



CIVIL AVIATION SAFETY AUTHORITY OF PNG

PNG

Civil Aviation Rules

Part 139

Aerodromes – Certification and Operation

Effective 1 May 2017

DESCRIPTION

Part 139 provides the regulatory requirements relating to—

- the certification and operation of aerodromes;
- the security measures applicable to aerodromes;
- the implementation of safety management systems.
- the use of aerodromes by aircraft operators

Part 139 adopts the standard layout for the rule parts relating to the certification of organisations. The layout prescribes specific requirements for the certification (entry standards), operation (continued operations), and safety audit (surveillance) of aerodromes. Part 139 also details the requirements for security measures to be complied with by the aerodrome certificate holder.

Bulletin

This part first came into force on 1 January 2004 and now incorporates the following amendments:

Amendment	Effective Date
Amendment 1	1 January 2015
Amendment 2	1 May 2017

Summary of amendments:

Amendment 1:

(CAR/17/139/36)

Rule 139.15 new amendments inserted and existing moved to 139.17.

139.51 amended and 139.53 inserted with existing

Reordering of Subpart B to bring Part 139 into line with other Parts.

Rules 139.69, 139.79, 139.81, 139.83, 139.85, 139.87, and 139.89 are rearrangement of the rule parts.

Rules 139.91, 139.93, 139.95 are insertions of new amendment.

139.97 replaces 139.77 with new amendments.

Subpart C is rearrangement following Subpart B to bring into line with other Parts.

Subpart D Rules 139.203, 139.205, 139.207 and 139.209 rearranged and new amendments inserted.

Appendix A to H is inserted as new amendments.

Amendment 2:

(CAR/16/139/01)

-Schedule of Rules renumbered.

-Editorial amendments

- Subpart A re-numbered for clarity and flow.

-Subpart C re-numbered for clarity and flow.

-Editorial amendment – Rule 139.51(a)(2) “Manger” corrected to “Manager”.

-Terminology – Delete “transport” in Rule 139.53(c)(2)&(3) for consistency in use of “Regular Air Operations” throughout the rule parts.

-New sub-paragraphs (c), (d) & (e) inserted in Rule 139.59.

-Terminology – “2 way voice radio communications” in Rule 139.63(b) & (c) amended to “two way radio communication” for consistency with Rule 139.87(c)(2)(i)(iii).

-Rule 139.93(a)– Existing text enhanced and new paragraph (c), added to Rule 139.93

New amendment inserted with additional text.

-Incorrect referencing of Rule “139.95” in relation to Rule 139.105(c)(1) and 139.105(c)(2) rectified to Rule “139.97”

-Consistency in use of “programme” – “program” in Rule 139.201(d)(15) amended to “programme” for consistency with Rules 139.79, 139.81, 139.83, 139.93, 139.205 etc.

-New sub-paragraph added to 139.201 under (17) for aerodrome programme contractual provision requirements

Appendix D is revised to include obstacle control requirements

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Subpart A — General

139.1 Purpose

This Part prescribes:-

- (1) rules governing the certification and operation of aerodromes; and
- (2) rules for security at certificated aerodromes.

139.3 Requirement for certificate

- (a) A person must not operate an aerodrome serving any aeroplane having a passenger seating configuration of 20 seats or more, excluding any required flight crew member seat, that is engaged in regular air operations for the carriage of passengers to, from or within Papua New Guinea except under the authority of, an aerodrome operating certificate issued by the Director under the Act and in accordance with this Part.
- (b) A person operating an aerodrome who is not required to hold an aerodrome operating certificate under paragraph (a), may apply for an aerodrome certificate under this Part or must meet the minimum aerodrome standards acceptable to the Director required by rule 139.15.

139.5 Application for certificate

An applicant for the grant of an aerodrome operating certificate must complete form CA139/01 and submit it to the Director with:-

- (1) the exposition required by 139.97; and
- (2) a payment of the appropriate application fee prescribed by regulations made under the Act; and
- (3) a plan of the aerodrome and its facilities certified by a registered surveyor; and
- (4) evidence of lawful entitlement to use the place as an aerodrome.

139.7 Issue of certificate

An aerodrome operating certificate may be issued by the Director under the Act in accordance with this Part if the Director is satisfied that:-

- (1) the applicant meets the requirements of Subpart B; and
- (2) the applicant, and the applicant's senior person or persons required by 139.51(a)(1) and (2) are fit and proper persons; and
- (3) the granting of the certificate is not contrary to the interests of aviation safety.

139.9 Duration of certificate

- (a) An aerodrome operating certificate may be granted or renewed for a period of up to 5 years.
- (b) An aerodrome operating certificate remains in force until it expires or is suspended or revoked.
- (c) The holder of an aerodrome operating certificate that expires or is revoked shall forthwith surrender the certificate to the Director.
- (d) The holder of an aerodrome operating certificate that is suspended shall forthwith produce the certificate to the Director for appropriate endorsement.

139.11 Renewal of certificate

- (a) An application for the renewal of an aerodrome operating certificate shall be made on form CA139/01.
- (b) The application shall be submitted to the Director at least 30 days before the certificate expires.

139.13 Non-certificated aerodrome requirements

A person operating an aerodrome who is not required to hold an aerodrome operating certificate must comply with the minimum aerodrome standards acceptable to the Director.

[CASA Advisory Circulars in the 139 series contain minimum aerodrome standards that are acceptable to the Director.]

139.15 Exemptions

The Director may exempt any person from any requirement in Subpart A, B, C, or D.

Subpart B — Certification Requirements**139.51 Personnel requirements**

- (a) An applicant for the grant of an aerodrome operating certificate must engage, employ or contract:-
 - (1) a senior person identified as the Chief Executive who has the authority within the applicant's organisation to ensure that all activities undertaken by the organisation can be financed and carried out in accordance with the requirements and standards prescribed by this Part; and
 - (2) a senior person designated as the Airport Manager or group of senior persons who are responsible for ensuring that the aerodrome and its operation comply with the requirements of this Part; and
 - (3) sufficient personnel to operate and maintain the aerodrome and its services and facilities in accordance with the requirements of Subparts B, C, and D.

- (b) An applicant for the grant of an aerodrome certificate must establish a procedure for initially assessing and for maintaining the competence of personnel required to operate and maintain the aerodrome and its services and facilities.

139.53 Aerodrome design requirements

- (a) An applicant for the grant of an aerodrome operating certificate must ensure that the physical characteristics of the aerodrome, the obstacle limitation surfaces, the visual aids for navigation and denoting obstacles and restricted areas, and the equipment and installations for the aerodrome are commensurate with:-
 - (1) the characteristics of the aircraft that the aerodrome is intended to serve; and
 - (2) the lowest meteorological minima intended for each runway; and
 - (3) the ambient light conditions intended for the operation of aircraft on each runway.
- (b) The physical characteristics, obstacle limitation surfaces, visual aids, and equipment and installations provided at the aerodrome must meet the applicable standards in Appendices C to H.
- (c) An applicant for the grant of an aerodrome certificate must ensure that a runway end safety area that complies with the physical characteristics specified in Appendix A is provided at each end of a runway at the aerodrome if:-
 - (1) the runway is used for regular air operations for the carriage of passengers to and from Papua New Guinea; or
 - (2) the runway is used for regular domestic air operations for the carriage of passengers by aeroplanes that have ICAO Code 4 category; or
 - (3) the aerodrome is used for regular air operations for the carriage of passengers by aeroplanes that have a certificated seating configuration of 20 seats or more excluding any required crew member seat and a runway is upgraded to instrument runway.

139.55 Aerodrome limitations

An applicant for the grant of an aerodrome operating certificate must, when necessary for the safety of aircraft operations at their aerodrome, establish appropriate limitations on the use of the aerodrome that arise from the aerodrome design or the facilities or services provided at the aerodrome.

139.57 Aerodrome emergency plan

- (a) An applicant for the grant of an aerodrome operating certificate must establish and maintain an aerodrome emergency plan that is designed to minimise the possibility and extent of personal injury and property damage at, or in the vicinity of, their aerodrome in an emergency.
- (b) The aerodrome emergency plan required by paragraph (a) must include—

- (1) details of the types of emergencies planned for; and
 - (2) procedures for prompt response to the emergencies planned for; and
 - (3) sufficient detail to provide adequate guidance to each person who must carry out the plan; and
 - (4) details of the agencies involved in the plan and the responsibility and role of each agency; and
 - (5) for an aerodrome serving international air transport operations, provision for an adequately equipped emergency operations centre and command post for each type of emergency; and
 - (6) a description of equipment that is available for implementing the emergency plan including medical equipment, and details of the location of the equipment; and
 - (7) information on names and telephone numbers of offices and persons to be contacted in the case of a particular emergency; and
 - (8) a grid map of the aerodrome and its immediate vicinity; and
 - (9) procedures to maintain the aerodrome emergency plan in accordance with rule 139.103.
- (c) The applicant must:-
- (1) co-ordinate its aerodrome emergency plan with law enforcement agencies, security providers, rescue and firefighting agencies, medical personnel and organisations, principal tenants of the aerodrome, and all other persons who have responsibilities in the plan; and
 - (2) to the extent practicable, provide for participation by all agencies and personnel specified in paragraph (c)(1) in the development of the aerodrome emergency plan.

139.59 Rescue and firefighting – category determination

- (a) Except as provided in paragraph (b), an applicant for the grant of an aerodrome operating certificate must, for any International aerodrome, and any other aerodrome when so required by the Director in the interest of safety:-
- (1) provide rescue and firefighting capability at that aerodrome; and
 - (2) determine the rescue and firefighting category of the aerodrome in accordance with Table 1 based on the longest aeroplanes normally using the aerodrome and their fuselage width; and
 - (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 Table 1, column (3), for that category, then the category for that aeroplane shall actually be one category higher.

