CAR PART XI

ON AERODROME EMERGENCY SERVICES, FACILITIES AND EQUIPMENT

(CORRECTED)

FOREWORD

1. This issue of the Regulation shall enter into force immediately once published.

2. With the exception of Temporary revisions which have been merged with this issue, new amended and corrected or added text will be marked through a revision bar on the left side of the paragraph.

3. This is the final rule, Issue 03 Revision 00 of CAR PART XI - ON AERODROME EMERGENCY SERVICES, FACILITIES AND EQUIPMENT; and it is based on NPA 23-2014.

4. Acceptable Mean of Compliance (AMC): The AMC serves as a means by which the GCAA Civil Aviation Regulations can be met. However, regulated entities may decide to demonstrate compliance with the requirements using other means by proposing alternative means of compliance acceptable to the GCAA.

5. Guidance Material (GM): is non-binding explanatory and interpretation material on how to achieve the requirements of the CARs and the AMCs. It contains information, including examples, to assist the user in the interpretation and application of the GCAA Regulation, and the AMCs.

AMENDMENTS HISTORY

Amendment	Subject(s)
Initial Issue 01 June 2009	Introduction of Civil Aviation Regulations Part IX, Subpart 2 – Fire, Rescue & Emergency Planning based upon ICAO Annex 14.
Re-issue 01 August 2010	Reissue as separate Car Part XI with the following minor changes to paragraphs: 1.6 (CAR Part 9 Appendix 2 Particulars to be included in Aerodrome Manual 2.5 RFFS Aerodrome Manual Requirements. 1.7 Addition of “rescue equipment” 6.6 Addition of “shall” 6.13 Addition of requirement for Vehicle specification to be forwarded to ANA section. 7.1 Addition of “should” 10.4 Addition of “than”
Issue 02 January 2015	Section 3: Extinguishing Agents Section 4: Storage of Extinguishing Agents Section 5: Training Foams Section 10: Response Time Section 28 Emergency Exercises.

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1. PRINCIPAL OBJECTIVE

1.1 The principal objective of a Rescue and Fire Fighting Service (RFFS) is to save lives. For this reason, the provision of means of dealing with an aircraft accident or incident occurring at, or in the immediate vicinity of an aerodrome, assumes primary importance. It is within this area that there are the greatest opportunities of saving lives. The RFFS must assume at all times the possibility of, and need for, extinguishing a fire which may occur either immediately following an aircraft accident or incident, or at any time during rescue operations.

1.2 The most important factors bearing on effective rescue in a survivable aircraft accident are:

a) The training received;

b) The effectiveness of the equipment;

c) The speed with which personnel and equipment designated for rescue and fire fighting purposes can be put into use.

1.3 Rescue and fire fighting equipment and services shall be provided at all certificated aerodromes.

Aircraft Rescue: - is defined as actions taken to save or set free persons involved in an aircraft accident/incident by safeguarding the integrity of the aircraft fuselage from an external / internal fire. To support self-evacuation, and to undertake the removal of injured and trapped persons.

1.4 The scale and standards of Rescue and Fire Fighting Service to be provided at certificated aerodromes in the United Arab Emirates accords with the International Civil Aviation Organization (ICAO) Standards and Recommended Practices (SARPs).

Requirements to deal with building fires and fires involving fuel installations, or recommendations for the foaming of runways are not taken into account within this section. The quantities of extinguishing agents and numbers of personnel required for certification of the aerodrome are not designed to deal with such eventualities. However, where an aerodrome chooses to deploy RFFS resources to any such incidents, this shall not impact on the response objective and minimum discharge rates specified below.

1.5 Policies and procedures relating to the provision and management of the RFFS shall be formulated and described in the Aerodrome Manual. (CAR Part 9 Appendix 2 Particulars to be included in Aerodrome Manual 2.5 RFFS Aerodrome Manual Requirements.

1.6 Information concerning the scale of protection and rescue equipment provided by aerodromes shall be made available in the UAE Aeronautical Information Publication (AIP)

2. LEVEL OF PROTECTION TO BE PROVIDED (RFFS CATEGORY)

2.1 The level of protection provided shall be based upon the aerodrome category.

2.2 The aerodrome category shall be determined from Table 1, and shall be based on the longest aeroplanes normally using the aerodrome and their maximum fuselage width.

2.3 If, after selecting the category appropriate to the longest aeroplane's overall length, that aeroplane's fuselage width is greater than the maximum width in column 3, Table 1 below, for that category, then the category for that aeroplane shall actually be one category higher.

2.4 During anticipated periods of reduced activity, the level of protection available shall be no less than that needed for the highest category of aeroplane planned to use the aerodrome during that time irrespective of the number of movements.

2.5 Changes in the level of protection normally available at an aerodrome for rescue and fire fighting shall be notified to the appropriate air traffic services units and aeronautical information units to enable those units to provide the necessary information to arriving and departing aircraft. Notification should be by radio and NOTAM.

2.6 The RFFS Inspector, ANS Regulation section of the GCAA Department of Security and Infrastructure shall also be advised at all times.

2.7 Aerodromes should consider developing contingency plans to limit the need for changes to the promulgated level of services. This may involve, for example, a preventative maintenance plan to ensure the mechanical efficiency of equipment and vehicles and arrangements to cover unplanned leave and absence of its minimum level of RFF personnel. The provision of reserve facilities to limit the need for temporary depletion should be considered.

2.8 Table 1: Aerodrome Category for Rescue and Fire Fighting

Aerodrome RFFS Category	Aircraft Overall Length	Maximum Fuselage Width
1	0 up to but not including 9m	2m
2	9m up to but not including 12m	2m
3	12m up to but not including 18m	3m
4	18m up to but not including 24m	4m
5	24m up to but not including 28m	4m
6	28m up to but not including 39m	5m
7	39m up to but not including 49m	5m
8	49m up to but not including 61m	7m
9	61m up to but not including 76m	7m
10	76m up to but not including 90m	8m

3. EXTINGUISHING AGENTS

3.1 The objective of an extinguishing agent is to extinguish/suppress a fire on which it is applied. Principal agents are provided for permanent control, i.e. for a period of several minutes or longer. Complementary agents may provide rapid-fire suppression but generally only offer a transient control which is available during application.

3.2 The quantities of water shown in Table 2, column 2 are based on the average overall length of aeroplanes in a given category. Where operations of an aeroplane larger than the average size are expected, the quantities of water would need to be recalculated. See the Airport Services Manual Part 1 for additional guidance.

3.3 Table 2: Minimum usable amounts of extinguishing agents

Aerodrome Category	Water (Litres)	Foam Concent-rate (Litres)	Discharge Rate Foam Solution (Litres/Minute)	Complementary Agent Dry Chemical Powder (kg)	Minimum Number of AES Vehicles
1	230	28*	230	45	1
2	670	82*	550	90	1
3	1200	144*	900	135	1
4	2400	288*	1800	135	1
5	5400	648*	3000	180	1
6	7900	948*	4000	225	2
7	12100	1452*	5300	225	2
8	18200	2184*	7200	450	3
9	24300	2916*	9000	450	3
10	32300	3876*	11200	450	4

* Foam meeting performance Level B

3.4 Approximate values for the production of two loads of foam solution. These quantities are based on the use of foam concentrates designed for use at 6% solution strength. Foam concentrates which may be used at other solution strengths are available. For example, 3% concentrates are ‘stronger’ than 6% concentrates. In certain instances operational advantages may be offered by using 3% concentrates.

3.5 The ICAO Critical Area Concept is not intended to ensure extinguishment of the entire fire; it seeks to control only the area of fire adjacent to the fuselage. The objective is to safeguard the integrity of the fuselage and maintain tolerable conditions for its occupants

3.6 Both principal and complementary agents shall be provided at all aerodromes.

3.7 Principal Extinguishing Agent

3.7.1 Both principal and Complementary agents shall normally be provided at an aerodrome.

3.7.2 The principal extinguishing agent shall be:

a) A foam meeting the minimum performance level B; or

b) A foam meeting the minimum performance level C; or

c) A combination of these agents.

GM to 3.7.2:

The objective of an extinguishing Agent is to extinguish/suppress a fire on which it is applied. Principal agents are provided for permanent control, i.e. for a period of several minutes or longer. Complementary agents may provide rapid-fire suppression but generally only offer a transient control which is available during application. Additional guidance is given in the ICAO Airport Services Manual (Doc 9137), Part 1.

3.7.3 At aerodromes where operations by aeroplanes larger than the average size in a given category are planned, the quantities of water shall be recalculated and the amount of water for foam production and the discharge rates for foam solution shall be increased accordingly.

3.7.4 The quantity of foam concentrate separately provided on vehicles for foam production shall be in proportion to the quantity of water provided, and the foam concentrate selected.

3.7.5 Minimum Usable Amounts of Extinguishing Agents are stated Table 2.1 and Table 2.2.

Table 2.1: Minimum usable amounts of extinguishing agents. *Foam meeting performance level B

Aerodrome Category	Water (Litres)	Foam Concentrate (Litres)	Discharge Rate Foam Solution (Litres/Minute)	Minimum Number of AES Vehicles
1	230	28*	230	1
2	670	82*	550	1
3	1200	144*	900	1
4	2400	288*	1800	1
5	5400	648*	3000	1
6	7900	948*	4000	2
7	12100	1452*	5300	2
8	18200	2184*	7200	3
9	24300	2916*	9000	3
10	32300	3876*	11200	4

GM1 to 3.7.5 Table 2.1

(*Foam meeting performance level B). Approximate values for the production of two loads of foam solution. These quantities are based on the use of foam concentrate designed for use at 6% solution strength.

Table 2.2: Minimum usable amounts of extinguishing agents. *Foam meeting performance level C.

Aerodrome Category	Water (Litres)	Foam Concentrate (Litres)	Discharge Rate Foam Solution (Litres/Minute)	Minimum Number of AES Vehicles
1	160	9.6*	160	1
2	460	27.6*	360	1
3	820	49.2*	630	1
4	1700	102*	1100	1
5	3900	234*	2200	1
6	5800	348*	2900	2
7	8800	528*	3800	2
8	12800	768*	5100	3
9	17100	1026*	6300	3
10	22800	1368*	7900	4

GM2 to 3.7.5 Table 2.2:

(*Foam meeting performance level C). Approximate values for the production of two loads of foam solution. These quantise are based on the use of foam concentrate designed for use at 3% concentrates.

GM3 to 3.7.5:

Foam concentrates which may be used at other solution strengths are available. For example, 3% concentrates are 'stronger' than 6% concentrates. In certain instances operational advantages may be offered by using 3% concentrates.

3.7.6 The required quantities of extinguishing agents shall be available for immediate discharge from AES vehicles and shall be in accordance with the aerodrome category, determined by Table 2.1 and Table 2.2.

3.7.7 The discharge rate of foam solution shall not be less than the rates defined in Table 2.1 and Table 2.2.

GM to 3.7.7:

Where different types of extinguishing agents are used on an aerodrome, care must be taken to ensure that incompatible types are kept apart, and stored in accordance with manufacturer's guidance.

3.7.8 Evidence of certification of the foam meeting performance level B and / or level C shall be obtained from the supplier and shall be retained by the AES.

3.7.9 The amount of foam concentrate provided on a vehicle should be sufficient to produce at least two loads of foam solution.

3.7.10 Vehicle foam tanks and water tank shall be kept full at all times when the vehicle is in operational service because partially filled tanks will create stability problems when the vehicle is cornering at speed.

GM to 3.7.10:

The mixing of different types of foam concentrate may lead to serious sludging and possible malfunction of vehicle foam production systems. If it is necessary to change the concentrate type carried on an appliance. It is vital that the manufacturers of the concentrate and the vehicle are consulted for guidance, to ensure that all parts of the foam production system are thoroughly cleaned prior to the new concentrate being used. This is vital to prevent any damage to foam systems or detrimental foam performance caused by the inadvertent mixing of incompatible foam concentrate types.

3.8 Complementary Extinguishing Agent

3.8.1 The complementary extinguishing agent shall be a dry chemical powder suitable for extinguishing hydrocarbon fires.

3.8.2 The minimum quantities of Dry Powder for each category are detailed in Table 2.3.

Table 2.3: Complementary Agent

Aerodrome category	Dry chemical powders (kg)	Discharge Rate (kg/second)
1	45	2.25
2	90	2.25
3	135	2.25
4	135	2.25
5	180	2.25
6	225	2.25
7	225	2.25
8	450	4.5
9	450	4.5
10	450	4.5

3.8.3 The discharge rate of the dry powder should be no less than values show in Table 2.3.

GM to 3.8.3:

Alternate complementary agents having equivalent firefighting capability may be utilized. Additional information on extinguishing agents is given in the ICAO Airport Services Manual (doc 9137) Part 1.

3.8.4 The complementary agents should comply with the appropriate specifications of the International Organization for Standardisation (ISO).

AMC to 3.8.4:

Where an additional quantity of dry powder is provided in hand held extinguishers the minimum capacity will be 9 kg. It will not be necessary to comply with the discharge rate of Table 2.3.

GM to 3.8.4:

Where different types of extinguishing agents are used on the aerodrome, care must be taken to ensure that incompatible types are kept apart and care is exercised when these have to be used simultaneously against fires (e.g. powders and foams).

3.9 Foam Production Systems

3.9.1 Foam generating systems shall be formally tested on acceptance and annually for induction accuracy, expansion ratio and drainage time.

3.9.2 All vehicles equipped with foam-making equipment should be tested at least 6 monthly to ensure that the quality of foam production is maintained. The quality of foam produced by a rescue and firefighting vehicles using any foam concentrate, will significantly affect the control and extinguishment times of an aircraft fire.

AMC1 to 3.9.2: Induction Accuracy:

For systems designed to induce at 6%, induction should be in the range 5% to 7% at the optimum working conditions. For systems designed to induce at 3%, the range is 3% to 4% and for 1% systems, the range is 1% to 1.1%. Pre-mixed foam systems should have foam concentrate introduced to within a tolerance of 0.9 to 1.1 times the manufacturer's desired induction rate.

AMC2 to 3.9.2: Expansion Ratio

The amount of air entrained into a foam stream governs its expansion, which in turn may affect the fluidity of the finished foam and therefore the rate of spread over the surface of burning fuels. The expansion of a representative sample of the foam blanket produced in operational operating conditions determined should be no less than 6:1, a value between 8:1 and 12:1 being preferred.

AMC3 to 3.9.2 Drainage Time:

The rate at which foam solution drains from a foam blanket may be a partial consideration in that foam blanket's efficiency in progressively controlling and extinguishing fires and subsequent post-fire security. A 25% drainage time of more than 5 minutes is preferred. However, the time taken for the drainage of 25% of the foam solution from a representative sample of the foam blanket produced in operational operating conditions shall be the greater

of at least 3 minutes, or no less than 90% of the ideal figures agreed and quoted by the foam and equipment manufacturers concerned.

GM1 to 3.9.2:

Amongst other factors, the use of foam branch pipes capable of producing aspirated foam of good consistency will be beneficial in prolonging foam drainage times.

GM2 to 3.9.2:

For this reason the use of any so-called 'non aspirated' foam branch pipes should be quickly supplemented by using 'aspirating' foam branch attachments or additional branch pipes traditionally referred to as 'aspirating' types.

GM3 to 3.9.2:

Certain combinations of types of foam concentrate and branch pipes may be found to perform differently to others. Care should be taken during the selection process to ensure that the optimum combination of foam and equipment is chosen.

3.10 Reserve Supply of Agents

3.10.1 A reserve supply of foam concentrate and complementary agent equivalent to 200 percent (%) of the quantities of these agents to be provided in the AES vehicles shall be maintained on the aerodrome for vehicle replenishment purposes.

AMC to 3.10.1:

Foam Concentrate carried on AES vehicles in excess of the quantities in Table 2.1 and Table 2.2 can contribute to the reserve.

GM to 3.10.1:

In considering reserve supplies of foam, consideration shall also be taken on the percentage of the solution strength. Where a major delay in the replenishment of this supply is anticipated, the amount of supply should be increased.

