Appendix 5 to Opinion No 02/2019

Draft Annex X to draft Decision 201X/XXX/R

Acceptable Means of Compliance (AMC) and Guidance Material (GM) to Commission Regulation (EU) No 965/2012

related to RMT.0296 (OPS.008(a))

The text of the amendment is arranged to show deleted, new or amended text as shown below:

1. deleted text is ~~struck through~~;
2. new or amended text is highlighted in blue; and
3. an ellipsis (…) indicates that the rest of the text is unchanged.

ANNEX I

Definitions for terms used in Annexes II to VIII

GM2 Annex I Definitions

ABBREVIATIONS AND ACRONYMS

The following abbreviations and acronyms are used in the Annexes to this Regulation:

AIREP	air-report
(…)	
ALAP	aerodrome landing analysis programme
(…)	
ALD	actual landing distance
(…)	
LDF	landing distance factor
(…)	
LDTA	landing distance at time of arrival
(…)	
PFC	porous friction course
(…)	
RCAM	runway condition assessment matrix
(…)	
RCR	runway condition report
(…)	
RWYCC	runway condition code
(…)	

GM17 Annex I Definitions

CONTAMINATED RUNWAY

As the runway condition is reported in runway thirds, a significant portion of the runway surface area is more than 25 % of one third of the runway surface area within the required length and width being used.

The runway length being used in this context is the physical length of runway available, typically from the start of the Take Off Run Available (TORA) in one direction to the start of the TORA in the opposite direction. When the runway is shortened by NOTAM, for example due to works, or the aerodrome operator is not able to clear the full length of the runway and closes part of it for operations, the length being used is that declared in the NOTAM or the “Cleared Length” in the Runway Condition Report.

The runway width being used in this context is the physical width of the runway (between the runway edge lights), or the "Cleared Width" if reported in the Runway Condition Report. It is not intended that 25% coverage is reported when contaminants affect only the runway edges after runway cleaning. Runway inspectors are instructed to focus on the area around the wheel tracks when reporting contaminant type, coverage and depth.

GM18 Annex I Definitions

DRY RUNWAY/WET RUNWAY

The 'area intended to be used' means the area of the runway that is part of the take-off run available (TORA), accelerate and stop distance available (ASDA) or landing distance available (LDA) declared in the aeronautical information publication (AIP) or by notice to airmen (NOTAM).

GM19 Annex I Definitions

RUNWAY SURFACE CONDITION(S)

(a) The runway surface conditions used in the runway condition report establish the performance requirements among the aerodrome operator, aeroplane manufacturer and aeroplane operator.

(b) Aircraft de-icing chemicals and other contaminants are also reported but are not included in the list of runway surface condition descriptors because their effect on runway surface friction characteristics and the runway condition code cannot be evaluated in a standardised manner.

GM20 Annex I Definitions

RUNWAY SURFACE CONDITION DESCRIPTORS - GENERAL

The runways surface condition descriptors are used solely in the context of the runway condition report and are not intended to supersede or replace any existing World Meteorological Organization (WMO) definitions.

RUNWAY SURFACE CONDITION DESCRIPTORS - FROST

(a) Freezing refers the freezing point of water (0 °C).

(b) Under certain conditions, frost can cause the surface to become very slippery, and it is then reported appropriately as 'reduced braking action'.

RUNWAY SURFACE CONDITION DESCRIPTORS – STANDING WATER

Running water of depth greater than 3 mm is reported as 'standing water' by convention.

RUNWAY SURFACE CONDITION DESCRIPTORS – WET ICE

Freezing precipitation can lead to runway conditions associated with wet ice from an aeroplane performance point of view. Wet ice can cause the surface to become very slippery. It is then reported appropriately as reduced braking action.

GM21 Annex I Definitions

LANDING DISTANCE AT TIME OF ARRIVAL

The landing distance data to be used for a landing performance assessment at time of arrival allow to establish an operationally achievable landing distance from 50ft above runway threshold to full stop that takes into account AFM procedures for final approach and landing and is provided as a function of the main influence parameters such as aeroplane mass and configuration, pressure altitude, wind, outside air temperature, runway slope and approach speed increments. It may be provided for use of automation such as autobrakes and autoland and may account for reverse thrust use. As the landing distance at time of arrival is the unfactored minimum landing distance achievable for the assumed conditions, an appropriate margin should be applied to this distance to determine the minimum LDA necessary for a safe stop.

GM22 Annex I Definitions

SLIPPERY WET RUNWAY

(a) The surface friction characteristics of the runway are considered to be degraded when friction values are below the minimum friction level.

(b) A portion of runway in the order of 100 m long may be considered significant.

ANNEX III

ORGANISATION REQUIREMENTS FOR AIR OPERATIONS [PART-ORO]

SUBPART GEN

GENERAL REQUIREMENTS

GM3 ORO.GEN.130(b) Changes related to an AOC holder

CHANGES REQUIRING PRIOR APPROVAL

The following GM is a non-exhaustive checklist of items that require prior approval from the competent authority as specified in the applicable Implementing Rules:

(…)

(n) performance:

(1) increased bank angles at take-off (for performance class A aeroplanes);

(2) short landing operations (for performance class A and B aeroplanes);

(3) steep approach operations (for performance class A and B aeroplanes);

(4) reduced required landing distance operations (for performance class A and B aeroplanes);

(…)

SUBPART MLR

MANUALS, LOGS AND RECORDS

GM1 ORO.MLR.100 Operations manual — general

CROSSWIND LIMITATIONS IN THE OPERATIONS MANUAL (OM)

When publishing operational crosswind limitations in Part B of the OM in accordance with AMC3 ORO.MLR.100, operators should consider:

(a) the following manufacturer's information:

(1) values published in the 'Limitations' Section of the AFM;

(2) maximum demonstrated crosswind values, when more limiting values are not published in the 'Limitations' Section of the AFM;

(3) gust values; and

(4) additional guidance or recommendations;

(b) operational experience; and

(c) operating-environment factors such as:

(1) runway width;

(2) runway surface condition; and

(3) prevailing weather conditions.

ANNEX IV

COMMERCIAL AIR TRANSPORT OPERATIONS [PART-CAT]

SUBPART B

Operating procedures

SECTION 1 - Motor-powered aircraft

AMC1 CAT.OP.MPA.300(a) Approach and landing conditions — aeroplanes

~~IN-FLIGHT DETERMINATION OF THE~~ LANDING DISTANCE ASSESSMENT

(a) The in-flight ~~determination of the~~ landing distance assessment should be based on the latest available ~~meteorological~~ weather report ~~or~~and runway ~~state~~condition report (RCR)~~, preferably not more than 30 minutes before the expected landing time~~.

(b) The assessment should be initially carried out when weather report and RCR are obtained, usually around top of descent. If the planned duration of the flight does not allow to carry out the assessment in non-critical phases of flight, the assessment should be carried out before departure.

(c) When meteorological conditions may lead to a degradation of the runway surface condition, the assessment should include consideration of how much deterioration in runway surface friction characteristics may be tolerated, so that a quick decision can be made prior to landing, if the flight crew of the preceding aircraft landing at the same runway provides a special air-report (AIREP) of worse than expected braking action.

(d) The flight crew should monitor the evolution of the actual conditions during the approach, to ensure that they do not degrade below the condition that was previously determined to be the minimum acceptable.

GM1 CAT.OP.MPA.300(a) Approach and landing conditions — aeroplanes

WIND DATA

The information on wind contained in METAR/SPECI/ATIS reports (average of a 10 minute period) should be the basis for the landing performance calculations, while instant wind information reported by the Tower should be monitored during the approach to ensure that the wind speed does not exceed the assumptions made for landing performance calculations.

AMC1 CAT.OP.MPA.301 Approach and landing conditions — helicopters

IN-FLIGHT DETERMINATION OF THE CONDITION OF THE FATO

The in-flight determination of the FATO suitability for a safe approach, landing or missed approach should be based on the latest available meteorological or runway condition report, preferably no more than 30 minutes before the expected landing time.

AMC1 CAT.OP.MPA.303 In-flight check of the landing distance at the time of arrival — aeroplanes

GENERAL

The assessment of the LDTA begins with the acquisition of the latest available weather information and the RCR. The information provided in the RCR is divided in two sections:

(a) The "aircraft performance" section which contains information that is directly relevant in a performance computation

(b) The "situational awareness" section which contains information that the flight crew should be aware of for a safe operation, but which does not have a direct impact on the performance assessment.

The "aircraft performance" section of the RCR includes a runway condition code (RWYCC), the contaminant type, depth and coverage for each third of the runway.

The determination of the RWYCC is based on the use of the runway condition assessment matrix (RCAM), however, the presentation of the information in the RCAM is appropriate for use by aerodrome personnel trained and competent in assessing the runway condition in a way that is relevant to aircraft performance. While full implementation of the RCAM standard would eventually no longer require the flight crew to derive from various information available to them the appropriate runway condition to be used for the landing performance assessment at the time of arrival, it is desirable that pilots maintain an understanding of the performance effect of various components considered in the assessment.

It is the task of the aerodrome personnel to assess the appropriate RWYCC in order to allow the flight crew to assess any potential change of the runway surface conditions. When no RWYCC is available in winter conditions, the RCAM provides the flight crew with a combination of the relevant information (runway surface conditions: state and/or contaminant or pilot report of braking action (AIREP)) in order to assess the RWYCC.

Table 1 below is an excerpt of the RCAM and permits to carry out the primary assessment based on the reported contaminant type and depth, as well as outside air temperature (OAT).

Table 1 — Association between runway surface condition and RWYCC based on reported contaminant type and depth and OAT

Runway surface condition	Surface condition descriptor	Depth	Notes	RWYCC
Dry		N/a	Including wet or contaminated runways below 25 % coverage in each runway third	6
Wet	Damp (any visible dampness)			5
	Wet	3 mm or less		5
Slippery wet				3
Contaminated	Compacted snow	Any	At or below OAT – 15 °C	4
			Above OAT – 15 °C	3
	Dry snow	3 mm or less		5
		More than 3 mm up to 100 mm	Including when any depth occurs on top of compacted snow	3
		Any	On top of ice	0[2]
	Frost[1]	Any		5
	Ice	Any	In cold and dry conditions	1
	Slush	3 mm or less		5
		More than 3 mm up to 15 mm		2
	Standing water	3 mm or less		5
		More than 3 mm up to 15 mm		2
		Any	On top of ice	0[2]
	Wet ice	Any		0[2]
	Wet snow	3 mm or less		5
		More than 3 mm up to 30 mm	Including when any depth occurs on top of compacted snow	3
		Any	On top of ice	0[2]

Note 1: under certain conditions, frost may cause the surface to become very slippery.

Note 2: operations in conditions where less-than-poor braking action prevails are prohibited.

Note 3: runway surface temperature should preferably be used where available.

A primary assessment may have to be downgraded by the aerodrome operator based on an AIREP of lower braking action than the one typically associated with the type and depth of contaminant on the runway.

Upgrading a RWYCC 5, 4, 3 or 2 determined by the aerodrome operator from the observed contaminant type is not allowed.

A RWYCC 1 or 0 maybe be upgraded by the aerodrome operator to a maximum of RWYCC 3. The reason for the upgrade will be specified in the "situational awareness" section of the RCR.

When the aerodrome operator is approved for operations on specially prepared winter runways, in accordance with Annex V (Part-ADR.OPS) to Regulation (EU) 139/2014, the RWYCC of a runway that is contaminated with compacted snow or ice, may be upgraded to RWYCC 4 upon a specific treatment of the runway. In such cases, the reason for the upgrade will be specified in the "situational awareness" section of the RCR.

Performance information for the assessment of the LDTA correlates the aircraft performance with the RWYCC contained in the RCR, hence the calculation will be based on the RWYCC of the intended runway of landing.

ASSESSMENT OF THE LDTA BASED ON DISPATCH CRITERIA

(a) The required landing distance for dry runways determined in accordance with CAT.POL.A.230(a) contains adequate margin to fulfil the intent of the assessment of the LDTA on a dry runway, as it includes allowance for the additional parameters considered in that calculation;

(b) The required landing distance for wet runways with specific friction improving characteristics determined in accordance with CAT.POL.A.235(a)(3), also contains adequate margin to fulfil the intent of the assessment of the LDTA on such runways, as it includes allowance for the additional parameters considered in that calculation;

(c) When at time of arrival the runway is dry or is a wet runway with specific friction improving characteristics and the overall conditions, including weather at the aerodrome and runway condition, have been confirmed as not changed significantly compared to the time of dispatch, the assessment of the LDTA may be carried out by confirming that the assumptions made at time of dispatch are still valid.

GM1 CAT.OP.MPA.303 In-flight check of the landing distance at the time of arrival — aeroplanes

RCR, RWYCC and RCAM

A detailed description of the RCR format and content, the RWYCC and the RCAM may be found in Annex V (Part-ADR.OPS) to Regulation (EU) 139/2014. Further guidance may be found in the following documents:

(a) ICAO Doc 9981 — 'PANS Aerodromes';

(b) ICAO Doc 4444 — 'PANS ATM';

(c) ICAO Doc 10064 – Aeroplane Performance Manual.

GM1 CAT.OP.MPA.303 In-flight check of the landing distance at time of arrival — aeroplanes

RUNWAY CONDITION CONSIDERATIONS

When available for the portion of the runway that will be used for landing, the following elements are relevant for consideration:

(a) runway condition code (RWYCC);

(b) expected runway conditions (contaminant type and depth);

(c) other information contained in the RCR related to the following elements:

(1) width of the runway to which the RWYCC apply if less than the published runway width;

(2) reduced runway length;

(3) drifting snow on the runway;

(4) loose sand on the runway;

(5) chemical treatment on the runway;

(6) snowbanks on the runway;

(7) snowbanks on taxiways;

(8) snowbanks adjacent to the runway;

(9) taxiway conditions;

(10) apron conditions;

(11) State approved and published use of measured friction coefficient;

(12) plain language remarks;

(d) pilot air-report (AIREP) of braking action.

AIRCRAFT PERFORMANCE CONSIDERATIONS

The following elements may impact landing distance calculations:

(a) runway slope;

(b) aerodrome elevation;

(c) wind;

(d) temperature;

(e) aeroplane mass and configuration;

(f) approach speed at threshold;

(g) eventual adjustments to the landing distance, such as autoland; and

(h) planned use of available and operative aeroplane ground deceleration devices.

AUTOBRAKE USAGE

While autobrakes are a part of the aeroplane's landing configuration, the landing distance assessment at the time of arrival is not intended to force a selection of a higher than reasonable autobrake level. For operations when the runway is dry or wet grooved or with a porous friction course (PFC), if the manual braking distance provides at least 15 % safety margin, then the braking technique may include a combination of autobrakes and manual braking even if the selected autobrake landing data does not provide a 15 % safety margin.

