Republic of the Philippines
CIVIL AVIATION AUTHORITY OF THE PHILIPPINES

MEMORANDUM CIRCULAR NO.: 06-2021

TO : ALL CONCERNED

FROM : DIRECTOR GENERAL

SUBJECT : AMENDMENT TO THE PHILIPPINE MANUAL OF STANDARDS FOR AERODROMES (MOS-AERODROMES) INCORPORATING AMENDMENT 15 TO ICAO ANNEX 14 VOL. I

REFERENCE:

1. Philippine Manual of Standards for Aerodromes
2. ICAO Annex 14 Vol. I; Amendment 15
3. CAAP Regulations Amendment Procedures
4. Board Resolution No. 2012-054 dated 28 September 2012

Pursuant to the powers vested in me under the Republic Act 9497, otherwise known as the Civil Aviation Authority Act of 2008 and in accordance with the Board Resolution No.: 2012-054 dated 28 September 2012, I hereby approve the incorporation of ICAO Annex 14 Vol. I Amendment No. 15 to the Philippine Manual of Standards for Aerodromes.

ORIGINAL REGULATION SUBJECT FOR REVIEW AND REVISION:

MANUAL OF STANDARDS FOR AERODROMES, 2nd EDITION:

…

Section 1.3 Airport design and Master Plan

1.3.1 Airport design
Applicable until 2 November 2022

1.3.1.1 Architectural and infrastructure-related requirements for the optimum implementation of international civil aviation security measures shall be integrated into the design and construction of new facilities and alterations to existing facilities at an aerodrome.

Note: - Guidance on all aspects of the planning of aerodromes including security considerations is contained in ICAO Document 9184 Airport Planning Manual, Part 1.

~~1.3.2~~ 1.3.1.2 ~~Where determined necessary,~~ tThe design of aerodromes shall take into account land-use and environmental control measures.

…

~~1.3.3~~ 1.3.1.3 For aerodromes open to public use, the aerodrome operator shall coordinate with the Office of Transportation Security (OTS), Department of Transportation (DOTr), for all matters to ensure international civil aviation security requirements are incorporated into the design and construction of new facilities and alterations to existing facilities.

~~1.3.4~~ 1.3.1.4 No aerodrome shall be constructed within twenty four kilometers of an operational aerodrome used by turbo-jet aircraft or within ten kilometers of any other operational aerodrome.

1.3.2 Airport design and Master plan
Applicable as of 3 November 2022

Introductory Note: - A master plan for the long-term development of an aerodrome displays the ultimate development in a phased manner and reports the data and logic upon which the plan is based. Master plans are prepared to support modernization of existing aerodromes and creation of new aerodromes, regardless of size, complexity, and role. It is important to note that a master plan does not constitute a confirmed implementation programme. It provides information on the types of improvements to be undertaken in a phased manner. Guidance on all aspects of the planning of aerodromes is contained in the Airport Planning Manual *(Doc 9184), Part 1.*

1.3.2.1 A master plan containing detailed plans for the development of aerodrome infrastructure should be established for aerodromes deemed by CAAP.

Note: - 1. A master plan represents the development plan of a specific aerodrome . It is developed by the aerodrome operator based on economic feasibility, traffic forecasts, current and future requirements provided by, among others, aircraft operators (see MOS 1.3.2.3).

Note: - 2. A master plan may be required when the lack of capacity at an airport, due to conditions such as, but not limited to expected traffic growth, changing weather and climatic conditions or major works to address safety or environmental concerns, would put the connectivity of a geographical area at risk or cause severe disruption to the air transport network.

1.3.2.2 The master plan should:

a) contain a schedule of priorities including a phased implementation plan; and

b) be reviewed periodically to take into account current and future aerodrome traffic.

1.3.2.3 Aerodrome stakeholders, particularly aircraft operators, should be consulted in order to facilitate the master planning process using a consultative and collaborative approach.

Note: - 1. Provision of advanced planning data to facilitate the planning process include future aircraft types, characteristics and numbers of aircraft expected to be used, the anticipated growth of aircraft movements, number of passengers and amount of cargo projected to be handled.

Note: - 2. See Annex 9, Chapter 6 on the need for aircraft operators to inform aerodrome operators concerning the former's service, schedule and fleet plans to enable rational planning of facilities and services in relation to the traffic anticipated.

Note: - 3. See ICAO's Policies on Charges for Airports and Air Navigation Services Doc 9082), Section 1, regarding consultation with users concerning provision of advance planning data and protection of commercially sensitive data.

1.3.2.4 Architectural and infrastructure-related requirements for the optimum implementation of international civil aviation security measures shall be integrated into the design and construction of new facilities and alterations to existing facilities at an aerodrome.

1.3.2.5 The design of aerodromes shall take into account land-use and environmental control measures.

Note: - Guidance on land-use planning and environmental control measures are described in the ICAO Doc 9184 Airport Planning Manual, Part 2.

1.3.2.6 For aerodromes open to public use, the aerodrome operator shall coordinate with the Office of Transportation Security (OTS), Department of Transportation (DOTr), for all matters to ensure international civil aviation security requirements are incorporated into the design and construction of new facilities and alterations to existing facilities.

1.3.2.7 No aerodrome shall be constructed within twenty four kilometers of an operational aerodrome used by turbo-jet aircraft or within ten kilometers of any other operational aerodrome.

…

Section 1.4 Definition of Terms

…

Aircraft classification number (ACN).† A number expressing the relative effect of an aircraft on a pavement for a specified standard sub-grade category.

Aircraft classification ~~number~~ *rating ACN~~R~~).†† A number expressing the relative effect of an aircraft on a pavement for a specified standard sub-grade category.

…

Instrument runway. One of the following types of runway intended for the operation of aircraft using instrument approach procedures:

…

(d) **Precision approach runway, category III.** A runway served by visual aids and nonvisual aid(s) intended for landing operations following an instrument approach operation type B ~~to and along the surface of the runway; and~~

~~(i) intended for operations~~ with a decision height (DH) lower than 30 m (100 ft), or no decision height and a runway visual range ~~not~~ less than ~~175~~ 300 m~~.~~ ~~or~~ no runway visual range limitations.

~~(ii) . intended for operations with a decision height lower than 15 m (50 ft), or no decision height (DH) and a runway visual range less than 175 m but not less than 50 m.~~

~~(iii). intended for operations with no decision height (DH) and no runway visual range limitations.~~

…

Pavement classification number (PCN).† A number expressing the bearing strength of a pavement for unrestricted operations ~~by aircraft with ACN value less than or equal to the PCN~~.

Pavement classification ~~number~~ rating (PC~~N~~R).†† A number expressing the bearing strength of a pavement ~~for unrestricted operations by aircraft with ACN value less than or equal to the PCN~~.

…

Section 1.5 Abbreviations and Symbols

ABN	Aerodrome beacon with color and flashing rate.
ACN	Aircraft classification number
ACN†	Aircraft classification number
ACR†	Aircraft classification rating
ADP	Airside driver permit
AIP	Aeronautical information publication
AL	Approach lights (other than high intensity).
APAPI	Abbreviated precision approach path indicator
ASPSL	Arrays of segmented point source lighting
aprx	Approximately
ARIWS	Autonomous runway incursion warning system
ASDA	Accelerate-stop distance available
ATS	Air traffic services
AT-VASIS	Abbreviated T visual approach slope indicator system
C	Degree Celsius
CBR	California bearing ratio
cd	Candela
CIE	Commission Internationale de l'Éclairage
cm	Centimeter
CRC	Cyclic redundancy check
DIFFS	Deck integrated firefighting system
DME	Distance measuring equipment
DPWH	Department of Public Works and Highways
E	Modulus of elasticity
FATO	Final approach and take-off area
FAS	Fixed application system
FMS	Fixed monitor system
FFAS	Fixed foam application system
FOD	Foreign object debris
FMS	Fixed monitor system

ft	Foot
GNSS	Global navigation satellite system
HAPI	Helicopter approach path indicator
HFM	Helicopter flight manual
HIAL-CAT I	High intensity approach lights-CAT I.
HIAL-CAT II or III	High intensity approach lights-CAT II or III.
HIOL	High intensity obstacle lights (flashing white).
HIRL	High intensity runway lights (unidirectional, five or six stages of intensity; lower intensity stages may be omni-directional).
Hz	Hertz
ILS	Instrument landing system
IMC	Instrument meteorological conditions
K	Degree Kelvin
kg	Kilogram
km	Kilometer
km/h	Kilometer per hour
kt	Knot
l	Liter
lb	Pounds
LDAH	Landing distance available heliports
l/min	Liter per minute
LOA	Limited obstacle area
LCFZ	Laser-beam critical flight zone
LDA	Landing distance available
LFFZ	Laser-beam free flight zone
LIOL	Low intensity obstacle lights (steady red).
LIRL	Low intensity runway lights (omni-directional, single stage of intensity).
LOS	Limited obstacle sector
LP	Luminescent panel
LSFZ	Laser-beam sensitive flight zone
m	Meter
MAPt	Missed approach point
max	Maximum
MIOL	Medium intensity obstacle lights (flashing red).

MIRL	Medium intensity runway lights (omni-directional, three stages of intensity).
MLS	Microwave landing system
mm	Millimeter
mnm	Minimum
MN	Meganewton
MPa	Megapascal
MSL	Mean sea level
MTOM	Maximum take-off mass
NFZ	Normal flight zone
NM	Nautical mile
NU	Not usable
NVIS	Night Vision Imaging System
OCA/H	Obstacle clearance altitude/height
OFS	Obstacle free sector
OFZ	Obstacle free zone
OLS	Obstacle limitation surface
OMGWS	Outer main gear wheel span
PAPI	Precision approach path indicator
PFAS	Portable foam application system
PCN	Pavement classification number
PCN†	Pavement classification number
PCR††	Pavement classification rating
PinS	Point-in-space
PTBL	Portable or temporary lights (flares or battery).
RCLL	Runway centerline lights.
RESA	Runway end safety area
RFFS	Rescue and firefighting service
R/T	Radio Telephony or radio communications
RTIL	Runway threshold identification lights (flashing white).
RTOD	Rejected take-off distance
RTODAH	Rejected take-off distance available heliports
RTZ	Runway touchdown zone lights.
RVR	Runway visual range
s	Second

SDBY PWR AVBL	Standby power available
SFL	Sequenced flashing lights.
SMS	Safety management system
t	Metric Tonne (1000 kg)
TLOF	Touchdown and lift-off area
TODA	Take-off distance available
TODAH	Take-off distance available heliports
TORA	Take-off run available
T-VASIS	T visual approach slope indicator system
VMC	Visual meteorological conditions
VOR	Very high frequency omnidirectional radio range
UCW	Undercarriage width
VSS	Visual segment surface
WHMP	Wildlife hazard management programme
WIP	Work in progress

1.5.2 Symbols

°	Degree
=	Equals
‘	Minute of arc
µ	Friction coefficient
>	Greater than
<	Less than
%	Percentage
±	Plus or minus
†	Applicable until 27 November 2024.
††	Applicable as of 28 November 2024

Section 1.~~5~~6 Certification of Aerodromes

…

CHAPTER 2. Application of standards to aerodromes

Section 2.1 General

…

2.1.6 Aerodrome Reference Code

…

2.1.6.6 Unless otherwise agreed by CAAP, aerodrome operators shall maintain the aerodrome facilities in accordance with the applicable standards set out in this MOS in relation to the aerodrome reference code for the facilities.

Code element 1	
Code number	**Aeroplane reference field length**
1	Less than 800 m
2	800 m up to but not including 1200 m
3	1200 m up to but not including 1800 m
4	1800 m and over
Code element 2	
Code number	**Wingspan**
A	Up to but not including 15 m
B	15 m up to but not including 24 m
C	24 m up to but not including 36 m
D	36 m up to but not including 52 m
E	52 m up to but not including 65 m
F	65 m up to but not including 80 m

Table 2.1-1: Aerodrome reference code
(see 2.1.6.1 to 2.1.6.4)

Note: - 1. Guidance on planning for aeroplanes with wing spans greater than 80 m is given in the Aerodrome Design Manual (Doc.9157), Parts 1 & 2.

