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| APPENDIX B TO NPA/ADR/01/2020 |
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SEYCHELLES TECHNICAL STANDARDS**STS-ADR**

Issue 02, [to insert applicable month] 2020

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ABBREVIATIONS AND SYMBOLSAbbreviations

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| AAIB | SCAA |
| ACN | Aircraft Classification Number |
| ADP | Airside driver permit |
| AGL | Airfield Ground Lighting Above ground level |
| ... | |
| CEO | Chief Executive Officer |
| CIE | Commission Internationale de l'Éclairage |
| cm | Centimetre |
| °C | Degrees Celsius |
| CEO | Chief Executive Officer (of Seychelles Civil Aviation Authority) |
| DME | Distance Measuring Equipment |
| E | Modulus of elasticity |
| ... | |
| SMS | Safety Management System |
| SSRD | Safety & Security Regulation Department of SCAA |
| ... | |
| VOR | Very high frequency omni-directional radio range |
| WHMP | Wildlife hazard management programme |
| WIP | Work in progress |

CHAPTER 1 – INTRODUCTION

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1.2.4 Relevant legislation and document

1.2.4.1 The relevant legislation and document hierarchy relating to the certification of aerodromes in Seychelles consists of:

- i. the relevant provisions of the Civil Aviation Act, 2005; the Seychelles Civil Aviation Authority Act, 2005; and the Civil Aviation (Safety) Regulations, 2017;
- ii. Applicable Civil Aviation Directives;

- iii. ~~This Manual of Aerodrome Standards~~ Seychelles Technical Standards (with including applicable references to relevant sections of ICAO Annex 14 Vol. I and related guidance material). and
- iv. Aerodrome Safety Directives and/or Aerodrome Safety Publications, as and when published, by the Aerodrome Safety and Standards Inspectorate.

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1.7. Definitions

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| Aerodrome Safety Directives, Aerodrome Safety Publications | Refers to directives and publications published by the Aerodrome Safety Unit & Standards Inspectorate, intended to supplement the standards, recommended practices and guidance material contained in the Manual of Aerodrome Standards Seychelles Technical Standards, or to provide recommended practices and additional materials for education. |
| ... | |
| Instrument runway | <p>One of the following types of runways intended for the operation of aircraft using instrument approach procedures:</p> <ul style="list-style-type: none"> a) Non-precision approach runway. An instrument runway served by visual aids and a non-visual aid(s) providing at least directional guidance adequate for a straight in approach intended for landing operations following an instrument approach operation type A and a visibility not less than 1000m. b) Precision approach runway, category I. An instrument runway served by ILS and/or MLS and visual aids and non-visual aid(s) intended for landing operations following an instrument approach operation type B with a decision height (DH) not lower than 60m (200 ft) and either a visibility not less than 800m or a runway visual range not less than 550m. c) Precision approach runway, category II. An instrument runway served by ILS and/or MLS and visual aids and non-visual aid(s) intended for landing operations following an instrument approach operation type B with a decision height (DH) lower than 60m (200 ft) but not lower than 30m (100 ft) and a runway visual range not less than 300m. d) Precision approach runway, category III. An instrument runway served by ILS and/or MLS to and along the surface of the runway and A runway served by visual aid(s) and non-visual aid(s) intended for lading operations following and instrument approach operation type B: e) A intended for operations with a decision height (DH) lower than 30m (100ft), or no decision height and a runway visual range not less than 175 300 m or 7 f) B intended for operations with a decision height lower than 15m |

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| | <p>(50 ft), or no decision height and a runway visual range less than 175m but not less than 50m.</p> <p>g) C—intended for operations with no decision height and no runway visual range limitations.</p> <p><i>Note 1. — See ICAO Annex 10, Volume 1, for related ILS and/or MLS specifications.</i></p> <p><i>Note 21 — Visual aids need not necessarily be matched to the scale of non-visual aids provided. The criterion for the selection of visual aids is the conditions in which operations are intended to be conducted.</i></p> <p><i>Note 2 — Refer to Annex 6 (Operation of Aircraft) for instrument approach operation types.</i></p> |
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CHAPTER 2 – APPLICATION OF STANDARDS AND RECOMMENDED PRACTICES TO AERODROMES

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2.1.3 The Minister has delegated to the Chief Executive Officer of Civil Aviation (CEO) and the Head of Aerodrome Safety & Standards Inspectorate, his power to specify the standards and recommended practices for aerodromes and their operations. These standards and recommended practices are set out in this document entitled ‘~~Manual of Aerodrome Standards~~ Seychelles Technical Standards – Aerodromes’ and are applicable to all operators of certified aerodromes subjected to Regulation 61 of Civil Aviation (Safety) Regulations, 2017. Standards and recommended practices may also be published through Civil Aviation Directives and Safety Directives.

