United Kingdom
Civil Aviation Authority
Official Record Series 9

CAA Decision to adopt AMC and GM for UK Reg (EU) No 139/2014 pursuant to Article 76(3) UK Reg (EU) 2018/1139

DECISION No. 14

Publication date: 2 September 2022

Decision amending Acceptable Means of Compliance (AMC) and Guidance Material (GM) for UK Reg (EU) No 139/2014 regarding data quality requirements and global reporting format

Background

CAA UK-EU Transition Decision No. 1 adopted a form of Acceptable Means of Compliance (**"AMC"**) as means by which the requirements in Regulation (EU) No **139/2014** as retained (and amended in UK domestic law) under the European Union (Withdrawal) Act 2018 ("**UK Reg (EU) No 139/2014**") could be met. That decision also adopted Guidance Material (**"GM"**) as non-binding explanatory and interpretation material on how to achieve the requirements in **UK Reg (EU) No 139/2014**. The CAA has decided to adopt revised AMC and GM in respect of **UK Reg (EU) No 139/2014**.

Decision

1. The CAA, under Article 76(3) of Regulation (EU) No 2018/1139 as retained (and amended in UK domestic law) under the European Union (Withdrawal) Act 2018, has decided to adopt the AMC and GM attached at Schedule 1.

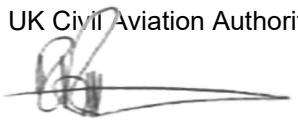
2. This AMC and GM supplements and/or replaces that which was adopted for **UK Reg (EU) No 139/2014** by CAA UK-EU Transition Decision No. 1 dated 22 December 2020.

3. This Decision will remain in force unless revoked or amended by the CAA.

4. The AMC and GM attached at Schedule 1 to this Decision comes into force on 2 September 2022.

Definitions

All references to UK Reg (EU) No 139/2014 are to those Regulations as retained and amended in UK domestic law pursuant to the European Union (Withdrawal) Act 2018.



Rob Bishton
For the Civil Aviation Authority and the United Kingdom

Date of Decision: 2 September 2022

Date of Decision Coming into force: 2 September 2022

Schedule 1

Includes the Acceptable Means of Compliance (AMC) and Guidance Material (GM) documents referenced below.

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

(a) ~~Text to be deleted is shown struck through~~;

(b) New text is highlighted in grey;

(c) ~~Text to be deleted is shown struck through~~ followed by the replacement text which is highlighted in grey.

AMC and GM for UK Reg (EU) No 139/2014

~~AMC1 ADR.OR.D.007(a) Management of aeronautical data and aeronautical information~~

~~QUALITY MANAGEMENT SYSTEM FOR AERONAUTICAL DATA AND AERONAUTICAL INFORMATION PROVISION ACTIVITIES~~

~~(a) A quality management system supporting the origination, production, storage, handling, processing, transfer, and distribution of aeronautical data and aeronautical information should:~~

~~(1) define the quality policy in such a way as to meet the needs of different users as closely as possible;~~

~~(2) set up a quality assurance programme that contains procedures designed to verify that all operations are being conducted in accordance with the applicable requirements, standards and procedures, including the relevant requirements of Part-ADR.OPS;~~

~~(3) provide evidence of the functioning of the quality system by means of manuals and monitoring documents;~~

~~(4) appoint management representatives to monitor compliance with, and adequacy of, procedures to ensure safe and efficient operational practices; and~~

~~(5) perform reviews of the quality system in place, and take remedial actions, as appropriate.~~

~~(b) An EN ISO 9001 certificate, issued by an appropriately accredited organisation, is considered as an Acceptable Means of Compliance.~~

GM1 ADR.OR.D.007(b) Management of aeronautical data and aeronautical information

INFORMATION SECURITY THREAT

Information security threat may be any circumstance or event with the potential to adversely impact the operation, systems and/or constituents due to human action (accidental, casual or purposeful, intentional or unintentional, mistaken) resulting from unauthorised access, use, disclosure, denial, disruption, modification, or destruction of information and/or information system interfaces. This includes malware and the effects of external systems on dependent systems but does not include physical threats.

GM1 ADR.OPS.A.005 Aerodrome data

[…]

CONDITION OF THE MOVEMENT AREA AND RELATED FACILITIES

The condition of the movement area and the operational status of related facilities ~~should~~ needs to be monitored and reported, on matters of operational significance affecting aircraft and aerodrome operations, particularly in respect of the following:

(a) construction or maintenance work;

(b) rough or broken surfaces on a runway, a taxiway or an apron;

~~(c) snow, slush, ice, or frost on a runway, a taxiway or an apron;~~

~~(d) water on a runway, a taxiway or an apron;~~

~~(e) snow banks or drifts adjacent to a runway, a taxiway or an apron;~~

~~(f) anti-icing or de-icing liquid chemicals or other contaminants on a runway, taxiway or apron;~~

~~(g) other temporary hazards, including parked aircraft;~~

~~(h) failure or irregular operation of part or all of the aerodrome visual aids; and~~

~~(i) failure of the normal or secondary power supply.~~

(c) other temporary hazards, including parked aircraft;

(d) failure or irregular operation of part or all the aerodrome visual aids; and

(e) failure of the normal or secondary power supply.

~~Water on a runway~~

~~Whenever water is present on a runway, a description of the runway surface should be made available using the following terms:~~

~~(a) DAMP — the surface shows a change of colour due to moisture;~~

~~(b) WET — the surface is soaked but there is no standing water;~~

~~(c) STANDING WATER — for aeroplane performance purposes, a runway where more than 25 per cent of the runway surface area (whether in isolated areas or not) within the required length and width being used is covered by water more than 3 mm deep.~~

~~Information that a runway or portion thereof maybe slippery when wet, should be made available to the aerodrome users.~~

~~Snow, slush or ice or frost on a runway~~

~~(a) Whenever an operational runway is contaminated by snow, slush, ice or frost, the runway surface condition should be assessed and reported. Runway condition assessment should be repeated as conditions change.~~

~~(b) The contaminant type, distribution, and for loose contaminants, depth for each third of the runway, should be assessed. An indication of surface friction characteristics is helpful in conducting runway condition assessment however caution should be exercised when correlating the results obtained by friction measuring equipment with aircraft performance. Additionally, for contaminants such as slush, wet snow and wet ice, contaminant drag on the equipment's measuring wheel, amongst other factors, may cause readings obtained in these conditions to be unreliable.~~

~~(c) Assessment of the friction of a runway should be made in descriptive terms of 'estimated surface friction'. The estimated surface friction should be categorised as good, medium to good, medium, medium to poor, and poor, and promulgated in SNOWTAM format as well as using appropriate RTF phraseologies.~~

~~(d) The estimated surface friction, based on the measured coefficient, when the runway is covered by compacted snow or ice only, could be reported according to the following table (indicative), although these values may vary due to the friction measuring device as well as to the surface being measured and the speed employed:~~

~~Measured Coefficient (μ)~~	~~Estimated surface friction~~	~~Code~~
~~0.40 and above~~	~~Good~~	~~5~~
~~0.39 to 0.36~~	~~Medium to good~~	~~4~~
~~0.35 to 0.30~~	~~Medium~~	~~3~~
~~0.29 to 0.26~~	~~Medium to poor~~	~~2~~
~~0.25 and below~~	~~Poor~~	~~1~~

~~Table 2~~

~~(e) Assessed surface condition information, including estimated surface friction, should be reported for each third of a runway. The thirds are called A, B and C;~~

> ~~(1) For the purpose of reporting information to aeronautical service units, Section A should always be the section associated with the lower runway designation number;~~
>
> ~~(2) When giving landing information to a pilot before landing, the sections should be referred to as first, second or third part of the runway. The first part should always mean the first third of the runway as seen in the direction of landing;~~
>
> ~~(3) Assessments should be made along two lines parallel to the runway, i.e. along a line on each side of the centreline approximately 3 m, or that distance from the centreline at which most operations take place. The objective of the assessment is to determine the type, depth and coverage of the contaminants and its effect on estimated surface friction given the prevailing weather conditions for sections A, B and C;~~
>
> ~~(4) In cases where a continuous friction measuring device is used, the mean values are obtained from the friction values recorded for each section;~~

(f) Whenever dry snow, wet snow, slush ice or frost is present and reported, the description of the runway surface condition should use the following terms:

(1) dry snow;

(2) wet snow;

(3) compacted snow;

(4) wet compacted snow;

(5) slush;

(6) ice;

(7) wet ice;

(8) frost;

(9) dry snow on ice;

(10) wet snow on ice;

(11) chemically treated;

(12) sanded; and should include, where applicable, the assessment of contaminant depth.

AMC1 ADR.OPS.A.010 Data quality requirements

GENERAL REQUIREMENTS

(a) The integrity of aeronautical data should be maintained throughout the data process from survey/origin to the next intended user. Based on the applicable integrity classification, the validation and verification procedures should:

(1) for routine data: avoid corruption throughout the processing of the data;

(2) for essential data: assure corruption does not occur at any stage of the entire process and may include additional processes as needed to address potential risks in the overall system architecture to further assure data integrity at this level; and

(3) for critical data: assure corruption does not occur ay any stage of the entire process and include additional integrity assurance procedures to fully mitigate the effect of faults identified by thorough analysis of the overall system architecture as potential data integrity risks.