3.10.2 Sufficient propellant gas should be included to utilise the reserve supply of complementary agents.

4. STORAGE OF EXTINGUISHING AGENTS

4.1 Reserve of agents shall be stored in locations close to the fire station (airside) to facilitate rapid replenishment of vehicles.

4.2 Extinguishing agent quantities designated as reserve shall be held in an appropriate manner, which easily allows vehicles to be replenished promptly.

GM1 to 4.2:

Any stocks of fire extinguishing agents, such as foam concentrates held in bulk tanks or drums, where the seal has been broken should be assessed for continued satisfactory performance. Such assessment shall be made by taking samples from each batch and having these analysed at regular intervals by a competent person. By way of guidance, the measurement of those physical and chemical properties determined as being important during the selection phase using methods outlined in ICAO national standards will be appropriate.

GM2 to 4.2:

The conditions of storage are frequently specified by manufacturers or suppliers, but in general terms the aim should be:

a) Foam Concentrates:
   i. Avoid extremes of temperature
   ii. Use stocks in order of receipt
   iii. Keep concentrate in manufacturers' containers until required for use
   iv. Replace and seal the caps of any partly used containers

b) Dry Chemical Powders:
   i. Avoid damp location.
   ii. Use stocks in order of receipt
   iii. Replace and seal the caps of any partly used containers

GM3 to 4.2:

Any stocks of fire extinguishing agents, such as foam concentrates held in bulk tanks or drums, where the seal has been broken should be assessed for continued satisfactory performance. Such assessment shall be made by taking samples from each batch and having these analysed at regular intervals by a competent person. By way of guidance, the measurement of those physical and chemical properties determined as being important during the selection phase using methods outlined in ICAO national standards will be appropriate.

GM4 to 4.2:

For extinguishing agents that have a certificate of conformity, and have remained sealed and stored according to manufacturer's guidance, a test to assess condition is not required within their shelf life unless the manufacturer's guidance recommends it.

GM5 to 4.2:

Material Safety Data Sheets should be used to determine the best practice with respect to hazards, use, storage and disposal of extinguishing agents. These are to be displayed in the storage area for ease of reference.

5. TRAINING FOAMS

5.1 Care shall be taken to prevent confusion between the storage and use of training foams with their operational counterparts. Where the manufacturer can demonstrate that the training foam produces identical test results to those expected to be obtained by the operational firefighting foam, it may be used to conduct the Foam Production Performance and In Service tests.

GM to 5.1:

Training foams do not comply with any recognized international standards, however they will be quality assured by the manufacturer. They will be formulated to imitate the operational foams, for induction, drainage and expansion properties. However, their firefighting properties may be reduced. Personnel shall understand this feature of training foams before they are used.

6. RESCUE & FIRE-FIGHTING APPLIANCES

6.1 The minimum number of rescue and fire fighting appliances provided at an aerodrome should be in accordance with Table 2.

All appliances shall be appropriately insured for deployment to an off-aerodrome incident.

6.2 The extinguishing agents and rescue equipment shall be carried on self-propelled appliances.

6.3 Appliances shall be capable of carrying their full load with maximum traction and mobility on surfaces in optimum weather conditions. They should be able to operate over all types of terrain on or around the aerodrome, at a speed commensurate with safety.

6.4 Appliances should be fitted with a monitor capable of a range appropriate to the largest of aircraft operating at the aerodrome, and be measured using aspirated foam.

6.5 All appliances fitted with monitors are required to produce foam on the move at slow speed at optimum monitor operating pressure.

6.6 Stationary discharge tests shall be conducted to establish the firefighting foam discharge patterns produced and the maximum range attainable by the monitor nozzle. The test shall be conducted under wind conditions of 8 km/h or less. To determine maximum discharge range, the monitor shall be tilted upward to form a 30-degree angle with the horizontal.

6.7 Foam shall be discharged onto a paved surface at the specified pressure, in both the straight stream and fully dispersed nozzle settings. For purposes of defining the edge of the pattern, any foam less than 12.7 mm in depth shall be disregarded. The distance from the monitor to the end of the effective foam pattern shall be measured.

6.8 All rescue and fire fighting appliances shall be provided with searchlights or floodlights to illuminate the scene of an aircraft accident at night

6.9 The option to fit a bumper monitor/turret, and under appliance protection is permitted, if these are of a non-aspirating type, consideration shall be given to integrity of the foam blanket.

6.10 Many appliances are capable of operation at full capacity with one operator. On an appliance which is capable of producing foam or other extinguishing agent through a monitor, the role of monitor shall not be performed by the driver of that appliance other than when sidelines from that appliance are in operation.

6.11 Where larger crews are provided and it is a matter for local decision as to an appropriate crewing level, in all cases the crew compartment must provide for the safe conveyance of the crew to an aircraft accident with sufficient space to facilitate the donning of elements of protective clothing. The storage of loose fire/rescue equipment within the crew compartment shall be discouraged. All equipment in the crew compartment shall be correctly and securely stowed.

6.12 A system of preventive maintenance of rescue and fire fighting appliances shall be employed to ensure effectiveness of the equipment and compliance with the specified response time throughout the life of the appliances.

6.13 Regular inspections shall be conducted on all appliances including every aspect of their structure, systems and operational functions.

6.14 Aerodromes should consider the provision of reserve appliances to maintain the appropriate level of services when any of the regular appliances are temporarily unavailable due to maintenance requirements or becoming unserviceable. Reserve appliances shall be able to meet the operational objective and operating specification/performance required in respect of the level of service provided.

6.15 Procurement and Assessment.

With the introduction of new technology and advances in the design of fire appliances and fire-fighting equipment, in the procurement of all appliances and equipment the aerodrome shall undertake a full and detailed assessment of the operational requirements of the selected item.

Procurement shall be based on a formal specification process that provides a phased approach and considers the preliminary, preparation of specification, and additional contractual considerations. New appliances or equipment shall not be declared operational until all the duty crew have been trained and assessed as competent in its function and operation.

Note: Guidance on minimum characteristics of RFFS appliances is given in the Airport Services Manual Part 1 and also gives guidance on the procurement of RFFS appliances.

7. FOAM PRODUCTION SYSTEMS

7.1 All appliances equipped with foam-making equipment should be tested at least 6 monthly to ensure that the quality of foam production is maintained. The quality of foam produced by a rescue and fire fighting appliance using any foam concentrate, will significantly affect the control and extinguishment times of an aircraft fire.

7.2 Foam generating systems shall be formally tested on acceptance and annually for induction accuracy, expansion ratio and drainage time.

Induction Accuracy

For systems designed to induce at 6%, induction should be in the range 5% to 7% at the optimum working conditions. For systems designed to induce at 3%, the range is 3% to 4% and for 1% systems, the range is 1% to 1.1%. Pre-mixed foam systems should have foam concentrate introduced to within a tolerance of 0.9 to 1.1 times the manufacturer's desired induction rate.

Expansion Ratio

The amount of air entrained into a foam stream governs its expansion, which in turn may affect the fluidity of the finished foam and therefore the rate of spread over the surface of burning fuels. The expansion of a representative sample of the foam blanket produced in operational operating conditions determined should be no less than 6:1, a value between 8:1 and 12:1 being preferred.

Drainage Time

Drainage time: The rate at which foam solution drains from a foam blanket may be a partial consideration in that foam blanket's efficiency in progressively controlling and extinguishing fires and subsequent post-fire security. A 25% drainage time of more than 5 minutes is preferred. However, the time taken for the drainage of 25% of the foam solution from a representative sample of the foam blanket produced in operational operating conditions shall be the greater of at least 3 minutes, or no less than 90% of the ideal figures agreed and quoted by the foam and equipment manufacturers concerned.

Amongst other factors, the use of foam branchpipes capable of producing aspirated foam of good consistency will be beneficial in prolonging foam drainage times.

For this reason the use of any so-called 'non aspirated' foam branchpipes should be quickly supplemented by using 'aspirating' foam branch attachments or additional branchpipes traditionally referred to as 'aspirating' types.

Certain combinations of types of foam concentrate and branchpipes may be found to perform differently to others. Care should be taken during the selection process to ensure that the optimum combination of foam and equipment is chosen.

Note: Further guidance can be found in the ICAO Airport Services Manual, Part 1 (Document 9137-AN/898; Part 1).

8. RESCUE & FIRE-FIGHTING EQUIPMENT

8.1 An aircraft accident will result in a need for rescue and medical equipment at some stage. Aerodromes shall consider the provision of specific resources and rescue equipment commensurate with the level of aircraft operations at the aerodrome.

8.2 Rescue equipment commensurate with the level of aircraft operations shall be provided on the rescue and fire fighting appliance/s.

8.3 With the introduction of new technology and advances in the design of rescue & fire-fighting equipment, the aerodrome, in the procurement of all equipment, shall undertake a full and detailed assessment of the operational requirements of the selected item. New equipment shall not be placed operationally until all of the duty crew have been trained and assessed as competent in its function and operation.

8.4 A thorough knowledge of all equipment carried is essential in order to ensure intelligent handling. All rescue and fire-fighting equipment shall be regularly tested and inspected. A defined process in regards to competency levels, carrying out test, inspections, recording, reporting and tracking of all tests, inspections and defects shall be established. The procedure should include a level of supervisory oversight and actions to be taken when defective equipment remains outstanding for prolong periods.

8.5 The results of actual tests and inspection shall be fully recorded, any decay in operational performance needs to be identified, monitored and actions taken with immediate effect. Records of all equipment tests and inspection shall be maintained and retained, for the operational life of the equipment, for auditing purposes.

8.6 In addition to the above, suitable rescue equipment and services should be available at aerodromes where the area to be covered by the service includes sand, water, or other difficult environments, that cannot be fully served by conventional wheeled appliances. This is particularly important where a significant portion of approach departure operations takes place over these types of areas. The purpose of these special vehicles is to rescue aircraft occupants at an aircraft accident that may occur in this area.

Note: Guidance on the nature of rescue equipment and quantities to be provided at aerodromes can be found in the ICAO Airport Services Manual, Part 1 (Document 9137-AN/898; Part 1.

9. PROTECTIVE CLOTHING & RESPIRATORY EQUIPMENT

9.1 All rescue & fire-fighting personnel shall be provided with protective clothing and respiratory equipment to enable them to perform their duties in an effective manner.

9.2 **Personnel Protective Clothing (PPE**) It is essential that all personnel operating at an aircraft fire shall be provided with protective clothing. The wearer must be able to perform the assigned duties. Protective clothing is distinct from ordinary fire service uniform, and is worn during fire-fighting/rescue activities, including practical training.

Facilities should be provided for the cleaning, drying and storage of PPE when crews are off duty. These facilities should be well ventilated, and secure. The drying of PPE should not be by direct sunlight exposure.

9.3 Respiratory Protective Equipment (Breathing Apparatus (BA))

Fire-Fighters attending an aircraft crash/fire may require Respiratory Protective Equipment (RPE). Fire-fighters required to enter a smoke filled cabin shall be provided with RPE of an approved design for the anticipated hazardous environment. In selecting RPE careful consideration shall be given into the design, function, duration, servicing, and repairs and testing of the equipment.

Further consideration shall be given to the manufactures instructions for use and the need to achieve an adequate facemask seal. Those persons required to enter and work in a toxic atmosphere will need to have a facemask fit assessment carried out to ensure positive pressure within the facemask can be achieved.

A process of command and control of those persons nominated to wear breathing apparatus during training or operational incident shall be formulated and implemented on each occasion.

Fire fighters required to wear BA must maintain the area of the seal free from hair (facial or head). Failure to do so will impair the efficiency of the seal and an avoidable safety hazard to the BA wearer.

9.4 It is essential that a high level of competency in the use of breathing apparatus equipment is achieved and maintained by those fire-fighters nominated to wear breathing apparatus.

Note: GCAA CAAP 45 Breathing Apparatus Operational Guidance

10. RESPONSE TIME

10.1 The operational objective of the rescue and fire-fighting service shall be to achieve a response time of not exceeding two minutes to any point of each operational runway in optimum visibility and surface conditions.

GM1 to 10.1:

Response time is considered to be the time between the initial call to the rescue and fire-fighting service, and the time when the first responding appliance/s is/are in position to apply foam at a rate of at least 50 per cent of the discharge rate specified in Table 2.

GM2 to 10.1:

If a central control facility (Main Watch room) is in operation with multiple fire stations, the response time starts once the central control facility receives the emergency call, not the responding fire station which will be used.

GM3 to 10.1:

Fire access lanes from the fire station directly onto a runway are to be controlled by ATC with the required runway ahead warnings clearly displayed.

10.2 The operational objective of the rescue and fire fighting service should be to achieve a response time not exceeding three minutes to any other part of the movement area, in optimum visibility and surface conditions.

GM1 to 10.2:

Optimum visibility and surface conditions are defined as daytime, good visibility, no precipitation with normal response routes free of aircraft and surface contamination.

GM2 to 10.2:

To meet the operational objective in conditions of less than optimum visibility, it may be necessary to provide guidance for rescue and fire fighting vehicles. This may include:

1. Navigation equipment installed in the vehicle
2. Thermal imaging or other image enhancement,
3. By radio telephone from the air traffic control tower based on surveillance radar,
4. Collision avoidance facility either from equipment installed in the vehicles or provided by surveillance radar from air traffic control.

GM3 to 10.2:

On aerodrome development projects which could affect the response time, objectives are to be fully assessed by the AES. During developments alternative response routes may need to be

assessed, established and clearly promulgated. If response objectives cannot be achieved, AES CFO should assess the possibility of strategically positioning vehicles to achieve response time.

GM4 to 10.2:

Response routes should be assessed, so that access for AES vehicles to the runway and movement area is direct and clear.

10.3 Any vehicles, other than the first responding vehicles(s), required to deliver the amounts of extinguishing agents specified in Table 2 should ensure continuous agent application and should arrive no more than three minutes from the initial call.

10.4 When RFFS personnel designated as part of the minimum level for response operational duty fire crew are engaged on extraneous duties (sweeping, bird control, and surface inspections. etc.) they shall be capable of meeting response times whilst carrying out those duties. No extraneous duty should create conditions likely to affect individual or crew performance or introduce additional hazards.

11. FIRE STATION

11.1 All rescue and fire fighting appliances shall normally be housed in a fire station. Satellite fire stations shall be provided whenever the response time cannot be achieved from a single fire station.

11.2 The fire station shall be located so that the access for rescue and fire fighting appliances into the runway area is direct and clear, requiring a minimum number of turns.

11.3 The placement of the watchroom in each fire station should ensure the widest possible view of the movement area.

11.4 Facilities for the major maintenance of vehicles need not be included provided that these exist elsewhere, on, or in close proximity to, the airport.

11.5 The range and extent of facilities may vary as between those necessary in the main fire station and those appropriate to a satellite station.

Note: Further guidance is contained in ICAO Airport Services Manual, Part 1 (Document 9137-AN/898; Part 1)

12. ALERTING & COMMUNICATIONS SYSTEMS

12.1 Alerting System

12.1.1 An alerting system for rescue and fire-fighting personnel, capable of being operated from that fire station, shall be provided at all fire stations, along with any other fire station at the aerodrome and aerodrome control tower.

12.1.2 Satellite fire stations watchrooms shall be linked to the main watchroom by direct telephone line. The satellite fire station should also be served by a public address system and alarm system operated by the main watchroom. Each Satellite station should also have the ability to activate the alarm and make public address broadcasts within its station.

12.1.3 A discrete communication system shall be provided linking a fire station with the aerodrome control tower, any other fire station on the aerodrome and the rescue and fire fighting appliances.

12.1.4 All telephone and radio equipment within each watchroom shall be regularly tested and contingency arrangements shall exist to overcome service and repair issues. An occurrence log shall be maintained, the preferred format to be decided by the aerodrome.