Note: - 2. Procedures on conducting aerodrome compatibility study to accommodate aeroplanes with folding wing tips spanning two code letters are given in the Procedures for Air Navigation Services Aerodromes (*PANS-Aerodromes,* Doc 9981). *Further guidance can be found in the manufacturer's aircraft characteristics for airport planning manual.*

…

CHAPTER 3. Applying for an aerodrome certificate

Section 3.1 General

…

3.1.2 Processing an Aerodrome Certificate application

…

3.1.2.3 As part of the certification process, CAAP shall ensure that an aerodrome manual which will include all pertinent information on the aerodrome site, facilities, services, equipment, operating procedures, organization and management including a safety management system, is submitted by the applicant for approval/acceptance prior to granting the aerodrome certificate.

Note: - The intent of a safety management system is to have in place an organized and orderly approach in the management of aerodrome safety by the aerodrome operator. CAR-Safety Management 2nd Edition contains the safety management provisions applicable to certified aerodromes. ~~Guidance on harmonized safety management system is given in the~~ Overarching

guidance on safety management systems is provided in the Safety Management Manual (SMM) (Doc 9859) and in the Manual on Certification of Aerodromes (Doc 9774). Procedures on the management of change, conduct of safety assessment, reporting and analyses of safety occurrences at aerodromes; runway safety; and continuous monitoring to enforce compliance with applicable specifications so that hazards are identified and risks are assessed and mitigated, ~~can be found~~ are specified in the PANS-Aerodromes (Doc 9981).

…

CHAPTER 4. Applying for an Aerodrome Registration Type 1, Aerodrome Registration Type 2 and Permit to Operate (PTO)

…

4.1.2 Processing an Aerodrome Registration Type 1 application

…

4.1.2.5 Aerodrome Registration Type 1 process is detailed in MOS 4.1.8.

…

4.1.6 Transfer of an Aerodrome Registration Type 1

4.1.6.1 In case of change in ownership or management of the aerodrome, the new aerodrome operator or manager shall apply for a transfer of the Aerodrome Registration Type 1 in accordance with CAR Aerodromes 2.3.060.

…

Section ~~4.1~~ 4.2 Registered Aerodrome Type 2

~~4.1.1~~ 4.2.1 Introduction

4.2.1.1 Under the provisions of CAR-Aerodromes 2.3.095,

An aerodrome shall only be operated by a person who holds a valid Aerodrome Registration Type 2 issued by CAAP for that aerodrome if it is:

(a) an aerodrome open for public or private use in domestic operations with an annual aircraft movement of 5,000 and below, or annual passenger movement of 300,000 and below, or

(b) a heliport using aircraft with 10 or more passenger seats; or

(c) an aerodrome not covered by the PTO requirements.

…

CHAPTER 5. Aerodrome information for AIP

…

5.1.4 Standards for determining Aerodrome Information

…

5.1.4.10 Pavement strength.

Part A

Applicable until 27 November 2024

…

5.1.4.23 Lighting systems. Provide information of aerodrome lighting systems by using the ~~following~~ related abbreviations detailed in MOS 1.5.1.

~~**Abbreviation**~~	~~**Meaning**~~
~~SDBY PWR AVBL~~	~~Standby power available.~~

~~PTBL~~	~~Portable or temporary lights (flares or battery).~~
~~…~~	~~…~~
~~Taxiways~~	~~Centerline lights are green and edge lights are Blue.~~

…

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

~~*Note: – 1. See CAR-ANS 15, Appendix 15G, for graphical illustrations of obstacle data collection surfaces and criteria used to identify obstacles in Area 2 and 3.*~~

Note: - ~~2.~~ ~~PANS-AIM (Doc 10066),~~ Manual of Standards for Aeronautical Information Services (MOS-AIS), Appendix ~~1 and~~ 8 provides requirements for obstacle data determination in Area 2 and 3.

…

5.1.5 Condition of the movement area and related facilities

5.1.5.1 Information on the condition of the movement area and the operational status of related facilities shall be provided to the appropriate aeronautical information services units, and similar information of operational significance to the air traffic services 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 ~~N~~nature, format and conditions of the information to be provided are specified in ~~CAR-ANS Part 15~~ the Manual of Standards for Aeronautical Information Services (MOS-AIS) and MOS-ATS. Specific procedures pertaining to works in progress on the movement area and to the reporting of such works are specified in the PANS-Aerodromes (Doc 9981).

…

5.1.9 Strength of pavements

Part B

Applicable as of 28 November 2024

5.1.9.1 The bearing strength of a pavement shall be determined.

5.1.9.2 The bearing strength of a pavement intended for aircraft of apron (ramp) mass greater than 5 700 kg shall be made available using the aircraft classification rating – pavement classification rating (ACR-PCR) method by reporting all of the following information:

a) the pavement classification rating (PCR) and numerical value;

b) pavement type for ACR-PCR determination;

c) subgrade strength category;

d) maximum allowable tire pressure category or maximum allowable tire pressure value; and

e) evaluation method.

Note: - Guidance on reporting and publishing of PCRs is contained in the Aerodrome Design Manual *(Doc 9157, Part 3).*

5.1.9.3 The pavement classification rating (PCR) reported shall indicate that an aircraft with an aircraft classification rating (ACR) equal to or less than the reported PCR can operate on the pavement subject to any limitation on the tire pressure, or aircraft all-up mass for specified aircraft type(s).

Note: - Different PCRs may be reported if the strength of the pavement is subject to significant seasonal variation.

5.1.9.4 The ACR of an aircraft shall be determined in accordance with the standard procedures associated with the ACR-PCR method.

Note: - The standard procedures for determining the ACR of an aircraft are given in the Aerodrome Design Manual *(Doc 9157), Part 3. For convenience, dedicated software is available on the ICAO website, for computing any aircraft ACRs at any mass on rigid and flexible pavements for the four standard subgrade strength categories detailed in 5.1.9.6 b) below.*

5.1.9.5 For the purpose of determining the ACR, the behaviour of a pavement shall be classified as equivalent to a rigid or flexible construction.

5.1.9.6 Information on pavement type for ACR-PCR determination, subgrade strength category, maximum allowable tire pressure category and evaluation method shall be reported using the following codes:

a) Pavement type for ACR-PCR determination:

	Code
Rigid pavement	R
Flexible pavement	F

Note: - If the actual construction is composite or non-standard, include a note to that effect (see example 2 below).

b) Subgrade strength category:

		Code
i.	*High strength:* characterized by E=200 MPa, and representing all E values equal to or above 150 MPa for rigid and flexible pavements.	A
ii.	*Medium* strength: characterized by E=120 MPa and representing a range in E values equal to or above 100 MPa and strictly less than 150 MPa, for rigid and flexible pavements.	B

iii.	*Low strength*: characterized by E=80 MPa and representing a range in E values equal to or above 60 MPa and strictly less than 100 MPa, for rigid and flexible pavements.	C
iv.	*Ultra-low* strength: characterized by E=50 MPa and representing all E values strictly less than 60 MPa, for rigid and flexible pavements.	D

c) Maximum allowable tire pressure category:

	Code
Unlimited: no pressure limit	W
High: pressure limited to 1.75 MPa	X
Medium: pressure limited to 1.25 MPa	Y
Low: pressure limited to 0.50 MPa	Z

Note: - See Note 5 to (10.15.2.1) where the pavement is used by aircraft with tire pressures in the upper categories.

d) Evaluation method:

		Code
i.	*Technical evaluation:* representing a specific study of the pavement characteristics and the types of aircraft which the pavement is intended to serve.	T
ii.	*Using aircraft experience:* representing a knowledge of the specific type and mass of aircraft satisfactorily being supported under regular use.	U

(e) The following examples illustrate how pavement strength data are reported under ACR-PCR method. Further guidance on this topic is contained in the Aerodrome Design Manual (Doc 9157), Part 3 - Pavements.

Example: - 1. If the bearing strength of a rigid pavement, resting on a medium strength subgrade, has been assessed by technical evaluation to be PCR 760 and there is no tire pressure limitation, then the reported information would be:

PCR 760 / R / B / W / T

Example: - 2. If the bearing strength of a composite pavement, behaving like a flexible pavement and resting on a high strength subgrade, has been assessed by using aircraft experience to be PCR 550 and the maximum tire pressure allowable is 1.25 MPa, then the reported information would be:

PCR 550 / F / A / Y / U

Note: - Composite construction.

5.1.9.7 *Criteria should be established to regulate the use of a pavement by an aircraft with an ACR higher than the PCR reported for that pavement in accordance with MOS 5.1.9.2 and 5.9.1.3.*

Note: - MOS ATT. A Section 15, details a simple method for regulating overload operations while the Manual (Doc 9157), Part 3, includes the descriptions of more detailed procedures for evaluation of pavements and their suitability for restricted overload operations.

5.1.9.8 The bearing strength of a pavement intended for aircraft of apron (ramp) mass equal to or less than 5 700 Kg shall be made available by reporting the following information:

a) maximum allowable aircraft mass; and

b) maximum allowable tire pressure.

Example: 4 800 kg/0.60 MPa.

…

CHAPTER 6. Aerodrome physical characteristics

…

Section 6.3 Runway strip

…

6.3.3 Runway Strip Width

…

6.3.3.4 A strip including a non-instrument runway shall extend on each side of the centerline of the runway and its extended centerline throughout the length of the strip, to a distance of at least:

— 75 m where the code number is 3 or 4;

— 40 m where the code number is 2; and

— 30 m where the code number is 1.

~~6.3.3.4~~ 6.3.3.5 MOS 6.3.8.5, recommends that the portion of a strip of an instrument runway within at least 75 m from the centerline shall be graded where the code number is 3 or 4. For a precision approach runway, it may be desirable to adopt a greater width where the code number is 3 or 4. MOS Figure 6.3-3 shows the shape and dimensions of a wider strip that may be considered for such a runway. This strip has been designed using information on aircraft running off runways. The portion to be graded extends to a distance of 105 m from the centerline, except that the distance is gradually reduced to 75 m from the centerline at both ends of the strip, for a length of 150 m from the runway end.

~~6.3.3.5~~ 6.3.3.6 If an aerodrome operator wishes to provide a lesser runway strip width to that specified in the standards or a runway strip width with graded and ungraded components, the aerodrome operator must provide CAAP with a safety case justifying why it is impracticable to meet the standard. The safety case must include documentary evidence that all relevant stakeholders have been consulted.

…

6.3.9 Objects on runway strips

6.3.9.1 No fixed object, other than visual aids required for air navigation or those required for aircraft safety purposes and which must be sited on the runway strip, and satisfying the relevant frangibility requirement in (MOS 8 and 9), shall be permitted 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 centerline of a precision approach category I, II or III runway, whose code number is 4 and the code letter is F; or~~

~~(b) within 60 m of the centerline of a precision approach category I, II or III runway, whose code number is 3 or 4; or~~

~~(c) within 45 m of the centerline of a precision approach category I runway, whose code number is 1 or 2.~~

6.3.9.2 No mobile object shall be permitted on a runway strip while the runway is in use for takeoff or landing.

Note.— See MOS 7.3.2.9 for characteristics of inner transitional surface.

6.3.9.3 All fixed objects permitted on the runway strip must be of low mass and frangibly mounted. An object situated on a runway strip which may endanger aeroplanes ~~shall~~ should be regarded as an obstacle and ~~shall~~ should, as far as practicable, be removed.

…

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 the PANS-Aerodromes (Doc 9981). Further ~~G~~guidance ~~on Wildlife Control and Reduction~~ can be found in the Airport Services Manual (Doc 9137), Part 3.

