

CHAPTER (9)

AERODROME OPERATIONAL SERVICES, EQUIPMENT AND INSTALLATIONS

9.1 AERODROME EMERGENCY PLANNING

General

Aerodrome emergency planning is the process of preparing an aerodrome to cope with an emergency occurring at the aerodrome or in its vicinity. The objective of aerodrome emergency planning is to minimize the effects of an emergency, particularly in respect of saving lives and maintaining aircraft operations. The aerodrome emergency plan sets forth the procedures for coordinating the response of different aerodrome agencies (or services) and of those agencies in the surrounding community that could be of assistance in responding to the emergency.

Note: Guidance material to assist the appropriate authority in establishing aerodrome emergency planning is given in the CARC Guidance Material Airport Emergency Planning 34/AEP.

9.1.1 An aerodrome emergency plan shall be established at an aerodrome, commensurate with the aircraft operations and other activities conducted at the aerodrome.

9.1.2 The aerodrome emergency plan shall provide for the coordination of the actions to be taken in an emergency occurring at an aerodrome or in its vicinity.

Note 1: Examples of emergencies are: aircraft emergencies, sabotage including bomb threats, unlawfully seized aircraft, dangerous goods occurrences, building fires, natural disasters and public health emergencies.

Note 2: Examples of public health emergencies are increased risk of travellers or cargo spreading a serious communicable disease internationally through air transport and severe outbreak of a communicable disease potentially affecting a large proportion of aerodrome staff.

9.1.3 The plan shall coordinate the response or participation of all involved agencies which could be of assistance in responding to an emergency.

Examples of agencies are:

- on the aerodrome: air traffic control unit, rescue and fire fighting services, aerodrome administration, medical and ambulance services, aircraft operators, security services, and police;
- off the aerodrome: fire departments, police, health authorities (including medical, ambulance, hospital and public health services), military, and harbor patrol or coast guard.

Public health services include planning to minimise adverse effects to the community from health related events and deal with population health issues rather than provision of health services to individuals.

9.1.4 The plan shall provide for cooperation and coordination with the rescue coordination center, as necessary.

9.1.5 The aerodrome emergency plan document shall include at least the following:

- a) types of emergencies planned for;
- b) agencies involved in the plan;
- c) responsibility and role of each agency, the emergency operations center and the command post, for each type of emergency;
- d) information on names and telephone numbers of offices or people to be contacted in the case of a particular emergency; and
- e) a grid map of the aerodrome and its immediate vicinity.

9.1.6 The plan shall observe Human Factors principles to ensure optimum response by all existing agencies participating in emergency operations.

Note: Guidance material on Human Factors principles can be found in the CARC Guidance Material Human Factors Training 34/HFT.

Emergency operations center and command post

9.1.7 A fixed emergency operations center and a mobile command post shall be available for use during an emergency.

9.1.8 The emergency operations center shall be a part of the aerodrome facilities and shall be responsible for the overall coordination and general direction of the response to an emergency.

9.1.9 The command post shall be a facility capable of being moved rapidly to the site of an emergency, when required, and shall undertake the local coordination of those agencies responding to the emergency.

9.1.10 A person shall be assigned to assume control of the emergency operations center and, when appropriate, another person the command post.

Communication system

9.1.11 Adequate communication systems linking the command post and the emergency operations center with each other and with the participating agencies shall be provided in accordance with the plan and consistent with the particular requirements of the aerodrome.

Aerodrome emergency exercise

9.1.12 The plan shall contain procedures for periodic testing of the adequacy of the plan and for reviewing the results in order to improve its effectiveness.

Note: The plan includes all participating agencies and associated equipment.

9.1.13 The plan shall be tested by conducting:

- a) a full-scale aerodrome emergency exercise at intervals not exceeding two years; and partial emergency exercises in the intervening year to ensure that any deficiencies found during the full-scale aerodrome emergency exercise have been corrected; or
- b) a series of modular tests commencing in the first year and concluding in a full-scale aerodrome emergency exercise at intervals not exceeding three years;

and reviewed thereafter, or after an actual emergency, so as to correct any deficiency found during such exercises or actual emergency.