GENERAL

Background information and further guidance on the in-flight check of the LDTA may be found in the ICAO Doc 10064 – Aeroplane Performance Manual.

AMC1 CAT.OP.MPA.303(e) In-flight check of the landing distance at the time of arrival — aeroplanes

PERFORMANCE INFORMATION FOR THE ASSESSMENT OF LDTA – APPROVED DATA

Approved data for the assessment of LDTA contained in the AFM should be developed in accordance with AMC 25.1592, or equivalent.

PERFORMANCE INFORMATION FOR THE ASSESSMENT OF LDTA – SUPPLEMENTARY DATA

When approved data for the assessment of LDTA contained in the AFM is insufficient, the content of the AFM may be supplemented with one of the following set of data, provided by the aircraft manufacturer or the type certificate holder (TCH) or an organization approved under Part-21 and having the relevant privileges in the scope of its organization approval:

(a) Data for the assessment of LDTA produced for aeroplanes not having CS-25.1592 or equivalent in their certification basis. Such data may be presented in terms of runway surface conditions, pilot-reported braking actions, or both, and should include at least:

(13) an operational airborne distance;

(14) the range of braking actions as related to the RWYCC;

(15) the effect of speed increments over threshold;

(16) the effect of temperature; and

(17) the effect of runway slope;

When data are provided only in terms of pilot-reported braking actions, instructions should be provided on how to use such data to carry out an assessment of the LDTA in terms of a runway surface condition description;

(b) Data developed in compliance with FAA AC 25-32;

(c) AFM data for wet runways at time of dispatch;

(d) Data for contaminated runways developed in compliance with CS 25.1591 at Amendment 2 or later;

PERFORMANCE INFORMATION FOR THE ASSESSMENT OF LDTA – DATA DETERMINED BY THE AGENCY

When there are no data available for the assessment of LDTA, performance information for the assessment of LDTA may be determined by applying the following method:

(a) Correction factors may be applied to the certified landing distances on dry runway published in the AFM for turbojet-powered aeroplanes and turbopropeller-powered aeroplanes.

(b) For this purpose, the landing distance factors (LDFs) from Table 1 below may be used:

Table 1 — LDFs

Runway condition code (RWYCC)	**6**	**5**	**4**	**3**	**2**	**1**
Braking action	**Dry**	**Good**	**Good to medium**	**Medium**	**Medium to poor**	**Poor**
Runway description	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1
Turbojet without reverse	1.67	2.6	2.8	3.2	4.0	5.1
Turbojet with all reversers operating	1.67	2.2	2.3	2.5	2.9	3.4
Turboprop (see Note 2)	1.67	2.0	2.2	2.4	2.7	2.9

Note 1: runway descriptions may be found in the runway condition assessment matrix (RCAM) for each RWYCC or braking action.

Note 2: these LDFs apply only to modern turboprops with efficient disking drag. For older turboprops without adequate disking drag, use the Turbojet, No Reverse LDFs.

Note 3: the LDFs can apply to any type of anti-skid system, i.e. fully-modulating, quasi-modulating or on-off system.

(1) To find the required landing distance (RLD) multiply the AFM (dry, unfactored) landing distance by the applicable LDFs from Table 1 above for the runway conditions existing at time of arrival. If the AFM landing distances are presented as factored landing distances, then that data needs to be adjusted to remove the applicable dispatch factors applied to that data.

(2) The LDFs given in Table 1 above include a 15 % safety margin and an air distance representative of normal operational practices. They account for variations of temperature up to international standard atmosphere (ISA) + 20 °C, runway slopes between –2 % and +2 %, and an average approach speed increment of 5 up to 20 kt. They may not be conservative for all configurations in case of unfavourable combinations of these parameters.

AMC1 CAT.OP.MPA.311 Reporting on runway braking action

GENERAL

The role of the flight crew in the runway surface condition reporting process does not end once a safe landing has been achieved. While the aerodrome operator is responsible for generating the RCR, flight crew are responsible for providing accurate braking action reports.

The flight crew braking action reports provide feedback to the aerodrome operator regarding the accuracy of the RCR resulting from the observed runway surface conditions.

ATC passes these braking action reports both to the subsequent aeroplane landing at the same runway and to the aerodrome operator, which in turn uses them in conjunction with the RCAM to determine if it is necessary to downgrade or upgrade the Runway Condition Code (RWYCC).

During busy times, runway inspections and maintenance may be less frequent and need to be sequenced with arrivals. Therefore, aerodrome operators may depend on braking action reports to confirm that the runway surface condition is not deteriorating below the assigned RCR.

Since both the ATC and the aerodrome operator rely on accurate braking action reports, flight crew should use standardised terminology in accordance with ICAO Doc 4444 — 'PANS ATM'.

The following Table 1 shows the correlation between the terminology to be used in the AIREP to report the braking action and the RWYCC.

Table 1 — Association between AIREP and RWYCC

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

Note 1: the aerodrome personnel may downgrade or upgrade the reported RWYCC based on the friction coefficient (Mu) measured by a friction measuring device meeting standards set or agreed by the state of aerodrome. Such a decision should not be taken by a flight

crew on the approach as it must be supported by other observations. Measured friction values poorly correlate with actual aircraft braking capability and landing performance.

An AIREP should be transmitted to the ATC, in accordance with one of the following specifications, as applicable:

(a) Good braking action is reported as “BRAKING ACTION GOOD”

(b) Good to medium braking action is reported as “BRAKING ACTION GOOD TO MEDIUM”

(c) Medium braking action is reported as “BRAKING ACTION MEDIUM”

(d) Medium to poor braking action is reported as “BRAKING ACTION MEDIUM TO POOR”

(e) Poor braking action is reported as “BRAKING ACTION POOR”

(f) Less than poor braking action is reported as “BRAKING ACTION LESS THAN POOR”

In some cases the differences between two consecutive levels of the six braking action categories between “Good” and “Less than Poor” may be too subtle for the flight crew to detect. It is therefore acceptable for the flight crew to report on a more coarse scale of “Good”, “Medium” and “Poor”.

Whenever requested by ATC, or if the braking action encountered during the landing roll is not as previously reported by the aerodrome operator in the RCR, pilots should provide a braking action report. This is especially important and safety relevant where the experienced braking action is worse than the braking action associated with any RWYCC code currently in effect for the portion of the runway concerned.

When the experienced braking action is is better than that reported by the aerodrome operator, it is also relevant to report this information, which may trigger further actions for the arodrome operator in order to upgrade the RCR.

If an aircraft-generated braking action report is available, it should be transmitted, identifying its origin accordingly. If the flight crew have reason to modify the aircraft-generated braking action report based on their judgement, the commander should be able to amend such report.

An braking action AIREP of “Less Than Poor” leads to a runway closure until the aerodrome operator can improve the runway condition.

An air safety report (ASR) should be submitted whenever flight safety has been endangered due to low braking action.

AMC1 CAT.OP.MPA.303 & CAT.OP.MPA.311 In-flight check of the landing distance at the time of arrival — aeroplanes & Reporting on runway braking action

FLIGHT CREW TRAINING

Flight crew should be trained on the the use of the RCR, on the use of performance data for the assessment of the LDTA and on reporting braking action using the AIREP format. The training should include face-to-face parts with an instructor and not only self-study items.

A training syllabus should include, in addition to the requirements of Subpart FC of Annex III (ORO.FC), at least the following elements:

(a) General

(1) Contamination

(i) Definition
(ii) Contaminants which cause increased drag thus affecting acceleration, and contaminants causing reduced braking action affecting deceleration
(iii) Slippery when wet condition.

(2) Contaminated Runway

(i) Runway surface condition descriptors
(ii) Operational Observations with Friction Devices
(iii) Operator´s policy on the usage of:

A. Reduced takeoff thrust
B. Reports by runway thirds

(iv) Stopway

(3) Runway Condition Codes

(i) RCAM

A. Differences between those published for aerodromes and flight crew
B. Format in use
C. The use of runway friction measurements
D. The use of temperature*
E. RWYCC
F. Downgrade/Upgrade Criteria
G. Difference between a calculation and an assessment

(ii) Braking action
(iii) Use of aircraft wind limit diagram with contamination

(4) Runway Condition Report

(i) Availability
(ii) Validity
(iii) Performance and situational awareness
(iv) Decoding
(v) Situational awareness

(5) Aeroplane control in takeoff and landing

(i) Lateral control

A. Windcock effect
B. Effect of reversers
C. Cornering forces
D. Crosswind limitations,(including operations when cleared runway width is less than published

(ii) Longitudinal control

A. V1 correction in correlation with minimum control speed on ground
B. Aquaplaning
C. Anti-skid
D. Autobrake

(6) Takeoff distance

(i) Acceleration and deceleration
(ii) Takeoff performance limitations
(iii) Takeoff distance models
(iv) Factors affecting TO distance
(v) Why to use the type and depth of contaminant instead of Runway Condition Code
(vi) Safety margins

(7) Landing distance

(i) Distance at time of arrival model
(ii) Factors affecting landing distance
(iii) Safety margins

(8) Exceptions

(i) States that do not comply with ICAO standards for RCR and assessment of the LDTA

(b) Flight planning

(1) Dispatch/in-flight conditions

(2) MEL/CDL items affecting takeoff and landing performance

(3) Operator´s policy on variable wind and gusts

(4) Landing performance at destination and alternates

(i) Selection of alternates if an a erorome is not available due to runway conditions

A. En-route
B. Destination alternates

(ii) Number
(iii) Runway condition

(c) Takeoff

(1) Runway selection

(2) Takeoff from a wet or contaminated runway

(d) In-flight

(1) Landing distance

(i) Distance at time of arrival calculations

A. Considerations for flight crew
B. Operator´s policy

(ii) Factors affecting landing distance
(iii) Runway selection for landing
(iv) Safety margins

(2) Use of aircraft systems

(i) Brakes/autobrakes
(ii) Difference between friction limited braking and different modes of autobrakes
(iii) Reversers

(e) Landing techniques

(1) Flight crew procedures and flying techniques when landing on length limited runway

(f) Safety considerations

(1) Types of errors possible

(2) Mindfulness principles necessary for high reliability

(g) Documentation and Records

(h) AIREPs

(1) Assessment of braking action

(2) Terminology

(3) Automated/aircraft–generated braking action reports, if applicable

(4) Air safety reports, if flight safety has been endangered due to insufficient braking action

Subpart C

Aircraft performance and operating limitations

Section 1 — Aeroplanes

Chapter 2
Performance class A

AMC1 CAT.POL.A.200 General

WET AND CONTAMINATED RUNWAY DATA

If the performance data have been determined on the basis of a measured runway friction coefficient, the operator should use a procedure correlating the measured runway friction coefficient and the effective braking coefficient of friction of the aeroplane type over the required speed range for the existing runway conditions. The determination of take-off performance data for wet and contaminated runways should be based on the reported runway surface condition in terms of contaminant and depth. The determination of landing performance data should be based on information provided in the operations manual (OM) on the reported runway condition code (RWYCC). The RWYCC is determined by the aerodrome operator using the runway condition assessment matrix (RCAM) and associated procedures defined in ICAO Doc 9981 — 'PANS Aerodromes'. The RWYCC is reported through a runway condition report (RCR) in the SNOWTAM format in accordance with ICAO Annex 15.

AMC1 CAT.POL.A.230 & CAT.POL.A.235 Landing — dry runways & Landing – wet and contaminated runways

FACTORING OF AUTOMATIC LANDING DISTANCE PERFORMANCE DATA

In those cases where the landing requires the use of an automatic landing system, and the distance published in the AFM includes safety margins equivalent to those contained in CAT.POL.A.230-(a)(1), CAT.POL.A.230(a)(2) and CAT.POL.A.235, the landing mass of the aeroplane should be the lesser of:

(a) the landing mass determined in accordance with CAT.POL.A.230-(a)(1), CAT.POL.A.230(a)(2) or CAT.POL.A.235, as appropriate; or

(b) the landing mass determined for the automatic landing distance for the appropriate surface condition, as given in the AFM or equivalent document. Increments due to system features such as beam location or elevations, or procedures such as use of overspeed, should also be included.

GM1 CAT.POL.A.230 Landing — dry runways

LANDING MASS

CAT.POL.A.230 establishes two considerations in determining the maximum permissible landing mass at the destination and alternate aerodromes:

(a) Firstly, the aeroplane mass will be such that on arrival the aeroplane can be landed within 60 %, 70 %, or ~~7~~80 % (as applicable) of the landing distance available (LDA) on the most favourable (normally the longest) runway in still air. Regardless of the wind conditions, the maximum

landing mass for an aerodrome/aeroplane configuration at a particular aerodrome cannot be exceeded.

(b) Secondly, consideration should be given to anticipated conditions and circumstances. The expected wind, or ATC and noise abatement procedures, may indicate the use of a different runway. These factors may result in a lower landing mass than that permitted under (a), in which case dispatch should be based on this lesser mass.

(c) The expected wind referred to in (b) is the wind expected to exist at the time of arrival.

GM1 CAT.POL.A.230(a) Landing – dry runways

ALTERNATE AERODROMES

The alternate aerodromes for which the landing mass is required to be determined in accordance with CAT.POL.A.230 are:

(a) destination alternate aerodromes;

(b) fuel en-route alternate (ERA) aerodromes; and

(c) re-dispatch or re-clearance aerodromes.

GM1 CAT.POL.A.230(d)(2) Landing – dry runways

AFM LANDING PERFORMANCE CORRECTIONS

Landing performance data is provided in the AFM at least for the certified range of pressure altitudes and for runway slope. AFM data may include other influence parameters such as, but not limited to, temperature. The effect of speed increments over threshold should also be accounted for when these increments are required by the applicable AFM procedures, such as autoland or steep approach.

GM1 CAT.POL.A.235(a) and (b) Landing – wet and contaminated runways

DISPATCH CONSIDERATIONS FOR MARGINAL CASES

The landing distance at time of arrival (LDTA) required by CAT.OP.MPA.303 may, in some cases, and in particular on wet or contaminated runways, exceed the landing distance considered at time of dispatch. The requirements for dispatch remain unchanged, however, when the conditions at time of arrival are expected to be marginal, it is a good practice to carry out at time of dispatch a preliminary calculation of the LDTA.

GM1 CAT.POL.A.235(a)(1) Landing – wet and contaminated runways

AFM LANDING DISTANCES FOR WET RUNWAYS

Specific landing distances provided in the AFM for wet runways, unless otherwise indicated, include a safety factor, which renders not necessary the application of the 15% safety factor used in CAT.POL.A.235(a)(2). This implies that the AFM distance may be presented as factored distance. These distances may be longer or shorter than those resulting from CAT.POL.A.235(a)(2), but when provided they are intended as a replacement of CAT.POL.A.235(a)(2) and mandatory for use at the time of dispatch.

