

ICAO Global Reporting System and Format Creation

ICAO Workshop

on the implementation of the new ICAO Global
Reporting Format for Runway Surface Conditions

ICAO EUR Region

Helsinki, 28 - 29 January 2020

Armann Norheim

Rapporteur ICAO Friction Task Force

Operational need

Let there be no doubt.

- The ICAO global reporting system and format is developed based upon the operational need for information for the safe operation of the aircraft.
- Improved safety through performance-relevant reporting of runway conditions.

A global language.

A tool for making decisions.

Creation of a global system and format

Need to standardise information to pilots



Three accidents

- 1958 – Munich, Germany (+ 1959 incident at Idlewild, New York, USA)
 - Brought the slush into sharp focus – ½ inch rule
- 1989 – Dryden, Ontario, Canada
 - exhaustive investigation, but also of **the aviation system that allowed it to occur.**
 - JWRFMP
- 2006 – Midway, Chicago, USA
 - TALPA ARC

This methodology communicates actual runway conditions to pilots
in terms that directly relate to expected aircraft performance.

JWRFMP (1995 – 2004+)

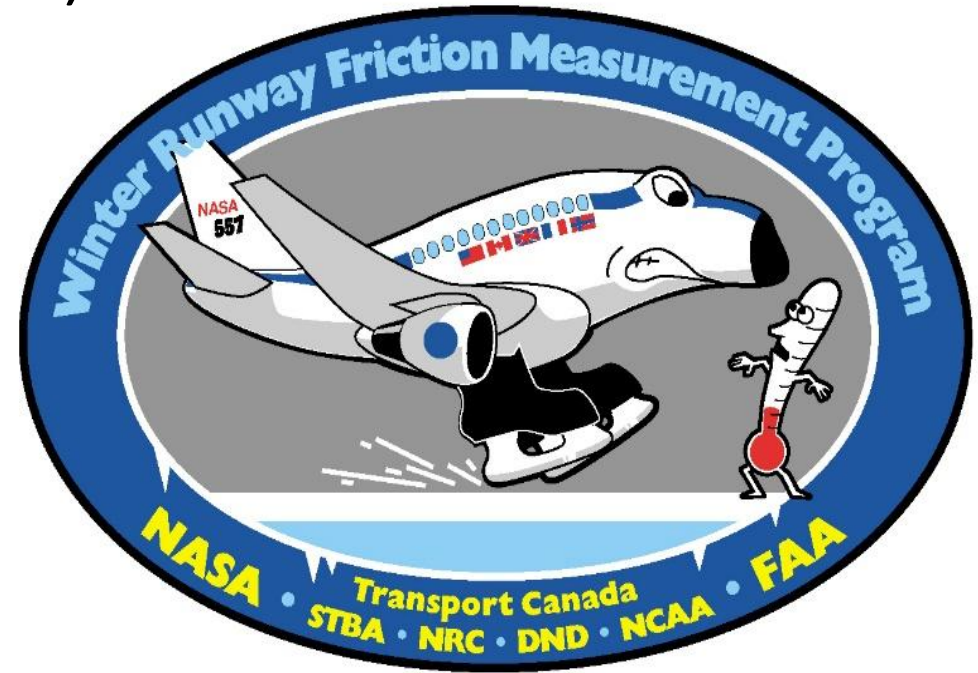


Angelo Boccanfuso

1962 – 2016

Transport Canada Development Centre

Joint Winter Runway Friction Measurement Program 1995 – 2004 +



JWRFMP overall objective

- device a better, more meaningful method for the pilot to determine landing and accelerated stopping distance requirements.
- Based upon, among others; recommendation (part of):
 - technically accurate means of defining runway surface conditions and their effects on aircraft performance.

IMAPCR '99

- Review of ICAO documentation presented at ICAO HQ , Montreal through 16 Safety Barriers with a clear message to address the concern expressed:
 - that ICAO address the discrepancies outlined
 - that ICAO needs to address and clarify the documentation

AOSWG/1 – June 2005

Need to standardise information to pilots

(Chicago Midway - December 2005)

ICAO State letter - May 2006 – Questionnaire

FAA Workshop - August 2006

Aerodrome Panel - 1 December 2006

FAA – TALPA ARC - October 2007

AOSWG/5 – April 2008

ICAO Friction Task Force - April 2008

TALPA ARC transmitted proposals to FAA in April/May 2009

TALPA ARC closed in Nov 2009

TALPA initiative

FTF Phase 1 (2008 – 2011)