12.1.5 In many instances the watchroom can become overloaded with alarms, switches, buzzers, coloured lights, radio equipment, public address systems and operational procedural process. Consideration should be given to the workload on the watchroom attendant and their overall competency required. Ongoing competency of watchroom attendants should be maintained at all times with adequate training, supervision and assessment.

12.2 Radio Communications

12.2.1 The provision of effective communications is essential in preparing to deal with an aircraft accident/incident.

12.2.2 When rescue and fire fighting vehicles leave their fire stations and enter the manoeuvring area they come under the direction of air traffic control. These vehicles shall be equipped with two-way radio communications equipment, through which their movements can at all times, be subject to direction by air traffic control. Therefore all fire and rescue vehicles shall be provided with adequate communications equipment.

12.2.3 The radio equipment on rescue and fire fighting vehicles shall accommodate communication between vehicles, en route to, and in operation at, an aircraft accident. Within individual vehicles there should be an intercommunication system, particularly between drivers and monitor-operators, to optimize the deployment of the vehicles at an accident.

12.2.4 The equipment provided on fire vehicles may be in fixed or portable form and shall have an effective range which will ensure reception within all areas that the fire service may be required to operate.

12.2.5 Radio equipment to enable Fire Officers to maintain communications when not in their vehicles shall be provided. The recommended radio call-sign for the duty fire officer -in-charge is “Fire Command”.

12.2.6 Where the deployment of personnel and vehicles for non-fire service duties includes entry to buildings, aircraft or other aerodrome installations, portable communications equipment shall be provided to ensure that capability to respond to aircraft incidents is maintained at all times.

12.2.7 All communication systems for use by the RFFS during an emergency shall be operated on licensed radio frequencies assigned specifically for that use.

12.2.8 All RFFS radio communications shall be recorded and these records retained for 31 days for investigation purposes.

12.2.9 Rescue boats or other specialized vehicles intended for use in water, or other difficult terrain shall also be provided with two-way radio equipment. Special attention should be given to selection of units intended for use in marine applications.

12.2.10 Consideration shall be given in providing communication equipment for use with Breathing Apparatus.

12.2.11 It is important to provide the fire service with the facility to communicate with flight crew members in certain types of incidents, particularly where undercarriage/engine fire situations are involved or aircraft evacuation may be proposed.

12.2.12 At all aerodromes, Radio Communications equipment shall be provided to enable the airport fire officer(s) to communicate with the aircraft flight deck. An aeronautical radio frequency, 121.6 MHz, is to be used for this purpose.

12.2.13 Standard operating procedures shall be formulated and training given in the use of all radio communications equipment.

12.2.14 The likelihood of high noise levels within a fire appliance shall be taken into consideration for the use of radio communications. This may require the use of noise cancelling microphones, headsets or loudspeakers for effective intercommunication.

13. MINIMUM NUMBER OF RFF PERSONNEL

13.1 The Aerodrome shall appoint a competent person to establish and effectively manage all aspects of Rescue and Fire-Fighting Operations.

13.2 Minimum staffing levels for all RFFS Categories operated by an aerodrome shall be agreed with the GCAA and promulgated in the Aerodrome Manual.

13.3 Sufficient competent personnel shall be readily available to respond and operate the RFFS equipment at maximum capacity. These personnel shall be deployed in a way that ensures that response objectives shall be achieved and that continuous agent application at the appropriate rate(s) shall be fully maintained.

When RFFS personnel designated as part of the operational duty fire crew and they are engaged on extraneous duties (Sweeping, Bird Control, and surface Inspections. etc) they shall be capable of meeting response times whilst carrying out those duties. No extraneous duty should create conditions likely to affect individual or crew performance or introduce additional hazards.

13.4 At all aerodromes the minimum number of personnel designated shall be assessed by the Aerodrome. In determining the minimum number of rescue and fire-fighting personnel, a Task Resource Analysis (TRA) shall be conducted and completed for acceptance to the GCAA.

13.5 When conducting this assessment the following shall be taken into account:

The types of aircraft using the aerodrome;

Response times;

Type, design, capacity and discharge rate of appliances to be deployed;

Need for the rescue of aircraft occupants;

Need to operate ladders, breathing apparatus, and rescue equipment;

Availability of water supplies;

The speed and scale of response of any mutual aid agency;

Competency levels of all RFFS staff.

13.6 Consideration shall also be given for personnel to use hand lines, ladders and other rescue and fire fighting equipment normally associated with aircraft rescue and fire fighting operations.

13.7 The agreed minimum staffing level shall not be reduced without an assessment being conducted and forwarded, in writing, to the GCAA for acceptance.

13.8 The minimum level of staffing of the aerodrome RFFS shall include an adequate number of competent supervisors and managers reflecting the appropriate command structure. In assessing the level of personnel proposed, the aerodrome shall take account of the supervisors' and managers' competence in the role(s) and tasks applicable to their position.

Where the available staff displays limited capacity to use initiative, the deficiency must be made good by the provision of additional staff of a superior grade who will be responsible for exercising command and control of their crews. Each operational fire appliance shall have a designated supervisor on board when responding.

13.9 If the GCAA considers that minimum staffing levels provided are inappropriate for the level of aircraft operation or where an assessment is unacceptable to the GCAA, it will assess and set the minimum staffing level based on the criteria set out above. This would include the supervisory grades.

13.10 All aerodromes shall formulate a selection and recruitment process that identifies the ideal candidate to undertaken RFFS duties.

13.11 All rescue and fire fighting personnel shall meet the minimum medical standards as described in Appendix 1 to this Subpart.

The aerodrome shall appoint an appropriate Medical Physician with an occupational qualification to conduct the periodic examination of the firefighters within the guidelines set by the GCAA.

The process for initial fitness assessment of recruit fire-fighters shall be formulated based on operational tasks that the individual would undertake during RFFS training and operations.

An aerodrome shall formulate and apply a process to assess the standard of fitness of all operational fire service personnel. This process should be based on a formal fitness assessment within each 12 month period.

The airport shall provide adequate facilities to ensure the physical fitness of operational fire-fighters can be improved and maintained. Consideration for fitness instructors should be considered to implement and monitor any fitness programme.

13.12 Following the initial medical examination, fitness assessment and issue of a medical certificate, the aerodrome operator shall ensure that individuals renew the medical/fitness certificates. The maximum period of validity of the medical certificate shall be five-yearly intervals for a firefighter aged 40 or below and two-yearly intervals up to the age of 50 and then annually thereafter.

The physical fitness assessment shall be carried out at least once every12 months.

14. TRAINING AND DEVELOPMENT

14.1 During flight operations, sufficient competent personnel shall be detailed and be readily available to ride the rescue and fire fighting appliances. Personnel shall be deployed in a way which ensures that minimum response times can be achieved and that continuous agent application at the appropriate rate can be fully maintained.

14.2 The Aerodrome should appoint a competent person to establish and oversee all training and development programmes

14.3 A training needs analysis shall be conducted to identify the underpinning knowledge, understanding and skills required to carry out the tasks of RFFS personnel in relation to their role i.e. firefighter, crew supervisors, watch managers and senior officers. This analysis will also include an evaluation process which measures the outcomes of the training provided by the aerodrome against published aims and objectives of the training programme to ensure that these are being achieved.

14.4 The aerodrome shall carry out a frequency analysis to determine the interval at which competence in each core element should be assessed. All RFFS personnel employed at aerodromes shall be assessed in skills and knowledge to ensure competencies in role/s and task/s within a maximum period of four years.

14.5 All rescue and fire fighting personnel shall be properly trained to perform their duties in an efficient manner and shall participate in live fire drills commensurate hazards and risks on their aerodrome and type of rescue and fire fighting equipment in use at the aerodrome, including pressure-fed fuel fires, in accordance with Appendix 2.

14.6 Training facilities commensurate with the type and size of aircraft using the aerodrome shall be provided on the aerodrome to ensure operational fire-fighting competency can be maintained.

14.7 All personnel forming part of the operational team shall hold a Certificate of Competence which confirms their possession of the necessary standard of competence as applicable to their task and role.

14.8 All RFFS personnel employed at aerodromes shall commence the process of acquiring competence through a Structured Learning Programme (SLP). Structured Learning Programmes shall be submitted to the GCAA for acceptance.

14.9 On successful completion of the GCAA accepted SLP, a Certificate of Competence endorsed by the GCAA will be issued.

14.10 Competency shall be maintained through an on aerodrome maintenance of competency scheme (MOC) accepted by the GCAA.

Note: Guidance on an acceptable scheme can be found in Appendix 2, paragraph 5.

14.11 In addition to formal training for the purposes of acquiring a Certificate of Competence, it is a requirement that RFFS personnel maintain their knowledge and skills of their operational function.

14.12 An individual shall be able to consistently demonstrate that he is operationally competent to operate an aerodrome's operational fire-fighting & rescue equipment safely and effectively in situations likely to be experienced at an operational aircraft accident/incident, or operational incident likely to be attended while employed at an aerodrome as an operational member of the Rescue & Fire-Fighting Service.

14.13 All fire officers shall be formally selected and understand operational Incident Command. They shall achieve a minimum level of competency required for the role identified by the aerodrome. All officers shall hold a Certificate of Competency for their rank/role.

14.14 Given the criticality of the function and the lack of opportunities for the evaluation of operational competence during attendance at actual incidents involving aircraft, there needs to be a process for the consistent measurement of competence.

14.15 The control of any training regime may be complex and wide-ranging and will depend on local conditions, equipment, roles, ability and experience of participating individuals. Time should be allocated specifically for training and a regular assessment of skills should be conducted.

14.16 A programme for the training of all core and non-core components shall be established. Periodicity will vary according to training needs but should be consistently applied. The criteria used to determine such a training programme should be clearly identified and recorded.

14.17 The overall aim is to ensure that RFFS personnel have sufficient knowledge, skills, technique and experience to carry out their operational functions likely to be encountered during employment at any particular aerodrome safely and effectively. In such a complex and potentially dangerous occupation, the provision of adequate training is critical to the overall success of the RFFS

14.18 Opportunities shall be provided for co-ordination and training where more than one appliance is to be utilised as part of an accident response. Practical training should create or simulate the conditions and situations likely to be experienced.

14.19 All personnel shall be trained and competent in First Aid to a minimum standard detailed in Appendix 2.

14.20 All drivers shall be competent in driving techniques appropriate to emergency response and all-terrain environments. All appliance drivers should be in possession of a relevant driving licence where required by UAE legislation.

14.21 Personnel shall be given regular and comprehensive training in any specialist rescue equipment carried. Particular attention is to be given to operation of marine rescue equipment, vehicles with aerial capability and equipment provided for dealing with hazardous materials including radioactive substances where appropriate.

14.22 Personal training records for all employees shall be retained by the aerodrome for the duration of that person's employment and for a period of five years after employment.

14.23 Records shall contain sufficient information to enable judgments of any individual's training achievements to be made. These may be retained electronically provided they are available to the GCAA's Inspector for examination. See Appendix 2.

14.24 The rescue and fire fighting personnel training programme shall include training in human performance, including team coordination.

Note 1: Guidance to assist the Airport Authority in providing proper training is given in Attachment A, Section 17 of ICAO Annex 14 Vol 1; Airport Services Manual, Part 1; and Training Manual, Part E-2.

Note 2: Fires associated with fuel discharged under very high pressure from a ruptured fuel tank are known as pressure-fed fuel fires.

Note 3: Guidance material to design training programmes on human performance and team coordination can be found in ICAO Circular 216 (Human Factors Digest No. 1 – Fundamental Human Factors Concepts) and Circular 227 Human Factors No. 3 – Training of Operational Personnel in Human Factors.

15. DIFFICULT ENVIRONS, THE 1000 METRE AREA AND ACCESS ROADS

15.1 An assessment of the approach and departure areas within 1000m of the runway threshold should be carried out to determine the options available for rescue. In considering the need for any specialist rescue and access routes, the following should be considered:

Emergency access roads shall be provided on an aerodrome where terrain conditions permit their construction, so as to facilitate achieving minimum response times. Particular attention shall be given to the provision of ready access to approach areas up to 1000 metres from the threshold, or at least within the aerodrome boundary; and

Where a fence is provided, the need for convenient access to outside areas shall be taken into account. In such circumstances, crash gates shall be provided that comply with security provisions; and

All emergency access/exit points will need to be clearly identified. Retro-reflective tape or markers will be of assistance where the aerodrome may need to be accessible during the hours of darkness. Numbering each gate would also be an advantage; and

Emergency access roads shall be capable of supporting the heaviest vehicles which will use them, and be usable in all weather conditions. Roads where constructed shall measure at least twice the axle width of the largest emergency appliance anticipate to utilise the road. Roads within 90 metres of a runway shall be surfaced to prevent surface erosion and runway contamination; and

When the surface of the road is indistinguishable from the surrounding area, edge markers shall be placed at 10 metre intervals; and

At those aerodromes located close to water, sandy or difficult terrain, the aerodrome emergency plan shall include the establishment, testing and assessment at regular intervals of a pre-determined response for any specialist rescue equipment and/or service, taking the terrain/surface into consideration.

Aerodromes should ensure the development of special procedures and availability of equipment, to deal with accidents that may occur in these areas.

16. WATER RESCUE FACILITIES

16.1 Where airports are situated adjacent to large bodies of water or where they are located on coastlines, special provisions shall be made for rescue and fire fighting operations in the event of an aircraft accident in the water.

16.2 In developing the water rescue service, full consideration shall be given to public services such as coast guard departments, harbour police and military search and rescue units.

16.3 If rescue boats are provided they should be capable of shallow water operations. Boats powered by jet-type propulsion eliminate the dangers of propellers puncturing inflatable equipment or injuring survivors during rescue operations. Boats powered by conventional propellers may prevent the hazards of puncture and injury by being equipped with fan-type guards or cowls. Inflatable boats may be punctured by wreckage or barnacles.

16.4 Rescue boats and other rescue vehicles should be located so that they can be brought into action in minimum time. Special boathouses or launching ramps should be provided in order to reduce response time.

16.5 Rescue boats should be of such size as to efficiently carry the flotation equipment required with adequate space for the crew.

16.6 Sufficient working space should be provided to permit rapid dispersal of the flotation devices. Inflatable life rafts should be the prime flotation equipment carried; there should be a sufficient quantity on hand to accommodate the maximum passenger load of the largest aircraft normally using the airport.

16.7 Adequate two-way radio equipment should be provided in all rescue boats in order to permit communications with other rescue units.

17. MAINTAINING RESPONSE CAPABILITY IN LOW VISIBILITY CONDITIONS

17.1 To meet the operational objective as nearly as possible in less than optimum conditions of visibility, especially during low visibility operations, suitable guidance, equipment and/or procedures for rescue and fire-fighting services shall be provided.

17.2 RFFS appliances should approach any aircraft accident by the quickest route commensurate with safety, although this might not necessarily be the shortest distance to the scene. Traversing through unimproved areas can take longer than travelling a greater distance on paved surfaces therefore a thorough knowledge by RFFS personnel, of the topography of the airport and its immediate vicinity is fundamental. The use of grid maps and careful selection of routes is essential for success in meeting the response objective.

17.3 RFFS appliances shall be equipped with an airfield chart clearly showing all taxiways, runways, holding points and appliance routes marked with their appropriate designation. The chart(s) should be accompanied by written instructions clearly detailing the action that the driver should take in the event that the appliance should break down or that the driver should become unsure of the appliances position on the aerodrome.

17.4 Aerodrome operators shall conduct an assessment of, and provide equipment acceptable to the GCAA, that could enhance RFFS response to the location of an accident site in low visibility conditions.

17.5 Once low visibility operations have been initiated it may be necessary to restrict the operation of appliances and persons in the aircraft manoeuvring area. Procedures for ATC to assist the RFFS in case of an accident or incident in low visibility conditions should be developed and implemented.

17.6 RFFS should be made aware of the existence of any areas that may from time to time become impassable because of weather or other conditions, and of the location of obstacles both permanent and temporary.

