2021

ETHIOPIAN CIVIL AVIATION AUTHORITY

Aerodrome Safety and Standards Directorate

Global Reporting Format (GRF) for Runway Surface Conditions

PREAMBLE

WHEREAS, it is desirable to consolidate and modernize the aviation Advisory Circular to bring them to international standards,

WHEREAS, it is important to set the Advisory Circular as to how the regulatory, administrative, technical and supervisory activities of the Authority shall be performed in the one hand and setting the duties, obligations and standards that shall be respected by operators and aviation personnel,

WHEREAS, it is necessary, to provide detailed order for the administration of license, certification, investigation and enforcement of aviation laws

NOW THEREBY, The Authority under its power given by Article 92/2 of the Civil Aviation Proclamation No. 616/2008 issued the following Advisory Circular.

1. SHORT TITLE

This Advisory Circular may be cited as "**Global Reporting Format (GRF) for Runway Surface Conditions**, No. ECAA-AC-AGA031/2021"

2. REPEAL AND INAPPLICABLE LAWS

No directive, Advisory Circular or practice shall, in so far as it is inconsistent with this order, be applicable with respect to matters provided for by this Advisory Circular.

3. EFFECTIVE DATE

This Advisory Circular shall come into force as of May/ 2021.

Done at Addis Ababa, May, 2021

Wosenyeleh Hunegnaw (CoL)
Director General

AMENDMENTS

No.	Revision Number	Date Entered	Entered By
	Initial release	May 2021	

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Abbreviations

AC	Advisory circular
AFM	Aircraft flight manual
AIC	Aeronautical information circular
AIM	Aeronautical information management
AIP	Aeronautical information publication
AIREP	Air-report
AIS	Aeronautical information services
ATC	Air traffic control
ATIS	Automatic terminal information service
ATM	Air traffic management
ATS	Air traffic service
ECAA	Ethiopian Civil Aviation Authority
GRF	Global Reporting Format
ICAO	International Civil Aviation Organization
LDA	Landing distance available
MET	Meteorological services
MPD	Mean profile depth
MTD	Mean texture depth
NOTAM	Notice to airmen
NR	Not Reported
PANS	Procedures for Air Navigation Services
PIREP	Pilot Report
RCAM	Runway condition assessment matrix
RCR	Runway condition report
RESA	Runway end safety area
RST	Runway Safety Team
RWY	Runway
RWYCC	Runway condition code
TWY	Taxiway

1. Introduction

Aircraft operational performances, at landing or take-off, strongly depend on runway surface conditions. Inclement weather conditions such as rain may severely degrade runway surface conditions. For obvious safety reasons, pilots need relevant, reliable information about the nature of contaminants, the depth and coverage of contamination, and their effect on friction between the runway and the aircraft's wheels.

The International Civil Aviation Organisation (ICAO) has always identified runway safety, particularly runway excursions, as a primary concern for aviation safety. Indeed, lessons learnt from investigations into accidents and incidents suggest that the principal cause for excursions occurring during landing stem from ineffective braking action due to runway contamination. This trend has been corroborated by aircraft operators and aircraft manufacturers.

It has been acknowledged that a lack of standardised runway assessment and reporting methodology has created deficits in the processes employed by aerodrome operators around the world which indirectly contribute to the highlighted concerns pertaining runway safety. Consequently, to address these shortfalls, ICAO has developed a new globally harmonized methodology for runway condition assessment and reporting. This internationally accepted methodology is called the Global Reporting Format (GRF). The implementation date for GRF worldwide including Ethiopia is from November 2021.

Flight crews utilize the reported runway surface description (condition or type and depth of contaminant) when determining their aeroplane's expected take-off performance.

In preparation for the implementation of GRF in Ethiopia, Ethiopian Civil Aviation Authority (ECCA) has developed the new runway condition reporting methods which are described in this AC.

1.1 Purpose

The purpose of this Advisory Circular is to provide general information and instruction on the expected process for the effective implementation of GRF in Ethiopia.

This document is also being made available to the aviation industry for the purpose of conveying flight safety information. All aerodrome personnel involved with runway condition assessment should be aware of the forthcoming implementation of the new GRF for runway condition reporting. These personnel are encouraged to utilize this AC to assist them in reviewing this topic and to determine the applicability to their specific operations.

1.2 Applicability

This document is applicable to:

(a) Ethiopia aerodrome operators;

(b) Ethiopian Civil Aviation Authority (ECAA) inspectors with certification and safety oversight responsibilities; and

(c) This document is also available to the aviation industry at large for information purposes.

1.3 Description of change

A fundamental change in the new reporting system is the introduction of runway condition code (RWYCC). The assessment process of assigning a RWYCC is a deterministic process, starting with the identification of the various contaminants that determines what initial RWYCC must be reported. Based on all other information available, this initial RWYCC can be downgraded or upgraded.

The revised scale GOOD, GOOD TO MEDIUM, MEDIUM, MEDIUM TO POOR and POOR is used by the flight crew to characterize perceived braking action and lateral control of the aeroplane during landing roll. RWYCCs 0 through 5 are mapped to this terminology in the runway condition assessment matrix (RCAM) and describe a consistent runway surface condition in relation to its effect on aircraft braking performance and lateral control.

These changes are numerous and affect many documents and therefore the aerodrome operators should review this document in its entirety to ensure familiarity with all changes.

