

# Directorate General of Civil Aviation Aviation Safety Department

Guidance Material

Document Number 1447

## Global Reporting Format for Runway Surface Condition

ISSUE 01, REVISION 0,

OCTOBER 2021

## Forward

The Aviation Safety Department guidance material is published to keep pace with the guidelines prescribed by ICAO documents and publications. The objective of this guidance material is to assist the airport's staff in using the Global Reporting Format (GRF) to enhance safety and fulfill the obligations to comply with the published KCASRs.

## Scope

This document is intended to provide guidance for aerodrome operators and other stakeholders involved in GRFs.



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## Table of Amendments

Amendment /Revision No.	Date of Issue	Remarks
0	October 2021	New Guidance Material

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## Purpose

The Global Reporting Format (GRF) aims to mitigate the risk of runway excursions by enabling Aerodromes Operators to assess and report the surface conditions of a runway and a correspondingly improved flight crew assessment of take-off and landing performance.

- **Other purposes:**
  - Enhance safety for aircraft operating on wet and contaminated runways
  - Significantly reduce the risks associated with runway contamination

## Applicability

The applicability date for the Global Reporting Format (GRF) is the 4<sup>th</sup> of November, 2021. It is implemented when contaminants are present on a runway.

## Definitions

**Global Reporting Format (GRF):** is a harmonized and an objective methodology for assessing and reporting runway surface conditions in all climates. It is a consistent and standardized format from all airports.

**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. It allows flight crew to interpret the runway conditions in a standardized format and make calculations about how the aircraft will perform in those conditions.

**Runway Condition Report (RCR):** A comprehensive standardized report relating to runway surface conditions and its effect on the aircraft 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 aircraft performance purposes.

**Runway Excursion:** A veer off or overrun off the runway surface and can occur during take-off or landing.

**Dry Runway:** A runway is considered dry if its surface is free of visible moisture and not contaminated within the area intended to be used. **RWYCC = 6**

**Wet Runway:** The runway surface is covered by any visible dampness or water up to and including 3 mm deep within the intended area of use. **RWYCC = 5**

**Slippery Wet Runway:** A wet runway where the surface friction characteristics of a significant portion of the runway have been determined to be degraded. **RWYCC = 3**

**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.

## Abbreviations

<b>AIC</b>	Aeronautical information circular
<b>AIP</b>	Aeronautical information publication
<b>ATC</b>	Air traffic control
<b>ATIS</b>	Automatic terminal information service
<b>PANS</b>	Procedures for Air Navigation Services
<b>RCAM</b>	Runway condition assessment matrix
<b>RCR</b>	Runway condition report
<b>RWYCC</b>	Runway condition code
<b>GRF</b>	Global Reporting Format

### Important Notes:

- The **GRF** is an evaluation by **trained personnel** who complete a runway condition report (RCR).
- **A simplified RCAM** is published for airports that never experience snow or ice conditions (such as Kuwait). It gives information for DRY and WET conditions only.
- **There are four runway surface conditions in the RCAM:** Dry/Wet/Slippery Wet/Contaminated.
- **A runway condition code (RWYCC) is assigned for each third of the runway, which is a combination or result of** Type of Contamination + Depth of Contamination + Outside Temperature.

## References

KCASR 14 Volume I

ICAO Circular 355

ICAO Annex 14, Volume 1

ICAO Airport Services Manual (Doc 9137)

ICAO Aerodrome Design Manual (Doc 9157)

ICAO Manual of Surface Movement Guidance and Control Systems (SMGCS) (Doc 9476)

ICAO Advanced Surface Movement Guidance and Control Systems (A-SMGCS) Manual (9830)

ICAO PANS-Aerodromes (Doc 9981)



## GENERAL

### 1. Runway Surface Condition(s)

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

1. DRY
2. STANDING WATER
3. WET

*Note 1: The conditions, either individually or in combination with other observations, are criteria for which the effect on aircraft performance is sufficiently deterministic to allow assignment of a specific runway condition code.*

