



Republic of the Philippines
CIVIL AVIATION AUTHORITY OF THE PHILIPPINES

MEMORANDUM CIRCULAR NO.: 23-2021

TO : ALL CONCERNED

FROM : DIRECTOR GENERAL

SUBJECT : AMENDMENT TO THE PHILIPPINE MANUAL OF STANDARDS FOR AERODROMES (MOS-AERODROMES) INCORPORATING AMENDMENT 16 TO ICAO ANNEX 14 VOL. I

REFERENCE:

1. Philippine Manual of Standards for Aerodromes
2. ICAO Annex 14 Vol. I; Amendment 16
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. 16 to the Philippine Manual of Standards for Aerodromes.

ORIGINAL REGULATION SUBJECT FOR REVIEW AND REVISION:

MANUAL OF STANDARDS FOR AERODROMES, 2nd EDITION:

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CHAPTER 1. Introduction

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Section 1.4 Definition of Terms

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Runway. A defined rectangular area on a land aerodrome prepared for the landing and take-off of aircraft.

Runway condition assessment matrix (RCAM).[§] A matrix allowing the assessment of the runway condition code, using associated procedures, from a set of observed runway surface condition(s) and pilot report of braking action.

Runway condition code (RWYCC).[§] A number describing the runway surface condition to be used in the runway condition report.

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Runway condition report (RCR).[§] A comprehensive standardized report relating to runway surface condition(s) and its effect on the aeroplane landing and take-off performance.

...

Runway surface condition(s).[§] A description of the condition(s) of the runway surface used in the runway condition report which establishes the basis for the determination of the runway condition code for aeroplane performance purposes.

...

(d) *Contaminated runway.* A runway is contaminated when a significant portion of the runway surface area (whether in isolated areas or not) within the length and width being used is covered by one or more of the substances listed in the runway surface condition descriptors.

Note: — Procedures on determination of contaminant coverage on runway ~~is~~ are available in the PANS-Aerodromes (Doc 9981).

(e) ~~Element on the surface of the runway:~~ *Runway surface condition descriptors.* The element on the surface of the runway:

Note: — The description for standing water below, is used solely in the context of the runway condition report and ~~are~~ is not intended to supersede or replace any existing WMO definitions.

(F) *i) Standing water.* Water of depth greater than 3 mm.

Note.— Running water of depth greater than 3 mm is reported as standing water by convention.

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Section 1.5 Abbreviations and Symbols

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1.5.2 Symbols

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†† Applicable as of 28 November 2024

§ Applicable as of 4 November 2021

Section 1.6 Certification of Aerodromes

Note: — The intent of these specifications is to ensure that compliance with the specifications in the MOS can be effectively enforced. The most effective and transparent means of ensuring compliance with applicable specifications is the availability of a separate safety oversight entity and a well-defined safety oversight mechanism with support of appropriate legislation to be able to carry out the function of safety regulation of aerodromes. When an aerodrome is granted a certificate, it signifies to aircraft operators and other organizations operating on the aerodrome that, at the time of certification, the aerodrome meets the specifications regarding the facility and its operation, and that it has the capability to maintain these specifications for the period of validity of the certificate. The certification process also establishes the baseline for continued monitoring of compliance with the specifications. Information on the status of certification of aerodromes need to be provided to CAAP-AIS for promulgation in the Aeronautical Information Publication (AIP). See MOS ~~5.2.6.4~~ 5.3.1 and PANS-AIM (Doc 10066), Appendix 2, AD 1.5.

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CHAPTER 5. Aerodrome information for AIP

Section 5.1 General

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5.1.5 Condition of the movement area and related facilities

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5.1.5.2 The condition of the movement area and the operational status of related facilities shall be monitored and reports on matters of operational significance affecting aircraft and aerodrome operations shall be provided in order to take appropriate action, particularly in respect of the following:

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(c) water on a runway, a taxiway or an apron; **[applicable 4 November 2021]**

...

(g) failure of the normal or secondary power supply.

*Note: — 1. **Until 3 November 2021, Other contaminants may include mud, dust, sand, volcanic ash, oil and rubber. PCARs 8.7, Attachment B provides guidance on the description of runway surface conditions. Additional guidance is included in the Airport Services Manual (Doc 9137), Part 2. Procedures for monitoring and reporting the conditions of the movement area are included in the PANS-Aerodromes (Doc 9981).***

*Note: 2. **As of 4 November 2021, other contaminants may include mud, dust, sand, volcanic ash, oil and rubber. Procedures for monitoring and reporting the conditions of the movement area are included in the PANS-Aerodromes (Doc 9981).***

*Note: — 23. **As of 4 November 2021, The Aeroplane Performance Manual (Doc 10064) provides guidance on aircraft performance calculation requirements regarding description of runway surface conditions in MOS 5.1.5.2 c) and d).***

*Note: — 34. **As of 4 November 2021, Origin and evolution of data, assessment process and the procedures are prescribed in the PANS-Aerodromes (Doc 9981). These procedures are intended to fulfil the requirements to achieve the desired level of safety for aeroplane operations prescribed by PCAR Part 8 and PCAR Part 5 and to provide the information fulfilling the syntax requirements for dissemination specified in CAR-ANS Part 15, MOS Attachment A, Section 3.6, MOS-AIS and the MOS-ATS. 11.2.2.2.1 and Annex 15.***

5.1.5.3 To facilitate compliance with:

(a) (Until 3 November 2021) MOS 5.1.5.1 and MOS 5.1.5.2, inspections of the movement area shall be carried out each day at least once where the code number is 1 or 2 and at least twice where the code number is 3 or 4.

*Note: — **Guidance on carrying out daily inspections of the movement area is given in the Airport Services Manual (Doc 9137), Part 8 and in the Manual of Surface Movement Guidance and Control Systems (SMGCS) (Doc 9476).***

5.1.5.3 To facilitate compliance with 5.1.5.1 and 5.1.5.2, inspections of the movement area shall be carried out each day:

(b) (As of 4 November 2021): MOS 5.1.5.1 and MOS 5.1.5.2, inspections of the movement area shall be carried out each day:

(a) (i) for the movement area, at least once where the aerodrome reference code number is 1 or 2 and at least twice where the aerodrome reference code number is 3 or 4; and

(b) (ii) for the runway(s), inspections in addition to a) whenever the runway surface conditions may have changed significantly due to meteorological conditions.

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5.1.5.4 Personnel assessing and reporting runway surface conditions required in 5.1.5.2 and 5.1.7.1 shall be trained and competent to meet criteria set by CAAP. Personnel assessing and reporting runway surface conditions required in:

(a) MOS 5.1.5.2 and 5.1.7.1 should be trained and competent to meet criteria set by CAAP (Until 3 November 2021).