AMC1 CAT.POL.A.235(a)(3) Landing – wet and contaminated runways

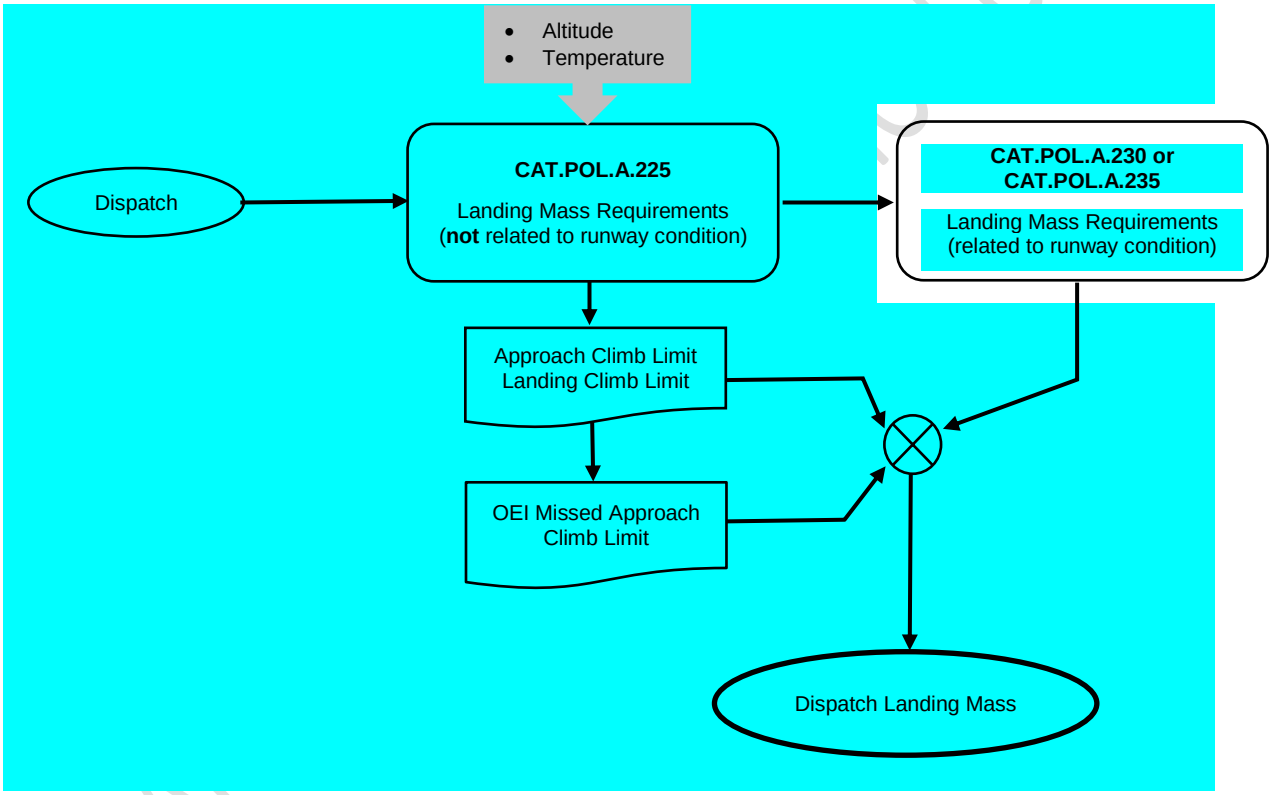
RUNWAYS WITH FRICTION IMPROVING CHARACTERISTICS

(a) Materials or construction techniques meant to improve the friction characteristics of a runway may be grooved runways, runways treated with porous friction course (PFC) or other materials or techniques for which the AFM provides specific performance data.

(b) Before taking the AFM performance credit for such runways, the operator should verify that the runways intended to be operated on are maintained to the extent necessary to ensure the expected improved friction characteristics.

GM1 CAT.POL.A.230 & CAT.POL.A.235 Landing – dry runways & Landing – wet and contaminated runways

WORKFLOW OF THE LANDING DISTANCE ASSESSMENT AT THE TIME OF DISPATCH - GENERAL



WORKFLOW OF THE LANDING DISTANCE ASSESSMENT AT THE TIME OF DISPATCH – RUNWAY SUITABILITY CHECK

CAT.POL.A.230(e) and CAT.POL.A.235(e)		
For landing distance assessment at time of dispatch:	Check: - Most favourable runway - at no wind	Check: - Most likely runway to be assigned - at probable wind
	If unable to comply ↓	
Dry runway	Dispatch not allowed	**CAT.POL.A.230(f)** 1 alternate aerodrome required
Wet runway	Dispatch not allowed	**CAT.POL.A.235(g)** 1 alternate aerodrome required
Contaminated runway	**CAT.POL.A.235(f)** 2 alternate aerodromes required	**CAT.POL.A.235(g)** 1 alternate aerodrome required

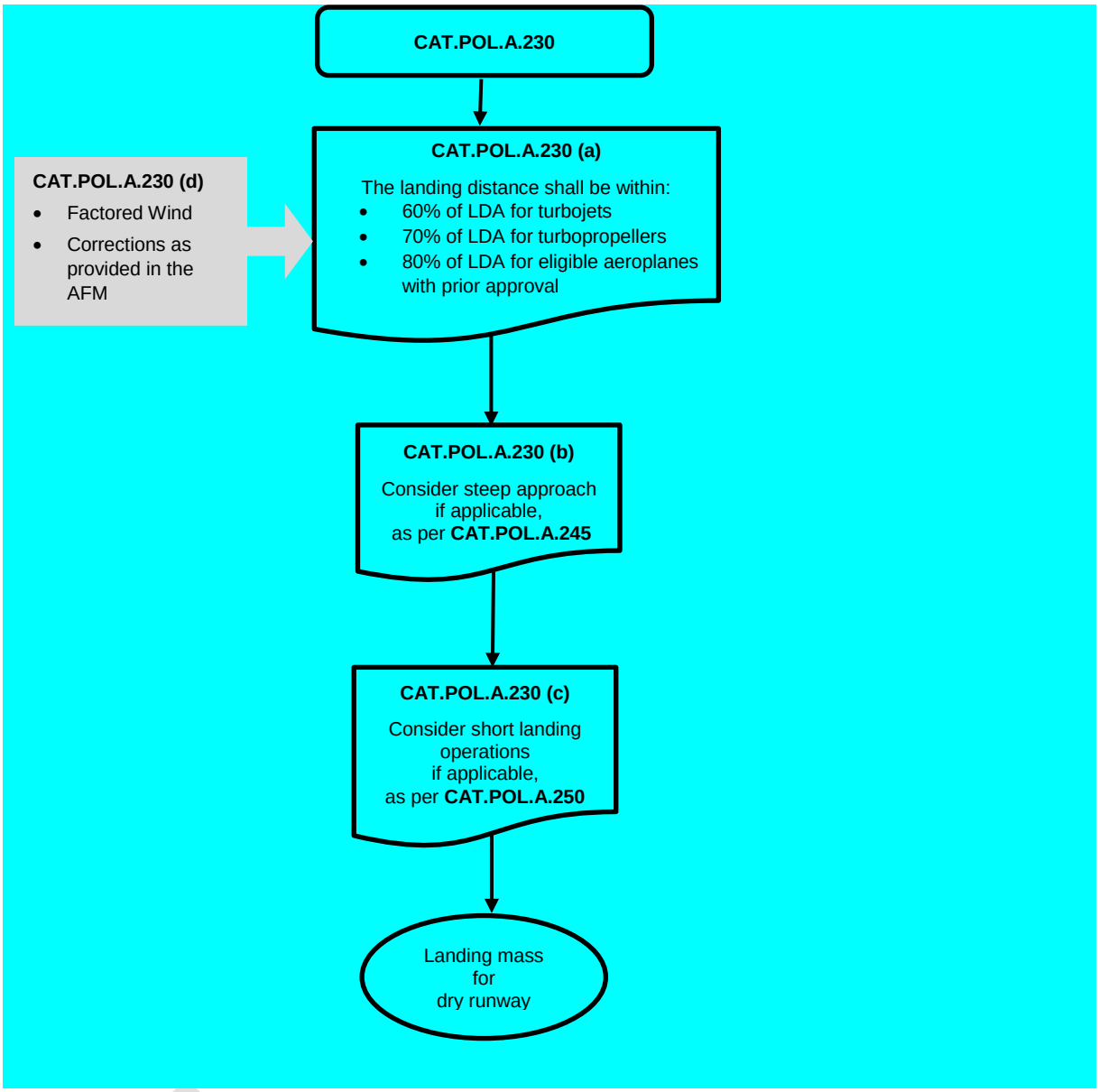
↓

CAT.POL.A.230 (f) and CAT.POL.A.235 (h)

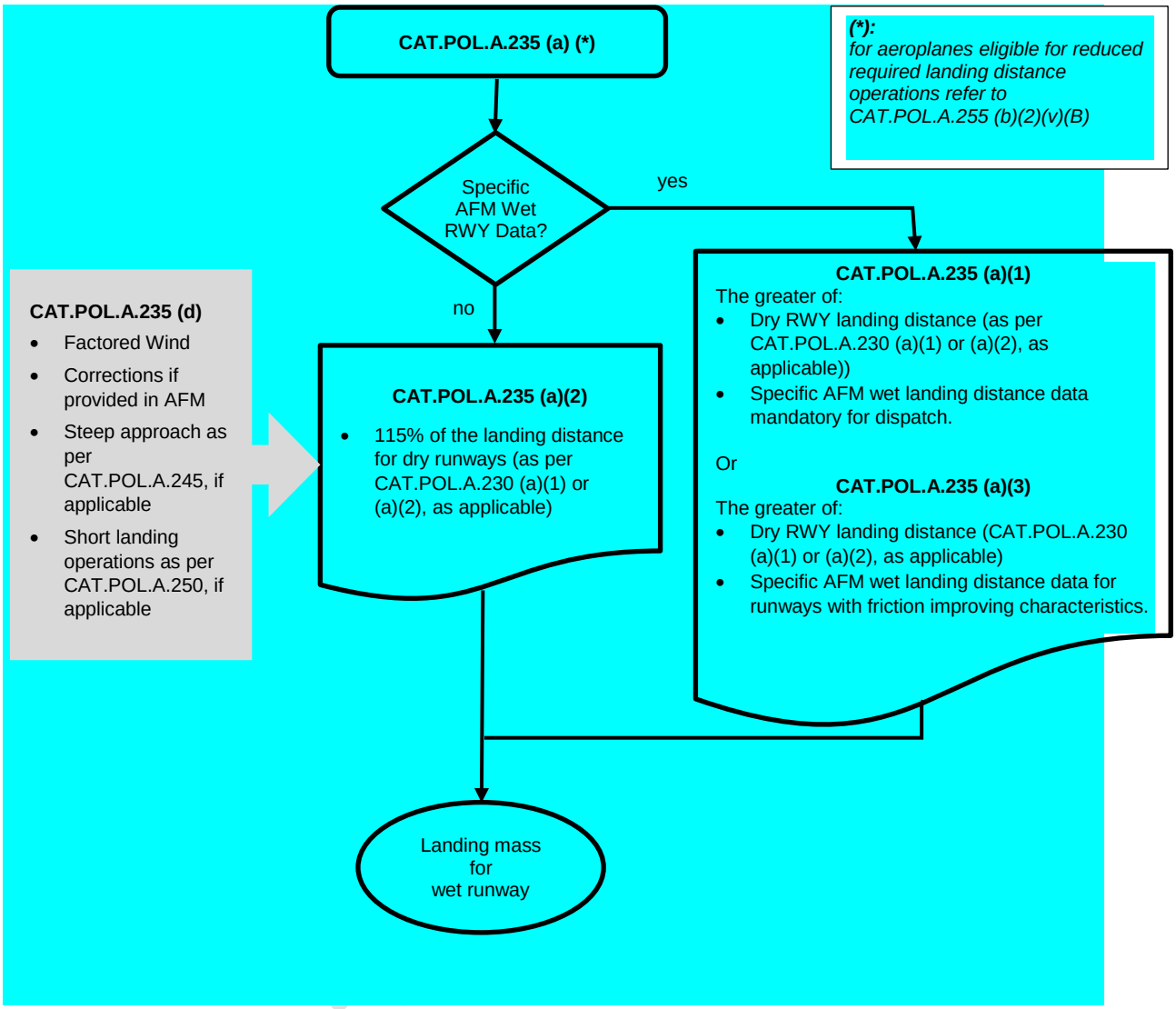
Alternate aerodromes shall permit full compliance with:

- **CAT.POL.A.230 (a) to (d)** for dry runways
- **CAT.POL.A.235 (a) to (d)** for wet or contaminated runways