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Table 2-1 – Aerodrome Reference Code

| Code element 1 | |
|----------------|--------------------------------------|
| Code number | Aeroplane reference field length |
| 1 | Less than 800m |
| 2 | 800m up to but not including 1200m |
| 3 | 1200m up to but not including 1800 m |
| 4 | 1800m and over |

| Code element 2 | |
|----------------|---------------------------------|
| Code letter | Wingspan |
| A | Up to but not including 15m |
| B | 15m up to but not including 24m |
| C | 24m up to but not including 36m |
| D | 36m up to but not including 52m |
| E | 52m up to but not including 65m |
| F | 65m up to but not including 80m |

Note 1 – Guidance on planning for aeroplanes with wingspans greater than 80m is given in the Aerodrome Design Manual (ICAO Doc 9157), Parts 1 and 2.

Note 2 – Procedures on conducting aerodrome compatibility study to accommodate aeroplanes with folding wing tips spanning two code letters are given in the ASP relating to Procedures for Air Navigation Services Aerodromes (PANS-ADR). Further guidance can be found in the manufacturer’s aircraft characteristics for airport planning manual.

2.10 Specific procedures for aerodrome operations

Introductory Note - *This section introduces ICAO PANS-Aerodromes (Doc 9981) for use by an aerodrome undertaking an assessment of its compatibility with the type of traffic or operation it is intending to accommodate. The material in the ICAO ASP PANS-Aerodromes ADR addresses operational issues faced by existing aerodromes and provides the necessary procedures to ensure the continued safety of operations. Where alternative measures, operational procedures and operating restrictions have been developed, these are detailed in the aerodrome manual and reviewed periodically to assess their continued validity. The ICAO PANS-Aerodromes ADR does not substitute nor circumvent the provisions contained in this Manual STS. It is expected that infrastructure on an existing aerodrome or a new aerodrome will fully comply with the requirements in this Manual STS.*

- 2.10.1 When an aerodrome operator intends to accommodate an aeroplane that exceeds the certificated characteristics of the aerodrome, the compatibility between the operation of the aeroplane and aerodrome infrastructure and operations shall be assessed and appropriate measures developed in order to maintain an acceptable level of safety during operations. The assessment and proposed mitigating measures are to be submitted to the Aerodromes Safety & Standards Inspectorate for acceptance.

Note – Procedures to assess the compatibility of the operation of a new aeroplane with an existing aerodrome can be found in ICAO ASP PANS-Aerodromes (Doc 9981).

- 2.10.2 Information concerning alternative measures, operational procedures and operating restrictions implemented at an aerodrome arising from 2.10.1 shall be promulgated.

Note 1 – See ICAO PANS-AIM (Doc 10066), Appendix 2, AD 2.20, on the provision of a detailed description of local traffic regulations.

Note 2 – See ~~ICAO~~ASP PANS-Aerodromes (~~Doc 9981~~), ~~Chapter 3, section 3.6~~, on promulgation of safety information.

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CHAPTER 3 – AERODROME CERTIFICATION PROCESS AND AERODROME MANUAL REQUIREMENTS

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3.4 Applying for an Aerodrome Certificate

3.4.1 An applicant for an Aerodrome Certificate shall formally ~~write to the Head Aerodromes Safety & Standards Inspectorate, at the below address~~, expressing their interest and/or intentions to the Safety & Security Regulation Department at the following address:-

~~Head of Aerodrome~~ General Manager Safety & Standards Inspectorate Security Regulation
Safety & Security Regulation Department
Seychelles Civil Aviation Authority (SCAA)
PO Box 181, Victoria, Mahe,
Seychelles

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3.15.4 An aerodrome operator, is required to give the Aeronautical Information Services and the air traffic control unit immediate notice detailing any of the following circumstances of which the aerodrome operator has knowledge:

- a) in respect of obstacles, obstructions and hazards —
 - i. any projections by an object through an obstacle limitation surface relating to the aerodrome; and
 - ii. the existence of any obstruction or hazardous condition affecting aviation safety at or near the aerodrome;
- b) any reduction in the level of service at the aerodrome as set out in any publication by the Aeronautical Information Services or any variation (that has been accepted by the, ~~Chief Executive Officer of Civil Aviation or the Head of the Aerodrome Safety & Standards Inspectorate~~ SSRD) from this ~~Manual of Aerodrome Standards~~ STS;
- c) closure of any part of the movement area of the aerodrome;
- d) any significant changes in any aerodrome facility or the physical layout of the aerodrome; and

- e) any other condition that could affect aviation safety at the aerodrome and against which precautions are warranted.

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3.16 Application for changes to Aerodrome Certificate

3.16.4 If an aerodrome operator wishes to apply for an amendment to his Aerodrome Certificate, e.g. a change of the Special Conditions under which the Aerodrome Certificate is initially subjected to, he should write to the ~~Head of Aerodrome Safety & Standards Inspectorate~~ **General Manager Safety & Security Regulation Department** giving full details of the proposed variation and justification. The minimum notice required is 30 days.

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3.17.6 In addition to the provision of 13.17.1, the ASSI may require aerodrome operators to complete compliance checklists and submit to the ASSI within a defined period of time. Subsequent to the submission of the completed checklists, the ASSI may conduct detailed inspection in any particular area depending on the information and supporting document(s) provided by the aerodrome operator.