Note: - Guidance on criteria is included in the Airport Services Manual (Doc 9137), Part 8, Chapter 7.

(b) MOS 5.1.5.2 and MOS 5.1.7.1 shall be trained and competent to perform their duties (As of 4 November 2021).

Note: — 1. Guidance on training of personnel is given in Attachment A, Section 6 (applicable 4 November 2021).

Note: — 2. Information on training for personnel assessing and reporting runway surface conditions is available in the PANS-Aerodromes (Doc 9981).

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5.1.7 Runway surface condition(s) for use in the runway condition report

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Water on a runway [applicable until 3 November 2021]

~~5.1.7.1 The runway surface condition shall be assessed and reported through a runway condition code (RWYCC) and a description using the following terms:~~ Whenever water is present on a runway, a description of the runway surface conditions should be made available using the following terms:

~~DRY~~

~~STANDING WATER~~

~~WET~~

~~DAMP — the surface shows a change of colour due to moisture.~~

~~WET — the surface is soaked but there is no standing water.~~

~~STANDING WATER — for aeroplane performance purposes, a runway where more than 25 per cent of the runway surface area (whether in isolated areas or not) within the required length and width being used is covered by water more than 3 mm deep.~~

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

~~*Note: — 1. The surface friction characteristics of a runway or a portion thereof can be degraded due to rubber deposits, surface polishing, poor drainage or other factors. The determination that a runway or portion thereof is slippery wet stems from various methods used solely or in combination. These methods may be functional friction measurements, using a continuous friction measuring device, that fall below a minimum standard as defined by the State, observations by aerodrome maintenance personnel, repeated reports by pilots and aircraft operators based on flight crew experience or through analysis of aeroplane stopping performance that indicates a substandard surface. Supplementary tools to undertake this assessment are described in the PANS Aerodromes (Doc 9981).*~~

~~*Note: — 2. See MOS 5.1.5.2 and 5.2.6 concerning the provision of information to, and coordination between appropriate authorities.*~~

Note: — The determination that a runway or portion thereof may be slippery when wet is not based solely on the friction measurement obtained using a continuous friction measuring device. Supplementary tools to undertake this assessment are described in the Airport Services Manual (Doc 9137), Part 2.

Runway surface condition(s) for use in the runway condition report [applicable as of 4 November 2021]

Introductory Note: — The philosophy of the runway condition report is that the aerodrome operator assesses the runway surface conditions whenever water is present on an operational runway. From this assessment, a runway condition code (RWYCC) and a description of the runway surface are reported which can be used by the flight crew for aeroplane performance calculations. This report, based on the type, depth and coverage of contaminants, is the best assessment of the runway surface condition by the aerodrome operator; however, all other pertinent information may be taken into consideration. See Attachment A, Section 6, for further details. The PANS-Aerodromes (Doc 9981) contains procedures on the use of the runway condition report and assignment of the RWYCC in accordance with the runway condition assessment matrix (RCAM).

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

DRY

STANDING WATER

WET

Note: — 1. The runway surface conditions are those conditions for which, by means of the methods described in the PANS-Aerodromes (Doc 9981), the flight crew can derive appropriate aeroplane performance.

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

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

Note: — Procedures on depth and coverage reporting are found in the PANS-Aerodromes (Doc 9981).

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

Note: — 1. The surface friction characteristics of a runway or a portion thereof can be degraded due to rubber deposits, surface polishing, poor drainage or other factors. The determination that a runway or portion thereof is slippery wet stems from various methods used solely or in combination. These methods may be functional friction measurements, using a continuous friction measuring device, that fall below a minimum standard as defined by CAAP, observations by aerodrome maintenance personnel, repeated reports by pilots and aircraft operators based on flight crew experience, or through analysis of aeroplane stopping

performance that indicates a substandard surface. Supplementary tools to undertake this assessment are described in the PANS-Aerodromes (Doc 9981).

Note: — 2. See MOS Section 5.1.5.1 and MOS 5.3 concerning the provision of information to, and coordination between, appropriate authorities.

5.1.8 Runway friction level

5.1.8.1 Notification shall be given to relevant aerodrome users when the friction level of a paved runway or portion thereof is less than the minimum friction level specified in MOS 6.2.10.

Note: - 1. ~~Guidance on determining and expressing the minimum friction level is provided in the ICAO Circular 329 — Assessment, Measurement and Reporting of Runway Surface Conditions~~ Guidance on conducting a runway surface friction characteristics evaluation programme that includes determining and expressing the minimum friction level is provided in MOS Attachment A, Section.20 (Applicable until 3 November 2021).

Note: — 2. Guidance on determining and expressing the minimum friction level is provided in Assessment, Measurement and Reporting of Runway Surface Conditions (Cir 355) (Applicable as of 4 November 2021).

Note: — 3. Procedures on conducting a runway surface friction characteristics evaluation programme are provided in the PANS-Aerodromes (Doc 9981) (Applicable as of 4 November 2021).

Note: — 4. Information to be promulgated in a NOTAM includes specifying which portion of the runway is below the minimum friction level and its location on the runway (Applicable as of 4 November 2021).

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5.2.6 5.3 Coordination between aeronautical information services and aerodrome authorities

~~5.2.6.1~~ **5.3.1** To ensure that aeronautical information services units obtain information to enable them to provide up-to-date pre-flight information and to meet the need for in-flight information, arrangements shall be made between aeronautical information services and aerodrome authorities responsible for aerodrome services to report to the responsible aeronautical information services unit, with a minimum of delay:

(a) information on the status of certification of aerodromes and aerodrome conditions (ref. MOS 3, MOS 6.7.12, MOS 5.1.5, MOS 10.7.3, MOS 14 and MOS ~~5.2.6 5.3~~ or MOS 5.1.9);

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~~5.2.6.2~~ **5.3.2** Before introducing changes to the air navigation system, due account shall be taken by the services responsible for such changes of the time needed by aeronautical information services for the preparation, production and issue of relevant material for promulgation. To ensure timely provision of the information to aeronautical information services, close coordination between those services concerned is therefore required.

~~5.2.6.3~~ **5.3.3** Of a particular importance are changes to aeronautical information that affect charts and/or computer-based navigation systems which qualify to be notified by the aeronautical information regulation and control (AIRAC) system, as specified in CAR-ANS Part 15, 15.6. The predetermined, internationally agreed AIRAC effective dates shall be

observed by the responsible aerodrome services when submitting the raw information/data to aeronautical information services.

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5.2.6.4 5.3.4 The aerodrome services responsible for the provision of raw aeronautical information/data to the aeronautical information services shall do that, while taking into account accuracy and integrity requirements necessary to meet the needs of the end-user of aeronautical data.