Runway Condition Assessment Matrix (Source: Doc 9981) - WET and DRY only

Runway condition assessment matrix (RCAM)			
Assessment criteria		Downgrade assessment criteria	
Runway condition code	Runway surface description	Aeroplane deceleration or directional control observation	Pilot report of runway braking action
6	• DRY	---	---
5	• WET (The runway surface is covered by any visible dampness or water up to and including 3 mm depth)	Braking deceleration is normal for the wheel braking effort applied AND directional control is normal.	GOOD
4		Braking deceleration OR directional control is between Good and Medium.	GOOD TO MEDIUM
3	• WET ("slippery wet" runway)	Braking deceleration is noticeably reduced for the wheel braking effort applied OR directional control is noticeably reduced.	MEDIUM
2	More than 3 mm depth of water: • STANDING WATER	Braking deceleration OR directional control is between Medium and Poor.	MEDIUM TO POOR
1		Braking deceleration is significantly reduced for the wheel braking effort applied OR directional control is significantly reduced.	POOR
0		Braking deceleration is minimal to non-existent for the wheel braking effort applied OR directional control is uncertain.	LESS THAN POOR

Note: - A RWYCC 5,4,3 or 2 cannot be upgraded.

Figure 1. Runway Condition Assessment Matrix

**Note:** Runway Condition Assessment Matrix for reasons of simplicity reduced to wet and dry aerodromes only, as winter conditions do not apply to aerodromes in the State of Kuwait. For complete table including winter conditions refer to PANS-Aerodromes, Doc 9981.

## 2. Reporting

a) The aerodrome operator shall disseminate a RCR through the aeronautical information services and air traffic services, when the runway is wholly or partly contaminated by standing water. When the runway is wet, not associated with the presence of standing water the assessed information shall be disseminated using the RCR through the air traffic services only.

b) Reporting, in compliance with the runway condition report, shall commence when a significant change in runway surface condition occurs due to water.

c) Reporting of the runway surface condition shall continue to reflect significant changes until the runway is no longer contaminated. When this occurs, the aerodrome shall issue a runway condition report that states the runway is wet or dry as appropriate.

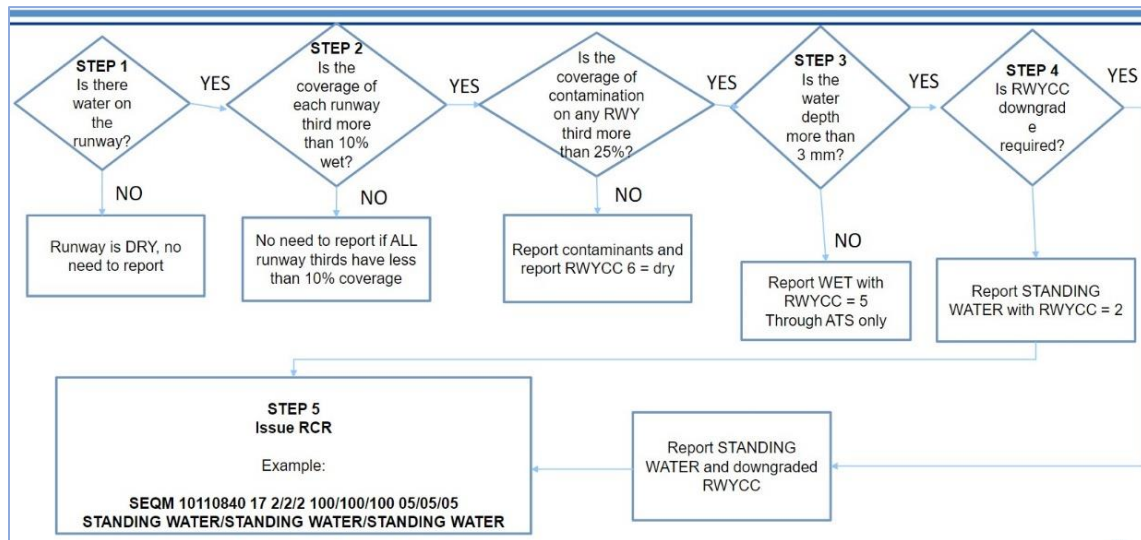


Figure 2. Runway Condition Report (RCR) Format and Structure

## 3. Runway Condition Code

a) The RWYCC shall be reported for each third of the runway assessed.