- Annex 14 and (Annex 15)
- Revised Reporting Procedure
- Revised SNOWTAM

MEASURED OR CALCULATED COEFFICIENT	or	ESTIMATED SURFACE FRICTION	
0.40 and above		GOOD	— 5
0.35 to 0.39		MEDIUM/GOOD	— 4
0.30 to 0.34		MEDIUM	— 3
0.25 to 0.29		MEDIUM/POOR	— 2
0.20 and below		POOR	— 1
9 — unreliable		UNRELIABLE	— 9

Since 14 November, 2013

- Circular 329 – Assessment, Measurement and Reporting of Runway Surface Conditions

NO longer reporting μ

No longer reporting μ

Friction measuring equipment values are no longer used to determine and report surface conditions because joint industry and multi-national government tests have not established a reliable correlation between runway friction values and the relationship to airplane braking performance.

FAA SAFO 19001 - Landing Performance Assessment at Time of Arrival, 11 March 2019

FTF Phase 2 (2011 – 2020+)

- Global reporting system and format

5. November 2020

- Co-operation across Annex's and Panels

That what makes this work so valuable

Air Navigation Commission JOB CARD ADOP.001

- Problem Statement:
- Runway surface conditions have contributed to many safety events and investigations have revealed **shortfalls in the accuracy and timeliness of assessment and reporting methods** currently provided for in ICAO provisions and guidance material.

Air Navigation Commission JOB CARD ADOP.001

- **Pilots** of modern aircraft also **need reports that are directly related to the performance of the aircraft.**

AMENDMENTS

- Annex 3
- Annex 6, Part II
 - Aeroplane Performance Manual (Doc 10064) New (to be publ. early 2020)
- Annex 8
- Annex 11
 - PANS ATM
- Annex 14, Vol I
 - PANS Aerodromes
 - Circular 329 – Revised → Circular 355 (March 2019)
- Annex 15
 - PANS AIM – (Doc 10066) New (2018) (AIS-AIMSG)

All changes are (and must be) coordinated!

Affects

- Aircraft Manufacturers (Aircraft Flight Manual)
- Aircraft Operators (Operations Manual)
- Aerodrome Operators (Aerodrome Manual)
- Aeronautical Information Services (SNOWTAM)
- Air Traffic Services (ATIS/VOICE)

ALL: One language

Defined concept

- Definitions of terms define the fundamental, conceptual part of the report and assessment of the runway surface conditions methodology.
- Based on the defined concept the RCR is a **validated** method that replaces subjective judgements with objective assessments that are directly tied to criteria relevant for aeroplane performance. These criteria have been determined by aeroplane manufacturers to cause specific changes in aeroplane braking performance.

Standardised information to pilots

Aeroplane performance calculation section

Information provided in standardised order.

Type of information identified by location in the information string.

Situational awareness section

Information provided in standardised order.

Each information ends with a . “full stop”

