

Annex to ED Decision 2021/003/R

‘AMC & GM to Authority, Organisation and Operations Requirements for Aerodromes — Issue 1, Amendment 5’

The Annex to ED Decision 2014/012/R is amended as follows:

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

- deleted text is ~~struck through~~;
- new or amended text is highlighted in **blue**;
- an ellipsis ‘[...]’ indicates that the rest of the text is unchanged.

ANNEX I**GUIDANCE MATERIAL TO DEFINITIONS USED IN COMMISSION REGULATION (EU)****No 139/2014****GM1 38 (b) Runway condition code**

The purpose of the runway condition code (RWYCC) is to permit an operational aeroplane performance calculation by the flight crew.

GM1 38 (g) Runway surface condition

The runway surface conditions used in the runway condition report (RCR) establish a common language between the aerodrome operator, the aeroplane manufacturer and the aeroplane operator.

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 the runway surface friction characteristics and the RWYCC cannot be evaluated in a standardised manner.

GM1 38 (h) Runway surface condition descriptors

The descriptors under (a) to (h) are used solely in the context of the RCR and are not intended to supersede or replace any existing World Meteorological Organization (WMO) definitions.

GM1 38h (c) Runway surface condition descriptors

'Freezing' refers to the freezing point of water (0 degree Celsius).

Under certain conditions, frost can cause the surface to become very slippery and it is then reported appropriately as downgraded RWYCC.

GM1 38h (f) Runway surface condition descriptors

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

GM1 38h (g) Runway surface condition descriptors

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 downgraded RWYCC.

GM1 41(a) Slippery wet runway

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

GM2 41 (a) Slippery wet runway

The surface friction characteristics of the runway are considered degraded when below the minimum standards.

GM1 41 (c) Specially prepared winter runway

'Frozen sand' is a method to improve the surface friction characteristics of an ice-covered surface by sand or grit fixed to the surface through a melting/freezing process. Frozen sand can be achieved using several techniques. One example is pre-wetting the material with hot water just prior to application in order to have the hot sand melting the top layer of the ice, which then immediately refreezes to fix the material to the surface. Another technique is to pre-wet the material with a suitable chemical in order to achieve a similar effect.

ANNEX II – PART-ADR.AR

PART AUTHORITY REQUIREMENTS – AERODROMES

SUBPART C – OVERSIGHT, CERTIFICATION AND ENFORCEMENT (ADR.AR.C)

AMC1 ADR.AR.C.010 Oversight programme

PROCEDURES FOR THE OVERSIGHT OF AERODROME OPERATORS AND OF ORGANISATIONS RESPONSIBLE FOR THE PROVISION OF AMS

[...]

- (b) Inspections, audits, and oversight procedures, on a scale and frequency appropriate to the operation, should include but not be limited, as appropriate, to the items from the following list:

[...]

- (2) visual aids and aerodrome electrical systems, including their maintenance programme;

[...]

- (4) aerodrome data reporting, including reporting of surface contaminants and runway surface conditions, and NOTAM origination;

[...]

- (14) vehicle ~~control~~ authorisation and operation on the movement area, including maintenance programmes;

- (15) control of pedestrians;

- ~~(15)~~ (16) wildlife hazard management;

- ~~(16)~~ (17) runway excursion and incursion prevention programmes of the aerodrome operator, as part of the Competent Authority's runway safety programme, including the functioning and effectiveness of the aerodrome's local runway safety team, as well as the implementation of identified actions;

- (18) FOD control programme of the aerodrome operator;

- ~~(17)~~ (19) inspections of the movement area;

- ~~(18)~~ (20) maintenance programme of the aerodrome systems and the movement area;

- ~~(19)~~ (21) aerodrome works;

- ~~(20)~~ (22) protection against hazardous activities in the aerodrome surroundings;

- ~~(21)~~ (23) personnel training and records, including review of training programme on runway excursion and incursion prevention, as well as the drivers' authorisations and language proficiency assessments, training programmes, and ~~its~~ their implementation;

- ~~(22)~~ (24) aerodrome manuals and documentation;

- (2325) operator’s management system, including its safety management system and its quality, and security management system for aeronautical data; ~~and~~
 - (2426) operator’s oversight of the compliance of the organisations operating, or providing services at the aerodrome (third parties).
- [...]

GM1 ADR.AR.C.035(e) Issuance of certificates

MODEL FOR THE TERMS OF THE CERTIFICATE TO BE ATTACHED TO THE CERTIFICATES

TERMS OF THE CERTIFICATE	
Certificate reference: [STATE CODE] ¹ :	
Aerodrome name — ICAO location indicator ² :	
Conditions to operate ³ :	
Operations on specially prepared winter runways ⁴	
Runway — declared distances ⁴⁵ :	
Types of approaches ⁵⁶ :	
Aerodrome reference code ⁶⁷ :	
Scope of aircraft operations with a higher aerodrome reference code letter ⁷⁸ :	
Provision of apron management services ⁸⁹ :	
Rescue and firefighting level of protection ⁹¹⁰ :	
Other ¹⁰¹¹	

¹ The certificate must be given the State Code [The two-letter ISO code should be used (ISO 3166 alpha-2), except for Greece and the United Kingdom, for which the abbreviations EL and UK are recommended] and a unique ascending number. Example: EL – 001

² To be specified: the official name of the aerodrome and the ICAO location indicator for the aerodrome.

³ To be specified: day/ night and IFR/ VFR.

⁴ To be specified: (yes/no). See ADR.OPS.B.036.

⁴⁵ To be specified: ASDA, LDA, TODA, TORA in metres for each direction of each runway, including intersection take-off if applicable.

⁵⁶ To be specified: approval of the runway for non-instrument, instrument, non-precision approach. In case of precision approach (-es) it is to be indicated, which of the following precision approach(-es) is (are) approved:

- Standard Category I;
- Lower than Standard Category I;
- Precision Approach Category II;
- Other than Standard Category II;
- Precision Approach Category III-A;
- Precision Approach Category III-B;
- Precision Approach Category III-C.

⁶⁷ To be specified: Aerodrome Reference Code (Code number/Code letter).

⁷⁸ To be specified: the approved type of aeroplanes with a higher code letter than indicated in point 7 above.

⁸⁹ To be specified: the name of the service provider, both in case such services are t or are not provided by the aerodrome operator.

⁹¹⁰ To be specified: the rescue and firefighting level of protection as per Annex IV (Part-ADR.OPS) ~~of~~ to this Regulation.

~~⁴⁰ To be specified: any other information that the Competent Authority finds necessary to include.~~

ANNEX III – PART-ADR.OR**PART ORGANISATION REQUIREMENTS****SUBPART B – CERTIFICATION – AERODROMES AND AERODROME OPERATORS (ADR.OR.B)****GM1 ADR.OR.B.040(a);(b) Changes****CHANGES REQUIRING PRIOR APPROVAL**

The following is a list of items which ~~should be~~ are granted prior approval by the Competent Authority, as specified in the applicable Implementing Rules.

[...]

(g) Implementation of aeroplane operations on specially prepared winter runways as required by ADR.OPS.B.036 Operations on specially prepared winter runways.

(~~g~~ h) Changes to low-visibility procedures as required by ADR.OPS.B.045(b) Low Visibility Operations.

(~~h~~ i) Operation of aircraft with higher code letter as required by ADR.OPS.B.090(a) Use of the aerodrome by higher code letter aircraft.

(j) Changes to the flight procedures.

[...]

SUBPART D – MANAGEMENT – AERODROME OPERATORS (ADR.OR.D)**~~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.OR.D.017(a);(b);(c);(d) Training and proficiency check programmes**TRAINING – GENERAL****(a) Aerodrome operator's personnel**

- (1) The purpose of the training programme is to ensure the initial and continued competence of the aerodrome operator's personnel to perform their duties, irrespective of their level in the organisation of the aerodrome. This is to be achieved by ensuring that each person receives initial, recurrent, and if necessary, refresher training (as a result of absence from duties), and other ad hoc training (e.g. due to the planned/implemented change to the aerodrome system, etc.), which is relevant to his or her function and tasks.

One method to achieve this is by identifying the tasks of the employees and ensuring that each one of them receives the training that corresponds to such tasks.

For example, an employee whose tasks involve driving would need to undergo the relevant driving training (depending on the area of the aerodrome that he or she will operate in the course of his or her duties). Moreover, if the duties of that person involve also conducting inspections of the movement area, then the training plan for that employee would also need to include relevant training for that area.

Moreover, apart from this specific type of training, one would also consider the need for all personnel to undergo a safety management system training relevant to their duties.

(2) As part of the process of the development of the training programme, there are also other issues that need to be considered, such as:

- (i) the content and duration of the courses;
- (ii) the minimum performance required by the trainees;
- (iii) the method to be used for the delivery of the training;
- (iv) the way the competency assessments of the trainees will be performed; and
- (v) the development of the relevant procedures to ensure that the training programme achieves its objectives and covers circumstances that may occur (e.g. the case where an employee fails to achieve the required competency level).

Consideration needs to be given to the fact that the relevant procedures would also need to address the organisation and implementation of the recurrent, refresher and continuation training.

(b) Personnel of other organisations operating or providing services at the aerodrome

(1) At the aerodrome environment, there may be also other organisations that operate or provide their services to other organisations or the aerodrome operator. Given that such activities may have an effect on safety and affect aerodrome operations, it is necessary to ensure that the personnel of these organisations that are allowed unescorted access to the movement area and other operational areas of the aerodrome, are trained in the applicable aerodrome's operational procedures and requirements, so that they are enabled to safely operate within the aerodrome environment (e.g. the apron, and sometimes on the manoeuvring area), sharing a common understanding about safety management.

To achieve this, the aerodrome operator needs to identify which are the applicable operational procedures and requirements for the relevant training of this type of personnel.

For instance, if an employee of another organisation needs to drive and work on the apron or on the manoeuvring area, then he or she would need to undergo the relevant training prior to being allowed to do so. This would involve the relevant driving training. On the other hand, the same person would be subject to certain aerodrome operational procedures and requirements which apply on this area, and so he or she would need to also receive training on these procedures and requirements (e.g. as part of the FOD control programme). Moreover, there is also an additional need for this employee to

receive a safety management system training relevant to their duties, e.g. how to file an occurrence report, etc.

- (2) As part of this process, the aerodrome operator would need to make considerations similar to the ones referred to in (a)(2) above, in order to ensure the continued competence and awareness of such personnel in the required fields.
- (3) In this way, the aerodrome operator is expected to be able to safely manage the interfaces it has with the other organisations present at the aerodrome. However, in order to ensure the successful implementation of this training, the aerodrome operator would need to cooperate and have relevant arrangements with the organisations whose employees need to complete this training. Depending on the situation and the solutions chosen in each case, the content of the arrangements may vary and cover different areas, such as the exchange of relevant information regarding absence of personnel for the organisation of a refresher training, the use of instructors or assessors proposed by these organisations for the implementation of the relevant part of the training programme, etc.
- (4) It is to be noted that the training related to the performance of the actual duties of this type of personnel (e.g. how to use its own organisation's equipment, or the internal procedures of that organisation, etc.) falls outside of the scope of this part of the training required under ADR.OR.D.017.

(c) Understanding of the aerodrome system as a whole

It is important that the training provides all trainees with an understanding of the interdependencies between the various functions and actors at the aerodrome environment, and how their work is related to the functions and work of other personnel and organisations, so that they acquire a rather 'global' (as opposed to an 'isolated') perspective.