b) The assessment process shall include:

1. Assessing and reporting the condition of the movement area;
2. Providing the assessed information in the correct format; and
3. Reporting significant changes without delay.

c) The information to be reported shall be compliant with the RCR which consists:

1. Aircraft performance calculation sections; and
2. Situational awareness section.

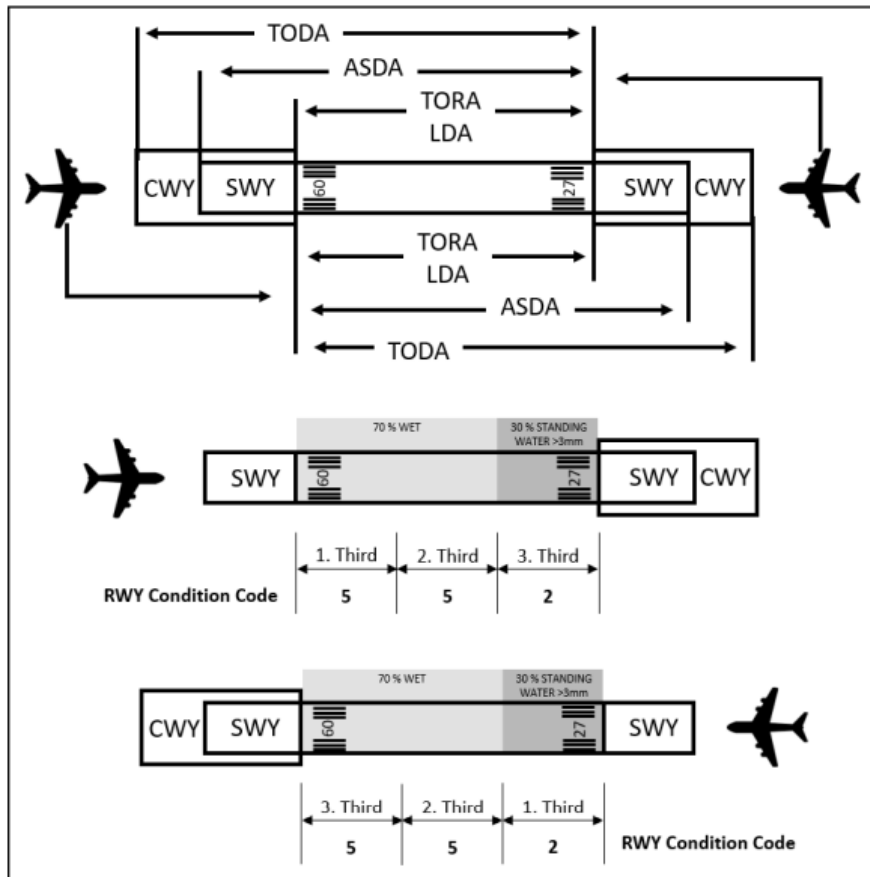


Figure 3. Reporting of RWYCC from Air Traffic Services to Flight Crew for Runway Thirds