Latitude and longitude	Accuracy Data Type	Integrity Classification
Aerodrome reference point	30 m surveyed/calculated	routine
Navaids located at the aerodrome	3 m surveyed	essential
Obstacles in Area 3	0.5 m surveyed	essential
Obstacles in Area 2 (the part within the aerodrome boundary)	5 m surveyed	essential
Runway thresholds	0.3 m surveyed	critical
Runway end (flight path alignment point)	1 m surveyed	critical

~~Runway centre line points~~	~~1 m surveyed~~	~~critical~~
~~Runway holding position~~	~~0.5 m surveyed~~	~~critical~~
~~Taxiway centre line/parking guidance line points~~	~~0.5 m surveyed~~	~~essential~~
~~Taxiway intersection marking line~~	~~0.5 m surveyed~~	~~essential~~
~~Exit guidance line~~	~~0.5 m surveyed~~	~~essential~~
~~Apron boundaries (polygon)~~	~~1 m surveyed~~	~~routine~~
~~De-icing/anti-icing facility (polygon)~~	~~1 m surveyed~~	~~routine~~
~~Aircraft stand points/INS checkpoints~~	~~0.5 m surveyed~~	~~routine~~

~~*Table 1 – Latitude and longitude*~~

~~Elevation/altitude/height~~	~~AccuracyData type~~	~~Integrity Classification~~
~~Aerodrome elevation~~	~~0.5 m surveyed~~	~~essential~~
~~WGS-84 geoid undulation at aerodrome elevation position~~	~~0.5 m surveyed~~	~~essential~~
~~Runway threshold, non-precision approaches~~	~~0.5 m surveyed~~	~~essential~~
~~WGS-84 geoid undulation at runway threshold, non-precision approaches~~	~~0.5 m surveyed~~	~~essential~~
~~Runway threshold, precision approaches~~	~~0.25 m surveyed~~	~~critical~~
~~WGS-84 geoid undulation at runway threshold, precision approaches~~	~~0.25 m surveyed~~	~~critical~~
~~Runway centre line points~~	~~0.25 m surveyed~~	~~critical~~
~~Taxiway centre line/parking guidance line points~~	~~1 m surveyed~~	~~essential~~
~~Obstacles in Area 2 (the part within the aerodrome boundary)~~	~~3 m surveyed~~	~~essential~~
~~Obstacles in Area 3~~	~~0.5 m surveyed~~	~~essential~~
~~Distance measuring equipment/precision (DME/P)~~	~~3 m surveyed~~	~~essential~~

~~*Table 2 – Elevation/Altitude/Height*~~

~~Declination/variation~~	~~AccuracyData type~~	~~Integrity Classification~~
~~VHF Navaid Station Declination~~	~~1 degree surveyed~~	~~essential~~
~~Aerodrome magnetic variation~~	~~1 degree surveyed~~	~~essential~~
~~ILS localizer antenna magnetic variation~~	~~1 degree surveyed~~	~~essential~~
~~MLS azimuth antenna magnetic variation~~	~~1 degree surveyed~~	~~essential~~

~~*Table 3 – Declination and magnetic variation*~~

~~Bearing~~	~~AccuracyData type~~	~~Integrity Classification~~
~~ILS localizer alignment~~	~~1/100 degree surveyed~~	~~essential~~
~~MLS zero azimuth alignment~~	~~1/100 degree surveyed~~	~~essential~~
~~Runway bearing (True)~~	~~1/100 degree surveyed~~	~~routine~~

~~*Table 4 – Bearing*~~

~~Length/distance/dimension~~	~~AccuracyData type~~	~~Integrity Classification~~
~~Runway length~~	~~1 m surveyed~~	~~critical~~

~~Runway width~~	~~1 m surveyed~~	~~essential~~
~~Displaced threshold distance~~	~~1 m surveyed~~	~~routine~~
~~Stopway length and width~~	~~1 m surveyed~~	~~critical~~
~~Clearway length and width~~	~~1 m surveyed~~	~~essential~~
~~Landing distance available~~	~~1 m surveyed~~	~~critical~~
~~Take-off run available~~	~~1 m surveyed~~	~~critical~~
~~Take-off distance available~~	~~1 m surveyed~~	~~critical~~
~~Accelerate-stop distance available~~	~~1 m surveyed~~	~~critical~~
~~Runway shoulder width~~	~~1 m surveyed~~	~~essential~~
~~Taxiway width~~	~~1 m surveyed~~	~~essential~~
~~Taxiway shoulder width~~	~~1 m surveyed~~	~~essential~~
~~ILS localizer antenna-runway end,distance~~	~~3 m calculated~~	~~routine~~
~~ILS glide slope antenna-threshold,distance along centre line~~	~~3 m calculated~~	~~routine~~
~~ILS marker-threshold distance~~	~~3 m calculated~~	~~essential~~
~~ILS DME antenna-threshold, distancealong centre line~~	~~3 m calculated~~	~~essential~~
~~MLS azimuth antenna-runway end, distance~~	~~3 m calculated~~	~~routine~~
~~MLS elevation antenna-threshold,distance along centre line~~	~~3 m calculated~~	~~routine~~
~~MLS DME/P antenna-threshold, distance along centre line~~	~~3 m calculated~~	~~essential~~

~~Table 5 – Length/distance/dimension~~

~~(c) Accuracy requirements for aeronautical data should be based upon a 95 % confidence level and, in that respect, three types of positional data should be identified: surveyed points (e.g. runway threshold), calculated points (mathematical calculations from the known surveyed points of points in space, fixes) and declared points (e.g. flight information region boundary points).~~

~~(d) Geographical coordinates indicating latitude and longitude should be determined and reported to the aeronautical information services in terms of the World Geodetic System — 1984 (WGS- 84) geodetic reference datum, identifying those geographical coordinates which have been transformed into WGS-84 coordinates by mathematical means, and whose accuracy of original field work does not meet the requirements in Table 3.~~

~~(e) The order of accuracy of the field work should be such that the resulting operational navigation data for the phases of flight will be within the maximum deviations, with respect to an appropriate reference frame, as indicated in the Tables 3–7.~~

~~(f) In addition to the elevation (referenced to mean sea level) of the specific surveyed ground positions at aerodromes, geoid undulation (referenced to the WGS-84 ellipsoid) for those positions as indicated in Tables 3–7, should be determined and reported to the aeronautical information services authority.~~

~~(g) Protection of electronic aeronautical data while stored or in transit, should be totally monitored by the cyclic redundancy check (CRC). To achieve protection of the integrity level of~~

~~critical, and essential aeronautical data as classified in (a)(1) and (a)(2) above, a 32- or 24-bit CRC algorithm should apply respectively.~~

~~(h) To achieve protection of the integrity level of routine aeronautical data as classified in (a)(3) above, a 16-bit CRC algorithm should apply.~~

~~(i)~~ The aerodrome operator should implement the procedures to:

~~(1~~a) monitor data relevant to the aerodrome and available services originating from the aerodrome operator, and promulgated by the relevant air traffic services providers;

~~(2~~b) notify the relevant aeronautical information services, and air traffic services providers of any changes necessary to ensure correct and complete data relevant to the aerodrome, and available services.

AMC2 ADR.OPS.A.010 Data quality requirements

FORMAL ARRANGEMENTS

(…)

(b) Content of formal arrangements

Such formal arrangements should include the following minimum content:

(1) ~~the scope of~~ aeronautical data ~~or aeronautical information~~ to be provided;

(2) ~~the accuracy, resolution, and integrity requirements for each data item supplied~~ the quality requirements for each data item supplied according to the aeronautical data catalogue;

(3) the ~~required~~ method(s) for demonstrating that the data provided conforms with the specified requirements;

(4) the ~~nature of~~ action to be taken in the event of discovery of a data error, or inconsistency in any data provided;

(5) the following minimum criteria for notification of data changes:

(i) criteria for determining the timeliness of data provision based on the operational or safety significance of the change;

(ii) any prior notice of expected changes; and

(iii) the means to be adopted for notification;

(6) the party responsible for documenting data changes;

(7) ~~the means to resolve any potential ambiguities caused where different formats are used to exchange aeronautical data or aeronautical information~~ data exchange details such as format or format change process;

(8) any limitations on the use of data;

(9) requirements for the production of data origination quality reports ~~by data providers to facilitate verification of data quality by the data users~~;

(10) metadata to be provided ~~requirements~~; and

(11) contingency requirements concerning the continuity of data provision.

GM1 ADR.OPS.A.010 Data quality requirements

~~Information in respect to the processing of aeronautical data and aeronautical information is contained in RTCA Document DO-200A and European Organization for Civil Aviation Equipment (EUROCAE) Document ED-76A – Standards for Processing Aeronautical Data.~~

CONTRACTED ACTIVITIES

In case of contracted activities to external organisations for the origination of aeronautical data and aeronautical information, data origination requirements for such organisations are to be found in ATM/ANS.OR.A.085 of Annex III of Commission Implementing Regulation (EU) 2017/373 of 1 March 2017 as retained (and amended in UK domestic law) under the European Union (Withdrawal) Act 2018.

GM2 ADR.OPS.A.010 Data quality requirements

URGENT DISTRIBUTION OF AERONAUTICAL INFORMATION

The obligation to comply with the relevant provisions of ADR.OPS.A.010 (Data quality requirements) does not prevent the urgent distribution of aeronautical information necessary to ensure the safety of flight. It is recognised that, in this case, it is not always possible to comply with all the relevant provisions. However, it is also not possible to determine a priority in all cases where this exception may apply; hence this is dependent on a case-by-case individual assessment made by competent staff.

GM1 ADR.OPS.A.010(f) Data quality requirements

RESOLUTION

(a) Stating that resolution needs to be commensurate with the actual accuracy means that digital data needs to have sufficient resolution to maintain accuracy. Typically, if an accuracy of 0.1 unit is needed, then a resolution of 0.01 or 0.001 units would enable a data chain to preserve the accuracy without any issue. A finer resolution could be misleading as one could assume that it supports a finer accuracy. This factor range of 10 to 100 between accuracy and resolution is applicable regardless of the units of measurements used.

(b) The resolution should be enough to capture the accuracy of the data.

GM1 ADR.OPS.A.010(g) Data quality requirements

TRACEABILITY

Traceability is supported by maintaining the metadata.

GM1 ADR.OPS.A.020(a) Common reference systems

HORIZONTAL REFERENCE SYSTEM — WGS-84

(a) A reference system provides a definition of a coordinate system in terms of the position of an origin in space, the orientation of an orthogonal set of Cartesian axes, and a scale. A terrestrialreference system defines a spatial reference system in which positions of points anchored on the Earth's solid surface have coordinates. Examples are: WGS-84, ITRS/European Terrestrial Reference System (ETRS) and national reference systems.

(b) WGS-84 defines, inter alia, a conventional terrestrial reference system, a reference frame and a reference ellipsoid. WGS-84 is currently the reference system ICAO requires for geo- referencing aeronautical information.

(c) Further explanation and guidance may be found in Annex B (Horizontal reference systems) to EUROCONTROL Specifications for the Origination of Aeronautical Data, Guidance material (EUROCONTROL-SPEC-154, Edition 2.0 of 16/12/2021).