Note 1: The purpose of a full-scale exercise is to ensure the adequacy of the plan to cope with different types of emergencies. The purpose of a partial exercise is to ensure the adequacy of the response to individual participating agencies and components of the plan, such as the communications system. The purpose of modular tests is to enable concentrated effort on specific components of established emergency plans.

Note 2: Guidance material on airport emergency planning is available in the CARC Guidance Material Airport Emergency Planning 34/AEP.

Emergencies in difficult environments

9.1.14 The plan shall include the ready availability of and coordination with appropriate specialist rescue services to be able to respond to emergencies where an aerodrome is located close to water and/or swampy areas and where a significant portion of approach or departure operations takes place over these areas.

9.1.15 At those aerodromes located close to water and/or swampy areas, or difficult terrain, the aerodrome emergency plan shall include the establishment, testing and assessment at regular intervals of a pre-determined response for the specialist rescue services.

9.1.16 An assessment of the approach and departure areas within 1,000 m of the runway threshold shall be carried out to determine the options available for intervention.

Note: Guidance material on assessing approach and departure areas within 1,000 m of runway thresholds can be found in CARC Guidance Material Rescue Operations in Difficult Environment.

9.2 RESCUE AND FIRE FIGHTING

General

9.2.1 In respect to 139.317 and Attachment A to this Part, The Aerodrome Operator may designate public or private organizations suitably located and equipped to provide/support the ARFF service. The housing for the ARFF service shall be located on the Aerodrome suitably so that responses will not be delayed and ensuring response times met.

Protective clothing and respiratory equipment:

Protective Clothing

9.2.2 It is the responsibility of the Aerodrome operating certificate holder that all personnel operating at an aircraft fire be provided with protective clothing which will ensure the wearer is able to perform the assigned duties. This clothing shall be provided, maintained and readily available for instant use. This specification must therefore have regard for two important factors in determining the types of clothing to be provided and the conventions specified in respect of its use during hours of duty, the 2 factors are :

- a) the extent to which it is necessary to wear continuously all, or some elements of, the protective clothing so as to ensure immediate response when a call for attendance at an aircraft accident is received;
- b) some elements of the protective clothing must be worn at all times during a tour of duty, the hot weather suggests that there may have to be a compromise solution between the ultimate degree of protection offered by some forms of clothing and a lesser, but acceptable, form of protection which can be provided by clothing specifically designed for use in areas with high ambient temperatures.

Respiratory Equipment

9.2.3 Fire fighters entering any environment in which fire is present during an aircraft incident shall be protected with self contained respiratory equipment as well as during overhaul operations, the Aerodrome operating certificate holder is responsible for providing and maintaining such equipment .

Personnel

9.2.4 Each Aerodrome operating certificate holder shall ensure the following:

- a) All rescue and firefighting personnel are equipped in a manner acceptable to the Chief Commissioner/CEO with protective clothing and equipment needed to perform their duties.
- b) All rescue and firefighting personnel are properly trained to perform their duties in a manner acceptable to the Chief Commissioner/CEO. The training

curriculum shall include initial and recurrent instruction in at least the following areas:

- 1) Aerodrome familiarization.
 - 2) Aircraft familiarization.
 - 3) Rescue and firefighting personnel safety.
 - 4) Emergency communication systems on the Aerodrome, including fire alarms.
 - 5) Use of the fire hoses, nozzles, turrets, and other appliances required for compliance with this part.
 - 6) Application of the types of extinguishing agents required for compliance with this part.
 - 7) Emergency aircraft evacuation assistance.
 - 8) Firefighting operations.
 - 9) Adapting and using structural rescue and firefighting equipment for aircraft rescue and firefighting.
 - 10) Aircraft cargo hazards.
 - 11) Familiarization with firefighters' duties under the Aerodrome emergency plan.
- c) All rescue and firefighting personnel participate in at least one live-fire drill every 12 months.
- d) At least one of the required personnel on duty during air carrier operations has been trained and is current in basic emergency medical care.