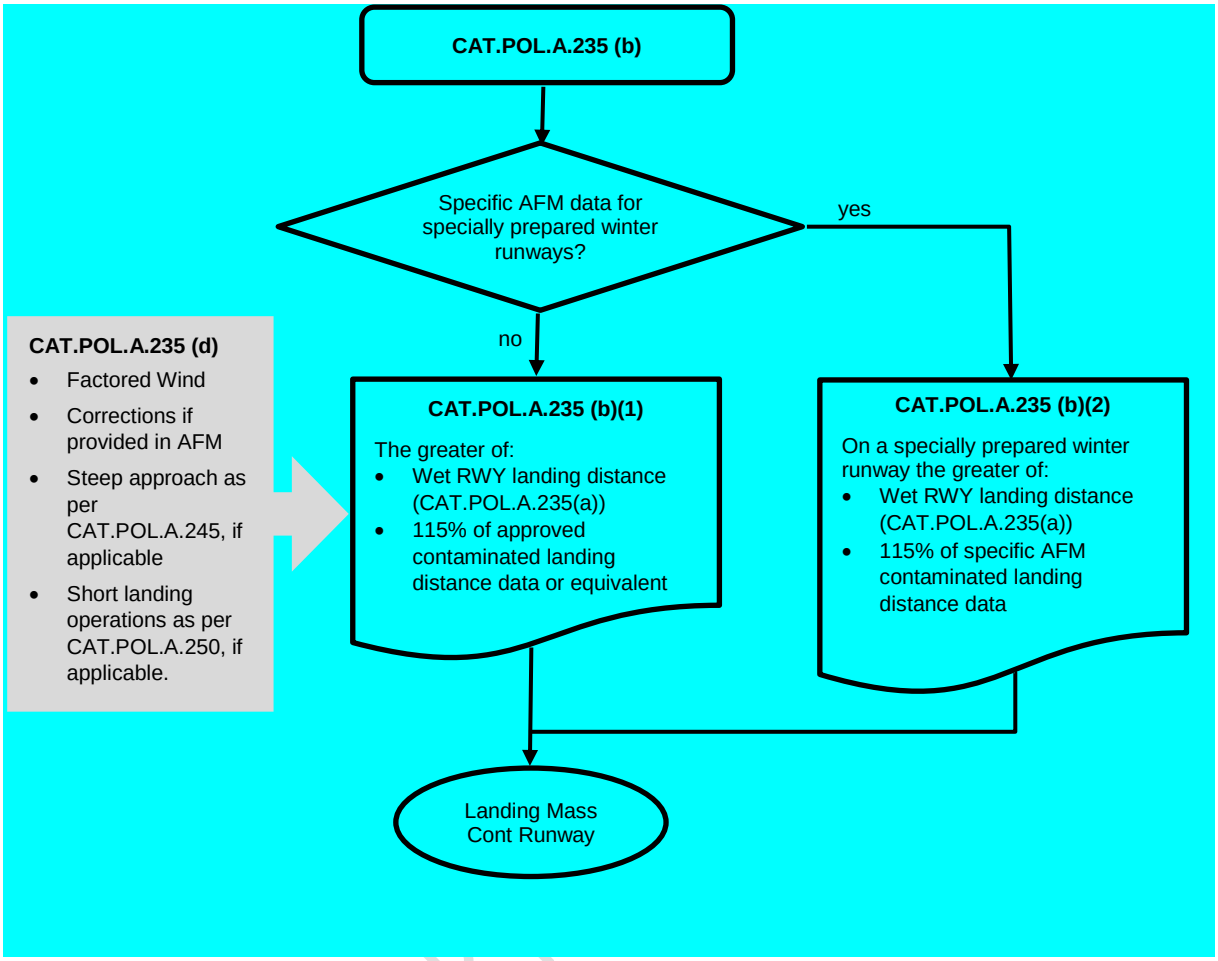
WORKFLOW OF THE LANDING DISTANCE ASSESSMENT AT THE TIME OF DISPATCH – DRY RUNWAYS



WORKFLOW OF THE LANDING DISTANCE ASSESSMENT AT THE TIME OF DISPATCH – WET RUNWAYS



WORKFLOW OF THE LANDING DISTANCE ASSESSMENT AT THE TIME OF DISPATCH – CONTAMINATED RUNWAYS



GM1 CAT.POL.A.230 & CAT.POL.A.235 Landing — dry runways & Landing – wet and contaminated runways

LANDING DISTANCES AND CORRECTIVE FACTORS

The AFM provides performance data for landing distance for the full range of conditions that may be encountered in service. This distance , commonly refrred to as the actual landing distance (ALD), is the distance from the position on the runway of the screen height to the point where the aeroplane comes to a full stop on a dry runway.

The determination of the ALD is based on the assumption that the landing is performed in accordance with the conditions and the procedures set out in the AFM on the basis of the apllicable certification standards.

As a matter of fact any particular landing may be different from the landing technique that is assumed in the AFM for certification purposes. The aircraft may approach the runway faster and/or higher than assumed; the aircraft may touchdown further along the runway than the optimum point; the actual winds and other weather factors may be different to those assumed in the calculation of the ALD; and

maximum braking may not be always achievable. For this reason the Landing Distance Available (LDA) is required by CAT.POL.A.230 and CAT.POL.A.235 to be longer than the ALD.

The margins by which the LDA shall exceed the ALD on dry runways, in accordance with CAT.POL.A.230, are shown in the following Table 1:

Table 1 — Corrective factors for dry runways

Aeroplane category	Required Margin (dry runway)	Resulting factor (dry runway)
Turbojet-powered aeroplanes	ALD < 60% of the LDA	LDA = at least 1.67 x ALD
Turbopropeller-powered aeroplanes	ALD < 70% of the LDA	LDA = at least 1.43 x ALD
Aeroplanes approved under CAT.POL.A.255	ALD < 80% of the LDA	LDA = at least 1.25 X ALD

If the runway is wet and the AFM does not provide specific performance data for use on wet runways, a further increase of 15% of the landing distance on dry runways has to be applied, in accordance with CAT.POL.A.235 or CAT.POL.A.255 as applicable, as shown in the following Table 2:

Table 2 — Corrective factors for wet runways

Aeroplane category	Resulting factor (wet runway)
Turbojet-powered aeroplanes	LDA = at least 1.15 x 1.67 x ALD = 1.92 x ALD
Turbopropeller-powered aeroplanes	LDA = at least 1.15 x 1.43 x ALD = 1.64 x ALD
Aeroplanes approved under CAT.POL.A.255	LDA is the longer of: • 1.15 x 1.25 X ALD = 1.44 x ALD • the LDTA resulting from CAT.OP.MPA.303

However, for aeroplanes that are approved under CAT.POL.A.255, when landing on wet runways, CAT.POL.A.255 further requires to apply the longer of the landing distance resulting from the above table and the landing distance resulting from the application of CAT.OP.MPA.303(a).

GM1 CAT.POL.A.245(a) Approval of steep approach operations

SCREEN HEIGHT

For the purpose of steep approach operations, the screen height is the reference height above the runway surface, typically above the runway threshold, from which the landing distance is measured. The screen height is set at 50 ft for normal operations and at another value between 60 ft and 30 ft for steep approach operations.

AMC1 CAT.POL.A.255(a) Approval of reduced required landing distance operations

AEROPLANE ELIGIBILITY

The AFM should state whether the aeroplane is eligible for operations with reduced required landing distance. When the factors required by CAT.POL.A.230(a)(1) or (a)(2), as applicable, have been used for compliance with certification standards the aeroplane should not be operated with reduced required landing distance.

GM1 CAT.POL.A.255(a) Approval of reduced required landing distance operations

AEROPLANE ELIGIBILITY

Whether the factors required by CAT.POL.A.230(a)(1) or (a)(2), as applicable, have been used for compliance with certification standards, such as but not limited to CS 25.1309 or equivalent, during the certifation process of an eroplane, may only be declared by the manufacturer.

Furthermore, certification methods offers options for the determination of air distance during landing.

One method is based on a calculation simulating a 3.5 degree glide path and 8 ft/s touchdown rate. This is more demanding than what can be achieved with the normal airport approach guidance and operational landing training.

Applying the reduced landing distance factor of 1.25 to an AFM landing distance based on the said method reduces the effective margin from an operational landing air distance from the current [35% to 45%] based on a 1.67 factor to [8 to 15%] based on the use of 80% of the LDA.

Whereas applying the 1.25 factor to an AFM distance based on normal airport approach guidance and operational landing training ensures a 25% margin based on the use of 80% of the LDA.

GM1 CAT.POL.A.255(a) Approval of reduced required landing distance operations

NON-SCHEDULED ON-DEMAND COMMERCIAL AIR TRANSPORT (CAT) OPERATIONS

For the purpose of reduced required landing distance operations, non scheduled on-demand CAT operations are those CAT operations conducted upon request of the customer.

Non-scheduled on-demand CAT operations eligible for reduced required landing distance operations do not include holiday charters, i.e. charter flights that are part of a holiday travel package.

AMC1 CAT.POL.A.255(b)(1) Approval of reduced required landing distance operations

EQUIVALENT LEVEL OF SAFETY

A level of safety equivalent to that intended by CAT.POL.A.230(a)(1) or CAT.POL.A.230(a)(2), as applicable, may be achieved when conducting reduced required landing distance operations if mitigating measures are established and implemented. Such measures should address flight crew, aircraft characteristics and performance, aerodromes and operations. It is, however, essential that all conditions established are adhered to as it is the combination of said conditions that achieves the intended level of safety. The operator should in fact also consider the interrelation of the various mitigating measures.

The mitigating measures may be determined by the operator by using a risk assessment or by fulfilling all the conditions established under CAT.POL.A.255(b)(2). An operator willing to establish a set of conditions different from those under CAT.POL.A.255(b)(2) needs to demonstrate to the competent authority the equivalent level of safety through a risk assessment.

The risk assessment required by CAT.POL.A.255(b)(1) should include at least the following elements:

(a) flight crew qualification in terms of training, checking and recency;

(b) flight crew composition;

(c) runway surface conditions;

(d) dispatch criteria;

(e) weather conditions and limitations, including crosswind;

(f) aerodrome characteristics, including available approach guidance;

(g) aeroplane characteristics and limitations;

(h) aeroplane equipment and systems affecting landing performance;

(i) aeroplane performance data;

(j) operating procedures and operating minima; and

(k) analysis of operators'sperformance and occurrence reports related to unstable approaches and long landings

The competent authority may require other mitigating measures in addition to those proposed by the operator.

AMC1 CAT.POL.A.255(b)(2)(iv) Approval of reduced required landing distance operations

GENERAL

(a) The operator should ensure that flight crew training programmes for reduced required landing distance operations include ground training, flight simulation training device (FSTD), and/or flight training.

(b) Flight crew with no reduced required landing distance operations experience should have completed the full training programme of (a) above.

(c) Flight crew with previous increased reduced required landing distance operations experience of a similar type of operation with another EU operator, may undertake the following:

(1) an abbreviated ground training course if operating an aircraft of a type or class different from that of the aircraft on which the previous reduced required landing distance operations experience was gained;

(2) an abbreviated ground, FSTD and/or flight training course if operating the same type or class and variant of the same aircraft type or class on which the previous reduced required landing distance operations experience was gained; this course should include at least the provisions of the conversion training contained in this AMC; the operator may reduce the number of approaches/landings required by the conversion training if the type/class or the variant of the aircraft type or class has the same or similar operating procedures, handling characteristics and performance characteristics as the previously operated aircraft type or class.

(d) Flight crew with reduced required landing distance operations experience with the operator may undertake an abbreviated ground, FSTD and/or flight training course according to the following conditions:

(1) when changing aircraft type or class, the abbreviated course should include at least the content of the conversion training;

(2) when changing to a different variant of aircraft within the same type or class rating that has the same or similar operating procedures, handling characteristics and performance characteristics, as the previously operated aircraft type or class, a difference course or familiarisation appropriate to the change of variant should fulfil the abbreviated course's purposes; and

(3) when changing to a different variant of aircraft within the same type or class rating that has significantly different operating procedures, handling characteristics and performance characteristics, the abbreviated course should include the content of the conversion training.

GROUND TRAINING

(a) The initial ground training course for reduced required landing distance operations should include at least the following:

(1) operational procedures and limitations, including flight preparation and planning;

(2) characteristics of the runway visual aids and runway markings;

(3) aircraft performance related to reduced required landing distance operations, including:

(i) aircraft-specific decelerating devices and equipment;
(ii) items that increase the aircraft landing distance, e.g. excess speed at touchdown, threshold crossing height, delayed brake application, delayed spoiler/speed brake or thrust reverser application; and
(iii) runway surface conditions;

(4) in-flight assessment of landing performance, including maximum landing masses and runway conditions;

(5) stabilised approach criteria;

(6) correct vertical flight path after the DA/MDA;

(7) correct flare, touchdown and braking techniques;

(8) touchdown within the appropriate touchdown zone;

(9) recognition of failure of aircraft equipment affecting aircraft performance, and action to be taken in that event;

(10) flight crew task allocation and pilot monitoring duties, including monitoring of the activation of deceleration devices;

(11) go-around/balked-landing criteria and decision-making;

(12) selection of precision approaches versus non-precision approaches if both are available; and

(13) qualification requirements for pilots to obtain and retain reduced required landing distance operations, including aerodrome landing analysis programme (ALAP) procedures.

FSTD TRAINING AND/OR FLIGHT TRAINING

(a) FSTD and/or flight training should at least be required for the commander and any other pilot flying for landing when performing reduced required landing distance operations.

(b) FSTD and/or flight training for reduced required landing distance operations should include checks of equipment functionality, both on the ground and in-flight.

(c) Initial reduced required landing distance operations training should consist of a minimum of two approaches and landings to include at least the following exercises which may be combined:

(1) an approach and landing at the maximum landing mass;

(2) an approach and landing without the use of visual approach;

(3) a landing on a wet runway;

(4) a landing with crosswind

(5) a malfunction of a stopping device on landing; and

(6) a go-around/balked landing.

(d) Special emphasis should be given to the following items:

(1) in-flight assessment of landing performance;

(2) stabilised approach, recognition of an unstable approach and, consequentially, a go-around;

(3) flight crew task allocation and pilot monitoring duties, including monitoring of the activation of deceleration devices;

(4) timely and correct activation of deceleration devices;

(5) correct flare technique; and

(6) landing within the appropriate touchdown zone.

CONVERSION TRAINING

Flight crew members should complete the following reduced required landing distance operations training if converting to a new type or class or variant of aircraft in which reduced required landing distance operations will be conducted.

(a) Ground training, taking into account the flight crew member's increased landing factor operations experience.

(b) FSTD training and/or flight training.

RECURRENT TRAINING AND CHECKING

(a) The operator should ensure that in conjunction with the normal recurrent training and operator's proficiency checks, the pilot's knowledge and ability to perform the tasks associated with reduced required landing distance operations are adequate.

(b) The items of the ground training should cover a 3-year period.

(c) An annual reduced required landing distance operations training should consist of a minimum of two approaches and landings so that it includes at least the following exercises which may be combined:

(1) an approach and landing at the maximum landing mass;

(2) an approach and landing without the use of visual approach;

(3) a landing on a wet runway;

(4) a malfunction of a stopping device on landing; and

(5) a go-around/balked landing.

(6) Operations in crosswind conditions

FLIGHT CREW QUALIFICATION AND EXPERIENCE

(a) Flight crew qualification and experience are specific to the operator and type of aircraft operated.

(b) The operator should ensure that each flight crew member successfully completes the specified FSTD and/or flight training before conducting reduced required landing distance operations.

(c) The operator should ensure that no inexperienced flight crew members, as defined in AMC1.ORO.FC.200(a), perform an approach and landing with reduced required landing distance operations.

AMC2 CAT.POL.A.255(b)(2)(iv) Approval of reduced required landing distance operations

MONITORING

(a) Reduced required landing distance operations should be continuously monitored by the operator to detect any undesirable trends before they become hazardous.

(b) A flight data monitoring (FDM) programme, as required by ORO.AOC.130, is an acceptable method to monitor operational risks related to reduced required landing distance operations.

GM1 CAT.POL.A.255(b)(2)(iv) Approval of reduced required landing distance operations

GENERAL

Flight crew training should be conducted preferably at aerodromes representative of the intended operations. A FSTD generic aerodrome with the same characteristics of an aerodrome requiring the reduced required landing distance is also acceptable for the initial and recurrent training.