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5.4 Disabled aircraft removal

Note: — See 10.7.3 for information on disabled aircraft removal services.

5.4.1 The telephone/telex number(s) of the office of the aerodrome coordinator of operations for the removal of an aircraft disabled on or adjacent to the movement area should be made available, on request, to aircraft operators.

5.4.2 Information concerning the capability to remove an aircraft disabled on or adjacent to the movement area shall be published in the AIP.

Note: — The capability to remove a disabled aircraft may be expressed in terms of the largest type of aircraft which the aerodrome is equipped to remove.

5.5 Rescue and firefighting

Note: — See MOS Chapter 14 for information on rescue and firefighting services.

5.5.1 Information concerning the level of protection provided at an aerodrome for aircraft rescue and firefighting purposes shall be made available.

5.5.2 The level of protection normally available at an aerodrome should be expressed in terms of the category of the rescue and firefighting services as described in MOS Chapter 14 and in accordance with the types and amounts of extinguishing agents normally available at the aerodrome.

5.5.3 Changes in the level of protection normally available at an aerodrome for rescue and firefighting shall be notified to the appropriate air traffic service unit and aeronautical information unit to enable those units to provide the necessary information to arriving and departing aircraft. When such a change has been corrected, the above units shall be advised accordingly.

Note: — Changes in the level of protection from that normally available at the aerodrome could result from a change in the availability of extinguishing agents, equipment to deliver the agents or personnel to operate the equipment, etc.

5.5.4 A change should be expressed in terms of the new category of the rescue and firefighting service available at the aerodrome.

5.6 Visual approach slope indicator systems

5.6.1 The following information concerning a visual approach slope indicator system installation shall be made available:

(a) associated runway designation number;

(b) type of system according to 5.3.5.2. For an AT-VASIS, PAPI or APAPI installation, the side of the runway on which the lights are installed, i.e. left or right, shall be given;

(c) where the axis of the system is not parallel to the runway centre line, the angle of displacement and the direction of displacement, i.e. left or right, shall be indicated;

(d) nominal approach slope angle(s). For a T-VASIS or an AT-VASIS this shall be angle Θ according to the formula in Figure 5-18 and for a PAPI and an APAPI this shall be angle $(B + C) \div 2$ and $(A + B) \div 2$, respectively as in Figure 5-20; and

(e) minimum eye height(s) over the threshold of the on-slope signal(s). For a T-VASIS or an AT-VASIS this shall be the lowest height at which only the wing bar(s) are visible; however, the additional heights at which the wing bar(s) plus one, two or three fly-down light units come into view may also be reported if such information would be of benefit to aircraft using the approach. For a PAPI this shall be the setting angle of the third unit from the runway minus 2', i.e. angle B minus 2', and for an APAPI this shall be the setting angle of the unit farther from the runway minus 2', i.e. angle A minus 2'.

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CHAPTER 9. Aerodrome visual aids – aerodrome lighting

Section 9.1 General

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9.1.16 Commissioning of lighting systems

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9.1.16.6 For those systems specified in MOS 9.1.15.4, the aerodrome operator shall submit duly certified ground check and flight check reports to CAAP. If satisfied with the reports, CAAP will approve the issue of a permanent NOTAM. Information for a visual approach slope indicator system to be included in the permanent NOTAM is included in MOS 5.6:

~~(a) runway designation;~~

~~(b) type of system, and for AT-VASIS and PAPI systems, the side of runway, as seen by approaching pilot, that the aid is installed;~~

~~(c) where the axis of the system is not parallel to the runway centerline, the angle of displacement and the direction of displacement, i.e. left or right;~~

~~(d) approach slope; and~~

~~(e) minimum eye height over threshold, for the on-slope signal.~~

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

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Section 10.7 Aerodrome Emergency Planning

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10.7.3 Disabled aircraft removal

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~~10.7.3.2 The telephone/telex number(s) of the office of the aerodrome coordinator of operations for the removal of an aircraft disabled on or adjacent to the movement area should be made available, on request, to aircraft operators.~~

10.7.3.32 The disabled aircraft removal plan shall be based on the characteristics of the aircraft that may normally be expected to operate at the aerodrome, and include among other things:

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~~10.7.3.4 Information concerning the capability to remove an aircraft disabled on or adjacent to the movement area shall be published in the AIP.~~

~~Note: — The capability to remove a disabled aircraft may be expressed in terms of the largest type of aircraft which the aerodrome is equipped to remove.~~

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Section 10.10 Aerodrome Works Safety

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10.10.11 Runway Pavement Overlays

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10.10.11.3 ~~Where practicable, the direction of pavement overlay must~~ Overlaying should proceed from one end of the runway toward the other end so that based on runway utilization most aircraft operations will experience a down ramp.

10.10.11.4 ~~Where practicable, the~~ The entire width of the runway must be overlaid during each work session. Where the entire width of the runway cannot be overlaid during a work session, then at least the central two-third width of the runway is to be overlaid. In this case, a temporary transverse ramp of between 0.8 and 1.0 per cent must be provided between the edge of the new overlay surface and the existing runway surface or previous overlay course when the difference in level exceeds 25 mm.

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10.10.11.6 The overlay shall be constructed and maintained above the minimum friction level specified in MOS 10.15.2.3. ~~in MOS Table 10.15-1.~~

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Section 10.15 Aerodrome Maintenance

10.15.1 Maintenance Programme

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

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10.15.2 Pavements

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10.15.2.3 A paved runway shall be maintained in a condition so as to provide surface friction characteristics at or above the minimum friction level specified by CAAP.

Note: — 1. ~~ICAO Digest Circ. 329 — Assessment, Measurement and Reporting of Runway Surface Conditions contains further information on this subject, on improving surface friction characteristics of runways~~ Until 3 November 2021, the Airport Services Manual (Doc 9137), Part 2, contains further information on this subject.

Note: — 2. ~~The Airport Services Manual (Doc 9137), Part 2, contains further information on this subject, on improving surface friction characteristics of runways~~ As of 4 November 2021, Assessment, Measurement and Reporting of Runway Surface Conditions (Cir 355) contains further information on this subject.

10.15.2.4 Runway surface friction characteristics for maintenance purposes shall be periodically measured with a continuous friction measuring device using self-wetting features and documented. The frequency of these measurements shall be sufficient to determine the trend of the surface friction characteristics of the runway.

Note: — 1. ~~Guidance on evaluating the runway surface friction characteristics provided in Cir. 329— Assessment, Measurement and Reporting of Runway Surface Conditions~~ Until 3 November 2021, guidance on evaluating the friction characteristics of a runway is provided in Attachment A, Section 7. Additional guidance is included in the Airport Services Manual (Doc 9137), Part 2.