2. References and requirements

2.1 Reference documents

It is intended that the following reference materials be used in conjunction with this document:

(a) Ethiopian Civil Aviation Rules and Standards Part 12 Aerodromes;
(b) Aerodrome Manual of Implementing Standards (MOIS);
(c) ECAA-AGA-AC-008/2013 ‘‘Runway Surface Friction measurement and reporting procedures’’;
(d) International Civil Aviation Organization (ICAO) Annex 14 to the Convention on International Civil Aviation —International Standards and Recommend Practices: Aerodromes –Volume I Aerodrome Design and Operations (Eighth Edition, July 2018);
(e) ICAO Circular 355–Assessment, Measurement and Reporting of Runway Surface Conditions; and
(f) ICAO Doc 9981 Procedures for Air Navigation Services –Aerodromes (Second Edition, 2016).

2.2 Definitions

The following definitions are used in this document:

Aeronautical information circular (AIC): A notice containing information that does not qualify for the origination of a NOTAM or for inclusion in the AIP, but which relates to flight safety, air navigation, technical, administrative or legislative matters.

Aeronautical information management (AIM): The dynamic, integrated management of aeronautical information through the provision and exchange of quality-assured digital aeronautical data in collaboration with all parties.

Aeronautical information service (AIS): A service established within the defined area of coverage responsible for the provision of aeronautical data and aeronautical information necessary for the safety, regularity and efficiency of air navigation.

Air-report: A report from an aircraft in flight prepared in conformity with requirements for position, and operational and/or meteorological reporting.

Air traffic service: A generic term meaning variously, flight information service, alerting service, air traffic advisory service, air traffic control service (area control service, approach control service or aerodrome control service).

Automatic terminal information service (ATIS): The automatic provision of current, routine information to arriving and departing aircraft throughout 24 hours or a specified portion thereof:

> ***Data link-automatic terminal information service (D-ATIS):*** The provision of ATIS via data link.
>
> ***Voice-automatic terminal information*** **service** ***(Voice-ATIS):*** The provision of ATIS by means of continuous and repetitive voice broadcasts.

Braking action: A term used by pilots to characterize the deceleration associated with the wheel braking effort and directional controllability of the aircraft.

Coefficient of friction: A dimensionless ratio of the friction force between two bodies to the normal force pressing these two bodies together.

Conditional: subject to one or more conditions or requirements being met.

Contaminant: A deposit (such as snow, slush, ice, standing water, mud, dust, sand, oil and rubber) on an aerodrome pavement, the effect of which is detrimental to the friction characteristics of the pavement surface.

Critical tire-to-ground contact area: An area (approximately 4 square metres for the largest aircraft currently in service) which is subject to forces that drive the rolling and braking characteristics of the aircraft, as well as directional control.

Friction: A resistive force along the line of relative motion between two surfaces in contact.

Friction characteristics: The physical, functional and operational features or attributes of friction arising from a dynamic system.

Grooved or porous friction course runway. A paved runway that has been constructed and maintained with lateral grooving or a porous friction course (PFC) surface to improve braking characteristics when wet in compliance with the *Aerodrome Design Manual* (Doc 9157) or equivalent.

Hazard: A condition or an object with the potential to cause injuries to personnel, damage to equipment or structures, loss of material, or reduction of the ability to perform a prescribed function.

Industry codes of practice: Guidance material developed by an industry body, for a particular sector of the aviation industry to comply with the requirements of the International Civil Aviation Organization's Standards and Recommended Practices, other aviation safety requirements and the best practices deemed appropriate.

Landing distance available (LDA): The length of runway which is declared available and suitable for the ground run of an aeroplane landing.

Mandatory: required by law or mandate; compulsory.

NOTAM: A notice distributed by means of telecommunication containing information concerning the establishment, condition or change in any aeronautical facility, service, procedure or hazard, the timely knowledge of which is essential to personnel concerned with flight operations.

Operational personnel: Personnel involved in aviation activities who are in a position to report safety information.

Optional: available to be chosen but not obligatory.

Note:- *Such personnel include, but are not limited to: flight crews; air traffic controllers; aeronautical station operators; maintenance technicians; personnel of aircraft design and manufacturing organizations; cabin crews; flight dispatchers; apron personnel and ground handling personnel.*

Retardation: The deceleration of a vehicle braking, measured in m/s^2.

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.

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

Runway Safety Team: A team comprising representatives from the aerodrome operator, air traffic service provider, airlines or aircraft operators, pilot and air traffic controllers associations and any other group with a direct involvement in runway operations at a specific aerodrome, that advise the appropriate management on potential runway safety issues and recommend mitigation strategies.

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.

a) ***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.

b) ***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.

c) ***Slippery wet runway***. A wet runway where the surface friction characteristics of a significant portion of the runway have been determined to be degraded.

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.

Safety: The state in which risks associated with aviation activities, related to, or in direct support of the operation of aircraft, are reduced and controlled to an acceptable level.

Safety management system (SMS): A systematic approach to managing safety, including the necessary organizational structures, accountability, responsibilities, policies and procedures.

Significant change: A change in the magnitude of a hazard, which leads to a change in the safe operation of the aircraft.

Skid resistant: A runway surface that is designed, constructed and maintained to have good water drainage, which minimizes the risk of hydroplaning when the runway is wet and provides aircraft braking performance shown to be better than that used in the airworthiness standards for a wet, smooth runway.

SNOWTAM: A special series NOTAM given in a standard format providing a surface condition report notifying the presence or cessation of hazardous conditions due to snow, ice, slush, frost, standing water or water associated with snow, slush, ice or frost on the movement area.

Surface friction characteristics. The physical, functional and operational features or attributes of friction that relate to the surface properties of the pavement and can be distinguished from each other.

3. Aerodrome operator responsibilities

The Aerodrome Operator is responsible for assessing aerodrome surface conditions and disseminating such information through the relevant ATS/AIS provider.

To fulfil this role it is expected that the aerodrome operator adopts a process which includes the following:

(1) Identify the methodology to be adopted to measure the percentage of coverage and depth of contaminant for each third of runways. The process shall also include data gathering for other parts of the movement area.