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CHAPTER 4 – AERODROME OPERATOR ORGANIZATION AND DOCUMENT MANAGEMENT

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4.2 Aerodrome operational staff and competency

4.2.1 An aerodrome operator shall employ an adequate number of qualified and skilled personnel to perform all critical activities for the operation and maintenance of his aerodrome. The following are to be taken into consideration when determining the number, qualifications and skills of the personnel:

- i. the size and complexity of the aerodrome;
- ii. the type of traffic;
- iii. the type of operations;
- iv. the level and density of the traffic;
- v. the operating hours of the aerodrome;
- vi. the amount of full-time equivalents (FTEs) necessary for each activity;
- vii. human factors principle;
- viii. labour legislation; and
- ix. the degree of subcontracting.

Note – Refer to ASP relating to PANS-ADR for further on training.

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CHAPTER 5 – AERODROME WORK SAFETY, SAFETY MANAGEMENT SYSTEM AND ACCIDENT/INCIDENT REPORTING AND INVESTIGATION PROCEDURES

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5.1.6 For minor work on the movement area, a system of work permits should be established.

Note – Refer to ASP relating to PANS-ADR for further on work in progress.

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5.8.4 The SMS of the aerodrome operator shall:

- a) be established in accordance with the framework and elements contained in this Manual STS and ICAO Annex 19, Appendix 2 other documents published by ASSI; and
- b) be commensurate with their size and the complexity of its aerodrome and aerodrome operations.

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5.10.2 ~~In accordance with 10.2.1~~ The SMS framework shall include:

- 1. clearly defined lines of responsibility and accountability throughout the aerodrome operator, including a direct accountability for safety on the part of senior management;

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CHAPTER 6 – AERODROME DATA

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6.1.1. This chapter contains specifications relating to the provision of aerodrome data to the Aeronautical Information Service (AIS) for publication in accordance with ~~Annex 15 to the Convention of International Civil Aviation~~ STS-AIS/ACS.

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6.6.5 The geographical coordinates of obstacles in Area 2 (the part within the aerodrome boundary) and in Area 3 shall be measured and reported to the AIS in degrees, minutes, seconds and tenths of seconds. In addition, the top elevation, type, marking and lighting (if any) of obstacles shall be reported to the aeronautical information services authority.

Note 1. — See Annex 15, Appendix 1, for graphical illustrations of obstacle data collection surfaces and criteria used to identify obstacles in Areas 2 and 3.
Note 2. — PANS-AIM (ICAO Doc 10066), Appendix 1 and Appendix 8 provides requirements for obstacle data determination in Areas 2 and 3.

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6.9 Declared distances

6.9.1 The following distances shall be calculated to the nearest meter for a runway intended for use by international commercial air transport:

- a) take-off run available;
- b) take-off distance available;
- c) accelerate-stop distance available; and
- d) landing distance available.

Note – Guidance on calculation of declared distances is given in ICAO Annex 14, Attachment A, Section 3 Aerodrome Safety Publications.

6.10 Condition of the movement area and related facilities

6.10.1 Information on the condition of the movement area and the operational status of related facilities shall be provided to the Aeronautical Information Services, and similar information of operational significance to the air traffic service units, to enable those units to provide the necessary information to arriving and departing aircraft. The information shall be kept up to date and changes in conditions reported without delay.

Note – The nature, format and conditions of the information to be provided are specified in the PANSs-AIM (Doc 10066) and the PANS-ATM (Doc 4444). Specific procedures pertaining to works in progress on the movement area and to the reporting of such works are specified in ASP PANS-Aerodromes.

6.10.2 The condition of the movement area and the operational status of related facilities shall be monitored and reports on matters of operational significance or affecting aircraft performance given, particularly in respect of the following:

- a) construction or maintenance work;
- b) rough or broken surfaces on a runway, taxiway or an apron;
- c) water on a runway, a taxiway or an apron; [~~applicable until 4 November 2020~~]
- d) other temporary hazards, including parked aircraft;
- e) failure or irregular operation of part ~~of~~ all of the aerodrome visual aids; and
- f) failure of the normal or secondary power supply.

Note 1 – As of 05 November 2020, other contaminants may include mud, dust, sand, volcanic ash, oil and rubber. Procedures for monitoring and reporting the conditions of the movement area are included in ASP PANS-Aerodromes.

Note 2 - As of 5 November 2020, the Aeroplane Performance Manual (ICAO Doc 10064) provides guidance on aircraft performance calculation requirements regarding the description of runway surface conditions in 2.9.2 c), e) and f).

Note 3 - As of 5 November 2020, origin and evolution of data, assessment process and the procedures are prescribed in ASP PANS-Aerodromes. These procedures are intended to fulfil the requirements to achieve the desired level of safety for aeroplane operations prescribed by CAD-OPS P8, CAD-AIRW/10 and CAD-AIRW/11 and to provide the information fulfilling the syntax requirements for dissemination specified in STS-AIS/ACS and the PANS-ATM (Doc 4444).