Note: — 2. As of 4 November 2021, guidance on evaluating the runway surface friction characteristics is provided in Assessment, Measurement and Reporting of Runway Surface Conditions (Cir 355).

Note: - 23. Until 3 November 2021, The objective of MOS 10.15.2.3 to 10.15.2.8 is to ensure that the surface friction characteristics for the entire runway remain at or above a minimum friction level specified by CAAP.

Note: — 4. As of 4 November 2021, the objective of MOS 10.15.2.3 to 10.15.2.8 and 10.15.2.10 is to ensure that the surface friction characteristics for the entire runway remain at or above a minimum friction level specified by CAAP.

Note: — 5. Until 3 November 2021, guidance for the determination of the required frequency is provided in MOS Attachment A, Section 3 and in the Airport Services Manual (Doc 9137), Part 2, Appendix 5.

10.15.2.5 As of 4 November 2021, When runway surface friction measurements are made for maintenance purposes using a self-wetting continuous friction measuring device, the performance of the device shall meet the standard set or agreed by CAAP.

10.15.2.6 As of 4 November 2021, Personnel measuring runway surface friction required in 10.15.2.5 shall be trained to fulfil their duties.

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~~10.15.2.8 The runway surface shall be visually assessed, as necessary, under natural or simulated rain conditions for ponding or poor drainage and where required, corrective maintenance action taken. When a taxiway is used by turbine-engined aeroplanes, the surface of the taxiway shoulders shall be maintained so as to be free of any loose stones or other objects that could be ingested by the aeroplane engines.~~

Note: — Guidance on this subject is given in the Aerodrome Design Manual (Doc 9157), Part 2.

10.15.2.8 Until 3 November 2021, when there is reason to believe that the drainage characteristics of a runway, or portions thereof, are poor due to slopes or depressions, then the runway surface friction characteristics should be assessed under natural or simulated conditions that are representative of local rain, and corrective maintenance action should be taken as necessary.

10.15.2.9 As of 4 November 2021, the runway surface should be visually assessed, as necessary, under natural or simulated rain conditions for ponding or poor drainage and where required, corrective maintenance action taken.

10.15.2.10 As of 5 November 2020, the runway surface should be visually assessed, as necessary, under natural or simulated rain conditions for ponding or poor drainage and where required, corrective maintenance action taken.

10.15.2.11 When a taxiway is used by turbine-engined aeroplanes, the surface of the taxiway shoulders should be maintained so as to be free of any loose stones or other objects that could be ingested by the aeroplane engines.

Note: — Guidance on this subject is given in the Aerodrome Design Manual (Doc 9157), Part 2.

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CHAPTER 14. Rescue and firefighting service

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Section 14.2 Level of protection

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14.2.4 See also MOS 5.5.3. ~~Changes in the level of protection normally available at an aerodrome for rescue and firefighting shall be notified to the appropriate air traffic service unit and aeronautical information unit to enable those units to provide the necessary information to arriving and departing aircraft. When such a change has been corrected, the above units shall be advised accordingly.~~

~~14.2.5 Changes to level of protection from that normally available at the aerodrome may result from changes in availability of extinguishing agents, equipment to deliver the agents or personnel to operate the equipment.~~

14.2.6 Any change shall be expressed in terms of the new category of level of protection available at the aerodrome.

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Section 14.4 Response time

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14.4.7 An aerodrome operator shall submit every three (3) months in a manner acceptable to CAAP for the following RFFS actual response time (if applicable) and response time exercises. All Duty shifts shall participate and experience the conduct of response time exercises.

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ATTACHMENT A: SUPPLEMENTARY GUIDANCE MATERIAL TO MOS

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3. Runway condition report for reporting runway surface condition

Applicable as of 4 November 2021

3.1 On a global level, movement areas are exposed to a multitude of climatic conditions and consequently a significant difference in the condition to be reported. The runway condition report (RCR) describes a basic methodology applicable for all these climatic variations and is structured in such a way that States can adjust them to the climatic conditions applicable for the CAAP or region.

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3.8 The training syllabus ~~should~~ **may** include initial and periodic recurrent training in the following areas:

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4. Runway surface evenness

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4.3 The operation of aircraft and differential settlement of surface foundations will eventually lead to increases in surface irregularities. Small deviations in the above tolerances will not seriously hamper aircraft operations. In general, isolated irregularities of the order of 2.5 cm to 3 cm over a 45 m distance are acceptable, as shown in MOS Figure A-2. Although maximum acceptable deviations vary with the type and speed of an aircraft, the limits of acceptable surface irregularities can be estimated to a reasonable extent. The following table describes acceptable, tolerable and excessive limits:

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(b) if the surface irregularities exceed the heights defined by the tolerable limit curve, but are less than the heights defined by the excessive limit curve, at the specified minimum acceptable length, herein noted by the excessive region, then maintenance corrective action is mandatory to restore the condition to the acceptable region. The runway ~~should~~ **may** remain in service but be repaired within a reasonable period. This region can lead to the risk of possible aircraft structural damage due to a single event or fatigue failure over time; and

(c) if the surface irregularities exceed the heights defined by the excessive limit curve, at the specified minimum acceptable length, herein noted by the unacceptable region, then the area of the runway where the roughness has been identified warrants closure. Repairs ~~should~~ **must** be made to restore the condition to within the acceptable limit region and the aircraft operators ~~should~~ **may** be advised accordingly. This region runs the extreme risk of a structural failure and ~~should~~ **must** be addressed immediately.

Surface Irregularity	Length of irregularity (m)								
	3	6	9	12	15	20	30	45	60
Acceptable surface irregularity height (cm)	2.9	3.8	4.5	5	5.4	5.9	6.5	8.5	10
Tolerable surface irregularity height (cm)	3.9	5.5	6.8	7.8	8.6	9.6	11	13.6	16
Excessive surface irregularity height (cm)	5.8	7.6	9.1	10	10.8	11.9	13.9	17	20