17.7 Operational procedures should be developed through which ATC stop or divert all aircraft and non-essential traffic that conflicts with responding RFFS appliances. RFFS personnel should continuously monitor the minimum visibility operating conditions in order to maintain response capability under such conditions.

18. ON AERODROME DEVELOPMENTS (WORK IN PROGRESS)

18.1 The extent to which work in progress (WIP) is likely to affect the response capability or operational performance of the RFFS and other emergency services should be considered during the work planning process. Where it is considered the proposed works might have an impact, suitable mitigations should be developed and if necessary adjustments to the Emergency Plan should be made and promulgated, prior to the commencement of work.

18.2 Aerodromes considering or conducting airport development shall assess all elements which may improve or delay the response capability.

18.3 All on aerodrome developments which could have an impact on any supplementary water supply (hydrant) should be assessed.

19. SUPPLEMENTARY WATER SUPPLIES

19.1 Supplementary water supplies, for the expeditious replenishment of rescue and fire-fighting appliances at the scene of an aircraft accident, shall be provided.

19.2 The objective of providing additional water supplies at adequate pressure and flow is to ensure rapid replenishment of aerodrome RFFS appliances. This supports the principle of continuous application of extinguishing media to maintain survivable conditions at the scene of an aircraft accident for far longer than that provided for by the minimum amounts of water set out in Table 2.

19.3 Additional water to replenish appliances may be required in as little as five minutes after an accident therefore Aerodromes should conduct an analysis to determine the extent to which supplies, and the associated storage and delivery facilities, shall be provided.

19.4 It is not possible to specify a single operational requirement which ensures adequate provision of supplementary water supplies in all circumstances and for all sizes of aerodrome. Each aerodrome fire & rescue service shall undertake a Water Needs Assessment to determine their requirements and equipment.

19.5 The provision of auxiliary water tank vehicles to maintain foam production at an aircraft accident is advocated. Water tankers should be provided to a capacity to ensure a second foam solution discharge rate as defined in Table 2.

19.6 All hydrant water supplies provided for supplementary water supplies shall be assessed for flow and pressure, with two or more hydrants open to simulate multi refill operations during aircraft fire-fighting from the same water main.

19.7 All supplementary water supplies shall be subjected to regular testing; inspecting and personnel shall undertake training. Records of all these activities shall be maintained.

20. AERODROME EMERGENCY PLAN

20.1 Emergency Planning Objective

20.1 The objective of aerodrome Emergency Planning is to anticipate the effects an emergency might have on life, property, and aerodrome operations, and to prepare a course, or courses, of action to minimize those effects, particularly in respect of saving lives.

20.2 Emergency Plan Objective

20.3 The objective of an Emergency Plan is to consider and record how an emergency situation or incident can be managed in order to minimize the effects it may have on life, property, and aerodrome operations, and how the best use of appropriate available resources should be applied to achieve that aim.

20.4 Aerodrome Emergency Plan (Strategic Level)

20.4.1 An Aerodrome Emergency Plan shall be established at an aerodrome, commensurate with the aircraft operations and other activities conducted at the aerodrome.

20.4.2 At aerodromes with multiple runways, the Aerodrome Emergency Plan shall take into consideration the requirement to continue operations on one runway whilst the RFFS is involved with an aircraft emergency on another runway. An Assessment for continued operations shall not be solely based on the Airport Fire & Rescue Category. The assessment shall take into account the emergency plan's ability to cope with another emergency situation occurring on the second runway whilst the first emergency is still being attended to.

20.4.3 The Aerodrome Emergency Plan shall:

Provide for the coordination of actions to be taken in an emergency occurring at an aerodrome or in its vicinity; and

Observe Human Factors principles to ensure optimum response by all existing agencies participating in emergency operations; and

Include procedures for leading passengers, evacuated from aircraft, to secure areas away from the scene of an incident; and

Include procedures for the safe control of passengers evacuated airside from a terminal or other airport building.

20.4.4 The Aerodrome shall appoint a competent person to establish and oversee all aspects of the Emergency Preparedness.

20.4.5 The Emergency Instructions / Orders shall be written in both Arabic and English.

20.4.6 The Emergency Plan shall form part of the application required for an aerodrome Certificate and shall be acceptable to the Authority. After acceptance of the Emergency Plan, the aerodrome shall be required to demonstrate the effectiveness of the Emergency Plan before the issuance of the Aerodrome Certificate. Therefore any amendments shall be fully assessed by the aerodrome and accepted by the Authority before implementation.

20.5 Emergency Planning Committee

20.5.1 The Committee while forming the Emergency Plan should meet regularly to discuss tactics, liaison, co-operative training, and exercise planning etc. Post accident and post exercise meetings should be held to consider the work carried out by the aerodrome and to analyse the results with reference to improvement possibilities. The meetings should be chaired by a senior member of the aerodrome management team. Records of the meetings shall be taken and retained.

20.5.2 The Committee shall:

Ensure that comprehensive plans are promulgated setting out the actions to be taken by, and the responsibilities of, all those concerned with the handling of aerodrome emergencies; and

Ensure that all incidents are reviewed and detailed reports formulated to ensure the emergency plan remains up to date and reflects continued aircraft operations; and

Take into consideration the requirements of paragraph 20.3.2 while forming the Emergency Plan.

20.5.3 Any changes to the Emergency Plan shall be assessed fully before implementation by the committee.

20.5.4 The Aerodrome Emergency Plan shall, where applicable, include coordinating actions for at least the following on and off aerodrome agencies:

Air Traffic Services	Mutual Aid Fire Service & Rescue
Aerodrome Fire & Rescue Service	Mutual Aid Police
Aerodrome Police / Security	Local Ambulances
Aerodrome Operations	Medical Services
Airline and significant other operators	Local Hospitals
Ground Handling Companies	Welfare Agencies
Customs & Immigration	Coastguard & Off Shore Rescue
Occupational Medical / Clinics	Government Authorities
Mechanical transport	Military
Telecommunications	Rescue Co-Ordination Centre
Works / Engineering facilities	Religious Leaders

20.5.5 The Aerodrome Emergency Plan shall, for security related occurrences, reference the Airport Security Programme and where necessary, the UAE National Civil Aviation Security Programme. Any response actions to security related emergencies contained in the Aerodrome Emergency Plan shall be coordinated and consistent with the Airport Security Programme.

20.5.6 The Aerodrome Emergency Plan document shall include the following:

Types of emergencies planned for; and

Agencies involved in the plan (both on and off the aerodrome), along with their telephone numbers, and notification procedures; and

Responsibility and role of each agency, the Emergency Operations Centre and the Command Post, for each type of emergency; and

A clearly specified commander and chain of authority for each emergency specified, covering all phased of the emergency; and

Information on the names and telephone numbers of offices or people to be contacted in the case of a particular emergency; and

A list of pertinent on and off aerodrome services available with telephone numbers and contact persons; and

Copies of Memoranda of Understanding (MOUs) or agreements with other agencies for mutual aid and the provision of emergency services; and,

A grid map of the aerodrome and its immediate vicinity.

20.6 Emergency Instructions/ Orders Operational Level

20.6.1 Emergency Orders shall clearly translate the Emergency Plan into a course or courses of action to be followed, for a given emergency or incident, which will ensure the achievement of the objectives stated above.

Emergency Instructions should provide detailed instructions to individuals, or to departments, of the actions required to initiate the Emergency Plan.

Emergency Instructions should be drawn up and displayed, detailing the actions to be taken by any particular person or service under each emergency situation, to ensure that the Emergency Orders are completed.

They should contain separate sections for display and use by the various persons, departments or services concerned, e.g. Air Traffic Control, Aerodrome Rescue and Fire Fighting Service, Aerodrome Police, Aircraft Handling Agents etc.

20.6.2 The Aerodrome Emergency Orders / Instructions shall include procedures for at least the following types of emergencies:

Aircraft emergencies; local standby, full emergency, aircraft crash on and off airport, ground incident.

Security related emergencies; unlawful seizure of aircraft, sabotage including bomb threats to aircraft and airport facilities;

Hazardous Materials / Dangerous goods occurrences;

Building fires;

Natural disasters;

Medical emergencies

Note: Hazardous materials include inflammable liquids and solids, corrosive liquids, compressed gases and magnetized or radioactive materials. The arrangements to deal with an accidental spillage of hazards materials shall be included in the emergency plan.

20.6.3 An aerodrome may generate hazards in addition to those that relate directly to the operation of aircraft e.g. the handling of hazardous cargoes or bulk fuel storage. Where appropriate, aerodromes should make plans to deal with emergencies which arise from these peripheral activities. The quantities of equipment, extinguishing agents and personnel required to deal with such emergencies, may exceed those provided by the aerodrome for the scale of RFFS required to protect the movements of aircraft only.

20.7 Airport Incident Command System. (Operational Level)

20.7.1 The importance of an agreed framework for command and control should not be underestimated. This enables each agency to tailor its own response and interface with the plans of other agencies without disrupting its own procedures.

20.7.2 On arrival at the scene of an accident or incident, the emergency services should take appropriate immediate measures and assess the extent of the problem, under the command of their respective Incident Officers. They should concentrate on their specific tasks within their areas of responsibility reporting to and operating from the Mobile Command Post.

20.7.3 An Airport Incident Command System shall be formulated, published and adopted by all aerodromes.

20.7.4 An Airport Incident Command System (AICS) provides a clear framework to assist the Airport Incident Commander (AIC) to organise and deploy available resources in a safe and efficient

manner. It provides the AIC with a ready to use organisational structure that can be adapted to fit every incident, from a fuel spillage situation to the largest most complex aircraft incident.

20.7.5 The requirement to develop and apply an Airport Incident Command System is driven by the critical nature of the types of incidents, which the Airport Fire & Rescue Service responds to.

20.7.6 The development of an Aircraft Incident Command System should be seen as part of the Airports overall organizational System for Managing Risk.

20.7.7 The Airport Incident Commander (AIC) must focus on the safe and effective resolution of the incident. The AIC tactics are based on a dynamic assessment and/or the limited resources available at the time of the incident. At sometime within the timeframe of the incident the AIC will need to work in conjunction with other mutual aid services and agencies as necessary. At this point the full Aerodrome Emergency Plan would have been implemented.

20.7.8 The AIC is therefore principally concerned with the tactical co-ordination of tasks, which will be based on Standard Operating Procedures (SOPs). Operations are best described as tasks that are carried out on the incident ground to achieve desired objectives, using prescribed techniques and procedures in accordance with the Aerodrome Emergency Plan and local procedures.

21. USE OF 'ZONING' TO EFFECT OVERALL CONTROL AT AN ACCIDENT SITE

21.1 The principle of dividing an accident site into separate areas is to establish effective overall control of the site by the Incident Control Officer or Tactical Commander, and to maximize the efficiency of the various disciplines dealing with different aspects of the emergency.

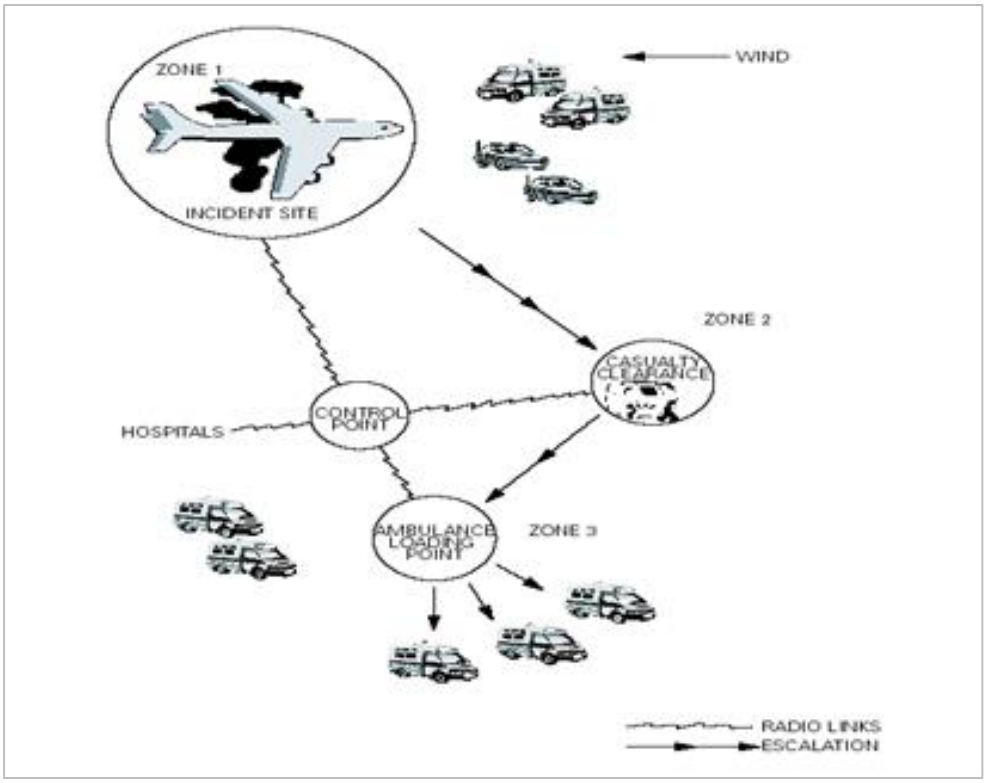
The process requires the establishment of a number of zones:

Zone 1. This is the area within which the attending Airport and Mutual Aid Fire Services will operate with the aim of establishing fire control and of rescuing the occupants.

Zone 2. This is the Casualty Clearance Zone and is sited upwind of Zone 1. Here medical services will initiate the removal of the injured to hospitals or rest centres as appropriate.

Zone 3. This zone is sited at the nearest hardstanding to Zone 2 and should be designated the Ambulance Loading Point.

An Incident Control Point should be established close to Zones 1 and 2 where the Incident Control Officer will maintain overall control of those responding to the emergency. A communication system should be set up linking the Incident Control Officer with the Officers-in-Charge of each Zone, with local hospitals and other organizations as appropriate.



22. AIRPORT SILVER COMMAND CENTRE (TACTICAL LEVEL)

22.1 A fixed Airport Silver Command centre shall be available for use during an emergency.

22.2 The Airport Silver Command centre 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.

22.3 It is desirable to install recording devices with time insertion units at the operations centre and/or mobile command post to ensure that all communications are recorded for later analysis. It is also desirable to record all emergency communications, including printed communication.

22.4 The Airport Silver Command Centre Facility is to establish contact with the United Arab Emirates National Crisis & Emergency Management Authority (NCEMA), fully briefing NCEMA on the circumstances and details of the aircraft accident, emergency situation and actions taken. Any request for specialist assistance is to be directed through NCEMA.

23. AIRPORT BRONZE COMMAND (OPERATIONAL LEVEL)

23.1 The Mobile Airport Bronze 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.

23.2 The Aerodrome Operator shall assign a person to assume control of the Airport Silver Command centre and, another person for the Mobile Bronze Command Post. These persons are to be trained and competent in incident/crisis management.

23.3 The importance of an agreed framework for command and control should not be underestimated. This enables each agency to tailor its own response and interface with the plans of other agencies without disrupting its own procedures.

23.4 It is important to provide serviceable communication equipment in sufficient quantity to ensure rapid response of personnel and equipment to an emergency.

23.5 Strict communication discipline shall be employed to prevent jamming of emergency frequencies. Each agency should operate on its own frequency, and there should be a designated command frequency.

23.6 The communication system shall be tested each day to verify the operability of all radio and telephone networks.

23.7 An operational Log shall be maintained during the implementation and duration of the incident at the Airport Silver Command Centre and Airport Bronze Command Post.

24. SPECIALIST EQUIPMENT & PROCEDURES

24.1 At those aerodromes located close to water and 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.

24.2 Portable casualty shelters and blankets for use during all weather conditions should be considered, taking into account the numbers of casualties that could reasonably be expected.

24.3 Portable lighting should be provided for illuminating an accident scene particularly triage and casualty handling areas.