AMC1 ADR.OR.D.017(a);(b) Training and proficiency check programmes

TRAINING PROGRAMME OF AERODROME PERSONNEL — GENERAL

- (a) The training programme should cover all personnel:
 - (1) involved in the operation, maintenance, and management of the aerodrome (supervisors, managers, senior managers, and the accountable manager); and
 - (2) operating unescorted on the movement area, and other operational areas of the aerodrome, and which are related to the aerodrome operator, ~~or other organisations which operate or provide services at the aerodrome,~~regardless of their level in the organisation.
- ~~(b) The training of persons mentioned in paragraph (a) should be completed prior to the initial performance of their duties, or allowing them unescorted access on the movement area and other operational areas of the aerodrome, as appropriate.~~

- (eb) The training programme should include safety management system training whose level of detail should be appropriate to the individual's responsibility and involvement in the safety management system and should also include human and organisational factors. ~~; for those persons referred to in paragraph under (a)(2) employed by other organisations operating, or providing services at the aerodrome, the safety management system training may cover only the necessary elements (e.g. relevant procedures, safety reporting system, aerodrome safety programmes, etc.).~~
- (ec) The training programme should consist of the following:
- (1) a process to identify training standards, including:
 - (i) syllabi, duration, and frequency for each type of training and area of activity for the persons mentioned in paragraph point (a), including for the instructors and assessors;
 - (ii) method(s) for delivery of training and competency assessment; minimum performance to be achieved by trainees; and
 - (iii) track completion of required training;
 - (2) a validation process that measures the effectiveness of training;
 - (3) initial, job-specific, training;
 - (4) ~~on-the-job~~ practical training; ~~and~~
 - (5) recurrent training-;
 - (6) refresher training; and
 - (7) continuation training.
- (ed) The training programme should identify training responsibilities and contain procedures:
- (1) for training and ~~checking~~ competency assessment of the trainees;
 - (2) to be applied in the event that personnel do not achieve or maintain the required standards.
- (fe) Training contents, ~~and~~ syllabi and duration should comply with the requirements prescribed in Part-ADR.OPS.
- (gf) A training file should be developed for each employee, including management, and a system should be in place to assist in identifying and tracking employee training requirements, and verifying that personnel have received the required/planned training.
- (hg) Information related to points paragraphs (ec) and (ed), including the identified training standards and the related syllabi and frequency, should be included in the aerodrome manual.

AMC2 ADR.OR.D.017(a);(b) is deleted.

AMC3 ADR.OR.D.017(a);(b) is deleted.

AMC1 ADR.OR.D.017(c);(d) Training and proficiency check programmes

TRAINING OF PERSONNEL OF OTHER ORGANISATIONS — GENERAL

With regard to the training of the personnel employed by other organisations which operate or provide services at the aerodrome, and which are allowed unescorted access to the movement area or other operational areas of the aerodrome, the provisions of AMC1 ADR.OR.D.017(a);(b) apply, except that the safety management system training may cover only the necessary elements (e.g. relevant procedures, safety reporting system, aerodrome safety programmes, etc.).

AMC1 ADR.OR.D.017(e) Training and proficiency check programmes

INITIAL TRAINING

(a) Theoretical training

- (1) A suitable method (or suitable methods) for the delivery of each part of the required training should be identified and specified in the training programme.**
- (2) The theoretical training should be delivered at appropriate training facilities, and the delivery of the training should be supported by means and equipment which are suitable for the training area covered.**

Computer-based training may also be used, where interaction of the trainee(s) with other persons is not necessary and where the training material has been prepared, reviewed and updated by an instructor nominated in accordance with AMC1 ADR.OR.D.017(h). Where provided, such training should consider human factors principles, and, as a minimum, should also cater for the possibility for the trainees to ask questions and receive clarifications, as well as to provide feedback.

- (3) After the initial training, the acquired competency should be assessed. The competency assessment should be accomplished by using identified method(s), appropriate to the training element to be assessed. Assessment procedures should be established, addressing, as a minimum, location(s), identity check and invigilation, and assessment discipline. Computer-based systems may be used for the assessment of the trainees provided that:**

(i) the assessment material is prepared, reviewed and updated by an assessor nominated in accordance with AMC1 ADR.OR.D.017(h); and

(ii) the assessment is conducted in a controlled facility and environment and in a manner that physically ensures the identity of the trainees during the assessment process.

(4) Training elements that require individual practical participation may be combined with practical assessments.

(b) Practical training

(1) The practical training should follow the successful completion of the theoretical training and should be provided by an instructor nominated in accordance with AMC1 ADR.OR.D.017(h). The duration of the practical training should be appropriate to the area covered.

(2) A practical competency assessment should be conducted by an assessor nominated in accordance with AMC1 ADR.OR.D.017(h), following the completion of each practical training provided. Assessment procedures should be established, addressing, as a minimum, location(s), identity check, and assessment discipline.

AMC2 ADR.OR.D.017(e) Training and proficiency check programmes

INITIAL TRAINING PROCESS — NEW EMPLOYEES

When an aerodrome operator employs personnel mentioned in point (a) of AMC1 ADR.OR.D.017(a);(b), who have already completed a training programme with another aerodrome operator, the current employer may, when determining the training needs required for the post to be filled by that employee, decide to credit training subjects on which the individual has already completed relevant training, as they are documented in his or her training records. In any case, no credit may be given for training areas which are specific to that aerodrome.

GM21 ADR.OR.D.017(ae);(b) Training and proficiency check programmes

INITIAL TRAINING PROGRAMME METHODS — CHECKING OF TRAINEES

(a) The methods to be used for the delivery of the theoretical training include, but are not limited to, the following:

(1) lecture;

(2) lesson/demonstration;

(3) case study;

(4) exercises, including computer-based practical exercises;

- (5) facilitation;
- (6) group work;
- (7) interactive training; and
- (8) supervised practices.

(b) The methods to be used for the ~~checking~~ competency assessment of the trainees upon completion of the theoretical training could include:

- (a1) practical demonstration;
- (a2) computer-based assessment;
- (a3) oral or written ~~tests~~ assessments;

or combinations of such methods, as appropriate.

When determining the method(s) to be used for the assessment of the trainees, the advantages and the limitations of each method, as well as the objectives of the training, would need to be taken into account.

For example, the oral assessment may be used to test the understanding of the trainees around certain issues, as well as the requirements governing them, to have a clearer indication that the trainee not only knows what he or she should be doing in a given case, but also why he or she should be doing it. However, the oral assessment requires considerable skills and it should be undertaken in a way that ensures consistency among individual assessors. On the other hand, written assessments may also be used to test the theoretical knowledge and to a lesser degree the understanding of the trainees. Written tests may be easier to administer and to ensure their consistency, particularly when using multiple-choice questions. However, multiple-choice questions may test knowledge, but they may not be appropriate for determining how a person would react in an operational situation. A written assessment may also be computer-based.

AMC1 ADR.OR.D.017(f) Training and proficiency check programmes

RECURRENT, REFRESHER AND CONTINUATION TRAINING

(a) Recurrent training

The recurrent training may be only theoretical and should cover the areas addressed in the initial theoretical training provided. The recurrent training should be designed to review, reinforce or enhance the existing knowledge and skills of the trainees, and should also take into account the changes that have taken place in the content of the subjects covered by the initial training.

Upon completion of the recurrent training, an assessment of the trainee should be conducted.

(b) Refresher training

The refresher training may be only theoretical, and shorter than the recurrent training, and its content should take into account the length of the person's absence and the magnitude of the relevant changes that may have taken place during the period of absence of the employee.

Upon completion of the refresher training, an assessment of the trainee should be conducted (for the process of the assessment, see AMC1 ADR.OR.D.017(e)).

(c) Continuation training

Continuation training should be provided in the following cases:

(1) A person is assigned new/different tasks

In the case a person is to be assigned to different/additional tasks, an appropriate theoretical and practical training which covers any differences between his or her previous and future tasks should be completed. This differences training should be determined based on a comparison between the training required for the new tasks, and the training already completed by that person, as documented in his or her training records.

The provision of training should be followed by relevant competency assessment (for the process of the assessment, see AMC1 ADR.OR.D.017(e));

(2) A change is introduced to the operating environment of a person, which is of such nature and/or magnitude that it requires the training of the personnel (e.g. a new system to be used by the personnel concerned).

A method should be established and documented to be used for determining the need (or not) for, as well as the type(s) (theoretical, practical, or both) of, training to be provided following changes. The provision of training should be followed by a relevant competency assessment.

GM1 ADR.OR.D.017(a);(b) is deleted.

GM1 ADR.OR.D.017(c) is deleted.

GM2 AMC1 ADR.OR.D.017(cg) Training and proficiency check programmes

PROFICIENCY CHECKS

- (a)** The purpose of the proficiency check is to establish the ability of an individual to perform satisfactorily, in accordance with applicable requirements and the content of the aerodrome manual as they relate to his or her tasks.

In particular, the proficiency check of the aerodrome operator's personnel should determine the performance of an individual regarding the tasks assigned to him or her. Regarding personnel of other organisations operating or providing services at the aerodrome, the objective of the proficiency check should be the assessment of the performance of the individual with regard to the applicable operational procedures and requirements of the aerodrome.

To this end, the elements that each proficiency check should cover should be identified and documented.

A proficiency check does not need to cover all associated elements at the same time; however, all elements of a proficiency check should be covered within the period specified in GM1-ADR.OR.D.017(e) ADR.OR.D.017(g).

Depending on the situation, specialty and element checked, and provided that it will not affect the quality and completeness of the proficiency check, a single proficiency check may be used to cover more than one person. The person(s) to be checked should be made aware ~~about~~ prior to the proficiency check ~~relevant procedure~~.

Proficiency checks may be conducted during normal and/or abnormal/emergency conditions depending on the situation and the specialty of the person being checked.

(b) The proficiency check programme should:

- (1) include a process to identify the frequency of proficiency checks, including for the instructors and assessors, and track completion of the required checks;
- (2) identify checking responsibilities and relevant checking methods and procedures;
- (3) include procedures to be applied in the event that personnel do not achieve the required standards; and
- (4) include a validation process that measures the effectiveness of the programme.

(c) Information related to the proficiency check programme should be included in the aerodrome manual.

GM1 ADR.OR.D.017(g) Training and proficiency check programmes

PROFICIENCY CHECKS

Proficiency checks may be conducted at shorter intervals following, for example, an occurrence or to ensure that the person is able to apply in practice knowledge acquired due to updated training.

AMC1 ADR.OR.D.017(dh) Training and proficiency check programmes**INSTRUCTORS — ASSESSORS**

- (a) The aerodrome operator should nominate instructors and assessors to be used for the implementation of the training and proficiency check programmes. The personnel to be nominated may also include contracted instructors **or organisations** for individual subjects.

The aerodrome operator may also nominate personnel proposed by organisations operating or providing services at the aerodrome to be used as instructors and assessors for the implementation of the respective part of the training and proficiency check programmes of these organisations' personnel. ~~In any case, the responsibility to ensure the proper implementation of the programme is with the aerodrome operator.~~ **Irrespective of the solution chosen, the aerodrome operator remains responsible for the proper implementation of the training programme and the proficiency check programme in a consistent manner, and according to the relevant procedures and standards established by the aerodrome operator.**

[...]

- (c) Instructors

[...]

- (2) Instruction on practical skills should be given by appropriately qualified instructors who:

[...]

- (iv) receive **relevant** ~~regular refresher~~ training, **in accordance with the training programme,** to ensure that the instructional competencies are maintained.

- (d) Assessors

[...]

- (2) receive **relevant** ~~regular refresher~~ training, **in accordance with the training programme,** to ensure that the assessment standards are maintained up to date; and

[...]

AMC1 ADR.OR.D.017(ei) Training and proficiency check programmes

[...]

GM1 AMC2 ADR.OR.D.017(ei) Training and proficiency check programmes**TRAINING RECORDS**

(a) Training programme — general

The ~~aerodrome operator should maintain~~ records of the training sessions ~~that it has~~ provided, ~~should include~~ including as a minimum the following:

- (1) type of training, area of training and subjects covered;
- (2) names of participants/signed list of participants;
- (3) date and duration of training; and
- (4) names of the instructor and assessor.