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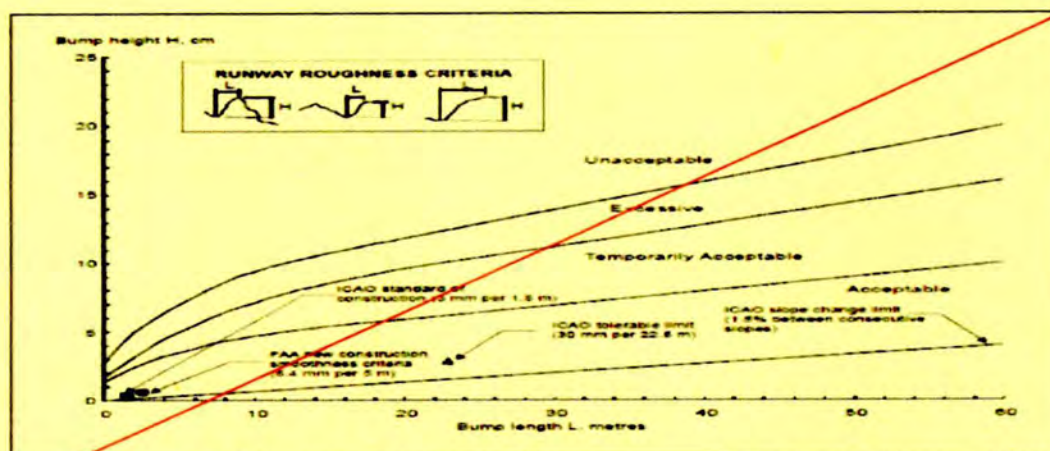


Figure A-2. Comparison of roughness criteria

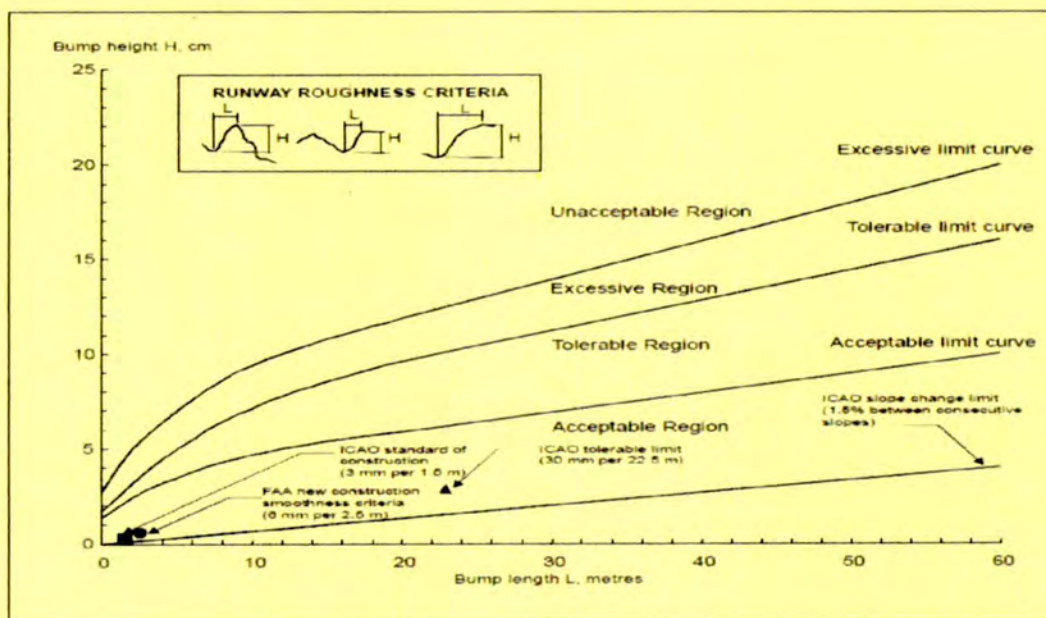


Figure A-2. Comparison of roughness criteria

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4.5 Deformation of the runway with time may also increase the possibility of the formation of water pools. Pools as shallow as approximately 3 mm in depth, particularly if they are located where they are likely to be encountered at high speed by landing aeroplanes, can induce aquaplaning, which can then be sustained on a wet runway by a much shallower depth of water. Improved guidance regarding the significant length and depth of pools relative to aquaplaning is the subject of further research.

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20. Determination of surface friction characteristics for construction and maintenance purposes

Applicable until 3 November 2021

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— END —

NEW/AMENDED REGULATION AFTER REVISION:

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CHAPTER 1. Introduction

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(d) *Contaminated runway.* A runway is contaminated when a significant portion of the runway surface area (whether in isolated areas or not) within the length and width being used is covered by one or more of the substances listed in the runway surface condition descriptors.

Note.— *Procedures on determination of contaminant coverage on runway are available in the PANS-Aerodromes (Doc 9981).*

(e) *Runway surface condition descriptors.* The element on the surface of the runway:

Note: - *The description for standing water below, is used solely in the context of the runway condition report and is not intended to supersede or replace any existing WMO definitions.*

i) *Standing water.* Water of depth greater than 3 mm.

Note: — *Running water of depth greater than 3 mm is reported as standing water by convention.*

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§ Applicable as of 4 November 2021

Section 1.6 Certification of Aerodromes

Note: — *The intent of these specifications is to ensure that compliance with the specifications in the MOS can be effectively enforced. The most effective and transparent means of ensuring compliance with applicable specifications is the availability of a separate safety oversight entity and a well-defined safety oversight mechanism with support of appropriate legislation to be able to carry out the function of safety regulation of aerodromes. When an aerodrome is granted a certificate, it signifies to aircraft operators and other organizations operating on the aerodrome that, at the time of certification, the aerodrome meets the specifications regarding the facility and its operation, and that it has the capability to maintain these specifications for the period of validity of the certificate. The certification process also establishes the baseline for continued monitoring of compliance with the specifications. Information on the status of certification of aerodromes need to be provided to CAAP-AIS for promulgation in the Aeronautical Information Publication (AIP). See MOS 5.3.1 and PANS-AIM (Doc 10066), Appendix 2, AD 1.5.*

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CHAPTER 5. Aerodrome information for AIP

Section 5.1 General

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5.1.5 Condition of the movement area and related facilities

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5.1.5.2 The condition of the movement area and the operational status of related facilities shall be monitored and reports on matters of operational significance affecting aircraft and aerodrome operations shall be provided in order to take appropriate action, particularly in respect of the following:

...

(c) water on a runway, a taxiway or an apron; *[applicable 4 November 2021]*

...

(g) failure of the normal or secondary power supply.

Note: — 1. Until 3 November 2021, other contaminants may include mud, dust, sand, volcanic ash, oil and rubber. PCARs 8.7, Attachment B provides guidance on the description of runway surface conditions. Additional guidance is included in the Airport Services Manual (Doc 9137), Part 2.

Note: — 2. As of 4 November 2021, other contaminants may include mud, dust, sand, volcanic ash, oil and rubber. Procedures for monitoring and reporting the conditions of the movement area are included in the PANS-Aerodromes (Doc 9981).

Note: — 3. As of 4 November 2021, the Aeroplane Performance Manual (Doc 10064) provides guidance on aircraft performance calculation requirements regarding description of runway surface conditions in MOS 5.1.5.2 c) and d).

