Doc 9137-AN/898
Part 1

AIRPORT SERVICES MANUAL

PART 1

RESCUE AND FIRE FIGHTING

THIRD EDITION — 1990

Approved by the Secretary General
and published under his authority

INTERNATIONAL CIVIL AVIATION ORGANIZATION

Airport Services Manual

(Doc 9137-AN/898)

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Rescue and Fire Fighting

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AMENDMENTS

Amendments are announced in the supplements to the *Catalogue of ICAO Publications;* the Catalogue and its supplements are available on the ICAO website at www.icao.int. The space below is provided to keep a record of such amendments.

RECORD OF AMENDMENTS AND CORRIGENDA

AMENDMENTS		
No.	Date	Entered by
1	14/11/95	ICAO

CORRIGENDA		
No.	Date	Entered by

Foreword

In accordance with the provisions of Annex 14, States are required to provide rescue and fire fighting equipment and services at an airport. The purpose of the material in this manual is to assist States in the implementation of these specifications and thereby help to ensure their uniform application.

In 1969 the Air Navigation Commission of ICAO established the Rescue and Fire Fighting Panel. The objectives of the panel were to evaluate recent research and experimental work and to develop a more logical system for assessing the requirements for airport rescue and fire fighting services taking into account the characteristics of new aircraft.

The method contained in Annex 14 at that time for determination of the level of protection to be provided at an airport was related to the fuel load and passenger capacity of the critical aeroplane. The Rescue and Fire Fighting Panel developed a new concept based on the critical area to be protected in any post-accident fire situation. The objective of this concept is the safe evacuation of the aircraft occupants. The panel in its work also developed material on the dimensions of the critical area, application and discharge rates for extinguishing agents, airport categorization and amounts of extinguishing agents to be provided at an airport. The critical area concept was adopted by ICAO in conjunction with the adoption of Amendment No. 30 to Annex 14.

This manual includes, *inter alia,* material concerning the level of protection to be provided at an airport, critical area concept and the method by which the scale of extinguishing agents has been related to the critical area, vehicle and extinguishing agent characteristics, siting of fire stations, training of personnel and operating procedures for dealing with an emergency. The manual also contains information on precautionary measures to be taken during aircraft fuelling operations as well as aircraft data for use in the training of rescue and fire fighting personnel.

It is intended that the manual be kept up to date. Future editions will most likely be improved on the basis of experience gained and of comments and suggestions received from users of this manual. Therefore, readers are invited to give their views, comments and suggestions on this edition. These should be directed to the Secretary General of ICAO.

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Chapter 1
General Considerations

1.1 INTRODUCTION

1.1.1 The principal objective of a rescue and fire fighting service is to save lives in the event of an aircraft accident or incident.

1.1.2 This contingency must assume at all times the possibility of and need for extinguishing a fire which may:

a) exist at the time an aircraft is landing, taking off, taxiing, parked, etc.; or

b) occur immediately following an aircraft accident or incident; or

c) occur at any time during rescue operations.

The rupture of fuel tanks in an aircraft crash and the consequent spillage of highly volatile fuels, and other flammable liquids used by aircraft, present a high degree of probability of ignition if these liquids come into contact with hot metal parts of the aircraft or because of sparks caused by the movement of wreckage or disturbance of the electrical circuit. Fires may also occur through the discharge of accumulated electrostatic charges at the time of ground contact or during fuelling operations. An outstanding characteristic of aircraft fires is their tendency to reach lethal intensity within a very short time. This presents a severe hazard to the lives of those directly involved and handicaps rescue efforts.

1.1.3 For this reason, the provision of adequate and special means of dealing promptly with an aircraft accident or incident occurring at, or in the immediate vicinity of, an airport assumes primary importance because it is within this area that there are the greatest opportunities of saving lives.

1.1.4 The extent of aircraft fires which may affect rescue is influenced largely by the quantity and disposition of fuel carried by the aircraft and the location of any fuel released as a result of the accident or incident. It may be possible to reduce these hazards through the provision of effective fire prevention devices, such as fire walls at all strategic points of the aircraft or crash and fire resistant fuel tanks and fuel lines, installed aboard an aircraft.

1.1.5 The standardization of emergency exits and their ability to be opened from the inside and outside of an aircraft is of primary importance in rescue operations. The provision of special tools to rescue teams in order to gain access to the interior of a fuselage is essential but their use can only be regarded as an extreme measure to be taken whenever for special reasons normal means of access are unavailable or unsuitable for use.