GM2 CAT.POL.A.255(b)(2)(iv) Approval of reduced required landing distance operations

MONITORING

Although ORO.AOC.130 requires FDM only for aeroplanes with a maximum certified take-off mass (MCTOM) of more than 27 000 kg, FDM may be used voluntarily on aeroplanes having smaller MCTOM. It is recommended for all operators conducting reduced required landing distance operations.

AMC1 CAT.POL.A.255(b)(2)(v) Approval of reduced required landing distance operations

AERODROME LANDING ANALYSIS PROGRAMME (ALAP)

The intent of an ALAP is to ensure that the aerodrome critical data related to landing performance in reduced required landing distance operations are known and taken into account in order to avoid any further increase of the landing distance. Two important aerodrome-related variables largely contribute to increasing the landing distance: landing (ground-) speed and deceleration capability. Related factors to consider should include at least the following elements:

(a) Airport facilities

Consideration should bebgiven to the services are available at the airport. Services such as communications, maintenance, and fueling may have an impact on operations to and from that airport, though not directly related to landing distance. The availability of adequate RFFF and medical services should be also taken into account. It is worth to consider also whether the aerodrome is only meeting ICAO and national standards or ICAO recommendations as well.

(b) Topography

Terrain around the aerodrome should be considered. High, fast-rising terrain may require special approach or decisiosn points, missed approach or balked landing procedures and may impact performance requirements. Aerodromes located on top of hilly terrain or downwind of mountainous terrain may occasionally experience conditions of windshear and gusts. Such conditions are particularly relevant during the landing maneuver, particularly during the flare, and may increase landing distance.

(c) Runway conditions

Runway characteristics, such as unknown slope and surface composition, can cause the actual landing distance to be longer than the calculated landing distance. Braking action always impacts the landing distance required as it deteriorates. To this regard, consideration should be given to the maintenance status of the runway, as a wet runway surface may be significantly degraded due to poor airport maintenance.

(d) Airport or Area weather

Some aerodromes may not have current weather reports and forecast available for flight planning. Others may have automated observations for operational use. Others may depend on the weather forecast of a nearby aerodrome. Area forecasts are also valuable in evaluating weather conditions for a particular operation. Comparing forecasted conditions to current conditions provoides insight upcoming changes as weather systems move and forecasts are updated. Longer flight segments may lean more heavily on the forecast for the estimated time of arrival (ETA), as current conditions may change significantly as weather systems move.

(e) Adverse weather

Adverse weather conditions include but are not restricted to thunderstorms, showers, downbursts, squall lines, tornadoes, moderate or severe turbulence on approach, heavy precipitation, wind shear, icing conditions. In general, all weather phenomena having the potential to increase the landing distance should be carefully assessed. Among these, tailwind is particularly relevant.

Wind variations should be carefully monitored as they may lead to variations in the reported and/or actual wind at the touchdown zone. Due consideration should be given also to the crosswind perpendicular to the landing runway as a slight variation in the direction of the crosswind may result in a considerable tailwind component.

(f) Runway safety margins

Displaced thresholds, airport construction, and temporary obstacles (such as cranes and drawbridges) may impact runway length available for landing. Notices to Airmen (NOTAM) must be consulted during the flight preparation. Another safety margin is the size and adequacy of the runway strip and runway end safety area (RESA). A well designed and maintained runway strip and RESA decreases the risk of damaging the aircraft in case of a runway excursion. ICAO annex 14 provides the SARPS to this regards. Consideration should be given to those aerodroems barely meeting these ICAO SARPS or when the bearing ratio's are below the design and maintenance criteria as indicated in ICAO doc 9157 – Aerodroem Design Manual.

AMC1 CAT.POL.A.255(b)(2)(vi) Approval of reduced required landing distance operations

EQUIPMENT AFFECTING LANDING PERFORMANCE

Equipment affecting landing performance typically includes flaps, slats, spoilers, brakes, anti-skid, autobrakes, reversers, etc. The operator should establish procedures to identify, based on the aircraft characteristics, those systems and the equipment that are performance relevant, and to ensure that they are verified to be operative before commencing the flight. Dispatch with such equipment that is inoperative under the minimum equipment list (MEL) is not allowed for reduced required landing distance operations.

GM1 CAT.POL.A.255(b)(2)(vi) Approval of reduced required landing distance operations

EQUIPMENT AFFECTING LANDING PERFORMANCE

Should any equipment affecting landing performance become inoperative during reduced required landing distance operations, the failure will be dealt with in accordance with the abnormal /emergency procedures established in the OM and, based on the prevailing conditions for the remainder of the flight, the commander will decide upon the discontinuation of the planned operation of reduced required landing distance.

AMC1 CAT.POL.A.255(b)(2)(vii) Approval of reduced required landing distance operations

RECENCY

Flight crew conducting reduced landing distance operations should have a recency in said operations of at least two landings, either in actual operations or in an FSTD, performed within the validity period of the operator proficiency check (OPC).

AMC1 CAT.POL.A.255(b)(2)(ix) Approval of reduced required landing distance operations

ADDITIONAL AERODROME CONDITIONS

(a) Operators should establish procedures to ensure that:

(1) the aerodrome information is obtained from a reliable source;

(2) any change reducing landing distances that has been declared by the aerodrome operator has been taken into account; and

(3) no steep approaches, screen heights lower than 35 ft or higher than 60 ft, operations outside the stabilised approach criteria, or low-visibility operations are required at the aerodrome where reduced required landing distance operations are conducted.

(b) Additional aerodrome conditions related to aeroplane type characteristics, orographic characteristics in the approach area, available approach aids and missed approach/balked landing considerations, as well as operating limitations, should also be taken into account.

(c) When assessing the aerodrome characteristics and the level of risk of the aeroplane undershooting or overrunning the runway, the operator should consider the nature and location of any hazard beyond the runway end, including the topography and obstruction environment beyond the runway strip, the length of the Runway End Safety Area (RESA) and the effectiveness of any other mitigation measures that may be in place to reduce the likelihood and the consequences of a runway overrun.

Chapter 3
Performance class B

AMC1 CAT.POL.A.305 Take-off

RUNWAY SURFACE CONDITION

(…)

(a) The determination of take-off performance data for wet and contaminated runways should be based on the reported runway surface condition in terms of contaminant and depth.

AMC1 CAT.POL.A.330 Landing — dry runways

LANDING DISTANCE CORRECTION FACTORS

(a) Unless otherwise specified in the AFM, or other performance or operating manuals from the manufacturers, the variable affecting the landing performance and the associated factor that should be applied to the AFM data are shown in the table below. It should be applied in addition to the operational factors as prescribed in CAT.POL.A.330-(a) and CAT.POL.A.330(b).

(…)

GM1 CAT.POL.A.330 Landing — dry runways

LANDING MASS

CAT.POL.A.330 establishes two considerations in determining the maximum permissible landing mass at the destination and alternate aerodromes.

(a) Firstly, the aeroplane mass will be such that on arrival the aeroplane can be landed within 70 % or 80 %, as applicable, of the LDA on the most favourable (normally the longest) runway in still air. Regardless of the wind conditions, the maximum landing mass for an aerodrome/aeroplane configuration at a particular aerodrome cannot be exceeded.

(…)

GM1 CAT.POL.A.330(a) Landing – dry runways

ALTERNATE AERODROMES

The alternate aerodromes for which the landing mass is required to be determined in accordance with CAT.POL.A.330 are:

(a) destination alternate aerodromes;

(b) fuel en-route alternate (ERA) aerodromes; and

(c) re-dispatch or re-clearance aerodromes.

AMC1 CAT.POL.A.335 Landing – wet and contaimanted runways

WET AND CONTAMINATED RUNWAY DATA

The determination of landing performance data should be based on information provided in the operations manual (OM) on the reported runway condition code (RWYCC). The RWYCC is determined by the aerodrome operator using the runway condition assessment matrix (RCAM) and associated procedures defined in ICAO Doc 9981 — 'PANS Aerodromes'. The RWYCC is reported through a runway condition report (RCR) in the SNOWTAM format in accordance with ICAO Annex 15.

GM1 CAT.POL.A.335(a) and (b) Landing – wet and contaminated runways

DISPATCH CONSIDERATIONS FOR MARGINAL CASES

The landing distance at time of arrival (LDTA) required by CAT.OP.MPA.303 may, in some cases, and in particular on wet or contaminated runways, exceed the landing distance considered at time of dispatch. The requirements for dispatch remain unchanged, however, when the conditions at time of arrival are expected to be marginal, it is a good practice to carry out at time of dispatch a preliminary calculation of the LDTA.

GM1 CAT.POL.A.335(a)(1) Landing – wet and contaminated runways

AFM LANDING DISTANCES FOR WET RUNWAYS

Specific landing distances provided in the AFM for wet runways, unless otherwise indicated, include a safety factor, which renders not necessary the application of the 15% safety factor used in CAT.POL.A.335(a)(2). This implies that the AFM distance may be presented as factored distance. These distances may be longer or shorter than those resulting from CAT.POL.A.335(a)(2), but when provided they are intended as a replacement of CAT.POL.A.335(a)(2) and mandatory for use at the time of dispatch.

AMC1 CAT.POL.A.335(a)(3) Landing – wet and contaminated runways

RUNWAYS WITH FRICTION IMPROVING CHARACTERISTICS

(a) Materials or construction techniques meant to improve the friction characteristics of a runway may be grooved runways, runways treated with porous friction course (PFC) or other materials or techniques for which the AFM provides specific performance data.

(b) Before taking the AFM performance credit for such runways, the operator should verify that the runways intended to be operated on are maintained to the extent necessary to ensure the expected improved friction characteristics.

GM1 CAT.POL.A.330 & CAT.POL.A.335 Landing — dry runways & Landing – wet and contaminated runways

LANDING DISTANCES AND CORRECTIVE FACTORS

The AFM provides performance data for landing distance for the full range of conditions that may be encountered in service. This distance , commonly refrred to as the actual landing distance (ALD), is the distance from the position on the runway of the screen height to the point where the aeroplane comes to a full stop on a dry runway.

The determination of the ALD is based on the assumption that the landing is performed in accordance with the conditions and the procedures set out in the AFM on the basis of the apllicable certification standards.

As a matter of fact any particular landing may be different from the landing technique that is assumed in the AFM for certification purposes. The aircraft may approach the runway faster and/or higher than assumed; the aircraft may touchdown further along the runway than the optimum point; the actual winds and other weather factors may be different to those assumed in the calculation of the ALD; and maximum braking may not be always achievable. For this reason the Landing Distance Available (LDA) is required by CAT.POL.A.330 and CAT.POL.A.335 to be longer than the ALD.

The margins by which the LDA shall exceed the ALD on dry runways, in accordance with CAT.POL.A.330 are shown in the following Table 1:

Table 1 — Corrective factors for dry runways

Aeroplane category	**Required Margin (dry runway)**	**Resulting factor (dry runway)**
All aeroplanes	ALD < 70% of the LDA	LDA = at least 1.43 x ALD
Aeroplanes approved under CAT.POL.A.355	ALD < 80% of the LDA	LDA = at least 1.25 X ALD

If the runway is wet and the AFM does not provide specific performance data for use on wet runways, a further increase of 15% of the landing distance on dry runways has to be applied, in accordance with CAT.POL.A.335 or CAT.POL.A.355 as applicable, as shown in the following Table 2:

Table 2 — Corrective factors for wet runways

Aeroplane category	**Resulting factor (wet runway)**
All aeroplanes	LDA = at least 1.15 x 1.43 x ALD = 1.64 x ALD
Aeroplanes approved under CAT.POL.A.355	LDA is the longer of: • 1.15 x 1.25 X ALD = 1.44 x ALD • the LDTA resulting from CAT.OP.MPA.303

However, for aeroplanes approved under CAT.POL.A.355 and landing on wet runways, CAT.POL.A.355 further requires to apply the longer of the landing distance resulting from the above table and the landing distance resulting from the application of CAT.OP.MPA.303(b).

GM1 CAT.POL.A.345(a) Approval of steep approach operations

SCREEN HEIGHT

For the purpose of steep approach operations, the screen height is the reference height above the runway surface, typically above the runway threshold, from which the landing distance is measured. The screen height is set at 50 ft for normal operations and at another value between 60 ft and 30 ft for steep approach operations.

GM1 CAT.POL.A.355(b) Approval of reduced required landing distance operations

EQUIVALENT LEVEL OF SAFETY

A level of safety equivalent to that intended by CAT.POL.A.330(a) may be achieved when conducting reduced required landing distance operations if mitigating measures are established and implemented. Such measures should address flight crew, aircraft characteristics and performance, aerodromes and operations. It is, however, essential that all conditions established are adhered to as it is the combination of said conditions that achieves the intended level of safety. The operator should in fact also consider the interrelation of the various mitigating measures.

The competent authority may require other mitigating measures in addition to those proposed by the operator.

AMC1 CAT.POL.A.355(b)(4) Approval of reduced required landing distance operations

CONTROL OF THE TOUCHDOWN AREA

The control of the touchdown area may be ensured by using external references visible from the flight crew compartment. The end of the designated touchdown area should be clearly identified with a ground reference point beyond which a go-around is required. Adequate go-around and balked landing instructions should be established in the operations manual (OM). A written and/or pictorial description of the procedure should be provided for crew use.

AMC1 CAT.POL.A.355(b)(5) and (b)(6) Approval of reduced required landing distance operations

TYPE EXPERIENCE

The operator should specify in the OM the minimum pilot's experience on the aircraft type or class used to conduct such operations.

TRAINING PROGRAMME

(a) Initial training

(1) The aerodrome training programme shall include ground and flight training with a suitably qualified instructor.

(2) Flight training should be carried out on the runway of the intended operations, and should include a suitable number of:

(i) approaches and landings; and
(ii) missed approach/balked landings.

(3) When performing approaches and landings, particular emphasis should be placed on:

(i) stabilised approach criteria;
(ii) accuracy of flare and touchdown;
(iii) positive identification of the ground reference point controlling the touchdown area; and
(iv) correct use of deceleration devices.

(4) These exercises should be conducted in accordance with the specific control procedure of the touchdown area established by the operator, and should enable the flight crew to identify the external visual references and the designated touchdown area.

(b) Recurrent training

The operator should ensure that in conjunction with the recurrent training and checking programme required by Subpart FC of Annex III (Part-ORO) to Regulation (EU) No 965/2012, the pilot's knowledge and ability to perform the tasks associated with this particular operation, for which the pilot is authorised by the operator, are verified.