Note: — 4. As of 4 November 2021, origin and evolution of data, assessment process and the procedures are prescribed in the PANS-Aerodromes (Doc 9981). These procedures are intended to fulfil the requirements to achieve the desired level of safety for aeroplane operations prescribed by PCAR Part 8 and PCAR Part 5 and to provide the information fulfilling the syntax requirements for dissemination specified in CAR-ANS Part 15, MOS-AIS and the MOS-ATS.

5.1.5.3 To facilitate compliance with:

(a) (Until 3 November 2021) MOS 5.1.5.1 and MOS 5.1.5.2, inspections of the movement area shall be carried out each day at least once where the code number is 1 or 2 and at least twice where the code number is 3 or 4.

Note: — Guidance on carrying out daily inspections of the movement area is given in the Airport Services Manual (Doc 9137), Part 8 and in the Manual of Surface Movement Guidance and Control Systems (SMGCS) (Doc 9476).

(b) (As of 4 November 2021): MOS 5.1.5.1 and MOS 5.1.5.2, inspections of the movement area shall be carried out each day:

(i) for the movement area, at least once where the aerodrome reference code number is 1 or 2 and at least twice where the aerodrome reference code number is 3 or 4; and

(ii) for the runway(s), inspections in addition to a) whenever the runway surface conditions may have changed significantly due to meteorological conditions.

...

5.1.5.4 Personnel assessing and reporting runway surface conditions required in:

(a) MOS 5.1.5.2 and 5.1.7.1 should be trained and competent to meet criteria set by CAAP (Until 3 November 2021).

Note: — Guidance on criteria is included in the Airport Services Manual (Doc 9137), Part 8, Chapter 7.

(b) MOS 5.1.5.2 and MOS 5.1.7.1 shall be trained and competent to perform their duties (As of 4 November 2021).

Note: — 1. Guidance on training of personnel is given in Attachment A, Section 6 (applicable 4 November 2021).

Note: — 2. Information on training for personnel assessing and reporting runway surface conditions is available in the PANS-Aerodromes (Doc 9981).

...

5.1.7 Runway surface condition(s) for use in the runway condition report

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Water on a runway [applicable until 3 November 2021]

5.1.7.1 Whenever water is present on a runway, a description of the runway surface conditions should be made available using the following terms:

DAMP — the surface shows a change of colour due to moisture.

WET — the surface is soaked but there is no standing water.

STANDING WATER — for aeroplane performance purposes, a runway where more than 25 per cent of the runway surface area (whether in isolated areas or not) within the required length and width being used is covered by water more than 3 mm deep.

...

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

Note: — The determination that a runway or portion thereof may be slippery when wet is not based solely on the friction measurement obtained using a continuous friction measuring device. Supplementary tools to undertake this assessment are described in the Airport Services Manual (Doc 9137), Part 2.

Runway surface condition(s) for use in the runway condition report [applicable as of 4 November 2021]

Introductory Note: — The philosophy of the runway condition report is that the aerodrome operator assesses the runway surface conditions whenever water is present on an operational runway. From this assessment, a runway condition code (RWYCC) and a description of the runway surface are reported which can be used by the flight crew for aeroplane performance calculations. This report, based on the type, depth and coverage of contaminants, is the best assessment of the runway surface condition by the aerodrome operator; however, all other pertinent information may be taken into consideration. See Attachment A, Section 6, for further details. The PANS-Aerodromes (Doc 9981) contains procedures on the use of the runway condition report and assignment of the RWYCC in accordance with the runway condition assessment matrix (RCAM).

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

DRY

STANDING WATER

WET

Note: — 1. The runway surface conditions are those conditions for which, by means of the methods described in the PANS-Aerodromes (Doc 9981), the flight crew can derive appropriate aeroplane performance.

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

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

Note: — Procedures on depth and coverage reporting are found in the PANS-Aerodromes (Doc 9981).

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

Note: — 1. The surface friction characteristics of a runway or a portion thereof can be degraded due to rubber deposits, surface polishing, poor drainage or other factors. The determination that a runway or portion thereof is slippery wet stems from various methods used solely or in combination. These methods may be functional friction measurements, using a continuous friction measuring device, that fall below a minimum standard as defined by CAAP, observations by aerodrome maintenance personnel, repeated reports by pilots and aircraft operators based on flight crew experience, or through analysis of aeroplane stopping performance that indicates a substandard surface. Supplementary tools to undertake this assessment are described in the PANS-Aerodromes (Doc 9981).

Note: — 2. See MOS Section 5.1.5.1 and MOS 5.3 concerning the provision of information to, and coordination between, appropriate authorities.

5.1.8 Runway friction level

5.1.8.1 Notification shall be given to relevant aerodrome users when the friction level of a paved runway or portion thereof is less than the minimum friction level specified in MOS 6.2.10.

Note: — 1. Guidance on conducting a runway surface friction characteristics evaluation programme that includes determining and expressing the minimum friction level is provided in MOS Attachment A, Section.20 (Applicable until 3 November 2021).

Note: — 2. Guidance on determining and expressing the minimum friction level is provided in Assessment, Measurement and Reporting of Runway Surface Conditions (Cir 355) (Applicable as of 4 November 2021).

Note: — 3. Procedures on conducting a runway surface friction characteristics evaluation programme are provided in the PANS-Aerodromes (Doc 9981) (Applicable as of 4 November 2021).

Note: — 4. Information to be promulgated in a NOTAM includes specifying which portion of the runway is below the minimum friction level and its location on the runway (Applicable as of 4 November 2021).

...

5.3 Coordination between aeronautical information services and aerodrome authorities

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

(a) information on the status of certification of aerodromes and aerodrome conditions (ref. MOS 3, MOS 6.7.12, MOS 5.1.5, MOS 10.7.3, MOS 14 and MOS 5.3 or MOS 5.1.9);

...

5.3.2 Before introducing changes to the air navigation system, due account shall be taken by the services responsible for such changes of the time needed by aeronautical information services for the preparation, production and issue of relevant material for promulgation. To ensure timely provision of the information to aeronautical information services, close coordination between those services concerned is therefore required.

5.3.3 Of a particular importance are changes to aeronautical information that affect charts and/or computer-based navigation systems which qualify to be notified by the aeronautical information regulation and control (AIRAC) system, as specified in CAR-ANS Part 15, 15.6. The predetermined, internationally agreed AIRAC effective dates shall be observed by the responsible aerodrome services when submitting the raw information/data to aeronautical information services.

...

5.3.4 The aerodrome services responsible for the provision of raw aeronautical information/data to the aeronautical information services shall do that, while taking into account accuracy and integrity requirements necessary to meet the needs of the end-user of aeronautical data.

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5.4 Disabled aircraft removal

Note: — See 10.7.3 for information on disabled aircraft removal services.