GM2 ADR.OPS.A.020(a) Common reference systems

TEMPORARY NON-COMPLIANCE OF GEOGRAPHICAL CO-ORDINATES

In those particular cases where geographical co-ordinates have been transformed into WGS-84 coordinates by mathematical means and whose accuracy of original field work does not meet the applicable requirements contained in the aeronautical data catalogue, they should be identified untilthe time when they can be compliant.

AMC1 ADR.OPS.A.020(b) Common reference systems

VERTICAL REFERENCE SYSTEM

(a) The aerodrome operator should use the Earth Gravitational Model — 1996 (EGM-96), as theglobal gravity model.

(b) When a geoid model other than the EGM-96 model is used, a description of the model used, including the parameters required for height transformation between the model and EGM-96, should be provided in the aeronautical information publication (AIP).

GM1 ADR.OPS.A.020(b) Common reference systems

VERTICAL REFERENCE SYSTEM

Further explanation and guidance may be found in Annex C (Vertical reference systems) to EUROCONTROL Specifications for the Origination of Aeronautical Data, (EUROCONTROL-SPEC-154, Edition 2.0 of 16/12/2021).

GM2 ADR.OPS.A.020(b) Common reference systems

MEAN SEA LEVEL

(a) The geoid globally most closely approximates mean sea level (MSL). It is defined as the equipotential surface in the gravity field of the Earth, which coincides with the undisturbed MSL extended continuously through the continents.

(b) Gravity-related heights (elevations) are also referred to as 'orthometric heights', while distancesof points above the ellipsoid are referred to as 'ellipsoidal heights'.

(c) Global and local geoids differ in their origin: global geoids consider only the long- and middle- wave part of the Earth's gravity field, whilst local geoids also consider the short-wave part of the gravity field. Global geoids are used when consistent orthometric heights, over long distances (continent or earth surveying), are required. Currently, the world's best global geoid model is EGM 200846. It was determined using satellite tracking, gravity anomalies and satellite altimetry. Its accuracy is in the range of ± 0.05 m (oceans) and ± 0.5 m (on land). This accuracy is higher in flat regions than in topographically mountainous terrain, such as the Alps.

(d) For local engineering applications and cadastre-surveying, global geoids are not as accurate as needed. For such applications, local geoid models are calculated. These can only be developedusing local field measurements. They offer centimetre accuracy over several hundred kilometres, with a high resolution. Local geoids are not suitable for height comparison over large distances since they are based on different origins and reference heights (different equipotential levels).

GM1 ADR.OPS.A.020(c) Common reference systems

TEMPORAL REFERENCE SYSTEM

(a) A value in the time domain is a temporal position measured relative to a temporal referencesystem.

(b) ISO Standard 8601 specifies the use of the Gregorian calendar and 24-hour local or UTC for information interchange, while ISO Standard 19108 prescribes the Gregorian calendar and UTC as the primary temporal reference system for use with geographic information.

GM1 ADR.OPS.A.025 Data error detection and authentication

DIGITAL DATA ERROR DETECTION TECHNIQUES

(a) Digital data error detection techniques can be used to detect errors during the transmission or storage of data. An example of a digital error detection technique is the use of cyclic redundancy checks (CRCs). Coding techniques can be effective regardless of the transmission media (e.g. computer disks, modem communication, or internet).

(b) Transmission of data via electronic/digital means (e.g. file transfer protocol (FTP) sites,

web downloads, or email) may be subject to malicious attack that can corrupt the integrity of data for its intended use. Provision of means to mitigate the intentional corruption of digitally transmitted data may already exist within the organisational construct and operating procedures of participating entities.

(c) The objective of data security is to ensure that data is received from a known source and that there is no intentional corruption during processing and exchange of data.

(d) Records are maintained to show what data security provisions have been implemented.

(e) Provisions supporting this objective may include:

(1) implementation of technical data security measures to provide authentication and prevent intentional corruption during exchange of data (e.g. secure hashes, secure transmissions, digital signatures); and

(2) implementation of organisational data security measures to protect processing resources and prevent intentional corruption during processing of data.

GM2 ADR.OPS.A.025 Data error detection and authentication

DATA ERROR PROCESSING

More explanation and guidance may be found in Appendix C (Guidance on compliance with data processing requirements) to EUROCAE ED-76A.

GM1 ADR.OPS.A.030 Aeronautical Data Catalogue

GENERAL

The aeronautical data catalogue presents the scope of data that can be collected and maintained by the aeronautical information services providers and provides a common terminology that can be used by data originators and service providers.

AMC1 ADR.OPS.A.035 Data verification and validation

VALIDATION AND VERIFICATION

(a) The processes implemented to carry out validation and verifications should define the means used to:

(1) verify received data and confirm that the data has been received without corruption;

(2) preserve data quality and ensure that stored data is protected from corruption; and

(3) confirm that originated data has not been corrupted prior to being stored.

(b) Those processes should define the:

(1) actions to be taken when data fails a verification or validation check; and

(2) tools required for the verification and validation process.

GM1 ADR.OPS.A.035 Data verification and validation

VALIDATION AND VERIFICATION — GENERAL

(a) Validation

(1) Validation is the activity where a data element is checked as having a value that is fully applicable to the identity ascribed to the data element, or where a set of data elements are checked as being acceptable for their intended use.

(2) The application of validation techniques considers the entire aeronautical data chain. This includes the validation performed by prior data chain participants and any requirements levied on the data supplier.

(3) Examples of validation techniques include:

(i) Validation by application

One method of validation is to apply data under test conditions. In certain cases, this may not be practical. Validation by application is considered to be the most effective form of validation. For example, flight inspection of final approach segment data prior to publication can be used to ensure that the published data is acceptable.

(ii) Logical consistency

Logical consistency validates by comparing two different data sets or elements and identifying inconsistencies between values based on operative rules (e.g. business rules).

(iii) Semantic consistency

Semantic consistency validates by comparing data to an expected value or range of values for the data characteristics.

(iv) Validation by sampling

Validation by sampling evaluates a representative sample of data and applies statistical analysis to determine the confidence in the data quality.

(b) Verification

(1) Verification is a process for checking the integrity of a data element whereby the data element is compared to another source, either from a different process or from a different point in the same process. While verification cannot ensure that the data is correct, it can be effective to ensure that the data has not been corrupted by the

data process.

(2) The application of verification techniques considers only the portion of the aeronautical data chain controlled by the organisation. Yet, verification techniques may be applied at multiple phases of the data processing chain.

(3) Examples of verification techniques include:

(i) Feedback

Feedback testing is the comparison between the output and input state of a data set.

(ii) Independent redundancy

Independent redundancy testing involves processing the same data through two or more independent processes and comparing the data output of each process.

(iii) Update comparison

Updated data can be compared to its previous version. This comparison can identify all data elements that have changed. The list of changed elements can then be compared to a similar list generated by the supplier. A problem can be detected if an element is identified as changed on one list and not on the other.

GM2 ADR.OPS.A.035 Data verification and validation

VALIDATION AND VERIFICATION TECHNIQUES

Validation and verification techniques are employed throughout the data processing chain to ensure that the data meets the associated data quality requirements. More explanatory material may be found in Appendix C (Guidance on compliance with data processing requirements) to EUROCAE ED- 76A 'Standards for Processing Aeronautical Data'.

GM1 ADR.OPS.A.040 Error handling requirements

GENERAL

(a) The term 'error' is understood as being defective, degraded, lost, misplaced or corrupted data elements, or data elements not meeting stated quality requirements.

(b) Guidance on how to detect, identify, report and address/resolve aeronautical data errors may be found in Appendix C (Guidance on compliance with data processing requirements) to EUROCAE ED-76A 'Standards for Processing Aeronautical Data'.

GM1 ADR.OPS.A.055 Tools and software

SOFTWARE

(a) A means by which the requirement can be met, is through the verification of software applied to a known executable version of the software in its target operating environment.

(b) The verification of software is a process of ensuring that the software meets the requirementsfor the specified application or intended use of the aeronautical data and aeronautical information.

(c) The verification of software is an evaluation of the output of an aeronautical data and/or aeronautical information software development process to ensure correctness and consistency with respect to the inputs and applicable software standards, rules and conventions used in that process.

GM2 ADR.OPS.A.055 Tools and software

TOOLS

Tools can be qualified by meeting point 2.4.5 Aeronautical Data Tool Qualification of EUROCAE ED-76A/RTCA DO-200B 'Standards for Processing Aeronautical Data', dated June 2015.

AMC1 ADR.OPS.A.057(a)(1) Origination of NOTAM

GENERAL

The procedures should as a minimum:

(a) define the ways and means that the aerodrome operator may use to request the issuance of a NOTAM, in accordance with the arrangements that the aerodrome operator has with the aeronautical information service (AIS) provider(s). The procedures should clearly indicate the names of the aerodrome operator's personnel that have the authority to originate a NOTAM, and which should be included in the arrangements with the AIS provider.

(b) contain instructions regarding the:

(1) cases when a NOTAM should be originated by the aerodrome operator;

(2) cases when a NOTAM should not be originated by the aerodrome operator; and

(3) completion of the NOTAM form (including the use of relevant electronic applications, if applicable) by the personnel designated by the aerodrome operator as NOTAM originators; and

(c) specify the cases in which coordination with the Competent Authority is needed prior to the origination of the NOTAM, and the way to inform the Competent Authority about the issuanceof a NOTAM.

AMC1 ADR.OPS.A.057(a)(2);(3) Origination of NOTAM

INITIAL TRAINING FOR AERODROME PERSONNEL INVOLVED IN NOTAM ORIGINATION AND OTHER AERODROME PERSONNEL

(a) The theoretical part of the training of a person to be designated as a NOTAM originator should, as a minimum, cover the following areas:

(1) regulatory framework governing NOTAM origination and issuance, and its relationshipwith other aeronautical data products, including:

(i) cases when the origination of a NOTAM is required;

(ii) cases when a NOTAM should not be originated.

(2) NOTAM form completion, including word abbreviations and phrase contractionsapplicable to NOTAMs;

(3) NOTAM types and understanding of NOTAM;

(4) use of electronic applications for initiating a NOTAM (if applicable); and

(5) aerodrome procedures for origination and internal dissemination of a NOTAM.