Challenges

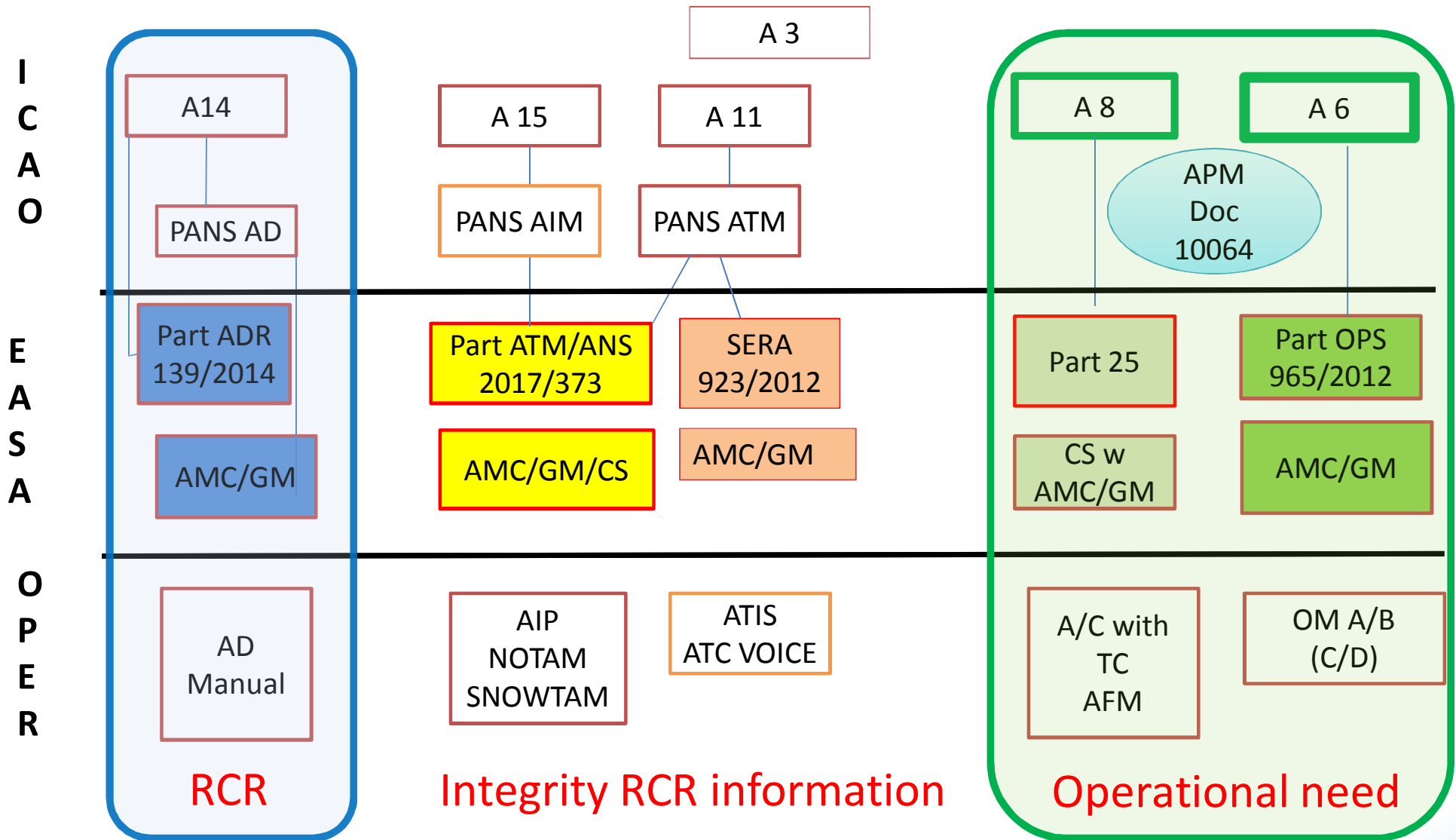
- Implementation
- Training
- Technical issues/Programming

Willingness to change

Change to



Doc Hierarchy Europe



Simplicity

WET

For aerodromes not exposed to snow, slush or ice

Simplicity

DRY

Simplicity

DRY

WET

Simplicity

DRY

WET

WET (slippery wet)

Simplicity

DRY

WET

Simplicity

WET (slippery wet)

STANDING WATER

DRY

WET

Simplicity

WET (slippery wet)



3 mm

STANDING WATER

DRY

Up to and including 3 mm
WET - Report RCR using ATM/ATS only.

WET

WET (slippery wet)



STANDING WATER

3 mm

More than 3 mm
WET (Slippery wet runway) – Report RCR using
AIM/AIS and;
ATM/ATS.

DRY

Up to and including 3 mm
WET - Report RCR using ATM/ATS only.

WET

WET (slippery wet)

3 mm

Maintenance issue
NOTAM

STANDING WATER

More than 3 mm
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STANDING WATER

More than 3 mm
WET (Slippery wet runway) – Report RCR using
AIM/AIS and;
ATM/ATS.

Main focus on the path of the wheels along the runway

3mm depth - Assessed

Even if measured; the measured value has to be judged to be representative for the runway thirds.

Maintenance issue: How the runway

- drains during a rainstorm;
 - Rutting – streams of water?
- dries up after a rainfall
 - Ponding?



Main focus on the path of the wheels along the runway

KEY IMPROVEMENT

Table A-1. RCAM — WET and DRY only (based on PANS-Aerodromes (Doc 9981))

RUNWAY CONDITION ASSESSMENT MATRIX (RCAM)			
Assessment criteria		Downgrade assessment criteria	
Runway condition code (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 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.— An RWYCC 5,4,3 or 2 cannot be upgraded.