…

Section 6.5 Clearway

…

6.5.3 Dimensions of Clearways

…

~~6.5.3.2 The width of a clearway must not be less than:~~

~~(a) 150 m If the runway code number is 3 or 4;~~

~~(b) 80 m If the runway code number is 2 ; and~~

~~(c) 60 m If the runway code number is 1.~~

~~*Note: - For code 3 or 4 runways used by aeroplanes having a maximum take-off mass less than 22,700 kg and operating in VMC by day, the width of the clearway may be reduced to 90 m.*~~

~~6.5.3.3~~ 6.5.3.2 A clearway shall extend laterally ~~to a distance of at least 75 m~~ on each side of the extended centerline of the runway~~.,~~ to a distance of at least:

a) 75 m for instrument runways; and

b) half of the width of the runway strip for non-instrument runways.

…

Section 6.7 Taxiways

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

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

Note: - 2. See MOS 8.6.14 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: - ~~2~~ 3. See MOS Attachment A, Section 9 for specific taxiway design guidance which may assist in the prevention of runway incursions when developing a new taxiway or improving existing ones with a known runway incursion safety risk.

Note: - ~~3~~ 4. Guidance on layout and standardized nomenclature of taxiways is given in the Aerodrome Design Manual (Doc 9157), Part 2.

…

Section 6.8 Holding Bays, Runway-Holding Positions, Intermediate Holding Positions and Road-Holding Positions

…

6.8.4 Distance from Runway-holding Position, Intermediate Holding Position or Road-holding Position to Runway Centerline

~~6.8.4.1 A runway-holding position, intermediate holding position, holding bay or a road holding position must not be located closer to the centerline of the runway than the distance determined using Table 6.5-1.~~

6.8.4.1 The distance between a holding bay, runway-holding position established at a taxiway/runway intersection or road-holding position and the center line of a runway shall be in accordance with Table 6.5-1and, 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 or penetrate the inner transitional surface.

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

Table 6.5-1: Minimum distance from the runway center line to a holding bay, runway-holding position or road-holding position ~~runway-holding position, intermediate holding position or road-holding position to associated runway centerline~~

Code number	Type of runway				
	Non-instrument	Non-precision approach	Precision Category I	Precision Category II or III	Take-off
1	30 m	40 m	60 m [b]	-	30 m
2	40 m	40 m	60 m [b]	-	40 m
3	75 m	75 m	90 m [a, b]	90 m [a, b]	75 m

4	75 m	75 m	90 m [a, b]	90 m [a, b]	75 m

…

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 ~~Annex 10, Volume I, Attachments C and G~~, ~~See~~ CAR-ANS Part 6 Attachment ~~B~~ C and G respectively (see also MOS 6.8.4.1).

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

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

~~c. 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 120 m, a distance greater than 90 m may be necessary to ensure that a holding aircraft is clear of the obstacle free zone. For example, ~~The~~ a distance of ~~107.5~~ 100 m ~~for code number 4 where the code letter is F~~ is based on an aircraft with a tail height of 24 m, a distance from the nose to the highest part of the tail of 62.2 m and a nose height of 10 m holding at an angle of 45° or more with respect to the runway centerline, being clear of the obstacle free zone.

~~6.8.4.2 For a precision approach runway the distance in Table 6.5-1 may be reduced by 5 meters for every meter by which the elevation of the runway holding position is lower than the elevation of the runway threshold, contingent upon not infringing the inner transitional surface.~~

6.8.4.~~3~~2 At elevations greater than 700 m (2,300 ft) the distance of 90 m specified in MOS Table 6.5-1 for a precision approach runway code number 4 should be increased as follows:

(a) up to an elevation of 2 000 m (6,600 ft); 1 m for every 100 m (330 ft) in excess of 700 m (23,00 ft);

(b) elevation in excess of 2 000 m (6,600 ft) and up to 4000 m (13,320 ft); 13 m plus 1.5 m for every 100 m (330 ft) in excess of 2000 m (6,600 ft); and

6.8.4.~~4~~3 If a holding bay, runway-holding position or road-holding position for a precision approach runway code number 4 is at a greater elevation compared to the threshold, the distance ~~of 90 m or 107.5 m, as appropriate~~, specified in MOS Table 6.5-1 shall be further increased 5 m for every meter the bay or position is higher than the threshold.

…

CHAPTER 8. Aerodrome visual aids: markers, markings, signals and signs

…

Section 8.6 Signs

…

8.6.2 Naming of taxiway location signs

8.6.2.1 The following convention must be used in the naming of taxiway location signs:

…

(d) ~~to avoid confusion with the numerals 1, 0 and closed marking, the letters I, O and X and the use of words such as inner and outer must be avoided wherever possible. Letter Q should only be used where unavoidable;~~ When designating taxiways, the use of words such as inner and outer should be avoided wherever possible.

~~(d)~~ (e) ~~to avoid confusion with the numerals 1, 0 and closed marking, the letters I, O and X and the use of words such as inner and outer must be avoided 5.4.3.37~~ 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 wherever possible. Letter Q should only be used where unavoidable;

~~(e)~~(f) At aerodromes where the number of taxiways are or will be large, alphanumeric designators may be used for short intersecting taxiways. Successive intersecting taxiways must use the same letter, with sequential numbers. If sequential numbers are not practicable, due to geometry of the taxiway system, all pilot-used taxiway plans (aerodrome charts) must include advice as to the missing designators;

~~(f)~~ (g) A taxiway shall be identified by a designator comprising a letter, letters or a combination of a letter or letters followed by a number;

…

8.6.4 Sign size and location distances, incl. runway exit signs

8.6.4.1 Sign size and location distances must be in accordance with Table 8.6-1 and Table 8.6-2.

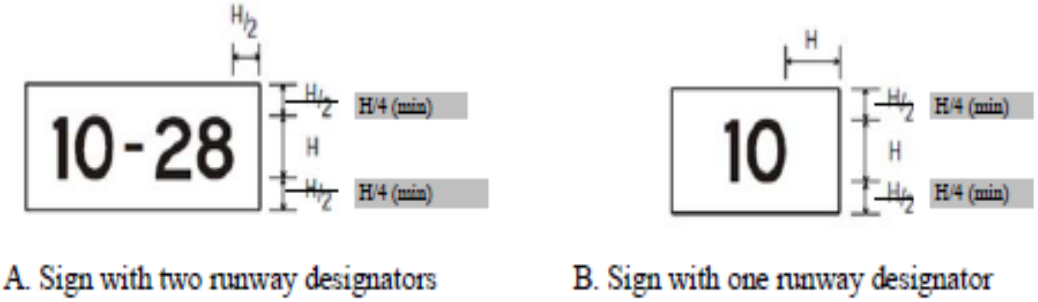
Sign Height (mm)					Perpendicular distance from defined taxiway pavement edge to near side of sign	Perpendicular distance from defined runway pavement edge t near side of sign
Code Number	Type	Legend	Face (min)	Installed (max)		
1 or 2 [a]	I	200	~~400~~ 300	700	5 - 11 m	3 - 10 m
1 or 2	M	300	~~600~~ 450	900	5 - 11 m	3 - 10 m
3 or 4 [a]	I	300	~~600~~ 450	900	11 - 21 m	8 - 15 m
3 or 4	M	400	~~800~~ 600	1100	11 - 21 m	8 - 15 m
[a] For runway exit signs, use the mandatory size.						
I - Information sign type, M - Mandatory instruction sign type.						

8.6.4.2 The face height of signs, stroke width of letters and arrows ~~must~~ shall be as follows:

Legend height	Face height (min	Stroke width
200 mm	300 mm	32 mm
300 mm	450 mm	48 mm
400 mm	600 mm	64 mm

…

8.6.4.4 The face width of signs shall be determined using MOS 8.6-7 except that, where a mandatory instruction sign is provided on one side of a taxiway only, the face width shall not be less than:



A. Sign with two runway designators B. Sign with one runway designator

Figure 8.6-7 Sign dimensions

Explanatory Note to Figure 8.6-7: "H" stands for the inscription height

8.6.4.~~4~~5 The forms of characters, i.e. letters, numbers, arrows and symbols, shall conform to those shown in Figure 8.6-1 to 8.6-6. The width of characters and the space between individual characters shall be determined as indicated in Table 8.6-3.

8.6.4.~~5~~6 Borders

(a) The black vertical delineator between adjacent direction signs should have a width of approximately 0.7 of the stroke width.

(b) The yellow border on a stand-alone location sign should be approximately 0.5 stroke width.

8.6.4.~~6~~7 The colors of signs shall be in accordance with the appropriate specifications in MOS 9.2.

…

8.6.23 Aircraft stand identification signs

…

8.6.23.4 Apron stand designators should not be the same as taxiway designators.

…

Section 8.9 Visual Aids denoting Restricted Use Areas

8.9.1 Closed runways and taxiways or parts thereof

…

8.9.1.5 The closed marking shall be of the form and proportions as detailed in Figure 8.9-1(a), when displayed on a runway, and shall be of the form and proportions as detailed in Figure 8.9-1(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 the PANS-Aerodromes (Doc 9981).

…

8.9.4 Unserviceable areas

8.9.4.1 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. On a movement area used at night, unserviceability lights shall be used.

Note: - 1. Unserviceability markers and lights are used 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 the PANS-Aerodromes (Doc 9981).

…

Section 8.10 Obstacle Markings

8.10.1 General

~~8.10.1.1 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.~~

8.10.1.~~2~~1 Fixed objects, temporary and permanent, which extend above the obstacle limitation surfaces but are permitted to remain or objects which are present on the movement area are regarded as obstacles, and must be marked. The aerodrome operator must submit details of such obstacles to CAAP, for hazard assessment and particular requirements for marking and lighting. The relevant information must be included in the Aerodrome Manual.

8.10.1.~~3~~2 A structure must be marked when more than 150 m higher than the surrounding terrain. Surrounding terrain means the area within 400 m of the structure. Structures above 90 m may need to be marked, and inconspicuous structures 75 m above ground level should also be marked. Fixed objects on the aerodrome movement area, such as ILS buildings, must be marked as obstacles.

8.10.1.~~4~~3 CAAP may permit obstacles to remain unmarked:

(a) when obstacles are sufficiently conspicuous by their shape, size or color; or

(b) when obstacles are shielded by other obstacles already marked; or

(c) when obstacles are lighted by high intensity obstacle lights by day.

8.10.2 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 an 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 the 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.

…

CHAPTER 9. Aerodrome visual aids – aerodrome lighting

…

9.12.16 Provision of runway guard lights

Note: - 1. Runway guard lights are sometimes referred to as 'wig wags'. The effectiveness of this lighting system in preventing runway incursions has been successfully proven in a number of countries and this lighting system has been adopted by ICAO as a standard. Provision of runway guard lights will bring aerodrome lighting in line with international practices.

Note: - 2. 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 incursion 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 a runway. There are two standard configurations of runway guard lights as illustrated in MOS Figure 9.12-~~2~~ 3.

9.12.16.1 Runway guard lights Configuration A must be provided at each runway/taxiway intersection when the runway is intended for use in:

(a) runway visual range conditions less than a value of 550m where a stop bar is not installed; and

(b) runway visual range conditions of values between 550m and 1200m 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 the Aerodrome Design Manual *(Doc 9157), Part 4.*

…

9.12.17 Pattern and location of runway guard lights

9.12.17.1 There are two standard configurations of runway guard lights:

(a) ~~Configuration A (or Elevated Runway Guard Lights) has lights on each side of the taxiway, and 5.3.23.5~~ Runway guard lights, Configuration A, shall be located at each side of the taxiway on the holding side of the runway-holding position marking.

(b) ~~Configuration B (or In-pavement Runway Guard Lights) has lights across the taxiway. 5.3.23.6~~ Runway guard lights, Configuration B, shall be located across the taxiway on the holding side of the runway-holding position marking.

…

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

9.12.18 Characteristics of runway guard lights

9.12.18.1 Configuration A runway guard lights must consist of two pairs of elevated lights showing yellow, one pair on each side of the taxiway.