The theoretical training should be followed by an assessment of the trainees (see CAP2173 AMC1 ADR.OPS.A.057(a)(2);(3) Origination of NOTAM)

(b) Following the successful completion of the theoretical training, the practical part of the training should, as a minimum, include familiarisation with the origination of NOTAM and implementation of the relevant aerodrome operating procedures for the persons to be designated as NOTAM originators. Upon completion of the practical training, and the successful competency assessment of the trainee in practical terms, the person may be designated as a NOTAM originator.

(c) For other aerodrome personnel, whose duties require only the understanding of a NOTAM, the theoretical part of the training should be adjusted to their needs and need not include (a)(4) and (a)(5) above, while the practical training should include practical examples to assess the level of their understanding. Both the theoretical and the practical training should be followed by an assessment of the person concerned (see CAP2173 AMC1 ADR.OPS.A.057(a)(2);(3) Origination of NOTAM)

GM1 ADR.OPS.A.057(a)(2);(3) Origination of NOTAM

RECURRENT, REFRESHER AND CONTINUATION TRAINING

CAP2173 GM1 ADR.OR.D.017(a);(b) Training and proficiency check programmes provides guidance on the provision of training following the completion of the initial training, as part of the aerodrome operator's training programme. For the process that needs to be followed to ensure the continued competence of the personnel involved in NOTAM origination and use.

GM1 ADR.OPS.A.057(b) Origination of NOTAM

NON-ORIGINATION OF NOTAM

Promulgation of information through NOTAM is required under certain circumstances. In such cases, the responsible organisation (e.g. Competent Authority, aerodrome operator, air traffic services provider, etc.) originates a NOTAM, which is finally issued by the AIS provider. ADR.OPS.A.057 defines the responsibilities of the aerodrome operator with respect to the NOTAM origination process, while its point (b) requires the origination of a NOTAM by the aerodrome operator in the cases prescribed in it.

On the other hand, for a variety of reasons (e.g. prevention of information overflow), not all kinds of information are eligible for promulgation through NOTAM. To this end, Commission Implementing Regulation (EU) 2017/373 of 1 March 2017 as retained (and amended in UK domestic law) under the European Union (Withdrawal) Act 2018, which applies to AIS providers, prescribes in AIS.TR.330 the cases where the AIS provider shall (or shall not) issue a NOTAM.

This means that there are cases in which, even if an aerodrome operator originates a NOTAM to promulgate information, the NOTAM will not be finally issued by the AIS provider if this information is not allowed to be promulgated by NOTAM as per AIS.TR.330. To avoid such situations, the aerodrome operator needs to:

(a) ensure that the relevant aerodrome operator's personnel are adequately trained in the relevant regulatory framework regarding both the origination and issuance of NOTAM;

(b) develop robust procedures regarding NOTAM origination by its personnel; and

(c) maintain close cooperation with the relevant AIS provider.

The following are example cases where the aerodrome operator will not originate a NOTAM:

(a) routine maintenance work on aprons and taxiways that does not affect the safe movement ofaircraft;

(b) temporary obstructions in the vicinity of aerodromes/heliports that do not affect the safeoperation of aircraft;

(c) partial failure of aerodrome/heliport lighting facilities where such a failure does not directlyaffect aircraft operations;

(d) partial temporary failure of air-ground communications when suitable alternative frequenciesare available and are operative;

(e) lack of apron marshalling services, road traffic closures, limitations and control;

(f) unserviceability of location, destination or other instruction signs on the aerodrome movementarea;

(g) training activities performed by ground units;

(h) unavailability of backup and secondary systems if these systems do not have an operationalimpact;

(i) limitations to aerodrome facilities or general services with no operational impact;

(j) announcements or warnings about possible/potential limitations with no operational impact;

(k) general reminders on already published information;

(l) availability of equipment for ground units, without information on the operational impact on airspace and facility users;

(m) information about laser emissions with no operational impact and about fireworks below the minimum flying heights;

(n) closure of parts of the movement area in connection with locally coordinated, planned work of duration of less than 1 hour;

(o) closure, changes, unavailability in the operation of aerodrome(s)/heliport(s) other than in the aerodrome(s)/heliport(s) operation hours; and

(p) other non-operational information of a similar temporary nature.

Information which relates to an aerodrome and its vicinity and which does not affect its operational status may be distributed locally during pre-flight or in-flight briefing or other local contact with flight crews. Thus, in case of need, the aerodrome operator may disseminate such type of information through the AIS provider it has arrangements with.

GM2 ADR.OPS.A.057(b) Origination of NOTAM

PRESENCE OF WILDLIFE

The permanent presence of wildlife is to be contained in the AIP, whereas the notification of hazardous wildlife activity at short notice needs to be promulgated by NOTAM.

When originating such a NOTAM, specific bird-related abbreviations should be avoided to facilitate readability and to prevent queries.

GM1 ADR.OPS.A.057(d)(1) Origination of NOTAM

NOTAM FORMAT

Information on the completion of a NOTAM format may be found in Chapter 6 of ICAO Doc 8126 ‘Aeronautical Information Services Manual’.

Information on the ICAO NOTAM code and abbreviations to be used may be found in ICAO Doc 8400 ‘Procedures for Air Navigation Services - ICAO Abbreviations and Codes’ (PANS ABC).

GM1 ADR.OPS.A.057(d)(4) Origination of NOTAM

SNOWTAM FORMAT

The way to complete correctly a SNOWTAM format when initiating a SNOWTAM is indicated below.

1. General

(a) When reporting on more than one runway, repeat Items B to H (aeroplane performance calculation section).

(b) The letters used to indicate items are only used for reference purposes and should not be included in the messages. The letters M (mandatory), C (conditional) and O (optional) mark the usage and information and should be included as explained below.

(c) Metric units should be used, and the unit of measurement shall not be reported.

(d) The maximum validity of SNOWTAM is 8 hours. A new SNOWTAM should be issued whenever a new RCR is received.

(e) A SNOWTAM cancels the previous SNOWTAM.

(f) The abbreviated heading 'TTAAiiii CCCC MMYYGGgg (BBB)' is included to facilitate the automatic processing of SNOWTAM messages in computer databanks. The explanation of these symbols is:

TT = data designator for SNOWTAM = SW;

AA = geographical designator for Member States, e.g. LF = FRANCE;

iiii = SNOWTAM serial number in a four-digit group;

CCCC = four-letter location indicator of the aerodrome to which the SNOWTAM refers;

MMYYGGgg = date/time of observation/measurement, whereby:

MM = month, e.g. January = 01, December = 12;

YY = day of the month;

GGgg = time in hours (GG) and minutes (gg) UTC;

(BBB) = optional group for:

Correction, in the case of an error, to a SNOWTAM message previously disseminated with the same serial number = COR.

Brackets in (BBB) are used to indicate that this group is optional.

When reporting on more than one runway and individual dates/times of observation/assessment are indicated by the repeated Item B, the latest date/time of observation/assessment is inserted in the abbreviated heading (MMYYGGgg).

(g) The text 'SNOWTAM' in the SNOWTAM Format and the SNOWTAM serial number in a four-digit group is separated by a space, e.g. SNOWTAM 0124.

(h) For readability purposes for the SNOWTAM message, a linefeed would be included after the SNOWTAM serial number, after Item A, and after the aeroplane performance calculation section.

(i) When reporting on more than one runway, repeat the information in the aeroplane performance calculation section from the date and time of assessment for each runway before the information in the situational awareness section.

(j) Mandatory information is:

(1) AERODROME LOCATION INDICATOR;

(2) DATE AND TIME OF ASSESSMENT;

(3) LOWER RUNWAY DESIGNATOR NUMBER;

(4) RUNWAY CONDITION CODE FOR EACH RUNWAY THIRD; and

(5) CONDITION DESCRIPTION FOR EACH RUNWAY THIRD (when RWYCC is reported 1- 5)

2. Aeroplane performance calculation section

Item A — Aerodrome location indicator (four-letter location indicator).

Item B — Date and time of assessment (eight-figure date/time group giving time of observation as month, day, hour and minute in UTC).

Item C — Lower runway designator number (nn[L] or nn[C] or nn[R]).

Only one runway designator should be inserted for each runway and always the lower number.

Item D — RWYCC for each runway third. Only one digit (0, 1, 2, 3, 4, 5 or 6) is inserted for each runwaythird, separated by an oblique stroke (n/n/n).

Item E — Per cent coverage for each runway third. When provided, insert 25, 50, 75 or 100 for each runway third, separated by an oblique stroke ([n]nn/[n]nn/[n]nn).

This information is provided only when the runway condition for each runway third (Item D) has beenreported as other than 6 and there is a condition description for each runway third (Item G) that has been reported other than 'DRY'.

When the conditions are not reported, this is signified by the insertion of 'NR' for the appropriate runway third(s).

Item F — Depth of loose contaminant for each runway third. When provided, insert in millimetres foreach runway third, separated by an oblique stroke (nn/nn/nn or nnn/nnn/nnn).

This information is only provided for the following contamination types:

— *standing water, value to be reported 04, then assessed value. Significant changes 3 mm;*

— *slush, value to be reported 03, then assessed value. Significant changes 3 mm;*

— *wet snow, value to be reported 03, then assessed value. Significant changes 5 mm; and*

— *dry snow, value to be reported 03, then assessed value. Significant changes 20 mm.*

When the conditions are not reported, this is signified by the insertion of 'NR' for the appropriaterunway third(s).

Item G — Condition description for each runway third. Any of the following condition descriptions for each runway third, separated by an oblique stroke, is inserted.

COMPACTED SNOW
DRY SNOW
DRY SNOW ON TOP OF COMPACTED SNOW
DRY SNOW ON TOP OF ICE
FROST
ICE

SLUSH
STANDING WATER
WATER ON TOP OF COMPACTED SNOW
WET
WET ICE
WET SNOW
WET SNOW ON TOP OF COMPACTED SNOW
WET SNOW ON TOP OF ICE
DRY (only reported when there is no contaminant)

When the conditions are not reported, this is signified by the insertion of 'NR' for theappropriate runway third(s).

