NAMIBIA CIVIL AVIATION AUTHORITY

Advisory Pamphlet (AP)

FSS-AGA-AP139/14

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Assessment, Measurement and Reporting of Runway Surface Conditions

Explanation of Advisory Pamphlets (AP) system.

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Advisory Pamphlets are intended to provide information and guidance to illustrate a means but not necessarily the only means of complying with the Regulations, or to explain certain Regulatory requirements by providing interpretative and explanatory material. Where an AP is referred to in a 'Note' below the regulation, the AP remains as guidance material.

APs should always be read in conjunction with the referenced regulations.

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2. ***Effective date:*** _____

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1. INTRODUCTION

1.1. Introduction

NAMCARs, Part 139 requires an Aerodrome Operator to establish and implement the Global Reporting Format (GRF) for runway surface condition. GRF is a globally harmonized methodology for runway surface condition assessment, measurement and reporting. Hence, GRF enhances the improved flight crew assessment of take-off and landing performances, with the objective of reducing runway excursions, thus improving the safety of airport operations.

1.2. Purpose

This Advisory Pamphlet (AP) provides guidance to Aerodrome Operators on GRF establishment and implementation procedures to meet the requirements of the Namibia Civil Aviation Regulations (NAMCARs), Part 139 and the associated Technical Standards.

1.3. Applicability

This advisory pamphlet is applicable to all aerodrome operators.

1.4. Description of Amendments

There are no amendments.

2. REQUIREMENTS AND REFERENCES

2.1. Regulatory reference

- NAMCARs, PART 139.09.10, NAMCARs, PART 17.3 and NAMCARS, PART 17.4

2.2. Reference documents

- Namibia Civil Aviation Regulations (NAMCARs) 2023

2.3. Training Requirement

- Runway Surface Condition Assessment and Reporting must be completed by trained personnel. The training must be provided by an ICAO certified training institution.

3. ESTABLISHMENT

3.1 Runway Surface Condition Assessment and Reporting

NAMCAR Part 139 requires an aerodrome operator to assess and report the condition of the movement area and related facilities is necessary in order to provide the flight crew with the information needed for safe operation of the aeroplane. The runway condition report (RCR) is used for reporting assessed information.

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 RCR describes a basic structure applicable for all these climatic variations. Assessing runway surface conditions rely on a great variety of techniques and no single solution can apply to every situation.

The philosophy of the RCR is that the aerodrome operator assesses the runway surface conditions whenever water, snow, slush, ice or frost are present on an operational runway. From this assessment, a runway condition code (RWYCC) and a description of the runway surface are reported which can be used by the flight crew for aeroplane performance calculations. This format, 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 will be taken into consideration and be kept up to date and changes in conditions reported without delay.

The RWYCC reflects the runway braking capability as a function of the surface conditions. With this information, the flight crew can derive, from the performance information provided by the aeroplane manufacturer, the necessary stopping distance of an aircraft on the approach under the prevailing conditions.

The operational requirements in 1.1.3 stem from Operation of Aircraft and Airworthiness of Aircraft with the objective of achieving the desired level of safety for the aeroplane operations.

The operational practices are intended to provide the information needed to fulfil the syntax requirements for dissemination and promulgation as specified in NAMCATS 175.01.1, Appendix 4 of the Procedures for Aeronautical Information Management manual, Appendix 1 – Instruction for Air -reporting by voice communications – Section 3, Part 4, Chapter 12- Reporting of operational and meteorological information, 12.3. and 12.6, Part 7, Chapter 5 – Essential information on aerodrome conditions 5.2 and Part 11, Chapter 4 – Message types and their application 4.3.

When the runway is wholly or partly contaminated by standing water, snow, slush, ice or frost, or is wet associated with the clearing or treatment of snow, slush, ice or frost, the runway condition report should be disseminated through the AIM (Aeronautical Information Management) and ATS services. When the runway is wet, not associated with the presence of standing water, snow, slush, ice or frost, the assessed information should be disseminated using the runway condition report through the ATS only.

Operationally relevant information concerning taxiways and aprons are covered in the situational awareness section of the RCR.

The operational practices describe procedures to meet the operationally needed information for the flight crew and dispatchers for the following sections:

(a) aeroplane take-off and landing performance calculations:
(b) dispatch — pre-planning before commencement of flight:
(c) take-off from a runway; and
(d) landing on a destination aerodrome or an alternate aerodrome;
(e) in flight — when assessing the continuation of flight; and
(f) before landing on a runway; and
(g) situational awareness of the surface conditions on the taxiways and aprons.