(b) The aerodrome category determined under paragraph (a) may be reduced by 1 category if the number of aeroplane movements at the aerodrome of those aeroplanes used to determine the aerodrome category under paragraph (a) is less than 700 movements in the busiest consecutive three months of the year.

(c) 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

(d) The aerodrome category shall be determined from Table 1 and shall be based on the longest aeroplanes normally using the aerodrome and their fuselage width.

(e) 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), for that category, then the category for that aeroplane shall actually be one category higher.

Table 1. Aerodrome category for rescue and firefighting

<u>Aerodrome category</u>	<u>Aeroplane over-all length</u>	<u>Maximum fuselage width</u>
1	0 up to but not including 9 m	2 m
2	9 m up to but not including 12 m	2 m
3	12m up to but not including 18 m	3 m
4	18 m up to but not including 24 m	4 m
5	24 m up to but not including 28 m	4 m
6	28 m up to but not including 39 m	5 m
7	39 m up to but not including 49 m	5 m
8	49 m up to but not including 61 m	7 m
9	61 m up to but not including 76 m	7 m
10	76 m up to but not including 90 m	8 m

139.61 Rescue and firefighting – extinguishing agents

An applicant for the grant of an aerodrome operating certificate must have the minimum extinguishing agents required for the category determined under 139.59, as specified in Table 2.

Table 2. Minimum usable amounts of extinguishing agents

Aerodrome category	Foam Meeting Performance level B		Complementary agents		
	Water (L)	Discharge rate form solution/minute (L)	Dry chemical powders (kg)	Or Halons (kg)	Or CO ₂ (kg)
1	230	230	45	45	91
2	670	550	90	90	180
3	1200	900	135	135	270
4	2400	1800	135	135	270
5	5400	3000	180	180	360
6	7900	4000	225	225	450
7	12100	5300	225	225	450
8	18200	7200	450	450	900
9	24300	9000	450	450	900
10	32300	11200	450	450	900

139.63 Rescue and firefighting – vehicles

(a) Subject to paragraphs (b) and (d), an applicant for the grant of an aerodrome operating certificate must have the minimum rescue and firefighting vehicles for the aerodrome category determined under 139.59, as specified in Table 3.

(b) Subject to paragraph (c), each vehicle required by paragraph (a) must be equipped for two way radio communications with at least:-

- (1) each of the other required rescue and firefighting vehicles required for the aerodrome; and

- (2) the aerodrome control service or aerodrome flight information service serving the aerodrome; and
 - (3) other stations as specified in the applicant's aerodrome emergency plan.
- (c) Where only 1 vehicle is required by paragraph (a) and there is no aerodrome control service or aerodrome flight information service serving the aerodrome and the aerodrome emergency plan does not provide for contact with other stations, the vehicle does not need to be equipped for two way radio communications.
- (d) Each vehicle required by paragraph (a) must:-
- (1) have a flashing or rotating beacon; and
 - (2) be marked in a single conspicuous colour of red or yellowish green.

Table 3. Minimum rescue and firefighting vehicles

Aerodrome category	Rescue and fire fighting vehicles
1	1
2	1
3	1
4	1
5	1
6	2
7	2
8	3
9	3
10	3

139.65 Rescue and firefighting – personnel requirements

An applicant for the grant of an aerodrome operating certificate must establish a procedure for ensuring that all rescue and firefighting personnel at their aerodrome are:-

- (1) equipped with adequate protective clothing and rescue equipment needed to do their duties; and

- (2) trained, are medically and physically fit, and are competent in the use of the rescue and firefighting equipment; and
- (3) receiving recurrent training and regular practice to maintain their competency; and
- (4) sufficient in number and are readily available to operate the rescue and firefighting vehicle or vehicles and the equipment at maximum capacity; and
- (5) alerted by siren, alarm, or other means to any existing or impending emergency requiring their assistance.

139.67 Rescue and firefighting – response capability

An applicant for the grant of an aerodrome operating certificate must, when required by the Director, demonstrate the following rescue and firefighting response capability in optimum conditions of visibility and surface conditions—

- (1) within 3 minutes of the initial call, the rescue and firefighting vehicles and personnel needed to discharge foam at a rate of at least 50 percent of the discharge rate required by rule 139.61 Table 2 for the aerodrome category must reach the furthest point of the movement area from their assigned posts and be in position at that point to apply that amount of foam:
- (2) any vehicles, other than the first responding vehicles required to deliver the amount of distinguishing agents required by rule 139.61 Table 2 for the aerodrome category must ensure continuous agent application and must arrive not more than 4 minutes after the initial call.

139.69 Rescue and firefighting – communication and alerting system

An applicant for the grant of an aerodrome operating certificate must provide a discrete communication system linking a fire station with the control tower, any other fire station on the aerodrome and the rescue and fire fighting vehicles.

139.71 Public protection

- (a) An applicant for the grant of an aerodrome operating certificate must provide at their aerodrome:-
 - (1) safeguards for preventing inadvertent entry of animals to the movement area, and safeguards for deterring the entry of unauthorized persons or vehicles to the aerodrome operational area; and
 - (2) reasonable protection of persons and property from aircraft blast.
- (b) The safeguards required by paragraph (a)(1) must:-
 - (1) in areas adjacent to the aerodrome operational area to which the public has direct vehicle or pedestrian access:-
 - (i) be continuous barriers that may include existing structures, gates and doors with secured or controlled access; and

- (ii) be at least 1200 millimetres in height; and
- (2) in other areas, be of a construction and height appropriate to prevent incursion by animals likely to endanger aircraft operations.

139.73 Wildlife hazard management

- (a) An applicant for the grant of an aerodrome operating certificate must, where any wildlife presents a hazard to aircraft operations at their aerodrome, establish an environmental management programme to minimise or eliminate the wildlife hazard; and
- (b) Where there is potential for domestic animals to intrude into the movement areas of the aerodrome, an applicant for an aerodrome operating certificate must conduct an awareness programme with residents and settlements in the vicinity of an aerodrome about the consequences of allowing domestic animals in their care to enter the aerodrome.

139.75 Notification of aerodrome data and information

An applicant for the grant of an aerodrome operating certificate must establish a procedure to notify aeronautical information service providers certificated under Part 175:-

- (1) of the aerodrome data and information; and
- (2) of any limitation established under rule 139.55 on the use of the aerodrome; and
- (3) as soon as practicable, of any change that affects the use of the aerodrome.

139.77 Movement data reporting

An applicant for the grant of an aerodrome operating certificate must establish procedures for collecting traffic movement data at the aerodrome on a monthly basis and report that movement quarterly to the Director.

139.79 Aerodrome maintenance

- (a) An applicant for the grant of an aerodrome operating certificate must establish a maintenance programme, including preventive maintenance where appropriate, for maintaining the aerodrome facilities in a condition that does not impair the safety, security, regularity or efficiency of aircraft operations.
- (b) The maintenance programme required by paragraph (a) must provide for:-
 - (1) the surface of paved manoeuvring areas to remain clear of any loose stones or other objects that might endanger aircraft operations; and
 - (2) the surface of paved runways to be maintained in a condition that provides good surface friction characteristics and low rolling resistance for aircraft; and
 - (3) the measurement and provision of real-time surface condition reporting when a runway is contaminated using standardized reporting methods.

139.81 Aerodrome inspection programme

An applicant for the grant of an aerodrome operating certificate must:-

- (1) establish an aerodrome inspection programme for ensuring that the aerodrome and its facilities are maintained in accordance with the requirements and standards of this Part; and
- (2) provide appropriate equipment for use in conducting the aerodrome inspections in accordance with the programme required by paragraph (1); and
- (3) establish procedures for ensuring that qualified personnel to perform the aerodrome inspections in accordance with the programme required by paragraph (1); and
- (4) establish a reporting system for ensuring prompt correction of unsafe aerodrome conditions that is noted during an aerodrome inspection.

139.83 Visual aids for navigation – maintenance and checking

- (a) An applicant for the grant of an aerodrome operating certificate must establish a maintenance programme for the visual aids for navigation that are installed on the aerodrome.
- (b) The maintenance programme required by paragraph (a) must include:-
 - (1) procedures for ensuring that each visual aid for navigation provides reliable and accurate guidance information to the users in accordance with the applicable standards prescribed in this Part; and
 - (2) details on the number of lights that may be allowed to be unserviceable in each lighting system to ensure continuity of guidance to the user; and
 - (3) procedures for restoring any unserviceable or deteriorated items back into service without undue delay.

139.85 Works on Aerodromes

An applicant for the grant of an aerodrome operating certificate must establish procedures, including precautions to be taken for ensuring that any works carried out on the aerodrome do not endanger aircraft operations.

139.87 Ground Vehicles

- (a) An applicant for the grant of an aerodrome operating certificate must establish procedures for limiting and controlling access by ground vehicles to the operational areas of the aerodrome.
- (b) Under the procedures required by paragraph (a), ground vehicle access to the operational areas of the aerodrome must be limited to those vehicles that are necessary for the operation of the aerodrome and the operation of aircraft.
- (c) When an aerodrome control service is in operation at the aerodrome, the procedures required by

paragraph (a) must:-

- (1) provide for the safe and orderly access to, and operation on the aerodrome operational area of ground vehicles; and
- (2) require each ground vehicle operating on the operational area of the aerodrome to be controlled by:-
 - (i) two way radio communications between the vehicle and the aerodrome control service; or
 - (ii) if the vehicle does not have radio communications, an accompanying escort vehicle that has two-way communication with the aerodrome control service; or
 - (iii) if it is not practical to have two-way radio communications or an accompanying escort vehicle, by adequate measures such as signs, signals or guards for controlling the vehicle; and
- (d) When an aerodrome control service is not in operation at the aerodrome, the procedures required by paragraph (a) must provide for ground vehicles operating on the operational area of the aerodrome to be controlled by signs or prearranged signals.
- (e) The procedures required by paragraph (a) must ensure that each employee, tenant, or contractor who operates a ground vehicle on any portion of the aerodrome which has access to the operational area of the aerodrome is familiar with, and complies with, the procedures established by the certificate holder for the operation of ground vehicles on the aerodrome.