Item H — Width of runway to which the RWYCCs apply. The width in metres if less than the published runway width is inserted.

5. Situational awareness section

Elements in the situational awareness section end with a full stop.

Elements in the situational awareness section for which no information exists, or where the conditionalcircumstances for publication are not fulfilled, are left out completely.

Item I — Reduced runway length. The applicable runway designator and available length in metres isinserted (e.g. RWY nn [L] or nn [C] or nn [R] REDUCED TO [n]nnn).

This information is conditional when a NOTAM has been published with a new set of declareddistances.

Item J — Drifting snow on the runway. When reported, the lower runway designator is inserted with
a space 'DRIFTING SNOW' (RWY nn or RWY nn[L] or nn[C] or nn[R] DRIFTING SNOW).

Item K — Loose sand on the runway. When loose sand is reported on the runway, the lower runway designator is inserted with a space 'LOOSE SAND' (RWY nn or RWY nn[L] or nn[C] or nn[R] LOOSE SAND).

Item L — Chemical treatment on the runway. When application of chemical treatment has been reported, the lower runway designator is inserted with a space 'CHEMICALLY TREATED' (RWY nn or RWY nn[L] or nn[C] or nn[R] CHEMICALLY TREATED).

Item M — Snowbanks on the runway. When snowbanks are reported present on the runway, the lower runway designator is inserted with a space 'SNOWBANK' and with a space left 'L' or right 'R' or both sides 'LR', followed by the distance in metres from centre line separated by a space 'FM CL' (RWY nn or RWY nn[L] or nn[C] or nn[R] SNOWBANK Lnn or Rnn or LRnn FM CL).

Item N — Snowbanks on a taxiway. When snowbanks are present on taxiway(s), the taxiway(s) designator(s) is (are) inserted with a space 'SNOWBANKS' (TWY [nn]n or TWYS [nn]n/[nn]n/[nn]n/… or ALL TWYS SNOWBANKS).

Item O — Snowbanks adjacent to the runway. When snowbanks are reported present, penetrating the height profile in the aerodrome snow plan, the lower runway

designator and ‘ADJ SNOWBANKS’ are inserted (RWY nn or RWY nn[L] or nn[C] or nn[R] ADJ SNOWBANKS).

Item P — Taxiway conditions. When taxiway conditions are reported slippery or poor, the taxiway designator followed by a space ‘POOR’ is inserted (TWY [n or nn] POOR or TWYS [n or nn]/[n or nn]/… POOR or ALL TWYS POOR).

Item R — Apron conditions. When apron conditions are reported slippery or poor, the apron designator followed by a space ‘POOR’ is inserted (APRON [nnnn] POOR or APRONS [nnnn]/[nnnn]/… POOR or ALL APRONS POOR).

Item S — NR (not reported)

Item T — Plain-language remarks.

GM2 ADR.OPS.A.057(d)(4) Origination of NOTAM

SNOWTAM FORMAT

Below are four examples of completed SNOWTAMs. Example SNOWTAM 1

GG EADBZQZX EADNZQZX EADSZQZX 170100 EADDYNYX

SWEA0149 EADD 02170055 (SNOWTAM 0149

EADD

02170055 09L 5/5/5 100/100/100 NR/NR/03 WET/WET/WET SNOW)

Example SNOWTAM 2

GG EADBZQZX EADNZQZX EADSZQZX 170140 EADDYNYX

SWEA0150 EADD 02170135
(SNOWTAM 0150 EADD

02170055 09L 5/5/5 100/100/100 NR/NR/03 WET/WET/WET SNOW

02170135 09R 5/2/2 100/50/75 NR/06/06 WET/SLUSH/SLUSH)

Example SNOWTAM 3

GG EADBZQZX EADNZQZX EADSZQZX 170229 EADDYNYX

SWEA0151 EADD 02170225 (SNOWTAM 0151

EADD

02170055 09L 5/5/5 100/100/100 NR/NR/03 WET/WET/WET SNOW

02170135 09R 5/2/2 100/50/75 NR/06/06 WET/SLUSH/SLUSH

02170225 09C 2/3/3 75/100/100 06/12/12 SLUSH/WET SNOW/WET SNOW

RWY 09L SNOWBANK R20 FM CL. RWY 09R ADJ SNOWBANKS. TWY B POOR. APRON NORTH POOR)

Example SNOWTAM 4

GG EADBZQZX EADNZQZX EADSZQZX 170350 EADDYNYX

SWEA0152 EADD 02170345(SNOWTAM 0152

EADD

02170345 09L 5/5/5 100/100/100 NR/NR/03 WET/WET/SLUSH

02170134 09R 5/2/2 100/50/75 NR/06/06 WET/SLUSH/SLUSH

02170225 09C 2/3/3 75/100/100 06/12/12 SLUSH/WET SNOW/WET SNOW

DRIFTING SNOW. RWY 09L LOOSE SAND. RWY 09R CHEMICALLY TREATED. RWY 09C CHEMICALLY TREATED.)

AMC1 ADR.OPS.A.065(a) Reporting of the runway surface condition

REPORTING

The aerodrome operator should disseminate an RCR through the aeronautical information services and air traffic services, when the runway is wholly or partly contaminated by standing water, snow, slush, ice or frost, or is wet associated with the clearing or treatment of snow, slush, ice or frost. When the runway is wet, not associated with the presence of standing water, snow, slush, ice or frost, the assessed information should be disseminated using the RCR through the air traffic service.

AMC2 ADR.OPS.A.065(a) Reporting of the runway surface condition

RUNWAY CONDITION REPORT

(a) The RCR should consist of the:

(1) aeroplane performance calculation section; and

(2) situational awareness section.

(b) The information should be included in an information string in the following order:

(1) aeroplane performance calculation section:

(i) aerodrome location indicator;

(ii) date and time of assessment;

(iii) lower runway designation number;

(iv) RWYCC for each runway third;

(v) per cent coverage contaminant for each runway third;

(vi) depth of loose contaminant for each runway third;

(vii) condition description for each runway third; and

(viii) width of runway to which the RWYCCs apply if less than the published width.

(2) Situational awareness section:

(i) reduced runway length;

(ii) drifting snow on the runway;

(iii) loose sand on the runway;

(iv) chemical treatment on the runway;

(v) snowbanks on the runway;

(vi) snowbanks on the taxiway;

(vii) snowbanks adjacent to the runway;

(viii) taxiway conditions;

(ix) apron conditions; and

(x) plain-language remarks.

GM1 ADR.OPS.A.065(a) Reporting of the runway surface condition

GENERAL

(a) Assessing and reporting the condition of the movement area and related facilities is necessary in order to provide the flight crew with the information needed for safe operation of the aeroplane. The RCR is used for reporting assessed conditions through the issuance of SNOWTAM, when necessary.

(b) Generally, movement areas are exposed to a multitude of climatic conditions and consequently there is a significant difference in the conditions to be reported. The RCR describes a basic structure applicable for all these climatic variations. Assessing the runway surface condition relies on a great variety of techniques and no single solution can apply to every situation.

(c) The philosophy of the RCR is that the aerodrome operator assesses the runway surface condition whenever water, snow, slush, ice or frost are present on an operational runway. From this assessment, a RWYCC and a description of the runway surface are reported, which can be used by the flight crew for aeroplane performance calculations. This format, based on the type, depth and coverage of contaminants, is the best assessment of the runway surface condition by the aerodrome operator; however, all other pertinent information is taken into consideration and kept up to date, and changes in conditions are reported without delay.

(d) The RWYCC reflects the runway braking capability as a function of the surface conditions. With this information, the flight crew can derive, from the performance information provided by the aeroplane manufacturer, the necessary stopping distance of an aircraft on the approach under the prevailing conditions.

GM2 ADR.OPS.A.065(a) Reporting of the runway surface condition

RUNWAY CONDITION REPORT

AEROPLANE PERFORMANCE CALCULATION SECTION

(a) The aeroplane performance calculation section is a string of grouped information, separated by a space ‘ ’ ending with a return and a two-line feed ‘<<≡’, in order to distinguish the aeroplane performance calculation section from the following situational awareness section or the following aeroplane performance calculation section of another runway.

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

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

This information is mandatory.

Format: nnnn

(2) **Date and time of the assessment**: date and time (UTC) when the assessment was performed.

This information is mandatory.

Format: MMDDhhmm

(3) **Lower runway designation number**: a two- or three-character number identifying

the runway for which the assessment is carried out and reported.

This information is mandatory.

Format: nn[L] or nn[C] or nn[R]

(4) **Runway condition code for each runway third**: a one-digit number identifying the RWYCC assessed for each runway third. The codes are reported in a three-character group separated by a ‘/’ for each third. The direction for listing the runway thirds is the direction as seen from the lower designation number.

This information is mandatory.

When transmitting information on the runway surface condition by air traffic services to flight crews, the sections are, however, referred to as the first, second or third part of the runway. The first part always means the first third of the runway as seen in the direction of landing or take-off as illustrated in Figures 1 and 2.

Format: n/n/n.