(2) Develop procedures for the:
   a) Collection of data,
   b) Production of RCR,
   c) Dissemination of information to ATS/AIS, and
   d) Updating of RCR.

(3) Identify personnel who would be responsible for tasks highlighted in point 2.

(4) Develop and amend existing training programmes to include subjects related to runway surface condition reporting as per ICAO Circular 355.

(5) Coordinate with the respective ATS/AIS provider to ensure seamless transmission of RCR taking into account the applicable aeronautical data transfer protocols.

(6) Perform necessary updates to ATIS and adopt the new SNOWTAM format.

(7) Inform all aerodrome users, particularly the General Aviation community and the military on GRF implementation, ideally through established safety committees.

(8) Apply the change management process and conduct a safety risk assessment to address any potential concerns.

(9) In conjunction with ATS/AIS provider, conduct system testing to ensure a smooth transition on target date.

(10) Update occurrence reporting process to include GRF.

4. ATS/AIS provider responsibilities

Depending on the situation, the RCR may be disseminated by means of:

a) SNOWTAM;
b) ATIS, or
c) Radiotelephony.

It is the responsibility of the ATS/AIS provider to ensure the timely availability of the RCR to aircrew and, to perform these tasks, it is expected that the ANSP adopts a process which includes the following:

(1) Coordinate with the aerodrome operator to establish the appropriate methodology for the receipt of the RCR considering the applicable aeronautical data transfer protocols.

(2) Amend and introduce new procedures for the implementation of GRF. This shall consider the receipt and forwarding of Air-reports (AIREPs) to the aerodrome operator.

(3) Develop and amend existing training programmes to include subjects related to GRF application, with interest groups mainly consisting of:

a) Management;
b) ATCOs;
c) AIS personnel.

Training subjects should primarily focus on: RCR decoding; SNOWTAM, and R/T transmission of RCR.

(4) Perform necessary updates to ATIS and adopt the new SNOWTAM format.

(5) Apply change management process and conduct a safety risk assessment to address any concerns stemming pre implementation.

(6) The pilot-in-command shall **report the runway braking action special air-report (AIREP)** when the runway braking action encountered is not as good as reported.

(7) When receiving special air-reports by voice communications concerning braking action encountered that is not as good as that reported, air traffic service units shall forward them without delay to the appropriate aerodrome operator.

(8) In conjunction with aerodrome operator, conduct system testing to ensure effective implementation on target date.

(9) Update occurrence reporting process to include GRF.

(10) Update AIP as required.

5. Components of the Global Reporting Format (GRF)

5.1 General

The Global Reporting Format (GRF) is an internationally accepted standardised report which uses a common language for disseminating the conditions of runways. It is intended to give advanced warning to aircrew on what to expect during the take-off/landing phases and enable them to take informed decisions considering their aircraft's performance. This is achieved through the production and dissemination of the Runway Condition Report (RCR).

The GRF consists of five fundamental elements:

(a) Runway Condition Report (RCR);
(b) Runway condition assessment matrix (RCAM);
(c) Runway condition code (RWYCC);
(d) Runway surface conditions (RSC); and
(e) Runway surface condition descriptions.

5.2 Runway Condition Report (RCR)

(1) Consistent with the principles of the GRF, the RCR have been specially designed to align with the aeroplane performance information which is used by pilots.

5.3 Runway condition assessment matrix (RCAM)

(1) The runway condition assessment matrix is used by aerodrome personnel conducting runway surface assessments to encode the Runway Condition Code for each third of the runway and for aircrew to decode the RWYCC into meaningful information. The RCAM is used to determine a runway condition code from a set of observed runway surface condition(s).

5.4 Runway Condition Code (RWYCC)

(1) The RWYCC is determined through the assessment of the following criteria:
- The percentage of coverage of contamination for each third of the runway;
- The type of contaminant which is selected from the RCAM;

• The depth of contamination;
• Surface air temperature (when applicable).

(2) The Assessment Criteria consist of Runway Surface Descriptions which are used to determine the Runway Condition Code (RWYCC).

(3) Flight crews use the final RWYCC for determining the landing performance of their aeroplane. (The RWYCC is not utilized for determining aeroplane takeoff performance.)

(4) The process for determining the RWYCC is provided below.

5.5 Runway Surface Conditions (RSC)

(1)The Situational Awareness section of the report allows a plain language description of surface conditions which adds value to the information being disseminated, particularly as regards other movement areas of the aerodrome. If available such information shall include the depth of related contaminant.

(2) The RCR shall be produced when a significant change in runway surface condition occurs due to the presence of water. Reporting should be maintained to reflect significant changes and until such time runways are no longer deemed contaminated.

(3) The RYWCC may be downgraded or upgraded by the Aerodrome Operator using a friction measuring device or other approved method.

(4) There are four defined runway surface conditions:
(a) Dry runway;
(b) Wet runway;
(c) Slippery wet; and
(d) Contaminated runway.

(5) The runway surface conditions are further sub-divided into **runway surface descriptions**, which describe the specific details of a runway surface.

(6) The runway surface descriptions, including depth and temperature (when applicable), are used to determine the preliminary RWYCC.

6. Runway Surface Condition Assessment and Reporting

6.1 General

(1) Assessing and reporting 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.

(2) 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.

(3) The philosophy of the GRF is that the airport operator assesses the runway surface conditions whenever any contaminants 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 airport operator. All other pertinent information should also be taken into consideration. When changes in conditions occur, they should be reported without delay.