This training shall include 40 hours covering at least the following areas:

- 1) Bleeding.
- 2) Cardiopulmonary resuscitation.
- 3) Shock.
- 4) Primary patient survey.
- 5) Injuries to the skull, spine, chest, and extremities.
- 6) Internal injuries.
- 7) Moving patients.
- 8) Burns.
- 9) Triage.

- e) Sufficient rescue and firefighting personnel are available during all air carrier operations to operate the vehicles, meet the response times, and meet the minimum agent discharge rates required by this part;
- f) Procedures and equipment are established and maintained for alerting rescue and firefighting personnel by siren, alarm, or other means acceptable to the Chief Commissioner/CEO, to any existing or impending emergency requiring their assistance.

9.3 DISABLED AIRCRAFT REMOVAL

Note: Guidance on removal of a disabled aircraft, including recovery equipment, is given in the CARC Guidance Material Removal of Disabled Aircraft 34/RODA. See also ICAO Annex 13 concerning protection of evidence, custody and removal of aircraft.

9.3.1 A plan for the removal of an aircraft disabled on, or adjacent to, the movement area shall be established for an aerodrome, and a coordinator designated to implement the plan, when necessary.

9.3.2 The disabled aircraft removal plan shall be based on the characteristics of the aircraft that may normally be expected to operate at the aerodrome, and include among other things:

- a) a list of equipment and personnel on, or in the vicinity of, the aerodrome which would be available for such purpose; and
- b) arrangements for the rapid receipt of aircraft recovery equipment kits available from other aerodromes.

9.4 WILDLIFE STRIKE HAZARD REDUCTION

Note: The presence of wildlife (birds and animals) on and in the airport vicinity poses a serious threat to aircraft operational safety.

9.4.1 The wildlife strike hazard on, or in the vicinity of, an aerodrome shall be assessed through:

- a) the establishment of a national procedure for recording and reporting wildlife strikes to aircraft;
- b) the collection of information from aircraft operators, airport personnel, and other sources, on the presence of wildlife on or around the aerodrome constituting a potential hazard to aircraft operations; and
- c) an ongoing evaluation of the wildlife hazard by competent personnel.

Note: Refer to ICAO Annex 15, Chapter 5.

9.4.2 Wildlife strike reports shall be collected and forwarded to ICAO for inclusion in the ICAO Bird Strike Information System (IBIS) database.

Note: The ICAO IBIS is designed to collect and disseminate information on wildlife strikes to aircraft. Information on the system is included in the Manual on the CARC Guidance Material National Bird Strike Information System (IBIS).

9.4.3 Action shall be taken to decrease the risk to aircraft operations by adopting measures to minimize the likelihood of collisions between wildlife and aircraft

Note: Guidance on effective measures for establishing whether or not wildlife, on or near an aerodrome, constitute a potential hazard to aircraft operations, and on methods for discouraging their presence, is given in the CARC Guidance Material Wildlife Control and Reduction 34/WLCR.

9.4.4 The airport operator, in collaboration with concerned authorities, shall take action to eliminate or to prevent the establishment of garbage disposal dumps or any other source which may attract wildlife to the aerodrome, or its vicinity, unless an appropriate wildlife assessment indicates that they are unlikely to create conditions conducive to a wildlife hazard problem. Where the elimination of existing sites is not possible, the airport operator, in collaboration with concerned authorities, shall ensure that any risk to aircraft posed by these sites is assessed and reduced to as low as reasonably practicable.

9.4.5 The concerned authorities, shall give due consideration to aviation safety concerns related to land developments in the vicinity of the aerodrome that may attract wildlife.