RECENCY

The operator should define in the OM appropriate recent-experience requirements to ensure that the pilot's ability to perform an approach to and landing on the intended runway is maintained.

GM1 CAT.POL.A.355(b)(7) Approval of reduced required landing distance operations

AERODROME LANDING ANALYSIS PROGRAMME (ALAP)

The intent of an ALAP is to ensure that the aerodrome critical data related to landing performance in reduced required landing distance operations are known and taken into account in order to avoid any further increase of the landing distance. Two important aerodrome-related variables largely contribute to increasing the landing distance: landing (ground-) speed and deceleration capability. Related factors to consider should include at least the following elements:

(g) Airport facilities

Consideration should bebgiven to the services are available at the airport. Services such as communications, maintenance, and fueling may have an impact on operations to and from that airport, though not directly related to landing distance. The availability of adequate RFFF and medical services should be also taken into account. It is worth to consider also whether the aerodrome is only meeting ICAO and national standards or ICAO recommendations as well.

(h) Topography

Terrain around the aerodrome should be considered. High, fast-rising terrain may require special approach or decisiosn points, missed approach or balked landing procedures and may impact performance requirements. Aerodromes located on top of hilly terrain or downwind of mountainous terrain may occasionally experience conditions of windshear and gusts. Such conditions are particularly relevant during the landing maneuver, particularly during the flare, and may increase landing distance.

(i) Runway conditions

Runway characteristics, such as unknown slope and surface composition, can cause the actual landing distance to be longer than the calculated landing distance. Braking action always impacts the landing distance required as it deteriorates. To this regard, consideration should be given to the maintenance status of the runway, as a wet runway surface may be significantly degraded due to poor airport maintenance.

(j) Airport or Area weather

Some aerodromes may not have current weather reports and forecast available for flight planning. Others may have automated observations for operational use. Others may depend on the weather forecast of a nearby aerodrome. Area forecasts are also valuable in evaluating weather conditions for a particular operation. Comparing forecasted conditions to current conditions provoides insight upcoming changes as weather systems move and forecasts are updated. Longer flight segments may lean more heavily on the forecast for the estimated time of arrival (ETA), as current conditions may change significantly as weather systems move.

(k) Adverse weather

Adverse weather conditions include but are not restricted to thunderstorms, showers, downbursts, squall lines, tornadoes, moderate or severe turbulence on approach, heavy precipitation, wind shear, icing conditions. In general, all weather phenomena having the potential to increase the landing distance should be carefully assessed. Among these, tailwind is particularly relevant.

Wind variations should be carefully monitored as they may lead to variations in the reported and/or actual wind at the touchdown zone. Due consideration should be given also to the crosswind perpendicular to the landing runway as a slight variation in the direction of the crosswind may result in a considerable tailwind component.

(l) Runway safety margins

Displaced thresholds, airport construction, and temporary obstacles (such as cranes and drawbridges) may impact runway length available for landing. Notices to Airmen (NOTAM) must be consulted during the flight preparation. Another safety margin is the size and adequacy of the runway strip and runway end safety area (RESA). A well designed and maintained runway strip and RESA decreases the risk of damaging the aircraft in case of a runway excursion. ICAO annex 14 provides the SARPS to this regards. Consideration should be given to those aerodroems barely meeting these ICAO SARPS or when the bearing ratio's are below the design and maintenance criteria as indicated in ICAO doc 9157 – Aerodroem Design Manual.

GM1 CAT.POL.A.355(b)(8)(i) Approval of reduced required landing distance operations

EQUIPMENT AFFECTING LANDING PERFORMANCE

Equipment affecting landing performance typically includes flaps, slats, spoilers, brakes, anti-skid, autobrakes, reversers, etc. The operator should establish procedures to identify, based on the aircraft characteristics, those systems and the equipment that are performance relevant, and to ensure that they are verified to be operative before commencing the flight. Dispatch with such equipment that is inoperative under the minimum equipment list (MEL) is not allowed for reduced required landing distance operations.

GM1 CAT.POL.A.355(b)(8)(i) Approval of reduced required landing distance operations

EQUIPMENT AFFECTING LANDING PERFORMANCE

Should any equipment affecting landing performance become inoperative during reduced required landing distance operations, the failure will be dealt with in accordance with the abnormal /emergency procedures established in the OM and, based on the prevailing conditions for the

remainder of the flight, the commander will decide upon the discontinuation of the planned operation of reduced required landing distance.

GM1 CAT.POL.A.355(b)(8)(ii) Approval of reduced required landing distance operations

CORRECT USE OF DECELERATION DEVICES

Flight crew should use full reverse when landing, irrespective of any noise-related restriction on its use, unless this affects the controllability of the aircraft. The use of all stopping devices, including reverse thrust, should commence immediately after touchdown without any delay.

AMC1 CAT.POL.A.355(b)(9) Approval of reduced required landing distance operations

SPECIFIC MAINTENANCE INSTRUCTIONS

Additional maintenance instructions, such as, but not limited to, more frequent checks for the aircraft's deceleration devices, especially for the reverse system, should be established by the operator in accordance with the manufacturer's recommendations, and be included in the operator's maintenance programme in accordance with Annex I (Part-M) to Regulation (EU) No 1321/2014.

SPECIFIC OPERATIONAL PROCEDURES

The operator should establish procedures for the flight crew to check before take-off the correct deployment of the deceleration devices, such as the reverse system.

AMC1 CAT.POL.A.355(b)(11) Approval of reduced required landing distance operations

ADDITIONAL AERODROME CONDITIONS

(a) Operators should establish procedures to ensure that:

(1) the aerodrome information is obtained from an reliable source; and

(2) any change reducing landing distances declared by the aerodrome operator has been taken into account.

(b) Additional aerodrome conditions related to aeroplane type characteristics, orographic characteristics in the approach area, available approach aids and missed approach/balked landing considerations, as well as operating limitations, should also be taken into account.

(c) When assessing the aerodrome characteristics and the level of risk of the aeroplane undershooting or overrunning the runway, the operator should consider the nature and location of any hazard beyond the runway end, including the topography and obstruction environment beyond the runway strip, the length of the Runway End Safety Area (RESA) and the effectiveness of any other mitigation measures that may be in place to reduce the likelihood and the consequences of a runway overrun.

Chapter 4
Performance class C

AMC3 CAT.POL.A.400 Take-off

RUNWAY SURFACE CONDITION

The determination of take-off performance data for wet and contaminated runways should be based on the reported runway surface condition in terms of contaminant and depth.

GM1 CAT.POL.A.430(a) Landing – dry runways

ALTERNATE AERODROMES

The alternate aerodromes for which the landing mass is required to be determined in accordance with CAT.POL.A.430 are:

(a) destination alternate aerodromes;

(b) fuel en-route alternate (ERA) aerodromes; and

(c) re-dispatch or re-clearance aerodromes.

AMC1 CAT.POL.A.435 Landing – wet and contaimanted runways

WET AND CONTAMINATED RUNWAY DATA

The determination of landing performance data should be based on information provided in the operations manual (OM) on the reported runway condition code (RWYCC). The RWYCC is determined by the aerodrome operator using the runway condition assessment matrix (RCAM) and associated procedures defined in ICAO Doc 9981 — 'PANS Aerodromes'. The RWYCC is reported through a runway condition report (RCR) in the SNOWTAM format in accordance with ICAO Annex 15.

GM1 CAT.POL.A.435(a) and (b) Landing – wet and contaminated runways

DISPATCH CONSIDERATIONS FOR MARGINAL CASES

The landing distance at time of arrival (LDTA) required by CAT.OP.MPA.303 may, in some cases, and in particular on wet or contaminated runways, exceed the landing distance considered at time of dispatch. The requirements for dispatch remain unchanged, however, when the conditions at time of arrival are expected to be marginal, it is a good practice to carry out at time of dispatch a preliminary calculation of the LDTA.

GM1 CAT.POL.A.435(a)(1) Landing – wet and contaminated runways

AFM LANDING DISTANCES FOR WET RUNWAYS

Specific landing distances provided in the AFM for wet runways, unless otherwise indicated, include a safety factor, which renders not necessary the application of the 15% safety factor used in CAT.POL.A.435(a)(2). This implies that the AFM distance may be presented as factored distance. These distances may be longer or shorter than those resulting from CAT.POL.A.435(a)(2), but when provided they are intended as a replacement of CAT.POL.A.435(a)(2) and mandatory for use at the time of dispatch.

GM1 CAT.POL.A.430 & CAT.POL.A.435 Landing — dry runways & Landing – wet and contaminated runways

LANDING DISTANCES AND CORRECTIVE FACTORS

The AFM provides performance data for landing distance for the full range of conditions that may be encountered in service. This distance , commonly refrred to as the actual landing distance (ALD), is the distance from the position on the runway of the screen height to the point where the aeroplane comes to a full stop on a dry runway.

The determination of the ALD is based on the assumption that the landing is performed in accordance with the conditions and the procedures set out in the AFM on the basis of the apllicable certification standards.

As a matter of fact any particular landing may be different from the landing technique that is assumed in the AFM for certification purposes. The aircraft may approach the runway faster and/or higher than assumed; the aircraft may touchdown further along the runway than the optimum point; the actual winds and other weather factors may be different to those assumed in the calculation of the ALD; and maximum braking may not be always achievable. For this reason the Landing Distance Available (LDA) is required by CAT.POL.A.430 and CAT.POL.A.435 to be longer than the ALD.

The margins by which the LDA shall exceed the ALD on dry runways, in accordance with CAT.POL.A.430, are shown in the following Table 1:

Table 1 — Corrective factors for dry runways

Aeroplane category	Required Margin (dry runway)	Resulting factor (dry runway)
All aeroplanes	ALD < 70% of the LDA	LDA = at least 1.43 x ALD

If the runway is wet and the AFM does not provide specific performance data for use on wet runways, a further increase of 15% of the landing distance on dry runways has to be applied, in accordance with CAT.POL.A.435, as shown in the following Table 2:

Table 2 — Corrective factors for wet runways

Aeroplane category	Resulting factor (wet runway)
All aeroplanes	LDA = at least 1.15 x 1.43 x ALD = 1.64 x ALD

ANNEX VI

NON-COMMERCIAL AIR OPERATIONS WITH COMPLEX MOTOR-POWERED AIRCRAFT [PART-NCC]

SUBPART B

OPERATIONAL PROCEDURES

AMC1 NCC.OP.225 Approach and landing conditions — aeroplanes

LANDING DISTANCE~~/FATO SUITABILITY~~

(a) The in-flight determination of the landing distance~~/FATO~~ should be based on the latest available ~~meteorological~~ weather report ~~or~~and runway ~~state~~condition report (RCR).

(b) An assessment should be initially carried out when weather report and RCR are obtained, usually around top of descent. If the planned duration of the flight does not allow to carry out the assessment in non-critical phases of flight, the assessment should be carried out before departure.

(c) When meteorological conditions may lead to a degradation of the runway surface condition, the assessment should include consideration of how much deterioration in runway surface friction characteristics may be tolerated, so that a quick decision can be made prior to landing, if the flight crew of the preceding aircraft landing at the same runway provides a special air-report (AIREP) of worse than expected braking action.

(d) The flight crew should monitor the evolution of the actual conditions during the approach, to ensure that they do not degrade below the condition that was previously determined to be the minimum acceptable.

(e) The in-flight determination of the landing distance should be done is such way that either:

(1) the landing distance available (LDA) on the intended runway is at least 115 % of the landing distance at the estimated time of landing, determined in accordance with the performance information for the assessment of the landing distance at time of arrival (LDTA); or

(2) if performance information for the assessment of the LDTA is not available, the LDA on the intended runway at the estimated time of landing is at least the landing distance determined at the time of dispatch.

(f) If performance information for the assessment of the LDTA is available, it should be based on approved data contained in the AFM, or on other data tha is either determined in accordance with the applicable certification standards for aeroplanes or determined by the Agency.

(g) Whenever the runway braking action encountered during the landing roll is not as good as reported by the aerodrome operator in the runway condition report (RCR), the pilot-in-command should notify the air traffic services (ATS) by means of a special air-report (AIREP) as soon as practicable.

GM1 NCC.OP.225 Approach and landing conditions — aeroplanes

LANDING DISTANCE

The assessment of the LDTA begins with the acquisition of the latest available weather information and the RCR. The information provided in the RCR is divided in two sections:

(a) The "aircraft performance" section which contains information that is directly relevant in a performance computation

(b) The "situational awareness" section which contains information that the flight crew should be aware of for a safe operation, but which does not have a direct impact on the performance assessment.

The "aircraft performance" section of the RCR includes a runway condition code (RWYCC), the contaminant type, depth and coverage for each third of the runway.

The determination of the RWYCC is based on the use of the runway condition assessment matrix (RCAM), however, the presentation of the information in the RCAM is appropriate for use by aerodrome personnel trained and competent in assessing the runway condition in a way that is relevant to aircraft performance. While full implementation of the RCAM standard would eventually no longer require the flight crew to derive from various information available to them the appropriate runway condition to be used for the landing performance assessment at the time of arrival, it is desirable that pilots maintain an understanding of the performance effect of various components considered in the assessment.

It is the task of the aerodrome personnel to assess the appropriate RWYCC in order to allow the flight crew to assess any potential change of the runway surface conditions. When no RWYCC is available in winter conditions, the RCAM provides the flight crew with a combination of the relevant information (runway surface conditions: state and/or contaminant or pilot report of braking action (AIREP)) in order to assess the RWYCC.

Table 1 below is an excerpt of the RCAM and permits to carry out the primary assessment based on the reported contaminant type and depth, as well as outside air temperature (OAT).

Table 1 — Association between runway surface condition and RWYCC based on reported contaminant type and depth and OAT

Runway surface condition	Surface condition descriptor	Depth	Notes	RWYCC
Dry		N/a	Including wet or contaminated runways below 25 % coverage in each runway third	6
Wet	Damp (any visible dampness)			5
	Wet	3 mm or less		5
Slippery wet				3
Contaminated	Compacted snow	Any	At or below OAT – 15 °C	4
			Above OAT – 15 °C	3
	Dry snow	3 mm or less		5
		More than 3 mm up to 100 mm	Including when any depth occurs on top of compacted snow	3
		Any	On top of ice	0[2]
	Frost[1]	Any		5
	Ice	Any	In cold and dry conditions	1
	Slush	3 mm or less		5
		More than 3 mm up to 15 mm		2
	Standing water	3 mm or less		5
		More than 3 mm up to 15 mm		2
		Any	On top of ice	0[2]
	Wet ice	Any		0[2]
	Wet snow	3 mm or less		5
		More than 3 mm up to 30 mm	Including when any depth occurs on top of compacted snow	3
		Any	On top of ice	0[2]

Note 1: under certain conditions, frost may cause the surface to become very slippery.