- 6.10.3 Until 04 November 2020, ~~To~~ to facilitate compliance with paragraphs 6.10.1 and 6.10.2, inspections of the movement area shall be carried out each day at least once where the code number is 1 or 2 and at least twice where the code number is 3 or 4.

Note – Guidance on carrying out daily inspections of the movement area is given in the ICAO Airport Services Manual, Part 8 and in the Manual of Surface Movement Guidance and Control Systems (SMGCS).

- 6.10.3 As of 5 November 2020, to facilitate compliance with 6.10.1 and 6.10.2, the following inspections shall be carried out each day:

- a. for the movement area, at least once where the aerodrome reference code number is 1 or 2 and at least twice where the aerodrome reference code number is 3 or 4; and
- b. for the runway(s), inspections in addition to a. whenever the runway surface conditions may have changed significantly due to meteorological conditions.

Note 1 - Procedures on carrying out daily inspections of the movement area are given in ASP PANS-Aerodromes. Further guidance is available in the Airport Services Manual (Doc 9137), Part 8, in the Manual of Surface Movement Guidance and Control Systems (SMGCS) (Doc 9476) and in the Advanced Surface Movement Guidance and Control Systems (A-SMGCS) Manual (Doc 9830).

Note 2 - The ASP PANS-Aerodromes contains clarifications on the scope of a significant change in the runway surface conditions.

- 6.10.4 Personnel assessing and reporting runway surface conditions required in 6.10.2 and 6.10.3 shall be trained and competent to perform their duties.

Note 1 – Guidance on training of personnel is given in ICAO Annex 14 Attachment A, Section 6 [applicable 05 November 2020].

Note 2 – Information on training for personnel assessing and reporting runway surface conditions is available in ASP PANS-Aerodromes.

6.11 Water on a runway [applicable until 04 November 2020]

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6.11 Runway surface condition(s) for use in the runway condition report [applicable 05 November 2020]

Introductory Note - The philosophy of the runway condition report is that the aerodrome operator assesses the runway surface conditions whenever water, snow, slush, ice or frost are present on an operational runway. From this assessment, a runway condition code (RWYCC) and a description of the runway surface are reported which can be used by the flight crew for aeroplane performance calculations. This report, based on the type, depth and coverage of contaminants, is the best assessment of the runway surface condition by the aerodrome operator; however, all other pertinent information may be taken into consideration. See ICAO Annex 14, Vol 1, Attachment A, Section 6, for further details. The ASP PANS-Aerodromes contains procedures on the use of the runway condition report and assignment of the RWYCC in accordance with the runway condition assessment matrix (RCAM).

6.11.1 The runway surface condition shall be assessed and reported through a runway condition code (RWYCC) and a description using the following terms:

DRY

STANDING WATER

WET

LOOSE SAND

Note 1 - The runway surface conditions are those conditions for which, by means of the methods described in ASP PANS-Aerodromes, the flight crew can derive appropriate aeroplane performance.

Note 2 - The conditions, either singly or in combination with other observations, are criteria for which the effect on aeroplane performance is sufficiently deterministic to allow assignment of a specific runway condition code.

Note 3 - The term LOOSE SAND do not appear in the aeroplane performance section but are used in the situational awareness section of the runway condition report.

6.11.2 Whenever an operational runway is contaminated, an assessment of the contaminant depth and coverage over each third of the runway shall be made and reported.

Note – Procedures on depth and coverage reporting are found in ASP PANS-Aerodromes.

6.11.3 Recommendation – Friction measurements made on runway surface conditions with contaminants other than compacted snow and ice should not be reported.

6.11.4 Information that a runway or portion thereof is slippery wet shall be made available.

Note 1 - The surface friction characteristics of a runway or a portion thereof can be degraded due to rubber deposits, surface polishing, poor drainage or other factors. The determination that a runway or portion thereof is slippery wet stems from various methods used solely or in combination. These methods may be functional friction measurements, using a continuous friction measuring device, that fall below the minimum standard, observations by aerodrome maintenance personnel, repeated reports by pilots and aircraft operators based on flight crew experience, or through analysis of aeroplane stopping performance that indicates a substandard surface. Supplementary tools to undertake this assessment are described in ASP PANS-Aerodromes.

Note 2 – See 6.10.1 and 6.15 concerning the provision of information to, and coordination between, appropriate authorities.

6.11.5 Notification shall be given to relevant aerodrome users when the friction level of a paved runway or portion thereof is less than the minimum friction level specified herein.

Note 1 – Guidance on determining and expressing the minimum friction level is provided in Assessment, Measurement and Reporting of Runway Surface Conditions (ICAO Cir 329).

Note 2 – Procedures on conducting a runway surface friction characteristics evaluation programme are provided in ASP PANS-Aerodromes.

Note 3 – Information to be promulgated in a NOTAM includes specifying which portion of the runway is below the minimum friction level and its location on the runway.