RCR/SNOWTAM

- Single standardised reporting format
- Structured information according to pilots need

Written procedures

KEY IMPROVEMENT

RCR/SNOWTAM

Runway Condition Assessment Matrix (RCAM)			
Assessment Criteria		Downgrade Assessment Criteria	
Runway Condition Code	Runway Surface Description	Aeroplane Deceleration Or Directional Control Observation	Pilot Braking Action Advisory Report
6	• DRY	---	---
5	• FROST • WET (The runway surface is covered by any visible dampness or water less than 3 mm deep) <i>Less than 3 mm depth:</i> • SLUSH • DRY SNOW • WET SNOW	Braking deceleration is normal for the wheel braking effort applied AND directional control is normal.	GOOD
4	<i>-15°C and Lower outside air temperature:</i> • COMPACTED SNOW	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 <i>3 mm and more depth:-</i> • DRY SNOW • WET SNOW <i>Higher than -15°C outside air temperature:</i> • COMPACTED SNOW	Braking deceleration is noticeably reduced for the wheel braking effort applied OR directional control is noticeably reduced.	MEDIUM
2	<i>3 mm and more depth of water or slush:</i> • STANDING WATER • SLUSH	Braking deceleration OR directional control is between Medium and Poor.	MEDIUM TO POOR.
1	• ICE ²	Braking deceleration is significantly reduced for the wheel braking effort applied OR directional control is significantly reduced.	POOR.
0	• WET ICE ² • WATER ON TOP OF COMPACTED SNOW ² • DRY SNOW or WET SNOW ON TOP OF ICE ²	Braking deceleration is minimal to non-existent for the wheel braking effort applied OR directional control is uncertain.	LESS THAN POOR.

- Single standardised reporting format
- Structured information according to pilots need

Written procedures

Operational need

The information
is being generated
in a standardised format
in order to meet an
operation need.

Runway Condition Report (RCR)

Runway Condition Report (RCR)

- Aerodrome operator
- **Origin** of information
 - Data collection
 - Assessment
 - Creating information
- **Annex 14 Vol I - Aerodromes**
- **PANS-Aerodromes (Doc 9981)**
- **Circular 355**

- Aircraft (Aeroplane) operator
- **Use** of information
 - Intended operation
 - Landing
 - Take off
 - Maintenance
- **Annex 8**
- **Annex 6, Part II**
- **Aeroplane Performance Manual (Doc 10064 New)**

Why is the Runway Condition Report generated?

Why do we provide the information?

Runway Condition Report (RCR)

- ICAO definition:

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

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

Runway Condition Report (RCR)

- 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.

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The information in the RCR – Why?

- Aeroplane performance section
 - Take-off from a runway
 - Landing on a destination aerodrome or an alternate aerodrome
- Situational awareness section

The information in the RCR – Why?

- Aeroplane performance section
 - Aerodrome location indicator
 - **Date and time of assessment**

The date and time information allows the flight crew to assess the magnitude of a possible evolution of the situation since the report was generated.

The report itself is a snapshot at a given time.

The information in the RCR – Why?

- Aeroplane performance section
 - Aerodrome location indicator
 - Date and time of assessment
 - Lower runway designation number

The observation for the different runway thirds is always reported as seen from the lowest runway designation number. There needs to be a standardised way of disseminating the information. However when reported from the tower always gives the information (1st 2nd 3rd third) in the operational direction.

The information in the RCR – Why?

- Aeroplane performance section
 - Aerodrome location indicator
 - Date and time of assessment
 - Lower runway designation number
 - **RWYCC for each runway third**

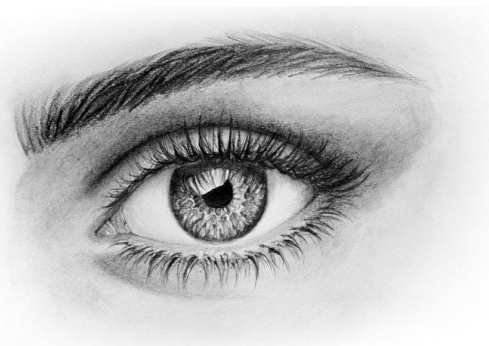
The code is assessed using the Runway Condition Assessment Matrix (RCAM) and associated procedures.

The code classifies the available braking action in one of 7 categories.

The assessed runway condition code is a direct input into a landing performance assessment at time of arrival.

The information in the RCR – Why?