(4) The RWYCC reflects the expected braking capability as a function of the surface conditions. With this information, the flight crews can derive, from the performance information provided by the aeroplane manufacturer, the landing distance of an aeroplane under the existing conditions. When a RWYCC is not provided, pilots reference the reported runway surface description (condition or type and depth of contaminant) to determine expected landing performance.

(5) The operational practices are intended to provide the information needed to fulfil the syntax requirements for dissemination and promulgation.

(6) When the runway is wholly or partly contaminated by standing water or is wet, the runway condition report should be disseminated through the AIS and ATS services. When the runway is wet, not associated with the presence of standing water, the assessed information should be disseminated using the runway condition report through the ATS only.

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

(7) 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:

i) Dispatch — pre-planning before commencement of flight:

— take-off from a runway; and
— landing on a destination aerodrome or an alternate aerodrome;

ii) In flight — when assessing the continuation of flight; and
— before landing on a runway; and

b) Situational awareness of the surface conditions on the taxiways and aprons.

6.2 Objectives

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

(2) The assessment process shall 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) The information to be reported shall be compliant with the RCR which consists of:
a) Aeroplane performance calculation section; and
b) Situational awareness section.

(4) The information shall be included in an information string in the following order using only AIS compatible characters:
a) Aeroplane performance calculation section (have 8 elements but only 7 elements are applicable in Ethiopia):

i) Aerodrome location indicator;
ii) Date and time of assessment;
iii) Lower runway designation number;
iv) RWYCC for each runway third;
v) Percent coverage contaminant for each runway third;
vi) Depth of loose contaminant for each runway third;
vii) Condition description for each runway third; and

b) Situational awareness section (have 11 elements but only 6 elements are applicable in Ethiopia):
i) reduced runway length;
ii) loose sand on the runway;
iii) taxiway conditions;
iv) apron conditions;

v) State-approved, and published use of, measured friction coefficient; and

vi) Plain language remarks.

(5) The syntax for dissemination as described in the RCR template in ICAO PANS AIM 10066, Appendix 4, is determined by the operational need of the flight crew and the capability of trained personnel to provide the information arising from an assessment.

(6) The syntax requirement in paragraph (5) shall be strictly adhered to when providing the assessed information through the RCR.

6.3 Operational practices

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

(2) 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.

(3) A change in the runway surface condition used in the runway condition report is considered significant whenever there is:

a) Any change in the RWYCC;

b) Any change in contaminant type;

c) Any change in reportable contaminant coverage according to Table-1;

d) Any change in contaminant depth according to Table-2; and

e) Any other information, for example a pilot report of runway braking action, which according to assessment techniques used, are known to be significant.

6.3.1 Process to determine the RWYCC

(1) The airport or aerodrome operator will assess surfaces, and report contaminants present on each runway. Based on the reported information, the preliminary RWYCCs will be determined using the RCAM in accordance with the process described in Section 7. The airport or aerodrome operator will then be prompted to confirm whether the preliminary RWYCCs are appropriate in consideration of other available information.

(2) A separate process outlined in Section 8.5 is used to determine the RWYCC for a runway that does not meet the minimum coefficient of friction, for which a “slippery when wet” normal NOTAM must be issued.

Step 1 – determine applicability of RWYCCs

(1) RWYCCs are only applicable if:

(a) The runway condition information is reported by runway thirds; and
(b) The runway surface is paved

Step 2 – apply assessment criteria to determine preliminary RWYCC

(1) Based on the runway surface description, the RCAM is used to determine a preliminary RWYCC for each third of the runway.

(2) The determination of the RWYCC remains solely the responsibility of the airport or aerodrome operator, who must ensure that the preliminary RWYCC is confirmed, downgraded, as applicable.

(3) The airport or aerodrome operator is to include RWYCCs on the printable form if applicable (paved runway and reporting in thirds). As the airport and aerodrome operator is responsible for determining and accepting the RWYCC, the information provided is deemed to be correct.

Step 3 – validate preliminary RWYCCs

(1) After the preliminary RWYCCs have been assigned, the airport or aerodrome operator should determine that the preliminary RWYCCs accurately reflect the runway condition. Through this determination, which should consider the measured runway friction value (if available), vehicle deceleration or directional control observations, pilot report(s), local knowledge and/or other information, the preliminary RWYCC will then be:

(a) Confirmed; or

(b) Downgraded;

(2) If the preliminary RWYCCs accurately represent the runway condition, the preliminary RWYCCs will be confirmed and the final RWYCCs may be disseminated.

(3) However, if it is determined through the runway friction measurement, pilot report(s), and/or other information that the runway is more slippery than indicated by the preliminary RWYCC (determined with reference to the RCAM Assessment Criteria), the RWYCC should be downgraded.

6.3.2 Runway Condition Report — Aeroplane performance calculation section

(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.

(2) The information to be included in this section consists of the following.

a) **Aerodrome location indicator:** a four-letter ICAO location indicator in accordance with Doc 7910, *Location Indicators.*

This information is mandatory.

Format: nnnn
Example: HAAB

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

This information is mandatory.

Format: MMDDhhmm
Example: 05111357

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

This information is mandatory.

Format: nn[L] *or* nn[C] *or* nn[R]
Example: 07L

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 shall be in the direction as seen from the lower designation number.

This information is mandatory.

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.

Format: n/n/n
Example: 5/5/2

Note 1:- *A change in RWYCC from, say, 5/5/2 to 5/5/3 is considered significant.*

Note 2:- *A change in RWYCC requires a complete assessment taking into account all information available.*

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-1.

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.

Note:- *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: 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-2. 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
Examples: 04/06/12 *[STANDING WATER]*

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

g) **Condition description for each runway third:** to be reported in capital letters using terms specified in ECAA Aerodrome MOIS chapter 6 Section 6.2.9.5. These terms have been harmonized with the terms used in the Standards and Recommended Practices in Annexes 6, 8, 11 and 15. The condition type is reported by any of the following condition type descriptions for each runway third and separated by an oblique stroke "/".

