Dangerous Goods.
 - 15. Preservation of the scene of the accident.
- d. The Rescue and Firefighting Procedures Manual must be correlated with the provisions of the Aerodrome Emergency Plan.

Part 6 - SALVAGE OPERATIONS IN DIFFICULT SETTINGS

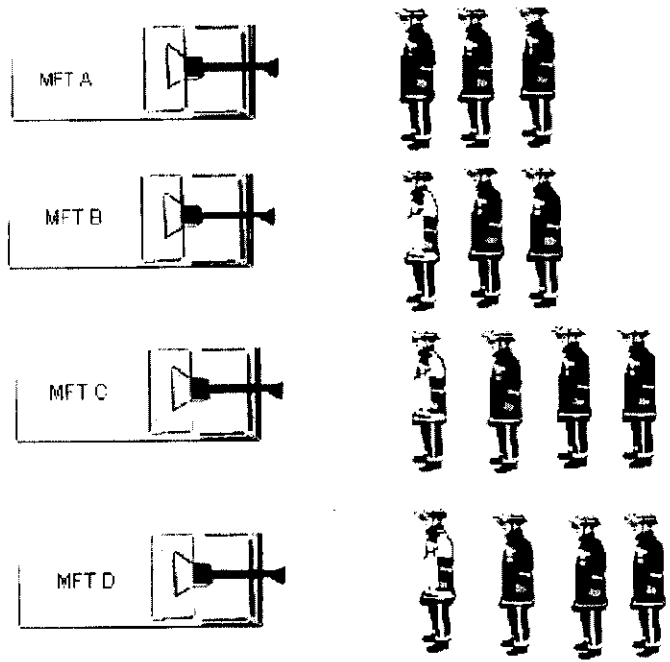
1. General

- a. At aerodromes where a considerable proportion of aircraft arrivals and departures take place over stretches of water, wetlands or other varieties of difficult terrain in the immediate vicinity of the airport, and where conventional salvage and firefighting vehicles cannot provide an effective response, the aerodrome operator must have procedures to deal with the accidents that occur in those places, which must be acceptable to the BDCA.
- b. The aerodrome operator must determine and specify in advance to the BDCA the area of action with respect to which it undertakes to provide rescue services.
- c. The operation objectives must allow to create conditions in which survival is possible and to carry out the total

salvage operation successfully.

- d. The magnitude of the rescue equipment must be related to the capacity of the larger aircraft that uses the airport.
- e. Difficult terrain types, for which special equipment may be needed, are:
 - 1. the sea and other significant stretches of water adjacent to the airport;
 - 2. the marshes or similar surfaces, especially the estuaries of the rivers that have tide;
 - 3. mountainous areas;
- f. In all situations, the aerodrome operator must have the following basic equipment:
 - 1. communications equipment, which may also include the visual signal equipment. Ideally, the use of a transmitter in the distress frequency provides liaison with the air traffic control and the emergency operations center;
 - 2. navigation aids;
 - 3. first aid medical kit;
 - 4. life-saving equipment, including life jackets when dealing with mishaps occurring in the water, tents, waterproof blankets and drinking water;
 - 5. lighting equipment;
 - 6. ropes, hooks for boats, megaphones and tools; for example, pliers to cut wires and knives to cut the seat belts.

APPENDIX 1 - Minimum Quantities of Equipment / Vehicles and personnel on board the MFTs



MFT – Foam Extinguishing Vehicle

COMMENTS:

Comments about this Advisory Circular, please send them to the Aerodromes Certification and Surveillance Department of the Belize Department of Civil Aviation.