

AUTORITATEA AERONAUTICĂ CIVILĂ

A REPUBLICII MOLDOVA

GM-AER-CAO.GRF

Guidance material on the use of the Global Reporting Format and runway condition code (assessment and reporting of runway surface condition) REPUBLICA MOLDOVA MINISTERUL ECONOMIEI ŞI INFRASTRUCTURII



РЕСПУБЛИКА МОЛДОВА МИНИСТЕРСТВО ЭКОНОМИКИ И ИНФРАСТРУКТУРЫ

O R D I N

cu privire la aprobarea ediției 01 a Materialelor de îndrumare privind utilizarea formatului global de raportare și codul de stare a pistei (GM-AER-CAO.GRF)

nr. 21/GEN din 19.04.2021

Monitorul Oficial nr.108-110/448 din 30.04.2021

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În temeiul art.7 alin.(3) subp.1) lit.d) din Codul aerian al Republicii Moldova nr.301/2017 și punctului 10 subp.1) lit.d.) din Regulamentul cu privire la organizarea și funcționarea Autorității Aeronautice Civile, aprobat prin Hotărârea Guvernului Republicii Moldova nr.133/2019, întru executarea atribuțiilor ce îi revin Autorității Aeronautice Civile în calitate de autoritate administrativă de certificare, supraveghere și control în domeniul aviației civile, în scopul facilitării implementării prevederilor referitoare la formatul global de raportare a datelor privind condițiile pistei, cuprinse în Specificațiile de certificare la Regulamentul privind procedurile administrative referitoare la aerodromuri (CS-ADR-DSN) și Cerințele tehnice privind proiectarea și exploatarea aerodromurilor (CT-AD) aprobate de Autoritatea Aeronautică Civilă,

ORDON:

1. Se aprobă ediția 01 a Materialelor de îndrumare privind utilizarea formatului global de raportare și codul de stare a pistei (GM-AER-CAO.GRF), conform Anexei la prezentul Ordin.

2. Autoritatea Aeronautică Civilă va pune la dispoziția tuturor persoanelor interesate Anexa la prezentul ordin prin publicarea pe pagina web oficială <u>www.caa.md</u>, la compartimentul "Cadrul Normativ/GM".

3. Prezentul ordin intră în vigoare la data publicării în Monitorul Oficial al Republicii Moldova.

DIRECTOR

Octavian NICOLAESCU

Nr.21/GEN. Chişinău, 19 aprilie 2021.

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RULES OF AMENDMENT

- (1) The provisions of the GM shall be modified only by amendment.
- (2) The amendment shall be approved through the general Order of the CAA Director.
- (3) After approval of the amendment, the GM's holder shall introduce the new issued pages and destroy the replaced pages.
- (4) A new edition of GM is issued if the volume of changes exceeds 30% of its content.

RECORDS OF AMENDMENT

No.	Edition/ Amendment no.	Approval order /Date of entry into force	Inserted by	Signature
1	Edition no.01	No.21/GEN of 19.04.2021/ 30.04.2021		

CHAPTER 1. GENERAL PROVISIONS

1.1 Definitions

When used in this GM, the terms below have the following meanings:

- 1) **Contaminant -** material that collects on a surface, including standing water, snow, slush, compacted snow, ice, frost, sand, and ice control chemicals.
- 2) **Percent coverage of contaminant** the estimated amount of contaminant present on the surface of the runway and reported as percentage of the assessed surface.
- 3) **Sand** small particles of crushed angular mineral aggregates or natural sand material used to improve runway surface friction levels.
- 4) **Significant change** a change in the magnitude of a hazard, which leads to a change in the safe operation of the aircraft.
- 5) **Snow drift** a heap or mound of snow created by action of the wind.
- Note: Other terms used in this GM are defined in Certification specifications (CS-ADR-DSN) and Technical requirements on design and operation of aerodromes (CT-AD) approved by the Civil Aviation Authority.