This information is mandatory.

DRY
STANDING WATER
WET

Format: nnnn/nnnn/nnnn
Example: WET / WET / STANDING WATER

6.3.3 Runway condition report — Situational awareness section:

(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).

The information to be included in this section consists of the following:

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 25L LDA REDUCED TO 1450.

b) **Loose sand on the runway**

This information is optional.

Format: RWY nn[L] *or* nn[C] *or* nn[R] LOOSE SAND
Example: RWY 07R LOOSE SAND.

c) **Taxiway conditions**

This information is optional.

Format: TWY [nn]n POOR
Example: TWY B POOR.

d) **Apron conditions**

This information is optional.

Format: APRON [nnnn] POOR
Example: APRON NORTH POOR.

e) **State-approved and published use of measured friction coefficient**

This information is optional.

Format: *[State set format and associated procedures]*
Example: *[Function of State set format and associated procedures]*.

f) **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:

A B C D E F G H I J K LM N O P Q R S T U V W X Y Z

0 1 2 3 4 5 6 7 8 9

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

Note: - *Information may be mandatory, conditional or optional. Regardless of the status, if information is considered to be significant for safe operations, timely updating is mandatory.*

6.3.4 Complete information string

(1) An example of a complete information string prepared for dissemination is as follows:

Aeroplane performance calculation section

1- Aerodrome Location indicator - HAAB
2- Date and time of assessment – 05121400
3- Lower runway designation number – 07R
4- RWYCC for each runway third – 5/5/2
5- % coverage contaminant for each runway third – 50/50/50
6- Depth of loose contaminant for each runway third – NR/NR/04
7- Condition description for each runway third – WET/WET/STANDING WATER

HAAB 05121400 07R 5/5/2 50/50/50 NR/NR/04 WET/WET/STANDING WATER

Situational awareness section

RWY 25L LDA REDUSED TO 1450. TWY B POOR. ARPON NORTH POOR

6.3.5 Assessing a runway and assigning a runway condition code

(1) The assessed RWYCC to be reported for each third of the runway is determined by following the procedure described in (12) to (14).

(2) If 25 per cent or less area of a runway third is wet or covered by contaminant, a RWYCC 6 shall be reported.

(3) 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) A description of the runway surface condition is provided using the contamination terms described in capital letters in Table-3 Assigning a runway condition code (RWYCC).

(5) 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.

(6) The RWYCC is determined using Table-3.

(7) The variables, in Table-3, 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.

(8) An assigned RWYCC 5, 4, 3 or 2 shall not be upgraded.

(9) 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.

(10) The RWYCC determined from Table-3 should be appropriately downgraded considering all available means of assessing runway slipperiness.

(11) 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; 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.

(12) Two consecutive pilot reports of runway braking action of POOR shall trigger an assessment if an RWYCC of 2 or better has been reported.

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

(14) Table-3 shows the correlation of pilot reports of runway braking action with RWYCCs.

(15) Table-3 form the runway condition assessment matrix (RCAM). The RCAM is a tool to be used when assessing runway surface conditions. It is not a standalone document and shall be used in compliance with the associated procedures of which there are two main parts:

a) Assessment criteria; and

b) Downgrade assessment criteria.

(16) The percent coverage is reported using the increments listed in Table 1. If the assessed percent coverage is between increments, it should be rounded up as indicated.

Table 1: Percentage of coverage for contaminants

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

(17) Contaminant depths will continue to be reported in mm, as illustrated in Table 2, below.

Table 2: Depth assessment for Contaminants

Contaminant	Valid Values to be reported	Significant change
Standing Water	04, then assessed value	3mm up to and including 15mm

Note 1: *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).*

Note 2: *Above 4 mm for STANDING WATER an assessed value is reported and a significant change relates to observed change from this assessed value.*

(18) When the depth of contaminant(s) is variable:

(a) the maximum depth should be entered, since only one value may be entered in this field, and the maximum depth is the most important information for pilots; and

(b) the remarks section may be used to report a range of values for depth.

(19) Contaminant depths will be reported for STANDING WATER

7. Runway condition assessment matrix (RCAM)

7.1 General

(1) The Runway Condition Assessment Matrix (RCAM) (Table 3) is the method by which the airport or aerodrome operator determines a preliminary Runway Condition Code (RWYCC) for each runway third, whenever water is present on the runway surface.

(2) The RCAM applies only to paved (asphalt and concrete) runway surfaces, and does not apply to unpaved or partially paved surfaces.

(3) When runway condition information is reported in thirds a RWYCC is to be reported. Conversely, if the runway condition information is not entered for each runway third, then the RWYCC will not be reported.

(4) The third column is to be used by the pilot to rate the estimated aeroplane braking performance on a given contaminant and estimate a runway braking action category based on six descriptions.

(5) The fourth column is a report of braking action on the runway by a pilot, providing other pilots with an indication of the degree/quality of expected braking.

7.2 Assessment Criteria

(1) This section of the RCAM consists of a Runway Surface Description and a Runway Condition Code. The Runway Surface Descriptions in each category are linked to the corresponding Runway Condition Code based on their effect on aeroplane braking performance.

7.3 Runway surface description

(1) The Runway Surface Description column of the RCAM lists:

(a) the contaminants on the runway; and

(b) runway surface conditions, if a runway is dry, wet or slippery when wet.

(2)These runway surface descriptions are directly correlated to aeroplane landing performance and are listed in order of slipperiness (i.e. from least slippery to most slippery).