24.4 Aerodromes should ensure that records appertaining to the medical facilities, covering specification, tests and inspection, and maintenance, are retained and can be made available for GCAA inspection if requested. The records should include details of consequential action where an inspection has revealed a defect or deficiency. The records shall be retained for a minimum period of five years.

An aerodrome Emergency Plan must consider that an accident can occur in weather conditions that could hamper the ability of Mutual Aid Emergency Services to find the accident site. A system must be devised whereby Mutual Aid Emergency Services, familiar or unfamiliar with the aerodrome, can be easily guided to the accident or incident.

24.5 Facilities and procedures shall be established by the aerodrome for a designated survivor holding area (Survivor Reception Centre). Those people responsible for the operations of this facility shall be appropriately trained.

Prearrangement shall be made for the immediate transportation by bus or by other suitable transport of the “walking survivors” from the accident site to the Survivors Reception Centre.

Occupants departing an aircraft using evacuation slides may be barefoot, without proper clothing and without required entry documents. These problems shall be anticipated by the aerodromes and appropriate procedures formulated.

24.6 Facilities and procedures shall be established by the aerodrome for a Friends and Relative Centre. Those people responsible for the operations of this facility shall be appropriately trained.

24.7 Facilities and procedures shall be established by the aerodrome for the repatriation of survivors. Those people responsible for the operations of this facility shall be appropriately trained.

25. MEDICAL EQUIPMENT

25.1 The aerodrome authority shall arrange to have sufficient medical supplies/facilities available on or in the vicinity of the airport, to treat the passenger and crew capacity of the largest aircraft normally using the aerodrome. Experience has shown, however, that more than one aircraft may be involved in an aircraft accident. Consequently, medical supplies to handle this possibility should be determined accordingly.

25.2 All rescue and fire-fighting personnel shall be trained in basic first aid and CPR (cardio pulmonary resuscitation) as taught by the appropriate medical authority. A number of operational personnel per shift should be trained to an emergency medical treatment level as determined by the aerodrome or medical authority. The objective is to stabilise any seriously injured casualties.

25.3 The estimated maximum number of casualties at an aircraft accident at an airport maybe anticipated by reference to the following statistical information published by ICAO:

Aircraft Occupants	Number of Casualties	20% casualties Immediate Care Priority I	30% casualties Delayed Care Priority II	50% Casualties Minor care Priority III
500	375	75	113	187
450	338	68	101	169
400	263	53	79	131
300	225	45	68	112
250	168	38	56	94
200	150	30	45	75
150	113	23	34	56
100	75	15	23	37
50	38	8	11	19

These figures are based on the assumption that the maximum number of surviving casualties at an aircraft accident occurring on or in the vicinity of an airport is estimated to be about 75% of the aircraft occupants.

Note: Further guidance is contained in ICAO Airport Services Manual, Part 7 (Document 9137-AN/898; Part 7)

26. SEARCH AND RESCUE COORDINATION CENTRES

26.1 The Aerodrome Emergency Plan shall provide cooperation and coordination with the Search and Rescue Coordination Centres, as is necessary.

27. MAPS

27.1 A grid map of the aerodrome and immediate vicinity shall be provided to the emergency response vehicle(s) normally providing first emergency response.

A thorough knowledge of the topography of the airport and its immediate vicinity is fundamental. The use of grid maps and careful selection of routes is essential for success in meeting the response objective.

It is essential that whenever the grid map is revised, an updated copy shall be provided to all participating agencies and the old map destroyed.

28. AERODROME EMERGENCY EXERCISE

28.1 The aerodrome emergency response plan shall contain procedures for periodic testing of the adequacy of the plan and for reviewing the results in order to improve its effectiveness. The plan shall include all participating agencies and associated resources.

28.2 Core elements of the plan should be identified and it should be established how and when these are to be tested. It may be appropriate to test some parts of the plan in isolation, provided satisfactory assurance of overall effectiveness can be achieved.

28.3 The aerodrome emergency plan shall be tested by conducting:

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

Or:

2. 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. The Aerodrome Operator will have to submit the three-year modular emergency exercise plan to the GCAA for acceptance.

GM1 to 28.3(1):

The purpose of a full-scale exercise is to ensure the adequacy of the plan to cope with different types of emergencies.

GM2 to 28.3(1):

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 systems.

28.4 Failure to comply or implement the agreed modular emergency exercise plan within any three-month period will result in the airport having to conduct a full-scale emergency exercise. If the revised modular emergency exercise plan is acceptable to the GCAA, it may be reinstated.

AMC to 28.3 and 28.4:

List of modules forming the three-year modular emergency exercise plan:

1. Airport Incident Command and Control
2. Specialist Equipment and Procedures (Airport Hazards and Risks)
3. Friends / Relatives / Survivors and Crew Reception Centres
4. Disabled Aircraft Recovery
5. Business Continuity Management / Operational Safety / Scene Preservation / Investigation

6. Practical Fire Fighting and Rescue Operations
7. Communications Exercise
8. Mobility Exercises; Casualty Handling
9. AEP Full-Scale Exercise(s)

GM1 to 28.3 and 28.4:

Emergency exercise plan modules with associated objectives:

Module	**Objective: Exercise or Test**
Airport Incident Command and Control	a) Operational Command b) Tactical Command c) Emergency Coordination d) Strategic Command e) EOC f) MCP g) Operation of RVP
Specialist Equipment and Procedures (Airport Hazards and Risks)	a) Close to water and water rescue b) Difficult terrain c) Difficult Environs d) Portable casualty shelters/blankets – consideration of weather conditions e) Management of Cadavers f) Portable lighting g) Records h) Maps i) RVP's and medivac
Friends / Relatives / Survivors and Crew Reception Centres	a) Reception Centre / Non-Emergency Services Response b) Repatriation process / family assistance
Disabled Aircraft Recovery	a) Scene Preservation / Investigation b) Provision of Equipment c) Testing, Maintenance & Inspection of Equipment d) Training / Exercises in the use of Equipment e) Local Agreements
Business Continuity Management / Operational Safety / Scene Preservation / Investigation	a) Operational Re-Start Operations b) Crisis Management c) Media / Press d) Recalculating Declared Distances e) Capability exercise f) Review Hazard Log
Practical Fire Fighting and Rescue Operations	a) Practical Fire Fighting / Search & Rescue Operations/ water supplies
Communications Exercise	a) Call Out Systems b) Call out Notifications c) Contingency Plans
Mobility Exercises; Casualty Handling	a) Medical Response & Triage b) Medical Facilities / Equipment c) Passenger Evacuation Management (PEMS)
AEP Full-Scale Exercise(s)	a) Full-scale test of AEP b) Clear inter-service / department objectives

GM2 to 28.3 and 28.4: Communications Exercises

Communications exercises do not require the movement of any persons or equipment; the exercise would be to assess the communications systems used in an emergency and to summon assistance.

To hold an exercise of this type it is usual to send a letter to the services and individuals who would respond to an emergency call, stating that a communications exercise will be held on a particular date. The recipient should be asked to reply giving:

1) The time the call was received;

2) The exact message received;

3) A brief note stating the action that would have been taken if the call had been to a genuine emergency.

When the pro forma has been returned to the aerodrome, an analysis of the information should be made. These inexpensive exercises can be of great value but it is essential to prefix all messages from the aerodrome with the word 'EXERCISE'.

A measure of secrecy helps to ensure that full benefit is obtained from each assessment.

GM3 to 28.3 and 28.4: Mobility and Casualty Handling Exercises

Following a communications exercise, mobility and casualty handling exercises carried out separately, provide a great deal of valuable information and experience to individual departments or organisations without committing large numbers of persons, fire vehicles and equipment and can be used as a preliminary to the main operational exercise.

GM4 to 28.3 and 28.4: Practical Exercises (Operational)

Operational exercises are more complicated, and are difficult to organise without some loss of the element of surprise. It is essential to consult with the local Mutual Aid Services and it may be necessary to plan an exercise at a particular time of day or on an agreed day to meet local requirements.

An exercise cannot be held without the co-operation of all concerned so some prior discussion is unavoidable. However, it should still be possible to withhold the precise time of the exercise and some of the details to be set.

It is seldom possible to assess more than two or three aspects of a simulated aircraft accident at one exercise, as to assess more often leads to inadequate observation and loss of benefit from the exercise.

The following can be tested in combinations of two or three:

1. Fire-fighting by the aerodrome fire service, with reinforcement and water transfer from the defence fire service.

2. An aircraft accident without fire, but with a complex rescue operation involving many casualties. This would test the aerodrome fire service, with possible assistance from mutual aid rescue services.

3. Casualty evacuation, after removal from the aircraft, assessing the (Passenger Evacuation Management System) Ambulance and Hospital arrangements, the setting-up of casualty clearance stations, the attendance of doctors, and Police control, including the segregation of deceased persons and the assembly of personal effects.

4. Crowd control and the preservation of aircraft debris for accident investigation purposes.

5. Forward Command Post, Command and Control, and communications.

In exercises (1), (2) and (3), it will be necessary to establish the relative responsibilities of the Fire Service and the medical services.

Once a person has been removed from the aircraft the after-care becomes the responsibility of the medical services, so that the RFFS can return to its fire and rescue duties.

Failure to recognize these facts will result in confusion and dissipation of effort. There are many more variations which can be introduced and it will be evident that there will be a requirement for simulation in an exercise.

It is seldom possible to provide a sufficiently large fire which will engage the aerodrome RFFS until the local authority fire service can attend and provide support. This difficulty can be overcome by delaying ignition until the local Fire Service can be seen approaching the incident.

The 'casualties' should be labelled or provided with simulated injuries.

28.5 an aircraft accident occurs and the response requires the implementation of all or part of the emergency exercise plan, the aerodrome operator shall carry out an assessment of the incident against the aerodrome emergency exercise plan objectives. The assessment shall be formally documented and shall be forwarded to the GCAA along with any request to defer the full-scale or partial exercise. Following a deferred exercise the subsequent exercise shall always be a full-scale exercise.

28.6 Each emergency planning exercise should be adequately pre-briefed and the objectives of the exercise clearly stated and understood by all.

Members of the Senior Management team should fulfil their planned emergency roles as part of the test.

A sufficient number of observers should be appointed to assess the effectiveness of the exercise in fulfilling its objectives. Each observer should formally record their findings.

Where aircraft movements take place at night, alternate exercises (or partial exercises) should be conducted during the hours of darkness.

The GCAA's Inspectors will require to be assured of the suitability of the Aerodrome's Emergency Plan. Inspectors may require seeing documentary evidence relating to the arrangements put in place by the Emergency Planning Committee. Inspectors may attend an exercise pre-briefing, testing or debriefing, or may choose to attend emergency exercises conducted by the aerodrome. Notification of a proposed biennial exercise must be given at least three months in advance.

29. Reserve

30. Reserve

31. Reserve

32. BUSINESS CONTINUITY MANAGEMENT

32.1 The aerodrome shall establish plans to allow for short/long term closures that ensure the aerodrome operation is safe to resume following an aircraft accident / incident.

32.2 All aerodromes shall prepare contingency plans to cope immediately with the loss of all or part of a facility, including but not limited to ATC facilities, passenger terminals, freight facilities, fuel facilities, road access, and administration buildings.

33. ENVIRONMENTAL ISSUES

33.1 The effects on the environment of RFFS activities should be considered and mitigated wherever possible. The main areas of concern the RFFS should consider are water and media run-off, hot fire training, foam testing and air quality.

34. RENDEZVOUS POINT SIGNS AND DIRECTIONAL ARROWS (SPECIFICATION AND LOCATION)

34.1 In many cases it may not be possible or practicable for mutual aid vehicles to proceed directly to the incident site. Therefore, suitable assembly, or Rendezvous Points, should be established, to which incoming appliances should report, and from which they can be escorted to the accident or incident site with the minimum of delay. In all cases a person should be posted at the aerodrome main gate, and the Rendezvous Point and a telephone should be made available at both locations.

The following signs are recognised internationally by Police, Fire and Ambulance services. The sizes given are the minimum likely to allow them to be recognised easily by attending mutual aid services.

35. RENDEZVOUS POINT (RVP) SIGNS

35.1 Rendezvous Point signs should be displayed at the point(s) designated by the Aerodrome.

Rendezvous Point signs should be displayed at the point(s) designated by the Aerodrome Emergency Plan as the rendezvous point(s) for all responding mutual aid services. Signs should be clearly visible from any direction from which responding emergency service vehicles/personnel are likely to approach when attending aircraft accidents/incidents within the response area defined by or cross-referenced in the Aerodrome Manual.

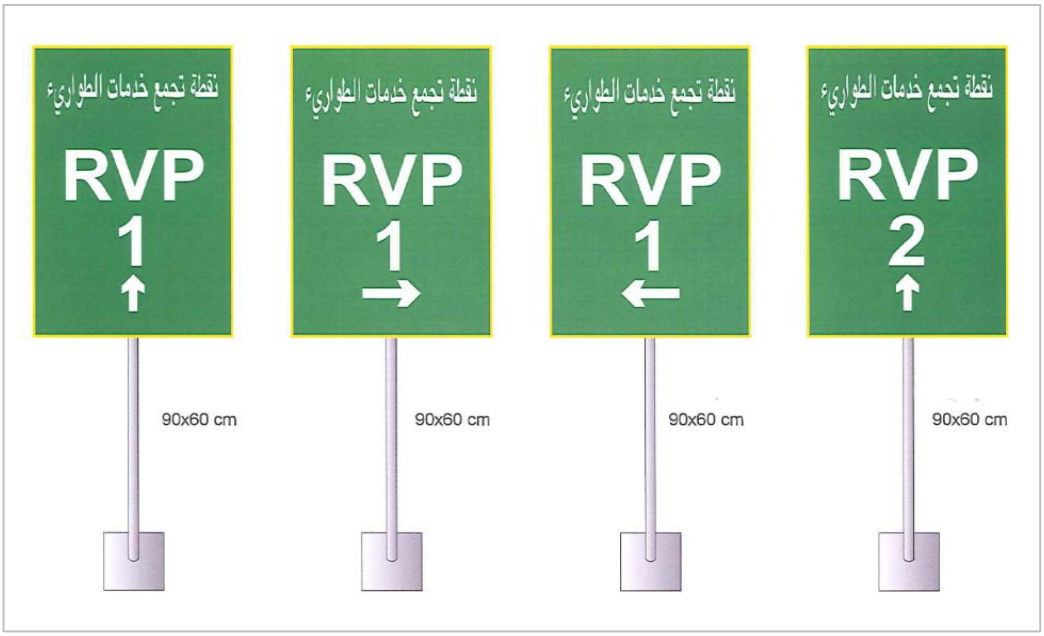
35.2 Signs located on the aerodrome should have nominal dimensions 1000 mm x 1000 mm and comprise bright, white letters 'EMERGENCY SERVICES RENDEZVOUS POINT' in English and Arabic, on a contrasting green background. (The white lettering may also be retro-reflective.) The sign should have a bright, contrasting yellow border of 25 mm dimensions. (The border may also be retro-reflective):

36. RENDEZVOUS POINT DIRECTIONAL ARROW SIGNS

36.1 Sufficient signs bearing RVP directional arrows should be placed in such a manner that 'off-aerodrome' mutual aid service vehicles/personnel responding to an incident on the aerodrome are directed expeditiously to any previously designated RVP. Text on the signs shall be in English and Arabic.

36.2 Sign(s) should be placed within and around the aerodrome perimeter so that they are visible and legible from any traffic direction of approach. Signs placed on a highway will need to conform to the dimensions and colour scheme as defined by the relevant Emirate's Traffic Signs and Signals requirements.

Where appropriate, RVP signs and RVP Directional Arrow signs should be illuminated.



Direction of route ahead for mutual aid vehicles leading to an RVP

36.3 Congestion-free ingress and egress roads need to be established immediately for emergency vehicles. The security services, police force, are expected to ensure that only persons with specific tasks be allowed at the scene of the accident. They should route non emergency traffic away from or around the accident site.