139.89 Unsafe conditions

An applicant for an aerodrome operating certificate must establish procedures for ensuring that aircraft operations are restricted, or if necessary prohibited, on any part of the aerodrome where an unsafe condition exists.

139.91 Documentation

An applicant for an aerodrome operating certificate must:-

- (1) hold copies of relevant documents necessary for the provision and operation of the aerodrome and the associated services and facilities; and
- (2) establish a procedure for controlling the document required under paragraph (1) to ensure that:-
 - (i) a procedure for controlling the document are available to personnel at each location where personnel need access to the documentation; and
 - (ii) every obsolete document is promptly removed from every point of issue; and

- (iii) the current version of each item of documentation can be identified to prevent the use of superseded material.

139.93 Safety management system

- (a) An applicant for the grant of an aerodrome operating certificate must establish, implement and maintain a safety management system which meets the requirements of Part 100.
- (b) The safety management system required by paragraph (a) must include a runway safety programme.
- (c) The safety management system required by paragraph (a) must oblige all users of the aerodrome, including fixed-base operators, ground handling agencies and other organizations that perform activities independently at the aerodrome in relation to flight or aircraft handling, to comply with the requirements laid down by the aerodrome operator with regard to safety at the aerodrome.

139.95 Quality management system

An applicant for the grant of an aerodrome operating certificate must establish, implement and maintain a quality management system which meets the requirements of Part 100.

139.97 Aerodrome exposition

- (a) An applicant for the grant of an aerodrome operating certificate must provide the Director with an exposition that contains the following:-
 - (1) a statement signed by the Chief Executive on behalf of the applicant's organisation, confirming that the exposition and any included manuals:-
 - (i) define the organisation and demonstrate its means and methods for ensuring ongoing compliance with this Part; and
 - (ii) is to be complied with at all times; and
 - (2) the titles and names of the senior persons required by 139.51(a)(1) and (2); and
 - (3) the duties and responsibilities of the senior persons specified under paragraph(a)(2) including matters for which they have responsibility to deal directly with the Director on behalf of the organisation; and
 - (4) an organisation chart showing lines of responsibility of the senior person or persons specified under paragraph (a)(2); and
 - (5) details of any limitations on the use of the aerodrome established under rule 139.55; and
 - (6) details of each current exemption granted to the applicant from any requirements-prescribed in Subparts A, B, C or D; and
 - (7) details of the aerodrome emergency plan required by rule139.57; and

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- (8) a statement of the rescue and firefighting category determined under 139.59 with a description of the following:
 - (i) extinguishing agents required by rules 139.61; and
 - (ii) vehicles required by 139.63; and
 - (iv) procedure and personnel required by rule 139.65; and
 - (iv) details of the response capability required by rule 139.67; and
 - (v) discrete communication system required by 139.69.
- (9) a description of the safeguards for public protection required by rule 139.71; and
- (10) details of the environmental management programme when required by rule 139.73; and
- (11) details of the procedures required by rule 139.75 for the notification of aerodrome data and information; and
- (12) details of the procedures required by rule 139.77 for the collection and reporting of traffic movement data; and
- (13) details of the aerodrome maintenance programme required by rule 139.79; and
- (14) details of the aerodrome inspection programme, procedures and reporting system required by rule 139.81; and
- (15) details of the procedures required by rule 139.83 for the preventive maintenance and checking of the aerodrome visual aids for navigation; and:
- (16) details of the procedures required by rule 139.85 and precautions for any works on the aerodrome; and
- (17) the procedures required by rule 139.87 for the control of ground vehicles; and
- (18) the procedures required by rule 139.89 for limiting aircraft operations if an unsafe aerodrome condition occurs; and
- (19) details of the procedures required by rule 139.91 for management and control of documents necessary for the provision and operation of the aerodrome and the associated services and facilities; and
- (20) details of the safety management system required by rule 139.93; and
- (21) details of the quality management system required by rule 139.95; and
- (22) a description of the measures taken to comply with the relevant security requirements in Subpart D, including details of the security awareness programme and procedures required by rule 139.201(d)(8) and (9); or

- (23) the aerodrome security programme required by 139.201(d) (15) for a security designated airport; and
 - (24) procedures to control, amend, and distribute the exposition.
- (b) The applicant's exposition must be acceptable to the Director.

Subpart C — Operating Requirements

139.101 Continued compliance

A holder of an aerodrome operating certificate must:-

- (1) hold at least one complete and current copy of the aerodrome exposition required by rule 139.97 on the aerodrome; and
- (2) comply with all procedures, plans, systems and programmes detailed in the exposition; and
- (3) make each applicable part of the exposition available to personnel who require those parts to carry out their duties; and
- (4) continue to meet the standards and comply with the requirements of Subpart B prescribed for aerodrome certification under this Part; and
- (5) notify the Director of any change of address for service, telephone number, or facsimile number required by form CA 139/01 within 28 days of the change; and
- (6) ensure the aerodrome exposition required by rule 139.97 remains acceptable to the Director.

139.103 Aerodrome emergency plan –maintenance

A holder of an aerodrome operating certificate must:-

- (1) ensure that all aerodrome personnel having duties and aerodrome emergency responsibilities under the holder's aerodrome emergency plan required by rule 139.57 are familiar with their assignments and are properly trained; and
- (2) test the aerodrome emergency plan required by rule 139.57 by conducting:-
 - (i) a full-scale aerodrome emergency exercise at intervals not exceeding 2 years; and
 - (ii) special emergency exercises in the intervening year to ensure that any deficiencies found during the full-scale aerodrome emergency exercise have been corrected; and
- (3) review the plan after each of the exercises specified in subparagraph (2) or after an actual emergency, to correct any deficiency found; and

- (4) co-ordinate its aerodrome emergency plan required by rule 139.57 with law enforcement agencies, security providers, rescue and firefighting agencies, medical personnel and organisations, the principal tenants of the aerodrome, and all other persons who have responsibilities in the plan.

139.105 Rescue and firefighting – operational requirements

(a) Except as provided in paragraph (c), the holder of an aerodrome operating certificate must provide on the aerodrome, during operations by aeroplanes having a certificated seating configuration

of 20 passenger seats or more, excluding any required flight crew member seat, that are engaged in regular air operations for the carriage of passengers, the rescue and firefighting capability meeting the minimum requirements of rules 139.61 and 139.63.

(b) Except as provided in paragraph (c), if an increase in the movements or a change in the type of air transport aeroplanes using the aerodrome results in an increase in the rescue and firefighting category of the aerodrome applicable under rule 139.59, the certificate holder must increase the rescue and firefighting capability to the minimum required for that higher category under rules 139.61 and 139.63.

(c) Subject to paragraph (d), during any period of operations when the use of the aerodrome is limited to aeroplanes having a lower specification than that normally applicable under rule 139.59, the certificate holder may reduce the rescue and firefighting capability to a lower level required for the aerodrome category corresponding to the highest specification aeroplane regularly using the aerodrome provided:

- (1) procedures for, and the persons having the authority to implement, the reductions are included in the exposition required by rule 139.97:
- (2) procedures for recall of the full aerodrome rescue and firefighting capability are included in the exposition required by rule 139.97:
- (3) information on the reduction is forwarded to the Aeronautical Information Service for appropriate publication.

(d) Any reduction in the rescue and firefighting capability under paragraph (c) must not be implemented until the information is promulgated by the Aeronautical Information Service for appropriate publication:

(e) The holder of an aerodrome operating certificate must employ a system of preventive maintenance of their rescue and firefighting vehicle or vehicles to ensure effectiveness of the equipment and compliance with the required response time throughout the life of each vehicle.

(f) The holder of an aerodrome operating certificate must immediately replace any required rescue and firefighting vehicle that becomes inoperative to the extent that the certificate holder cannot meet the response capability required by rule 139.67, with a vehicle that enables the certificate holder to meet that capability.

(g) If a replacement vehicle is not available immediately, the certificate holder must provide

the notification required by rule 139.115.

(h) If the required response capability is not restored within 72 hours, the certificate holder must limit regular air operations on the aerodrome to those aeroplanes compatible with the aerodrome category corresponding to the remaining operative rescue and firefighting vehicle or vehicles.

(i) The holder of an aerodrome operating certificate must, with the rescue and firefighting equipment required under this Part and the number of trained personnel who are required to assure an effective operation, respond to each aircraft emergency during operations of the kind specified in paragraph (a).

139.107 Aeronautical Study

(a) The holder of an aerodrome operating certificate must monitor operations and conduct an aeronautical study when a significant change in aerodrome operations occurs that may affect the safety of aircraft operations.

(b) For the purpose of paragraph (a), a significant change in aerodrome operations include a change in aerodrome aircraft traffic, a change in aircraft operations type, a change in the aerodrome physical characteristics, an increase in aerodrome accidents/incidents, or a change in airspace designation.

139.109 Aerodrome aircraft traffic management

Each holder of an aerodrome operating certificate shall ensure the provision of an aerodrome control service at their aerodrome when so required by the Director in the interest of safety.

139.111 Aerodrome aircraft traffic services

When an ATS is required to be provided at the aerodrome the holder of the aerodrome operating certificate must establish a written agreement with a holder of an air traffic service organisation certificate issued in accordance with Part 172 for the provision of the ATS.

139.113 Apron management service

(a) The holder of an aerodrome operating certificate must ensure that the aerodrome is provided with an appropriate apron traffic management service, when such service is warranted by the volume of traffic and operating conditions.

(b) The holder of an aerodrome operating certificate for an aerodrome that has an aerodrome control service and requires an apron management service must, ensure the coordination and safe, transition of aerodrome traffic between the apron management service and the aerodrome control service.