(b) Training records of individuals

[...]

- (6) any comments made by the instructor, if applicable;
- (7) the performance ~~evaluation~~ assessment of the trainee, if as applicable; and

[...]

GM2 AMC3 ADR.OR.D.017(ei) Training and proficiency check programmes

[...]

SUBPART E – AERODROME MANUAL AND DOCUMENTATION (ADR.OR.E)**AMC3 ADR.OR.E.005 Aerodrome manual****AERODROME MANUAL**

[...]

3. Required aerodrome personnel qualifications (see GM1 ADR.OR.D.015(d)). Moreover, procedures related to:
 - 3.1 the training programme, including the following:
 - 3.1.1 responsibilities, frequencies, syllabi, duration of each type of training, method for delivery of training and competency assessment, minimum performance to be achieved by the trainees, and the identified training standards for all personnel involved in the operation, rescue and firefighting maintenance and management of the aerodrome, and those persons operating unescorted on the movement area and other operational areas of the aerodrome.
 - 3.1.2 procedures:
 - 3.1.2.1 for training and checking competency assessment of the trainees;
 - 3.1.2.2 to be applied in the event that personnel do not achieve the required standards.
 - 3.1.3 description of documentation to be stored and storage periods.
 - 3.2 the proficiency check programme, including responsibilities and frequencies of proficiency checks;
 - 3.2.1 checking methods and procedures.
 - ~~3.2.1~~ 3.2.2 procedures to be applied in the event that personnel do not achieve the required standards.
 - 3.2.3 the validation process to measure the effectiveness of the programme.
 - ~~3.2.3~~ 3.2.4 description of documentation to be stored and storage periods.

[...]

15. Procedures for apron safety management, including:
 - 15.1 protection from jet blasts and downwash;
 - 15.2 enforcement of safety precautions during aircraft refuelling operations;
 - 15.3 FOD prevention, including apron cleaning/sweeping; and
 - 15.4 monitoring compliance of personnel on the apron with safety procedures; and
 - 15.5 escorting, controlling and protecting passengers on the apron, from vehicular traffic and operating aircraft, use of predetermined routes, and avoiding

interference with stationary aircraft ground servicing activities.

16. Procedures for the control and limitation of the number of vehicles operating on the movement area, issuance of authorisations and temporary permits of vehicles operating on or in the vicinity ~~of, or~~ the movement area, including driver's obligations, traffic rules, right of way, speed limits, and ~~method~~ procedures for issuing driving authorisations and permits, and enforcement ~~means~~ procedures. Procedures for escorting vehicles occasionally used in areas where radio and transponder or equivalent is required, as well as for vehicles temporarily permitted to operate on the movement area. Procedures and responsibilities for establishing and monitoring the implementation of the maintenance programme for vehicles operating on the movement area and other operating areas.

[...]

29. Procedures and measures for the prevention of fire at the aerodrome.
30. Communication procedures, including: frequencies; language and phraseology to be used when communicating with the air traffic services; vehicle call signs; communication signals to be used in case of radio communication failure; communication via the air traffic services provider; and dissemination of significant information.
31. Aircraft towing procedures, including: designated routes to be used; lights to be displayed by aircraft; communication procedures; guidance to be provided; measures for ensuring safety of towing operation in adverse weather conditions, including visibility and weather phenomena in which towing is limited or not permitted.
32. Procedures for the handover of activities between aerodrome personnel, including description of the system for the provision of operational information to other organisations operating at the aerodrome.

[...]

ANNEX IV – PART-ADR.OPS**PART OPERATIONS REQUIREMENTS – AERODROMES****SUBPART A – AERODROME DATA (ADR.OPS.A)**

[...]

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~~ need 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 at 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
Nav aids 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	Accuracy Data 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	Accuracy Data-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	Accuracy Data 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	Accuracy Data 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, distance along 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:
 - (1a) monitor data relevant to the aerodrome and available services originating from the aerodrome operator, and promulgated by the relevant air traffic services providers;
 - (2b) 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

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.085 of Annex III of Commission Implementing Regulation (EU) 2017/373.

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 priori 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(d) 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(e) 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 terrestrial reference 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 georeferencing 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, Volume 2: Guidance material (EUROCONTROL-SPEC-154, Edition 1.0 of 04/02/2013).

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 until the 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 the global 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, Volume 2 (EUROCONTROL-SPEC-154, Edition 1.0 of 04/02/2013).

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 distances of 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 developed using 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 reference system.
- (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 requirements for 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 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 issuance of 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 relationship with 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 contractions applicable 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 AMC1 ADR.OR.D.017(e)).

- (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 AMC1 ADR.OR.D.017(e)).

GM1 ADR.OPS.A.057(a)(2);(3) Origination of NOTAM**RECURRENT, REFRESHER AND CONTINUATION TRAINING**

ADR.OR.D.017 point (f) regulates 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, see ADR.OR.D.017(f) and AMC1 ADR.OR.D.017(f).

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, Regulation (EU) 2017/373, 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:

- (1) ensure that the relevant aerodrome operator's personnel are adequately trained in the relevant regulatory framework regarding both the origination and issuance of NOTAM;
- (2) 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 of aircraft;
- (b) temporary obstructions in the vicinity of aerodromes/heliports that do not affect the safe operation of aircraft;
- (c) partial failure of aerodrome/heliport lighting facilities where such a failure does not directly affect aircraft operations;
- (d) partial temporary failure of air-ground communications when suitable alternative frequencies are 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 movement area;
- (g) training activities performed by ground units;
- (h) unavailability of backup and secondary systems if these systems do not have an operational impact;
- (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 (airplane 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 MMYGGgg (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;

MMYGGgg = 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 (MMYGGgg).

- (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 airplane performance calculation section.
- (i) When reporting on more than one runway, repeat the information in the airplane 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 runway third, 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 been reported 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 for each 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 appropriate runway 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

SLIPPERY WET

SLUSH

SPECIALLY PREPARED WINTER RUNWAY

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 the appropriate 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.

3. 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 conditional circumstances for publication are not fulfilled, are left out completely.

Item I — Reduced runway length. The applicable runway designator and available length in metres is inserted (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 declared distances.

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

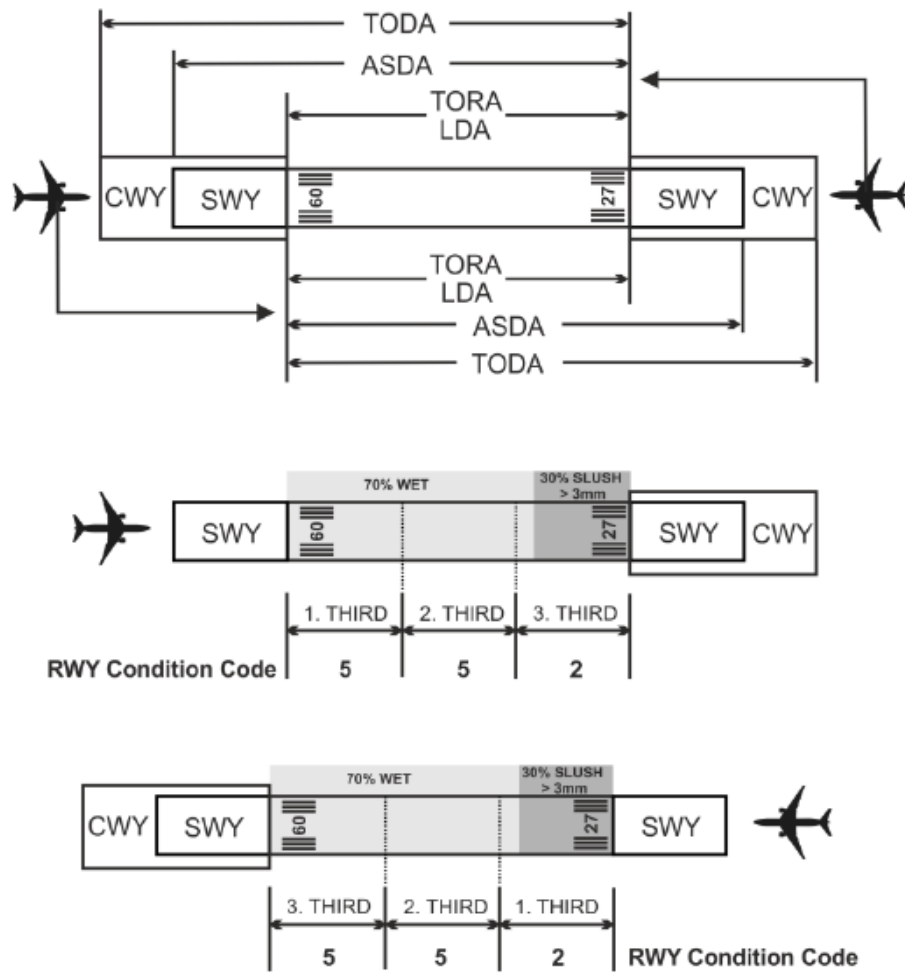


Figure 1: Reporting of RWYCC

from air traffic services to flight crew for runway thirds

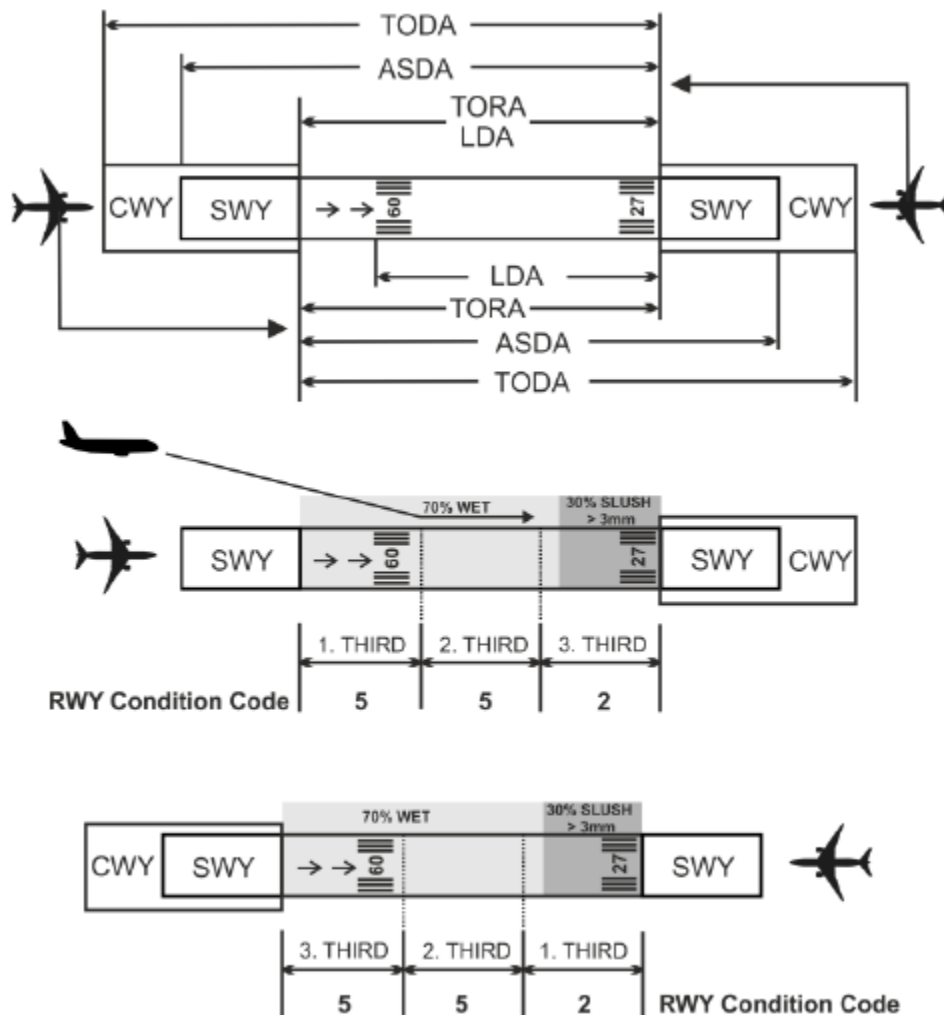


Figure 2: Reporting of RWYCC

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 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.