36.4 A method to easily identify responding emergency personnel should be implemented at security check points to ensure that they have immediate access to the accident site. "Emergency Access" identification can be pre-issued by the airport authority to emergency personnel for use during an emergency.

36.5 The plan should provide for the control of crowds that always collect at an accident site and also for the preservation of the entire area, undisturbed whenever practical, for investigation purposes.

37. MUTUAL AID EMERGENCY AGREEMENTS

37.1 The close proximity of an airport to surrounding communities and the possibility of an off-airport aircraft accident give rise to the need for mutual aid emergency agreements.

37.2 A mutual aid emergency agreement should specify initial notification, response assignments and also specify the responsibilities of the agency concerned.

37.3 It is imperative that mutual aid fire department(s) members recognize that unless the airport is closed to flight operations, unescorted movement on airport property is extremely dangerous and may result in conflict with aircraft movements.

37.4 The senior officer of the airport rescue and fire fighting service receiving mutual aid shall have full authority for fire fighting and rescue operations at the scene for an aircraft accident on the aerodrome.

38. PRESERVATION OF EVIDENCE FOR AIRCRAFT ACCIDENT INVESTIGATION

38.1 The GCAA is vested by the Government of the UAE as the Competent Authority for the development and promulgation of Regulations pertaining to aircraft accident investigation.

38.2 When a reportable accident occurs in or over the UAE, no person other than an authorized person shall have access to the aircraft involved in the accident and neither the aircraft nor its contents shall, except under the authority of the GCAA, be removed or otherwise interfered with.

38.3 Airport fire fighters and other rescue personnel should understand the basic need for and the techniques and procedures used in aircraft accident investigation. Whenever possible the wreckage should remain undisturbed until the arrival of the first aircraft accident investigator. However, when absolutely necessary for the rescue or fire suppression activities, the wreckage may be disturbed. Disturbance should be kept to a minimum.

38.4 As soon as practical after the emergency, all participants in the fire fighting and rescue efforts should be debriefed and their observations recorded by the proper authorities. Statements, sketches, diagrams, photographs, tape and video recordings made on the accident site as well as appropriate details on the tagging of bodies and parts removed from their locations are invaluable tools for investigators and should be handed to the investigator-in-charge upon this officer's arrival.

38.5 Isolation of and security measures within the wreckage area should be established as soon as possible. All authorized personnel should possess and display proper "Emergency Access" identification as required by the airport emergency plan.

38.6 All security personnel should be briefed on proper identification procedures. Two-way radio communication with appropriate authorities on the site can help identify any person seeking entry whose credentials are questionable.

39. INSPECTIONS & AUDITS OF THE RFFS BY INSPECTORS OF THE GENERAL CIVIL AVIATION AUTHORITY

39.1 The objective of audits and inspections by the GCAA is to establish and ensure continued regulatory compliance and the ability of the RFFS to achieve the principal objectives. The GCAA will perform an initial, inspection/audit of an aerodrome's RFFS unit prior to the issue of an aerodrome certificate. Once the certificate has been issued the GCAA will undertake regular inspections/audits.

39.2 The GCAA Inspector will seek:

Evidence that the aerodrome has made a full assessment of the operational requirements.

That the necessary procedures and practices have been documented and are in place for an effective response to aircraft accidents or incidents.

Documentary evidence relating to the qualifications of personnel employed in the RFFS including Certificates of Competence.

Records of training received and assessments made including those for training exercises conducted with other emergency services.

Records of inspections, test and maintenance of all appliances and equipment.

39.3 The aerodrome may be required to demonstrate the effectiveness of any of the objectives contained within this chapter. This may include any element, or all elements, of the Aerodrome Emergency Plan.

40. AERODROME FIRE SAFETY

40.1 Powers of the Rescue and Fire Fighting Service in an Emergency

An Officer of the Rescue and Fire Fighting Service at a GCAA Certificated Aerodrome may do anything he reasonably believes to be necessary on the aerodrome:

If the Officer reasonably believes a fire to have broken out , or to be about to break out, for the purposes of extinguishing or preventing the fire or protecting life or property may enter a building or aircraft, by force if necessary, without the consent of the owner or operator; or

For the purpose of preventing or limiting damage to property resulting from action taken as mentioned in 40.1, or to protect the persons wishing to enter, by restricting the access of persons to an aircraft, premises or a place.

40.2 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.

40.3 A means of quickly summoning the airport fire service in the event of a fire or fuel spillage shall be provided on the apron areas.

40.4 Familiarization/Hazard Identification

The Aerodrome Chief Fire Officer/Senior Airport Fire Officer may request through a formal process to the owner/occupier for access to airport buildings and facilities for familiarization and identification of potential hazards which could pose a significant risk to fire-fighting operations.

The owner/occupier should permit access to facilitate operational fire-fighting safety assessments within their premises or facilities.

40.5 Airport Buildings

The owner/occupier of on aerodrome buildings which facilitate public access, storage of dangerous goods, flammable liquids, and including aircraft maintenance facilities should have adequate fire detection and fire protection facilities including staff training to protect life and property.

A system of inspections and preventive maintenance shall be established and be implemented under an adequate level of supervision to ensure such facilities meet the required standards and intension.

APPENDIX 1: RFFS PERSONNEL MEDICAL STANDARDS

1 Selection of Personnel

1.1 Regard must be given to the arduous nature of rescue and fire fighting activities. Personnel selected for these duties should be free from any physical disability which may impair their performance or which may be aggravated by prolonged exertion.

1.2 Firemen should have at least average strength and have no abnormalities, which could reduce their physical powers during a rescue. Any conditions liable to be induced or aggravated by smoke, dust, heat, irritants or fumes (e.g. asthma) shall be considered a disqualification).

2 Medical Examinations

2.1 Personnel who are employed for rescue and fire fighting duties at Categories 3-9 aerodromes shall have an initial examination before recruitment and undergo further examinations at five-yearly intervals up to the age of 40, then at two-yearly intervals up to the age of 50 and annually thereafter.

2.2 Firemen should have at least average strength and have no abnormalities, which could reduce their physical powers during a rescue. Any conditions liable to be induced or aggravated by smoke, dust, heat, irritants or fumes (e.g. asthma) shall be considered a disqualification).

2.3 An ECG is to be carried out at the initial examination. At subsequent examinations an ECG may be carried out if the examiner considers it necessary.

2.4 Personnel should not be overweight. A suggested maximum is 20% above ideal weight, i.e. a Body Mass Index of 30. Exceptions may be made for persons of heavy muscular build.

2.5 The hazardous nature of the job makes most types of medication inadvisable. For example, antihistamines and tranquillizers may cause drowsiness and a slowing of reaction time. Persons who use antihistamines should be assessed unfit.

3 Medical Standards

3.1 Requirements

3.1.1 Persons employed for rescue and fire fighting duties shall meet the following medical standards

3.1.1. <u>General Physique</u>

1 Candidates should be of good general muscular development, with no marked obesity. They should be not less than 1.67m in height. They shall be fit for any manual work, including lifting, climbing and all fire service duties, and the use of breathing apparatus where appropriate.

3.1.1. Upper Limbs

2 Muscle power average. Able to do heavy manual work. Any disability should be so slight that it does not interfere with the ability to handle tools or do heavy manual work.

3.1.1. Locomotion

3 Capable of running, climbing ladders, jumping, crawling and performing all kinds of manual labour under conditions expected at a fire.

3.1.1. Hearing

4 Ability to hear sufficiently well under adverse circumstances is essential. Forced whisper to be heard in each ear separately at 6m. In cases of doubt an audiometer test is advisable.

3.1.1. Vision

5
1. Distance visual acuity should not be less than 6/12 in one eye and 6/36 in the other, with glasses if necessary, and not less than 6/18 with both eyes unaided**.**
2. Where spectacles are required to achieve the above standard, for operational duties they should be of a safety type approved by the Authority.
3. The use of contact lenses is not permitted.
4. Colour perception should be normal on initial testing by Ishihara plates. If a defect is found during the examination, a further test is to be carried out using a suitable lantern to demonstrate the ability to distinguish the signal colour, red, green and white.

3.1.1. Mental capacity

6 Normal - Able to perform all duties successfully.

3.1.1. Emotional stability

7 Emotionally fit to perform fire service duties adequately under operational conditions.

3.2 **Disqualifications**

3.2.1 The following disabilities render a person unsuitable for operational fire service duties:

1. History of epilepsy, gastric or duodenal ulcer or mental instability.
2. Hearing in either ear less than 6 m for ordinary conversational voice or any evidence of labyrinthine disturbance.
3. Patent perforation of one or both ears, otitis media, or gross nasal sepsis or

obstruction. Healthy perforation of one or other eardrum may be acceptable provided there is no serious hearing loss of chronic discharge.

4. Hernia or hydrocele.
5. Serious varicose veins giving rise to symptoms.
6. Serious chronic skin disease.
7. Chronic bronchitis or asthma or other disabling disease of the lungs.
8. Organic disease of the cardiovascular system.
9. Albuminuria, unless shown to be simple orthostatic with proof of normal renal function.
10. Personnel with glycosuria should normally be rejected, but if they are able to furnish satisfactory evidence of normal sugar metabolism (e.g. from a hospital, clinic or specialist) they may be accepted.
11. Organic nervous disorder of any kind, a history of vertigo or any condition, which would impair a candidate's sense of balance.
12. Significant obesity.

APPENDIX 2: RFFS TRAINING

1 General

1.1 All Rescue & Fire fighting personnel require appropriate training if they are to operate in a safe and effective manner. All personnel engaged on rescue and fire fighting duties, must receive initial and recurrent competence-based training relevant to their role.
The most important factors bearing on effective rescue in a survivable aircraft accident are: the training received, the effectiveness of the equipment, and the speed with which competent personnel and equipment designated for rescue and fire fighting purposes, can be put to use

1.2 The Aerodrome Management should have a written corporate policy, which acknowledges that training for competence is an integral part of its strategy. This policy should be compliant with the regulator's requirements. It should acknowledge that the key objective of training for competence is the development and use of training and assessment systems, which contribute to the efficient delivery of services while eliminating or reducing risk to the organization, its staff and equipment, the community within the boundaries it serves, and the environment.

1.3 Irrespective of the degree of realism that the learning environment or a simulated scenario may offer, there will always be certain aspects of performance that cannot be evidenced. Simulation cannot fully replicate a sufficiently dynamic environment that will enable the person to respond to high stress and risk situations, that include time pressures and the tensions of communicating and working with people.

2 RFFS Role Map

2.1 **Role-Mapping:** The collection of tasks grouped together, defining the activities relevant to a particular role. Within the tasks are critical functions which have to be carried out to ensure the objective is achievable.
The primary generic roles of personnel engaged in the aerodrome RFFS, may be grouped under the headings of Firefighter, Supervisor and Manager. The additional terms Crew Commander, Leading Fire-Fighter, Watch Commander/Manager, and Senior Airport Fire Officer/Fire Service Manager/ Chief Fire Officer, have also been used. The Aerodrome may choose to adopt their own specific terms within the generic terminology of Supervisor and Manager.
There is no such thing as a "typical" Firefighter, as all roles at aerodromes can vary due to a number of factors such as risk, resource availability, and organizational structure.
Role-maps provide a tool against which performance can be assessed and measured in order to plan for the four stages of development, namely:

1. Learning and development.
2. Achievement of competence.
3. Maintenance of competence.
4. Continuous Professional Development (CPD).

2.2 Critical Functions = Tasks = Objective

2.3 Objective is to save life at an aircraft accident with fire

Critical Functions	Watchroom	Fire Driver	Fire-fighter	Crew Commander	Dept-Watch Commander	Watch Commander
Communicate in English	√	√	√	√	√	√
Mobilize Resources to respond to incidents	√					
Maintain Operational Readiness	√	√	√	√	√	√
Don Appropriate PPE		√	√	√	√	√
Drive & Position Appliances at incidents		√				
Operate Appliances Systems		√	√	√	√	
Operate Appliance Monitors		√	√	√	√	
Deploy & use fire-fighting equipment			√	√	√	
Deploy & Operate secondary Media units			√	√	√	
Don & Operate in Breathing Apparatus			√	√	√	
Extinguish Fires at Aircraft Incidents		√	√	√	√	√
Deploy & Climb Fire Service Ladders			√	√	√	
Select & Operate Rescue Equipment			√	√	√	
Apply basic first aid skills to casualties		√	√	√	√	
Implement actions to resolve incidents				√	√	√
Manage information for Action				√	√	√
Understand Incident Command System				√	√	√
Implement actions to resolve Incidents				√	√	√
Determine solutions to hazards / risks at incidents				√	√	√
Understand / Apply Airside Safety		√	√	√	√	√
Airside Driver Training		√				√

3 Training Needs Analysis

3.1 A training needs analysis shall be conducted to identify the underpinning knowledge, understanding and skills required to carry out the tasks of RFFS personnel in relation to their role, i.e. Firefighter, Crew Supervisors, Watch Managers and Senior Officers. This

analysis will also include an evaluation process which measures the outcomes of the training provided by the aerodrome, against the published aims and objectives of the training programme to ensure that these are being achieved.

3.2 It is important to understand that completion of a training course does not, in isolation, determine that someone is competent. Competence can only be assessed and confirmed when there is sufficient and satisfactory evidence of consistent workplace performance.

3.3 Training Frequency Analysis

3.3.1 Upon the formulation and completion of the task and training needs analysis the next fundamental element of this scheme is to determine how many times specific tasks/functions have to be carried out in the workplace to ensure that operational competency is maintained at all times.

This frequency analysis of training is based on an assessment of four areas relating to the training for competency.

1. **Change:** i.e. does the subject change much over time?
2. **Repetition:** i.e. how often is the subject/skill practised in normal work?
3. **Complexity:** i.e. how difficult is the subject/skill?
4. **Risk:** i.e. what are the consequences of poor performance?

3.4 Training Subject Areas

3.4.1 The training areas shown below cover subjects necessary for initial, on job and recurrent competency training.

3.4.2 The following list of areas is representative but not exhaustive. This list may be used to construct a balanced RFFS training/development programme.

3.4.3 Aerodrome Familiarisation:

1. Recognize the runway and taxiway identification system and associated pavement marking, lighting and signs,
2. Comply with local rules regarding vehicle movements and access,
3. Locate a given point on the aerodrome using references given by Air Traffic Control,
4. Locate all emergency access routes and other non standard routes used to traverse areas where aircraft accidents may occur including difficult environs and runway undershoot/overshoot areas,
5. Understand and comply with special procedures during low visibility conditions,
6. Identify areas where hazardous materials including freight may be stored.

3.4.4 Aircraft Familiarisation:

1. Locate normal entry doors and emergency exits for aircraft normally using the aerodrome and describe methods of operation,
2. Describe slide deployment and methods of evacuation,
3. Identify aircraft seating and cargo configurations,
4. Locate and utilise aircraft break-in areas where installed,

5. Locate and utilise battery isolators,
6. Locate and utilise installed aircraft fire protection systems,
7. Identify types of fuel and locations of fuel tanks,
8. Identify component parts of aircraft using correct terminology,
9. Identify aircraft construction materials and describe the hazards arising from aircraft construction.

3.4.5 Emergency Plan:

1. Recognise different types of emergency contained in the emergency plan,
2. Comply with role as described in emergency plan,
3. Understand relevant roles of other aerodrome departments and/or external agencies.

3.4.6 Communications

1. Identify relevant radio frequencies.
2. Demonstrate correct radio procedures, terminology, and standard messages.
3. Demonstrate hand signals used to communicate with the aircraft flight crew.

3.4.7 Personal Safety:

1. Identify the hazards arising from aircraft incidents and aircraft systems,
2. Demonstrate correct and expeditious use of personal protective equipment,
3. Understand the limitations of personal protective equipment,
4. Demonstrate techniques to be used when working in confined areas,
5. Demonstrate techniques to be used when trapped or disoriented,
6. Describe the purpose and limitations of Self Contained Breathing Apparatus (SCBA),
7. Demonstrate correct and expeditious donning and start up procedures for SCBA,
8. Demonstrate use of SCBA in actual or simulated conditions i.e. smoke, heat and humidity etc.,
9. Demonstrate correct techniques when working as a team in SCBA,
10. Demonstrate emergency actions to be taken in the event of
    a) low air,
    b) Distress Signal Unit (DSU) operations,
    c) unit malfunction,
    d) face mask displacement, etc.