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6.15 Coordination between the aerodrome operator and the Aeronautical Information Services

6.15.1 To ensure that the Aeronautical Information Services obtain information to enable them to provide up-to-date pre-flight information and to meet the need for in-flight information, ~~the aerodrome operator shall establish arrangements with the Aeronautical Information Services to report~~ arrangements shall be made between aeronautical information services and aerodrome authorities responsible for aerodrome services to report to the responsible aeronautical information services unit, with a minimum of delay:

- a) information on ~~the status of certification of aerodromes~~ aerodrome

conditions (reference 1.9 and 6.10 to 6.14 above);

- b) the operational status of associated facilities, services and navigation aids within their area of responsibility;
- c) any other information considered to be of operational significance.

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CHAPTER 7 – PHYSICAL CHARACTERISTICS

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Objects on runway strips

Note — See 13.10 for information regarding siting of equipment and installations on runway strips.

- 7.5.6 An object situated on a runway strip which may endanger aeroplanes shall be regarded as an obstacle and shall be removed.

Note 1 – Consideration will have to be given to the location and design of drains on a runway strip to prevent damage to and aeroplane accidentally running off a runway. Suitably designed drain covers may be required. For further guidance, see ICAO's Aerodrome Design Manual (Doc 9157), Part 1.

Note 2 – Where open-air or covered storm water conveyances are installed, consideration will have to be given to ensure that their structure does not extend above the surrounding ground so as not to be considered an obstacle. See also Note 1 7.5.16.

Note 3 – Particular attention needs to be given to the design and maintenance of an open-air storm water conveyance in order to prevent wildlife attraction, notably birds. If needed, it can be covered by a net. Procedures on wildlife management are specified in ASP PANS-Aerodromes. Further Guidance on wildlife control and reduction can be found in ICAO's Airport Services Manual (Doc 9137), Part 3.

- 7.5.7 No fixed object, other than visual aids required for air navigation purposes or those required for aircraft safety purposes and which must be sitted on the runway strip, and satisfying the relevant frangibility requirement in Chapter 9 of this Manual, shall be permitted on any part of a runway strip of a precision approach runway delineated by the lower edges of the inner transitional surfaces.:

- a) ~~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~~
- b) ~~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~~

- e) ~~within 45 m of the runway Centre line of a precision approach runway category I where the code number is 1 or 2.~~

No mobile object shall be permitted on this part of the runway strip during the use of the runway for landing or take-off.

Note – See Chapter 8 for characteristics of inner transitional surface.

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Width of clearways

7.7.3 Recommendation — A clearway should extend laterally on each side of the extended centre line of the runway, to a distance of at least:

- a) 75 m on each side of the extended Centre line of the for instrument runways; and
- b) half of the width of the runway strip for non-instrument runways.

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7.10 Taxiways

Note 1 — Unless otherwise indicated the requirements in this section are applicable to all types of taxiways.

Note 2 – See 9.55 for a standardized scheme for the nomenclature of taxiways which may be used to improve situational awareness and as a part of an effective runway incursion prevention measure.

Note 23 – See ICAO Annex 14 Vol 1, Attachment A, Section 22, for specific taxiway design guidance which may assist in the prevention of runway incursions when developing a new taxiway or improving existing ones with known runway incursion safety risks.

General

7.10.1 Taxiways shall be provided to permit the safe and expeditious surface movement of aircraft.

Note — Guidance on layout and standardized nomenclature of taxiways is given in the ICAO Aerodrome Design Manual (Doc 9157), Part 2.

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7.13 Holding bays, runway-holding positions, intermediate holding positions and road-holding positions

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Location

7.13.6 The distance between a holding bay, runway-holding position established at a taxiway/runway intersection or road-holding position and the centre line of a

runway shall be in accordance with Table 7-2 of this Manual and, in the case of a precision approach runway, such that a holding aircraft or vehicle will not interfere with the operation of radio navigation aids.

Note – Guidance for the positioning of runway-holding positions is given in ICAO Aerodrome Design Manual (Doc 9157), Part 2.

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Table 7-2 – Minimum distance from the runway centre line to a holding bay, runway-holding position or road-holding position

| Type of runway | Code number | | | |
|--|------------------|------------------|--------------------|----------------------|
| | 1 | 2 | 3 | 4 |
| Non-instrument | 30m | 40m | 75m | 75m |
| Non-precision approach | 40m | 40m | 75m | 75m |
| Precision approach category I | 60m ^b | 60m ^b | 90m ^{a,b} | 90m ^{a,b,c} |
| Precision approach categories II and III | - | - | 90m ^{a,b} | 90m ^{a,b,c} |
| Take-off runway | 30m | 40m | 75m | 75m |

a. If a holding bay, runway-holding position or road-holding position is at lower elevation compared to the threshold, the distance may be decreased 5m for every metre the bay or holding position is lower than the threshold, contingent upon not infringing the inner transitional surface.

b. This distance may need to be increased to avoid interference with radio navigation aids, particularly the glide path and localizer facilities. Information on critical and sensitive areas of ILS and MLS is contained in ICAO Annex 10, Volume 1, Attachment C and G, respectively (see also paragraph 7.2.13.6 of this Manual).