Example: 5/5/2

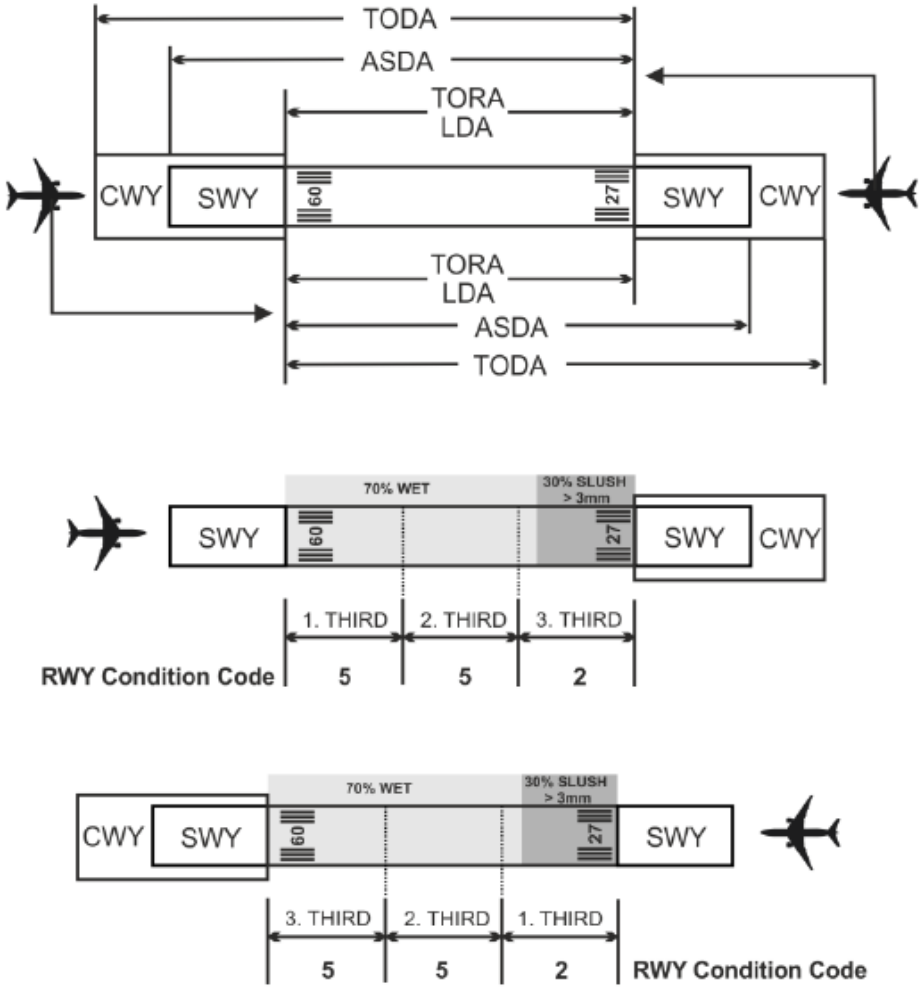


Figure 1: Reporting of RWYCC from air traffic services to flight crew for runway thirds

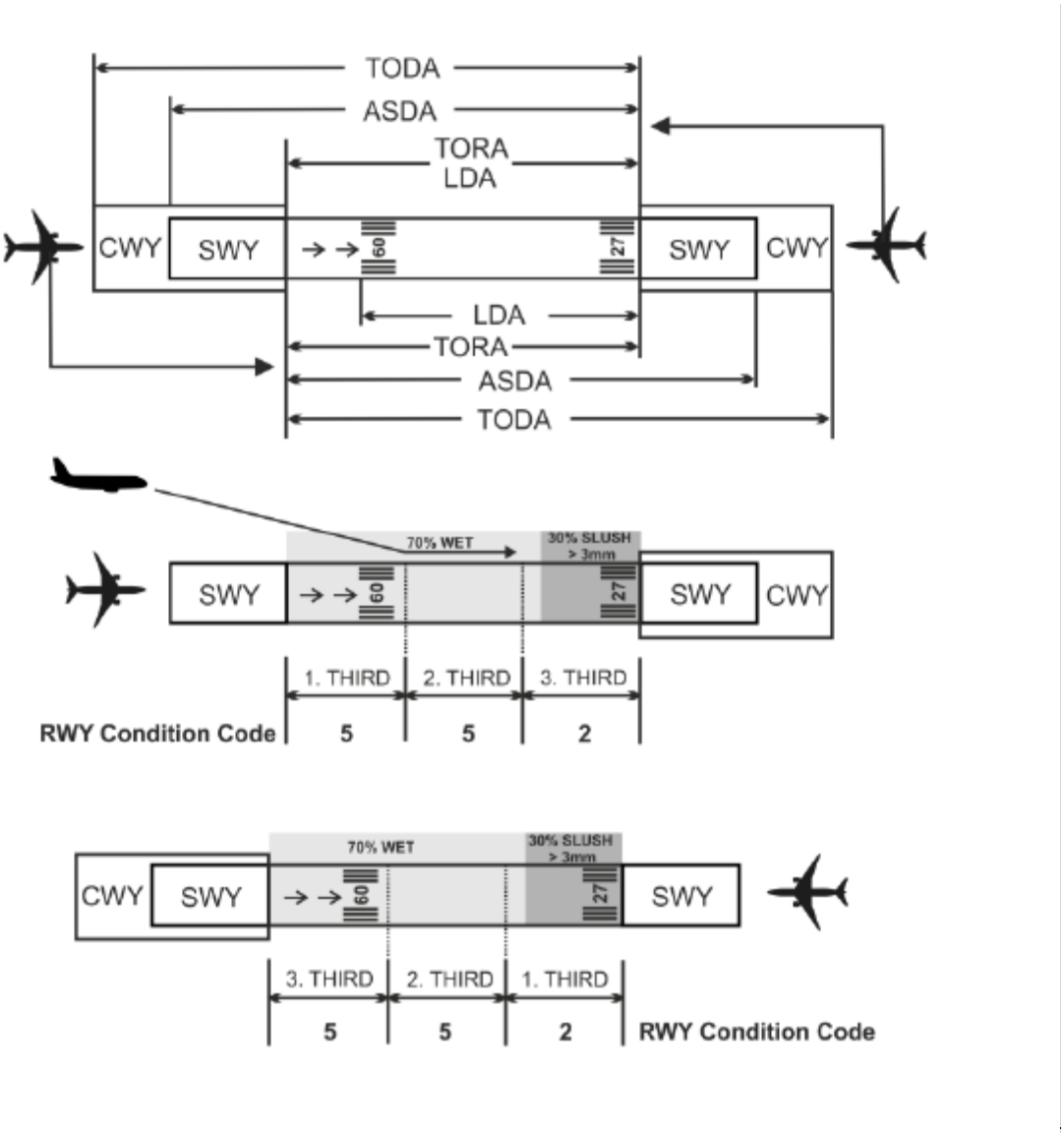


Figure 2: Reporting of RWYCC for runway thirds from air traffic services to flight crew on a runway with displaced threshold

(5) Per cent coverage contaminant for each runway third: a number identifying the percentage coverage. The percentages are to be reported in an up-to-nine character group separated by a '/' for each runway third. The assessment is based upon an even distribution within the runway thirds using Table 1.

This information is conditional. It is not reported for any runway third that is dry or covered with less than 10 per cent.

Format: [n]nn/[n]nn/[n]nn

Example: 25/50/100

In case of uneven distribution of the contaminants, additional information is given in the plain language remark part of the situational awareness section of the RCR. Where possible, a standardised text is used. When no information is to be reported, 'NR' is inserted at the relevant position of the message, to indicate to the user that no information exists.

(6) Depth of loose contaminant: dry snow, wet snow, slush or standing water for each runway third: a two- or three-digit number representing the assessed depth (mm)

of the contaminant for each runway third. The depth is reported in a six- to nine-character group separated by a '/' for each runway third as defined in CAP2173 Table 2 of AMC1 ADR.OPS.A.065(b);(c). The assessment is based upon an even distribution within the runway thirds following an assessment. If measurements are included as part of the assessment process, the reported values are still reported as assessed depths.

This information is conditional. It is reported only for DRY SNOW, WET SNOW, SLUSH and STANDING WATER.

Format: [n]nn/[n]nn/[n]nn

(7) Condition description for each runway third: to be reported in capital letters using the terms specified in ADR.OPS.A.065 point (a). The condition types are separated by an oblique stroke '/'.

This information is mandatory.

Format: nnnn/nnnn/nnnn

(8) Width of runway to which the RWYCCs apply if less than the published width: two-digit number representing the width of cleared runway in metres.

Format: nn

If the cleared runway width is not symmetrical along the centre line, additional information is given in the plain-language remark part of the situational awareness section of the RCR.

SITUATIONAL AWARENESS SECTION

(a) All individual messages in the situational awareness section end with a full-stop sign, in order to distinguish the message from subsequent message(s).

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

(1) Reduced runway length

The information is conditional when a NOTAM has been published with a new set of declared distances affecting the landing distance available (LDA).

Format: Standardised fixed text – RWY nn [L] or nn [C] or nn [R] LDA REDUCED TO [n]nnn

(2) Drifting snow on the runway

This information is conditional.

Format: Standardised fixed text – RWY nn [L] or nn [C] or nn[R] DRIFTING SNOW

(3) Loose sand on the runway

This information is conditional.

Format: RWY nn[L] or nn[C] or nn[R] LOOSE SAND

(4) Chemical treatment on the runway

This information is conditional.

Format: RWY nn[L] or nn[C] or nn[R] CHEMICALLY TREATED

(5) Snowbanks on the runway

This information is conditional.

Left or right distance in metres from centre line.

Format: RWY nn[L] or nn[C] or nn[R] SNOWBANK Lnn or Rnn or LRnn FM CL

(6) Snowbanks on taxiway

This information is conditional.

Format: TWY [nn]n or TWYS [nn]n/[nn]n/[nn]n/… or ALL TWYS SNOWBANKS

(7) Snowbanks adjacent to the runway penetrating level/profile set in the aerodrome snow plan.

This information is conditional.

Format: RWY nn[L] or nn[C] or nn[R] ADJ SNOWBANKS

(8) Taxiway conditions

This information is optional.

Format: TWY [nnn] POOR

(9) Apron conditions

This information is conditional.

Format: APRON [nnnn] POOR

(10) Plain-language remarks using only allowable characters in capital letters

Where possible, standardised text is used.

This information is optional except for the conditional information 'UPGRADED' or 'DOWNGRADED' used whenever the assessed RWYCC differs from what follows directly from the runway condition assessment matrix (RCAM). When present, this information is to be the first piece of information of the plain language remarks in order to ease readability and to recognise its importance as part of the situational awareness prior to aeroplane performance calculations.

Format: Combination of allowable characters where use of full stop '.' marks the end of the message.