This information is conditional.

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 [nn]n POOR or TWYS[nn]n/[nn]n/... POOR or ALL TWYS POOR

(9) Apron conditions

This information is conditional.

Format: APRON [nnnn] POOR or APRONS[nnnn]/[nnnn]/... POOR or ALL APRONS 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:

ABCDEFGHIJKLMNOPQRSTUVWXYZ

0123456789

/ [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)(18);(19) Reporting of the runway surface condition

REPORTING OF CHEMICALLY TREATED AND LOOSE SAND

The terms 'CHEMICALLY TREATED' and 'LOOSE SAND' 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 RCR is therefore created as:

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

(c) With even more precipitation, a further assessment reveals that 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

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.

**SUBPART B – AERODROME OPERATIONAL SERVICES, EQUIPMENT AND INSTALLATIONS
(ADR.OPS.B)****AMC1 ADR.OPS.B.003(a) Handover of activities — provision of operational information****HANDOVER OF OPERATIONAL ACTIVITIES — PERSONNEL BRIEFING**

- (a) The aerodrome operator procedures for the handover of operational activities should as a minimum:
- (1) cover the change of a shift within the same function (e.g. between RFFS personnel), as well as the case where a task is handed over to another person within the same shift, and the cases where an activity is handed over between different functions (e.g. from maintenance to operations);
 - (2) address the case when a planned activity (e.g. light maintenance) is not completed at the time of a planned shift change; or any other non-regular activity is in place; and
 - (3) allow for the preparation of both outgoing and incoming personnel.
- (b) The briefing should be in a manner that allows effective two-way communication between the outgoing and incoming personnel, during which all task-relevant information necessary for the incoming personnel is provided to them, both verbally and in writing. In the case of posts which are not continually manned, or aerodromes with interrupted working hours, the briefing may be in writing, while ensuring that additional information may be provided to the incoming personnel in case of such need.
- (c) The briefing of drivers and other operational personnel operating on the manoeuvring area should, as a minimum, include:
- (1) the runway(s) in use;
 - (2) any significant works areas in place, or being established or removed that day;
 - (3) conditions of stop bars, if applicable, that may be inoperable making a taxiway unusable for runway entry or crossing; and
 - (4) if low-visibility procedures are in force.

GM1 ADR.OPS.B.003(b) Handover of activities — provision of operational information**PROVISION OF OPERATIONAL INFORMATION TO OTHER ORGANISATIONS**

Given that changes of the operating conditions at an aerodrome may affect all personnel operating on the movement area, there is a need to ensure that the personnel of other organisations which operate or provide services at the aerodrome are also provided with the necessary operational information, which pertains to their operating environment.

Therefore, the aerodrome operator needs to provide this type of information to such organisations, so that they are enabled to relay it to their own personnel. It is important that there is no delay in the

provision of such information by the aerodrome operator, and that it is done in a manner prearranged with the other organisations, to ensure it reaches its destination.

Such information may include changes in the operating conditions on the apron (e.g. due to works or occurrences) or on the manoeuvring area, or other facilities of the aerodrome. For the type of information that may be provided regarding the manoeuvring area, see point (c) of AMC1 ADR.OPS.B.003(a).

GM ~~AMC1~~ ADR.OPS.B.010 ~~(a);(3)~~ **(d)** Rescue and firefighting services

[...]

AMC12 ADR.OPS.B.010 ~~(b);(c)~~ **(d)** Rescue and firefighting services

TRAINING PROGRAMME OF RFFS PERSONNEL – GENERAL

~~The provisions of AMC1 ADR.OR.D.017(a);(b) apply also for the training programme of RFFS personnel.~~

~~In addition, t~~he aerodrome operator should ensure that:

- (a) rescue and fire fighting personnel actively participate in live fire drills commensurate with the types of aircraft, and type of rescue and firefighting equipment in use at the aerodrome, including pressure-fed fuel fire drills or any other type of fuel, provided that they apply the same extinguishing techniques as for jet fuel; and
- (b) the rescue and firefighting personnel training programme includes training in human performance, including team coordination.

AMC2 ADR.OPS.B.010(b);(c) is deleted.

AMC31 ADR.OPS.B.010 ~~(b);(c)~~ Rescue and firefighting services

[...]

GM1 ADR.OPS.B.010(b);(c) is deleted.

GM2 ADR.OPS.B.010(b);(c) is deleted.

GM1 ADR.OPS.B.010(c) is deleted.

GM2 ADR.OPS.B.010(c) is deleted.

AMC1 ADR.OPS.B.010(d) is deleted.

AMC1 ADR.OPS.B.010(e) is deleted.

GM1 ADR.OPS.B.010(e) is deleted.

GM2 ADR.OPS.B.010(e) is deleted.

AMC2 ADR.OPS.B.015 Monitoring and inspection of movement area and related facilities

~~PERSONNEL~~ REQUIREMENTS AND PROCEDURES FOR MOVEMENT AREA INSPECTIONS

- (a) The aerodrome operator should designate the personnel responsible for carrying out movement area inspections.
- (b) The aerodrome operator should ensure that all vehicles on the manoeuvring area are in radio contact with the appropriate ~~Air T~~ ~~raffic S~~ ~~ervices~~ either directly or through an escort.
- (c) In order to prevent runway incursions, the aerodrome operator should have procedures in place, which have been coordinated with the air traffic services unit, for conducting runway inspections, ~~including direction of runway inspection~~, communication procedures, actions in case of ~~radio~~ communication ~~or transponder~~ failure or vehicle ~~brake down~~ ~~breakdown~~, stop bars crossing, ~~including in cases of stop bar unserviceability~~, runway crossings, etc. ~~Runway~~

inspections should be conducted in the opposite direction to that being used for landing or taking off and without interruption, unless it is operationally impossible. The inspection procedures should also cater for the temporary suspension of runway operations to allow a full runway inspection to be carried out without interruption, and should address the need to effectively inspect unidirectional lights.

(d) The aerodrome operator should ensure that personnel conducting movement area inspections ~~receive training~~ should be trained in, at least, the following areas:

- (1) aerodrome familiarisation, including aerodrome markings, signs, and lighting;
- (2) Aerodrome Manual;
- (3) Aerodrome Emergency Plan;
- (4) Notice to Airmen (NOTAM) ~~notification~~ initiation procedures;
- (5) aerodrome driving rules;
- (6) procedures ~~of~~ for radiotelephony, phraseology and ICAO phonetic alphabet;
- (7) aerodrome inspection procedures and techniques; ~~and~~
- (8) procedures for reporting inspection results and observations;
- (9) air traffic services procedures on the movement area; and
- (10) low-visibility procedures.

(e) Personnel conducting runway surface condition assessments, in addition to the training specified in point (d) above, should be trained in, at least, the following areas:

- (1) procedures for completion/initiation of RCR;
- (2) type of runway contaminants and reporting;
- (3) assessment and reporting of runway surface friction characteristics;
- (4) use, calibration and maintenance of runway friction measurement device, where applicable;
- (5) awareness of uncertainties related to point (4) above; and
- (6) awareness of the impact of runway surface condition assessment on aircraft performance.

(f) Following the successful completion of the theoretical training, the practical part of the training to be provided should take into account the individual needs of the trainees, and should include the practical application of the theoretical training. After the completion of the practical training, a competency assessment should take place (see AMC1 ADR.OR.D.017(e)).

GM7 ADR.OPS.B.015 Monitoring and inspection of movement area and related facilities**RECURRENT, REFRESHER AND CONTINUATION TRAINING**

ADR.OR.D.017 point (f) regulates 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, see ADR.OR.D.017(f) and AMC1 ADR.OR.D.017(f).

GM2 ADR.OPS.B.015 is deleted.

AMC1 ADR.OPS.B.016(a) Foreign object debris control programme**FOD CONTROL PROGRAMME — GENERAL**

The FOD control programme should be actively supported by the senior management of the aerodrome operator and of the other organisations operating or providing services at the aerodrome. The aerodrome operator should designate an individual within the aerodrome organisation to manage the aerodrome's FOD control programme.

AMC1 ADR.OPS.B.016(b)(1) Foreign object debris control programme**FOD PREVENTION****(a) Personnel awareness**

Personnel should be kept aware through appropriate activities of the existence of the FOD control programme, and should be actively encouraged to identify and report potential FOD hazards, act to remove observed FOD, and propose solutions to mitigate related safety risks.

(b) Personnel training

The FOD training programme should aim at increasing the personnel awareness of the causes and effects of FOD damage and to promote their active participation in eliminating FOD during the performance of daily work routines.

(1) The theoretical part of the initial FOD training programme should cover the following areas:

- (i) safety of aircraft, personnel and passengers as they relate to FOD;
- (ii) overview of the FOD control programme in place at the aerodrome;
- (iii) causes and principal contributing factors of FOD creation;
- (iv) the consequences of ignoring FOD, and/or the incentives for preventing FOD;

- (v) practising 'clean-as-you-go' work habits and the general cleanliness and inspection standards of work areas;
- (vi) FOD detection procedures, including the proper use of detection technologies (if applicable);
- (vii) requirements and procedures for the regular inspection and cleaning of movement areas;
- (viii) FOD removal procedures;
- (ix) proper care, use, and stowage of material and component or equipment items used around aircraft while in servicing, maintenance or on aerodrome surfaces;
- (x) control of debris in the performance of work assignments;
- (xi) control over personal items and equipment;
- xii) proper control/accountability and care of tools and hardware;
- (xiii) how to report FOD incidents or potential incidents; and
- (xiv) continuous vigilance for potential sources of FOD.

The theoretical training should be followed by an assessment of the trainees (see AMC1 ADR.OR.D.017(e)).

- (2) Following the successful completion of the theoretical training, the practical part of the training to be provided should take into account the individual needs of the trainees, according to the responsibilities/tasks of the personnel, and, as a minimum, should include familiarisation with the tools/equipment used for the removal/containment/prevention of FOD, and the implementation of the relevant aerodrome operating procedures related to the programme. Following the completion of the practical training, a competency assessment should take place (see AMC1 ADR.OR.D.017(e)).

GM1 ADR.OPS.B.016(b)(1) Foreign object debris control programme

RECURRENT, REFRESHER AND CONTINUATION TRAINING

ADR.OR.D.017 point (f) regulates 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, see ADR.OR.D.017(f) and AMC1 ADR.OR.D.017(f).

AMC1 ADR.OPS.B.016(b)(2) Foreign object debris control programme**FOD PREVENTION — MEASURES**

The aerodrome operator should identify activities that may be associated with the generation of FOD, as well as measures that should be taken in order to prevent this from happening. A record of the analysis made should be maintained.

GM1 ADR.OPS.B.016(b)(2) Foreign object debris control programme**FOD PREVENTION — MEASURES**

FOD may be produced by many activities and may be generated by personnel, aerodrome infrastructure (pavements, lights and signs), the environment (e.g. wind, heavy rain), aircraft, vehicles, or other equipment operating at the aerodrome. The elements below have also the potential to become sources of FOD on an aerodrome.

(a) Aircraft servicing and maintenance activities

During the activities related to the aircraft servicing, various types of FOD may be generated and be left or transferred on the apron, service roads, and other operational areas. Such items may include small luggage parts, cabin waste, plastic or metallic items, etc. FOD may also be generated by vehicles or the equipment that operates in these areas.