~~*Note: - To enhance visual acquisition:*~~

~~*(a) the centerline of lights in each pair shall be separated by a horizontal distance that is not less than 2.5 times, and not more than 4 times, the radius of the individual lantern lens;*~~

~~*(b) each light shall be provided with a visor to minimize extraneous reflection from the optical surfaces of the lanterns;*~~

~~*(c) the visors and the face of the light fitting surrounding the lantern lens shall be black to minimize reflection and provide enhanced contrast;*~~

~~*(d) where additional isolation of the signal is required from the background, a black target board must be provided around the sides and top of the face of the light fitting.*~~

~~*(e) Some other device or design, e.g. specially designed optics, must be used in lieu of the visor*~~.

9.12.18.2 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.

9.12.18.~~2~~3 Configuration B runway guard lights must consist of ~~inset lights showing~~ yellow lights spaced at intervals of 3 m across the taxiway.

9.12.18.~~3~~4 The light beam shall be unidirectional and shall show yellow in the direction of approach to ~~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 the Aerodrome Design Manual (Doc 9157) Part 4.

~~9.12.18.4 The performance of Configuration A runway guard lights must comply with the following:~~

~~(a) the lights in each pair are to be illuminated alternately at between 30 and 60 cycles per minute;~~

~~(b) the light suppression and illumination periods of each light in a pair are to be of equal and opposite duration;~~

~~(c) the light beams are to be unidirectional and aimed so that the beam centers cross the taxiway centerline at a point 60 m prior to the runway holding position;~~

~~(d) the effective intensity of the yellow light and beam spread are to be in accordance with the specifications in MOS Figure 9.13-11.~~

~~(e) Where runway guard lights are intended for use during the day, the intensity in yellow light and beam spreads of lights of Configuration A should be in accordance with the specifications in MOS Figure 9.13-12.~~

~~*Note: - The optimum flash rate is dependent on the rise and fall times of the lamps used. Runway guard lights, Configuration A, installed on 6.6 ampere series circuits have been found to look best when operated at 45 to 50 flashes per minute per lamp.*~~

9.12.18.5 The intensity in yellow light and beam spreads of lights of Configuration A should be in accordance with the specifications in MOS Figure 9.13-11.

9.12.18.6 Where runway guard lights are intended for use during the day, the intensity in yellow light and beam spreads of lights of Configuration A should be in accordance with the specifications in MOS Figure 9.13-12.

9.12.18.~~5~~7 Where runway guard lights are specified as components of an advanced surface movement guidance and control system where higher light intensities are required, the intensity in yellow light and beam spreads of lights of Configuration A should be in accordance with the specifications in MOS Figure 9.13-12.

Note: - Higher light intensities may be required to maintain ground movement at a certain speed in low visibilities.

~~9.12.18.6 The performance of Configuration B runway guard lights must comply with the following:~~

~~(a) adjacent lights are to be alternately illuminated and alternate lights are to illuminate in unison;~~

~~(b) the lights are to be illuminated between 30 and 60 cycles per minute and the light suppression and illumination periods are to be equal and opposite in each light;~~

~~*Note: - The optimum flash rate is dependent on the rise and fall times of the lamps used. Runway guard lights, Configuration A, installed on 6.6 ampere series circuits have been found to look best when operated at 45 to 50 flashes per minute per lamp. Runway guard lights, Configuration B, installed on 6.6 ampere series circuits have been found to look best when operated at 30 to 32 flashes per minute per lamp.*~~

~~(c) the light beam is to be unidirectional and aligned so as to be visible to the pilot of an aeroplane taxiing to the holding position.~~

~~(d) the effective intensity of the yellow beam and beam spread are to be in accordance with the specifications in MOS Figure 9.13-3.~~

~~(e) Where runway guard lights are intended for use during the day, the intensity in yellow light and beam spreads of lights of Configuration B shall be in accordance with the specifications in MOS Figure 9.13-9.~~

~~*Note: - The optimum flash rate is dependent on the rise and fall times of the lamps used. Runway guard lights, Configuration B, installed on 6.6 ampere series circuits have been found to look best when operated at 30 to 32 flashes per minute per lamp.*~~

9.12.18.8 The intensity in yellow light and beam spreads of lights of Configuration B should be in accordance with the specifications in MOS Figure 9.13-9.

9.12.18.9 Where runway guard lights are intended for use during the day, the intensity in yellow light and beam spreads of lights of Configuration B should be in accordance with the specifications in MOS Figure 9.13-9.

9.12.18.~~7~~ 10 Where runway guard lights are specified as components of an advanced surface movement guidance and control system where higher light intensities are required, the intensity in yellow light and beam spreads of lights of Configuration B ~~shall~~ should be in accordance with the specifications in MOS Figure 9.13-9.

9.12.18.11 The lights in each unit of Configuration A shall be illuminated alternately.

9.12.18.12 For Configuration B, adjacent lights shall be alternately illuminated and alternative lights shall be illuminated in unison.

9.12.18.13 The lights shall be illuminated between 30 and 60 cycles per minute and the light suppression and illumination periods shall be equal and opposite in each light.

…

9.12.23 Stop bars

…

9.12.23.1 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 a value of ~~350~~ 550 m, ~~unless~~ except where:

…

~~9.12.23.2 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 between values of 350 m and 550 m, unless:~~

~~(a) appropriate aids and procedures are available to assist in preventing inadvertent incursions by aircraft and vehicles onto the runway; and~~

~~(b) operational procedures exist to limit, in runway visual range conditions less than a value of 550 m, the number of:~~

~~(i) aircraft on the maneuvering area to one at a time; and~~

~~(ii) vehicles on the maneuvering area to the essential minimum. Where there is more than one stop bar associated with a taxiway/runway intersection, only one shall be illuminated at any given time.~~

9.12.23.2 Where there is more than one stop bar associated with a taxiway/runway intersection, only one shall be illuminated at any given time.

…

9.12.23.4 A stop bar ~~must~~ should be provided at an intermediate holding position when it is desired to supplement markings with lights and to provide traffic control by visual means.

9.12.24 Location of stop bars

9.12.24.1 ~~A stop bar must be provided at every runway holding position serving a runway and:~~ Stop bars shall be located across the taxiway at the point where it is desired that traffic stop. Where the additional lights specified in MOS 9.12.25.2 are provided, these lights shall be located not less than 3 m from the taxiway edge.

~~(a) be located across the taxiway on, or not more than 3 m before, the point at which it is intended that traffic approaching the runway stop;~~

~~(b) consist of inset lights spaced at uniform intervals of no more than 3 m apart across the taxiway;~~

~~(c) be disposed symmetrically about, and at right angles to, the taxiway centerline.~~

~~9.12.24.2 Where a pilot may be required to stop the aircraft in a position so close to the lights that they are blocked from view by the structure of the aircraft, a pair of elevated lights, with the same characteristics as the stop bar lights, must be provided abeam the stop bar, located at a distance of at least 3 m from the taxiway edge sufficient to overcome the visibility problem.~~

9.12.25 Characteristics of Stop Bars

~~9.12.25.1 A stop bar must be unidirectional and show red in the direction of approach to the intersection or runway holding position.~~

~~*Note: - Where necessary to enhance conspicuity of an existing stop bar, extra lights are installed uniformly.*~~

9.12.25.1 Stop bars shall consist of lights spaced at uniform intervals of no more than 3 m across the taxiway, showing red in the intended direction(s) of approach to the intersection or runway-holding position.

Note: - Where necessary to enhance conspicuity of an existing stop bar, extra lights are installed uniformly.

9.12.25.2 A pair of elevated lights should be added to each end of the stop bar where the in-pavement stop bar lights might be obscured from a pilot's view, for example, by rain, or where a pilot may be required to stop the aircraft in a position so close to the lights that they are blocked from view by the structure of the aircraft.

9.12.25.~~2~~3 Stop bars installed at a runway-holding position shall be unidirectional and shall show red in the direction of approach to the runway.

9.12.25.~~3~~4 Where the additional lights specified in MOS ~~9.12.24.2~~ 9.12.25.2 are provided, these lights shall have the same characteristics as the lights in the stop bar, but shall be visible to approaching aircraft up to the stop bar position.

9.12.25~~.4~~5 The intensity and beam spread of the stop bar lights must be in accordance with the applicable specifications in MOS 9.13, Figure 9.13-1 ~~to~~ through Figure 9.13-5, as appropriate.

~~9.12.25.5 Selectively switchable stop bars must be installed in conjunction with at least three taxiway centerline lights (extending for a distance of at least 90 m from the stop bar) in the direction that it is intended for an aircraft to proceed from the stop bar.~~

9.12.25.~~7~~6 Where stop bars are specified as components of an advanced surface movement guidance and control system and where, from an operational point of view, higher intensities are required to maintain ground movements at a certain speed in very low visibilities or in bright daytime conditions, the intensity in red light and beam spreads of stop bar lights ~~shall~~ should be in accordance with the specifications of MOS 9.13, Figure 9.13-8, Figure 9.13-9 or Figure 9.13-10.

9.12.25.~~8~~7 Where a wide beam fixture is required, the intensity in red light and beam spreads of stop bar lights ~~shall~~ should be in accordance with the specifications of MOS 9.13, Figure 9.13-9 or Figure 9.13-10.

Note: - High-intensity stop bars shall only be used in case of an absolute necessity and following a specific study.

9.12.25.~~6~~8 The lighting circuit must be designed so that:

…

9.12.26 No - entry Bars

~~*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 a tnight and in all visibility conditions~~ can form part of effective runway incursion prevention measures.

…

9.12.26.3 A no-entry bar should be co-located with a no-entry sign and/or a no-entry marking.

9.12.26.~~3~~4 A no-entry bar ~~shall~~ should consist of unidirectional lights spaced at uniform intervals of no more than 3 m showing red in the intended direction(s) of approach to the runway.

Note: - Where necessary to enhance conspicuity, extra lights are installed uniformly.

9.12.26~~.4~~5 A pair of elevated lights ~~shall~~ should be added to each end of the no-entry bar where the in-pavement no entry bar lights might be obscured from a pilot's view, for example, by rain

or any climatic conditions, or where a pilot may be required to stop the aircraft in a position so close to the lights that they are blocked from view by the structure of the aircraft.

9.12.26.~~5~~6 The intensity in red light and beam spreads of no-entry bar lights shall be in accordance with the specifications in MOS 9.13 Figure 9.13-1 through Figure 9.13-5 as appropriate.

9.12.26.~~6~~7 Where no-entry bars are specified as components of an advanced surface movement guidance and control system and where, from an operational point of view, higher intensities are required to maintain ground movements at a certain speed in very low visibilities or in bright daytime conditions, the intensity in red light and beam spreads of no-entry bar lights ~~shall~~ should be in accordance with the specifications of MOS 9.13 Figure 9.13-6, Figure 9.13-7 or Figure 9.13-8.

Note: - High-intensity no-entry bars are typically only used in case of an absolute necessity and following a specific study.

9.12.26.~~7~~ 8 Where a wide beam fixture is required, the intensity in red light and beam spreads of no-entry bar lights ~~shall~~ should be in accordance with the specifications of MOS 9.13 Figure 9.13-6 or Figure 9.13-8.

~~9.12.26.8 The lighting circuit shall be designed so that:~~

~~(a) no-entry bars are switchable selectively or in groups;~~

~~(b) when a no-entry bar is illuminated, any taxiway centerline lights installed beyond the no-entry bar, when viewed towards the runway, shall be extinguished for a distance of at least 90 m; and~~

~~(c) when a no-entry bar is illuminated, any stop bar installed between the no entry bar and the runway shall be extinguished~~.

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

…

CHAPTER 10. Operating standards for certified aerodromes and Aerodrome Registration Type 1

…

Section 10.8 Guidelines for Aerodrome Emergency Plans

…

10.8.1.8 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 the 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 the PANS-Aerodromes (*Doc 9981*).

…

Section 10.9 Control of Airside Access and Vehicle Control

…

10.9.2 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 the PANS-Aerodromes (Doc 9981), Part II, Chapter 9.