9.5 APRON MANAGEMENT SERVICE

9.5.1 When warranted by the volume of traffic and operating conditions, an appropriate apron management service shall be provided on an apron by an aerodrome ATS unit, by aerodrome operations unit, or by a cooperative combination of these, in order to:

- a) regulate movement with the objective of preventing collisions between aircraft, and between aircraft and obstacles;
- b) regulate entry of aircraft into, and coordinate exit of aircraft from, the apron with the aerodrome control tower; and
- c) ensure safe and expeditious movement of vehicles and appropriate regulation of other activities.

9.5.2 When the aerodrome control tower does not participate in the apron management service, procedures shall be established to facilitate the orderly transition of aircraft between the apron management unit and the aerodrome control tower.

Note: Guidance on an apron management service is given in the CARC Guidance Materials, Aerodrome Operational Services and Surface Movement Guidance and Control Systems (SMGCS).

9.5.3 An apron management service shall be provided with radiotelephony communications facilities.

9.5.4 Where low visibility procedures are in effect, persons and vehicles operating on an apron shall be restricted to the essential minimum.

Note: Guidance on related special procedures is given in the CARC Guidance Material Surface Movement Guidance and Control Systems 34/SMGCS.

9.5.5 An emergency vehicle responding to an emergency shall be given priority over all other surface movement traffic.

9.5.6 A vehicle operating on an apron shall:

- a) give way to an emergency vehicle; an aircraft taxiing, about to taxi, or being pushed or towed; and
- b) give way to other vehicles in accordance with local regulations.

9.5.7 An aircraft stand shall be visually monitored to ensure that the recommended clearance distances are provided to an aircraft using the stand.

9.6 GROUND SERVICING OF AIRCRAFT

9.6.1 Fire extinguishing equipment suitable for at least initial intervention in the event of a fuel fire and personnel trained in its use shall be readily available during the ground servicing of an aircraft, and there shall be a means of quickly summoning the rescue and fire fighting service in the event of a fire or major fuel spill.

9.6.2 When aircraft re-fuelling operations take place while passengers are embarking, on board or disembarking, ground equipment shall be positioned so as to allow:

- a) the use of a sufficient number of exits for expeditious evacuation; and
- b) a ready escape route from each of the exits to be used in an emergency.

9.7 AERODROME VEHICLE OPERATIONS

Note 1: Guidance on aerodrome vehicle operations is contained in Attachment A, Section 19, and on traffic rules and regulations for vehicles in the CARC Guidance Material Surface Movement Guidance and Control Systems 34/SMGCS.

Note 2: It is intended that roads located on the movement area be restricted to the exclusive use of aerodrome personnel and other authorized persons, and that

access to the public buildings by an unauthorized person will not require use of such roads.

9.7.1 A vehicle shall be operated:

- a) on a maneuvering area only as authorized by the aerodrome control tower;
- b) on an apron only as authorized by the designated authority.

9.7.2 The driver of a vehicle on the movement area shall comply with all mandatory instructions conveyed by markings and signs unless otherwise authorized by:

- a) the aerodrome control tower when on the maneuvering area; or
- b) the designated authority when on the apron.

9.7.3 The driver of a vehicle on the movement area shall comply with all mandatory instructions conveyed by lights.

9.7.4 The driver of a vehicle on the movement area shall be appropriately trained for the tasks to be performed and shall comply with the instructions issued by:

- a) the aerodrome control tower, when on the maneuvering area; and
- b) the designated authority, when on the apron.

9.7.5 The driver of a radio-equipped vehicle shall establish satisfactory two-way radio communication with the aerodrome control tower before entering the maneuvering area and with the appropriate designated authority before entering the apron. The driver shall maintain a continuous listening watch on the assigned frequency when on the movement area.

9.8 SURFACE MOVEMENT GUIDANCE AND CONTROL SYSTEMS

Application

9.8.1 A surface movement guidance and control system shall be provided at an aerodrome.

Note: Guidance on surface movement guidance and control systems is contained in the CARC Guidance Material Surface Movement Guidance and Control Systems 34/SMGCS.

Characteristics

9.8.2 The design of a surface movement guidance and control system shall take into account:

- a) the density of air traffic;
- b) the visibility conditions under which operations are intended;
- c) the need for pilot orientation;
- d) the complexity of the aerodrome layout; and
- e) movements of vehicles.