1.1.6 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 personnel and equipment, designated for rescue and fire fighting purposes, can be put into use.

1.1.7 The proposals set out hereunder concerning these services are intended as a general guide, to be applied to the fullest extent practicable.

1.2 ADMINISTRATION

1.2.1 The rescue and fire fighting service at an airport should be under the administrative control of the airport management, which should also be responsible for ensuring that the service provided is organized, equipped, staffed, trained and operated in such a manner as to fulfil its proper functions. The airport management may designate public or private organizations suitably located and equipped to provide the rescue and fire fighting service. It is intended that the fire station housing these organizations be normally located on the airport although an off-airport location is not precluded provided the response time can be met.

1.2.2 It is intended that the above include the availability of suitable rescue equipment and services for an airport located close to water, swamp, desert or other

difficult environment, where a significant portion of approach or departure operations takes place over these areas. The purpose of these special vehicles is to rescue aircraft occupants at an aircraft accident that may occur in this area. Special fire fighting equipment need not be provided; this does not prevent the provision of such equipment if it would be of practical use, such as when the areas concerned include reefs or islands. Material related to rescue operations in difficult environments may be found in Chapter 13.

1.2.3 Co-ordination between the rescue and fire fighting service at an airport and public protective agencies (local fire departments, police forces, coast guard and hospitals) should be achieved by prior agreement for assistance in dealing with an aircraft accident.

1.2.4 A detailed grid map(s) of the airport and its immediate vicinity (with date of revision) should be provided for the use of the airport services concerned. Information concerning topography, access roads and location of water supplies should be indicated. This map should be conspicuously posted in the control tower and the fire station and be available on the rescue and fire fighting vehicles and such other supporting vehicles required to respond to an aircraft accident or incident. Copies should also be distributed to public protective agencies as desirable.

Chapter 2

Level of Protection to be Provided

2.1 AIRPORT CATEGORY

2.1.1 The level of protection to be provided at an airport should be based on the dimensions of the aeroplanes using the airport as adjusted for their frequency of operations.

2.1.2 The airport category for rescue and fire fighting should be based on the over-all length of the longest aeroplanes normally using the airport and their maximum fuselage width. The airport category should be determined from Table 2-1 by categorizing the aeroplanes using the airport, by first evaluating their over-all length and second, their fuselage width. If after selecting the category appropriate to an aeroplane's over-all length that aeroplane's fuselage width is greater than the maximum width in column 3 for that category, then the category for that aeroplane is actually one category higher.

2.1.3 Airports should be categorized for rescue and fire fighting purposes by counting the aeroplane movements in the busiest consecutive three months of the year as follows:

a) when the number of movements of the aeroplanes in the highest category normally using the airport is 700 or greater in the busiest consecutive three months, then that category should be the airport category (see examples nos. 1 and 2);

b) when the number of movements of the aeroplanes in the highest category normally using the airport is less than 700 in the busiest consecutive three months, then the airport category may be one less than the highest aeroplane category (see examples nos. 3 and 4); and

c) when there is a wide range of difference between the dimensions of the aeroplanes which are included in reaching 700 movements, the aeroplane category may be further reduced to be no lower than two categories below that of the highest aeroplane category (see example no. 5).

2.1.4 It should be noted that the concession to adjust the level of protection provided based on frequency of operations is intended to be withdrawn in two stages and that from 1 January 2000, the level of protection provided shall not be less than one category below the determined category and from 1 January 2005, the level of protection provided should be equal to the determined category.

2.1.5 Either a take-off or a landing constitutes a movement. Movements of scheduled, non-scheduled and general aviation operations should be counted in determining the airport category. A classification of representative aeroplanes by the airport category shown in Table 2-1 is included in Appendix 2.

2.1.6 The following examples illustrate the method for the determination of the airport category.

Example No. 1

Aeroplane	*Over-all length*	*Fuselage width*	*Category*	*Movements*
Tupolev TU-154	47 m	3.45 m	7	300
Boeing B707-320	46.61 m	3.55 m	7	600

The longest aeroplanes are categorized by evaluating, from Table 2-1, first their over-all length and second, their fuselage width, until 700 movements are reached. It may be seen that the number of movements of the longest aeroplanes in the highest category totals more than 700. The airport in this case would be category 7.

Example No. 2

Aeroplane	*Over-all length*	*Fuselage width*	*Category*	*Movements*
DC-8-61	57.12 m	3.51 m	8	300
Super VC-10	52.43 m	3.50 m	8	300
Boeing 767-200	48.50 m	5.03 m	8	300