139.115 Protection of navigation aids & ATS facilities

A holder of an aerodrome operating certificate must:-

- (1) prevent any construction or activity on the aerodrome, or surrounding area that the certificate holder has authority over, that could have an adverse effect on the operation of any electronic or visual navigation aid or air traffic service facility on the aerodrome; and

- (2) prevent, as far as it is within the certificate holder's authority, any interruption of visual or electronic signals of navigation aids for the aerodrome.

139.117 Aerodrome condition notification

The holder of an aerodrome operating certificate must, in accordance with the procedure required by rule 139.75, notify the Aeronautical Information Service, as soon as practicable (for the issue of a NOTAM), of any aerodrome operational condition at the aerodrome that may affect the safe operation of aircraft.

139.119 Changes to certificate holder's organisation

(a) The holder of an aerodrome operating certificate must ensure that the aerodrome exposition required by rule 139.97 is amended to remain a current description of the aerodrome and its associated plans, programmes, services, systems, procedures, and facilities.

(b) The certificate holder must ensure that any amendments made to the aerodrome exposition meets the applicable requirements of this Part and comply with the amendment procedures contained in the exposition.

(c) The certificate holder must provide the Director with a copy of each amendment to the aerodrome exposition as soon as practicable after its incorporation into the exposition.

(d) If the holder of an aerodrome certificate proposes to change, or changes, the person identified as the Chief Executive, or any of the senior persons required by rule 139.51(a)(2), the certificate holder must notify the Director prior to the change or as soon as practicable after the change if prior notification is not possible.

(e) The changes of persons referred to in paragraph (d) must be accepted by the Director after satisfactory demonstration of the fit and proper person criteria required by Section 50 of the Act before being incorporated into the certificate holder's exposition.

(f) The Director may impose conditions under which the holder of an aerodrome operating certificate may operate during or following any of the changes specified in paragraph (d) and (e).

(g) The holder of an aerodrome operating certificate must comply with any conditions imposed by the Director under paragraph (f).

(h) If any of the changes under paragraph (d) and (e) require an amendment to the aerodrome operating certificate, the holder of the certificate must forward the certificate to the Director as soon as practicable for endorsement of the amendment.

(i) The holder of an aerodrome operating certificate must amend the holder's exposition as the Director may consider necessary in the interests of safety.

139.121 Deviations

(a) The holder of an aerodrome operating certificate may deviate from any requirement of Subpart C, or D if an emergency occurs requiring immediate action for the protection of life or property involving carriage by air.

(b) A certificate holder who deviates from a requirement of Subpart C, or D under paragraph (a) must provide a written report to the Director as soon as practicable, but in any event not later than 14 days after the emergency. The report must cover the nature, extent and duration of the deviation.

Subpart D — Aerodrome Security

139.201 Requirements for security designated aerodromes Barrier requirements

(a) The holder of an aerodrome operating certificate for a security designated aerodrome must, in addition to complying with rule 139.71, provide safeguards for preventing inadvertent unauthorised access and for deterring intentional unauthorised access, to any security area or security enhanced area within their aerodrome.

(b) The safeguards required by paragraph (a) must:-

- (1) Consist of fences, gates, doors and other barriers between public and security areas or security enhanced areas with adequate locking or control systems; and
- (2) Ensure control of any duct, drain or tunnel giving access to any security area or security enhanced areas.

(c) The construction and height of each barrier required by paragraph (b)(1) must, considering the surrounding topography, provide an effective measure against penetration of the security area or security enhanced areas and must in no case be less than 2440 millimetres in height.

Other requirements

(d) The holder of an aerodrome operating certificate for a security designated aerodrome must:-

- (1) designate an isolated aircraft parking position at their aerodrome for the parking of an aircraft that is known or believed to be the subject of unlawful interference, or which for other security reason needs isolation from normal aerodrome activities; and
- (2) provide and maintain lighting, and emergency lighting in the event of failure of the normal lighting system, on any parking areas at their aerodrome used at night by aeroplanes having a certificated seating configuration of 20 seats or more, excluding any required flight crew member seat, that are engaged in scheduled air transport operations for the carriage of passengers; and
- (3) provide lighting, or have portable lighting available within 30 minutes, on any designated isolated aircraft parking area at their aerodrome intended to be used at night; and
- (4) provide the following areas at their aerodrome for the screening of passengers and baggage:-
 - (i) areas for the screening of international passengers, crew, and their baggage, prior to aircraft boarding;
 - (ii) sterile areas where international passengers and crew subject to screening are prevented from having access to unauthorised articles or contact with unscreened persons;

- (iii) areas for the separation of arriving passengers and crew from departing passengers during international deplaning to prevent arriving, transit, and transfer passengers and crew having contact with any person who has been subject to screening; and
- (5) when considered necessary by the Director, provide areas at their aerodrome for the screening and searching of persons, items, substances, and vehicles entering and remaining within security areas or enhanced security areas; and
- (6) when considered necessary by the Director to respond to a security threat, provide areas at their aerodrome of the kind required by paragraph (d) (4) (for the screening of international passengers, crew and their baggage) for the screening of domestic passengers, crew and their baggage; and
- (7) ensure that concession areas at their aerodrome that are situated in an area accessible to screened passengers are designed in such a way that they provide access control measures sufficient to prevent delivery to any screened person of:-
 - (i) any firearm; or
 - (ii) any other dangerous or offensive weapon or instrument of any kind; or
 - (iii) any ammunition; or
 - (iv) any explosive substance or device, or any injurious substance or device of any kind that could be used to endanger the safety of an aircraft or of the persons on an aircraft; and
- (8) design all areas required by paragraph (d) (4), (5) (6) and (7) in such a way that they provide access control measures sufficient to prevent any unauthorised persons from entering the area; and
- (9) ensure that personnel engaged, employed or contracted by the certificate holder undergo a security awareness programme, and that each person required to carry out specific security tasks is trained for those tasks; and
- (10) establish procedures for identifying, reporting to the Director, and dealing with, breaches of and deficiencies in, any security procedures established by the holder and any provisions of any enactment relating to security at the aerodrome; and
- (11) make provision for the security of services including, but not limited to, energy supplies, communications, sewerage and water supplies, in order to minimise the risk of such services being used to interfere unlawfully with aviation operations; and
- (12) when so required by the Director, affix signs at the perimeter of security areas or enhanced security areas within their aerodrome.
- (13) ensure that a percentage of persons other than passengers, together with items carried, prior to entry into a security area or an enhanced security area serving international civil aviation operations are subject to screening and security controls. The percentage of screening must be determined by a risk assessment carried out by the aerodrome operator.

- (14) ensure that vehicles being granted access to secure areas, or enhanced security areas, together with items contained within them, are subjected to screening or other appropriate security controls when so required by the Director.
- (15) establish, implement and maintain a written aerodrome security programme appropriate to meet the security requirements of the aerodrome.
- (16) establish and implement procedures to control the parking of unattended vehicles in areas immediately adjacent to the front of any terminal serving passenger carrying air services.
- (17) ensure that each aerodrome programme shall contain—where any work relating to compliance with this Part is intended to be contracted out to any other organisation, the contractual provisions by which the applicant for an aerodrome operating certificate ensures that any such contractor or other agent complies with the requirements of the applicant's aerodrome programme in particular the Airport Security Programme; and - details of the person responsible for training personnel in accordance with the procedures required by 139.205.

139.203 Prohibitions

A holder of an aerodrome operating certificate for a security designated aerodrome must develop and implement procedures to ensure that no person at a security designate aerodrome shall, without lawful authority:-

- (1) leave open or insecure or otherwise uncontrolled any door, gate or other barrier provided to control access to any security area, security enhanced area or operational area; or
- (2) deposit, or leave adjacent to, or on any fence, barrier, or other thing being used to prevent unauthorised access to any security area, enhanced area, or operational area any article that is capable of facilitating the evasion of control measures.

139.205 Security training programme

- (a) A holder of an aerodrome operating certificate issued for a security designated aerodrome must establish a security training programme and procedures for ensuring that every person who is employed, engaged, or contracted by the certificate holder has the appropriate level of security awareness applicable to the person's function.
- (b) The training programme required by paragraph (a) must contain:-
 - (1) applicable segments for initial training and recurrent training; and
 - (2) knowledge testing or competency assessment as appropriate for the training conducted.
- (c) the holder of an aerodrome operating certificate issued for a security designated aerodrome must ensure that each segment required by paragraph (b)(1):-
 - (1) includes a syllabus that is acceptable to the Director; and
 - (2) is conducted in a structured and coordinated manner by a person authorised by the certificate holder.

- (d) the holder of an aerodrome operating certificate issued for a security designated aerodrome must ensure that every person who is required to be trained undertakes the recurrent training segment of the training programme at an interval of not more than 2 years.
- (e) the holder of an aerodrome operating certificate issued for a security designated aerodrome must ensure that there is a record of:-
 - (1) every person who conducts a security training segment under the authority of the certificate; and
 - (2) every person who undertakes security training conducted under the authority of the certificate.
- (f) the records required by paragraph (e)(1) must include:-
 - (1) the name of the person; and
 - (2) details of the training, competencies, or experience that qualifies the person to conduct the training; and
 - (3) the scope of training that the person may conduct.
- (g) the records required by paragraph (e)(2) must include:-
 - (1) the name and date of birth of the person; and
 - (2) the identity of the training segment; and
 - (3) details of the person's attendance, instructor comments, and the results of tests or assessments as applicable.
- (h) the records required by paragraph (e) must be:-
 - (1) accurate, legible and of a permanent nature; and
 - (2) retained for a period of 3 years from the date of the last entry.

139. 207 Liaison with other organisations

- (a) A holder of an aerodrome operating certificate issued for a security designated aerodrome must, for each aerodrome it operates:-
 - (1) consult and liaise with all other organisations involved in contingency planning affecting the security of operations at that location; and
 - (2) establish a security committee to ensure that sufficient information is given to other organisations at that location to motivate security awareness on the part of all personnel.
- (c) The holder of an aerodrome operating certificate issued for a security designated aerodrome must, for each security committee established under paragraph (a)(2), convene, chair, and minute security committee meetings at regular intervals not exceeding 12 months.