3.2 Runway Condition Code

3.2.1 The RWYCC must be reported for each third of the runway assessed.

3.2.2 The assessment process must include:

(a) assessing and reporting the condition of the movement area;

(b) providing the assessed information in the correct format; and

(c) reporting significant changes without delay.

3.2.3 The information to be reported must be compliant with the RCR which consists of the aeroplane performance calculation section and situational awareness section.

3.2.4 The information must be included in an information string in the following order using only AIM-compatible characters:

3.2.4.1 **Aeroplane performance calculation section:**

a. aerodrome location indicator;

b. date and time of assessment;

c. lower runway designation number;

d. RWYCC for each runway third;

e. per cent coverage contaminant for each runway third;

f. depth of loose contaminant for each runway third;

g. condition description for each runway third; and

h. width of runway to which the RWYCCs apply if less than published width.

3.2.4.2 **Situational awareness section:**

a) reduced runway length;

b) drifting snow on the runway;

c) loose sand on the runway;

d) chemical treatment on the runway;

e) taxiway conditions;

f) apron conditions;

g) Namibian-approved, and published use of, measured friction coefficient (refer to Part 139.17.3); and

h) plain language remarks.

3.2.5 The syntax for dissemination as described in the RCR template is determined by the operational need of the flight crew and the capability of trained personnel to provide the information arising from an assessment.

3.2.6 The syntax requirement in 3.2.5 must be strictly adhered to when providing the assessed information through the RCR.

4. IMPLEMENTATION

4.1 Introduction

4.1.2 This section covers the specific operational practices and the ways in which they are applied in order to achieve the basic principles defined in section 3.

4.1.3 Reporting, in compliance with the runway condition report, must commence when a significant change in runway surface condition occurs due to water, snow, slush, ice or frost.

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

4.1.5 A change in the runway surface condition used in the runway condition report is considered significant whenever there is any:

a. change in the RWYCC;
b. change in contaminant type;
c. change in reportable contaminant coverage according to *Table 3* below;
d. change in contaminant depth according to *Table 4* below; and
e. other information, for example a pilot report of runway braking action, which according to assessment techniques used, are known to be significant.

Table 1 *Percentage of coverage for contaminants*

Assessed per cent	Reported per cent
10 - 25	25
26 – 50	50
51 – 75	75
76 - 100	100

Table 2 *Depth assessment for contaminants*

Contaminant	**Valid values to be reported**	**Significant change**
STANDING WATER	04, then assessed value	3 mm up to and including 15 mm
SLUSH	03, then assessed value	3 mm up to and including 15 mm
Note: For STANDING WATER, 04 (4 mm) is the minimum depth value at and above which the depth is reported. (From 3 mm and below, the runway third is considered WET). For SLUSH 03 (3 mm) is the minimum depth value at and above which the depth is reported. Above 4 mm for STANDING WATER and 3 mm for SLUSH an assessed value is reported and a significant change relates to observed change from this assessed value		

4.2 Runway Condition Report - Aeroplane Performance Calculation Section

4.2.1 The aeroplane performance calculation section is a string of grouped information separated by a space " " and ends with a return and two line feed "≪≡". This is to distinguish the aeroplane performance calculation section from the following situational awareness section or the following aeroplane performance calculation section of another runway.

4.2.2 The **mandatory information** to be included in this section consists of the following, a summary is provided in *Table 1*.

a) **Aerodrome location indicator:** a four-letter ICAO location indicator.

Format: nnnn

Example: ENZH

b) Date and time of assessment: date and time (UTC) when the assessment was performed by the trained personnel.

Format: MMDDhhmm

Example: 09111357

c) Lower runway designation number: a two- or three-character number identifying the runway for which the assessment is carried out and reported.

Format: nn[L] or nn[C] or nn[R]

Example: 09L

d) Runway condition code for each runway third: a one-digit number identifying the RWYCC assessed for each runway third. The codes are reported in a three-character group separated by a "/" for each third. The direction for listing the runway thirds must be in the direction as seen from the lower designation number. When transmitting information on runway surface conditions by ATS to flight crews, the sections are, however, referred to as the first, second or third part of the runway. The first part always means the first third of the runway as seen in the direction of landing or take-off as illustrated in Figures 1 and 2 below.

Format: n/n/n

Example: 5/5/2

A change in RWYCC from, say, 5/5/2 to 5/5/3 is considered significant.

A change in RWYCC requires a complete assessment taking into account all information available.

