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**ACI/ICAO
GLOBAL
REPORTING
FORMAT
COURSE**



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Session 4 – Introducing GRF concept

□ End- Objectives

At the end of the session, the participants should be able to :

- Explain the purpose of GRF and its importance
- Demonstrate familiarization with the fundamental elements of ICAO's GRF

- ❑ **Why GRF?**
- ❑ **Fundamental elements of GRF(5)**
 - ❖ **Runway condition assessment matrix(RCAM)**
 - ❖ **Runway surface conditions**
 - ❖ **Runway surface condition descriptors**
 - ❖ **Runway condition codes(RWYCC)**
 - ❖ **Runway condition report (RCR)**

Why GRF?

- Safe operations of aircraft on runways is critical for aviation safety
- Runway excursions identified as one of the most serious runway safety issue
- 80% runway excursion accidents between 1995 and 2008 where due to contaminated runways(water, snow, ice, slush)
- Accurate information on runway conditions is essential to reduce the risk of runway excursions

Why GRF?

- ❑ Accurate information allows flight crews to determine aircraft take-off and landing performance
 - ✓ Enable them to make informed decisions on how they will approach take off or landing in the given conditions

- ❑ Some countries developed their own systems to assess and report of runway surfaces

- ❑ Considering the expanding number of international flights – critical need to harmonize the different processes

Why GRF?

- ❑ GRF developed to ensure global consistency in how runway surfaces conditions are assessed and reported
 - ✓ Harmonized terminology
 - ✓ Harmonized process of assessing and reporting RWY surface conditions
 - ✓ Can easily be used by flight crews to calculate aircraft take-off and landing performances

Fundamental elements of GRF

- 5 fundamental elements :
 - ❖ Runway condition assessment matrix(RCAM)
 - ❖ Runway surface conditions
 - ❖ Runway surface condition descriptors
 - ❖ Runway surface condition code(RWYCC)
 - ❖ Runway condition report (RCR)

Fundamental elements of GRF

- ❑ Runway condition assessment matrix(RCAM)
 - ❖ 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.
 - ❖ Tool to be used in compliance with procedures related to
 - ✓ Assessment criteria
 - ✓ Downgrade assessment criteria

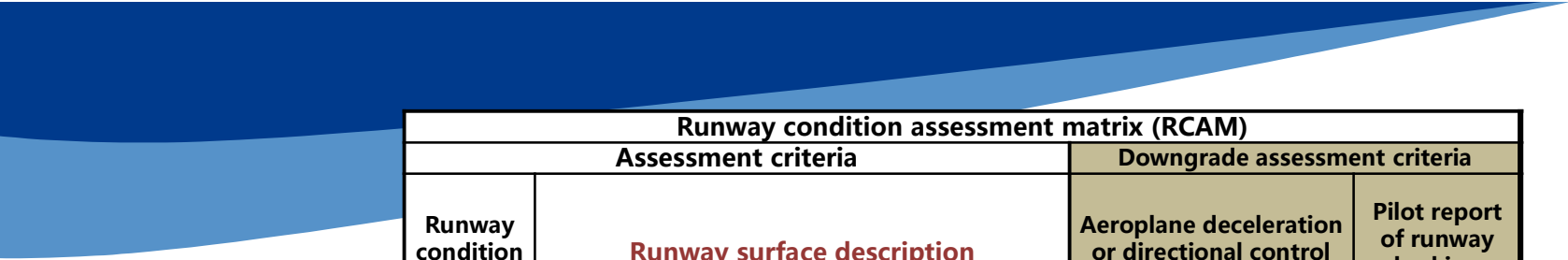
Fundamental elements of GRF

- ❑ Runway condition assessment matrix(RCAM)
 - ❖ Allows objective assessments - tied directly to criteria relevant for aerodrome performance
 - ❖ Assessment criteria determined by aeroplane manufacturers
 - ✓ Based on aeroplane braking performance



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	<ul style="list-style-type: none"> • DRY 	---	---
5	<ul style="list-style-type: none"> • FROST • WET (The runway surface is covered by any visible dampness or water up to and including 3 mm depth) <p>Up to and including 3 mm depth:</p> <ul style="list-style-type: none"> • SLUSH • DRY SNOW • WET SNOW 	Braking deceleration is normal for the wheel braking effort applied AND directional control is normal.	GOOD
4	<p>-15°C and Lower outside air temperature:</p> <ul style="list-style-type: none"> • COMPACTED SNOW 	Braking deceleration OR directional control is between Good and Medium.	GOOD TO MEDIUM
3	<ul style="list-style-type: none"> • WET ("slippery wet" runway) • DRY SNOW or WET SNOW (any depth) ON TOP OF COMPACTED SNOW <p>More than 3 mm depth:</p> <ul style="list-style-type: none"> • DRY SNOW • WET SNOW <p>Higher than -15°C outside air temperature¹:</p> <ul style="list-style-type: none"> • COMPACTED SNOW 	Braking deceleration is noticeably reduced for the wheel braking effort applied OR directional control is noticeably reduced.	MEDIUM
2	<p>More than 3 mm depth of water or slush:</p> <ul style="list-style-type: none"> • STANDING WATER • SLUSH 	Braking deceleration OR directional control is between Medium and Poor.	MEDIUM TO POOR
1	<ul style="list-style-type: none"> • ICE ² 	Braking deceleration is significantly reduced for the wheel braking effort applied OR directional control is significantly reduced.	POOR
0	<ul style="list-style-type: none"> • 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



(RCAM)
For aerodromes which never
experiences (or report)
snow and ice conditions

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

Fundamental elements of GRF

- ❑ Runway surface conditions (4)
 - ❖ Dry runway
 - ❖ Wet runway
 - ❖ Slippery wet runway
 - ❖ Contaminated runway