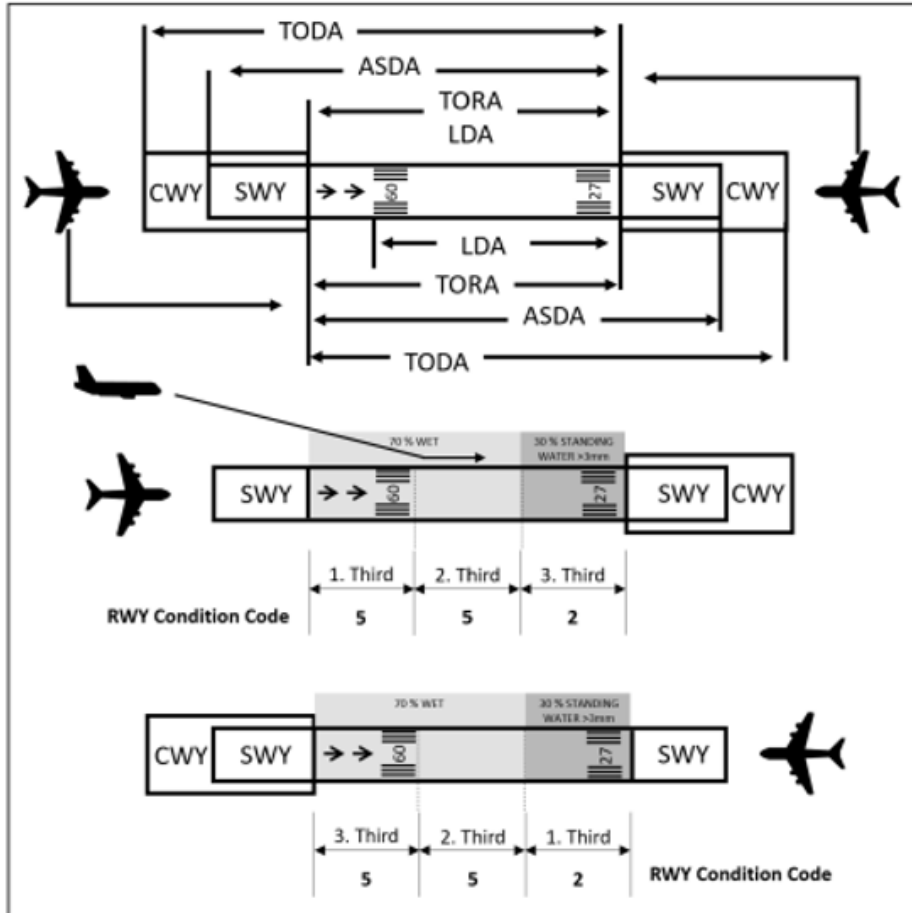


Figure 4. Reporting of RWYCC for Runway Thirds from Air Traffic Services to Flight Crew on a Runway with Displaced Threshold

d) The information shall be included in an information string in the following order using only AIS compatible characters in a Runway Condition Report. The Runway Condition Report consist of the:

1. Aircraft performance calculation sections:

- i) aerodrome location indicator;
- ii) date and time of assessment;
- iii) lower runway designation number;
- iv) RWYCC for each runway third;
- v) percentage of coverage contaminant for each runway third;

Table 1. Percentage of Coverage for Contaminants

<i>Assessed per cent</i>	<i>Reported per cent</i>
10 – 25	25
26 – 50	50
51 – 75	75
76 – 100	100

If Coverage is  $\geq 10\%$  for at least one third of the runway, Runway is Contaminated.

If Coverage is  $< 10\%$  for each runway third, Runway is considered not contaminated

Where % coverage is not being reported, enter NR.

- vi) depth of loose contaminant for each runway third;
- vii) condition description for each runway third; and
- viii) width of runway to which the RWYCCs apply if less than published width.

2. situational awareness section:

- i) reduced runway length;
- ii) taxiway conditions;
- iii) apron conditions;
- iv) plain language remarks.