Procedures for assigning a RWYCC are available in 4.5.7 to 4.5.13.

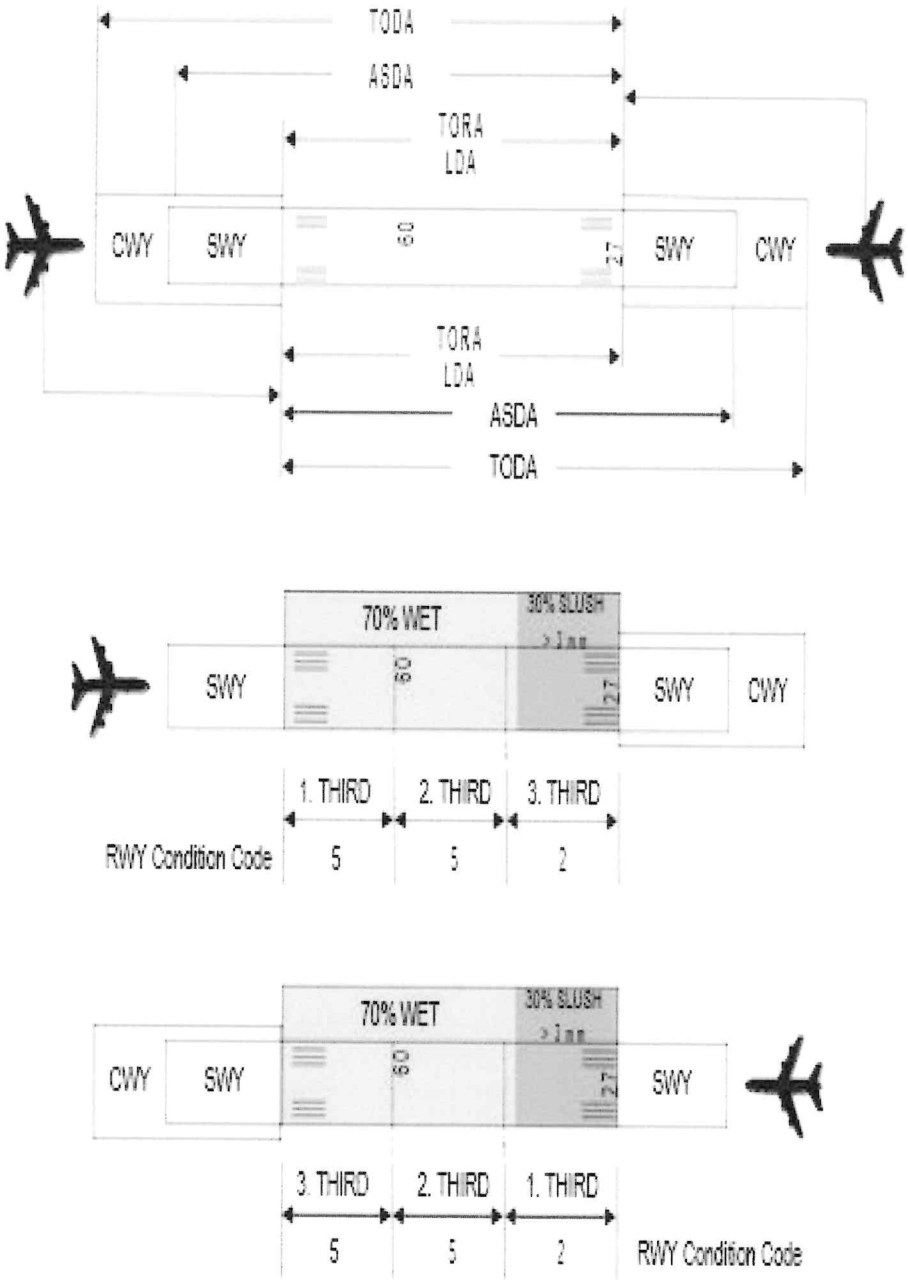

Figure 1 *Reporting of runway condition code from ATS to flight crew for runway thirds*