Note 2: operations in conditions where less-than-poor braking action prevails are prohibited.

Note 3: runway surface temperature should preferably be used where available.

A primary assessment may have to be downgraded by the aerodrome operator based on an AIREP of lower braking action than the one typically associated with the type and depth of contaminant on the runway.

Upgrading a RWYCC 5, 4, 3 or 2 determined by the aerodrome operator from the observed contaminant type is not allowed.

A RWYCC 1 or 0 maybe be upgraded by the aerodrome operator to a maximum of RWYCC 3. The reason for the upgrade will be specified in the "situational awareness" section of the RCR.

When the aerodrome operator is approved for operations on specially prepared winter runways, in accordance with Annex V (Part-ADR.OPS) to Regulation (EU) 139/2014, the RWYCC of a runway that is contaminated with compacted snow or ice, may be upgraded to RWYCC 4 upon a specific treatment of the runway. In such cases, the reason for the upgrade will be specified in the "situational awareness" section of the RCR.

GM2 NCC.OP.225 Approach and landing conditions — aeroplanes

RCR, RWYCC and RCAM

A detailed description of the RCR format and content, the RWYCC and the RCAM may be found in Annex V (Part-ADR.OPS) to Regulation (EU) 139/2014. Further guidance may be found in the following documents:

(a) ICAO Doc 9981 — 'PANS Aerodromes';

(b) ICAO Doc 4444 — 'PANS ATM';

(c) ICAO Doc 10064 – Aeroplane Performance Manual.

GM3 NCC.OP.225 Approach and landing conditions — aeroplanes

PERFORMANCE INFORMATION FOR THE ASSESSMENT OF LDTA

Guidance on performance information for the assessment of the LDTA may be found in:

(a) AMC1 CAT.OP.MPA.303(e) of Annex IV (Part CAT) to Regulation (EU) No 965/2012;

(b) ICAO Doc 10064 – Aeroplane Performance Manual.

GM4 NCC.OP.225 Approach and landing conditions — aeroplanes

REPORTING ON RUNWAY BRAKING ACTION

The role of the flight crew in the runway surface condition reporting process does not end once a safe landing has been achieved. While the aerodrome operator is responsible for generating the RCR, flight crew are responsible for providing accurate braking action reports.

The flight crew braking action reports provide feedback to the aerodrome operator regarding the accuracy of the RCR resulting from the observed runway surface conditions.

ATC passes these braking action reports both to the subsequent aeroplane landing at the same runway and to the aerodrome operator, which in turn uses them in conjunction with the RCAM to determine if it is necessary to downgrade or upgrade the Runway Condition Code (RWYCC).

During busy times, runway inspections and maintenance may be less frequent and need to be sequenced with arrivals. Therefore, aerodrome operators may depend on braking action reports to confirm that the runway surface condition is not deteriorating below the assigned RCR.

Since both the ATC and the aerodrome operator rely on accurate braking action reports, flight crew should use standardised terminology in accordance with ICAO Doc 4444 — 'PANS ATM'.

The following Table 1 shows the correlation between the terminology to be used in the AIREP to report the braking action and the RWYCC.

Table 1 — Association between AIREP and RWYCC

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

Note 1: the aerodrome personnel may downgrade or upgrade the reported RWYCC based on the friction coefficient (Mu) measured by a friction measuring device meeting standards set or agreed by the state of aerodrome. Such a decision should not be taken by a flight crew on the approach as it must be supported by other observations. Measured friction values poorly correlate with actual aircraft braking capability and landing performance.

An AIREP should be transmitted to the ATC, in accordance with one of the following specifications, as applicable:

(a) Good braking action is reported as “BRAKING ACTION GOOD”

(b) Good to medium braking action is reported as “BRAKING ACTION GOOD TO MEDIUM”

(c) Medium braking action is reported as “BRAKING ACTION MEDIUM”

(d) Medium to poor braking action is reported as “BRAKING ACTION MEDIUM TO POOR”

(e) Poor braking action is reported as “BRAKING ACTION POOR”

(f) Less than poor braking action is reported as “BRAKING ACTION LESS THAN POOR”

In some cases the differences between two consecutive levels of the six braking action categories between “Good” and “Less than Poor” may be too subtle for the flight crew to detect. It is therefore acceptable for the flight crew to report on a more coarse scale of “Good”, “Medium” and “Poor”.

Whenever requested by ATC, or if the braking action encountered during the landing roll is not as previously reported by the aerodrome operator, pilots should provide a braking action report. This is especially important and safety relevant where the experienced braking action is worse than the braking action associated with any RWYCC code currently in effect for that portion of the runway. When they match up, the AIREP provides both the pilot and the airport operator additional confidence in the reported runway codes. Also when the experienced braking action is is better than that reported by the aerodrome operator, it is important to report this information, which may trigger further actions for the arodrome operator in order to upgrade the RCR.

If an aircraft-generated braking action report is available, it should be transmitted, identifying its origin accordingly. If the flight crew have reason to modify the aircraft-generated braking action report based on their judgement, the commander should be able to amend such report.

An braking action AIREP of "Less Than Poor" leads to a runway closure until the aerodrome operator can improve the runway condition.

An air safety report (ASR) should be submitted whenever flight safety has been endangered due to low braking action.

GM5 NCC.OP.225 Approach and landing conditions — aeroplanes

FLIGHT CREW TRAINING

Flight crew should be trained on the the use of the RCR, on the use of performance data for the assessment of the LDTA, if available, and on reporting braking action using the AIREP format.

Guidance to develop the content of the training may be found in:

(a) AMC1 CAT.OP.MPA.303 & CAT.OP.MPA.311, of Annex IV (Part CAT) to Regulation (EU) No 965/2012, as applicable to the intended operations;

(b) ICAO Doc 10064 – Aeroplane Performance Manual.

AMC1 NCC.OP.226 Approach and landing conditions — helicopters

FATO SUITABILITY

The in-flight determination of the FATO suitability should be based on the latest available meteorological report.

SUBPART C

AIRCRAFT PERFORMANCE AND OPERATING LIMITATIONS

GM1 NCC.POL.125 Take-off — aeroplanes

RUNWAY SURFACE CONDITION

Operation on runways contaminated with water, slush, snow or ice implies uncertainties with regard to runway friction and contaminant drag and therefore to the achievable performance and control of the aeroplane during take-off or landing, since the actual conditions may not completely match the assumptions on which the performance information is based. In the case of a contaminated runway, the first option for the pilot-in-command is to wait until the runway is cleared. If this is impracticable, he/she may consider a take-off or landing, provided that he/she has applied the applicable performance adjustments, and any further safety measures he/she considers justified under the prevailing conditions. The excess runway length available including the criticality of the overrun area should also be considered.

The determination of take-off performance data for wet and contaminated runways should be based on the reported runway surface condition in terms of contaminant and depth.

GM1 NCC.POL.135 Landing – aeroplanes

WET AND CONTAMINATED RUNWAY DATA

The determination of landing performance data should be based on information provided in the operations manual (OM) on the reported runway condition code (RWYCC). The RWYCC is determined by the aerodrome operator using the runway condition assessment matrix (RCAM) and associated procedures defined in ICAO Doc 9981 — 'PANS Aerodromes'. The RWYCC is reported through a runway condition report (RCR) in the SNOWTAM format in accordance with ICAO Annex 15.

ANNEX VII

NON-COMMERCIAL AIR OPERATIONS WITH OTHER-THAN COMPLEX MOTOR-POWERED AIRCRAFT [PART-NCO]

SUBPART B

OPERATIONAL PROCEDURES

AMC1 NCO.OP.205 Approach and landing conditions — aeroplanes

LANDING DISTANCE~~/FATO SUITABILITY~~

(a) The in-flight determination of the landing distance~~/FATO~~ should be based on the latest available ~~meteorological~~ weather report ~~or~~and runway ~~state~~condition report (RCR).

(b) An assessment should be initially carried out when weather report and RCR are obtained, usually around top of descent. If the planned duration of the flight does not allow to carry out the assessment in non-critical phases of flight, the assessment should be carried out before departure.

(c) When meteorological conditions may lead to a degradation of the runway surface condition, the assessment should include consideration of how much deterioration in runway surface friction characteristics may be tolerated, so that a quick decision can be made prior to landing, if the flight crew of the preceding aircraft landing at the same runway provides a special air-report (AIREP) of worse than expected braking action.

(d) The flight crew should monitor the evolution of the actual conditions during the approach, to ensure that they do not degrade below the condition that was previously determined to be the minimum acceptable.

(e) The in-flight determination of the landing distance should ensure that the aeroplane performance information allows a safe landing on the intended runway taking into account the runway condition code (RWYCC) reported in the RCR.

(f) Whenever the runway braking action encountered during the landing roll is not as good as reported by the aerodrome operator in the runway condition report (RCR), the pilot-in-command should notify the air traffic services (ATS) by means of a special air-report (AIREP) as soon as practicable.

GM1 NCO.OP.205 Approach and landing conditions — aeroplanes

LANDING DISTANCE

The assessment of the landing distance begins with the acquisition of the latest available weather information and the RCR. The information provided in the RCR is divided in two sections:

(a) The “aircraft performance” section which contains information that is directly relevant in a performance computation

(b) The “situational awareness” section which contains information that the flight crew should be aware of for a safe operation, but which does not have a direct impact on the performance assessment.

The “aircraft performance” section of the RCR includes a runway condition code (RWYCC), the contaminant type, depth and coverage for each third of the runway.

The determination of the RWYCC is based on the use of the runway condition assessment matrix (RCAM), however, the presentation of the information in the RCAM is appropriate for use by aerodrome personnel trained and competent in assessing the runway condition in a way that is relevant to aircraft performance. While full implementation of the RCAM standard would eventually no longer require the flight crew to derive from various information available to them the appropriate runway condition to be used for the landing performance assessment at the time of arrival, it is desirable that pilots maintain an understanding of the performance effect of various components considered in the assessment.

It is the task of the aerodrome personnel to assess the appropriate RWYCC in order to allow the flight crew to assess any potential change of the runway surface conditions. When no RWYCC is available in winter conditions, the RCAM provides the flight crew with a combination of the relevant information (runway surface conditions: state and/or contaminant or pilot report of braking action (AIREP)) in order to assess the RWYCC.

Table 1 below is an excerpt of the RCAM and permits to carry out the primary assessment based on the reported contaminant type and depth, as well as outside air temperature (OAT).

Table 1 — Association between runway surface condition and RWYCC based on reported contaminant type and depth and OAT

Runway surface condition	Surface condition descriptor	Depth	Notes	RWYCC
Dry		N/a	Including wet or contaminated runways below 25 % coverage in each runway third	6
Wet	Damp (any visible dampness)			5
	Wet	3 mm or less		5
Slippery wet				3
Contaminated	Compacted snow	Any	At or below OAT – 15 °C	4
			Above OAT – 15 °C	3
	Dry snow	3 mm or less		5
		More than 3 mm up to 100 mm	Including when any depth occurs on top of compacted snow	3
		Any	On top of ice	0[2]
	Frost[1]	Any		5
	Ice	Any	In cold and dry conditions	1
	Slush	3 mm or less		5
		More than 3 mm up to 15 mm		2
	Standing water	3 mm or less		5
		More than 3 mm up to 15 mm		2
		Any	On top of ice	0[2]
	Wet ice	Any		0[2]
	Wet snow	3 mm or less		5
		More than 3 mm up to 30 mm	Including when any depth occurs on top of compacted snow	3
		Any	On top of ice	0[2]

Note 1: under certain conditions, frost may cause the surface to become very slippery.

Note 2: operations in conditions where less-than-poor braking action prevails are prohibited.

Note 3: runway surface temperature should preferably be used where available.

A primary assessment may have to be downgraded by the aerodrome operator based on an AIREP of lower braking action than the one typically associated with the type and depth of contaminant on the runway.

Upgrading a RWYCC 5, 4, 3 or 2 determined by the aerodrome operator from the observed contaminant type is not allowed.

A RWYCC 1 or 0 maybe be upgraded by the aerodrome operator to a maximum of RWYCC 3. The reason for the upgrade will be specified in the "situational awareness" section of the RCR.

When the aerodrome operator is approved for operations on specially prepared winter runways, in accordance with Annex V (Part-ADR.OPS) to Regulation (EU) 139/2014, the RWYCC of a runway that is contaminated with compacted snow or ice, may be upgraded to RWYCC 4 upon a specific treatment of the runway. In such cases, the reason for the upgrade will be specified in the "situational awareness" section of the RCR.

GM2 NCO.OP.205 Approach and landing conditions — aeroplanes

RCR, RWYCC and RCAM

A detailed description of the RCR format and content, the RWYCC and the RCAM may be found in Annex V (Part-ADR.OPS) to Regulation (EU) 139/2014. Further guidance may be found in the following documents:

(a) ICAO Doc 9981 — 'PANS Aerodromes';

(b) ICAO Doc 4444 — 'PANS ATM';

(c) ICAO Doc 10064 – Aeroplane Performance Manual.

GM3 NCO.OP.205 Approach and landing conditions — aeroplanes

REPORTING ON RUNWAY BRAKING ACTION

The role of the flight crew in the runway surface condition reporting process does not end once a safe landing has been achieved. While the aerodrome operator is responsible for generating the RCR, flight crew are responsible for providing accurate braking action reports.

The flight crew braking action reports provide feedback to the aerodrome operator regarding the accuracy of the RCR resulting from the observed runway surface conditions.

ATC passes these braking action reports both to the subsequent aeroplane landing at the same runway and to the aerodrome operator, which in turn uses them in conjunction with the RCAM to determine if it is necessary to downgrade or upgrade the Runway Condition Code (RWYCC).

During busy times, runway inspections and maintenance may be less frequent and need to be sequenced with arrivals. Therefore, aerodrome operators may depend on braking action reports to confirm that the runway surface condition is not deteriorating below the assigned RCR.

Since both the ATC and the aerodrome operator rely on accurate braking action reports, flight crew should use standardised terminology in accordance with ICAO Doc 4444 — 'PANS ATM'.

The following Table 1 shows the correlation between the terminology to be used in the AIREP to report the braking action and the RWYCC.

Table 1 — Association between AIREP and RWYCC

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

Note 1: the aerodrome personnel may downgrade or upgrade the reported RWYCC based on the friction coefficient (Mu) measured by a friction measuring device meeting standards set or agreed by the state of aerodrome. Such a decision should not be taken by a flight crew on the approach as it must be supported by other observations. Measured friction values poorly correlate with actual aircraft braking capability and landing performance.