Note 1 – The distance of 90 m for code 3 or 4 is based in an aircraft with a tail height of 20m, a distance from the nose to the highest part of the tail of 52.7m and a nose height of 10m holding at an angle of 45° or more with respect to the runway centre line, being clear of the obstacle free zone and not accountable for the calculation if OCA/H.

Note 2 – The distance of 60m for code number 2 is based on an aircraft with a tail height of 8m, a distance from the nose to the highest part of the tail of 24.6m and a nose height of 5.2m holding at an angle of 45° or more with respect to the runway centre line, being clear of the obstacle free zone.

~~e. Where the code letter is F, this distance should be 107.5m.~~

Note 3 – For code number 4 where the width of the inner edge of the inner approach surface is more than 120m, a distance greater than 90m may be necessary to ensure that

a holding aircraft is clear of the obstacle free zone. For example, The a distance of 107.5m 100m for code number 4 where the code letter is F is based on an aircraft with a tail height of 24m, a distance from the nose to the highest part of the tail of 62.2m and a nose height of 10m holding at an angle of 45° or more with respect to the runway centre line, being clear of the obstacle free zone.

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CHAPTER 9 – VISUAL AIDS FOR NAVIGATION

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9.42 Stop bars

Application

Note 1 — The provision of stop bars requires their control either manually or automatically by air traffic control services.

Note 2 — Runway incursions may take place in all visibility or weather conditions. The provision of stop bars at runway holding positions and their use at night in visibility conditions greater than 550 m RVR can form part of effective runway incursion prevention measures.

9.42.1 A stop bar shall 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 a value of 550 m, except where:

- a) appropriate aids and procedures are available to assist in preventing inadvertent incursions of aircraft and vehicles onto the runway; or
- b) operational procedures exist to limit, in runway visual range conditions less than a value of 550 m, the number of:
 1. aircraft on the maneuvering area to one at a time; and
 2. vehicles on the maneuvering area to the essential minimum.

~~9.42.2 — A stop bar shall 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 of values between 350 m and 550 m, except where:~~

- ~~a) appropriate aids and procedures are available to assist in preventing inadvertent incursions of aircraft and vehicles onto the runway; or~~
- ~~b) operational procedures exist to limit, in runway visual range conditions less than a value of 550 m, the number of:

 - ~~1. aircraft on the maneuvering area to one at a time; and~~
 - ~~2. vehicles on the maneuvering area to the essential minimum.~~~~

Note – Subsequent SARPs will be renumbered accordingly.

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9.45 Runway guard lights

Note — Runway incursions may take place in all visibility or weather conditions. The use of runway guard lights at runway-holding positions can form part of effective runway incursions prevention measures. The purpose of Runway guard lights is to warn pilots and drivers of vehicles when they are operating on taxiways that they are about to enter an active runway. There are two standard configurations of runway guard lights as illustrated in ICAO Annex 14, Vol. 1, Figure 5-29.

Application

- 9.45.1 Runway guard lights, Configuration A, shall be provided at each taxiway/runway intersection associated with a runway intended for use in:
- runway visual range conditions less than a value of 550 m where a stop bar is not installed; and
 - runway visual range conditions of values between 550 m and 1 200 m where the traffic density is heavy.

Note 1 – Runway guard lights Configuration B may supplement Configuration A when deemed necessary.

Note 2 – Guidance on the design, operation and the location of runway guard lights Configuration B is given in ICAO's Aerodrome Design Manual (Doc 9157), Part 4.

- 9.45.2 **Recommendation** – As part of runway incursion prevention measures, runway guard lights, Configuration A or B, should be provided at each taxiway/runway intersection where runway incursion hot spots have been identified, and used under all-weather conditions during day and night.

- 9.45.3 **Recommendation** – Configuration B runway guard lights should not be collocated with a stop bar.

- 9.45.4 Where more than one runway-holding positions exist at a runway/taxiway intersections, only the set of runway guard lights associated with the operational runway-holding position shall be illuminated.

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| Note – Subsequent SARPs have been renumbered accordingly. |
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Location

- 9.45.5 Runway guard lights, Configuration A, shall be located at each side of the taxiway on the holding side of the runway-holding positions marking at a distance from the runway centre line not less than that specified for a take-off runway in Table 7-2 of this Manual.

- 9.45.6 Runway guard lights, Configuration B, shall be located across the taxiway on the holding side of the runway-holding position marking at a distance from the runway centre line not less than that specified for a take-off runway in Table 7-2 of this Manual.

Characteristics

- 9.45.7 Runway guard lights, Configuration A, shall consist of two pairs of yellow lights.
- 9.45.8 **Recommendation** — Where there is a need to enhance the contrast between the on and off state of runway guard lights, Configuration A, intended for use during the day, a visor of sufficient size to prevent sunlight from entering the lens without interfering with the function of the fixture should be located above each lamp.
- Note — Some other device or design, e.g. specially designed optics, may be used in lieu of the visor.*
- 9.45.9 Runway guard lights, Configuration B, shall consist of yellow lights spaced at intervals of 3 m across the taxiway.
- 9.45.10 The light beam shall be unidirectional and shall show yellow in the direction of approach aligned so as to be visible to the pilot of an aeroplane taxiing to the runway-holding position.