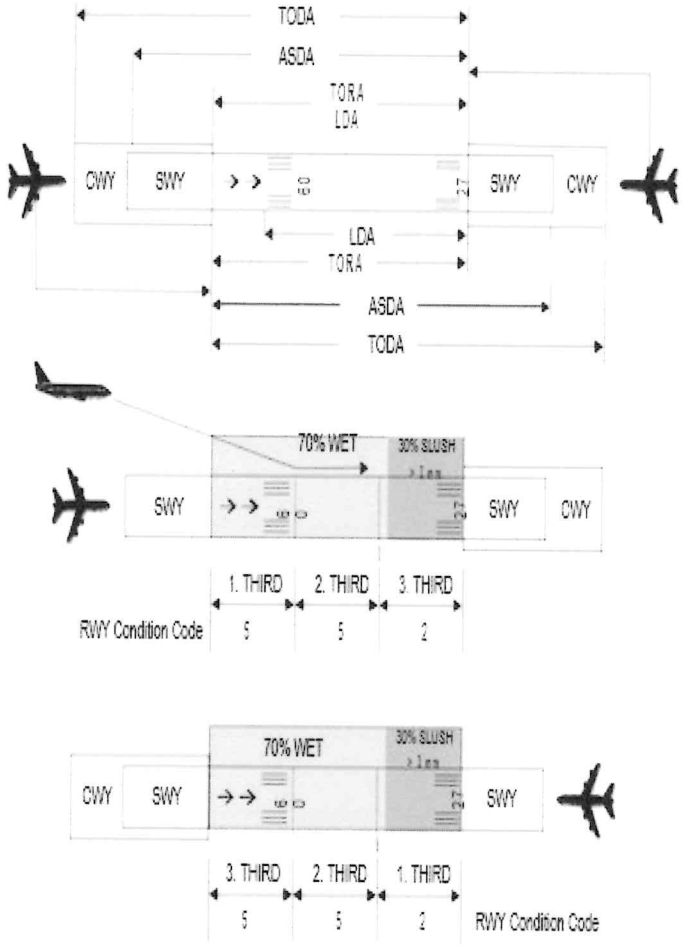

Figure 2 *Reporting of runway condition code for runway thirds from ATS to flight crew on a runway with displaced threshold*

e) Per cent coverage contaminant for each runway third: a number identifying the percentage coverage. The percentages are to be reported in an up-to-nine-character group separated by a "/" for each runway third. The assessment is based upon an even distribution within the runway thirds using the guidance in *Table 3*.

This information is conditional. It is not reported for one runway third if it is dry or covered with less than 10 per cent.

Format: [n]nn/[n]nn/[n]nn

Example: 25/50/100

NR/50/100 if contaminant coverage is less than 10% in the first third

25/NR/100 if contaminant coverage is less than 10% in the middle third

25/50/NR if contaminant coverage is less than 10% in the last third

With uneven distribution of the contaminants, additional information is to be given in the plain language remark part of the situational awareness section of the runway condition report. Where possible, a standardized text should be used.

When no information is to be reported, insert "NR" at its relevant position in the message to indicate to the user that no information exists (/NR/).

f) Depth of loose contaminant: dry snow, wet snow, slush or standing water for each runway third: a two- or three-digit number representing the assessed depth (mm) of the contaminant for each runway third. The depth is reported in a six to nine-character group separated by a "/" for each runway third as defined in *Table 4*. The assessment is based upon an even distribution within the runway thirds as assessed by trained personnel. If measurements are included as part of the assessment process, the reported values are still reported as assessed depths, as the trained personnel have placed their judgment upon the measured depths to be representative for the runway third.

Format: [n]nn/[n]nn/[n]nn

Example: 04/06/02 [STANDING WATER]

This information is conditional. It is reported only for STANDING WATER.

Example of reporting depth of contaminant whenever there is a significant change.

1) After the first assessment of runway condition, a first runway condition report is generated. The initial report is:

5/5/5 100/100/100 02/02/02 SLUSH/SLUSH/SLUSH

The full information string is not used in this example.

2) With continuing precipitation, a new runway condition report is required to be generated as subsequent assessment reveals a change in the runway condition code. A second runway condition report is therefore created as:

2/2/2 100/100/100 03/03/03 SLUSH/SLUSH/SLUSH

3) With even more precipitation, further assessment reveals the depth of precipitation has increased from 3 mm to 5 mm along the entire length of the runway. However, a new runway condition report is not required because the runway condition code has not changed (change in depth is less than the significant change threshold of 3 mm).

4) A final assessment of the precipitation reveals that the depth has increased to 7 mm. A new runway condition code is required because the change in depth from the last runway condition report (second runway condition code) i.e., from 3 mm to 7 mm is greater than the significant change threshold of 3 mm. A third runway condition report is thus created as below:

2/2/2 100/100/100 07/07/07 SLUSH/SLUSH/SLUSH

For contaminants other than STANDING WATER, SLUSH, WET SNOW or DRY SNOW, the depth is not reported. The position of this type of information in the information string is then identified by /NR/. Example: /NR/

When the depth of the contaminants varies significantly within a runway third, additional information is to be given in the plain language remark part of the situational awareness section of the runway condition report.