7.4 Runway condition code (RWYCC)

(1) Runway Condition Codes (Format: X/X/X) represent the runway condition description based on defined terms and increments. Use of these codes harmonizes with ICAO

Annex 14, providing a standardized "shorthand" format for reporting runway condition, which can be used by pilots to determine landing performance parameters.

(2) A preliminary RWYCC is determined using the RCAM based on type and depth of contaminant and outside air temperature (where applicable); or the runway condition, when the runway is dry, wet, or slippery when wet. The preliminary RWYCC must be confirmed, downgraded.

(3) In the event the full width of the runway is not cleared, the runway condition code will be determined based on the contaminants present in the cleared portion of the runway (typically centre 100 feet).

7.5 Runway Friction measurement information presented in the RCAM

(1) The runway friction measurement result is a valuable tool which provides an objective measure of the runway friction that will allow the airport or aerodrome operator to:

(a) Validate the preliminary RWYCCs determined through the use of the RCAM,

(b) Downgrade the RWYCC, when appropriate,

(2) An approximate range of the runway friction measurement values correspond to various RWYCCs. These runway friction measurement ranges are used to downgrade a RWYCC, as described in Section 7.6.

7.6 RWYCC downgrade assessment criteria

(1) As described in Section 7.4, the preliminary RWYCC is initially determined using the RCAM based on type and depth of contaminant and outside air temperature (where applicable); or the runway condition, when the runway is dry, wet, or slippery when wet.

(2) The airport or aerodrome operator should consider downgrading a RWYCC when the runway friction measurements (if available), directional control observations, pilot report(s), local knowledge and/or other information reveal that the runway surface is more slippery than the preliminary RWYCC indicated.

(3) The airport or aerodrome operator should exercise vigilance and downgrade the RWYCC when appropriate so that flight crews are provided with a RWYCC that best reflects the actual slipperiness of the runway.

(4) The shaded area of the RCAM provides Downgrade Assessment Criteria, as detailed below:

(a) the airport or aerodrome operator should utilize the continuous friction measurement readings, when available, to assess slipperiness of the runway.

(b) Pilot reports may also provide useful information. These reports may relate to the specific sections of the runway in which wheel braking was applied, and should be considered for the applicable runway third.

(c) Vehicle control or deceleration observations are another source of useful information. As with pilot reports, vehicle control or deceleration observations may relate to specific sections of the runway and should be considered for the applicable runway third.

(5) When a RWYCC has been downgraded this information needs to be included in the runway remarks.

Table 3: Runway condition assessment matrix (RCAM)

Runway condition assessment matrix			
Assessment Criteria		**Downgrade Assessment Criteria**	
RWYCC	**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 3mm depth)	Braking deceleration is normal for the wheel braking applied AND directional control is normal	GOOD
4	NA	NA	NA
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 3mm depth of water : • STANDING WATER	Braking deceleration OR directional control is between Medium and Poor	MEDIUM TO POOR
1	NA	NA	NA
0	NA	NA	NA

7.6 Pilot reported braking action

(1) A pilot report (PIREP) of braking action reflects the pilots’ assessment of the available wheel braking.

(2) Where available, pilot reports of braking action should be taken into consideration as part of the ongoing monitoring process, using the following principles:

- A pilot report of braking action should be taken into consideration for downgrading purposes;

Notes:-

1) Airport and aerodrome operators need to ensure that runway surface descriptions (type and depth) are reported in accordance with the pertinent regulatory requirements and the guidance provided, regardless of pilot braking action reports.

2) Where Air Traffic Services (ATS) are provided, ATS are to notify airport or aerodrome operators of any significant change in surface conditions that they have observed or have been provided knowledge.

(3) When previous pilot braking action reports have indicated GOOD or MEDIUM braking action, two consecutive pilot braking action reports of POOR indicates that surface conditions may be deteriorating. In this situation, the airport or aerodrome operator should conduct a runway assessment prior to the next aircraft operation.

8. Runway surface descriptions

8.1 General

If more than two conditions or contaminants are present, only the two most prevalent are reported. Other factors that may be taken into consideration in determining which two runway surface descriptions of report include:

(a) the location of the condition or contaminant on the runway; and

(b) the slipperiness of the condition or contaminant, which is reflected in the corresponding RWYCC.

8.2 DRY runway

A “DRY” runway surface condition should be reported:

(a) When there is need to report wet or contaminated conditions on the remainder of the surface. This would be the case when a runway third(s) is 100%.

(b) When a significant change has occurred. For example when a runway third(s) reported as RWYCC 5 is now RWYCC 6; and

8.3 Wet runways

(1) The timely and accurate reporting of conditions when water or moisture is present on the runway is recognized to be challenging. For example, during an active thunderstorm a runway may rapidly transition from dry, to wet to contaminate and with standing water, in a very short period of time. In addition, variations in the drainage capabilities of a runway and/or portions of a runway further complicate

accurate reporting. Therefore, aerodrome operators may not be able to report these conditions.

(2) When an airport or aerodrome operator reports water or moisture on a runway, the following should be considered:

(a) A surface condition where there is any visible dampness or water up to and including 3mm is reported as “WET.”

(b) A surface condition where there is water of depth greater than 3mm is reported as “STANDINGWATER” as described in Section 8.4 below.

(3) The reporting of “SLIPPERY WHENWET” runway conditions is described in Section 8.5, below.

(4) The reporting of standing water patches (localized standing water conditions – such as puddles or pools of water) is described below.

8.4 Standing water

(1) Water on a runway at a depth greater than 3mm is reported as “STANDING WATER”

(2) Due to the dynamic nature of rainfall conditions, the timely and accurate reporting of conditions when water or moisture is present on the runway is recognized to be challenging.

(3) Where practicable, the reporting of standing water is encouraged.