- Aeroplane performance section
 - Aerodrome location indicator
 - Date and time of assessment
 - Lower runway designation number
 - RWYCC for each runway third
 - Per cent coverage contaminant for each runway third



25

When the per cent coverage exceeds 25 in a runway third it is understood that the runway contamination affects aeroplane performance.

The information in the RCR – Why?

- Aeroplane performance section
 - Aerodrome location indicator
 - Date and time of assessment
 - Lower runway designation number
 - RWYCC for each runway third
 - Per cent coverage contaminant for each runway third
 - Depth of loose contaminant for each runway third

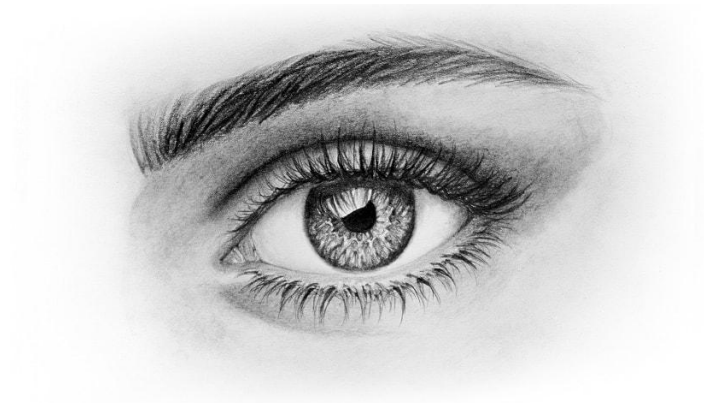
This information applies only to **STANDING WATER, SLUSH, WET SNOW or DRY SNOW**

This information is input into a take-off performance calculation

Depth assessment

Table II-1-2. Depth assessment for contaminants

<i>Contaminant</i>	<i>Valid values to be reported</i>	<i>Significant change</i>
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
WET SNOW	03, then assessed value	5 mm
DRY SNOW	03, then assessed value	20 mm



3 mm

The information in the RCR – Why?

- Aeroplane performance section
 - Aerodrome location indicator
 - Date and time of assessment
 - Lower runway designation number
 - RWYCC for each runway third
 - Per cent coverage contaminant for each runway third
 - Depth of loose contaminant for each runway third
 - Condition description for each runway third

Only contaminants listed in Annex 14 Vol I, 8th Edition 2.9.5 shall be used.

Descriptors

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

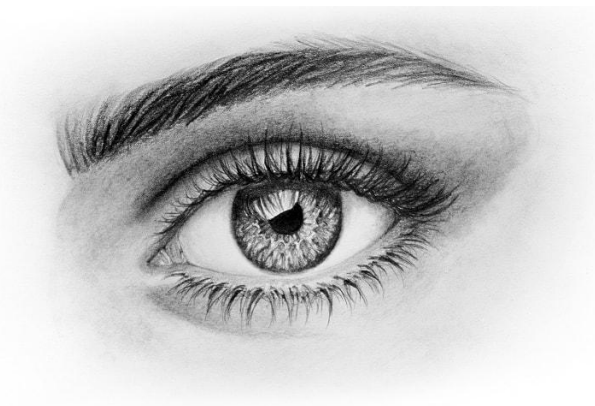
COMPACTED SNOW
DRY
DRY SNOW
DRY SNOW ON TOP OF COMPACTED SNOW
DRY SNOW ON TOP OF ICE
FROST
ICE
SLUSH
STANDING WATER
WATER ON TOP OF COMPACTED SNOW
WET
WET ICE
WET SNOW
WET SNOW ON TOP OF COMPACTED SNOW
WET SNOW ON TOP OF ICE
CHEMICALLY TREATED
LOOSE SAND



The information in the RCR – Why?

- Aeroplane performance section
 - Aerodrome location indicator
 - Date and time of assessment
 - Lower runway designation number
 - RWYCC for each runway third
 - Per cent coverage contaminant for each runway third
 - Depth of loose contaminant for each runway third
 - Condition description for each runway third
 - **Width of runway to which the RWYCC apply if less than published width**

Used when the clearing cannot occur on the entire published width of the runway. Relevant for crosswind considerations.



The information in the RCR – Why?

- Aeroplane performance section
 - Aerodrome location indicator
 - Date and time of assessment
 - Lower runway designation number
 - RWYCC for each runway third
 - Per cent coverage contaminant for each runway third
 - Depth of loose contaminant for each runway third
 - Condition description for each runway third
 - Width of runway to which the RWYCC apply if less than published width



Most important tool

The information in the RCR – Why?