In this context a significant variation in depth in the lateral direction is more than twice the depth indicated in column 3 of *Table 4*.

g) Width of runway to which the RWYCCs apply if less than published width is the two-digit number representing the width of cleared runway in meters.

This information is optional.

Format: nn

Example: 30

If the cleared runway width is not symmetrical along the centerline, additional information is to be given in the plain language remark part of the situational awareness section of the runway condition report.

Table 3: *Runway Condition Report for Aeroplane performance calculation section*

RUNWAY CONDITION REPORT (RCR)
Aeroplane performance calculation section

Information	***Source***
Aerodrome location indicator	*Aerodrome location indicator*
ICAO Location Indicators	*ICAO Location Indicators*
Date and time of assessment	*Date and time of assessment*
UTC time	*UTC time*
Lower runway designation number	*Lower runway designation number*
Actual runway (RWY)	*Actual runway (RWY)*
RWYCC for each runway third	*RWYCC for each runway third*
Assessment based upon RCAM and associated procedures	*Assessment based upon RCAM and associated procedures*

4.3 Runway Condition Report – Situational Awareness Section

4.3.1 All individual messages in the situational awareness section end with a full stop sign. This is to distinguish the message from subsequent message(s).

4.3.2 The **mandatory information** to be included in this section consists of the following, a summary is provided in *Table 2*:

a) Reduced runway length

This information is conditional when a NOTAM has been published with a new set of declared distances affecting the LDA.

Format: Standardized fixed text

RWY nn [L] or nn [C] or nn [R] LDA REDUCED TO [n]nnn.

Example: RWY 22L LDA REDUCED TO 1450.

b) Drifting snow on the runway

This information is optional.

Format: Standardized fixed text

Example: DRIFTING SNOW.

c) Loose sand on the runway.

This information is optional.

Format: RWY nn[L] or nn[C] or nn[R] LOOSE SAND

Example: RWY 02R LOOSE SAND.

d) Chemical treatment on the runway

Format: RWY nn[L] or nn[C] or nn[R]

Example: CHEMICALLY TREATED RWY 06 CHEMICALLY TREATED.

e) Taxiway conditions

This information is optional.

Format: TWY [nn]n POOR

Example: TWY B POOR.

f) Apron conditions

This information is optional.

Format: APRON [nnnn] POOR

Example: APRON NORTH POOR.

g) Namibia-approved and published use of measured friction coefficient

This information is optional.

Format: [Namibia set format and associated procedures]

Example: [Function of Namibia set format and associated procedures].

4.3.3 Plain language remarks using only allowable characters in capital letters Where possible, standardized text should be developed.

This information is optional.

Format: Combination of allowable characters where use of full stop «.» marks the end of the message.

Allowable characters: ABCDEFGHIJKLMNOPQRSTUVWXYZ

0123456789

/ [oblique stroke] "." [period]" " [space]

Table 4 *Runway Condition Report for Situational awareness section*

RUNWAY CONDITION REPORT (RCR)	
Situational awareness section	
Information	**Source**
Reduced runway length	Reduced runway length
NOTAM	NOTAM
Drifting snow on the runway	Drifting snow on the runway
Visual observation while at RWY	Visual observation while at RWY
Taxiway conditions	Taxiway conditions
Visual observation, AIREP, reported by other aerodrome personnel, etc.	Visual observation, AIREP, reported by other aerodrome personnel, etc.
Apron conditions	Apron conditions
Visual observation, AIREP, reported by other aerodrome personnel, etc.	Visual observation, AIREP, reported by other aerodrome personnel, etc.

4.4 Complete Information String

4.4.1 An example of a complete information string prepared for dissemination is as follows:

[COM header and Abbreviated header] (Completed by AIS)
EADBZQZX EADNZQZX EADSZQZX 170229 EADDYNYX
(SWEA0151 EADD 02170225 SNOWTAM 0151

4.4.2 Aeroplane performance calculation section

EADD 02170055 09 6/6/6 NR/NR/NR NR/NR/NR DRY/DRY/DRY

4.4.3 Situational awareness section

TWY B POOR. APRON NORTH POOR.

4.5 Assessing a Runway and Assigning a Runway Condition Code

4.5.1 The assessed RWYCC to be reported for each third of the runway is determined by following the procedure described in 4.5.7 to 4.5.13.