139.209 Requirements for non-security designated aerodromes

The holder of an aerodrome operating certificate that is not a security designated aerodrome must, in addition to complying with the requirements of rule 139.7:

- (a) have a contingency plan to provide when so required by the Director:-
 - (1) areas equivalent to those required for a security designated aerodrome under rule 139.201(d)(4) where domestic passengers, crew and their baggage can be screened; and
 - (2) measures to subject vehicles entering the aerodrome, and the items contained within them, to screening and other appropriate security controls.
- (b) comply with rules 139.201 (d) (1), (2), (3), (9) and (10) that are prescribed for the holder of an aerodrome operating certificate issued for a security designated aerodrome.
- (c) establish and facilitate a security awareness group in order to ensure sufficient information is given to other organisations at the aerodrome to motivate security awareness on the part of all personnel; and
- (d) convene, chair, and minute meetings of the security awareness group established under paragraph (d) at regular intervals not exceeding 12 months.

139.211 Airport identity cards

- (a) The Director may issue or approve airport identity cards and other identity documents in accordance with this rule.
- (b) Subject to paragraph (c), an airport identity card may only be issued if the person applying for the airport identity card has undergone a background check acceptable to the Director.
- (c) The background check referred to in 139. 211(b) is not required if the person making an application for an identity card is issued with a temporary identity card approved by the Director that entitles the person to enter and remain in a security area or enhanced security area when escorted by a person issued with an airport identity card in accordance with the background check process referred to in 139.211(b).
- (d) Subject to paragraphs (e) and (i), no person shall enter or remain in any security area or security enhanced area of any designated aerodrome or designated installation, unless that person:-
 - (1) wears an airport identity card on the front of his or her outer garment; or
 - (2) has in his or her possession another identity document or other identity documents for the time being approved under paragraph (a).
- (e) Where the Director considers it desirable that the name of the holder of an airport identity card be not disclosed, the Director may approve the wearing of an identity card from which the holder's name has been deleted.
- (f) A person who is authorised by this rule to enter a security area shall remain in that area only for the purposes of his or her duties.

(g) If required to do so by an authorised person, any person entering or in a security area or security enhanced area shall produce for inspection his or her airport identity card or other identity documents for the time being authorised under paragraph (a).

(h) If the holder of an airport identity card ceases to be employed in a position for which the card is required, or for any other reason ceases to be entitled to hold the card, the holder shall forthwith return the card to the issuing authority.

(i) Nothing in paragraph (b) shall apply to:-

- (1) any member of the crew of an aircraft engaged in an international air operations who wears on his or her outer garment an official identity card issued by his or her employer or the government of the state in which he or she permanently resides; or
- (2) any official of a Papua New Guinea government agency who is required, by reason of his or her official duties, to remain incognito; or
- (3) any passenger who enters or leaves a security area for the purpose of joining or leaving a flight, if he or she is in possession of a valid boarding pass for that flight or is being escorted by a crew member or a representative of the operator; or
- (4) any pilot-in-command of an aircraft engaged in operations that are not air operations who enters or is within a security area for the purpose of embarking, disembarking, or servicing the aircraft, if the pilot has in his or her possession a valid pilot licence, or any person being escorted by that pilot.

[CASA Advisory Circulars in the 139 series contain specifications for approved airport identity cards and background checks that are acceptable to the Director.]

Subpart E — Transition Provisions

139.301 – Transition

Transition provisions detailed in Part 20 apply to this Part.

Appendix A — Runway End Safety Areas

(a) A RESA must extend:-

- (1) to a distance of at least 90 metres from the end of the runway strip, and
- (2) if practicable:-
 - (i) to a distance of at least 240 metres from the end of the runway strip; or
 - (ii) To the greatest distance that is practicable between the 90 metres required in paragraph (1) and the 240 metres required in paragraph (i).

(c) The width of a RESA must:-

- (1) be at least twice the width of the associated runway and be positioned symmetrically on either side of the extended centre line of the runway; and
 - (2) where practicable, be equal to the width of the graded portion of the associated runway strip.
- (c) A RESA must be constructed to:-
- (1) provide a cleared and graded area to reduce the risk of damage to an aeroplane that undershoots or overruns the runway; and
 - (2) where practicable, be clear of any object which might endanger an aeroplane that undershoots or overruns the runway.
- (d) A RESA must not penetrate the approach or take-off climb surface for the runway.
- (e) If a RESA has a longitudinal slope:-
- (1) any downward slope must not exceed 5%; and
 - (2) slope changes must be as gradual as practicable; and
 - (3) abrupt changes or sudden reversals of slopes must be avoided.
- (f) If a RESA has a transverse slope:-
- (1) any upward or downward slope must not exceed 5%; and
 - (2) slope changes must be as gradual as practicable.

Appendix B — Reference Code

- (1) An aerodrome reference code — code number and letter — which is selected for aerodrome planning purposes must be determined in accordance with the characteristics of the aeroplane for which an aerodrome facility is intended.
- (2) The aerodrome reference code numbers and letters must have the meanings assigned to them in Table B-1.
- (3) The code number for element 1 must be determined from Table B-1, column 1, selecting the code number corresponding to the highest value of the aeroplane reference field lengths of the aeroplanes for which the runway is intended.

Note. — *The determination of the aeroplane reference field length is solely for the selection of a code number and is not intended to influence the actual runway length provided.*

- (4) The code letter for element 2 must be determined from Table B-1, column 3, by selecting the code letter which corresponds to the greatest wingspan, or the greatest outer main gear wheel span, whichever gives the higher code letter for the aeroplanes that the runway is intended to serve.

Table B-1. Aerodrome reference code

Code element 1		Code element 2		
Code number	Aeroplane reference field	Code letter	Wingspan	Outer main gear wheel span
(1)	(2)	(3)	(4)	(5)
1	Less than 800 m	A	Up to but not including 15 m	Up to but not including 4.5 m
2	800 m up to but not including 1200 m	B	15 m up to but not including 24 m	4.5 m up to but not including 6 m
3	1 200 m up to but not including 1 800 m	C	24 m up to but not including 36 m	6 m up to but not including 9 m
4	1 800 m and over	D	36 m up to but not including 52 m	9 m up to but not including 14 m
		E	52 m up to but not including 65 m	9 m up to but not including 14 m
		F	65 m up to but not including 80 m	14 m up to but not including 16 m

Note: The outer main gear wheel span in column 5 is the distance between the outside edges of the main landing gear wheels.

Appendix C — Physical Characteristics

C.1 Runway Strips

A runway and any associated stopways must be included in a strip

C.1.1 Length of runway strips

A strip must extend before the threshold and beyond the end of the runway or stopway for a distance of at least:-

- 60 m where the code number is 2, 3, 4;
- 60 m where the code number is 1 and the runway is an instrument one; and
- 30 m where the code number is 1 and the runway is a non-instrument one.

C.1.2 Width of runway strips

A strip must extend laterally on each side of the centre line of the runway and its extended centre line throughout the length of the strip to minimum distance as determined in Table C-1 below:

Table C-1. Minimum runway strip width

Aerodrome Reference Code Number	Runway Type	Strip Distance
3 or 4	Precision approach runway	150 m
1 or 2	Precision approach runway	75 m

3 and 4	Non-precision approach or non-instrument runway	75 m
3 and 4	Non-instrument runway day only applicable to aeroplanes at or below 2 2700 kg MCTOW	45 m
1 and 2	Non-precision approach runway	75 m
2	Non-instrument runway	40 m
1	Non-instrument runway	30 m

C.1.3 Objects on runway strips

- (a) No fixed object, other than visual aids required for air navigation purposes and satisfying the relevant frangibility requirements must be permitted on a runway strip:-
- within 77.5 m of the runway centre line of a precision approach runway category I, II or III where the code number is 4 and the code letter is F; or
 - within 60 m of the runway centre line of a precision approach runway category I, II or III where the code number is 3 or 4; or
 - within 45 m of the runway centre line of a precision approach runway category 1 where the code number is 1 or 2
- (b) No mobile object must be permitted on those parts of the runway strip as defined in paragraph (a) during use of the runway for landing or take-off.

C.1.4 Grading of runway strips

The surface of that portion of a strip that abuts a runway, shoulder or stopway must be flush with the surface of the runway, shoulder or stopway.

C.2 Runway turn pads

Where the end of a runway is not served by a taxiway or a taxiway turnaround and where the code letter is D, E or F, a runway turn pad must be provided to facilitate a 180-degree turn of aeroplanes.

C.2.1 Design of a runway turn pad

The design of a runway turn pad must be such that, when the cockpit of the aeroplane for which the turn pad is intended remains over the turn pad marking, the clearance distance between any wheel of the aeroplane landing gear and the edge of the turn pad must be not less than determined in Table C-2 below:

Table C-2.Runway turning pad clearance distances

Code letter	Clearance
A	1.5 m
B	2.25 m
C	3 m if the turn pad is intended to be used by aeroplanes with a wheel base less than 18 m; 4.5 m if the turn pad is intended to be used by aeroplanes with a wheel base equal to or greater than 18 m.
D	4.5 m
E	4.5 m

F	4.5 m
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C.2.2 Surface of runway turn pads

The surface of a runway turn pad must not have surface irregularities that may cause damage to an aeroplane using the turn pad.

C.3 Stopways

A stopway must have the same width as the runway with which it is associated.

C.4 Taxiways

The design of a taxiway must be such that, when the cockpit of an aeroplane for which the taxiway is intended remains over the taxiway centre line markings, the clearance distance between the outer main wheel of the aeroplane and the edge of the taxiway must not be less than determined in Table C-3 below:

Table C-3.Taxiway edge clearance distances

Code letter	Clearance
A	1.5 m
B	2.25 m
C	3m if the taxiway is intended to be used by aeroplanes with a wheel base less than 18m; 4.5 m if the taxiway is intended to be used by aeroplanes with a wheel base equal to or greater than 18 m.
D	4.5 m
E	4.5 m
F	4.5 m

C.5 Taxiway bridge

The width of that portion of a taxiway bridge capable of supporting aeroplanes, as measured perpendicularly to the taxiway centre line, must not be less than the width of the graded area of the strip provided for that taxiway, unless a proven method of lateral restraint is provided which must not be hazardous for aeroplanes for which the taxiway is intended.