To control this type of FOD, measures need to include securing and removing cabin waste from the aircraft stand. Cabin waste would not be left unattended on the apron, especially near aircraft stands. Moreover, cabin waste need not be disposed of using the FOD containers provided, as cabin waste may attract wildlife. To this end, the handling of cabin waste would be organised so that a damage of the rubbish bag is not likely to attract wildlife on the apron.

Similarly, during aircraft maintenance, FOD may be generated either in the form of waste or small items inadvertently left on the apron such as rivets, bolts, tools, etc. Procedures to address this may include measuring of tools, use of toolboxes, checklists, removal of waste produced upon the completion of the maintenance activities, etc.

Inspection of the aircraft stand or other areas that may have been used for aircraft servicing or maintenance, before and after the departure of the aircraft is an effective measure. The secure installation of suitable FOD bins, in appropriate locations, for depositing FOD is also an effective preventive measure.

(b) Cargo areas

In a cargo area, there is a high potential for blowing debris such as cargo strapping and plastic sheeting. Procedures to contain such debris, possibly by installing (and monitoring) catch fencing where appropriate, may help to control the environment. FOD trapped by such fences should be removed regularly.

(c) Construction activities

During construction activities, several materials (rocks, tools, vehicle parts, etc.) have the potential to become FOD if transferred by vehicles, weather phenomena, etc. on the movement area or other operational areas. For this reason, specific FOD prevention procedures need to be established and employed for each construction project. These procedures would be based on the proximity of the construction activities to the movement area and other operational areas, but in general would stress containment and regular cleaning of construction debris.

Aerodrome pre-construction planning would include means for controlling and containing FOD generated by the construction. This is especially true in high-wind environments where debris is more likely to become airborne.

The designated routes of construction vehicles on the movement area need to be planned so as to avoid or minimise crossing in critical areas of aircraft operations. If high-risk crossings cannot be avoided, subsequent provisions such as an increased frequency of FOD inspections could be implemented.

Contractors need to understand and comply with the requirements regarding the control and removal of FOD. To facilitate compliance with these requirements, the aerodrome operator may consider drafting FOD control guidance for all construction projects taking place within the movement area or nearby areas. Standard and project-specific FOD measures include:

- (1) requiring contractors to cover all loads;
- (2) requiring contractors to secure any loose items that could easily blow away or control dust through spraying of water;
- (3) ensuring the proper functioning of storm drains throughout the construction;
- (4) specifying whether any mechanical FOD removal devices will be required;
- (5) specifying how monitoring for FOD hazards will be accomplished; and
- (6) requirements for inspecting and removing FOD from tyres prior to traversing operational areas.

(d) Aerodrome maintenance operations

Mowing and other maintenance operations routinely disturb the vegetation and soil in areas adjacent to those travelled by aircraft. Therefore, procedures to remove this debris, such as the use of an assigned aerodrome sweeper or personnel on foot using shovels to repair vegetation and soil, need to be implemented.

Aerodrome lighting, pavement, and marking maintenance operations may generate concrete/asphalt debris as well as increase the potential for dropped repair parts, tools, and other items stored on the maintenance vehicles. Corrective procedures may include the use of aerodrome sweepers and the inspection of the worksite after maintenance is completed.

(e) Pavements and other aerodrome surfaces may be prone to generating FOD.

(1) Pavements

- (i) Deteriorating pavements can exhibit spalling or cracks. For example, pieces of concrete can break loose from pavements or FOD can develop from fatigue corner cracks.
- (ii) The service roads that cross taxiways may generate FOD from the vehicles using them, especially in the case of construction operations.
- (iii) Special attention should be paid to the cleaning of cracks and pavement joints.
- (iv) Asphalt and concrete pavements may be the most common source of FOD on an aerodrome; therefore, effective pavement maintenance practices are important for the prevention of FOD.

(2) Other aerodrome surfaces

Grass areas and ditches may collect and hold large amounts of light debris such as paper, cardboard, plastic and various containers that can originate from terminal aprons, cargo ramps and hangar ramps. This debris can blow back into areas used by aircraft unless collected in a timely manner.

Unpaved areas adjacent to pavements may require stabilisation, as appropriate, to prevent FOD from jet wash.

FOD fences may collect debris on windy days. This FOD would be collected before the wind increases or changes direction and the debris blows back on to areas used by aircraft.

(f) Vehicle operational activities

Vehicles used for operational reasons, e.g. preventive maintenance, wildlife management, and which may need to frequently move on surfaces that contain material that could be FOD in the movement area. Thus, procedural (e.g. inspection/cleaning of tyres) or technical (development of surfaces at predetermined points that help the removal of FOD from tyres) measures may be taken to address this potential FOD source.

AMC1 ADR.OPS.B.016(b)(3) Foreign object debris control programme

FOD DETECTION, REMOVAL, CONTAINMENT AND DISPOSAL

(a) The aerodrome operator should include the procedures for FOD detection in the aerodrome manual. The procedures should, where necessary, be coordinated with the air traffic services provider and should:

- (1) ensure that FOD detection is part of the established inspection schedule of the movement area, and that:

- (i) periodic FOD inspections on foot are carried out to increase the effectiveness of detection, and to inspect areas inaccessible by vehicle (such as grass areas);
- (ii) additional inspections are carried out:
 - (A) in construction areas;
 - (B) immediately after any aircraft or vehicle accident or incident;
 - (C) following any material spill;
 - (D) during, and after, extreme weather events (e.g. excessive heat, freeze and thaw periods, following a significant storm, etc.);
- (2) ensure that an inspection of an aircraft stand is carried out prior to the arrival and departure of an aircraft, in order to detect and remove any FOD present;
- (3) ensure that cabin waste is properly secured and removed from the aircraft, and any waste from aircraft maintenance activities is removed upon completion of the activities;
- (4) ensure that FOD detection is performed in a timely manner and that it includes the identification of the FOD source and its location;
- (5) ensure that aerodrome personnel are notified to remove detected FOD from the manoeuvring area, and describe how the air traffic services provider is notified to take appropriate action;
- (6) describe clearly when runway or taxiway operations have to be suspended, and the coordination required with the air traffic services provider;
- (7) ensure that FOD is removed as soon as possible after detection. FOD removal should be included in the tasks of all personnel operating on the aerodrome; and
- (8) describe the actions required to notify aircraft operators of any aircraft parts identified.
- (b) The aerodrome operator should provide designated FOD containers and ensure that they are:
 - (1) visibly placed on the apron and other areas, for the storage of debris;
 - (2) well marked, easy to identify and access, properly secured, and frequently emptied.

GM1 ADR.OPS.B.016(b)(3) Foreign object debris control programme

FOD DETECTION AND REMOVAL

(a) FOD detection

In addition to the standard inspections, personnel on the movement area need to employ a 'clean-as-you-go' technique, by looking for FOD during their regular duties.

When inspections occur at night, additional lights/lighting systems on vehicles are beneficial to better detect FOD.

Whenever possible, vehicles involved in FOD detection activities, are only driven on clean, paved surfaces. If a vehicle needs to be driven on unpaved surfaces, the driver needs to ensure that the vehicle's tyres do not transport FOD (e.g. mud or loose stones) back onto the pavement.

Encouraging the participation of the personnel of other organisations such as air operators, groundhandling companies, air traffic services providers in inspections may reinforce the concept that FOD control is a team effort and demonstrates the aerodrome operator's commitment to a FOD-free environment. This practice may help increase familiarity with local aerodrome conditions, and promotes effective communication between the aerodrome operator and its stakeholders.

(b) FOD removal

FOD may be removed either manually or by using mechanical equipment, such as sweepers, vacuum systems, jet air blowers, magnetic bars, FOD 'sweeping carpets', etc.

FOD containers need to be able to withstand strong winds and be of a 'closed-type' to prevent the wind from dislodging their content. Suggested locations for FOD containers are: near all entry points to the apron area, in hangars, aircraft maintenance areas, near aircraft stands and baggage areas. Clearly identified FOD storage locations increase the likelihood that collected debris will be deposited by personnel. Access to the FOD containers needs to be free by other objects.

AMC1 ADR.OPS.B.016(c) Foreign object debris control programme

FOD ANALYSIS — CONTINUOUS IMPROVEMENT

- (a) All FOD identified and collected on the aerodrome should be recorded, analysed and evaluated. To record the location of the FODs, a grid map of the aerodrome should be used. When needed, an investigation should be carried out to identify the source of the FOD. The sources of FOD, including their location and the activities generating FOD on the aerodrome, should be identified, recorded and analysed to identify trends and problem areas as well as to focus the efforts of the FOD control programme. Relevant records, including of the actions taken, should be maintained.
- (b) The FOD control programme should be periodically reviewed to assess and continually improve its effectiveness. The programme should be updated based on the feedback received, data analysis results and trends identified through the evaluation of FOD collected at the aerodrome.

GM1 ADR.OPS.B.016(c) Foreign object debris control programme**FOD DESCRIPTION**

As FOD may be composed of different materials, when reporting, a proper description is made to allow for the proper identification of the FOD source areas, as well as for the appropriate mitigation measures to be taken.

FOD may be items from the following, non-exhaustive, list:

- (a) aircraft and engine fasteners (nuts, bolts, washers, safety wire, etc.);
- (b) aircraft parts (fuel caps, landing gear fragments, oil sticks, metal sheets, trapdoors, and tyre fragments);
- (c) mechanics' tools;
- (d) catering supplies;
- (e) personal items (personnel badges, pens, pencils, luggage tags, drink cans, etc.);
- (f) apron items (paper and plastic debris from catering and freight pallets, luggage parts, and debris from ramp equipment);
- (g) runway and taxiway materials (concrete and asphalt chunks, rubber joint materials, and paint chips);
- (h) construction debris (pieces of wood, stones, fasteners and miscellaneous metal objects);
- (i) plastic and/or polyethylene materials; and
- (j) natural materials (e.g. plant fragments, inanimate wildlife and volcanic ash).

AMC1 ADR.OPS.B.025 is deleted.

AMC2 ADR.OPS.B.025 is deleted.

GM1 ADR.OPS.B.025 is deleted.

GM2 ADR.OPS.B.025 is deleted.

GM1 ADR.OPS.B.024(a) Authorisation of vehicle drivers**DRIVING AUTHORISATION FOR THE MOVEMENT AREA AND OTHER OPERATIONAL AREAS**

Depending on its design, the 'airside' part of an aerodrome may also encompass operational areas, other than the movement area, in which vehicles may also be operating for various purposes.

Example cases of such other operational areas, which are not part of the movement area, would be the service roads that may exist between the terminal buildings and aprons, perimeter roads used for various purposes, areas that are used for the parking of vehicles and ground support equipment, etc.

The driving in such other operational areas is also subject to the provisions of ADR.OPS.B.024.

GM1 ADR.OPS.B.024(a)(1) Authorisation of vehicle drivers**GENERAL**

Driving authorisations are meant to be issued only to persons whose functions and tasks require the driving of a vehicle on the movement area or other operational areas of the aerodrome.

Driving authorisations cover all types of activities that involve driving in these areas, including but not limited to aerodrome operations and maintenance, groundhandling, security, aircraft maintenance, etc. The identity of the organisation with which a driver is associated (e.g. private entity, State entity) is not considered relevant.

The number of persons authorised to drive on the manoeuvring area, and particularly on runways, needs to be limited to the minimum required in order to minimise the risk of runway incursions and should be reviewed periodically.

AMC1 ADR.OPS.B.024(a)(5) Authorisation of vehicle drivers**TRAINING OF DRIVERS ON THE USE OF VEHICLES**

- (a) A driver needs to receive specific training on the use of any vehicle or equipment, he or she will be using during his or her duties, e.g. special vehicle, tug, high loader, coach, etc. Upon completion of this training, the responsible organisation should provide the relevant records to the aerodrome operator.
- (b) If the driver is to be assigned a new vehicle type following the issuance of the authorisation, the process of point (a) should be repeated prior to allowing the driver to operate the new vehicle.