4.5.2 Guidance on methods of assessing runway surface condition, including the determination of a slippery wet runway, are given in Appendix 1 and 2.

4.5.3 If 25 per cent or less area of a runway third is wet or covered by contaminant, a RWYCC 6 must be reported.

4.5.4 If the distribution of the contaminant is not uniform, the location of the area that is wet or covered by the contaminant is described in the plain language remarks part of the situational awareness section of the runway condition report.

4.5.5 A description of the runway surface condition is provided using the contamination terms described in capital letters in *Table 5* below.

Table 5 *Assigning a runway condition code (RWYCC)*

Runway condition description	**Runway condition code (RWYCC)**
DRY	6
FROST WET (the runway surface is covered by any visible dampness or water up to and including 3 mm deep) SLUSH (up to and including 3 mm depth)	5
COMPACTED SNOW[1] (Outside air temperature minus 15 degrees Celsius and below)	4

WET ("Slippery wet" runway)	3
STANDING WATER (more than 3 mm depth) SLUSH (more than 3 mm depth)	2
ICE	1
WET ICE	0
Note: [1] Contaminant type not applicable to local conditions must be disregarded.	

4.5.6 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 judgment by trained personnel, considering what contaminant will most likely be encountered by the aeroplane and its likely effect on the aeroplane's performance.

4.5.7 The RWYCC is determined using *Table 5.*

4.5.8 The variables, in Table 5, that may affect the runway condition code are:

a. type of contaminant;

b. depth of contaminant; and

c. outside air temperature. Where available the runway surface temperature should preferably be used.

4.5.9 At air temperatures of plus 3°C and below, with a dew point spread of 3°C or less, the runway surface condition may be more slippery than indicated by the runway condition code assigned by *Table 5.* The narrow dew point spread indicates that the air mass is relatively close to saturation which is often associated with actual precipitation, intermittent precipitation, nearby precipitation or fog.

4.5.10 This may depend on its correlation with precipitation, but it may also, at least in part, depend on the exchange of water at the air-ice interface. Due to the other variables involved, such as surface temperature, solar heating and ground cooling or heating, a small temperature spread does not always mean that the braking action will be more slippery. The observation should be used by aerodrome operators as an indicator of slippery conditions but not as an absolute.

4.5.11 An assigned RWYCC 5, 4, 3 or 2 must not be upgraded.

4.5.12 An assigned RWYCC 1 or 0 can be upgraded using the following procedures (but see also 4.5.13):

a. if a properly operated and calibrated Namibia-approved measuring device and all other observations support a higher RWYCC as judged by trained personnel.

b. the decision to upgrade RWYCC 1 or 0 cannot be based upon one assessment method alone. All available means of assessing runway slipperiness are to be used to support the decision;

c. when RWYCC 1 or 0 is upgraded, the runway surface is assessed frequently during the period the higher RWYCC is in effect to ensure that the runway surface condition does not deteriorate below the assigned code; and

d. variables that may be considered in the assessment that may affect the runway surface condition, include but are not limited to:

i. any precipitation conditions;

ii. changing temperatures;

iii. effects of wind;

iv. frequency of runway in use; and

v. type of aeroplane using the runway.

4.5.13 Upgrading of RWYCC 1 or 0 using the procedures in 4.5.12 must not be permitted to go beyond a RWYCC 3.

4.5.14 If sand or other runway treatments are used to support upgrading, the runway surface is assessed frequently to ensure the continued effectiveness of the treatment.

4.5.15 The RWYCC determined from *Table 5* should be appropriately downgraded considering all available means of assessing runway slipperiness, including the criteria given in *Table 6* below.

Table 6 Correlation of runway condition code and pilot reports of runway braking action

Pilot report of runway braking action	Description	Runway condition code (RWYCC)
N/A		6
GOOD	Braking deceleration is normal for the wheel braking effort applied AND directional control is normal	5
GOOD TO MEDIUM	Braking deceleration OR directional control is between good and medium	4
MEDIUM	Braking deceleration is noticeably reduced for the wheel braking effort applied OR directional control is noticeably reduced	3
MEDIUM TO POOR	Braking deceleration OR directional control is between medium and poor	2
POOR	Braking deceleration is significantly reduced for the wheel braking effort applied OR directional control is significantly reduced	1
LESS THAN POOR	Braking deceleration is minimal to non-existent for the wheel braking effort applied OR directional control is uncertain	0

4.5.16 Where available, the pilot reports of runway braking action should be taken into consideration as part of the ongoing monitoring process, using the following principle:

a. a pilot report of runway braking action is taken into consideration for downgrading purposes can be found in 4.5.21 including the use of *Table 7* below, Runway condition assessment matrix (RCAM); and

b. a pilot report of runway braking action can be used for upgrading purposes only if it is used in combination with other information qualifying for upgrading.