Note: - ~~1~~2. Guidance on aerodrome vehicle operations is contained in MOS Attachment A, Section 6, and on traffic rules and regulations for vehicles in the Manual of Surface Movement Guidance and Control Systems (SMGCS) *(Doc 9476).*

Note: - ~~2~~3. 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.

…

Section 10.13 Aircraft Parking

…

10.13.4 Apron management service

…

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

Note: - Procedures on apron safety are specified in the PANS-Aerodromes (Doc 9981). Guidance on an apron management service is given in the Airport Services Manual (Doc 9137), Part 8, and in the Manual of Surface Movement Guidance and Control Systems (SMGCS) (Doc 9476).

…

10.13.4.7 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 the PANS-Aerodromes (Doc 9981), Part II, Chapters 1 and 7.

…

Section 10.14 Wildlife Hazard Management

…

10.14.2 Wildlife strike hazard reduction

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

…

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

Note: - ~~Guidance on effective measures for establishing whether or not wildlife, on or near an aerodrome, constitute a potential hazard to aircraft operations, and on methods for discouraging their presence, is given in the 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 the PANS-Aerodromes (Doc 9981), Part II, Chapters 1 and 6. Further guidance is given in the Airport Services Manual *(Doc 9137), Part 3.*

…

Section 10.15 Aerodrome Maintenance

10.15.1 Maintenance Programme

…

10.15.1.2 The design and application of the maintenance programme should observe Human Factors principles.

Note: - 1. Guidance material on Human Factors principles can be found in the Human Factors Training Manual (Doc 9683) and in the Airport Services 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 the PANS-Aerodromes (Doc 9981).

…

CHAPTER 11. Standards for other aerodrome facilities

Section 11.1 General

…

11.1.1 Siting of equipment and installations on operational areas

…

11.1.1.5 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 centerline where the code number is 4 and the code letter is F; or~~

~~(b)~~ (a) is situated within 240 m from the end of the strip and within:

(i) 60 m of the extended runway centerline where the code number is 3 or 4; or

(ii) 45 m of the extended runway centerline where the code number is 1 or 2; or

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

shall be frangible and mounted as low as possible.

~~*Note: - See MOS 9.1.11.3 for the protection date for existing elevated approach lights.*~~

…

CHAPTER 14. Rescue and firefighting service

…

Section 14.2 Level of protection

…

14.2.2 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 14-1, column 3 for that category, then the category for that aeroplane shall actually be one category higher.

~~*Note: -1. To categorize aeroplanes using the aerodrome, first evaluate the overall length of the aircraft, and second, their fuselage width.*~~

Note: - 1. See guidance in the Airport Services Manual *(Doc 9137), Part 1, Sect. 2.1.2 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 the PANS-Aerodromes (Doc 9981). Further guidance on the training of personnel, rescue equipment for difficult environments and other facilities and services for rescue and firefighting is given in MOS Attachment A, Section 5, and in the Airport Services Manual *(Doc 9137), Part 1.*

…

ATTACHMENT A: SUPPLEMENTARY GUIDANCE MATERIAL TO MOS

…

15. The ACN-PCN ACR-PCR method of reporting pavement strength

PART A: The ACN-PCN method of reporting pavement strength†

Applicable until 27 November 2024

…

PART B: The ACN-PCN ACR-PCR method of reporting pavement strength††

Applicable as of 28 November 2024

15.1 Overload operations

15.1.1. Overloading of pavements can result either from loads too large, or from a substantially increased application rate, or both. Loads larger than the defined (design or evaluation) load shorten the design life, whilst smaller loads extend it. With the exception of massive overloading, pavements in their structural behavior are not subject to a particular limiting load above which they suddenly or catastrophically fail. Behavior is such that a pavement can sustain a definable load for an expected number of repetitions during its design life. As a result, occasional minor overloading is acceptable, when expedient, with only limited loss in pavement life expectancy and relatively small acceleration of pavement deterioration. For those operations in which magnitude of overload and/or the frequency of use do not justify a detailed analysis, the following criteria are suggested:

(a) for flexible pavements, occasional movements by aircraft with ACN not exceeding 10% above the reported PCN shall not adversely affect the pavement;

(b) the annual number of overload movements shall not exceed approximately 5% of the total annual aircraft movements excluding light aircraft.

15.1.2. Such overload movements shall not normally be permitted on pavements exhibiting signs of distress or failure. Furthermore, overloading shall be avoided during any periods of thaw following frost penetration, or when the strength of the pavement or its subgrade can be weakened by water. Where overload operations are conducted, the appropriate authority shall

review the relevant pavement condition regularly, and shall also review the criteria for overload operations periodically since excessive repetition of overloads can cause severe shortening of pavement life or require major rehabilitation of pavement.

15.2. ACRs for several aircraft types

15.2.1. For convenience, a dedicated software is available on the ICAO website, for computing any aircraft ACRs at any mass on rigid and flexible pavements for the four standard subgrade strength categories detailed in MOS 5.1.4.10 (d)(ii).

— END—

NEW/AMENDED REGULATION AFTER REVISION:

MANUAL OF STANDARDS FOR AERODROMES, 2nd EDITION:

1.3.1 Airport design
Applicable until 2 November 2022

1.3.1.1 Architectural and infrastructure-related requirements for the optimum implementation of international civil aviation security measures shall be integrated into the design and construction of new facilities and alterations to existing facilities at an aerodrome.

Note: - Guidance on all aspects of the planning of aerodromes including security considerations is contained in ICAO Document 9184 Airport Planning Manual, Part 1.

1.3.1.2 The design of aerodromes shall take into account land-use and environmental control measures.
…
1.3.1.3 For aerodromes open to public use, the aerodrome operator shall coordinate with the Office of Transportation Security (OTS), Department of Transportation (DOTr), for all matters to ensure international civil aviation security requirements are incorporated into the design and construction of new facilities and alterations to existing facilities.

1.3.1.4 No aerodrome shall be constructed within twenty four kilometers of an operational aerodrome used by turbo-jet aircraft or within ten kilometers of any other operational aerodrome.

1.3.2 Airport design and Master plan
Applicable as of 3 November 2022

Introductory Note: - A master plan for the long-term development of an aerodrome displays the ultimate development in a phased manner and reports the data and logic upon which the plan is based. Master plans are prepared to support modernization of existing aerodromes and creation of new aerodromes, regardless of size, complexity, and role. It is important to note that a master plan does not constitute a confirmed implementation programme. It provides information on the types of improvements to be undertaken in a phased manner. Guidance on all aspects of the planning of aerodromes is contained in the Airport Planning Manual *(Doc 9184), Part 1.*

1.3.2.1 A master plan containing detailed plans for the development of aerodrome infrastructure should be established for aerodromes deemed by CAAP.

Note: - 1. A master plan represents the development plan of a specific aerodrome . It is developed by the aerodrome operator based on economic feasibility, traffic forecasts, current and future requirements provided by, among others, aircraft operators (see MOS 1.3.2.3).

Note: - 2. A master plan may be required when the lack of capacity at an airport, due to conditions such as, but not limited to expected traffic growth, changing weather and climatic conditions or major works to address safety or environmental concerns, would put the connectivity of a geographical area at risk or cause severe disruption to the air transport network.

1.3.2.2 The master plan should:

a) contain a schedule of priorities including a phased implementation plan; and

b) be reviewed periodically to take into account current and future aerodrome traffic.

1.3.2.3 Aerodrome stakeholders, particularly aircraft operators, should be consulted in order to facilitate the master planning process using a consultative and collaborative approach.

Note: - 1. Provision of advanced planning data to facilitate the planning process include future aircraft types, characteristics and numbers of aircraft expected to be used, the anticipated growth of aircraft movements, number of passengers and amount of cargo projected to be handled.

Note: - 2. See Annex 9, Chapter 6 on the need for aircraft operators to inform aerodrome operators concerning the former's service, schedule and fleet plans to enable rational planning of facilities and services in relation to the traffic anticipated.

Note: - 3. See ICAO's Policies on Charges for Airports and Air Navigation Services Doc 9082), Section 1, regarding consultation with users concerning provision of advance planning data and protection of commercially sensitive data.

1.3.2.4 Architectural and infrastructure-related requirements for the optimum implementation of international civil aviation security measures shall be integrated into the design and construction of new facilities and alterations to existing facilities at an aerodrome.

1.3.2.5 The design of aerodromes shall take into account land-use and environmental control measures.

Note: - Guidance on land-use planning and environmental control measures are described in the ICAO Doc 9184 Airport Planning Manual, Part 2.

1.3.2.6 For aerodromes open to public use, the aerodrome operator shall coordinate with the Office of Transportation Security (OTS), Department of Transportation (DOTr), for all matters to ensure international civil aviation security requirements are incorporated into the design and construction of new facilities and alterations to existing facilities.

1.3.2.7 No aerodrome shall be constructed within twenty four kilometers of an operational aerodrome used by turbo-jet aircraft or within ten kilometers of any other operational aerodrome.

…

Section 1.4 Definition of Terms

…

Aircraft classification number (ACN).† A number expressing the relative effect of an aircraft on a pavement for a specified standard sub-grade category.

Aircraft classification *rating ACR).*†† A number expressing the relative effect of an aircraft on a pavement for a specified standard sub-grade category.

…

Instrument runway. One of the following types of runway intended for the operation of aircraft using instrument approach procedures:

…

(d) **Precision approach runway, category III.** A runway served by visual aids and nonvisual aid(s) intended for landing operations following an instrument approach operation type B with a decision height (DH) lower than 30 m (100 ft), or no decision height and a runway visual range less than 300 m no runway visual range limitations.

…

Pavement classification number (PCN).† A number expressing the bearing strength of a pavement for unrestricted operations.

Pavement classification rating (PCR).†† A number expressing the bearing strength of a pavement.

…

Section 1.5 Abbreviations and Symbols

ABN	Aerodrome beacon with color and flashing rate.
ACN	Aircraft classification number
ACN†	Aircraft classification number
ACR†	Aircraft classification rating
ADP	Airside driver permit
AIP	Aeronautical information publication
AL	Approach lights (other than high intensity).
APAPI	Abbreviated precision approach path indicator
ASPSL	Arrays of segmented point source lighting
aprx	Approximately
ARIWS	Autonomous runway incursion warning system
ASDA	Accelerate-stop distance available
ATS	Air traffic services
AT-VASIS	Abbreviated T visual approach slope indicator system
C	Degree Celsius
CBR	California bearing ratio

cd	Candela
CIE	Commission Internationale de l'Éclairage
cm	Centimeter
CRC	Cyclic redundancy check
DIFFS	Desk integrated firefighting system
DME	Distance measuring equipment
DPWH	Department of Public Works and Highways
E	Modulus of elasticity
FATO	Final approach and take-off area
FAS	Fixed application system
FFAS	Fixed foam application system
FMS	Fixed monitor system
FOD	Foreign object debris
ft	Foot
GNSS	Global navigation satellite system
HAPI	Helicopter approach path indicator
HFM	Helicopter flight manual
HIAL-CAT I	High intensity approach lights-CAT I.
HIAL-CAT II or III	High intensity approach lights-CAT II or III.
HIOL	High intensity obstacle lights (flashing white).
HIRL	High intensity runway lights (unidirectional, five or six stages of intensity; lower intensity stages may be omni-directional).
Hz	Hertz
ILS	Instrument landing system
IMC	Instrument meteorological conditions
K	Degree Kelvin
kg	Kilogram
Kilometer per hour	Kilometer per hour
km	Kilometer
km/h	Kilometer per hour
kt	Knot
Litre	Liter
lb	Pounds
LDAH	Landing distance available heliports
l/min	Liter per minute
LOA	Limited obstacle area