(4) To facilitate the accurate reporting of standing water, airport and aerodrome operators should also be aware of the conditions which would lead to the accumulation of standing water including:

(a) the drainage characteristics of their runways, and

(b) the rate and amount of precipitation.

8.5 Slippery When Wet

(1) A runway or any portion of a runway is deemed as having low friction (e.g. due to rubber accumulation, surface texture degradation, etc.) when the friction measurements (as measured by a continuous friction measuring device in accordance with ECAA-AGA-AC008/2013) are below the minimum coefficient of friction specified in Aerodrome Manual of Implementing Standards (MOIS).

(2) A normal NOTAM which states that a runway may be "SLIPPERY WHEN WET" is issued whenever the surface friction characteristics of a runway fall below the minimum standard, as described above in paragraph (1).

Note: *The designation "SLIPPERY WHEN WET"–when applied to a normal NOTAM –is a function of the friction characteristics of the pavement.*

(3) The airport or aerodrome operator may cancel this normal "slippery when wet" NOTAM only when the runway friction level meets or exceeds the minimum standard.

(4) When there is a "SLIPPERY WHEN WET" normal NOTAM in effect, runway conditions and contaminants on a runway are reported in the following manner:

(a) for any visible dampness or water up to and including 3mm present on the runway, a runway surface condition is issued with a runway condition of ''SLIPPERY WHEN WET;"

(b) with more than 3mm of water present on the runway, an runway surface condition is issued with a runway condition of "STANDING WATER" with the corresponding percentage of coverage and depth); and

(5) When there is a "SLIPPERY WHEN WET" normal NOTAM in effect and there is a need to report a dry runway condition as outlined in Paragraph 8.2, a runway surface condition is issued with a runway condition of "DRY."

(6) As per paragraph (5) above, when reporting in thirds and there is a "SLIPPERY WHEN WET" normal NOTAM in effect, the runway surface conditions for each third will be reported as shown in the following examples:

(a) If the first third of a runway had twenty percent coverage of an 3mm **or less water** and the remaining runway thirds were dry, this would be reported as: SLIPPERY WHEN WET, DRY, DRY

(b) If the first third of a runway had thirty percent coverage of water (**more than 3mm of water**) and the last two thirds were wet, this would be reported as: 30 % STANDING WATER, SLIPPERY WHEN WET, SLIPPERY WHEN WET.

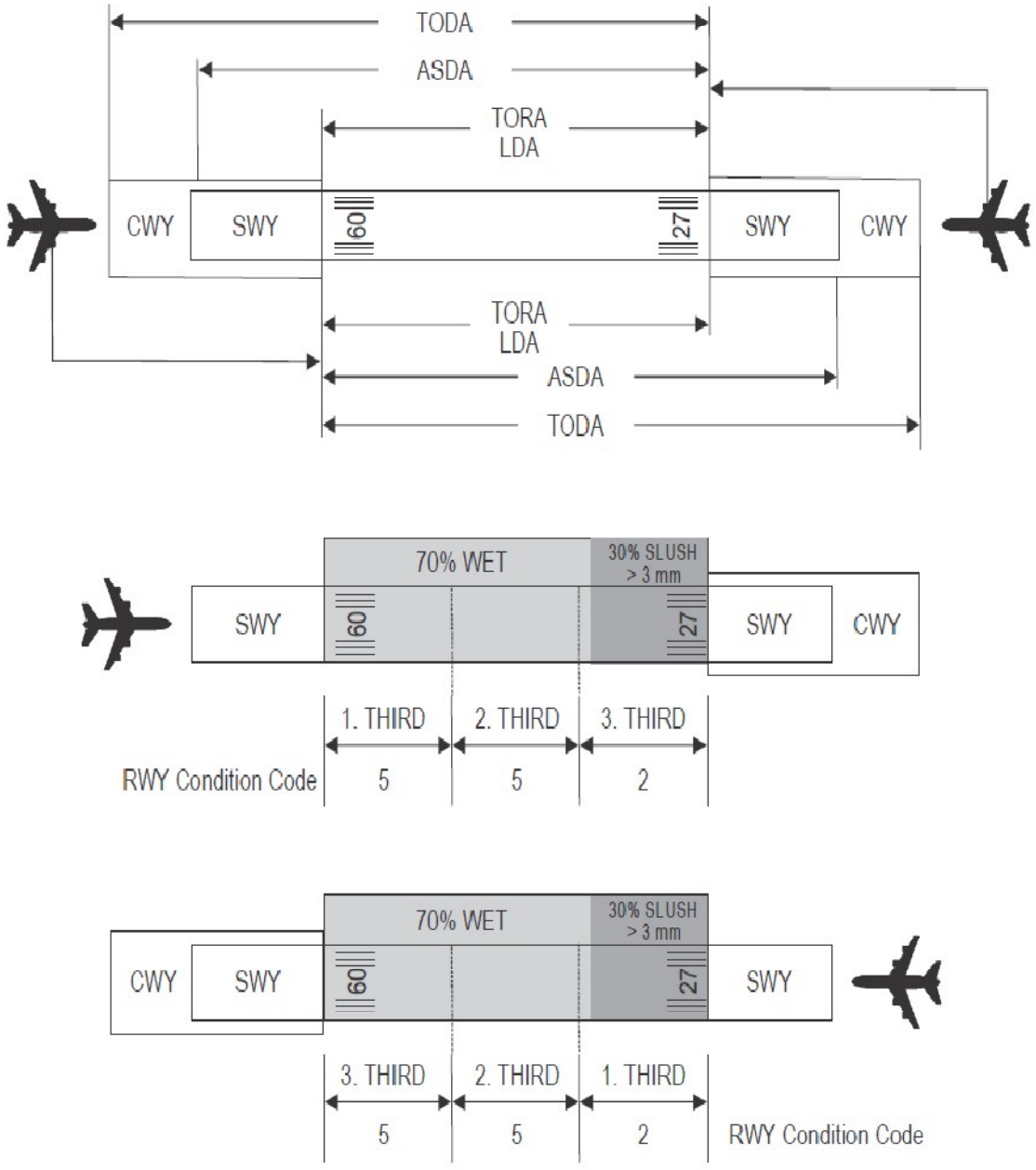

Figure -1:- Reporting of runway condition code from ATS to flight crew for runway thirds