AMC1 ADR.OPS.B.024(b) Authorisation of vehicle drivers**TRAINING OF DRIVERS — GENERAL**

(a) The training programme that drivers need to follow should depend on the areas where they need to be operating. The following two training programmes should be developed:

(1) General driving training programme

This training should cover the needs of all drivers operating on the apron area and other operational areas of the aerodrome. The successful completion of this training grants a driver the right to operate unescorted a vehicle on aprons and other operational areas of the aerodrome, except on the manoeuvring area.

(2) Manoeuvring area training programme

This training should cover the additional specific needs of the drivers who will be operating on the manoeuvring area. A driver is granted the right to operate unescorted on the manoeuvring area subject to the:

- (i) provisions of ADR.OPS.B.024(a)(4) and AMC3 ADR.OPS.B.024(b);
- (ii) successful completion of the general driving training programme; and
- (iii) successful completion of the manoeuvring area training programme.

(b) Each of the above-mentioned training programmes (general driving training programme and manoeuvring area training programme) should consist of the following parts:

(1) Theoretical training

The theoretical training should be of a defined and adequate duration, supported by suitable educational means and material.

The theoretical training should be followed by an assessment of the trainees (see AMC1 ADR.OR.D.017(e)). Once the theoretical part has been successfully completed, the driver should undertake practical training.

(2) Practical training

During the phase of the practical training, which needs to be of a defined and adequate duration, the trainees should be provided with adequate practical training and familiarisation with the aerodrome facilities and its procedures by the nominated instructors, in day and, if relevant, night conditions.

Following the delivery of the practical training, the competence of the trainees should be assessed, in practical terms, by the nominated assessors (see AMC1 ADR.OR.D.017(e)). This assessment should aim at assessing the ability of the trainees to apply, in practice, the knowledge and skills they have acquired through the theoretical and practical training.

(3) Upon the successful completion of the practical training, and provided that the driver has received training on the use of a vehicle (see AMC1 ADR.OPS.B.024(a)(5)), a driving authorisation should be issued.

GM1 ADR.OPS.B.024(b) Authorisation of vehicle drivers**TRAINING OF DRIVERS — GENERAL**

The theoretical training is supported by material which provides up-to-date, adequate and suitable information regarding the aerodrome, in the form of presentations, maps, diagrams, videos, booklets, checklists, etc. as appropriate.

AMC2 ADR.OPS.B.024(b) Authorisation of vehicle drivers**DRIVING TRAINING PROGRAMMES****(a) General driving training programme**

(1) The theoretical part of the general driving training programme should, as a minimum, cover the following areas:

(i) Driving authorisation framework, including:

- (A) issuance, validity, conditions of use;
- (B) control and audit of its issue;
- (C) driving violations and enforcement procedures;
- (D) relationship with the national driver licensing system;
- (E) national requirements related to general vehicle driving licences;
- (F) national Competent Authority guidance for movement area driving; and
- (G) roles of various organisations:
 - (a) the role of the aerodrome operator in setting and maintaining standards;
 - (b) the Competent Authority's role and its responsibilities;
 - (c) the role of the national and/or local police, and their involvement with airside driving; and
 - (d) the role of any other enforcement authorities dealing with vehicles, driving, health, and safety.

(ii) Personal responsibilities, including:

- (A) requirements concerning fitness to drive (medical standards);
- (B) use of personal protective equipment (e.g. high-visibility clothing and hearing protection);
- (C) general driving standards;
- (D) no-smoking; use of psychoactive substances and medicines, including requirements on alcohol consumption;

- (E) implementation of 'sterile-cab' concept, by avoiding disturbing and distracting activities while driving;
 - (F) responsibilities with respect to FOD and fuel/oil spillage; and
 - (G) the responsibility to ensure that a vehicle is suitable for the task and is used correctly.
- (iii) Vehicle standards, including:
- (A) condition and maintenance standards at the aerodrome and/or national level;
 - (B) the requirement to display obstruction lights and company insignia;
 - (C) the requirement for, and content of, daily vehicle inspections;
 - (D) vehicle fault reporting and rectification;
 - (E) requirements for the issue and display of vehicle authorisations;
 - (F) serviceability of all essential communication systems with air traffic services and base operations; and
 - (G) maintaining the vehicle's cabin free of loose and distracting articles/items, as per the 'sterile-cab' concept.
- (iv) Aerodrome rules and procedures, including:
- (A) rules of the air, and air traffic services procedures applicable to aerodromes as they relate to vehicles, particularly rights of way;
 - (B) aerodrome regulations, procedures and instructions pertaining to vehicle operations;
 - (C) definition of movement areas, manoeuvring areas and aprons;
 - (D) methods used to disseminate general information and instructions to drivers;
 - (E) methods used to disseminate information regarding works in progress; and
 - (F) reporting of occurrences the driver is involved in or witnesses.
- (v) General aerodrome layout, including:
- (A) the general geography of the aerodrome;
 - (B) aviation terminology used such as runway, taxiway, apron, roads, crossings, runway-holding points;
 - (C) all aerodrome signs, markings and lighting for vehicles and aircraft, including their meaning;
 - (D) specific reference to signs, markings and lighting used to guard runways and critical areas; and

- (E) specific reference to any controlled/uncontrolled taxiway crossing procedures.
- (vi) Hazards of general movement area driving, including:
 - (A) speed limits, prohibited areas, and no parking requirements;
 - (B) the danger zones around aircraft;
 - (C) engine suction/ingestion and blast, propellers, and helicopters;
 - (D) aircraft refuelling;
 - (E) FOD and spillages;
 - (F) vehicle reversing;
 - (G) staff and passengers walking across aprons;
 - (H) air bridges and other services such as fixed electrical ground power;
 - (I) the general aircraft turnaround process;
 - (J) aircraft emergency stop and fuel cut-off procedures;
 - (K) hazardous cargo;
 - (L) vehicle-towing requirements and procedures;
 - (M) driving at night; and
 - (N) driving in adverse weather conditions, particularly low visibility.
- (vii) Human performance, including:
 - (A) basic concepts of human factors;
 - (B) basic aviation psychology, including:
 - (a) attention and vigilance;
 - (b) perception;
 - (c) memory;
 - (d) human error;
 - (e) decision-making;
 - (f) avoiding and managing errors;
 - (g) human behaviour; and
 - (h) human overload and underload.
- (viii) Emergency procedures, including:
 - (A) actions and responsibilities in a crisis situation (any accident or serious incident occurring on the aerodrome);
 - (B) action in the event of a vehicle accident;

- (C) specific action in the event of a vehicle striking an aircraft;
- (D) action in the event of fire;
- (E) action in the event of an aircraft accident/incident; and
- (F) action in the event of personal injury.

(ix) Communications, including:

- (A) radio procedures and phraseologies to be used (other than with air traffic services);
- (B) light signals used by air traffic services;
- (C) procedures to be used by vehicle drivers if lost or uncertain of their position;
- (D) local emergency telephone numbers;
- (E) how to contact the local aerodrome unit;
- (F) portable radio, including:
 - (a) correct use of radios;
 - (b) effective range and battery life;
 - (c) screening/shielding effects on the aerodrome;
 - (d) use of correct call signs, as applicable; and
 - (e) safety while using radios, including procedures and instructions regarding the use of portable radios and hand-held microphones while driving a vehicle.

(2) The practical part of the general driving training programme should, as a minimum, include the following visual familiarisation of the aerodrome:

- (i) airside service roads, taxiway crossings, and any restrictions during low-visibility conditions;
- (ii) aprons and stands;
- (iii) surface paint markings for vehicles and aircraft;
- (iv) surface paint markings that delineate the boundary between aprons and taxiways;
- (v) signs, markings and lighting used on the taxiway that indicate the runways ahead;
- (vi) parking areas and restrictions;
- (vii) speed limits and regulations; and
- (viii) hazards during aircraft turnarounds and aircraft movements.

(b) Manoeuvring area training programme

(1) The theoretical part of the manoeuvring area training programme should, as a minimum, cover the following areas:

- (i) Air traffic services, including:

- (A) the aerodrome's air traffic services function and area of responsibility;
 - (B) the ground movement control function and area of responsibility;
 - (C) normal and emergency procedures used by air traffic services relating to aircraft;
 - (D) normal handover/transfer points for vehicles;
 - (E) air traffic services call signs, vehicle call signs; and
 - (F) demarcation of responsibilities between air traffic services and apron management unit, if applicable.
- (ii) Personal responsibilities, including:
- (A) fitness to drive with particular emphasis on eyesight and colour perception;
 - (B) correct use of personal protective equipment;
 - (C) responsibilities with respect to FOD; and
 - (D) responsibilities with respect to escorting other vehicles on the manoeuvring area.
- (iii) Vehicle standards, including:
- (A) responsibility for ensuring the vehicle used is fit for the purpose and task and appropriately marked and lighted;
 - (B) requirements for daily inspection prior to operating on the manoeuvring area;
 - (C) particular attention to the display of obstruction and general lights; and
 - (D) serviceability of all essential communication systems with air traffic services and base operations.
- (iv) Aerodrome layout, including:
- (A) particular emphasis on signs, markings and lighting used on the manoeuvring area;
 - (B) special emphasis on signs, markings and lighting used to protect the runway;
 - (C) description of equipment essential to air navigation such as instrument landing systems (ILS);
 - (D) description of sensitive, critical or other protected zones areas related to ILS or other navigation aid antennae and the related markings and signs;
 - (E) description of ILS protected areas, and their relation to runway-holding points;
 - (F) description of runway instrument/visual strip, cleared and graded area; and
 - (G) description of lighting used on the manoeuvring area with particular emphasis on those related to low-visibility operations.

- (v) Hazards of manoeuvring area driving, including:
 - (A) engine suction/ingestion and blast, vortex, propellers, and helicopter operations;
 - (B) requirements and procedures for driving at night;
 - (C) requirements and procedures for operations in low visibility and other adverse weather conditions;
 - (D) right of way of vehicles, aircraft, towed aircraft, and rescue and firefighting vehicles in an emergency.
- (vi) Emergency procedures, including:
 - (A) actions to be taken in the event of a vehicle accident/incident on the manoeuvring area;
 - (B) actions to be taken in the event of an aircraft accident/incident on the manoeuvring area;
 - (C) actions to be taken if FOD or other debris is found on runways and taxiways; and
 - (D) local emergency telephone numbers.
- (vii) Communication procedures, including:
 - (A) air traffic services frequencies used and areas of applicability;
 - (B) language to be used when communicating with the air traffic services;
 - (C) procedure to be used by vehicle drivers if lost or uncertain of their position on the manoeuvring area;
 - (D) procedure for a vehicle breakdown on runways and taxiways and notifying the air traffic services unit of such events; and
 - (E) radio communication failure:
 - (a) procedure in the event of a radio communication or transponder or equivalent equipment failure while a vehicle is on the manoeuvring area; and
 - (b) procedures for light signals and other communication means that can be used by the air traffic services unit to pass instructions to a vehicle driver on the manoeuvring area.
- (viii) Aircraft familiarisation, including:
 - (A) knowledge of aircraft types and ability to identify all types normally operating at the aerodrome;
 - (B) knowledge of aircraft call signs; and
 - (C) knowledge of aircraft terminology relating to engines, fuselage, control surfaces, undercarriage, lights, vents, etc.