LCFZ	Laser-beam critical flight zone
LDA	Landing distance available
LFFZ	Laser-beam free flight zone
LIOL	Low intensity obstacle lights (steady red).
LIRL	Low intensity runway lights (omni-directional, single stage of intensity).
LOS	Limited obstacle sector
LP	Luminescent panel
LSFZ	Laser-beam sensitive flight zone
m	Meter
MAPt	Missed approach point
Max	Maximum
MIOL	Medium intensity obstacle lights (flashing red).
MIRL	Medium intensity runway lights (omni-directional, three stages of intensity).
MLS	Microwave landing system
mm	Millimeter
mnm	Minimum
MN	Meganewton
MPa	Megapascal
MSL	Mean sea level
MTOM	Maximum take-off mass
NFZ	Normal flight zone
NM	Nautical mile
NU	Not usable
NVIS	Night Vision Imaging System
OCA/H	Obstacle clearance altitude/height
OFS	Obstacle free sector
OFZ	Obstacle free zone
OLS	Obstacle limitation surface
OMGWS	Outer main gear wheel span
PAPI	Precision approach path indicator
PCN	Pavement classification number
PCN†	Pavement classification number
PCR††	Pavement classification rating
PFAS	Portable foam application system

PinS	Point-in-space
PTBL	Portable or temporary lights (flares or battery).
RCLL	Runway centerline lights.
RESA	Runway end safety area
RFFS	Rescue and firefighting service
R/T	Radio Telephony or radio communications
RTIL	Runway threshold identification lights (flashing white).
RTOD	Rejected take-off distance
RTODAH	Rejected take-off distance available heliports
RTZ	Runway touchdown zone lights.
RVR	Runway visual range
s	Second
SDBY PWR AVBL	Standby power available
SFL	Sequenced flashing lights.
SMS	Safety management system
t	Metric Tonne (1000 kg)
TLOF	Touchdown and lift-off area
TODA	Take-off distance available
TODAH	Take-off distance available heliports
TORA	Take-off run available
T-VASIS	T visual approach slope indicator system
VMC	Visual meteorological conditions
VOR	Very high frequency omnidirectional radio range
UCW	Undercarriage width
VSS	Visual segment surface
WHMP	Wildlife hazard management programme
WIP	Work in progress

1.5.2 Symbols

°	Degree
=	Equals
‘	Minute of arc
µ	Friction coefficient
>	Greater than
<	Less than
%	Percentage

±	Plus or minus
†	Applicable until 27 November 2024.
††	Applicable as of 28 November 2024

Section 1.6 Certification of Aerodromes

…

CHAPTER 2. Application of standards to aerodromes

Section 2.1 General

…

2.1.6 Aerodrome Reference Code

…

2.1.6.6 Unless otherwise agreed by CAAP, aerodrome operators shall maintain the aerodrome facilities in accordance with the applicable standards set out in this MOS in relation to the aerodrome reference code for the facilities.

Code element 1	
Code number	**Aeroplane reference field length**
1	Less than 800 m
2	800 m up to but not including 1200 m
3	1200 m up to but not including 1800 m
4	1800 m and over
Code element 2	
Code number	**Wingspan**
A	Up to but not including 15 m
B	15 m up to but not including 24 m
C	24 m up to but not including 36 m
D	36 m up to but not including 52 m
E	52 m up to but not including 65 m
F	65 m up to but not including 80 m

Table 2.1-1: Aerodrome reference code
(see 2.1.6.1 to 2.1.6.4)

Note: - 1. Guidance on planning for aeroplanes with wing spans greater than 80 m is given in the Aerodrome Design Manual (Doc.9157), Parts 1 & 2.

Note: - 2. Procedures on conducting aerodrome compatibility study to accommodate aeroplanes with folding wing tips spanning two code letters are given in the Procedures for Air Navigation Services Aerodromes (*PANS-Aerodromes,* Doc 9981). *Further guidance can be found in the manufacturer's aircraft characteristics for airport planning manual.*

…

CHAPTER 3. Applying for an aerodrome certificate

Section 3.1 General

…

3.1.2 Processing an Aerodrome Certificate application

…

3.1.2.3 As part of the certification process, CAAP shall ensure that an aerodrome manual which will include all pertinent information on the aerodrome site, facilities, services, equipment, operating procedures, organization and management including a safety management system, is submitted by the applicant for approval/acceptance prior to granting the aerodrome certificate.

Note: - The intent of a safety management system is to have in place an organized and orderly approach in the management of aerodrome safety by the aerodrome operator. CAR-Safety Management 2nd Edition contains the safety management provisions applicable to certified aerodromes. Overarching guidance on safety management systems is provided in the Safety Management Manual (SMM) (Doc 9859) and in the Manual on Certification of Aerodromes (Doc 9774). Procedures on the management of change, conduct of safety assessment, reporting and analyses of safety occurrences at aerodromes; runway safety; and continuous monitoring to enforce compliance with applicable specifications so that hazards are identified and risks are assessed and mitigated, are specified in the PANS-Aerodromes (Doc 9981).

…

CHAPTER 4. Applying for an Aerodrome Registration Type 1, Aerodrome Registration Type 2 and Permit to Operate (PTO)

…

4.1.2 Processing an Aerodrome Registration Type 1 application

…

4.1.2.5 Aerodrome Registration Type 1 process is detailed in MOS 4.1.8.

…

4.1.6 Transfer of an Aerodrome Registration Type 1

4.1.6.1 In case of change in ownership or management of the aerodrome, the new aerodrome operator or manager shall apply for a transfer of the Aerodrome Registration Type 1 in accordance with CAR Aerodromes 2.3.060.

…

Section 4.2 Registered Aerodrome Type 2

4.2.1 Introduction

4.2.1.1 Under the provisions of CAR-Aerodromes 2.3.095,

An aerodrome shall only be operated by a person who holds a valid Aerodrome Registration Type 2 issued by CAAP for that aerodrome if it is:

(a) an aerodrome open for public or private use in domestic operations with an annual aircraft movement of 5,000 and below, or annual passenger movement of 300,000 and below, or

(b) a heliport using aircraft with 10 or more passenger seats; or

(c) an aerodrome not covered by the PTO requirements.

…

CHAPTER 5. Aerodrome information for AIP

…

5.1.4 Standards for determining Aerodrome Information

…

5.1.4.10 Pavement strength.

Part A

Applicable until 27 November 2024

…

5.1.4.23 Lighting systems. Provide information of aerodrome lighting systems by using the related abbreviations detailed in MOS 1.5.1.

…

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

Note: - Manual of Standards for Aeronautical Information Services (MOS-AIS), Appendix 8 provides requirements for obstacle data determination in Area 2 and 3.

…

5.1.5 Condition of the movement area and related facilities

5.1.5.1 Information on the condition of the movement area and the operational status of related facilities shall be provided to the appropriate aeronautical information services units, and similar information of operational significance to the air traffic services 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 Manual of Standards for Aeronautical Information Services (MOS-AIS) and MOS-ATS. Specific procedures pertaining to works in progress on the movement area and to the reporting of such works are specified in the PANS-Aerodromes (Doc 9981).

…

5.1.9 Strength of pavements

Part B

Applicable as of 28 November 2024

5.1.9.1 The bearing strength of a pavement shall be determined.

5.1.9.2 The bearing strength of a pavement intended for aircraft of apron (ramp) mass greater than 5 700 kg shall be made available using the aircraft classification rating – pavement classification rating (ACR-PCR) method by reporting all of the following information:

a) the pavement classification rating (PCR) and numerical value;

b) pavement type for ACR-PCR determination;

c) subgrade strength category;

d) maximum allowable tire pressure category or maximum allowable tire pressure value; and

e) evaluation method.

Note: - Guidance on reporting and publishing of PCRs is contained in the Aerodrome Design Manual *(Doc 9157, Part 3).*

5.1.9.3 The pavement classification rating (PCR) reported shall indicate that an aircraft with an aircraft classification rating (ACR) equal to or less than the reported PCR can operate on the

pavement subject to any limitation on the tire pressure, or aircraft all-up mass for specified aircraft type(s).

Note: - Different PCRs may be reported if the strength of the pavement is subject to significant seasonal variation.

5.1.9.4 The ACR of an aircraft shall be determined in accordance with the standard procedures associated with the ACR-PCR method.

Note: - The standard procedures for determining the ACR of an aircraft are given in the Aerodrome Design Manual *(Doc 9157), Part 3. For convenience, dedicated software is available on the ICAO website, for computing any aircraft ACRs at any mass on rigid and flexible pavements for the four standard subgrade strength categories detailed in 5.1.9.6 b) below.*

5.1.9.5 For the purpose of determining the ACR, the behaviour of a pavement shall be classified as equivalent to a rigid or flexible construction.

5.1.9.6 Information on pavement type for ACR-PCR determination, subgrade strength category, maximum allowable tire pressure category and evaluation method shall be reported using the following codes:

a) Pavement type for ACR-PCR determination:

	Code
Rigid pavement	R
Flexible pavement	F

Note: - If the actual construction is composite or non-standard, include a note to that effect (see example 2 below).

b) Subgrade strength category:

		Code
i.	*High strength:* characterized by E=200 MPa, and representing all E values equal to or above 150 MPa for rigid and flexible pavements.	A
ii.	*Medium* strength: characterized by E=120 MPa and representing a range in E values equal to or above 100 MPa and strictly less than 150 MPa, for rigid and flexible pavements.	B
iii.	*Low strength*: characterized by E=80 MPa and representing a range in E values equal to or above 60 MPa and strictly less than 100 MPa, for rigid and flexible pavements.	C
iv.	*Ultra-low* strength: characterized by E=50 MPa and representing all E values strictly less than 60 MPa, for rigid and flexible pavements.	D

c) Maximum allowable tire pressure category:

	Code
Unlimited: no pressure limit	W

High: pressure limited to 1.75 MPa	X
Medium: pressure limited to 1.25 MPa	Y
Low: pressure limited to 0.50 MPa	Z

Note: - See Note 5 to (10.15.2.1) where the pavement is used by aircraft with tire pressures in the upper categories.

d) Evaluation method:

		Code
i.	*Technical evaluation:* representing a specific study of the pavement characteristics and the types of aircraft which the pavement is intended to serve.	T
ii.	*Using aircraft experience:* representing a knowledge of the specific type and mass of aircraft satisfactorily being supported under regular use.	U

(e) The following examples illustrate how pavement strength data are reported under ACR-PCR method. Further guidance on this topic is contained in the Aerodrome Design Manual (Doc 9157), Part 3 - Pavements.

Example: - 1. If the bearing strength of a rigid pavement, resting on a medium strength subgrade, has been assessed by technical evaluation to be PCR 760 and there is no tire pressure limitation, then the reported information would be:

PCR 760 / R / B / W / T

Example: - 2. If the bearing strength of a composite pavement, behaving like a flexible pavement and resting on a high strength subgrade, has been assessed by using aircraft experience to be PCR 550 and the maximum tire pressure allowable is 1.25 MPa, then the reported information would be:

PCR 550 / F / A / Y / U

Note: - Composite construction.

5.1.9.7 *Criteria should be established to regulate the use of a pavement by an aircraft with an ACR higher than the PCR reported for that pavement in accordance with MOS 5.1.9.2 and 5.9.1.3.*

Note: - MOS ATT. A Section 15, details a simple method for regulating overload operations while the Manual (Doc 9157), Part 3, includes the descriptions of more detailed procedures for evaluation of pavements and their suitability for restricted overload operations.

5.1.9.8 The bearing strength of a pavement intended for aircraft of apron (ramp) mass equal to or less than 5 700 Kg shall be made available by reporting the following information:

a) maximum allowable aircraft mass; and

b) maximum allowable tire pressure.

Example: 4 800 kg/0.60 MPa.

…

CHAPTER 6. Aerodrome physical characteristics

…

Section 6.3 Runway strip

…

6.3.3 Runway Strip Width

…

6.3.3.4 A strip including a non-instrument runway shall extend on each side of the centerline of the runway and its extended centerline throughout the length of the strip, to a distance of at least:

— 75 m where the code number is 3 or 4;

— 40 m where the code number is 2; and

— 30 m where the code number is 1.