1.2 Abbreviations

The acronyms/abbreviations used in this GM have the following meanings:

AIM	Aeronautical Information Management
ANSP	Air Navigation Service Provider
ATC	Air Traffic Controller
ATM	Air Traffic Management
CAA	Civil Aviation Authority of the Republic of Moldova
GM	Guidance Material
GRF	Global Reporting Format
ICAO	International Civil Aviation Organization
MET	Meteorological
NOTAM	Notice to airman
PANS	Procedures for Air Navigation Services
RCAM	Runway Condition Assessment Matrix
RCR	Runway Condition Report
RFI	Runway Friction Index, µ
RWY	Runway
RWYCC	Runway Condition Code

1.3 Scope

The purpose of this document is to introduce and provide advisory information pertinent to the implementation of GRF for assessment and reporting of RWY surface conditions, from 04 of November 2021, so that all the concerned stakeholders such as, aerodrome operators, aircraft operators, pilots apply it to their respective operations, taking into account the provisions of:

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- 1) Government decision no.653/2018 on approval of the Regulation regarding administrative procedures related to aerodromes and applicable CS, AMC&GM (GD no.653/2018);
- 2) Government decision no.737/2020 on approval of the Regulation on administrative requirements for certain categories of aerodromes;
- 3) Technical requirements on design and operation of aerodromes (CT-AD).

1.4 Applicability

This GM is applicable to the aerodromes with a paved RWY surfaces which are affected by ice, snow and water as the contaminant.

1.5 Expected benefits of the GRF

- (1) Reporting of runway surface condition in a standardized manner.
- (2) Establish a common language between all stakeholders in the system: aerodrome operators, aircraft operators, pilots, ANSPs (ATCs), AIM, MET, aircraft manufacturers, etc.
- (3) Allow pilots to accurately determine airplane take-off and landing performance.

1.6 References

- 1) Technical requirements- Meteorological service for air navigation (CT-MET);
- 2) Technical requirements Aeronautical Information Services (CT-SIA);
- 3) Government decision no.831/2018 on approval of the Regulation regarding administrative procedures related to air operations and applicable AMC&GM;
- 4) ICAO Circular 355 Assessment, Measurement and Reporting of Runway Surface Conditions;
- 5) PANS-Aerodromes (ICAO Doc 9981);
- 6) PANS-AIM (ICAO Doc 10066);
- 7) PANS-ATM (ICAO Doc 4444);
- 8) Aeroplane Performance Manual (ICAO Doc 10064);
- 9) Airport Services Manual, Part 2 Pavement Surface Conditions, Part 8 Airport Operational Services and Part 9 Airport Maintenance Practices (ICAO Doc 9137).

CHAPTER 2. INTRODUCTION

- (1) The Friction Task Force, established by ICAO, inferred that there is no correlation between runway friction values and aircraft braking performance, thereby potentially causing safety events especially runway excursion.
- (2) With the objective of improving safety level in such area, ICAO has developed an updated and harmonized procedure, commonly known as the GRF, enabling the harmonized assessment and reporting of runway surface conditions and a correspondingly improved flight crew assessment of take-off and landing performance.
- (3) This new concept eliminates most of the shortfalls in accuracy and timeliness of current procedures through effective communication among all concerned stakeholders like aerodrome operators, aircraft operators, pilots etc., of relevant and reliable information on runway surface condition with respect to the nature of contaminants, the depth and coverage of contamination and their effect on friction between the runway and the aircraft's wheels.
- (4) Considering the various constraints in normalizing operations on airports from the Republic of Moldova, it is imperative that airports implement GRF so that the risk of occurrence of a safety event like runway excursion is further reduced thereby averting consequences in airport.

Table 1

CHAPTER 3. ASSESSMENT AND REPORTING OF RUNWAY SURFACE CONDITION

Note: For more detailed information (with examples) on assessment and reporting of runway surface condition see ICAO Doc 9981 - PANS-Aerodromes, Part II, Chapter 2.

3.1 Runway Condition Assessment

3.1.1 Runway Condition Assessment Matrix (RCAM)

(1) The RCAM (Table 1) is the method by which the aerodrome operator determines a RWYCC for each runway third, whenever water, snow, slush, ice or frost is present on the runway surface.

Runway condition assessment matrix (RCAM)				
	Assessment criteria	Downgrade assessment cri	iteria	
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 depth) Up to and including 3 mm depth: SLUSH DRY SNOW WET SNOW 	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 	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>More than 3 mm 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	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	Braking deceleration is significantly reduced for the wheel braking effort applied OR directional control is significantly reduced.	POOR	
0	•WET ICE •WATER ON TOP OF COMPACTED SNOW •DRY SNOW or WET SNOW ON TOP OF ICE	Braking deceleration is minimal to non- existent for the wheel braking effort applied OR directional control is uncertain.	LESS than POOR	

- (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 first column of RCAM is for Assessment Criteria that 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.
- (5) The Runway Surface Description column lists contaminants that are directly correlated to aeroplane landing performance. The description sections, ranging in terms of slipperiness, are categorized based on type and depth of contaminant and outside air temperature.
- (6) Runway Condition Codes in RCAM represent the runway condition description based on defined terms and increments. Use of these codes harmonizes with GD no.653/2018 and CT-AD, providing a standardized "shorthand" format for reporting runway condition, which can be used by pilots to determine landing performance parameters.
- (7) A RWYCC is determined using the RCAM based on type and depth of contaminant, percentage coverage and outside air temperature. When available, the runway surface temperature should be used.