- (2) The practical part of the manoeuvring area training programme should, as a minimum, include the following visual familiarisation of the aerodrome:
- (i) all runways (including access and exit routes), holding areas, taxiways and aprons;
 - (ii) all signs, surface markings and lighting associated with runways, holding positions, CAT I, II, and III operations;
 - (iii) all signs, surface markings and lighting associated with taxiways;
 - (iv) specific markings that demarcate the boundary between aprons and manoeuvring areas;
 - (v) navigation aids such as ILS, sensitive, critical, or other protected areas, antennae, RVR equipment, and other meteorological equipment;
 - (vi) hazards of operating around aircraft landing, taking off or taxiing; and
 - (vii) any used naming convention for particular areas or routes.

AMC3 ADR.OPS.B.024(b) Authorisation of vehicle drivers

RADIOTELEPHONY

(a) Any driver who will be operating on the manoeuvring area should undertake and complete a radiotelephony training, demonstrating both theoretical knowledge and practical competency in voice communication procedures.

(b) Theoretical training

The theoretical training should emphasise on the following areas:

(1) Categories of messages

Message categories and priorities; an understanding of distress, alerting, control and information messages.

(2) Use of phonetic alphabet

Correct pronunciation and transmission of letters, words and numbers.

(3) Use of standard phraseology

(i) emphasis on the need for drivers to use standard phraseology; and

(ii) the need for caution with certain phrases such as 'cleared' and 'go ahead'.

(4) Use of call signs for aircraft, air traffic services, and vehicles

(i) understanding of terminology and acronyms used by air traffic services and pilots;

(ii) knowledge of the airline call signs used at the aerodrome; and

(iii) knowledge of the vehicle call signs used at the aerodrome.

(5) Read-back procedures

The need for vehicle drivers to use standard read back, in the same manner as pilots, for instructions such as 'enter/cross the runway', and if conditional clearances are used.

(6) Test procedures including readability scale

Understanding and use of the readability scale from 1 to 5.

(7) Transmitting techniques and use of radiotelephony

(i) understanding the reasons for listening out prior to transmitting;

(ii) use of standard phraseology and ICAO air-ground radiotelephony communication procedures;

(iii) words and sounds to be avoided;

(iv) correct positioning of microphones to avoid voice distortion;

(v) avoidance of 'clipped' transmissions;

(vi) awareness of regional accents and variations of speech; and

(vii) speed of delivery of RTF phraseology.

(c) Practical training

In this phase, the training should cover the use of fixed and portable radio communication devices, and the practical use of the theoretical knowledge acquired in the previous phase of the training, through the implementation of the aerodrome's communication procedures.

The practical training on radiotelephony may be provided in the course of an overall practical training, which involves the training on the use of vehicles or specialised vehicle/equipment associated with the driver's task, or training on the operating procedures of the aerodrome, etc.

GM2 ADR.OPS.B.024(b) Authorisation of vehicle drivers

RECURRENT, REFRESHER AND CONTINUATION TRAINING

ADR.OR.D.017 point (f) regulates 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, see ADR.OR.D.017(f) and AMC1 ADR.OR.D.017(f).

GM1 ADR.OPS.B.024(c) Authorisation of vehicle drivers**DRIVING AUTHORITY FORMAT**

There are various solutions for issuing a driving authorisation. A combination of the driving authorisation with the badge issued to personnel or the issuance of a separate card are some of the possible solutions. In any case, it is important that the rights of the holder are clearly contained in the authorisation.

AMC1 ADR.OPS.B.024(d) Authorisation of vehicle drivers**TEMPORARILY PERMITTING THE DRIVING OF VEHICLES**

When permitting temporarily the driving of a vehicle, the period for which the permit is valid and the areas in which the driver will be allowed to operate under escort should be specified.

The escort of a vehicle whose driver has been issued a temporary driving permit should only be performed by the aerodrome operator directly or through a contracted organisation.

GM1 ADR.OPS.B.024(d) Authorisation of vehicle drivers**TEMPORARILY PERMITTING THE DRIVING OF VEHICLES**

ADR.OPS.B.024 in general addresses the case of authorisation of drivers whose nature of work and activities involves regular presence and driving within the aerodrome environment.

However, there are cases where it may be necessary to temporarily allow the driving of a vehicle on the movement area or other operational areas of the aerodrome for other reasons (e.g. a contractor's vehicle that needs to enter the movement area for maintenance activities taking place at the aerodrome, etc.).

In cases where the driving on the movement area or other operational areas is necessary but for a limited period of time, the aerodrome operator may permit such driving without requiring the driver to undergo the process for the issuance of an authorisation for the driving of this vehicle. It is expected, however, that before being permitted to operate in such areas, such drivers will be adequately briefed about their obligations while operating within the aerodrome perimeter, and that the aerodrome operator has developed procedures to be implemented during this type of operations.

In any case, the issuance of such a permit for such a driver does not waive the obligation of the aerodrome operator to ensure:

- the condition of the vehicle that this driver may be temporarily driving into the aerodrome area, in accordance with ADR.OPS.B.026 (e)(2)(i);
- that this vehicle will in any case be escorted. For the characteristics of the vehicle that will be escorting that vehicle, see ADR.OPS.B.026 (e)(2)(ii); and

- that the operation of this vehicle on the manoeuvring area is subject to the provisions of **ADR.OPS.B.026 (e)(2)(iii)**.

AMC1 ADR.OPS.B.024(e) Authorisation of vehicle drivers

PROCEDURES FOR ISSUANCE OF DRIVING AUTHORISATIONS AND TEMPORARILY PERMITTING DRIVING OF VEHICLES, AND RELEVANT MONITORING ACTIVITIES

- (a) The aerodrome operator should clearly identify responsibilities for:
 - (1) issuing driving authorisations and temporary driving permits;
 - (2) ensuring that the prerequisites for maintaining a driving authorisation valid continue to be met;
 - (3) monitoring the compliance of the drivers with the driving rules applicable at the aerodrome, and taking appropriate action as the case may be. Such actions should include the possibility of suspension or revocation of the driving authorisation or of temporary driving permit.
- (b) Issuing such authorisations, temporarily permitting the driving of vehicles and ensuring that the prerequisites for maintaining a driving authorisation valid should be a controlled activity.
- (c) Irrespective of the organisational set-up chosen, it should be ensured that information regarding drivers who:
 - (1) do not continue to meet the requirements for maintaining the validity of the relevant driving authorisation; or
 - (2) violate the driving requirements,is forwarded to the aerodrome unit(s) responsible for the issuance/revocation of the driving authorisations, in a timely manner, to take appropriate action depending on the case.
- (d) The established procedures should clearly indicate how cases of violations of the applicable driving requirements at the aerodrome are dealt with. They should especially take into account the seriousness of each violation and also address cases of repeated violations of the applicable driving requirements. The cases where a driver should be required to undergo additional training should also be addressed in the procedures.

AMC1 ADR.OPS.B.026(a)(1);(3) Authorisation of vehicles

EQUIPAGE OF VEHICLES — GENERAL

- (a) An updated copy of the movement area chart of sufficient size, including hot spots, as well the visual aids configuration on the aerodrome, and areas to be safeguarded, should be readily available in the driver's cabin of a vehicle intended to be operated in the manoeuvring area. If

a vehicle is not to be operated in the manoeuvring area, the copy of the chart may be customised to provide only relevant information of the area in which the vehicle is to be operated, along with information of the adjacent areas, to improve the situational awareness of the driver.

- (b) The aerodrome operator, in coordination with the air traffic services provider and, if applicable, the apron management services provider, if different, should assess in which areas of the aerodrome, except the manoeuvring area, a vehicle needs to be equipped with a radio.

The radio with which the vehicle is equipped should allow two-way communication with the air traffic services unit frequency, but also any other unit that the driver of the vehicle may need to establish contact with.

Updated information regarding the frequencies of each unit should be readily available in the driver's cabin, as well as the frequencies that may need to be used at different areas of the aerodrome. Moreover, the call-sign of the vehicle should be available at a prominent place.

GM1 ADR.OPS.B.026(b) Authorisation of vehicles

LIMITING THE NUMBER OF VEHICLES

The aerodrome operator limits vehicular activity to what is necessary, in order to ensure the safety of operations, but also taking into account the need to ensure the proper and smooth functioning of the aerodrome.

In this respect, vehicle use may be limited to those vehicles which are necessary to support the ground servicing and handling of aircraft cargo/mail and passengers, aerodrome maintenance and operations, including aerodrome emergency services, aerodrome security services, and State authorities vehicles.

Vehicles on the manoeuvring area should be limited to those absolutely necessary, especially on the runway. Vehicles allowed to operate on the runway should include only those necessary for operational activities such as inspections and maintenance, and emergency vehicles. It is strongly advised not to increase runway use by other vehicles such as those involved in ground operations, e.g. aircraft towing, etc. unless there is no alternative route.

AMC1 ADR.OPS.B.026(c)(1) Authorisation of vehicles

GENERAL

A vehicle authorisation should be carried/displayed at a prominent place on the vehicle.

GM1 ADR.OPS.B.026(c)(1) Authorisation of vehicles**GENERAL**

Depending on the number of vehicles and the complexity of the aerodrome, the use of colour-coded vehicle authorisations is a solution that may be considered, to facilitate the control of the vehicles.

GM1 ADR.OPS.B.026(d) Authorisation of vehicles**VEHICLE CALL SIGNS**

The use of similar call signs may lead to call sign confusion, which is one of the factors associated with runway incursions.

To avoid call sign confusion, when assigning a call sign to a vehicle, careful consideration needs to be given to the call signs used by aircraft operating at the aerodrome, as well as the call signs of other vehicles.

Ways to reduce the possibility of call sign confusion include:

- (a) use of unique numbers or identification call signs for each vehicle; and
- (b) use of call signs which are appropriate to the function of the vehicle (e.g. 'Operations', 'Fire'). Where more than one vehicle is used in the same function, then a numbering policy may be used, such that the call sign is followed by a number, e.g. 'Operations 1'.

At aerodromes where the number of vehicles and the aircraft traffic is high, before assigning a call sign to a vehicle, it is recommended that the aerodrome operator, apart from the coordination with the air traffic services provider, consults also the other organisations operating vehicles at the aerodrome. As soon as a call sign is assigned to a vehicle, this needs to be known to at least the air traffic services provider.

AMC1 ADR.OPS.B.026(e) Authorisation of vehicles**ESCORTING OF VEHICLES**

The escorting of a vehicle should only be performed by the aerodrome operator directly or through a contracted organisation. The aerodrome operator should establish procedures for the escorting of vehicles, which as a minimum should contain:

- (a) under which minimum visibility conditions escorting of a vehicle may be performed on the manoeuvring area;
- (b) communication means and procedures between the escorting and the escorted vehicle(s);
- (c) escorting procedures when more than one vehicle is to be escorted; and
- (d) procedures for ensuring that drivers of the escorted vehicles comply with the instructions provided by the air traffic services unit.

The procedures should be coordinated with the air traffic services unit.

GM1 ADR.OPS.B.026(e) Authorisation of vehicles

ESCORTING OF VEHICLES

- (a) Occasional operation of authorised vehicles without radio, transponder or other means supporting surveillance

The aerodrome operator may decide to permit the occasional operation of vehicles, which have been authorised to be operated on the aerodrome but which are not equipped with a radio, in areas where vehicles are required, by ADR.OPS.B.026 (a)(3), to be equipped with a radio allowing two-way communication with the air traffic services or other aerodrome units, if necessary. The same applies with regard to authorised vehicles, which are not equipped with a transponder or other equipment supporting surveillance as foreseen in ADR.OPS.B.026 (a)(4).

In this way, occasional unforeseen operational needs that may arise in the context of the operation of the aerodrome may be satisfied, given that such vehicles are not intended to be operated in such areas. However, if such need becomes more frequent, the aerodrome operator may need to consider the equipage of such vehicles with the necessary radio, transponder or other equipment supporting surveillance, considering, amongst others, the benefits that direct communication offers in terms of runway safety, as well as the fact that vehicle surveillance data facilitates the situational awareness of the air traffic services personnel.