- Situational awareness section

The information in the RCR – Why?

- Situational awareness section
 - Reduced runway length

NOTAM

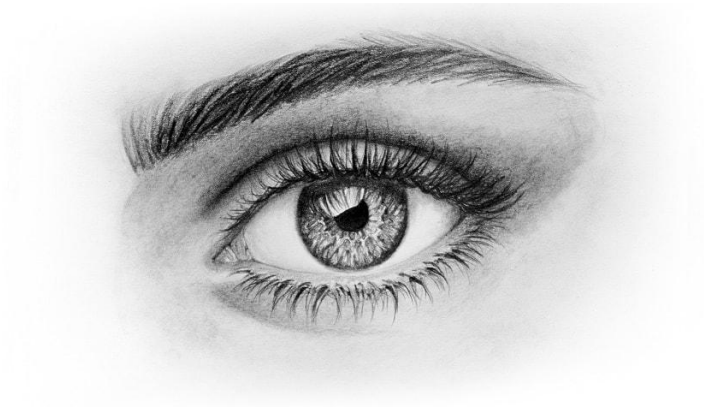
If the LDA has been reduced by NOTAM this information should be given using a standardized fixed text

Example: RWY 22L LDA REDUCED TO 1450.

NB! This information is used in landing performance calculations.

The information in the RCR – Why?

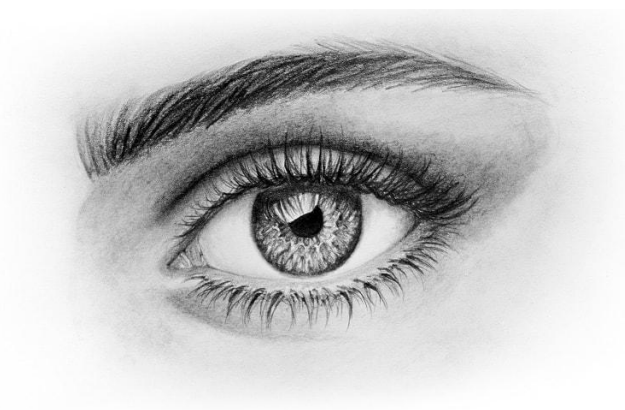
- Situational awareness section
 - Reduced runway length
 - **Drifting snow on the runway**



Can give an optical illusion of a 'moving runway' in crosswind conditions.

The information in the RCR – Why?

- Situational awareness section
 - Reduced runway length
 - Drifting snow on the runway
 - **Loose sand on the runway**



Standardised information - LOOSE SAND

Loose sand can inject into engines, and consequently can affect the use of reverse thrust.

The information in the RCR – Why?

- Situational awareness section
 - Reduced runway length
 - Drifting snow on the runway
 - Loose sand on the runway
 - Chemical treatment on the runway

This information might be used for monitoring the exposure to chemicals.

The information in the RCR – Why?

- Situational awareness section
 - Reduced runway length
 - Drifting snow on the runway
 - Loose sand on the runway
 - Chemical treatment on the runway
 - Taxiway conditions
 - Apron conditions

This information is given only if the conditions has been assessed as POOR.
Flight crew will adjust their speed & techniques accordingly.

The information in the RCR – Why?

- Situational awareness section
 - Reduced runway length
 - Drifting snow on the runway
 - Loose sand on the runway
 - Chemical treatment on the runway
 - Taxiway conditions
 - Apron conditions
 - State-approved, and published use of, measured friction coefficient

The ICAO SNOWTAM format do not make use of measured friction coefficient as an operational information to be reported.

FAA SAFO 19001, Landing Performance Assessment at Time of Arrival, 11 March 2019.

- *Friction equipment values are no longer used to determine and report surface conditions because joint industry and multi-national government tests have not established a reliable correlation between runway friction values and the relationship to airplane braking performance.*
- **ICAO: Friction coefficients was removed from the SNOWTAM format in 2013.**

The information in the RCR – Why?

- Situational awareness section
 - Reduced runway length
 - Drifting snow on the runway
 - Loose sand on the runway
 - Chemical treatment on the runway
 - Taxiway conditions
 - Apron conditions
 - State-approved, and published use of, measured friction coefficient
 - Plain language remarks.

Any other significant information.

The information in the RCR – Why?

SAFE OPERATION
OF
THE
AEROPLANE

Questions