9.8.3 The visual aid components of a surface movement guidance and control system, i.e. markings, lights and signs shall be designed to conform with the relevant specifications in Chapter 5 Sections 5.2, 5.3 and 5.4, respectively.

9.8.4 A surface movement guidance and control system shall be designed to assist in the prevention of inadvertent incursions of aircraft and vehicles onto an active runway.

9.8.5 The system shall be designed to assist in the prevention of collisions between aircraft, and between aircraft and vehicles or objects, on any part of the movement area.

Note: Guidance on control of stop bars through induction loops and on a visual taxiing guidance and control system is contained in the CARC Guidance Material Visual Aids for Navigation 34/VIFN.

9.8.6 Where a surface movement guidance and control system is provided by selective switching of stop bars and taxiway center line lights, the following requirements shall be met:

- a) taxiway routes which are indicated by illuminated taxiway center line lights shall be capable of being terminated by an illuminated stop bar;
- b) the control circuits shall be so arranged that when a stop bar located ahead of an aircraft is illuminated, the appropriate section of taxiway center line lights beyond it is suppressed; and
- c) the taxiway center line lights are activated ahead of an aircraft when the stop bar is suppressed.

Note 1: Refer to Sections Chapter 5 paragraph 5.3.17 and 5.3.20 for specifications on taxiway center line lights and stop bars, respectively.

Note 2: Guidance on installation of stop bars and taxiway center line lights in surface movement guidance and control systems is given in the CARC Guidance Material Visual Aids for Navigation 34/VIFN.

9.8.7 Surface movement radar for the maneuvering area shall be provided at an aerodrome intended for use in runway visual range conditions less than a value of 350 m.

9.8.8 Surface movement radar for the maneuvering area shall be provided at an aerodrome other than that in 9.8.7 when traffic density and operating conditions are such that regularity of traffic flow cannot be maintained by alternative procedures and facilities.

Note: Guidance on the use of surface movement radar is given in the CARC Guidance Material Surface Movement Guidance and Control Systems 34/SMGCS.

9.9 SITING OF EQUIPMENT AND INSTALLATIONS ON OPERATIONAL AREAS

Note 1: Requirements for obstacle limitation surfaces are specified in Chapter 4 Section 4.2.

Note 2: The design of light fixtures and their supporting structures, light units of visual approach slope indicators, signs, and markers, is specified in chapter 5, paragraph 5.3.1, 5.3.5, 5.4.1 and 5.5.1, respectively. Guidance on the frangible design of visual and non-visual aids for navigation is given in the CARC Guidance Material Frangibility 34/FRNG.

9.9.1 Unless its function requires it to be there for air navigation purposes, no equipment or installation shall be:

- a) on a runway strip, a runway end safety area, a taxiway strip or within the distances specified in Table 3-1, column 11, if it would endanger an aircraft; or
- b) on a clearway if it would endanger an aircraft in the air.

9.9.2 Any equipment or installation required for air navigation purposes which must be located:

- a) on that portion of a runway strip within:
 - 1) 75 m of the runway center line where the code number is 3 or 4; or
 - 2) 45 m of the runway center line where the code number is 1 or 2; or
- b) on a runway end safety area, a taxiway strip or within the distances specified in Table 3-1; or
- c) on a clearway and which would endanger an aircraft in the air;

shall be frangible and mounted as low as possible.

9.9.3 Any equipment or installation required for air navigation or for aircraft safety purposes which must be located on the non-graded portion of a runway strip shall be regarded as an obstacle and shall be frangible and mounted as low as possible.

Note: Guidance on the siting of navigation aids is contained in the CARC Guidance Material Frangibility 34/FRNG.

9.9.4 Unless its function requires it to be there for air navigation or for aircraft safety purposes, no equipment or installation shall be located within 240 m from the end of the strip and within:

- a) 60 m of the extended center line where the code number is 3 or 4; or
- b) 45 m of the extended center line where the code number is 1 or 2;

of a precision approach runway category I, II or III.