5.4.1 The telephone/telex number(s) of the office of the aerodrome coordinator of operations for the removal of an aircraft disabled on or adjacent to the movement area should be made available, on request, to aircraft operators.

5.4.2 Information concerning the capability to remove an aircraft disabled on or adjacent to the movement area shall be published in the AIP.

Note: — The capability to remove a disabled aircraft may be expressed in terms of the largest type of aircraft which the aerodrome is equipped to remove.

5.5 Rescue and firefighting

Note: — See MOS Chapter 14 for information on rescue and firefighting services.

5.5.1 Information concerning the level of protection provided at an aerodrome for aircraft rescue and firefighting purposes shall be made available.

5.5.2 The level of protection normally available at an aerodrome should be expressed in terms of the category of the rescue and firefighting services as described in MOS Chapter 14 and in

accordance with the types and amounts of extinguishing agents normally available at the aerodrome.

5.5.3 Changes in the level of protection normally available at an aerodrome for rescue and firefighting shall be notified to the appropriate air traffic service unit and aeronautical information unit to enable those units to provide the necessary information to arriving and departing aircraft. When such a change has been corrected, the above units shall be advised accordingly.

Note: — Changes in the level of protection from that normally available at the aerodrome could result from a change in the availability of extinguishing agents, equipment to deliver the agents or personnel to operate the equipment, etc.

5.5.4 A change should be expressed in terms of the new category of the rescue and firefighting service available at the aerodrome.

5.6 Visual approach slope indicator systems

5.6.1 The following information concerning a visual approach slope indicator system installation shall be made available:

- (a) associated runway designation number;
- (b) type of system according to 5.3.5.2. For an AT-VASIS, PAPI or APAPI installation, the side of the runway on which the lights are installed, i.e. left or right, shall be given;
- (c) where the axis of the system is not parallel to the runway centre line, the angle of displacement and the direction of displacement, i.e. left or right, shall be indicated;
- (d) nominal approach slope angle(s). For a T-VASIS or an AT-VASIS this shall be angle Θ according to the formula in Figure 5-18 and for a PAPI and an APAPI this shall be angle $(B + C) \div 2$ and $(A + B) \div 2$, respectively as in Figure 5-20; and
- (e) minimum eye height(s) over the threshold of the on-slope signal(s). For a T-VASIS or an AT-VASIS this shall be the lowest height at which only the wing bar(s) are visible; however, the additional heights at which the wing bar(s) plus one, two or three fly-down light units come into view may also be reported if such information would be of benefit to aircraft using the approach. For a PAPI this shall be the setting angle of the third unit from the runway minus 2', i.e. angle B minus 2', and for an APAPI this shall be the setting angle of the unit farther from the runway minus 2', i.e. angle A minus 2'.

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CHAPTER 9. Aerodrome visual aids – aerodrome lighting

Section 9.1 General

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9.1.16 Commissioning of lighting systems

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9.1.16.6 For those systems specified in MOS 9.1.15.4, the aerodrome operator shall submit duly certified ground check and flight check reports to CAAP. If satisfied with the reports, CAAP will approve the issue of a permanent NOTAM. Information for a visual approach slope indicator system to be included in the permanent NOTAM is included in MOS 5.6:

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

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Section 10.7 Aerodrome Emergency Planning

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10.7.3 Disabled aircraft removal

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10.7.3.2 The disabled aircraft removal plan shall be based on the characteristics of the aircraft that may normally be expected to operate at the aerodrome, and include among other things:

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Section 10.10 Aerodrome Works Safety

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10.10.11 Runway Pavement Overlays

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10.10.11.3 Overlaying should proceed from one end of the runway toward the other end so that based on runway utilization most aircraft operations will experience a down ramp.

10.10.11.4 The entire width of the runway must be overlaid during each work session. Where the entire width of the runway cannot be overlaid during a work session, then at least the central two-third width of the runway is to be overlaid. In this case, a temporary transverse ramp of between 0.8 and 1.0 per cent must be provided between the edge of the new overlay surface and the existing runway surface or previous overlay course when the difference in level exceeds 25 mm.

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10.10.11.6 The overlay shall be constructed and maintained above the minimum friction level specified in MOS 10.15.2.3.

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Section 10.15 Aerodrome Maintenance

10.15.1 Maintenance Programme

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

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10.15.2 Pavements

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10.15.2.3 A paved runway shall be maintained in a condition so as to provide surface friction characteristics at or above the minimum friction level specified by CAAP.

Note: — 1. Until 3 November 2021, the Airport Services Manual (Doc 9137), Part 2, contains further information on this subject.

Note: — 2. As of 4 November 2021, Assessment, Measurement and Reporting of Runway Surface Conditions (Cir 355) contains further information on this subject.

10.15.2.4 Runway surface friction characteristics for maintenance purposes shall be periodically measured with a continuous friction measuring device using self-wetting features and documented. The frequency of these measurements shall be sufficient to determine the trend of the surface friction characteristics of the runway.

Note: — 1. Until 3 November 2021, guidance on evaluating the friction characteristics of a runway is provided in Attachment A, Section 7. Additional guidance is included in the Airport Services Manual (Doc 9137), Part 2.

Note: — 2. As of 4 November 2021, guidance on evaluating the runway surface friction characteristics is provided in Assessment, Measurement and Reporting of Runway Surface Conditions (Cir 355).

Note: — 3. Until 3 November 2021, the objective of MOS 10.15.2.3 to 10.15.2.8 is to ensure that the surface friction characteristics for the entire runway remain at or above a minimum friction level specified by CAAP.

Note: — 4. As of 4 November 2021, the objective of MOS 10.15.2.3 to 10.15.2.8 and 10.15.2.10 is to ensure that the surface friction characteristics for the entire runway remain at or above a minimum friction level specified by CAAP.

Note: — 5. Until 3 November 2021, guidance for the determination of the required frequency is provided in MOS Attachment A, Section 3 and in the Airport Services Manual (Doc 9137), Part 2, Appendix 5.

10.15.2.5 As of 4 November 2021, when runway surface friction measurements are made for maintenance purposes using a self-wetting continuous friction measuring device, the performance of the device shall meet the standard set or agreed by CAAP.

10.15.2.6 As of 4 November 2021, personnel measuring runway surface friction required in 10.15.2.5 shall be trained to fulfil their duties.

...

10.15.2.8 Until 3 November 2021, when there is reason to believe that the drainage characteristics of a runway, or portions thereof, are poor due to slopes or depressions, then the runway surface friction characteristics should be assessed under natural or simulated conditions that are representative of local rain, and corrective maintenance action should be taken as necessary.