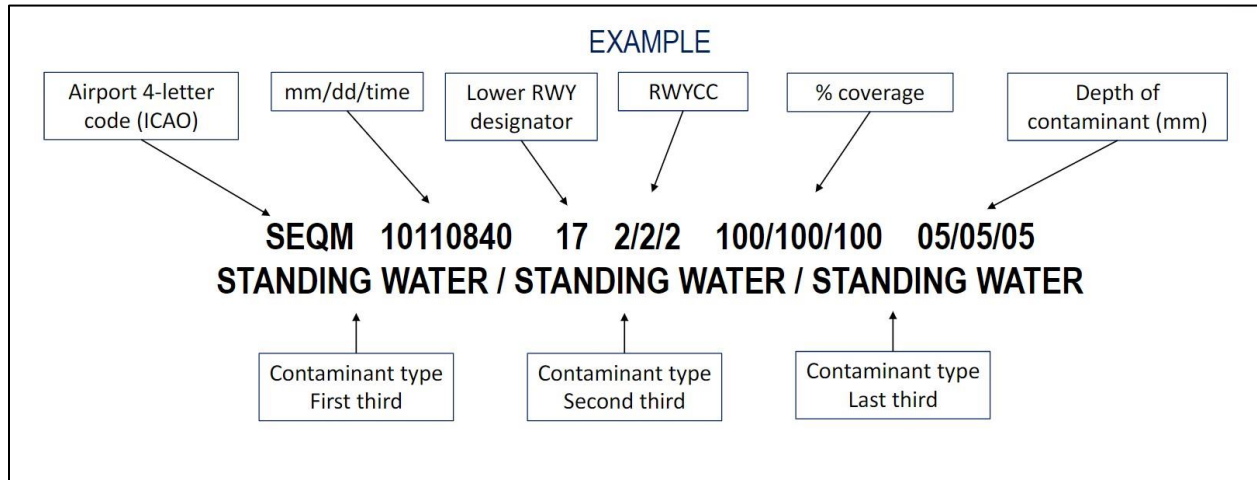


Figure 5. Runway Condition Report (RCR)

e) For aerodromes with multiple runways the aircraft performance section for each individual runway shall be reported from the date and time of the assessment for each runway before the information in the situational awareness section (see d) 1. - items ii – viii above).

f) The syntax requirement shall be strictly adhered to when provided the assessed information through the RCR.

**Note 1:** Elements in the situational awareness section should end with a full stop.

**Note 2:** Elements in the situational awareness section for which no information exists, or where the conditional circumstances for publication are not fulfilled, should be left out completely.

## 4. Contamination

### 4.1 General Contamination Assessment method

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)*

### 4.2 Single and Multiple Contaminants

When single or multiple contaminants are present, the RWYCC for any third of the runway is determined as follows:

a) When the runway third contains a single contaminant, the RWYCC for that third is based directly on that contaminant in the RCAM as follows:

- i. If the contaminant coverage for that third is less than 10 per cent, a RWYCC 6 is to be generated for that third, and no contaminant is to be reported. If all thirds have less than 10 per cent contaminant coverage, no report is generated; or
- ii. If the contaminant coverage for that third is greater than or equal to 10 per cent and less than or equal to 25 per cent, a RWYCC 6 is to be generated for that third and the contaminant reported at 25 per cent coverage; or
- iii. If the contaminant coverage for that third is greater than 25 per cent, the RWYCC for that third is based on the contaminant present.

b) If multiple contaminants are present where the total coverage is more than 25 per cent but no single contaminant covers more than 25 per cent of any runway third, the RWYCC is based upon the judgement of the runway inspector, considering what contaminant will most likely be encountered by the aircraft and its likely effect on the aircraft's performance. Typically, this would be the most widespread contaminant, but this is not an absolute.

c) The structure of the RCAM is ranging the contaminants in the column 'Runway surface description' from top to bottom and is having the most slippery contaminants at the bottom. However, this ranging is not an absolute, as the RCAM by design is landing oriented and if judged in a take-off scenario, the ranging could be different due to drag effects of loose contaminants.