Allowable characters:

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

0 1 2 3 4 5 6 7 8 9

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

If ICE, SNOW or SNOW ON ICE affects only the runway edge, the following text may be used: RWY nn[L] or nn[C] or nn[R] ICE or SNOW or SNOW ON ICE Lnn or Rnn or LRnn FM EDGE

GM3 ADR.OPS.A.065(a) Reporting of the runway surface condition

COMPLETE INFORMATION STRING

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

COM header and abbreviated header] (Completed by AIS)

GG EADBZQZX EADNZQZX EADSZQZX

070645 EADDYNYX

SWEA0151 EADD 02170055

SNOWTAM 0151

[Aeroplane performance calculation section]

EADD 02170055 09L 5/5/5 100/100/100 NR/NR/NR WET/WET/WET

EADD 02170135 09R 5/2/2 100/50/75 NR/06/06 WET/SLUSH/SLUSH

EADD 02170225 09C 2/3/3 75/100/100 06/12/12 SLUSH/WET SNOW/WET SNOW

[Situational awareness section]

RWY 09L SNOWBANK R20 FM CL. RWY 09R ADJ SNOWBANKS. TWY B POOR. APRON NORTH POOR.

GM4 ADR.OPS.A.065(a) Reporting of runway surface condition

REPORTING BY AERODROMES WITH MULTIPLE RUNWAYS

On aerodromes with multiple runways, SNOWTAM includes all the runways, in case that at least one runway is contaminated. This improves pilots' situational awareness and support their decision on the selection of the landing/take-off runway.

GM1 ADR.OPS.A.065(a) Reporting of the runway surface condition

REPORTING OF CHEMICALLY TREATED AND LOOSE SAND

The terms 'CHEMICALLY TREATED' and 'LOOSE SAND' are not specified in ADR.OPS.A.065 as they do not appear in the aeroplane performance calculation section but are used in the situational awareness section of the RCR.

AMC1 ADR.OPS.A.065(b);(c) Reporting of the runway surface condition

SIGNIFICANT CHANGES

A change in the runway surface condition used in the RCR should be considered significant whenever there is any:

(a) change in the RWYCC;

(b) change in the contaminant type;

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

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

(e) other information, for example a SPECIAL AIR-REPORT of runway braking action, which according to assessment techniques used, is known to be significant.

Assessed per cent	Reported per cent
10-25	25
26-50	50
51-75	75

76-100	100

Table 1: Percentage of coverage for contaminants

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

Table 2: Depth assessments for contaminants

Note 1 — For STANDING WATER, 04 (4 mm) is the minimum depth value at and above which the depth should be reported. From 3 mm and below, the runway third should be considered WET.

Note 2 — For SLUSH, WET SNOW and DRY SNOW, depths up to and including 3 mm should be reported as 03 (3 mm).

Note 3 — Above 4 mm for STANDING WATER and above 3 mm for SLUSH, WET SNOW and DRY SNOW, an assessed value should be reported, and a significant change relates to the observed change from this assessed value.

GM1 ADR.OPS.A.065(b);(c) Reporting of the runway surface condition

EXAMPLE OF REPORTING DEPTH OF CONTAMINANT WHENEVER THERE IS A SIGNIFICANT CHANGE

(a) After the first assessment of runway condition, a first RCR is generated. The initial report is:

5/5/5 100/100/100 03/03/03 SLUSH/SLUSH/SLUSH

Note: The full information string is not used in this example.

(b) With continuing precipitation, a new RCR is required to be generated as a subsequent assessment reveals that the depth of contamination has increased from 3 mm to 5 mm along the entire length of the runway and therefore a change in the RWYCC is needed. A second RCRis therefore created as:

2/2/2 100/100/100 05/05/05 SLUSH/SLUSH/SLUSH

(c) With even more precipitation, a further assessment reveals the depth of contamination has increased from 5 mm to 7 mm along the entire length of the runway. However, a new RCR is not required because the RWYCC has not changed (change in depth is less than the significant change threshold of 3 mm).

(d) A final assessment of the contamination reveals that the depth has increased to 10 mm. A new RWYCC is required because the change in depth from the last RCR (second RWYCC), i.e. from 5 mm to 10 mm is greater than the significant change threshold of 3

mm. A third RCR is thus created as below:

2/2/2 100/100/100 10/10/10 SLUSH/SLUSH/SLUSH

Note: For contaminants other than STANDING WATER, SLUSH, WET SNOW or DRY SNOW, the depth is not reported. The position of this type of information in the information string is then identified by /NR/.

When the depth of the contaminants varies significantly within a runway third, additional information is to be given in the plain-language remark part of the situational awareness section of the RCR.

GM1 ADR.OPS.A.065(d) Reporting of runway surface condition

USE OF FRICTION MEASUREMENTS

Friction measurements cannot be used by flight crews to determine landing performance requirements, because there is no correlation between the measurements and aeroplane performance data. Nevertheless, continuous friction measuring devices may be used, together with all other available means, to support upgrade or downgrade of the RWYCC, by using friction measurements in a comparative way and not as absolute values.

AMC1 ADR.OPS.B.037(a) Assessment of runway surface condition and assignment of runway condition code

RUNWAY CONDITION ASSESSMENT MATRIX (RCAM)

The aerodrome operator should use the following RCAM in order to assign the RWYCC:

Runway condition assessment matrix (RCAM)			
Assessment criteria		**Downgrade assessment criteria**	
RWYCC	**Runway surface description**	**Aeroplane deceleration or directional control observation**	**Special air-report of runway braking action**
6	DRY	-	-
5	• FROST • WET (The runway surface is covered by any visible dampness or water up to and including 3 mm depth) **Up to and including 3 mm depth:** • SLUSH • DRY SNOW • WET SNOW	Braking deceleration is normal for the wheel braking effort AND directional control is normal	GOOD

4	**-15°C and lower outside temperature** • COMPACTED SNOW	Braking deceleration OR directional control is between good and medium	GOOD TO MEDIUM
3	• WET ("slippery wet" runway) • DRY SNOW or WET SNOW (any depth) ON TOP OF COMPACTED SNOW **More than 3 mm depth:** • DRY SNOW • WET SNOW **Higher than -15°C outside air temperature:** • COMPACTED SNOW	Braking deceleration is noticeably reduced for the wheel braking effort applied OR directional control is noticeably reduced	MEDIUM
2	More than 3 mm: • STANDING WATER • SLUSH	Braking deceleration OR directional control is between medium and poor	MEDIUM TO POOR
1	• ICE	Braking deceleration is significantly reduced for the wheel braking effort applied OR directional control is significantly reduced	POOR

0	• WET ICE • WATER ON TOP OF COMPACTED SNOW • DRY SNOW or WET SNOW ON TOP OF ICE	Braking deceleration is minimal to non-existent for the wheel braking effort applied OR directional control is uncertain	LESS THAN POOR

GM1 ADR.OPS.B.037(a) Assessment of runway surface condition and assignment of runway condition code

AVAILABLE MEANS USED TO DETERMINE THE RWYCC

(a) The visual inspection of the movement area to assess the surface condition is the core method to determine the RWYCC. An overall assessment however implies more than that. The continuous monitoring of the development of the situation and the prevailing weather conditions is essential to ensure safe flight operations. Other aspects to be considered in the assessment result are the outside air temperature, the surface temperature, the dew point, the wind speed and direction, the effect of surface treatment, control and deceleration of the inspection vehicle, the special air-reports of braking action, the output from friction measuring devices, the weather forecast, etc. Due to interaction between them, a deterministic method on how these factors affect the RWYCC to be reported cannot be precisely defined.

(b) The RCAM supports the classification of runway surface conditions by their effect on aeroplane braking performance using a set of criteria identified and quantified based on the best industry knowledge, built upon dedicated flight testing and in-service experience. The thresholds at which a criterion changes the classification of a surface condition are intended to be reasonably conservative, without being excessively pessimistic.

(c) The following describes why the primary classification criteria in the RCAM have been set this way, and why it is important for aerodrome personnel to monitor and accurately report conditions when operating close to the boundaries of each RWYCC:

(1) Percentage of coverage with contamination in each runway third

A runway is considered contaminated whenever the extent of the coverage is more than a quarter of the surface of at least one third of the runway. It is important to note that whenever coverage is assessed to be below the 25 per cent threshold in each third, the computation assumption made by flight crew will be a dry runway (uniformly bare of moisture, water and contamination). It has been demonstrated that in conditions of contamination just below the reporting threshold but concentrated in the most unfavourable location, this assumption of dry runway still provides positive stop margins.

(2) Type of contaminant

Different contaminants affect the contact area between tyre and runway surface, where the stopping force is generated, in different ways. A water film of any depth leads to the partial (viscous aquaplaning) or total separation (dynamic aquaplaning) of the tyre from the surface. The smaller the surface, the smaller the force of adhesion, the less braking is available. This is why the maximum braking force decreases at higher speed and depends on contaminant depth. Other fluid contaminants have a similar effect. Hard contaminants, such as ice or compacted snow, prevent the contact between tyre and runway surface completely and at any speed, effectively providing a new surface that the tyre rolls on. A deterministic classification of the stopping performance can be made only for the contaminants listed in the RCAM. For other reportable contaminants (oil, mud, ash, etc.), a large variance in the aeroplane performance effect exists, or insufficient data is available to permit a deterministic classification. An exception is rubber contamination, for which in-service data indicates that an assumption of RWYCC 3 provides a satisfactory performance margin. Runway surface treatments with sand, grit or chemicals may be very effective or even detrimental depending on the conditions of the application, and no credit can be attributed to such treatment without verification and validation.

(3) Depth of the contamination

The industry accepts that the threshold for the effect of depth of fluid contaminants on aeroplane performance is at 3 mm. Below this threshold, any type of fluid contaminant can be removed from the tyre/runway contact zone either by forced drainage or by compressing it into the macrotexture of the surface, thus allowing adhesion between tyre and surface to exist, albeit on less than the full footprint surface area. This is the reason that contamination depths up to 3 mm are expected to provide similar stopping performance as a wet runway. It should be noted that the physical effects causing reduced friction forces begin to take effect from very small film thickness, therefore damp conditions are considered to provide no better braking action than a wet runway. Aerodrome personnel should be aware of the fact that the capability to generate friction in wet (or with thin layers of fluid contaminants) conditions is very dependent upon the inherent qualities of the runway surface (friction characteristics) and may be less than normally expected on poorly drained, polished or rubber contaminated surfaces. Above the 3 mm threshold, the impact on friction forces is more significant, leading to classification in lower RWYCCs. Above this depth, and depending on the density of the fluid, additional drag effects start to apply, due to displacement or compression of the fluid and impingement on the airframe of the aeroplane. These latter effects depend on the depth of the fluid and affect the ability of the aeroplane to accelerate for take-off.