3.1.2 Determination of Runway Condition Code (RWYCC)

- (1) The RWYCC is initially determined through use of the RCAM (Table 1).
- (2) When the runway third contains a single contaminant, the RWYCC for that third is based directly on that contaminant in the RCAM as shown in Figure 1.



Figure 1

(3) If the contaminant coverage for that third is less than 10 per cent, a RWYCC of 6 is to be generated for that third and no contaminant is to be reported. If all thirds have less than 10 percent contaminant coverage, no report is generated; or

- (4) If the per cent contaminant coverage for that third is greater than or equal to 10 percent and less than or equal to 25 per cent, a RWYCC of 6 is to be generated for that third and the contaminant reported at 25 per cent coverage; or
- (5) If the per cent contaminant coverage for that third is greater than 25 per cent, the RWYCC for that third shall be based on the contaminant present.

3.1.3 Downgrade Assessment Criteria

- (1) The aerodrome operator should consider downgrading a RWYCC when RFI measurements (if available), pilot reports or other observations reveal that the runway surface is more slippery than the RWYCC that was initially determined.
- (2) The 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.
- (3) A pilot report of braking action should be taken into consideration for downgrading purposes.
- (4) 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 operation.

3.1.4 Upgrade Assessment Criteria

- (1) Given the variability of certain contaminants, there are circumstances when a RWYCC of 0 or 1 may not be as slippery as the RWYCC generated by the RCAM.
- (2) An assigned RWYCC of 5, 4, 3, or 2 cannot be upgraded.
- (3) The airport or aerodrome operator may upgrade a RWYCC of 0 or 1 up to but no higher than a RWYCC of 3.

3.2 Runway Condition Reporting (RCR)

The Runway condition Reporting comprises two sections:

- (1) Aeroplane Performance Calculation Section;
- (2) Situational awareness section.

3.2.1 Aeroplane Performance Calculation Section

(1) This section basically consists of eight elements that are described by the block diagram as shown in Figure 2 where M, C and O stand for Mandatory, Conditional and Optional.



a) Aerodrome Location Indicator

This is the first element of RCR that clearly specifies the aerodrome for which the RCR is prepared. A four-letter ICAO location indicator assigned to the aerodrome is provided to this element of RCR.

Example: LUKK

b) Date and time of assessment

This is the second element of RCR to which Coordinated Universal Time (UTC) is provided complying the time frame 'mm/dd/hhmm'. For example, if the Runway Condition is assessed at 8:30 on 15th of February at LUKK, the corresponding RCR shall be as follows:

Example: LUKK 02150630

c) Lower Runway Designation

The runway shall be considered to be of three equal segments and the runway condition shall be assessed for each third of the runway considering the assessment from lower runway designation side.



Figure 3

<u>Example</u>: The assessment of runway condition at LUKK should be carried out from lower designation side 'RWY 08' or 'RWY 09' as shown above in Figure 3.

 Runway condition code for each runway third
 After assessment of condition for each runway third, a corresponding RWYCC shall be assigned to them from RCAM and shall be separated by slash '/'.

<u>Example</u>: If 1st, 2nd and 3rd Runway third from lower designation is dry, wet and slippery wet, this element of RCR shall be described as: 6/5/3.

e) Percent coverage contaminant for each runway third

For assessed percent of coverage of contamination for each runway third, a corresponding value in column "Percent to be Reported" of the Table 2 shall be reported to this fifth element of RCR. The value for each Runway Third shall be separated by slash '/'

Assessed percent	Percent to be reported	RWYCC
≤9	NR	6
10-25	25	6
26-50	50	Pacad an
51-75	75	Based OII
76-100	100	contaminant/descriptor

Table 2. Percentage of coverage for contaminants

Example: 25/50/NR

f) Depth of loose contaminant The depth in millimeter (mm) of any loose contaminant is required to be provided for each Runway third. Such values shall be expressed in two digit form and be separated from each other by slash '/'. The Table 3 describes the contaminant applicable for RCR with respect to the RCAM.