6.3.3.5 MOS 6.3.8.5, recommends that the portion of a strip of an instrument runway within at least 75 m from the centerline shall be graded where the code number is 3 or 4. For a precision approach runway, it may be desirable to adopt a greater width where the code number is 3 or 4. MOS Figure 6.3-3 shows the shape and dimensions of a wider strip that may be considered for such a runway. This strip has been designed using information on aircraft running off runways. The portion to be graded extends to a distance of 105 m from the centerline, except that the distance is gradually reduced to 75 m from the centerline at both ends of the strip, for a length of 150 m from the runway end.

6.3.3.6 If an aerodrome operator wishes to provide a lesser runway strip width to that specified in the standards or a runway strip width with graded and ungraded components, the aerodrome operator must provide CAAP with a safety case justifying why it is impracticable to meet the standard. The safety case must include documentary evidence that all relevant stakeholders have been consulted.

…

6.3.9 Objects on runway strips

6.3.9.1 No fixed object, other than visual aids required for air navigation or those required for aircraft safety purposes and which must be sited on the runway strip, and satisfying the relevant frangibility requirement in (MOS 8 and 9), shall be permitted any part of a runway strip of a precision approach runway delineated by the lower edges of the inner transitional surfaces.

6.3.9.2 No mobile object shall be permitted on a runway strip while the runway is in use for takeoff or landing.

Note: - See MOS 7.3.2.9 for characteristics of inner transitional surface.

6.3.9.3 All fixed objects permitted on the runway strip must be of low mass and frangibly mounted. An object situated on a runway strip which may endanger aeroplanes should be regarded as an obstacle and should, as far as practicable, be removed.

…

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 the PANS-Aerodromes (Doc 9981). Further guidance can be found in the Airport Services Manual (Doc 9137), Part 3.

…

Section 6.5 Clearway

…

6.5.3 Dimensions of Clearways

…

6.5.3.2 A clearway shall extend laterally on each side of the extended centerline of the runway to a distance of at least:

a) 75 m for instrument runways; and

b) half of the width of the runway strip for non-instrument runways.

…

Section 6.7 Taxiways

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

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

Note: - 2. See MOS 8.6.14 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: - 3. See MOS Attachment A, Section 9 for specific taxiway design guidance which may assist in the prevention of runway incursions when developing a new taxiway or improving existing ones with a known runway incursion safety risk.

Note: - 4. Guidance on layout and standardized nomenclature of taxiways is given in the Aerodrome Design Manual (Doc 9157), Part 2.

…

Section 6.8 Holding Bays, Runway-Holding Positions, Intermediate Holding Positions and Road-Holding Positions

…

6.8.4 Distance from Runway-holding Position, Intermediate Holding Position or Road-holding Position to Runway Centerline

6.8.4.1 The distance between a holding bay, runway-holding position established at a taxiway/runway intersection or road-holding position and the center line of a runway shall be in accordance with Table 6.5-1and, 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 or penetrate the inner transitional surface.

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

Table 6.5-1: Minimum distance from the runway center line to a holding bay, runway-holding position or road-holding position

Code number	Type of runway				
	Non-instrument	Non-precision approach	Precision Category I	Precision Category II or III	Take-off
1	30 m	40 m	60 m [b]	-	30 m
2	40 m	40 m	60 m [b]	-	40 m
3	75 m	75 m	90 m [a, b]	90 m [a, b]	75 m
4	75 m	75 m	90 m [a, b]	90 m [a, b]	75 m

…

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 CAR-ANS Part 6 Attachment C and G respectively (see also MOS 6.8.4.1).

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

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

Note: - 3. For code number 4 where the width of the inner edge of the inner approach surface is more than 120 m, a distance greater than 90 m may be necessary to ensure that a holding aircraft is clear of the obstacle free zone. For example, a distance of 100 is based on an aircraft with a tail height of 24 m, a distance from the nose to the highest part of the tail of 62.2 m and a nose height of 10 m holding at an angle of 45° or more with respect to the runway centerline, being clear of the obstacle free zone.

6.8.4.2 At elevations greater than 700 m (2,300 ft) the distance of 90 m specified in MOS Table 6.5-1 for a precision approach runway code number 4 should be increased as follows:

(a) up to an elevation of 2 000 m (6,600 ft); 1 m for every 100 m (330 ft) in excess of 700 m (23,00 ft);

(b) elevation in excess of 2 000 m (6,600 ft) and up to 4000 m (13,320 ft); 13 m plus 1.5 m for every 100 m (330 ft) in excess of 2000 m (6,600 ft); and

6.8.4.3 If a holding bay, runway-holding position or road-holding position for a precision approach runway code number 4 is at a greater elevation compared to the threshold, the distance specified in MOS Table 6.5-1 shall be further increased 5 m for every meter the bay or position is higher than the threshold.

…

CHAPTER 8. Aerodrome visual aids: markers, markings, signals and signs

…

Section 8.6 Signs

…

8.6.2 Naming of taxiway location signs

8.6.2.1 The following convention must be used in the naming of taxiway location signs:

…

(d) When designating taxiways, the use of words such as inner and outer should be avoided wherever possible;

(e) 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 wherever possible. Letter Q should only be used where unavoidable;

(f) At aerodromes where the number of taxiways are or will be large, alphanumeric designators may be used for short intersecting taxiways. Successive intersecting taxiways must use the same letter, with sequential numbers. If sequential numbers are not practicable, due to geometry of the taxiway system, all pilot-used taxiway plans (aerodrome charts) must include advice as to the missing designators;

(g) A taxiway shall be identified by a designator comprising a letter, letters or a combination of a letter or letters followed by a number;

…

8.6.4 Sign size and location distances, incl. runway exit signs

8.6.4.1 Sign size and location distances must be in accordance with Table 8.6-1 and Table 8.6-2.

Sign Height (mm)					Perpendicular distance from defined taxiway pavement edge to near side of sign	Perpendicular distance from defined runway pavement edge t near side of sign
Code Number	Type	Legend	Face (min)	Installed (max)		
1 or 2 [a]	I	200	300	700	5 - 11 m	3 - 10 m
1 or 2	M	300	450	900	5 - 11 m	3 - 10 m
3 or 4 [a]	I	300	450	900	11 - 21 m	8 - 15 m
3 or 4	M	400	600	1100	11 - 21 m	8 - 15 m
[a] For runway exit signs, use the mandatory size.						
I - Information sign type, M - Mandatory instruction sign type.						

8.6.4.2 The face height of signs, stroke width of letters and arrows shall be as follows:

Legend height	Face height (min	Stroke width
200 mm	300 mm	32 mm
300 mm	450 mm	48 mm
400 mm	600 mm	64 mm

…

8.6.4.4 The face width of signs shall be determined using MOS 8.6-7 except that, where a mandatory instruction sign is provided on one side of a taxiway only, the face width shall not be less than:

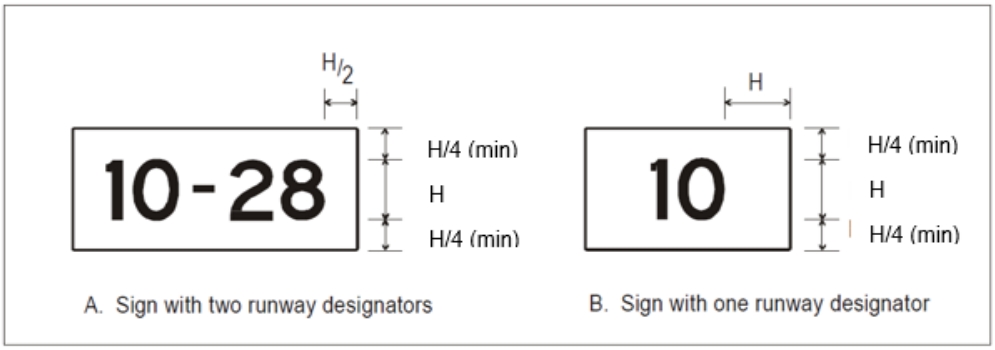


Figure 8.6-7 Sign dimensions

Explanatory Note to Figure 8.6-7: "H" stands for the inscription height

8.6.4.5 The forms of characters, i.e. letters, numbers, arrows and symbols, shall conform to those shown in Figure 8.6-1 to 8.6-6. The width of characters and the space between individual characters shall be determined as indicated in Table 8.6-3.

8.6.4.6 Borders

(a) The black vertical delineator between adjacent direction signs should have a width of approximately 0.7 of the stroke width.

(b) The yellow border on a stand-alone location sign should be approximately 0.5 stroke width.

8.6.4.7 The colors of signs shall be in accordance with the appropriate specifications in MOS 9.2.

…

8.6.23 Aircraft stand identification signs

…

8.6.23.4 Apron stand designators should not be the same as taxiway designators.

…

Section 8.9 Visual Aids denoting Restricted Use Areas

8.9.1 Closed runways and taxiways or parts thereof

…

8.9.1.5 The closed marking shall be of the form and proportions as detailed in Figure 8.9-1(a), when displayed on a runway, and shall be of the form and proportions as detailed in Figure 8.9-1(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 the PANS-Aerodromes (Doc 9981).

…

8.9.4 Unserviceable areas

8.9.4.1 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. On a movement area used at night, unserviceability lights shall be used.

Note: - 1. Unserviceability markers and lights are used 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 the PANS-Aerodromes (Doc 9981).

…

Section 8.10 Obstacle Markings

8.10.1.1 Fixed objects, temporary and permanent, which extend above the obstacle limitation surfaces but are permitted to remain or objects which are present on the movement area are regarded as obstacles, and must be marked. The aerodrome operator must submit details of such obstacles to CAAP, for hazard assessment and particular requirements for marking and lighting. The relevant information must be included in the Aerodrome Manual.

8.10.1.2 A structure must be marked when more than 150 m higher than the surrounding terrain. Surrounding terrain means the area within 400 m of the structure. Structures above 90 m may need to be marked, and inconspicuous structures 75 m above ground level should also be marked. Fixed objects on the aerodrome movement area, such as ILS buildings, must be marked as obstacles.

8.10.1.3 CAAP may permit obstacles to remain unmarked:

(a) when obstacles are sufficiently conspicuous by their shape, size or color; or

(b) when obstacles are shielded by other obstacles already marked; or

(c) when obstacles are lighted by high intensity obstacle lights by day.

8.10.2 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 an 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 the 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.

…

CHAPTER 9. Aerodrome visual aids – aerodrome lighting.

…

9.12.16 Provision of runway guard lights

Note: - 1. Runway guard lights are sometimes referred to as 'wig wags'. The effectiveness of this lighting system in preventing runway incursions has been successfully proven in a number of countries and this lighting system has been adopted by ICAO as a standard. Provision of runway guard lights will bring aerodrome lighting in line with international practices.

Note: - 2. 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 incursion prevention measures. Runway guard lights warn pilots, and drivers of vehicles when operating on taxiways, that they are about to enter a runway. There are two standard configurations of runway guard lights as illustrated in MOS Figure 9.12-3.

9.12.16.1 Runway guard lights Configuration A must be provided at each runway/taxiway intersection when the runway is intended for use in:

(a) runway visual range conditions less than a value of 550m where a stop bar is not installed; and

(b) runway visual range conditions of values between 550m and 1200m 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 the Aerodrome Design Manual *(Doc 9157), Part 4.*

…

9.12.17 Pattern and location of runway guard lights

9.12.17.1 There are two standard configurations of runway guard lights:

(a) Runway guard lights, Configuration A, shall be located at each side of the taxiway on the holding side of the runway-holding position marking.

(b) Runway guard lights, Configuration B, shall be located across the taxiway on the holding side of the runway-holding position marking.

…

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

9.12.18 Characteristics of runway guard lights

9.12.18.1 Configuration A runway guard lights must consist of two pairs of elevated lights showing yellow, one pair on each side of the taxiway.

9.12.18.2 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.