Table 7 *Runway condition assessment matrix (RCAM)*

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	• FROST • WET (the runway surface is covered by any visible dampness or water up to and including 3 mm deep) • SLUSH • DRY SNOW[1] • WET SNOW[1]	Braking deceleration is normal for the wheel braking effort applied AND directional control is normal.	GOOD
4	**−15°C and Lower outside air temperature:** • COMPACTED SNOW[1]	Braking deceleration OR directional control is between Good and Medium.	GOOD TO MEDIUM
3	• WET ("slippery wet" runway) • DRY SNOW or WET SNOW (any depth) ON TOP OF COMPACTED SNOW **More than 3 mm depth:** • DRY SNOW[1] • WET SNOW[1] **Higher than −15°C outside air temperature1:**	Braking deceleration is noticeably reduced for the wheel braking effort applied OR directional control is noticeably reduced.	MEDIUM

	• COMPACTED SNOW[1]		
2	**More than 3 mm depth of water or slush:** • STANDING WATER • SLUSH	Braking deceleration OR directional control is between Medium and Poor.	MEDIUM TO POOR
1	• ICE[3]	Braking deceleration is significantly reduced for the wheel braking effort applied OR directional control is significantly reduced.	POOR
0	• WET ICE [1&3] • WATER ON TOP OF COMPACTED SNOW[1&3] • DRY SNOW or WET SNOW ON TOP OF ICE[1&3]	Braking deceleration is minimal to nonexistent for the wheel braking effort applied OR directional control is uncertain.	LESS THAN POOR
Note: [1] Contaminant type not applicable to local conditions must be disregarded. [2] Runway surface temperature should preferably be used where available. [3] The aerodrome operator may assign a higher runway condition code (but no higher than code 3) for each third of the runway, provided the procedure in 2.1.3.15 is followed.			

4.5.17 Two consecutive pilot reports of runway braking action of POOR must trigger an assessment if an RWYCC of 2 or better has been reported.

4.5.18 When one pilot has reported a runway braking action of LESS THAN POOR, the information must be disseminated, a new assessment must be made and the suspension of operations on that runway must be considered.

4.5.19 If considered appropriate, maintenance activities may be performed simultaneously or before a new assessment is made.

4.5.20 Procedures for the provision of information to arriving aircraft are contained in Appendix 2.

4.5.21 *Table 6* shows the correlation of pilot reports of runway braking action with RWYCCs.

4.5.22 *Table 5* and *Table 6* combined form the runway condition assessment matrix (RCAM) in *Table 7*. The RCAM is a tool to be used when assessing runway surface conditions. It is not a standalone document and must be used in compliance with the associated procedures of which there are two main parts:

a. assessment criteria; and

b. downgrade assessment criteria.

APPENDIX 1

METHODS OF ASSESSING RUNWAY SURFACE CONDITION

			Remark
DESIGN AND CONSTRUCTION	Slope	3.1.13 Longitudinal slopes 3.1.19 Transverse slopes	
	Texture	3.1.26 The average surface texture depth of a new surface must not be less than 1.0 mm.	
	Minimum friction level	3.1.23 A paved runway must be so constructed or resurfaced as to provide surface friction characteristics at or above the minimum friction level set by Namibia.	The Namibian set criteria for surface friction characteristics and output assessment methods form the reference from which trend monitoring are performed and evaluated.
	Polishing	3.1.23 A paved runway must be so constructed or resurfaced as to provide surface friction characteristics at or above the minimum friction level set by Namibia.	Polished Stone Value. (PSV-value) is a measure of skidding resistance on a small sample of stone surface, having being subjected to a standard period of polishing.