Note – For guidance on orientation and aiming of runway guard lights, see ICAO Aerodrome Design Manual (Doc 9157), Part 4.

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| Note – Subsequent SARPs will be renumbered accordingly. |
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9.51 No-entry bar

Note 1— A no-entry bar is intended to be controlled manually by air traffic services.

Note 2— Runway incursions may take place in all visibility or weather conditions. The use provision of no-entry bars at taxiway/runway intersections and their use at night and in all visibility conditions can form part of effective runway incursion prevention measures.

Application

- 9.51.1 **Recommendation** – A no-entry bar should be provided across a taxiway which is intended to be used as an exit only taxiway to assist in preventing inadvertent access of traffic to that taxiway.

Location

- 9.51.2 **Recommendation** – A no-entry bar should be located across the taxiway at the end of an exit only taxiway where it is desired to prevent traffic from entering the taxiway on the wrong direction.
- 9.51.3 **Recommendation** – A no-entry bar should be co-located with a no-entry sign and/or a no-entry marking.

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| Note – Subsequent SARPs will be renumbered accordingly. |
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9.51.8 The lighting circuit shall be designed so that:

- a) ~~no entry bars are switchable selectively of in groups;~~
- b) ~~when a no entry bar is illuminated, any taxiway centre line lights installed beyond the no entry bar, when viewed towards the runway, shall be extinguished for a distance of at least 90m; and~~
- c) ~~when a no entry bar is illuminated, any stop bar installed between the no entry bar and the runway shall be extinguished.~~

Taxiway centre line lights installed beyond the no-entry bar, looking in the direction of the runway, shall not be visible when viewed from the taxiway.

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Subpart E – Signs

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Table 9-5 – Location distances for taxiing guidance signs including runway exit signs

| Sign height (mm) | | | | Perpendicular distance from defined taxiway pavement edge to near side of sign | Perpendicular distance from defined runway pavement edge to near side of sign |
|------------------|--------|--------------------|-----------------|--|---|
| Code number | Legend | Face (min.) | Installed (max) | | |
| 1 or 2 | 200 | 400 300 | 700 | 5-11 m | 3-10 m |
| 1 or 2 | 300 | 600 450 | 900 | 5-11 m | 3-10 m |
| 3 or 4 | 300 | 600 450 | 900 | 11-21 m | 8-15 m |
| 3 or 4 | 400 | 800 600 | 1100 | 11-21 m | 8-15 m |

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9.55.35 A taxiway shall be identified by a designator that is used only once on an aerodrome comprising a single letter, two letters or a combination of a letter or letters followed by a number.

9.55.36 **Recommendation** — When designating taxiways, the use of the letters I, O or X and the use of words such as inner and outer should be avoided wherever possible to avoid confusion with the numerals 1, 0 and closed marking.

9.55.37 When designating taxiways, the use of the letters I, O or X shall not be used to avoid confusion with the numerals 1, 0 and closed marking.

9.55.38 The use of numbers alone on the maneuvering area shall be reserved for the designation of runways.

9.55.39 **Recommendation** – Apron stand designators should not be the same as taxiway designators.

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CHAPTER 10 – VISUAL AIDS FOR DENOTING OBSTACLES

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Subpart B – Marking and lighting of obstacles

10.2 **Objects to be marked and/or lighted**

Note 1 – The marking and/or lighting of obstacles is intended to reduce hazards to aircraft by indicating the presence of the obstacles. It does not necessarily reduce operating limitations which may be imposed by an obstacle.

Note 2 – An autonomous aircraft detection system may be installed on or near an obstacle (or group of obstacles such as wind farms), designed to operate the lighting only when the system detects and aircraft approaching the obstacle, in order to reduce light exposure to local residents. Guidance on the design and installation of an autonomous aircraft detection system is available in ICAO's Aerodrome Design Manual (Doc 9157), Part 4. The availability of such guidance is not intended to imply that such a system has to be provided.

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CHAPTER 11 – VISUAL AIDS FOR DENOTING RESTRICTED USE AREAS

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11.2 **Closed runways and taxiways, or parts thereof**

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Characteristics

11.2.4 The closed marking shall be of the form and proportions as detailed in ICAO Annex 14 Vol. I, Figure 7-1, Illustration a), when displayed on a runway, and shall be of the form and proportions as detailed in ICAO Annex 14 Vo. I, Figure 7-1, Illustration b), when displayed on a taxiway. The marking shall be white when displayed on a runway and shall be yellow when displayed on a taxiway.

Note 1 – When an area is temporarily closed, frangible barriers or markings utilizing materials other than paint or other suitable means may be used to identify the closed area.

Note 2 – Procedures pertaining to the planning, coordination, monitoring and safety management of works in progress on the movement area are specified in ASP PANS-Aerodromes.