10.15.2.9 As of 4 November 2021, the runway surface should be visually assessed, as necessary, under natural or simulated rain conditions for ponding or poor drainage and where required, corrective maintenance action taken.

10.15.2.10 As of 5 November 2020, the runway surface should be visually assessed, as necessary, under natural or simulated rain conditions for ponding or poor drainage and where required, corrective maintenance action taken.

10.15.2.11 When a taxiway is used by turbine-engined aeroplanes, the surface of the taxiway shoulders should be maintained so as to be free of any loose stones or other objects that could be ingested by the aeroplane engines.

Note: — Guidance on this subject is given in the Aerodrome Design Manual (Doc 9157), Part 2.

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CHAPTER 14. Rescue and firefighting service

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Section 14.2 Level of protection

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14.2.4 See also MOS 5.5.3.

14.2.5 Any change shall be expressed in terms of the new category of level of protection available at the aerodrome.

...

Section 14.4 Response time

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14.4.7 An aerodrome operator shall submit every three (3) months in a manner acceptable to CAAP for the following RFFS actual response time (if applicable) and response time exercises. All Duty shifts shall participate and experience the conduct of response time exercises.

...

ATTACHMENT A: SUPPLEMENTARY GUIDANCE MATERIAL TO MOS

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3. Runway condition report for reporting runway surface condition

Applicable as of 4 November 2021

3.1 On a global level, movement areas are exposed to a multitude of climatic conditions and consequently a significant difference in the condition to be reported. The runway condition report (RCR) describes a basic methodology applicable for all these climatic variations and is structured in such a way that States can adjust them to the climatic conditions applicable for CAAP or region.

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3.8 The training syllabus may include initial and periodic recurrent training in the following areas:

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4. Runway surface evenness

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4.3 The operation of aircraft and differential settlement of surface foundations will eventually lead to increases in surface irregularities. Small deviations in the above tolerances will not seriously hamper aircraft operations. In general, isolated irregularities of the order of 2.5 cm to 3 cm over a 45 m distance are acceptable, as shown in MOS Figure A-2. Although maximum acceptable deviations vary with the type and speed of an aircraft, the limits of acceptable surface irregularities can be estimated to a reasonable extent. The following table describes acceptable, tolerable and excessive limits:

...

(b) if the surface irregularities exceed the heights defined by the tolerable limit curve, but are less than the heights defined by the excessive limit curve, at the specified minimum acceptable length, herein noted by the excessive region, then maintenance corrective action is mandatory to restore the condition to the acceptable region. The runway may remain in service but be repaired within a reasonable period. This region can lead to the risk of possible aircraft structural damage due to a single event or fatigue failure over time; and

(c) if the surface irregularities exceed the heights defined by the excessive limit curve, at the specified minimum acceptable length, herein noted by the unacceptable region, then the area of the runway where the roughness has been identified warrants closure. Repairs must be made to restore the condition to within the acceptable limit region and the aircraft operators may be advised accordingly. This region runs the extreme risk of a structural failure and must be addressed immediately.

Surface Irregularity	Length of irregularity (m)								
	3	6	9	12	15	20	30	45	60
Acceptable surface irregularity height (cm)	2.9	3.8	4.5	5	5.4	5.9	6.5	8.5	10

Tolerable surface irregularity height (cm)	3.9	5.5	6.8	7.8	8.6	9.6	11	13.6	16
Excessive surface irregularity height (cm)	5.8	7.6	9.1	10	10.8	11.9	13.9	17	20

...

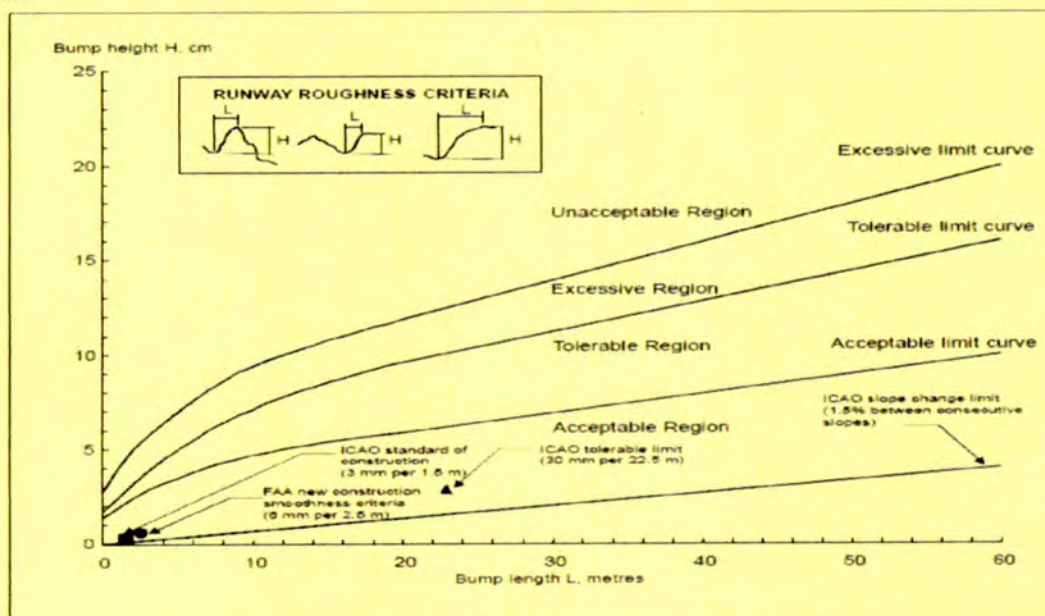


Figure A-2. Comparison of roughness criteria

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4.5 Deformation of the runway with time may also increase the possibility of the formation of water pools. Pools as shallow as approximately 3 mm in depth, particularly if they are located where they are likely to be encountered at high speed by landing aeroplanes, can induce aquaplaning, which can then be sustained on a wet runway by a much shallower depth of water. Improved guidance regarding the significant length and depth of pools relative to aquaplaning is the subject of further research.

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20. Determination of surface friction characteristics for construction and maintenance purposes

Applicable until 3 November 2021

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“End of Amendment”

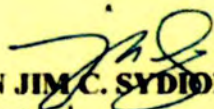
- i. ***Separability Clause.*** - If, for any reason, any provision of this Memorandum Circular is declared invalid or unconstitutional, the other part or parts thereof which are not affected thereby shall continue to be in full force and effect.
- ii. ***Repealing Clause.*** - All orders, rules, regulations 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 the Manual of Standards for Aerodromes in the next regular Amendment Cycle.

So Ordered. Signed this 01 day of JULY 2021, at the Civil Aviation Authority of the Philippines, MIA Road, Pasay City, Metro Manila, 1301.


CAPTAIN JIM C. SYDDIONGCO
Director General