9.9.5 Any equipment or installation required for air navigation or for aircraft safety purposes which must be located on or near a strip of a precision approach runway category I, II or III and which:

- a) is situated on that portion of the strip within 77.5 m of the runway center line where the code number is 4 and the code letter is F; or
- b) is situated within 240 m from the end of the strip and within:
 - 1) 60 m of the extended runway center line where the code number is 3 or 4; or
 - 2) 45 m of the extended runway center line where the code number is 1 or 2; or
- c) penetrates the inner approach surface, the inner transitional surface or the balked landing surface;

shall be frangible and mounted as low as possible.

9.9.6 Any equipment or installation required for air navigation purposes which is an obstacle of operational significance in accordance with Chapter 4 paragraph 4.2.4, 4.2.11, 4.2.20 or 4.2.27 shall be frangible and mounted as low as possible.

9.10 FENCING

Application

9.10.1 A fence shall be provided on an aerodrome to prevent the entrance to the movement area of animals large enough to be a hazard to aircraft.

9.10.2 A fence shall be provided on an aerodrome to deter the inadvertent or premeditated access of unauthorized persons onto a non-public area of the aerodrome.

Note 1: This is intended to include the barring of sewers, ducts, tunnels, etc., where necessary to prevent access.

Note 2: Special measures may be required to prevent the access of an unauthorized person to runways or taxiways which overpass public roads.

9.10.3 Suitable means of protection shall be provided to deter the inadvertent or premeditated access of unauthorized persons into ground installations and facilities essential for the safety of civil aviation located off the aerodrome.

Location

9.10.4 The fence shall be located so as to separate the movement area and other facilities or zones on the aerodrome vital to the safe operation of aircraft from areas open to public access.

9.10.5 When greater security is thought necessary, a cleared area shall be provided on both sides of the fence to facilitate the work of patrols and to make trespassing more difficult. Consideration shall be given to the provision of a perimeter road inside the aerodrome fencing for the use of both maintenance personnel and security patrols.

9.11 SECURITY LIGHTING

At an aerodrome where it has been found necessary to satisfy security requirements, and upon the request of concerned authorities, a fence provided for the protection of international civil aviation and its facilities shall be illuminated at a minimum essential level. Consideration shall be given to locating lights so that the ground area on both sides of the fence, particularly at access points, is illuminated.

9.12 AUTONOMOUS RUNWAY INCURSION WARNING SYSTEM

Note 1: The inclusion of detailed specification for an ARIWS in this section is not intended to imply that an ARIWS has to be provided at an aerodrome.

Note 2: The implementation of an ARIWS is a complex issue deserving careful consideration by aerodrome operators, air traffic services, States and in coordination with the aircraft operators.

Note 3: Attachment A, Section 21, provides a description of an autonomous runway incursion warning system (ARIWS) and information on its use.

Characteristics

9.12.1 Where an ARIWS is installed at an aerodrome:

- a) it shall provide autonomous detection of a potential incursion or of the occupancy of an active runway and a direct warning to a flight crew or vehicle operator;
- b) it shall function and be controlled independently of any other visual system on the aerodrome;
- c) its visual aid components, i.e. lights, shall be designed to conform with the relevant specifications in Chapter 5 section 5.3; and
- d) failure of part or all of it shall not interfere with normal aerodrome operations. To this end, provision shall be made to allow the ATC unit to partially or entirely shut down the system

Note 1: An ARIWS may be installed in conjunction with enhanced taxiway centre line markings, stop bars or runway guard lights.

Note 2: It is intended that the system(s) be operational under all weather conditions, including low visibility.

Note 3: An ARIWS may share common sensory components of an SMGCS or A-SMGCS, however, it operates independently of either system

9.12.2 Where an ARIWS is installed at an aerodrome, information on its characteristics and status shall be provided to the appropriate aeronautical information services for promulgation in the AIP with the description of the aerodrome surface movement guidance and control system and markings as specified in Annex 15.