C.6 Taxiway strips

A taxiway, other than an aircraft stand taxi lane, must be included in a strip.

C.7 Holding positions

(a) A runway-holding position must be established:

- (1) on the taxiway, at the intersection of a taxiway and a runway; and
- (2) at an intersection of a runway with another runway when the former runway is part of a standard taxi-route.

- (b) A runway-holding position must be established on a taxiway if the location or alignment of the taxiway is such that a taxiing aircraft or vehicle can infringe an obstacle limitation surface or interfere with the operation of radio navigation aid.
- (c) A road-holding position must be established at an intersection of a road with a runway.

Appendix D — Obstacle Restriction and Removal

D.1 Obstacle limitation surfaces

D.1.1 Non-instrument runways

- (a) The following obstacle limitation surfaces must be established for a non instrument runway:
 - (1) conical surface;
 - (2) inner horizontal surface;
 - (3) approach surface; and
 - (4) transitional surfaces.
- (b) The heights and slopes of the surfaces shall not be greater than, and their other dimensions not less than, those specified in Table D-1.
- (c) New objects or extensions of existing objects shall not be permitted above an approach or transitional surface except when, in the opinion of the appropriate authority, the new object or extension would be shielded by an existing immovable object.
- (d) New objects or extensions of existing objects should not be permitted above the conical surface or inner horizontal surface except when, in the opinion of the appropriate authority, the object would be shielded by an existing immovable object, or after aeronautical study it is determined that the object would not adversely affect the safety or significantly affect the regularity of operations of aeroplanes.
- (e) Existing objects above any of the surfaces required by (a) should as far as practicable be removed except when, in the opinion of the appropriate authority, the object is shielded by an existing immovable object, or after aeronautical study it is determined that the object would not adversely affect the safety or significantly affect the regularity of operations of aeroplanes.
- (f) In considering proposed construction, account should be taken of the possible future development of an instrument runway and consequent requirement for more stringent obstacle limitation surfaces.

D.1.2 Non-precision approach runways

- (a) The following obstacle limitation surfaces must be established for a non precision runway:
 - (1) conical surface;
 - (2) inner horizontal surface;
 - (3) approach surface; and
 - (4) transitional surfaces.
- (b) The heights and slopes of the surfaces shall not be greater than, and their other dimensions not less than, those specified in Table D-1, except in the case of the horizontal section of the approach surface (see (c)).
- (c) The approach surface shall be horizontal beyond the point at which the 2.5 per cent slope intersects:

- i) a horizontal plane 150 m above the threshold elevation; or
 - ii) the horizontal plane passing through the top of any object that governs the obstacle clearance altitude/height (OCA/H);
which ever is the higher.
- (d) New objects or extensions of existing objects should not be permitted above the approach surface beyond 3 000 m from the inner edge, the conical surface or inner horizontal surface except when, in the opinion of the appropriate authority, the object would be shielded by an existing immovable object, or after aeronautical study it is determined that the object would not adversely affect the safety or significantly affect the regularity of operations of aeroplanes.
- (e) Existing objects above any of the surfaces required by (a) should as far as practicable be removed except when, in the opinion of the appropriate authority, the object is shielded by an existing immovable object, or after aeronautical study it is determined that the object would not adversely affect the safety or significantly affect the regularity of operations of aeroplanes.

D.1.3 Precision approach runways

- (a) The following additional obstacle limitation surfaces must be established for a precision approach runway category II or III:
- (1) inner approach surface;
 - (2) inner transitional surfaces; and
 - (3) balked landing surface.
- (b) New objects or extensions of existing objects should not be permitted above the conical surface and the inner horizontal surface except when, in the opinion of the appropriate authority, an object would be shielded by an existing immovable object, or after aeronautical study it is determined that the object would not adversely affect the safety or significantly affect the regularity of operations of aeroplanes.
- (c) Existing objects above an approach surface, a transitional surface, the conical surface and inner horizontal surface should as far as practicable be removed except when, in the opinion of the appropriate authority, an object is shielded by an existing immovable object, or after aeronautical study it is determined that the object would not adversely affect the safety or significantly affect the regularity of operations of aeroplanes.
- (d) For a non-instrument runway, new objects or extensions of existing objects must not be permitted above an approach or transitional surface.
- (e) For a non-precision approach runway, new objects or extensions of existing objects must not be permitted above an approach surface within 3000 m of the inner edge or above a transitional surface.
- (e) For a precision approach runway fixed objects must not be permitted above the inner approach surface, the inner transitional surface or the balked landing surface, except for frangible objects which because of their function must be located on the strip. Mobile objects must not be permitted above these surfaces during the use of the runway for landing.
- (f) For a precision approach runway, new objects or extensions of existing objects must not be permitted above an approach surface or a transitional surface.

D.2 Take-off climb surface

- (a) A take-off climb surface must be established for a runway meant for take-off:
 (b) New objects or extensions of existing objects must not be permitted above a take-off climb surface.

Table D-1. Dimensions and slopes of obstacle limitation surfaces — Approach runways
APPROACH RUNWAYS

RUNWAY CLASSIFICATION										
Surface & Dimensions ^a (1)	Non-Instrument Code Number				Non-Precision approach Code Number			Precision approach category		
	1 (2)	2 (3)	3 (4)	4 (5)	1,2 (6)	3 (7)	4 (8)	I Code Number 1,2 (9)	II or III Code Number 3,4 (10)	3,4 (11)
CONICAL										
Slope	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Height	35 m	55 m	75 m	100 m	60 m	75 m	100 m	60 m	100 m	100 m
INNER HORIZONTAL										
Height	45 m	45 m	45 m	45 m	45 m	45 m	45 m	45 m	45 m	45 m
Radius	2 000 m	2 500 m	4 000 m	4 000 m	3 500 m	4 000 m	4 000 m	3 500 m	4 000 m	4 000 m
INNER APPROACH										
Width	-	-	-	-	-	-	-	90 m	120 m ^c	120 m ^c
Distance from threshold	-	-	-	-	-	-	-	60 m	60 m	60 m
Length	-	-	-	-	-	-	-	900 m	900 m	900 m
Slope	-	-	-	-	-	-	-	2.5%	2%	2%
APPROACH										
Length of inner edge	60 m	80 m	150 m	150 m	150 m	300 m	300 m	150 m	300 m	300 m
Distance from threshold	30 m	60 m	60 m	60 m	60 m	60 m	60 m	60 m	60 m	60 m
Divergence (each side)	10%	10%	10%	10%	15%	15%	15%	15%	15%	15%
First Section										
Length	1 600 m	2 500 m	3 000 m	3 000 m	2 500 m	3 000 m	3 000 m	3 000 m	3 000 m	3 000 m
Slope	5%	4%	3.33%	2.5%	3.33%	2%	2%	2.5%	2%	2%
Second section										
Length	-	-	-	-	-	3 600 m ^b	1 200 m ^b	3 600 m	3 600 m ^b	3 600 m ^b
Slope	-	-	-	-	-	2.5%	2.5%	3%	2.5%	2.5%
Horizontal section										
Length	-	-	-	-	-	8 400 m ^b	8 400 m ^b	-	8 400 m ^b	8 400 m ^b
Total Length	-	-	-	-	-	15 000 m	15 000 m	15 000 m	15 000 m	15 000 m
TRANSITIONAL										
Slope	20%	20%	14.3%	14.3%	20%	14.3%	14.3%	14.3%	14.3%	14.3%
INNER TRANSITIONAL										
Slope	-	-	-	-	-	-	-	40%	33.3%	33.3%
BALKED LANDING SURFACES										
Length of inner edge	-	-	-	-	-	-	-	90 m	120 m ^c	120 m ^c
Distance from threshold	-	-	-	-	-	-	-	c	1 800 m ^d	1 800 m ^d
Divergence (each side)	-	-	-	-	-	-	-	10%	10%	10%
Slope	-	-	-	-	-	-	-	4%	3.33%	3.33%

a. All dimensions are measured horizontally unless specified otherwise.
 b. Variable length (see D.1.2(c)).
 c. Distance to the end of strip.
 d. Or end of runway whichever is less.

e. Where the code letter is F (Column (3) of Table B-1), the width is increased to 155 m. For information on code letter F aeroplanes equipped with digital avionics that provide steering commands to maintain an established track during the go-around manoeuvre.

Appendix E — Visual Aids for Navigation

E.1 Indicators

E.1.1 Wind direction indicators

A wind direction indicator (windsock) must be located on the left hand side of each paved runway threshold.

E.1.2 Illuminated wind direction indicators

A runway intended to be used at night must have one illuminated wind direction indicator (windsock) adjacent to each threshold.

E.2 Markings

E.2.1 Runway markings

(a) A runway designation marking, centre line marking and threshold marking must be provided on all paved runways.

E.2.2 Colour

- (a) Runway markings must be white.
- (b) Taxiway markings and aircraft stand markings must be yellow.
- (c) Apron safety lines must be of a conspicuous colour which must contrast with that used for aircraft stand markings.

E.2.3 Interruption of runway markings

- (a) At an intersection of 2 (or more) runways the markings of the more important runway, except for the runway side stripe marking, must be displayed and the markings of the other runway(s) must be interrupted. The runway side stripe marking of the more important runway may be either continued across the intersection or interrupted.
- (b) At an intersection of a runway and taxiway the markings of the runway must be displayed and the markings of the taxiway interrupted, except that runway side stripe markings may be interrupted.