(4) Surface or air temperature

It is self-evident that close to the freezing point significant changes in surface conditions can occur very quickly. Surface temperature is more significant for the relevant physical effects, and surface and air temperature may be significantly different due to latency and radiation. However, surface temperature may not be readily available and it is acceptable to use air temperature as a criterion for the

contaminant classification. The threshold for the classification of compacted snow in RWYCC 4 (below OAT -15 degrees) or RWYCC 3 (above this temperature) is based on historical North American operational practice and may be very conservative, therefore other assessment means should be used to support the classification. Such assessment means should be based upon specific rationale, specific procedures and substantiating aeroplane data.

GM2 ADR.OPS.B.037(a) Assessment of runway surface condition and assignment of runway condition code

ICE is considered to be untreated ice that covers the runway macrotexture.

AMC1 ADR.OPS.B.037(a);(b) Assessment of runway surface condition and assignment of runway condition code

ASSIGNMENT OF RUNWAY CONDITION CODE

(a) The aerodrome operator should:

(1) assign a RWYCC 6, if 25 per cent or less area of a runway third is wet or covered by contaminant;

(2) describe in the plain-language remarks part of the situational awareness section of the RCR the location of the area that is wet or covered by the contaminant, if the distribution of the contaminant is not uniform;

(3) assign a RWYCC based on the contaminant that will most likely affect the aeroplane's performance, if multiple contaminants are present and the total coverage is more than 25 per cent but no single contaminant covers more than 25 per cent of any runway third;

(4) not upgrade an assigned RWYCC 5, 4, 3, or 2; and

(5) not upgrade beyond RWYCC 3 an assigned RWYCC 1 or 0.

(b) The aerodrome operator may upgrade an assigned RWYCC 1 or 0 when all available means of assessing runway slipperiness, including properly operated and calibrated measuring devices, if available, have been used to support the decision.

(c) The aerodrome operator, when RWYCC 1 or 0 is upgraded, should assess the runway surface frequently during the period the higher RWYCC is in effect, to ensure that the runway surface condition does not deteriorate below the assigned code.

(d) The aerodrome operator, if sand or other runway treatments are used to support upgrading of the RWYCC, should assess the runway surface frequently to ensure the continued effectiveness of the treatment.

(e) The aerodrome operator should appropriately downgrade the RWYCC taking into consideration all available means of assessing runway slipperiness, including special air-reports.

GM1 ADR.OPS.B.037(b) Assessment of runway surface condition and assignment of runway condition code

SINGLE AND MULTIPLE CONTAMINANTS

When single or multiple contaminants are present, the RWYCC for any third of the runway is determined as follows:

(a) When the runway third contains a single contaminant, the RWYCC for that third is based directly on that contaminant in the RCAM as follows:

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

(2) If the contaminant coverage for that third is greater than or equal to 10 per cent and less than or equal to 25 per cent, a RWYCC 6 is to be generated for that third and the contaminant reported at 25 per cent coverage; or

(3) If the contaminant coverage for that third is greater than 25 per cent, the RWYCC for that third is based on the contaminant present.

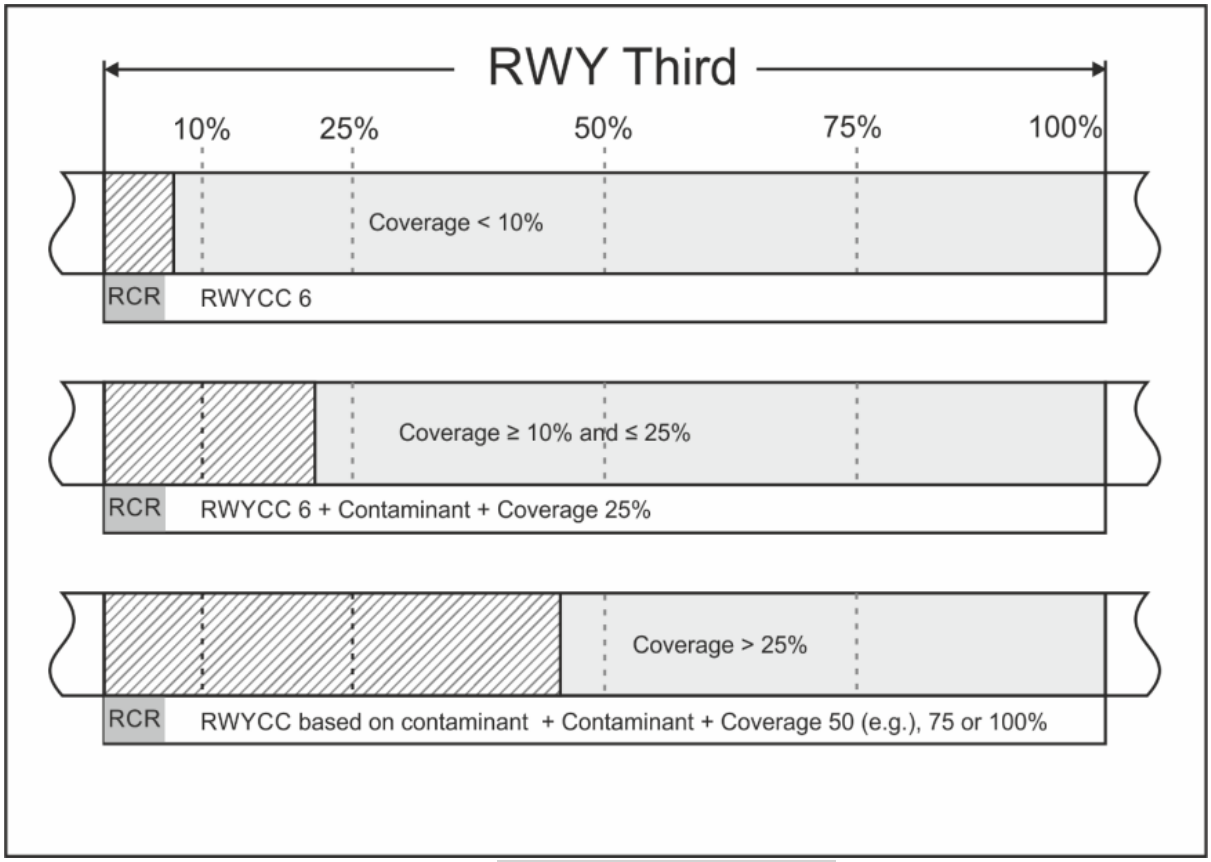


Figure 1: Single contaminant

(b) If multiple contaminants are present where the total coverage is more than 25 per cent but no single contaminant covers more than 25 per cent of any runway third, the RWYCC is based

upon the judgement of the runway inspector, considering what contaminant will most likely be encountered by the aeroplane and its likely effect on the aeroplane's performance. Typically, this would be the most widespread contaminant, but this is not an absolute.

(c) The structure of the RCAM is ranking the contaminants in the column 'Runway surface description' from top to bottom and is having the most slippery contaminants at the bottom. However, this ranking is not an absolute, as the RCAM by design is landing oriented and if judged in a take-off scenario, the ranking could be different due to drag effects of loose contaminants.

GM2 ADR.OPS.B.037(b) Assessment of runway surface condition and assignment of runway condition code

DOWNGRADING AND UPGRADING

(a) The RCAM allows making an initial assessment based on visual observation of contaminants on the runway surface: their type depth and coverage, as well as the outside air temperature. Downgrading and upgrading is an integral part of the assessment process and essential to developing relevant reports of the prevailing runway surface condition. When all other observations, experience and local knowledge indicate that the primary assignment of the RWYCC does not reflect the prevailing conditions accurately, a downgrade or upgrade should be made.

(b) Examples of aspects to be considered in assessing the runway slipperiness for the downgrade process:
- (1) Prevailing weather conditions
  - (i) stable sub-freezing temperature
  - (ii) dynamic conditions
  - (iii) active precipitation
- (2) Observations
- (3) Measurements
  - (i) friction measurements
  - (ii) vehicle behaviour
  - (iii) shoe scraping
- (4) Experience (local knowledge)
- (5) Special air-reports

(c) When the complete removal of contaminants cannot be achieved, but the RWYCC initially assigned does not reflect the real surface condition, the aerodrome personnel may apply the upgrade procedures. Upgrading is applicable only when the initial RWYCC is 0 or 1. Upgrading can only occur up to RWYCC 3.

(d) When upgrading RWYCC 0 and 1, a preponderance of evidence should exist pointing towards the higher RWYCC.

(e) When a friction measuring device is used for upgrading purposes, a preponderance of evidence should exist. In order to upgrade a RWYCC 0 or 1 to no higher than RWYCC 3, the friction measuring device should demonstrate an equivalent friction to that of a wet runway (RWYCC 5) or higher.

AMC1 ADR.OPS.B.037(c) Assessment of runway surface condition and assignment of runway condition code

USE OF SPECIAL AIR-REPORTS

(a) The aerodrome operator should:

(1) re-assess the runway surface condition if RWYCC 2 or better has been reported and two consecutive special air-reports of POOR runway braking action are received; and

(2) re-assess the runway surface condition and consider the suspension of operations on that runway when one pilot has reported a LESS THAN POOR runway braking action.

(b) The aerodrome operator may use a special air-report of runway braking action for upgrading purposes only if it is used in combination with other information qualifying for upgrading.

GM1 ADR.OPS.B.037(c) Assessment of runway surface condition and assignment of runway condition code

USE OF SPECIAL AIR-REPORTS

Special air-reports typically provide aerodrome personnel and other pilots with an observation that can confirm the ground-based assessment of or alert to degraded conditions experienced in terms of braking capability and/or lateral control during the landing roll. The braking action observed is dependent on the type of aircraft, aircraft weight, runway portion used for braking, and other factors. Pilots will use the terms GOOD, GOOD TO MEDIUM, MEDIUM, MEDIUM TO POOR, POOR and LESS THAN POOR. When receiving a special air-report, the recipient should consider that it rarely applies to the full length of the runway and is limited to the specific sections of the runway surface in which sufficient wheel braking was applied to reach friction limitation. As special air-reports are subjective and contaminated runways may affect the performance of different aeroplane types in a different way, the reported braking action may not be directly applicable to another aeroplane.