3.4.8 Fire Behaviours:

1. Demonstrate an understanding of causes of fire development, heat transfer and fire classification,
2. Demonstrate an understanding of the fire characteristics of materials used in aircraft construction including aviation fuel,
3. Demonstrate an understanding of the fire characteristics of materials used in aircraft hanger/building construction including dangerous goods.

3.4.9 Extinguishing Agents:

1. Understand the principles of fire initiation, spread and suppression/extinction,

2. Understand the various types of extinguishing agents commonly available.

3.4.10 Foam Monitors/Bumper Turrets:

1. Demonstrate operation of foam monitors in jet and dispersed pattern,
2. Demonstrate correct application methods,
3. Demonstrate judicious use of extinguishing agents,
4. Understand effects of wind on foam monitor use,
5. Understand and demonstrate Extended Boom Technology (EBT)

3.4.11 Hand Line Use:

1. Demonstrate selection and deployment of hand lines,
2. Demonstrate correct application of foam, foam solution and water,
3. Demonstrate judicious use of extinguishing agents,
4. Understand effect of wind on hand line and branch pipe effectiveness.

3.4.12 Complementary Agent:

1. Select and deploy complementary agents carried,
2. Demonstrate correct application of complementary agents,
3. Demonstrate tactics for dual agent application,
4. Understand effects of wind on complementary agent application.

3.4.13 Tools/Equipment:

1. Identify and locate each tool carried,
2. Demonstrate an understanding of the safety procedures necessary when operating equipment,
3. Demonstrate tactical use of each tool carried,
4. Operate and climb rescue ladders

3.4.14 Appliance Replenishment:

1. Identify location of local water supplies,
2. Demonstrate procedures for replenishment using local water supplies (hydrants, tanks, static water, etc.)

3.4.15 Fire Fighting Operations:

1. Demonstrate correct fire fighting tactics for a variety of scenarios involving aircraft normally using the aerodrome (engines, undercarriage, APU, cargo hold, avionics,)
2. Demonstrate tactics for securing and maintaining rescue paths,
3. Demonstrate tactics necessary to protect fuselage from fire exposure,
4. Demonstrate tactics necessary to control/extinguish three dimensional fires,
5. Describe the procedures for maintaining integrity of foam blankets,
6. Describe procedures for controlling/containing fuel spillage,
7. Demonstrate casualty handling and removal from an aircraft fuselage.

3.4.16 First Aid:

1. Carry out primary and secondary surveys for life threatening injuries,
2. Establish airway,

3. Carry out cardiopulmonary resuscitation,
4. Identify and treat internal/external bleeding,
5. Identify and treat casualty suffering from shock,
6. Identify injuries to skull, spine, chest and extremities,
7. Identify internal injuries,
8. Place casualties in recovery position,
9. Move casualties,
10. Treat burns,
11. Understand particular problems related to injured children/babies,
12. Manage unconscious casualties.

3.4.17 Appliance driving:

1. Correctly operate all appliances controls,
2. Drive appliances within limits of design,
3. Drive appliances in compliance with legislation and local by-laws,
4. Operate appliances to traverse difficult terrain,
5. Correctly position vehicle at an aircraft incident,
6. Pump 'on the move'.

3.4.18 Supervision/Command:

1. Ensure adherence to safety procedures,
2. Assess tactical priorities to maximise passenger survivability,
3. Select, deploy and direct fire fighting tactics,
4. Manage resources to ensure effectiveness,
5. Communicate with external agencies,
6. Fully understand the airport incident command system,
7. Fully understand the role of the forward command post,
8. Be able to operate within the forward command post,
9. Fully understand the role/rank,
10. Understand the process of delivering station training at watch level.

3.4.19 Watchroom Operators:

1. Maintain occurrence log,
2. Obtain accurate and complete information,
3. Raise the alarms within acceptable timescales,
4. Alert external mutual aid agencies.

3.5 Training Facilities Analysis

3.5.1 A detailed assessment needs to be carried out on what appropriate training simulator and training aids will be required, to ensure that the RFFS maintains its operational competency in relation to the type and frequency of aircraft operations.

4 Training Records

4.1 A record of individual achievement shall be maintained for all RFFS personnel. Records may be either in paper or electronic format, or a combination of both. Records shall be durable and auditable.

The following represents the minimum information to be recorded.

1. Unique Identification Number
2. Candidate Name
3. Date of Birth
4. Date of entry into RFFS
5. Location
6. Date of Commencement, Initial Core Competence Training
7. Date of Satisfactory Completion, Initial Core Competence Training
8. Examination Results
9. Level of qualification – Firefighter, Supervisor, Manager
10. Due date for re-certification of Core Competence
11. Date of commencement, Progressive Training to Supervisor/manager
12. Examination Results
13. Level of Qualification Confirmed – Firefighter, Supervisor, Manager
14. Transfer into other employment/position/left employment (reference brought forward)
15. Any additional courses or certifications

Training records should be maintained for the full period of service and for 5 years after transfer or cessation of employment.

5 Competency Scheme Acceptance Guidelines.

5.1 Application for GCAA acceptance of a MOC scheme shall be made in writing to the Director, Aviation Security and Infrastructure and include a full description of the facilities proposed for the proposed scheme, together with a copy of the programme syllabi, assessment strategies, staffing structure and quality assurance procedures.

5.2 The GCAA's acceptance process shall consist of 3 phases:

1. An informal discussion phase at which the GCAA's overall requirements will be explained;
2. A paper assessment phase in which the submission details will be reviewed;
3. An inspection phase where all resources provided for the design, delivery, evaluation and control of training and assessments for RFFS personnel will be sampled.

On completion of the above, the training scheme will be considered for acceptance based on the information presented and gathered during the above phases.

The GCAA will confirm in writing acceptance of the MOC scheme.
On going approval will be subject to regular audits of the scheme by the GCAA. The GCAA shall suspend, vary or revoke acceptance of the MOC should any audit reveal that the originally approved scheme has not been maintained. Significant changes to any of the resources involved in the scheme shall be discussed with the GCAA RFFS Inspector prior to implementation.
The GCAA reserves the right to review the syllabus content and practical training requirements from time to time. .

APPENDIX 3: SUPPLEMENTARY WATER SUPPLIES

1 General

1.1 Supplementary Water supplies, for the expeditious replenishment of rescue & fire–fighting vehicles at the scene of an aircraft accident shall be provided.

1.2 Airport fire-fighting appliances are required to carry set minimum quantities of water for foam production. Although the amounts carried by appliances may sound a lot, aerodrome fire-fighting appliances with high performance pumps and high output monitors, will empty their water tanks within 2 to 3 minutes. Therefore supplementary water supplies at an adequate pressure and flow shall be provided to ensure rapid replenishment of aerodrome fire-fighting appliances.

1.3 The operational objective shall be to support the continuous application of primary fire extinguishing agent (foam) in an effort to maintain a survivable environment around the immediate vicinity of an aircraft accident for far longer than that provided for by the **minimum** quantities of water for foam production set out in Table 2 of Subpart 2.

1.4 The availability of supplementary water supplies following an aircraft accident shall be described within the Aerodrome Manual. Details of the policy to be followed in the event of any operation which requires isolation or depletion of any supplementary water supply shall also be included.

1.5 It is not possible to specify a single operational requirement which ensures adequate provision of supplementary water supplies in all circumstances and for all sizes of aerodrome. Each aerodrome fire & rescue service shall undertake a Water Needs Assessment, to determine their requirements and equipment. The process decided upon shall be clearly documented and shall ensure that operational / emergency planning arrangements fulfill those requirements.

1.6 It is very possible that a supplementary water supply to replenish aerodrome fire-fighting appliances will be required in as little as 5 minutes after the time of initial emergency call.

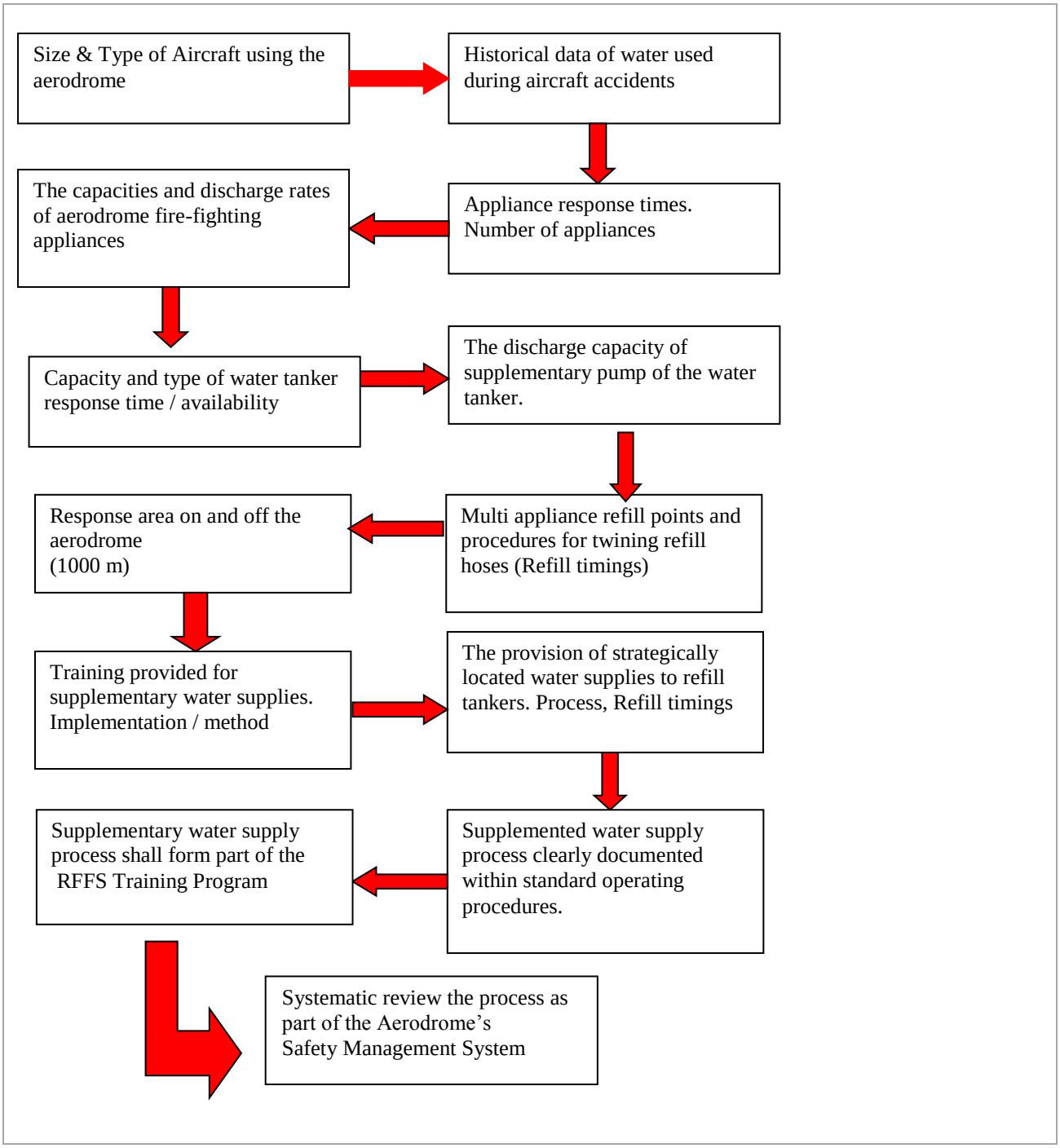
1.7 All on aerodrome developments should be assessed for the potential impact on any supplementary water supply.

1.8 All hydrant water supplies provided for supplementary water supplies shall be assessed for flow and pressure, with two or more hydrants open to simulate multi refill operations during aircraft fire-fighting from the same water main.

1.9 The availability of a sufficient quantity of water from sources in proximity to aprons, as a support to aircraft rescue and fire fighting operations, should be considered. At aerodromes where such hydrants have been provided, use of them can still be made provided they are used for replenishment of auxiliary water tank vehicles.

1.10 All supplementary water supplies shall be subjected to regular testing and inspection. Personnel shall undertake training and records of all these activities shall be maintained.

1.11 Water Needs Assessment Suggested Framework
Each box represents a focus area (s) which needs to be examined / assessed.


Size & Type of Aircraft using the aerodrome
Historical data of water used during aircraft accidents
Appliance response times. Number of appliances
The capacities and discharge rates of aerodrome fire-fighting appliances
Capacity and type of water tanker response time / availability
The discharge capacity of supplementary pump of the water tanker.
Multi appliance refill points and procedures for twining refill hoses (Refill timings)
Response area on and off the aerodrome (1000 m)
Training provided for supplementary water supplies. Implementation / method
The provision of strategically located water supplies to refill tankers. Process, Refill timings
Supplemented water supply process clearly documented within standard operating procedures.
Supplementary water supply process shall form part of the RFFS Training Program
Systematic review the process as part of the Aerodrome's Safety Management System

APPENDIX 4: INCIDENT COMMAND AND CONTROL

1 General

1.1 An Airport Incident Command System (AICS) provides a clear framework to assist the Airport Incident Commander (AIC), to organise and deploy available resources in a safe and efficient manner. It provides the AIC with a ready-to-use organisational structure that can be adapted to fit every incident, from a fuel spillage situation to the largest most complex aircraft incident.

The requirement to develop and apply an Airport Incident Command System is driven by the critical nature of the types of incidents, to which the Airport Fire & Rescue Service responds.

The development of an Aircraft Incident Command System should be seen as part of the Airport's overall organisational System for Managing Risk.

2 The Airport Incident Commander RFFS

2.1 The Airport Incident Commander (AIC) must focus on the safe and effective resolution of the incident. The AIC tactics are based on a dynamic assessment and/or the limited resources available at the time of the incident. At sometime within the timeframe of the incident, the AIC will need to work in conjunction with other mutual aid services and agencies as necessary. At this point, the full Aerodrome Emergency Plan would have been implemented.

The AIC is therefore principally concerned with the tactical co-ordination of tasks, which will be based on operational procedures. Operations are best described as tasks that are carried out on the incident ground to achieve desired objectives, using prescribed techniques and procedures in accordance with the Aerodrome Emergency Plan/Orders

3 The Operational Environment (AIC)

3.1 **Airport Incident Command System:** Is driven by the critical nature of many of the incidents the Airport Fire & Rescue Service attends, within and/or outside the Aerodrome boundary. Aircraft related incidents often share a common characteristic, which includes:

1. **Time Criticality.** Time pressure on the requirement to make decisions and act upon them. When or if the aircraft is being evacuated and or involved in a fire is arguably the major contributory factor in the determination of incident criticality.
2. **Complexity**. Large type aircraft related incidents have a higher degree of complexity, which could result in the uncertainty about outcomes. (Internal or External Aircraft situations). Each will offer a level of complexity in relation to the minimum level of Airport Rescue & Fire-Fighting Service provided.
3. **Moral Pressure**. Significant incidents involving people and aircraft will generate moral pressure on those responding. This will place the individual

under immense pressure to quickly take action and make operational-tactical decisions.

4. **Duty of Care.** Duty of Care by the Airport Incident Commander is critical at incidents in avoiding exposing RFFS personnel to unnecessary exposure to risk.
5. **Scrutiny**. GCAA investigation will focus on those in Command at the Critical Stage of the aircraft incident. Airport Incident Commanders must expect to have their decisions and subsequent actions scrutinised.
6. **Decision Making**. Decision making under crisis conditions and the operational competency of the AIC could have an effect on the overall outcome of incident.