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11.5 Unserviceable areas

Application

11.5.1 Unserviceability markers shall 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. Unserviceability markers shall also be displayed at the entrances to a permanently or temporarily closed runway or taxiway, or part thereof. On a movement area used at night, unserviceability lights shall be used.

Note 1 – Unserviceability markers and lights used to guide aircraft to bypass a portion of a taxiway, apron or holding bay that is unfit for normal movement are intended for such purposes as warning pilots of a hole in a taxiway or apron pavement or outlining a portion of pavement, such as on an apron, that is under repair. They are not suitable for use when a portion of a runway becomes unserviceable, nor on a taxiway when a major portion of the width becomes unserviceable. In such instances, the runway or taxiway is normally closed.

Note 2 – Procedures pertaining to the planning, coordination, monitoring and safety management of works in progress on the movement area are specified in ASP PANS-Aerodromes.

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CHAPTER 13 – AERODROME OPERATIONAL SERVICES, EQUIPMENT AND INSTALLATIONS

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Subpart B – Provision of emergency services

13.2 Aerodrome emergency planning

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

Note 1 – Guidance material on Human Factors principles can be found in ICAO Human Factors Training Manual (Doc 9683).

Note 2 – General principles and procedures on the training of aerodrome personnel, including training programmes and competence checks, are specified in ASP PANS-Aerodromes.

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13.3 Rescue and firefighting

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13.3.6 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 13-1 of this

Manual, column 3, for that category, then the category for that aeroplane shall actually be one category higher.

Note 1 — See guidance in ICAO Airport Services Manual (Doc 9137), Part 1, for categorizing aerodromes, including those for all-cargo aircraft operations, for rescue and firefighting purposes.

Note 2 — Principles and procedures on training, including training programmes and competence checks, are specified in ASP PANS-Aerodromes. Further guidance on the training of personnel, rescue equipment for difficult environments and other facilities and services for rescue and firefighting is given in ICAO Annex 14 Vol I Attachment A, Section 18, and in the ICAO Airport Services Manual (Doc 9137), Part 1.

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13.5 Wildlife strike hazard reduction

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13.5.3 When a wildlife strike hazard is identified at or within the vicinity of an aerodrome, the aerodrome operator shall take action to decrease the risk to aircraft operations by adopting measures to minimize the likelihood of collisions between wildlife and aircraft.

Note — Guidance on effective measures for establishing whether or not wildlife, on or near an aerodrome, constitute a potential hazard to aircraft operations, and on methods for discouraging their presence, is given in the ICAO Airport Services Manual (Doc 9137), Part 3. Procedures on the management of wildlife hazards on and within the vicinity of aerodromes, including the establishment of a wildlife hazard management programme (WHMP), wildlife risk assessment, land-use management and personnel training, are specified in ASP PANS-Aerodromes, Part II. Further guidance is given in ICAO's Airport Services Manual (Doc 9137), Part 3.

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13.6 Apron management service

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

Note — Procedures on apron safety are specified in ASP PANS-Aerodromes. Guidance on an apron management service is given in the ICAO Airport Services Manual (Doc 9137), Part 8 and in the ICAO Manual of Surface Movement Guidance and Control Systems (SMGCS) (Doc 9476).

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

Note – Procedures on the training of operational personnel and on apron safety and operations, are specified in ASP PANS-Aerodromes, Part II.

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13.8. Aerodrome vehicle operations

Note 1 — Procedures on the establishment of an airside driver permit (ADP) scheme and vehicle/equipment safety requirements, including detailed personnel training, are specified in ASP PANS-Aerodromes, Part II.

Note 2 - Guidance on aerodrome vehicle operations is contained in ICAO Annex 14 Vol. I, Attachment A, Section 19 and on traffic rules and regulations for vehicles is contained in the ICAO Manual of Surface Movement Guidance and Control Systems (SMGCS) (Doc 9476).

Note 23 — It is intended that roads located on the movement area be restricted to the exclusive use of aerodrome personnel and other authorized persons, and that access to the public buildings by an unauthorized person will not require use of such roads.

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13.10 Siting of equipment and installations on operational areas

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

a) ~~is situated on that portion of the strip within 77.5 m of the runway centre line where the code number is 4 and the code letter is F; or~~

is situated within 240 m from the end of the strip and within:

1. 60 m of the extended runway centre line where the code number is 3 or 4; or
2. 45 m of the extended runway centre line where the code number is 1 or 2; or

b) penetrates the inner approach surface, the inner transitional surface or the balked landing surface;

shall be frangible and mounted as low as possible.

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CHAPTER 14 – AERODROME MAINTENANCE

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Subpart B – Provision of aerodrome maintenance

14.2 General

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14.2.2 Recommendation — The design and application of the maintenance program should observe Human Factors principles.

Note 1 — Guidance material on Human Factors principles can be found in the ICAO Human Factors Training Manual (Doc 9683) and ICAO Airport Service Manual (Doc 9137), Part 8 – Airport Operational Services.

Note 2 – General principles and procedures on the training of aerodrome personnel, including training programmes and competence checks, are specified in ASP PANS-Aerodromes.

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