E.2.4 Transverse stripe

- (a) Where a runway threshold is displaced from the extremity of a paved runway or where the extremity of a paved runway is not square with the runway centre line, a transverse stripe must be added to the threshold marking.
- (b) A transverse stripe must not be less than 1.80 m wide

E.2.5 Arrows

- (a) Where a paved runway threshold is permanently displaced, arrows must be provided on the portion of the runway before the displaced threshold.

- (b) When a paved runway threshold is temporarily displaced from the normal position, it must be marked and all markings prior to the displaced threshold must be obscured except the runway centre line marking, which must be converted to arrows.

E.2.6 Aiming point marking

An aiming point marking must be provided at each approach end of a paved instrument runway where the aerodrome reference code number is 2, 3 or 4.

E.2.7 Touchdown zone marking

A touchdown zone marking must be provided in the touchdown zone of a paved precision approach runway where the aerodrome reference code number is 2, 3 or 4.

E.2.8 Runway side stripe marking

A runway side stripe marking must be provided between the thresholds of a paved runway where there is a lack of contrast between the runway edges and the shoulders or the surrounding terrain.

E.2.9 Taxiway centre line marking

- (a) Taxiway centre line marking must be provided on a paved taxiway, de/anti-icing facility and apron where the aerodrome reference code number is 3 or 4 in such a way as to provide continuous guidance between the runway centre line and aircraft stands.
- (b) Taxiway centre line marking must be provided on a paved runway when the runway is part of a standard taxi-route and:
 - (1) there is no runway centre line marking; or
 - (2) where the taxiway centre line is not coincident with the runway centre line.
- (c) Where provided, enhanced taxiway centre line marking must be provided at all taxiway/runway intersections at that aerodrome.

E.2.10 Runway turn pad mark

Where a runway turn pad is provided, a runway turn pad marking must be provided for continuous guidance to enable the aeroplane to complete a 180 degree turn and align with the runway centre line.

E.2.11 Runway-holding position marking

A runway-holding position marking must be displayed along a runway-holding position.

E.2.12 VOR aerodrome check-point marking

When a VOR aerodrome check-point is established, it must be indicated by a VOR aerodrome check-point marking and sign

E.2.13 Road-holding position marking

A road-holding position marking must be provided at all road entrances to a runway.

E.2.14 Mandatory instruction marking

Where it is impracticable to install a mandatory instruction sign, a mandatory marking must be

provided on the surface of the pavement.

E.2.15 Information marking

Where an information sign would normally be installed and it is impracticable to install the sign, an information marking must be displayed on the surface of the pavement.

E.3 Lights

E.3.1 Elevation approach lights

- (a) Elevated approach lights and their supporting structures must be frangible except that, in that portion of the approach lighting system beyond 300 m from the threshold:
- (1) where the height of a supporting structure exceeds 12 m, the frangibility requirement must apply to the top 12 m only; and
 - (2) where a supporting structure is surrounded by non-frangible objects, only that part of the structure that extends above the surrounding objects must be frangible.
- (b) When an approach light fixture or supporting structure is not in itself sufficiently conspicuous, it must be suitably marked.

E.3.2 Elevated lights

Elevated runway, stopway and taxiway lights must be frangible. Their height must be sufficiently low to preserve clearance for propellers and for the engine pods of jet aircraft.

E.3.3 Surface lights

Light fixtures inset in the surface of runways, stopways, taxiways and aprons must be so designed and fitted as to withstand being run over by the wheels of an aircraft without damage either to the aircraft or to the lights themselves.

E.3.4 Light intensity and control

- (a) The intensity of runway lighting must be adequate for the minimum conditions of visibility and ambient light in which use of the runway is intended, and compatible with that of the nearest section of the approach lighting system when provided.
- (b) Where a high-intensity lighting system is provided, a suitable intensity control must be incorporated to allow for adjustment of the light intensity to meet the prevailing conditions. Separate intensity controls or other suitable methods must be provided to ensure that the following systems when installed can be operated at compatible intensities:-
- approach lighting system;
 - runway edge lights;
 - runway threshold lights;
 - runway end lights;
 - runway centre line lights;

- runway touchdown zone lights; and
- taxiway centre line lights.

E.3.5 Aerodrome beacon

- (a) An aerodrome beacon must be provided at an aerodrome intended for use at night if one or more of the following conditions exist:-
- (1) aircraft navigate predominantly by visual means;
 - (2) reduced visibilities are frequent; or
 - (3) it is difficult to locate the aerodrome from the air due to surrounding lights or terrain.

E.3.6 Approach lighting systems

- (a) A simple approach lighting system must be provided to serve a non-precision approach runway, except when the runway is used only in conditions of good visibility or sufficient guidance is provided by other visual aids.
- (b) A precision approach category I lighting system must be provided to serve a precision approach runway category I.
- (c) A precision approach category II and III lighting system must be provided to serve a precision approach runway category II or III.

E.3.7 Visual approach slope indicator systems

- (a) A visual approach slope indicator system must be provided to serve the approach to a runway whether or not the runway is served by other visual approach aids or by non- visual aids, where one or more of the following conditions exist:-
- (1) the runway is used by turbojet, turbofan or other aeroplanes with similar approach guidance requirements;
 - (2) the pilot of any type of aeroplane may have difficulty in judging the approach due to:-
 - (i) inadequate visual guidance such as is experienced during an approach over water or featureless terrain by day or in the absence of sufficient extraneous lights in the approach area by night; or
 - (ii) misleading information such as is produced by deceptive surrounding terrain or runway slopes;
 - (3) the presence of objects in the approach area may involve serious hazard if an aeroplane descends below the normal approach path, particularly if there are no non- visual or other visual aids to give warning of such objects;
 - (4) physical conditions at either end of the runway present a serious hazard in the event of an aeroplane undershooting or overrunning the runway;
 - (5) terrain or prevalent meteorological conditions are such that the aeroplane may be

subjected to unusual turbulence during approach.

- (b) PAPI, T-VASIS or AT-VASIS must be provided where the aerodrome reference code number is 3 or 4 when one or more of the conditions specified in paragraphs (a) (1) to (5) exists.
- (c) PAPI or APAPI must be provided where the aerodrome reference code number is 1 or 2 when 1 or more of the conditions specified in paragraphs (a) (1) to (5) exists.

E.3.8 Obstacle protection surface

- (a) An obstacle protection surface must be established when it is intended to provide a visual approach slope indicator system.
- (b) New objects or extensions of existing objects must not be permitted above an obstacle protection surface.
- (c) Existing objects above an obstacle protection surface must be removed.
- (d) Where an aeronautical study indicates that an existing object extending above an obstacle protection surface could adversely affect the safety of operations of aeroplanes one or more of the following measures must be taken:-(1)suitably raise the approach slope of the visual approach slope indicator system ;
 - (1) reduce the azimuth spread of the visual approach slope indicator system so that the object is outside the confines of the beam;
 - (2) displace the axis of the visual approach slope indicator system and its associated obstacle protection surface by no more than 5 degrees;
 - (3) suitably displace the runway threshold; and.
 - (4) where paragraph (4) is found to be impracticable, suitably displace the visual approach slope indicator system upwind of the runway threshold to provide an increase in threshold crossing height equal to the height of the object penetration.

E.3.9 Runway edge lights and runway end lights

Runway edge lights and runway end lights must be provided for a runway intended for use at night or for a precision approach runway intended for use by day or night.

E.3.10 Runway threshold and wing bar lights

- (a) Runway threshold lights must be provided for a runway equipped with runway edge lights except on a non-instrument or non-precision approach runway where the threshold is displaced and wing bar lights are provided.
- (b) Wing bar lights must be provided on a non- instrument or non-precision approach runway where the threshold is displaced and runway threshold lights are required, but are not provided.

E.3.11 Runway centre line lights

- (a) Runway centre line lights must be provided on a precision approach runway category II or III.
- (b) Runway centre line lights must be provided on a runway intended to be used for take-off with an operating minimum below a runway visual range of 400 m.

E.3.12 Runway touchdown zone lights

Touchdown zone lights must be provided in the touchdown zone of a precision approach runway category II or III.

E.3.13 Stopway lights

Stopway lights must be provided for a stopway intended for use at night.

E.3.14 Taxiway centre line lights

- (a) Taxiway centre line lights must be provided on an exit taxiway, taxiway, de/anti-icing facility and apron intended for use in runway visual range conditions less than 350 m in such a manner as to provide continuous guidance between the runway centre line and aircraft stands.
- (b) Taxiway centre line lights must be provided on a runway forming part of a standard taxi-route and intended for taxiing in runway visual range conditions less than 350 m.

E.3.15 Taxiway edge lights

- (a) Taxiway edge lights must be provided at the edges of a holding bay, de/anti-icing facility, and apron, intended for use at night and on a taxiway not provided with taxiway centre line lights and intended for use at night.
- (b) Taxiway edge lights must be provided on a runway forming part of a standard taxi-route and intended for taxiing at night where the runway is not provided with taxiway centre line lights.

E.3.16 Runway Turn pad lights

Runway turn pad lights must be provided for continuous guidance on a runway turn pad intended for use in runway visual range conditions less than 350 m, to enable an aeroplane to complete a 180 degree turn and align with the runway centre line.

E.3.17 Stop bars

A stop bar must be provided at every runway-holding position serving a runway when it is intended that the runway will be used in runway visual range conditions less than 550 m.

E.3.18 Intermediate holding position lights

Except where a stop bar has been installed, intermediate holding position lights must be provided at an intermediate holding position intended for use in runway visual range conditions less than 350 m.

E.3.19 Runway guard lights

Runway guard lights must be provided at each intersection of a taxiway with a runway intended for use in:

- (a) runway visual range conditions less than 550 m where a stop bar is not installed; and
- (b) runway visual range conditions between 550 m and 1200 m where the traffic density is heavy.

E.3.20 Visual docking guidance system

A visual docking guidance system must be provided when it is intended to indicate, by a visual aid, the precise positioning of an aircraft on an aircraft stand and other alternative means, such as mar musters, are not practicable.