9.12.18.3 Configuration B runway guard lights must consist of yellow lights spaced at intervals of 3 m across the taxiway.

9.12.18.4 The light beam shall be unidirectional and shall show yellow in the direction of approach to the runway- holding position.

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

9.12.18.5 The intensity in yellow light and beam spreads of lights of Configuration A should be in accordance with the specifications in MOS Figure 9.13-11.

9.12.18.6 Where runway guard lights are intended for use during the day, the intensity in yellow light and beam spreads of lights of Configuration A should be in accordance with the specifications in MOS Figure 9.13-12.

9.12.18.7 Where runway guard lights are specified as components of an advanced surface movement guidance and control system where higher light intensities are required, the intensity in yellow light and beam spreads of lights of Configuration A should be in accordance with the specifications in MOS Figure 9.13-12.

Note: - Higher light intensities may be required to maintain ground movement at a certain speed in low visibilities.

9.12.18.8 The intensity in yellow light and beam spreads of lights of Configuration B should be in accordance with the specifications in MOS Figure 9.13-9.

9.12.18.9 Where runway guard lights are intended for use during the day, the intensity in yellow light and beam spreads of lights of Configuration B should be in accordance with the specifications in MOS Figure 9.13-9.

9.12.18.10 Where runway guard lights are specified as components of an advanced surface movement guidance and control system where higher light intensities are required, the intensity in yellow light and beam spreads of lights of Configuration B should be in accordance with the specifications in MOS Figure 9.13-9.

9.12.18.11 The lights in each unit of Configuration A shall be illuminated alternately.

9.12.18.12 For Configuration B, adjacent lights shall be alternately illuminated and alternative lights shall be illuminated in unison.

9.12.18.13 The lights shall be illuminated between 30 and 60 cycles per minute and the light suppression and illumination periods shall be equal and opposite in each light.

…

9.12.23 Stop bars

…

9.12.23.1 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 a value of 550 m, except where:

…

9.12.23.2 Where there is more than one stop bar associated with a taxiway/runway intersection, only one shall be illuminated at any given time.

…

9.12.23.4 A stop bar should be provided at an intermediate holding position when it is desired to supplement markings with lights and to provide traffic control by visual means.

9.12.24 Location of stop bars

9.12.24.1 Stop bars shall be located across the taxiway at the point where it is desired that traffic stop. Where the additional lights specified in MOS 9.12.25.2 are provided, these lights shall be located not less than 3 m from the taxiway edge.

9.12.25 Characteristics of Stop Bars

9.12.25.1 Stop bars shall consist of lights spaced at uniform intervals of no more than 3 m across the taxiway, showing red in the intended direction(s) of approach to the intersection or runway-holding position.

Note: - Where necessary to enhance conspicuity of an existing stop bar, extra lights are installed uniformly.

9.12.25.2 A pair of elevated lights should be added to each end of the stop bar where the in-pavement stop bar lights might be obscured from a pilot's view, for example, by rain, or where a pilot may be required to stop the aircraft in a position so close to the lights that they are blocked from view by the structure of the aircraft.

9.12.25.3 Stop bars installed at a runway-holding position shall be unidirectional and shall show red in the direction of approach to the runway.

9.12.25.4 Where the additional lights specified in MOS 9.12.25.2 are provided, these lights shall have the same characteristics as the lights in the stop bar, but shall be visible to approaching aircraft up to the stop bar position.

9.12.25.5 The intensity and beam spread of the stop bar lights must be in accordance with the applicable specifications in MOS 9.13, Figure 9.13-1 through Figure 9.13-5, as appropriate.

9.12.25.6 Where stop bars are specified as components of an advanced surface movement guidance and control system and where, from an operational point of view, higher intensities are required to maintain ground movements at a certain speed in very low visibilities or in bright daytime conditions, the intensity in red light and beam spreads of stop bar lights should be in accordance with the specifications of MOS 9.13, Figure 9.13-8, Figure 9.13-9 or Figure 9.13-10.

9.12.25.7 Where a wide beam fixture is required, the intensity in red light and beam spreads of stop bar lights should be in accordance with the specifications of MOS 9.13, Figure 9.13-9 or Figure 9.13-10.

Note: - High-intensity stop bars shall only be used in case of an absolute necessity and following a specific study.

9.12.25.8 The lighting circuit must be designed so that:

…

9.12.26 No - entry Bars

…

9.12.26.3 A no-entry bar should be co-located with a no-entry sign and/or a no-entry marking.

9.12.26.4 A no-entry bar should consist of unidirectional lights spaced at uniform intervals of no more than 3 m showing red in the intended direction(s) of approach to the runway.

Note: - Where necessary to enhance conspicuity, extra lights are installed uniformly.

9.12.26.5 A pair of elevated lights should be added to each end of the no-entry bar where the in-pavement no entry bar lights might be obscured from a pilot's view, for example, by rain or any climatic conditions, or where a pilot may be required to stop the aircraft in a position so close to the lights that they are blocked from view by the structure of the aircraft.

9.12.26.6 The intensity in red light and beam spreads of no-entry bar lights shall be in accordance with the specifications in MOS 9.13 Figure 9.13-1 through Figure 9.13-5 as appropriate.

9.12.26.7 Where no-entry bars are specified as components of an advanced surface movement guidance and control system and where, from an operational point of view, higher intensities are required to maintain ground movements at a certain speed in very low visibilities or in bright daytime conditions, the intensity in red light and beam spreads of no-entry bar lights should be in accordance with the specifications of MOS 9.13 Figure 9.13-6, Figure 9.13-7 or Figure 9.13-8.

Note: - High-intensity no-entry bars are typically only used in case of an absolute necessity and following a specific study.

9.12.26.8 Where a wide beam fixture is required, the intensity in red light and beam spreads of no-entry bar lights should be in accordance with the specifications of MOS 9.13 Figure 9.13-6 or Figure 9.13-8.

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

…

CHAPTER 10. Operating standards for certified aerodromes and Aerodrome Registration Type 1

…

Section 10.8 Guidelines for Aerodrome Emergency Plans

…

10.8.1.8 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 the 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 the PANS-Aerodromes (*Doc 9981*).

…

Section 10.9 Control of Airside Access and Vehicle Control

…

10.9.2 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 the PANS-Aerodromes (Doc 9981), Part II, Chapter 9.

Note: - 2. Guidance on aerodrome vehicle operations is contained in MOS Attachment A, Section 6, and on traffic rules and regulations for vehicles in the Manual of Surface Movement Guidance and Control Systems (SMGCS) *(Doc 9476).*

Note: - 3. 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.

…

Section 10.13 Aircraft Parking

…

10.13.4 Apron management service

…

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

Note: - Procedures on apron safety are specified in the PANS-Aerodromes (Doc 9981). Guidance on an apron management service is given in the Airport Services Manual (Doc 9137), Part 8, and in the Manual of Surface Movement Guidance and Control Systems (SMGCS) (Doc 9476).

…

10.13.4.7 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 the PANS-Aerodromes (Doc 9981), Part II, Chapters 1 and 7.

…

Section 10.14 Wildlife Hazard Management

…

10.14.2 Wildlife strike hazard reduction

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

…

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

Note: - 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 the PANS-Aerodromes (Doc 9981), Part II, Chapters 1 and 6. Further guidance is given in the Airport Services Manual *(Doc 9137), Part 3.*

…

Section 10.15 Aerodrome Maintenance

10.15.1 Maintenance Programme

…

10.15.1.2 The design and application of the maintenance programme should observe Human Factors principles.

Note: - 1. Guidance material on Human Factors principles can be found in the Human Factors Training Manual (Doc 9683) and in the Airport Services 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 the PANS-Aerodromes (Doc 9981).

…

CHAPTER 11. Standards for other aerodrome facilities

Section 11.1 General

…

11.1.1 Siting of equipment and installations on operational areas

…

11.1.1.5 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 within 240 m from the end of the strip and within:

(i) 60 m of the extended runway centerline where the code number is 3 or 4; or

(ii) 45 m of the extended runway centerline 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.

…

CHAPTER 14. Rescue and firefighting service

…

Section 14.2 Level of protection

…

14.2.2 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 14-1, column 3 for that category, then the category for that aeroplane shall actually be one category higher.

Note: - 1. See guidance in the Airport Services Manual *(Doc 9137), Part 1, Sect. 2.1.2 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 the PANS-Aerodromes (Doc 9981). Further guidance on the training of personnel, rescue equipment for difficult environments and other facilities and services for rescue and firefighting is given in MOS Attachment A, Section 5, and in the Airport Services Manual *(Doc 9137), Part 1.*

…

ATTACHMENT A: SUPPLEMENTARY GUIDANCE MATERIAL TO MOS

…

15. The ACN-PCN ACR-PCR method of reporting pavement strength

PART A: The ACN-PCN method of reporting pavement strength†

Applicable until 27 November 2024

…

PART B: The ACN-PCN ACR-PCR method of reporting pavement strength††

Applicable as of 28 November 2024

15.1 Overload operations

15.1.1 Overloading of pavements can result either from loads too large, or from a substantially increased application rate, or both. Loads larger than the defined (design or evaluation) load shorten the design life, whilst smaller loads extend it. With the exception of massive overloading, pavements in their structural behavior are not subject to a particular limiting load above which they suddenly or catastrophically fail. Behavior is such that a pavement can sustain a definable load for an expected number of repetitions during its design life. As a result, occasional minor overloading is acceptable, when expedient, with only limited loss in pavement life expectancy and relatively small acceleration of pavement deterioration. For those operations in which magnitude of overload and/or the frequency of use do not justify a detailed analysis, the following criteria are suggested:

(a) for flexible pavements, occasional movements by aircraft with ACN not exceeding 10% above the reported PCN shall not adversely affect the pavement;

(b) the annual number of overload movements shall not exceed approximately 5% of the total annual aircraft movements excluding light aircraft.

15.1.2. Such overload movements shall not normally be permitted on pavements exhibiting signs of distress or failure. Furthermore, overloading shall be avoided during any periods of thaw following frost penetration, or when the strength of the pavement or its subgrade can be weakened by water. Where overload operations are conducted, the appropriate authority shall review the relevant pavement condition regularly, and shall also review the criteria for overload operations periodically since excessive repetition of overloads can cause severe shortening of pavement life or require major rehabilitation of pavement.

15.2. ACRs for several aircraft types

15.2.1. For convenience, a dedicated software is available on the ICAO website, for computing any aircraft ACRs at any mass on rigid and flexible pavements for the four standard subgrade strength categories detailed in MOS 5.1.4.10 (d)(ii).

xxx

"End of Amendment"

i. ***Separability Clause.*** **-** If, for any reason, any provision of this Memorandum Circular is declared invalid or unconstitutional, the other part or parts thereof which are not affected thereby shall continue to be in full force and effect.

ii. ***Repealing Clause.*** **-** All orders, rules, regulations and issuances, or parts thereof which are inconsistent with this Memorandum Circular are hereby repealed, superseded or modified accordingly.

iii. ***Determination of changes.*** **–** To highlight the amendments and/or revisions in the Memorandum Circular, the deleted text shall be shown with strikethrough and the new inserted text shall be highlighted with grey shading, as illustrated below:

1. Text deleted: ~~Text to be deleted is shown with a line through it.~~
2. New text inserted: New text is highlighted with grey shading.
3. New text replacing existing text: ~~Text to be deleted is shown with a line through it~~ followed by the replacement text which is highlighted with grey shading.

iv. ***Effectivity Clause.*** **-** This Memorandum Circular shall take effect fifteen (15) days following completion of its publication in a newspaper of general circulation or the Official Gazette and a copy filed with the U.P. Law Center - Office of the National Administrative Register. The amendment shall be incorporated to Philippine CAR-ANS in the next regular Amendment Cycle.

So Ordered. Signed this **29th** day of **January** 2021, at the Civil Aviation Authority of the Philippines, MIA Road, Pasay City, Metro Manila, 1301.

CAPTAIN JIM C. SYDIONGCO
Director General