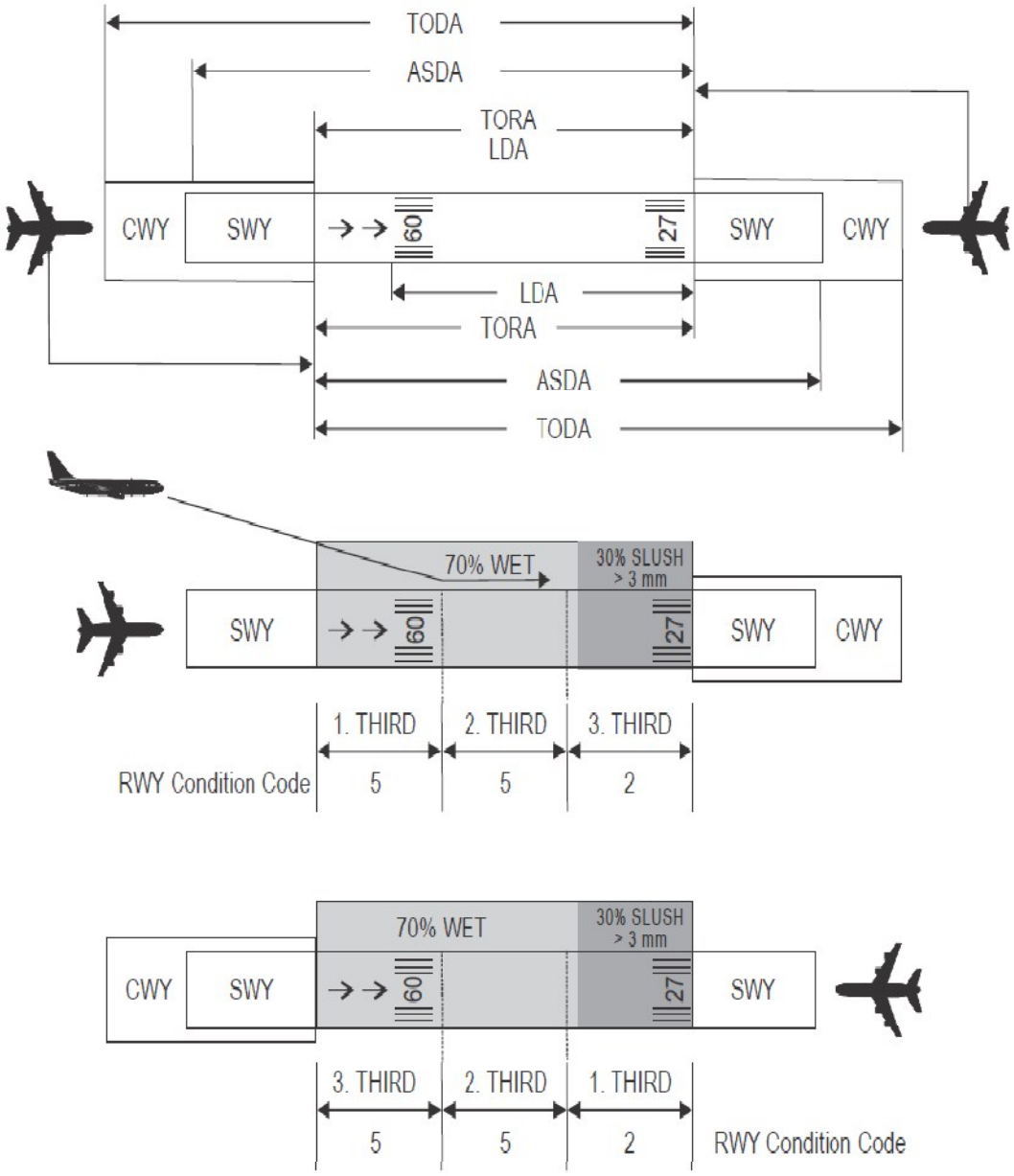

Figure -2:- Reporting of runway condition code for runway thirds from ATS to flight crew on a runway with displaced threshold

APPENDIX 1

RUNWAY CONDITION REPORT (RCR)	
Aeroplane performance calculation section	
Information	**Source**
Aerodrome location indicator	ICAO Doc 7910, *Location Indicators*
Date and time of assessment	UTC time
Lower runway designation number	Actual runway (RWY)
RWYCC for each runway third	Assessment based upon RCAM and associated procedures
Per cent coverage contaminant for each runway third	Visual observation for each runway third
Depth of loose contaminant for each runway third	Visual observation assessed for each runway third, confirmed by measurements when appropriate
Condition description (contaminant type) for each runway third	Visual observation for each runway third
Situational awareness section	
Reduced runway length	NOTAM
Loose sand on the runway	Visual observation while at RWY
Taxiway conditions	Visual observation, AIREP, reported by other aerodrome personnel, etc
Apron conditions	Visual observation, AIREP, reported by other aerodrome personnel, etc
State approved and published use of measured friction coefficient	Dependent upon the State set or agreed standard
Plain language remarks using only allowable characters in capital letters	Any additional operational significant information to be reported