E.3.21 Road-holding position light

A road-holding position light must be provided at each road-holding position serving a runway when it is intended that the runway will be used in runway visual range conditions less than 350 m.

E.4 Signs

E.4.1 Signs General

Signs must be provided to convey a mandatory instruction, information on a specific location or destination on a movement area or to provide other information to meet the requirements of a surface movement guidance and control system.

E.4.2 Mandatory instruction signs

- (a) A mandatory instruction sign must be provided to identify a location beyond which an aircraft taxiing or vehicle must not proceed unless authorized by the aerodrome control tower.
- (b) Mandatory instruction signs must include runway designation signs, category I, II or III holding position signs, runway-holding position signs, road-holding position signs and NO ENTRY signs.
- (c) At an intersection of a taxiway and a non-instrument, non-precision approach or take of runway, the runway-holding position marking must be supplemented at a taxiway/runway intersection or a runway/runway intersection with a runway designation sign.
- (d) At an intersection of a taxiway and a precision approach category I, II or III runway, the runway-holding position marking must be supplemented with a category I, II or III holding position sign.

A runway-holding position marking at a runway-holding position established in accordance with Appendix D.7 must be supplemented with a runway-holding position sign.

- (e) A 'NO ENTRY' sign must be provided when entry into an area is prohibited.

E.4.3 Information signs

- (a) An information sign must be provided where there is an operational need to identify by a sign, a specific location, or routing (direction or destination) information.
- (b) Information signs must include: direction signs, location signs, destination signs, runway exit signs, runway vacated signs and intersection take-off signs.
- (c) A runway exit sign must be provided where there is an operational need to identify a runway exit.
- (d) A runway vacated sign must be provided where the exit taxiway is not provided with taxiway centre line lights and there is a need to indicate to a pilot leaving a runway the perimeter of the ILS/MLS critical/sensitive area or the lower edge of the inner transitional surface whichever is farther from the runway centre line.
- (e) A combined location and direction sign must be provided when it is intended to indicate routing information prior to a taxiway intersection.

- (f) A direction sign must be provided when there is an operational need to identify the designation and direction of taxiways at an intersection.
- (g) A location sign must be provided in conjunction with a runway designation sign except at a runway/runway intersection.
- (h) A location sign must be provided in conjunction with a direction sign.

E.4.4 VOR aerodrome check-point sign

When a VOR aerodrome check-point is established, it must be indicated by a VOR aerodrome check-point marking and sign.

E.4.5 Road-holding position sign

A road-holding position sign must be provided at all road entrances to a runway.

E.5 Markers

E.5.1 General

Markers must be frangible. Those located near a runway or taxiway must be sufficiently low to preserve clearance for propellers and for the engine pods of jet aircraft.

E.5.2 Boundary markers

Boundary markers must be provided at an aerodrome where the landing area has no defined runway.

Appendix F — Visual Aids for Denoting Obstacles

F.1 Objects to be marked and/or lighted

- (a) A fixed obstacle that extends above an approach or transitional surface within 3000 m of the inner edge of the approach surface must be marked and, if the runway is used at night, lighted, except that:-
 - (1) such marking and lighting may be omitted when the obstacle is shielded by another fixed obstacle;
 - (2) the marking may be omitted when the obstacle is lighted by medium-intensity obstacle lights, Type A, by day and its height above the level of the surrounding ground does not exceed 150 m;
 - (3) the marking may be omitted when the obstacle is lighted by high-intensity obstacle lights by day; and
 - (4) the lighting may be omitted where the obstacle is a lighthouse and an aeronautical study indicates the lighthouse light to be sufficient.
- (b) A fixed object that extends above an obstacle protection surface must be marked and, if the runway is used at night, lighted.
- (c) Vehicles and other mobile objects, excluding aircraft, on the movement area of an aerodrome are obstacles and must be marked and, if the vehicles and aerodrome are used at night or in conditions of low visibility, lighted, except that aircraft servicing equipment and vehicles used

only on aprons may be exempt.

- (d) Elevated aeronautical ground lights within the movement area must be marked so as to be conspicuous by day. Obstacle lights must not be installed on elevated ground lights or signs in the movement area.
- (e) All obstacles within the distance specified in the following Table F-1, from the centre line of a taxiway, an apron taxiway or aircraft stand taxi lane must be marked and, if the taxiway, apron taxiway or aircraft stand taxi lane is used at night, lighted.

Table F-1. Markings & Lighting Requirements for Obstacles

Aerodrome Reference Code letter	Taxiway other than aircraft stand taxilane, centre line to object (metres)	Aircraft stand taxilane centre line to object (metres)
A	16.25	12
B	21.5	16.5
C	26	24.5
D	40.5	36
E	47.5	42.5
F	57.5	50.5

F.2 Marking of objects

- (a) All fixed objects to be marked must, whenever practicable, be coloured, but if this is not practicable, markers or flags must be displayed on or above them, except that objects that are sufficiently conspicuous by their shape, size or colour need not be otherwise marked.
- (b) All mobile objects to be marked must be coloured or display flags.

F.3 Use of markers

Markers displayed on or adjacent to objects must be located in conspicuous positions so as to retain the general definition of the object and must be recognizable in clear weather from a distance of at least 1000 m for an object to be viewed from the air and 300 m for an object to be viewed from the ground in all directions in which an aircraft is likely to approach the object. The shape of markers must be distinctive to the extent necessary to ensure that they are not mistaken for markers employed to convey other information, and they must be such that the hazard presented by the object they mark is not increased.

F.4 Use of flags

Flags used to mark objects must be displayed around, on top of, or around the highest edge of, the object. When flags are used to mark extensive objects or groups of closely spaced objects, they must be displayed at least every 15 m. Flags must not increase the hazard presented by the object they mark.

F.5 Lighting of objects

- (a) The presence of objects which must be lighted, as specified in appendix G.1 (as indicated under objects to be marked and/or lit), must be indicated by low-, medium- or high-intensity obstacle lights, or a combination of such lights.
- (b) Low-intensity obstacle lights, Type C, must be displayed on vehicles and other mobile objects excluding aircraft.
- (c) Low-intensity obstacle lights, Type D, must be displayed on follow-me vehicles.

Appendix G — Visual Aids for Denoting Restricted Use Areas

G.1 Closed runways and taxiways

A closed marking must be displayed on a runway or taxiway, or portion thereof, which is permanently closed to the use of all aircraft.

G.2 Non-load-bearing surfaces

Shoulders for taxiways, holding bays and aprons and other non-load-bearing surfaces which cannot readily be distinguished from load-bearing surfaces and which, if used by aircraft, might result in damage to the aircraft must have the boundary between such areas and the load-bearing surface marked by a taxi side stripe marking.

G.3 Unserviceable areas

Unserviceability markers must be displayed wherever any portion of a taxiway, apron or holding bay is unfit for the movement of aircraft but it is still possible for aircraft to bypass the area safely. On a movement area used at night, unserviceability lights must be used.

Appendix H — Electrical Systems

H.1 Power supply systems for air navigation facilities

- (a) Adequate primary power supply must be available at aerodromes for the safe functioning of air navigation facilities.
- (b) For aerodromes used for international operations, the design and provision of electrical power systems for aerodrome visual and radio navigation aids must be such that an equipment failure will not leave the pilot with inadequate visual and non-visual guidance or misleading information.

H.2 Visual Aids

- (a) For a precision approach runway, a secondary power supply capable of meeting the requirements specified in Table H-1 for the appropriate category of precision approach runway must be provided. Electric power supply connections to those facilities for which secondary power is required must be so arranged that the facilities are automatically connected to the secondary power supply on failure of the primary source of power.

- (b) For a runway meant for take-off in runway visual range conditions less than 800 m, a secondary power supply capable of meeting the relevant requirements of Table H-1 must be provided.

H.3 System design

- (a) For a runway meant for use in runway visual range conditions less than 550 m, the electrical systems for the power supply, lighting and control of the lighting systems included in Table H-1 must be so designed that an equipment failure will not leave the pilot with inadequate visual guidance or misleading information
- (b) Where the secondary power supply of an aerodrome is provided by the use of duplicate feeders, such supplies must be physically and electrically separate so as to ensure the required level of availability and independence.
- (c) Where a runway forming part of a standard taxi-route is provided with runway lighting and taxiway lighting, the lighting systems must be interlocked to preclude the possibility of simultaneous operation of both forms of lighting.

H.4 Monitoring

Where lighting systems are used for aircraft control purposes, such systems must be monitored automatically so as to provide an indication of any fault which may affect the control functions. This information must be automatically relayed to the air traffic service unit.

Table H-1.Secondary power supply requirements

Runway	Lighting aids requiring power	Maximum switch-over time	Reference Notes
Precision approach category I	Approach lighting system	15 seconds	
	Runway edged	15 seconds	C
	Visual approach slope indicators	15 seconds	A, C
	Runway threshold	15 seconds	C
	Runway end	15 seconds	
	Essential taxiway	15 seconds	A
	Obstacle	15 seconds	A
Precision approach category II/III	Inner 300 m of the approach	1 second	A
	lighting system	15 seconds	A
	Other parts of the approach	15 seconds	A
	lighting system	15 seconds	A
	Obstacle	1 second	A

	Runway edge	1 second	A
	Runway threshold	1 second	A
	Runway end	1 second	A
	Runway centre line	1 second	A
	Runway touchdown zone	15 seconds	A
	All stop bars		A
	Essential taxiway		A
Runway meant for take-off in runway visual range conditions less than a value of 550 m	Runway edge	15 seconds	B
	Runway end	1 second	
	Runway centre line	1 second	
	All stop bars	1 second	
	Essential taxiway	15 seconds	A
	Obstacle	15 seconds	A

Reference Notes:

- A. *Supplied with secondary power when their operation is essential to the safety of flight operation.*
- B. *One second where runway centreline lights are not provided.*
- C. *One second where the approaches are over hazardous or precipitous terrain*