An AIREP should be transmitted to the ATC, in accordance with one of the following specifications, as applicable:

(a) Good braking action is reported as “BRAKING ACTION GOOD”

(b) Good to medium braking action is reported as “BRAKING ACTION GOOD TO MEDIUM”

(c) Medium braking action is reported as “BRAKING ACTION MEDIUM”

(d) Medium to poor braking action is reported as “BRAKING ACTION MEDIUM TO POOR”

(e) Poor braking action is reported as “BRAKING ACTION POOR”

(f) Less than poor braking action is reported as “BRAKING ACTION LESS THAN POOR”

In some cases the differences between two consecutive levels of the six braking action categories between “Good” and “Less than Poor” may be too subtle for the flight crew to detect. It is therefore acceptable for the flight crew to report on a more coarse scale of “Good”, “Medium” and “Poor”.

Whenever requested by ATC, or if the braking action encountered during the landing roll is not as previously reported by the aerodrome operator, pilots should provide a braking action report. This is especially important and safety relevant where the experienced braking action is worse than the braking action associated with any RWYCC code currently in effect for that portion of the runway.

When they match up, the AIREP provides both the pilot and the airport operator additional confidence in the reported runway codes. Also when the experienced braking action is is better than that reported by the aerodrome operator, it is important to report this information, which may trigger further actions for the arodrome operator in order to upgrade the RCR.

If an aircraft-generated braking action report is available, it should be transmitted, identifying its origin accordingly. If the flight crew have reason to modify the aircraft-generated braking action report based on their judgement, the commander should be able to amend such report.

An braking action AIREP of "Less Than Poor" leads to a runway closure until the aerodrome operator can improve the runway condition.

An air safety report (ASR) should be submitted whenever flight safety has been endangered due to low braking action.

GM4 NCO.OP.205 Approach and landing conditions — aeroplanes

FLIGHT CREW TRAINING

Flight crew should be trained on the the use of the RCR, on the assessment of the landing distance, and on reporting braking action using the AIREP format.

Guidance to develop the content of the training may be found in:

(a) AMC1 CAT.OP.MPA.303 & CAT.OP.MPA.311, of Annex IV (Part CAT) to Regulation (EU) No 965/2012, as applicable to the intended operations;

(b) ICAO Doc 10064 – Aeroplane Performance Manual.

AMC1 NCO.OP.206 Approach and landing conditions — helicopters

FATO SUITABILITY

The in-flight determination of the FATO suitability should be based on the latest available meteorological report.

ANNEX VIII

SPECIALISED OPERATIONS
[Part-SPO]

SUBPART B

GENERAL REQUIREMENTS

OPERATIONAL PROCEDURES

AMC1 SPO.OP.210 Approach and landing conditions — aeroplanes

LANDING DISTANCE~~/FATO SUITABILITY~~

(a) The in-flight determination of the landing distance~~/FATO~~ should be based on the latest available ~~meteorological~~ weather report ~~or~~and runway ~~state~~condition report (RCR).

(b) An assessment should be initially carried out when weather report and RCR are obtained, usually around top of descent. If the planned duration of the flight does not allow to carry out the assessment in non-critical phases of flight, the assessment should be carried out before departure.

(c) When meteorological conditions may lead to a degradation of the runway surface condition, the assessment should include consideration of how much deterioration in runway surface friction characteristics may be tolerated, so that a quick decision can be made prior to landing, if the flight crew of the preceding aircraft landing at the same runway provides a special air-report (AIREP) of worse than expected braking action.

(d) The flight crew should monitor the evolution of the actual conditions during the approach, to ensure that they do not degrade below the condition that was previously determined to be the minimum acceptable.

(e) For complex motor-powered aeroplanes, the in-flight determination of the landing distance should be done is such way that either:

(1) the landing distance available (LDA) on the intended runway is at least 115 % of the landing distance at the estimated time of landing, determined in accordance with the performance information for the assessment of the landing distance at time of arrival (LDTA); or

(2) if performance information for the assessment of the LDTA is not available, the LDA on the intended runway at the estimated time of landing is at least the landing distance determined at the time of dispatch.

(f) For complex motor-powered aeroplanes, if performance information for the assessment of the LDTA is available, it should be based on approved data contained in the AFM, or on other data tha is either determined in accordance with the applicable certification standards for aeroplanes or determined by the Agency.

(g) For other-than complex motor-powered aeroplanes, the in-flight determination of the landing distance should ensure that the aeroplane performance information allows a safe landing on

the intended runway taking into account the runway condition code (RWYCC) reported in the RCR.

(h) Whenever the runway braking action encountered during the landing roll is not as good as reported by the aerodrome operator in the runway condition report (RCR), the pilot-in-command should notify the air traffic services (ATS) by means of a special air-report (AIREP) as soon as practicable.

GM1 SPO.OP.210 Approach and landing conditions — aeroplanes

LANDING DISTANCE

The assessment of the Landing distance begins with the acquisition of the latest available weather information and the RCR. The information provided in the RCR is divided in two sections:

(a) The "aircraft performance" section which contains information that is directly relevant in a performance computation

(b) The "situational awareness" section which contains information that the flight crew should be aware of for a safe operation, but which does not have a direct impact on the performance assessment.

The "aircraft performance" section of the RCR includes a runway condition code (RWYCC), the contaminant type, depth and coverage for each third of the runway.

The determination of the RWYCC is based on the use of the runway condition assessment matrix (RCAM), however, the presentation of the information in the RCAM is appropriate for use by aerodrome personnel trained and competent in assessing the runway condition in a way that is relevant to aircraft performance. While full implementation of the RCAM standard would eventually no longer require the flight crew to derive from various information available to them the appropriate runway condition to be used for the landing performance assessment at the time of arrival, it is desirable that pilots maintain an understanding of the performance effect of various components considered in the assessment.

It is the task of the aerodrome personnel to assess the appropriate RWYCC in order to allow the flight crew to assess any potential change of the runway surface conditions. When no RWYCC is available in winter conditions, the RCAM provides the flight crew with a combination of the relevant information (runway surface conditions: state and/or contaminant or pilot report of braking action (AIREP)) in order to assess the RWYCC.

Table 1 below is an excerpt of the RCAM and permits to carry out the primary assessment based on the reported contaminant type and depth, as well as outside air temperature (OAT).

Table 1 — Association between runway surface condition and RWYCC based on reported contaminant type and depth and OAT

Runway surface condition	Surface condition descriptor	Depth	Notes	RWYCC
Dry		N/a	Including wet or contaminated runways below 25 % coverage in each runway third	6
Wet	Damp (any visible dampness)			5
	Wet	3 mm or less		5
Slippery wet				3
Contaminated	Compacted snow	Any	At or below OAT – 15 °C	4
			Above OAT – 15 °C	3
	Dry snow	3 mm or less		5
		More than 3 mm up to 100 mm	Including when any depth occurs on top of compacted snow	3
		Any	On top of ice	0[2]
	Frost[1]	Any		5
	Ice	Any	In cold and dry conditions	1
	Slush	3 mm or less		5
		More than 3 mm up to 15 mm		2
	Standing water	3 mm or less		5
		More than 3 mm up to 15 mm		2
		Any	On top of ice	0[2]
	Wet ice	Any		0[2]
	Wet snow	3 mm or less		5
		More than 3 mm up to 30 mm	Including when any depth occurs on top of compacted snow	3
		Any	On top of ice	0[2]

Note 1: under certain conditions, frost may cause the surface to become very slippery.

Note 2: operations in conditions where less-than-poor braking action prevails are prohibited.

Note 3: runway surface temperature should preferably be used where available.

A primary assessment may have to be downgraded by the aerodrome operator based on an AIREP of lower braking action than the one typically associated with the type and depth of contaminant on the runway.

Upgrading a RWYCC 5, 4, 3 or 2 determined by the aerodrome operator from the observed contaminant type is not allowed.

A RWYCC 1 or 0 maybe be upgraded by the aerodrome operator to a maximum of RWYCC 3. The reason for the upgrade will be specified in the "situational awareness" section of the RCR.

When the aerodrome operator is approved for operations on specially prepared winter runways, in accordance with Annex V (Part-ADR.OPS) to Regulation (EU) 139/2014, the RWYCC of a runway that is contaminated with compacted snow or ice, may be upgraded to RWYCC 4 upon a specific treatment of the runway. In such cases, the reason for the upgrade will be specified in the "situational awareness" section of the RCR.

GM2 SPO.OP.210 Approach and landing conditions — aeroplanes

RCR, RWYCC and RCAM

A detailed description of the RCR format and content, the RWYCC and the RCAM may be found in Annex V (Part-ADR.OPS) to Regulation (EU) 139/2014. Further guidance may be found in the following documents:

(a) ICAO Doc 9981 — 'PANS Aerodromes';

(b) ICAO Doc 4444 — 'PANS ATM';

(c) ICAO Doc 10064 – Aeroplane Performance Manual.

GM3 SPO.OP.210 Approach and landing conditions — complex moto-powered aeroplanes

PERFORMANCE INFORMATION FOR THE ASSESSMENT OF LDTA

Guidance on performance information for the assessment of the LDTA may be found in:

(a) AMC1 CAT.OP.MPA.303(e) of Annex IV (Part CAT) to Regulation (EU) No 965/2012;

(b) ICAO Doc 10064 – Aeroplane Performance Manual.

GM4 SPO.OP.210 Approach and landing conditions — aeroplanes

REPORTING ON RUNWAY BRAKING ACTION

The role of the flight crew in the runway surface condition reporting process does not end once a safe landing has been achieved. While the aerodrome operator is responsible for generating the RCR, flight crew are responsible for providing accurate braking action reports.

The flight crew braking action reports provide feedback to the aerodrome operator regarding the accuracy of the RCR resulting from the observed runway surface conditions.

ATC passes these braking action reports both to the subsequent aeroplane landing at the same runway and to the aerodrome operator, which in turn uses them in conjunction with the RCAM to determine if it is necessary to downgrade or upgrade the Runway Condition Code (RWYCC).

During busy times, runway inspections and maintenance may be less frequent and need to be sequenced with arrivals. Therefore, aerodrome operators may depend on braking action reports to confirm that the runway surface condition is not deteriorating below the assigned RCR.

Since both the ATC and the aerodrome operator rely on accurate braking action reports, flight crew should use standardised terminology in accordance with ICAO Doc 4444 — 'PANS ATM'.

The following Table 1 shows the correlation between the terminology to be used in the AIREP to report the braking action and the RWYCC.

Table 1 — Association between AIREP and RWYCC

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

Note 1: the aerodrome personnel may downgrade or upgrade the reported RWYCC based on the friction coefficient (Mu) measured by a friction measuring device meeting standards set or agreed by the state of aerodrome. Such a decision should not be taken by a flight crew on the approach as it must be supported by other observations. Measured friction values poorly correlate with actual aircraft braking capability and landing performance.

An AIREP should be transmitted to the ATC, in accordance with one of the following specifications, as applicable:

(a) Good braking action is reported as “BRAKING ACTION GOOD”

(b) Good to medium braking action is reported as “BRAKING ACTION GOOD TO MEDIUM”

(c) Medium braking action is reported as “BRAKING ACTION MEDIUM”

(d) Medium to poor braking action is reported as “BRAKING ACTION MEDIUM TO POOR”

(e) Poor braking action is reported as “BRAKING ACTION POOR”

(f) Less than poor braking action is reported as “BRAKING ACTION LESS THAN POOR”

In some cases the differences between two consecutive levels of the six braking action categories between “Good” and “Less than Poor” may be too subtle for the flight crew to detect. It is therefore acceptable for the flight crew to report on a more coarse scale of “Good”, “Medium” and “Poor”.

Whenever requested by ATC, or if the braking action encountered during the landing roll is not as previously reported by the aerodrome operator, pilots should provide a braking action report. This is especially important and safety relevant where the experienced braking action is worse than the braking action associated with any RWYCC code currently in effect for that portion of the runway. When they match up, the AIREP provides both the pilot and the airport operator additional confidence in the reported runway codes. Also when the experienced braking action is is better than that reported by the aerodrome operator, it is important to report this information, which may trigger further actions for the arodrome operator in order to upgrade the RCR.

If an aircraft-generated braking action report is available, it should be transmitted, identifying its origin accordingly. If the flight crew have reason to modify the aircraft-generated braking action report based on their judgement, the commander should be able to amend such report.

An braking action AIREP of "Less Than Poor" leads to a runway closure until the aerodrome operator can improve the runway condition.

An air safety report (ASR) should be submitted whenever flight safety has been endangered due to low braking action.

GM5 SPO.OP.210 Approach and landing conditions — aeroplanes

FLIGHT CREW TRAINING

Flight crew should be trained on:

(a) the the use of the RCR;

(b) the assessment of the landing distance:

(c) for complex motor-powered aeroplanes only, on the use of performance data for the assessment of the LDTA, if available:

(d) on reporting braking action using the AIREP format.

Guidance to develop the content of the training may be found in:

(a) AMC1 CAT.OP.MPA.303 & CAT.OP.MPA.311, of Annex IV (Part CAT) to Regulation (EU) No 965/2012, as applicable to the intended operations;

(b) ICAO Doc 10064 – Aeroplane Performance Manual.

AMC1 SPO.OP.211 Approach and landing conditions — helicopters

FATO SUITABILITY

The in-flight determination of the FATO suitability should be based on the latest available meteorological report.

SUBPART C

AIRCRAFT PERFORMANCE AND OPERATING LIMITATIONS

GM1 SPO.POL.130(a)(4) Take-off — complex motor-powered aeroplanes

RUNWAY SURFACE CONDITION

Operation on runways contaminated with water, slush, snow or ice implies uncertainties with regard to runway friction and contaminant drag and therefore to the achievable performance and control of the aeroplane during take-off or landing, since the actual conditions may not completely match the assumptions on which the performance information is based. In the case of a contaminated runway, the first option for the pilot-in-command is to wait until the runway is cleared. If this is impracticable, he/she may consider a take-off or landing, provided that he/she has applied the applicable performance adjustments, and any further safety measures he/she considers justified under the prevailing conditions. The excess runway length available including the criticality of the overrun area should also be considered.

The determination of take-off performance data for wet and contaminated runways should be based on the reported runway surface condition in terms of contaminant and depth.

GM1 SPO.POL.140 Landing – complex motor-powered aeroplanes

WET AND CONTAMINATED RUNWAY DATA

The determination of landing performance data should be based on information provided in the operations manual (OM) on the reported runway condition code (RWYCC). The RWYCC is determined by the aerodrome operator using the runway condition assessment matrix (RCAM) and associated procedures defined in ICAO Doc 9981 — 'PANS Aerodromes'. The RWYCC is reported through a runway condition report (RCR) in the SNOWTAM format in accordance with ICAO Annex 15.