Fundamental elements of GRF

☐ Runway surface conditions (4)

❖ Dry runway:

- ✓ A runway is considered dry if its surface is free of visible moisture and not contaminated within the area to be used

Fundamental elements of GRF

☐ Runway surface conditions (4)

❖ Wet runway:

- ✓ When runway surface is covered by any visible dampness or water up to and including 3 mm deep within the intended area of use



Wet runway

Fundamental elements of GRF

□ Runway surface conditions (4)

❖ Slippery Wet runway:

- ✓ A wet runway where the friction characteristics of a significant portion of the runway has been determined to be degraded

Fundamental elements of GRF

☐ Runway surface conditions (4)

❖ Contaminated runway:

- ✓ When a significant portion of the runway surface area (isolated areas or not) within the length and width being used is covered by one or more of the substances listed as runway condition descriptors



Contaminated runway



Fundamental elements of GRF

- ❑ Runway surface condition descriptors (8)
 - ❖ **Compacted snow**
 - ❖ **Dry snow**
 - ❖ **Frost**
 - ❖ **Ice**
 - ❖ **Slush**
 - ❖ **Standing water**
 - ❖ **Wet ice**
 - ❖ **Wet snow**

Fundamental elements of GRF

- ❑ Runway surface condition descriptors (8)
 - ❖ **Compacted snow** : Snow that has been compacted into a solid mass such that aeroplane tires, at operating pressures and loadings will run on the surface without significant further compaction or rutting of the surface
 - ❖ **Dry snow** : Snow from which a snowball cannot readily be made

Fundamental elements of GRF

- ❑ Runway surface condition descriptors (8)
 - ❖ **Frost** : Frost consists of ice crystal formed from airborne moisture on a surface whose temperature is below freezing;
 - ✓ frost crystals grow independently and have a more granular texture than ice
 - ❖ **Ice** : Water that as frozen or compacted snow that has transitioned into ice, in cold and dry conditions

Fundamental elements of GRF

- ❑ Runway surface condition descriptors (8)
 - ❖ **Slush** : Snow that is so water saturated that water will drain from it when a handful is picked up or will splatter if stepped on forcefully
 - ❖ **Standing water** : Water of depth greater than 3 mm

Fundamental elements of GRF

- ❑ Runway surface condition descriptors (8)
 - ❖ **Wet ice** : Ice with water on top of it or ice that is melting

 - ❖ **Wet snow**: Snow that contains enough water content to be able to make a well compacted , solid snowball , but water will not squeeze out

A decorative graphic consisting of two overlapping blue shapes that tapers to the right, extending from the top left towards the top right of the page. The top shape is a dark blue triangle, and the bottom shape is a lighter blue trapezoid.

PROGRESS TESTS

Fundamental elements of GRF

- ❑ Runway surface condition code(RWYCC)
 - ❖ Number describing the runway surface condition to be used in the RCR
 - ❖ Purpose: Permit an operational aeroplane performance calculation by flight crew

Fundamental elements of GRF

☐ Runway surface condition code(RWYCC)

Runway condition description	RWYCC
Dry	6
<ul style="list-style-type: none"> ▪ Wet ▪ Frost; ▪ \geqto 3mm depth : slush, dry snow, wet snow 	5
<ul style="list-style-type: none"> ▪ Compacted snow – air temperature < 15 degrees celsius 	4
<ul style="list-style-type: none"> ▪ Slippery wet ▪ >3mm depth : Dry snow , Wet snow, ▪ Dry snow or wet snow on top of compacted snow ▪ Compacted snow – air temperature > 15 degrees celsius 	3
>3mm depth : Standing water ; slush	2
<ul style="list-style-type: none"> ▪ Ice 	1
<ul style="list-style-type: none"> ▪ Wet ice, dry or wet snow on top of ice, water on top of compacted snow 	0

Fundamental elements of GRF

Pilot report of braking action	Description	RWYCC
N/A		6
GOOD	Braking deceleration is normal for the wheel braking effort AND directional control is normal	5
GOOD TO MEDIUM	Braking deceleration OR directional 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

Fundamental elements of GRF

- ❑ Runway condition report (RCR)
 - ❖ Standardized report relating to runway surface conditions and its effect on the aeroplane landing and take-off performance

 - ❖ Contain information relevant for :
 - ✓ Aeroplane performance
 - ✓ Situational awareness

Aeroplane performance calculation section

Information	Source
Aerodrome location indicator	ICAO Doc 7910, <i>Location Indicators</i>
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
Width of runway to which the RWYCCs apply if less than published width	Visual observations while at the RWY and information from local procedures/snow plan

Situational awareness section

Reduced runway length	NOTAM
Drifting snow on the runway	Visual observation while at RWY
Loose sand on the runway	Visual observation while at RWY
Chemical treatment on the runway	Known treatment application. Visual observation of residual chemicals on the runway
Snowbanks on the runway	Visual observations while at the RWY
Snowbanks on taxiway	Visual observations while at the taxiway (TWY)
Snowbanks adjacent to the runway penetrating level/profile set in the aerodrome snow plan	Visual observations while at the RWY confirmed by measurements when appropriate
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

Fundamental elements of GRF

- ☐ Runway condition report (RCR)

RCR

----- Aerodrome	----- Date & Time	----- RWY	----- RWYCC	----- % Coverage	----- Depth in mm
..... Contaminant Type 1st third	 Contaminant Type 2nd third	 Contaminant Type 3rd third	
Plain language remarks Reduced RWY width in m (if applicable)
.....					

PROGRESS TESTS



Any Questions?



GLOBAL TRAINING



Any Questions?



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