 Table 3. Depth assessment for contaminants

Contaminant	Valid values to be reported	Significant change
STANDING WATER	04, then assessed value	3 mm up to and including 15mm
SLUSH	03, then assessed value	3 mm up to and including 15mm
WET SNOW	03, then assessed value	5 mm
DRY SNOW	03, then assessed value	20 mm

Example: 04/06/12 [STANDING WATER]

g) Condition description for each runway third The surface condition of each runway third is required to be provided to this element of RCR in terms of various surface descriptors given in RCAM like DRY, WET, STANDING WATER. They shall be in capital letter and be separated by slash '/'.

Example: DRY/WET/STANDING WATER

 Width of runway to which the RWYCCs apply if less than published width If the width of the runway to which the RWYCC applies is less than the published width, it should be provided through this element of RCR.

Example: 30

(1) RCR Information String

RCR information string that consists of all eight elements as described above is expressed as below:

			//_	_/_/_	_/_/_	//	
Aerodrome	Date &Time	RWY	RWYCC	%Coverage	Depth	Contaminant	Reduced
				of	-	type	RWY
				Contaminant			Width

Example:

Runway assessment done at 8:30 on 15th of February at LUKK shows that First Third is 20% Wet, Second Third is 5% Wet and Third Third has 40% water of maximum 5mm depth.

ICAO Location Indicator: LUKK

UTC timeframe for 8:30: month 02, day 15, time 06h 30m

Lower Runway Designation: RWY 08

Referring table, 20% damp is to be reported as 25% WET and RWYCC is assigned as 6 for First Third, 5% damp is not required to be reported thereby reported as NR and RWYCC is assigned as 6 for Second Third. And 40% water is to be reported as 50% STANDING WATER and RWYCC is assigned as 2 for Third Runway Third.

Since the depth of contaminant like STANDING WATER only above 3mm is to be reported, the reporting of the same shall be NR for the First and Second Runway Third. Hence, the RCR for this case will be as follows:

LUKK 02150630 08 6/6/2 25/NR/50 NR/NR/5 WET/DRY/STANDING WATER

3.2.2 Situational Awareness Section

(1) This section provides information on eleven elements that have been shown in Table 4 below. The information to be provided must be in the order of listed eleven elements, where M, C and O stand for Mandatory, Conditional and Optional.

Table 4

1	Reduced Runway length This information is to be published when a NOTAM has been published with a new set of declared distances affecting the LDA.	С
2	Drifting snow on the runway	0
3	Loose sand on the runway	0
4	Chemical treatment on the runway	М
5	Snowbanks on the runway Left or right distance in metres from centre line.	0
6	Snowbanks on the taxiway Left or right distance in metres from centre line.	Ο
7	Snowbanks adjacent to the runway	0
8	Taxiway conditions	0
9	Apron conditions	0
10	State-approved and published use of measured friction Whenever an operational runway is contaminated by ice or compacted snow the overall runway surface assessment is made (for detailed information see GM1 ADR.OPS.A.005 "Condition of the movement area and related facilities" (h) and CT-AD p. 2.9.8).	0
11	Plain language remarks	0

3.3 Complete information string

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

[Aeroplane performance calculation section] LUKK 02150630 08 6/6/2 25/NR/50 NR/NR/5 WET/DRY/STANDING WATER

[Situational awareness section]

RWY 26 LDA REDUCED TO 1850. RWY 08 ADJ SNOWBANKS. TWY B POOR. APRON SOUTH POOR.

CHAPTER 4. TRAINING

4.1 Requirements

- (1) Aerodrome operators shall ensure that their personnel are adequately trained to perform their duties.
- (2) It is recommended that aerodrome operators develop a training program for all personnel who will assess and report runway conditions. This training program should include:
 - a) Initial training;
 - b) Annual recurrent training.

4.2 Initial Training

- (1) For the purpose of initial training, aerodrome operators should use the information in this GM to develop and conduct training which includes both:
 - a) a review of the theoretical concepts; and
 - b) practical exercises.
- (2) Initial training should include, but not limited to the following topics:
 - a) assessment and reporting of runway surface friction characteristics;
 - b) calibration, maintenance and use of runway friction measurement device;
 - c) basics of GRF;
 - d) RCAM Components;
 - e) determination along with downgrade and upgrade of RWYCC;
 - f) RCR;
 - g) Measurement technique and assessment.

4.3 Annual Recurrent Training

- (1) For the purpose of annual recurrent training, aerodrome operators should use the information in this GM to develop and conduct appropriate training for their personnel which:
 - a) focuses primarily on the practical aspects of runway condition assessment and reporting; and
 - b) incorporates "lessons learned" from the previous year(s) operations.

APPENDIX A - Process Flowchart for Runway Surface Condition Assessment