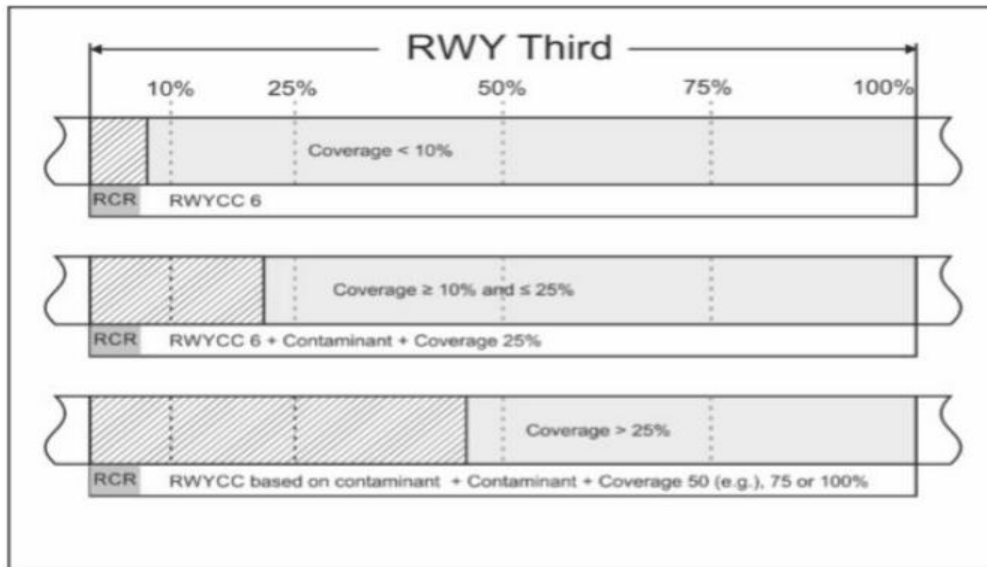


Figure 6. Single Contaminants Reporting Format

## 5. Slippery Runway Information

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. The Assessment on Runway Friction Characteristics, observations by aerodrome maintenance personnel, repeated reports by pilots and aircraft operators based on flight crew experience, or through analysis of aircraft stopping performance that indicates a substandard surface. Supplementary tools to undertake this assessment are described in PANS Aerodromes (Doc 9981).

**Note 2:** Guidance on conducting a runway surface friction characteristics evaluation programme that includes determining and expressing the minimum friction level is provided in ICAO Annex 14, Volume 1, Attachment A, Section 7. 4.11.4.5

## 6. Pavement Maintenance Programme

- a) The surfaces of all Movement Areas including pavements (runways, taxiways and aprons) and adjacent areas shall be inspected and their condition monitored regularly as part of an aerodrome preventive and corrective maintenance programme with the objective of avoiding and eliminating any foreign object debris that might cause damage to aircraft or impair the operation of aircraft systems.

*Note 1: Guidance on carrying out daily inspections of the Movement Area is given in given in the ICAO Airport Services Manual (Doc 9137), Part 8, the Manual of Surface Movement Guidance and Control Systems (SMGCS) (Doc 9476) and the ICAO Advanced Surface Movement Guidance and Control Systems (A-SMGCS) Manual (Doc 9830).*

*Note 2: Additional guidance on sweeping/cleaning of surfaces is contained in the Airport Services Manual (ICAO Doc 9137), Part 9.*

*Note 3: Guidance on precautions to be taken in regard to the surface of shoulders is given in ICAO, Annex 14, Volume 1, Attachment A, Section 8, and the ICAO Aerodrome Design Manual (Doc 9157), Part 2.*

- b) The surface of a runway shall be maintained in a condition such as to preclude formation of harmful irregularities.

*Note: See ICAO Annex 14, Volume 1, Attachment A, Section 5 4.16.6.3 When a taxiway is used by jet turbine powered aircrafts, 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 aircraft engines.*

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

## 7. Pavement Surface Inspections

All pavements within the Movement Area shall be subject to inspection and evaluation by appropriate and competent pavement engineers for the preparation/upkeep of a pavement management system and maintenance schedule. These detailed pavement inspections shall be undertaken at least once a year.

## 8. Runway Surface Friction

- a) A paved runway shall be maintained in a condition so as to provide surface friction characteristics at or above the Minimum Friction Level.

*Note 1: Guidance on evaluating the friction characteristics of a runway is provided in the ICAO Airport Services Manual (Doc 9137), Part 2, contain further information on this subject, on improving surface friction characteristics of runways.*

*Note 2: Guidance for the determination of the required frequency is provided in ICAO Annex 14, Volume 1, Attachment A, Section 7 and in the ICAO Airport Services Manual (Doc 9137), Part 2, Appendix 5.*

*Note 3: Corrective maintenance action shall be taken to prevent the runway surface friction characteristics for any portion thereof from falling below Minimum Friction Level.*

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**End**