4 Generic & Operational Dynamic Risk Assessment (AIC)

4.1 The benefits of proceeding with any task must be weighed carefully against the risks to the fire-fighters. The AIC must first calculate the risks within the hazard.
Fire-fighters will take some risk to save lives.
Fire-fighters may take some risk to save property.
Fire-fighters will not take any risk at all to save lives or property already lost.
Therefore, if after implementing all available control measures, the cost (in terms of risk to life) of proceeding with a task still outweighs the benefit, the AIC must not permit operations to proceed but consider viable alternative course of actions. For instance, would the AIC deploy BA teams in a fully developed internal aircraft fire?
This is a critical and defining aspect of the operational AIC's responsibility. To discharge this competently requires a detailed knowledge of the principles and regulations surrounding risk assessment as well as a sound understanding of the factors influencing safety within the 'fire' and rescue operation and of course the current situation.

4.2 Generic Risk Assessment:

Due to the very nature of Airport Fire & Rescue Service operations there are a wide range of operational activities to cover. This can potentially make risk assessment a time consuming activity. To minimise this and avoid duplication and inconsistent approach, the Airport Fire & Rescue Service should conduct Generic Risk Assessments as part of their Safety Management System (SMS).

4.3 Risk Register:

Airport Fire & Rescue Services should conduct and formulate a Risk Register (Hazard Log) of all identifiable risks within or in the very close proximity of their aerodrome. From the Risk Register the Emergency Plan is formulated, along with Operational Procedures, training and exercise plans, which are all part of the overall Safety Management System.

4.4 Dynamic Risk Assessment:

The term Dynamic Risk Assessment (DRA), is used to describe the continuing assessment of risk that is carried out in a rapidly changing environment at aircraft /

airport related incidents. The outcome of the initial Dynamic Risk Assessment is the declaration of a Tactical Mode. The constant Dynamic Risk Assessment may not change the mode of operations.
The Airport Incident Commanders Dynamic Risk Assessment takes into account the frequently and sometimes rapidly evolving nature of an aircraft incident, and is a continuous process. This is further complicated with the need to deal with large numbers of evacuated passengers, external fuel fires, aircraft wreckage and airport/aircraft ground activities.
It is nevertheless essential that an effective risk assessment be carried out at all operational incidents. In a high risk slow time environment, the Airport Incident Commander must implement greater levels of control and apply appropriate control measures, in order to reduce risk to an acceptable level (Large Fuel Spillage). However, under the circumstances of a rapidly developing aircraft fire situation with many casualties the risk is high and the timeframe is short with the situation being much more dynamic. Nevertheless, control measures still need to be implemented.

5 Tactical Mode

Tactical Mode is the term used to describe the outcome of the strategic decision, which has been taken by the AIC, which in turn provides the operating framework within which all tactical operations will be conducted. It is often the only strategic decision taken at an aircraft incident.
Tactical Mode is required for all incidents and must be kept current at all times.
In any aircraft incident, there are three possible modes of operation; these are 'Offensive', 'Defensive' and 'Transitional'. Where safe systems of work are deployed and adequate control measures implemented, the mode of operation is likely to be 'Offensive'. However, where the risk to crews is excessive, 'Defensive' mode will be declared.
Where an incident is sectorised and the mode of operation varies between sectors, i.e. both Offensive and Defensive modes are in operation at the same time at an incident, the incident is deemed to be in 'Transitional Mode'.
On arrival at an aircraft incident the AIC must establish what and where the most significant are hazards to his personnel exist. The AIC must be aware that the hazard area may well extend beyond the boundaries of the aircraft, terminal building or hangar involved. The hazard area is defined as 'an area in which significant hazards have been identified'. The AIC must decide if the level of risk to crews is justifiable within this area.

6 Offensive Mode:

This mode may apply to the entire incident or to a sector within the incident.
This is where the operation is being tackled from within the perceived hazard area.
Most aircraft incidents will be dealt with from the offset in this mode.
The AIC would have established that potential benefits outweigh the identified risks, so

the AIC will be committing crews into a relatively hazardous area, supported by appropriate equipment, procedures and training.
Greater levels of control, additional resource and control measures may be required which form the basis of the Aerodrome Emergency Planning arrangements.
Offensive Mode is the normal mode of operation used at, for example, hot brakes, undercarriage fires, engine fires, taxiway/apron traffic collisions, etc.
Further examples of Offensive Mode:

1. RFFS BA crews committed to investigate a smoking undercarriage (hazard area) to undertake possible fire fighting action.
2. RFFS crews committed into a hazard area at an Apron Traffic Collision to perform First Aid and/or rescue.
3. RFFS crews to lay a foam blanket on a fuel spillage adjacent to an aircraft on stand.

7 Defensive Mode

This mode may apply to the entire incident or a sector.
This is where the operation is being fought with a defensive position. In Defensive Mode, the identified risks outweigh the potential benefits, so no matter how many additional control measures are put into place, the risks are too great.
In these circumstances the AIC would announce Defensive Mode and ensure that all responding personnel are aware of the mode and its implications.
For example, the internal fire on an aircraft has completely destroyed the integrity of the fuselage; the tactics are to protect exposure risks and adjoining property without committing crews into the hazard area.
Further Examples of Defensive Mode:

1. Withdrawing a crew from a hazardous area because the risk has increased.
2. Standing by awaiting expert advice, before committing crews, for example to a hazardous/dangerous cargo incident.

8 Default to Defensive

A Tactical Mode must be declared immediately at all incidents. This is a critical part of the procedure. The AIC will make an immediate judgment about whether it is safe to proceed with Offensive operations. If the AIC feels it is not safe enough, a Defensive approach should be used until a suitably safe approach to deal with the incident can be decided upon.
As most RFFS resources exceed the minimum requirements, the initial RFFS response is likely to be in Offensive mode.
If the AIC is unsure whether it is safe to announce ‘Offensive Mode’, or confirm offensive operations, then ‘Defensive Mode’ must be announced. As soon as the AIC is able, a review of the mode should be conducted. This approach is referred to as ‘Default to Defensive’.
The key to effective use of the Tactical Mode procedure is speed of application within

the critical decision-making process.
The process is founded on the operational competency of the AIC and his own confidence in making such decisions.

9 Recording of Tactical Mode

The AIC should decide upon the Tactical Mode and then communicate by radio to the Air Traffic Control, Watchroom, and Aerodrome Emergency Planning Centre. Most if not all radio communication at aerodromes is recorded.
As the aircraft incident grows and the AIC's span of control increases, it is essential that all RFFS personnel are aware of the tactics on the incident ground and the prevailing Tactical Mode.
AIC when booking in attendance, the first radio message to ATC and/or watchroom
Example: - "Fire Command in attendance 737 aircraft undercarriage fire 'Offensive Mode' aircraft being evacuated".
Communication over the ATC radio results in a recording and time stamping of that announcement. When a Dynamic Risk Assessment is conducted, the outcome is therefore recorded.
Any changes in the tactical mode must be transmitted to ATC, the watchroom and the EOC by radio for recording purposes.

10 Identification

The AIC needs to be easily identifiable by wearing distinctive PPE or surcoat / tabard.
When and if the AIC has hands over operational command he should take on the function of Airport Command Liaison and provide any technical information, liaison and support to the Incident Commander.

Airport Incident Commander

Airport Sector Commander

11 Airport Sector Commander

The AIC will delegate responsibilities for sectors to Sector Commanders. It is their responsibility to monitor the situation and the progress of the incident and pass on all information regarding progress and incident situation to the Airport Incident Commander.
The Airport Sector Commander is to ensure liaison with all emergency service personnel operating within their sector.

Airport Sector Commanders shall ensure that the AIC is kept informed of all operational progress and any change in tactics due to the development or deterioration of conditions in their sector. All Sector Commanders shall be identified, usually by tabards. Effective communication is of critical importance at all incidents. Information has to be relayed accurately from the AIC to the crews carrying out the work and vice-versa so that the crews are aware of the tactics being employed and the AIC is aware of developments on the incident ground.

12 Airport Incident Command Competence

12.1 Command competence is about decisions and actions required to brief crews and allocate responsibilities for resolution of accidents/incidents. It includes the following key aspects:

1. Good communications skills
2. Allocating tasks to individuals
3. Decision-making
4. Use and application of all available resources
5. Technical knowledge
6. Practical ability
7. Understanding of Aerodrome Emergency Plan

The role of the Airport Incident Commander is a safety critical function for all Senior Airport Fire Officers who have a responsibility to respond to incidents. It is essential that Airports are able to provide evidence that their Airport Incident Commanders are competent, and that the Airport Incident Commander themselves understand and maintain their operational competence.

12.2 There are six key elements to the process of Operational Command Competence.

1. Robust selection process
2. The definition of competence.
3. Competency Standards for the role.
4. Workplace Training and Assessment.
5. Personal Development / Training / Assessment Records.
6. Continuing Professional Development (CPD).

It is fundamental that the Airport Incident Commander is able to learn continuously from the successes and challenges experienced during Incident Command situations. Command Competence and the assessment of Command Competency are vital to the overall performance of the Airport Incident Commander, and if performance isn't being measured, it isn't being managed.

Command Competence is the ability to consistently use knowledge, skills and understanding to the standards expected in employment, to meet the changing demands of an operational incident and solve operational problems.

It is important that the Airport Incident Commander is not only able to demonstrate adequately those practical skills involved in carrying out Incident Command, but can

also manage the range of tasks in a dynamic, stressful and constantly changing environment.
A Workplace assessment linked to operational competency standards is vital in assessing the operational, knowledge, understanding and ability of the Airport Incident Commander.
If any shortfalls in performance are identified, these become part of the development requirements for the individual concerned.

13 Safety Management Systems

13.1 Effective Safety Management requires a systems approach to the development of Safety polices, procedures and practices. Airport Fire Service Safety Management, of which AICS is a fundamental part, requires planning, organizing, communicating, training and evaluating.
Safety Management integrates diverse activities undertaken by the Airport Fire Service in a coherent manner.
Effective Safety Management requires more than established organisational structures and procedures. It requires a genuine commitment to Safety on the part of all those attending operational incidents (Safety Culture see CAR Part 9 CAR Part 10).

14 Inter-Agency Liaison (Emergency Preparedness)

14.1 The Airport Incident Commander must establish and maintain effective liaison with all other mutual aid agencies, where they are present at an incident.
This will include tactical liaison with other mutual emergency services to co-ordinate operational activities effectively, and liaison with technical specialists whose specific knowledge may be critical in helping to resolve the incident.
Management and command of serious aircraft incidents is rarely a single agency task.
The Airport Incident Command System must be developed to ensure on airport procedures fit seamlessly with those of partner organisations, and the overall approach to integrated emergency management.
The Airport Incident Commander must keep the Forward Command Post (FOC) fully informed of his actions and up to date with the changes in operational circumstances.
The Airport Incident Commander needs to understand clearly the various agencies, and players, at various levels within emergency plan including knowledge of the powers and duties of officials at key levels.
Within the Airports Emergency Plan, the function/role of all agencies attending the airport as part of the aircraft incident response would have to be clearly identified and assessed.
An aircraft accident site is potentially an extremely hazardous area, particularly if the airframe has been damaged by impact or exposed to the effects of fire. It is likely, in these circumstances, that hazardous gases, vapours, aviation fuel, hydraulic fluids and particles of composite materials fibres will contaminate the site. It is therefore essential

that those requiring access to the accident site are well informed, prepared and protected.

15 Cordon Control

15.1 Cordons are employed as an effective method of controlling resources and maintaining safety on the aircraft incident site. The AIC must consider the safety of firefighters, evacuated passengers, other members of the public, members of other emergency services and voluntary agencies attending.

After the initial cordon has been established to secure the scene, usually by the airport police, the incident is usually divided into two types of cordon:

1. Inner Cordon

An inner cordon is used to control access to the immediate scene of operations. Access to the area controlled by an inner cordon, which by definition is a high hazard zone, should be restricted to the minimum numbers required for work to be undertaken safely and effectively.

A basic way to establish an inner cordon in the first instance is from the front of each attending airport major foam tender.

However, if the aircraft incident is the consequence of a suspected criminal act, the police will assume overall control of the area and liaison between all attending services will determine entry and exit protocol.

Personnel should only enter when they have received a full briefing and been allocated specific tasks.

It is vital that local planning and exercising is conducted to ensure misunderstandings about roles and responsibilities do not occur during an incident. In terms of accounting for the safety and whereabouts of personnel, it is a responsibility of AICs, or this function can be delegated to Sector Commanders when the incident has been sectorised, to be aware of which personnel and other agencies crews are active in their sector.

2. Outer Cordon:

An outer cordon is used to prevent access by the public into an area used by the emergency services while they are attending an incident. The police will usually control outer cordons. Marshalling areas will usually be located within the outer cordon area if one or more are established. The outer cordon for an on aerodrome aircraft incident may be the aerodrome boundary fence.

Access through the outer cordon for essential non-emergency service personnel should be by way of a scene access control point. The outer cordon may then be further supplemented by a traffic cordon.

16 Overall Incident Command & Control

16.1 BRONZE (OPERATIONAL)

Each mutual aid agency shall provide a suitable level of management at the incident.

BRONZE – Operational Commanders.

These command the people at the scene who are carrying out the actual work of dealing with the incident; the firefighters, police officers, medical and ambulance crews, etc. Each service could have its own Bronze Commander.

The Mobile 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. (Bronze Command Post).

16.2 SILVER (TACTICAL)

Each mutual aid agency shall provide a suitable level of management to form a Silver Command Team. This team will operate remotely from the incident and will be responsible for providing tactical guidance and adequate resources for the successful conclusion of the incident. The Silver Command Team will ensure that pre-determined contingency plans are correctly followed.

SILVER - Tactical Commanders.

The "middle management". A number of organisations and groups of organisations will take on a Silver Command role. Some may have their own co-ordination or emergency centres to assist them, and will make extensive use of liaison officers to ensure that there is good communication.

They translate the strategic view from the Gold Commanders into actions to be taken by those on the ground:

The Airports Emergency Operations Centre 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. (Silver Command Post).

16.3 GOLD (STRATEGIC)

Each mutual aid agency will provide a suitable level of management (normally at executive level), who will operate remotely from the incident. This Gold Command Team will determine the overall strategy for resolving the incident and returning back to normality.

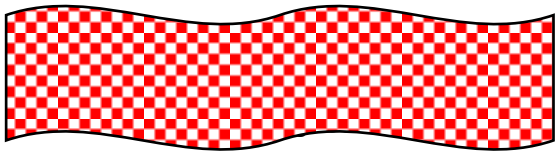
GOLD - Strategic Command

Senior Officers from the organisations involved will meet to agree a strategic view. Their concern will be more focused on the future than dealing with immediate problems. Gold is chaired by a senior officer from the lead organisation. In most cases this will be the Police.

16.4 MOBILE COMMAND POST

A Mobile Command Post will provide an operational scene rendezvous point. It must be clearly identifiable to all attending emergency responders.

A means of identifying the Mobile Command Post is by a red and white chequered flag or Mast Elevated Red Strode Light for night operations.



16.5 INCIDENT COMMAND BOARD

The planning and recording of the plan is essential to a fluid and achievable operations objective. It can also be used to facilitate operational briefings at the incident site to other responders. Keeping up to date information regarding casualties, rescues and other incident operations. It could also be used at an incident aid memoir of required actions at an Aircraft Incident.

The use of an Incident Command Board has a tactical tool by the AIC would be of benefit.

See suggested Incident Command Board below.

17 Conclusions

The Airport Incident Commander does not, and should not work alone. The need for effective team performance on the incident ground remains vital.

Only by a careful assessment of the accident site can the hazards and risks be limited and the area controlled. The Airport Incident Commander must exercise good command and control in the initial stages of an incident.

It should be noted that the Air Accidents Investigation Branches across the world have raised concerns on a number of occasions, where robust Incident Command procedures may have led to improved resolution of some aircraft related incidents.

Documentation Reference

General Civil Aviation Authority Publication CAR Part 9
ICAO Safety Management Manual 9859
ICAO Airport Services Manual Part 7 9137