			Rubber build-up	Geometry change	Polishing
ASSESSMENT METHODS FOR MONITIORING TREND OF CHANGE TO SURFACE FRICTION CHARACTERISTICS	Visual macrotexture	Visual assessment will only give a very crude assessment of the macrotexture. Extensive rubber build-up can be identified.	X		
	Visual microtexture	Visual assessment will give a very crude assessment of the microtexture and to what degree the microtexture has been filled and covered by rubber.	X		
	Visual runway geometry (ponding)	Visual assessment during a rainstorm and subsequent drying process of the runway will reveal how the runway drains and if there have been any changes to runway geometry causing ponding. Depth of any pond can be measured by a ruler or any other appropriate depth		X	

		measurement method/tool.			
	By-touch macrotexture	Assessment by touch can differentiate between degree of loss of texture but not quantifying it.	X		
	By-touch microtexture	Assessment by touch can identify if microtexture has been filled in/covered by rubber build-up.	X		
	Grease smear method (MTD)	Measure a volume – Mean Texture Depth (MTD) primarily by using the grease smear method, is the measurement method used for research purposes related to aeroplane performance.	X		
	Sand (glass) patch method (MTD)	Measure a volume – Mean Texture Depth (MTD). The sand (glass) patch method is not identical to the grease smear method. There is at present no internationally accepted relationship between the two methods.	X		
	Laser – stationary (MPD) Laser – moving (MPD)	Measure a profile – Mean Profile Depth (MPD). There is no established relationship between MTD and MPD. The relationship must be established for the laser devices used and the preferred volumetric measurement method used.	X		
	Friction measurement – controlled applied water depth	A friction measurement is a system output which includes all the surface friction characteristics and characteristics of the measuring device itself. All other variables than those related to the surface friction characteristics must be controlled in order to relate the measured values to the surface friction characteristics. The system output is a dimensionless number which is related to the surface friction characteristics and as such is also a measure of macrotexture. (The system generated number needs to be paired with other information	X		X

		(assessment methods) to identify which surface friction characteristics significantly influence the system output.) It is recognized that there is currently no consensus within the aviation industry on how to control the uncertainty related to repeatability, reproducibility and time stability. It is paramount to keep this uncertainty as low as possible, consequently ICAO has tightened the Standards associated with use of friction measurement devices, including training of personnel who operate the friction measuring devices.			
	Friction measurement – natural wet conditions	Friction measurements performed under natural wet conditions during a rain storm might reveal if portions of a runway are susceptible to ponding and/or to fall below Namibia set criteria.	X	X	X
	Modelling of water flow and prediction of water depth	Emerging technologies based on the use of a model of the runway surface describing its geometrical surface (mapped) and paired with sensor information of water depth allow real-time information and thus a complete runway surface monitoring, and anticipation of water depths.		X	

APPENDIX 2

INFORMATION FOR ARRIVING AIRCRAFT

1. Introduction

1.1 As early as practicable after an aircraft has established communication with the unit providing approach control service, the following elements of information, in the order listed, shall be transmitted to the aircraft, with the exception of such elements which it is known the aircraft has already received:

a) type of approach and runway-in-use;
b) meteorological information, as follows:
   1) surface wind direction and speed, including significant variations;
   2) visibility and, when applicable, runway visual range (RVR);
   3) present weather;
   4) cloud below 1 500 m (5 000 ft) or below the highest minimum sector altitude, whichever is greater; cumulonimbus; if the sky is obscured, vertical visibility when available;
   5) air temperature;
   6) dew point temperature, inclusion determined on the basis of a regional air navigation agreement;
   7) altimeter setting(s);
   8) any available information on significant meteorological phenomena in the approach area; and
   9) trend-type landing forecast, when available.

c) current runway surface conditions, in case of precipitants or other temporary hazards;
d) changes in the operational status of visual and non-visual aids essential for approach and landing.

1.2 It should be recognized that information published by NOTAM or disseminated by other means may not have been received by the aircraft prior to departure or during en-route flight.

1.3 If it becomes necessary or operationally desirable that an arriving aircraft follow an instrument approach procedure or use a runway other than that initially stated, the flight crew shall be advised without delay.

1.4 At the commencement of final approach, the following information shall be transmitted to aircraft:

a) significant changes in the mean surface wind direction and speed;
   The controller possesses wind information in the form of components, the significant changes are:
   - Mean headwind component: 19 km/h (10 kt)
   - Mean tailwind component: 4 km/h (2 kt)
   - Mean crosswind component: 9 km/h (5 kt)

b) the latest information, if any, on wind shear and/or turbulence in the final approach area;
c) the current visibility representative of the direction of approach and landing or, when provided, the current runway visual range value(s) and the trend.

1.5 During final approach, the following information shall be transmitted without delay:

a) the sudden occurrence of hazards (e.g. unauthorized traffic on the runway);
b) significant variations in the current surface wind, expressed in terms of minimum and maximum values;
c) significant changes in runway surface conditions;
d) changes in the operational status of required visual or non-visual aids;
e) changes in observed RVR value(s), in accordance with the reported scale in use, or changes in the visibility representative of the direction of approach and landing.