- (b) Temporarily permitting vehicle operation

Vehicles used on the movement area and other operational areas of the aerodrome need to be authorised as per ADR.OPS.B.026 (a). Vehicles may be authorised only if they are used in activities related to the operation of the aerodrome. However, from time to time, and for various reasons, it may be necessary to allow a vehicle to enter the aerodrome area and to be operated on the movement area or other operational areas, for a limited period of time (e.g. transportation of supplies, maintenance activities, transportation of patients, etc.). In such cases, the aerodrome operator may issue a temporary permit for the entry of the vehicle into the aerodrome and its operation in the area necessary.

In such situations, a visual inspection of the vehicle is necessary, for obvious damages or malfunctions of the vehicle (e.g. leakages, braking system, condition of tyres, lights, etc.) to determine the serviceability of the vehicle.

- (c) Characteristics of escorting vehicles

A vehicle mentioned in points (a) or (b) above, needs to be escorted by a vehicle equipped with a radio, in accordance with ADR.OPS.B.026 (e)(1)(i) or ADR.OPS.B.026 (e)(2)(b), if it is to be operated:

- (a) on the manoeuvring area; or

(b) in other areas where vehicles are required to be equipped with a radio (see also point (b) of AMC1 ADR.OPS.B.026(a)(1);(3)).

In addition, if the escorted vehicle is to be operated on the manoeuvring area, the escorting vehicle would also need to be fitted with a transponder or other equipment supporting surveillance, if so required for the operation of the SMGCS of the aerodrome (see ADR.OPS.B.026(a)(4)).

Moreover, the escorting vehicle needs to meet at all times the respective marking and lighting requirements for the area(s) where the escorted vehicle will be operating (see ADR.OR.OPS.080).

(d) Operational considerations

If the vehicle(s) mentioned in points (a) and (b) above is (are) intended to be operated on the manoeuvring area, care is taken to ensure that this is done in compliance with ADR.OPS.B.026 (e)(1)(iii) or ADR.OPS.B.026 (e)(2)(c), as the case may be, as well as the relevant procedures.

Particular attention needs to be paid to the cases where two or more vehicles are temporarily entering the aerodrome, and especially the manoeuvring area, forming a convoy. In such cases, the escorting vehicles are in positions that allow the monitoring of all escorted vehicles at all times, to ensure that all vehicles comply with the instructions of the air traffic services unit. In addition, attention is necessary to the way and means that the communication between the escorting and the escorted vehicle will be taking place.

In any case, temporarily permitting the use of the vehicle in accordance with ADR.OPS.B.026 (e)(2), or permitting the operation of an already authorised vehicle in accordance with ADR.OPS.B.026 (e)(1) does not waive the obligation of the aerodrome operator to ensure that the driver of the vehicle holds a permit to temporarily drive into the aerodrome area, or a driving authorisation as the case may be, in accordance with ADR.OPS.B.024.

AMC1 ADR.OPS.B.026(f) Authorisation of vehicles

PROCEDURES FOR ISSUANCE OF VEHICLE AUTHORISATIONS, TEMPORARILY PERMITTING THE OPERATION OF VEHICLES, ASSIGNING CALL SIGNS AND RELEVANT MONITORING ACTIVITIES

(a) The procedures should clearly identify responsibilities for:

- (1) issuing vehicle authorisations, temporarily permitting the operation of a vehicle and assigning call signs to vehicles;
- (2) ensuring that the prerequisites for maintaining a vehicle authorisation valid continue to be met; and
- (3) monitoring the compliance of vehicles with the relevant requirements, and taking of appropriate action depending on the case. Such actions should include the possibility of suspension and revocation of a vehicle authorisation or a permission for the temporary operation of a vehicle.

- (b) Issuing vehicle authorisations, temporarily permitting the operation of vehicles and ensuring that the prerequisites for maintaining a vehicle authorisation valid should be a controlled activity.
- (c) Irrespective of the organisational set-up chosen to monitor the compliance of vehicles with the applicable requirements, a close cooperation should be established with the organisational unit(s):
- (1) responsible for the implementation of the maintenance programme of its own vehicles (see ADR.OPS.C.007); and
 - (2) monitoring the implementation of the maintenance programme of the vehicles of organisations operating or providing services at the aerodrome.
- It should be ensured that information regarding vehicles which do not continue to meet the relevant requirements is forwarded to the responsible aerodrome unit(s) (if different) to take appropriate action.
- (d) The established procedures should clearly indicate how cases of violations of the applicable requirements are dealt with, taking also into account the significance of each violation.

GM1 ADR.OPS.B.027(e)(1) Operation of vehicles

OPERATION OF VEHICLES ON RUNWAY STRIPS, RESA AND CLEARWAYS

For the establishment of a runway-holding position or any road holding positions, see CS ADR-DSN.D.340.

AMC1 ADR.OPS.B.027(h)(2) Operation of vehicles

DISTURBING AND DISTRACTING ACTIVITIES WHILE DRIVING

When driving, a 'sterile-cab concept' should be implemented. In line with this, drivers should not be involved in non-essential activities that may affect their attention, situational awareness or judgement.

Such activities include but are not limited to the following:

- (a) texting with mobile phones or other devices;
- (b) making or answering phone calls;
- (c) listening to music or making use of media;
- (d) being involved in activities that require the lowering of the radio volume, if the vehicle is radio equipped; and
- (e) non-essential conversations with other persons that are in the driver's cabin, or over the radio.

Moreover, the vehicle's cabin should be kept free of loose and distracting articles/items.

AMC1 ADR.OPS.B.028 Aircraft towing

AIRCRAFT TOWING PROCEDURES

- (a) The aerodrome operator should identify and designate the routes that may be used for towing operations, taking into account the aircraft characteristics and its compatibility with the design characteristics of the aerodrome and its operation.
- (b) The procedures should, as a minimum, cover the following:
 - (1) request for and authorisation of the towing operation;
 - (2) manoeuvring procedures, including turning direction(s), when exiting a stand, and limitations to aircraft types as applicable;
 - (3) measures to control other traffic on the apron area during the manoeuvring of the towed aircraft;
 - (4) coordination with the air traffic services unit and the apron management services unit, if different, taking into account their areas of responsibility;
 - (5) communication procedures to be applied during towing procedures;
 - (6) ensuring the display of lights of the aircraft to be towed, as per the requirements of SERA.3215;
 - (7) cases where guidance (e.g. marshaller and/or wing-walker) is needed in order to ensure aircraft clearance from obstacles;
 - (8) runway crossing, if applicable;
 - (9) cases where the use of a 'follow-me' service is required; and
 - (10) the safety measures to be taken to execute towing operation in adverse weather phenomena (slush, ice, etc.) or visibility conditions, and cases and conditions where such an operation is limited or not permitted.

GM1 ADR.OPS.B.028 Aircraft towing

TOWING ROUTES

An aerodrome operator may designate various routes for towing operations.

The way that these routes are used by the air traffic services provider, or other unit(s) responsible for parts of the aerodrome where the air traffic services provider is not responsible, depends on the operating and traffic conditions at an aerodrome.

In any case, irrespective of the actual route to be chosen at a given situation, the route needs to be suitable for the particular aircraft, as specified in AMC1 ADR.OPS.B.028 point (a).

AMC1 ADR.OPS.B.029(b) Language proficiency
RATING SCALE

The following table describes the different levels of language proficiency:

LEVEL	PRONUNCIATION	STRUCTURE	VOCABULARY	FLUENCY	COMPREHENSION	INTERACTIONS
	Assumes a dialect or accent intelligible to the aeronautical community	Relevant grammatical structures and sentence patterns are determined by language functions appropriate to the task				
Expert (Level 6)	Pronunciation, stress, rhythm, and intonation, though possibly influenced by the first language or regional variation, almost never interfere with ease of understanding.	Both basic and complex grammatical structures and sentence patterns are consistently well controlled.	Vocabulary range and accuracy are sufficient to communicate effectively on a wide variety of familiar and unfamiliar topics. Vocabulary is idiomatic, nuanced and sensitive to register.	Able to speak at length with a natural, effortless flow. Varies speech flow for stylistic effect, for example to emphasise a point. Uses appropriate discourse markers and connectors spontaneously.	Comprehension is consistently accurate in nearly all contexts and includes comprehension of linguistic and cultural subtleties.	Interacts with ease in nearly all situations. Is sensitive to verbal and non-verbal cues, and responds to them appropriately.
Extended (Level 5)	Pronunciation, stress, rhythm, and intonation, though influenced by the first language or regional variation, rarely interfere with ease of understanding.	Basic grammatical structures and sentence patterns are consistently well controlled. Complex structures are attempted but with errors which	Vocabulary range and accuracy are sufficient to communicate effectively on common, concrete, and work-related topics. Paraphrases	Able to speak at length with relative ease on familiar topics, but may not vary speech flow as a stylistic device. Can make use of appropriate discourse	Comprehension is accurate on common, concrete, and work-related topics and mostly accurate when the speaker is confronted with a linguistic or	Responses are immediate, appropriate, and informative. Manages the speaker or listener relationship effectively.

		sometimes interfere with meaning.	consistently and successfully. Vocabulary is sometimes idiomatic.	markers or connectors.	situational complication or an unexpected turn of events. Is able to comprehend a range of speech varieties (dialect or accent) or registers.	
Operational (Level 4)	Pronunciation, stress, rhythm, and intonation are influenced by the first language or regional variation but only sometimes interfere with ease of understanding.	Basic grammatical structures and sentence patterns are used creatively and are usually well controlled. Errors may occur, particularly in unusual or unexpected circumstances, but rarely interfere with meaning.	Vocabulary range and accuracy are usually sufficient to communicate effectively on common, concrete, and work-related topics. Can often paraphrase successfully when lacking vocabulary particularly in unusual or unexpected circumstances.	Produces stretches of language at an appropriate tempo. There may be occasional losses of fluency on transition from rehearsed or formulaic speech to spontaneous interaction, but this does not prevent effective communication. Can make limited use of discourse markers and connectors. Fillers are not distracting.	Comprehension is mostly accurate on common, concrete, and work-related topics when the accent or variety used is sufficiently intelligible for an international community of users. When the speaker is confronted with a linguistic or situational complication or an unexpected turn of events, comprehension may be slower or require clarification strategies.	Responses are usually immediate, appropriate, and informative. Initiates and maintains exchanges even when dealing with an unexpected turn of events. Deals adequately with apparent misunderstandings by checking, confirming, or clarifying.
Pre-operational (Level 3)	Pronunciation, stress, rhythm, and intonation are influenced by the first language or regional variation and frequently	Basic grammatical structures and sentence patterns associated with predictable situations	Vocabulary range and accuracy are often sufficient to communicate effectively on	Produces stretches of language, but phrasing and pausing are often inappropriate.	Comprehension is often accurate on common, concrete, and work-related topics when the	Responses are sometimes immediate, appropriate, and informative.

	interfere with ease of understanding.	are not always well controlled. Errors frequently interfere with meaning.	common, concrete, and work-related topics but range is limited and the word choice often inappropriate. Is often unable to paraphrase successfully when lacking vocabulary.	Hesitations or slowness in language processing may prevent effective communication. Fillers are sometimes distracting.	accent or variety used is sufficiently intelligible for an international community of users. May fall to understand a linguistic or situational complication or an unexpected turn of events.	Can initiate and maintain exchanges with reasonable ease on familiar topics and in predictable situations. Generally inadequate when dealing with an unexpected turn of events.
Elementary (Level 2)	Pronunciation, stress, rhythm, and intonation are heavily influenced by the first language or regional variation and usually interfere with ease of understanding.	Shows only limited control of few simple memorised grammatical structures and sentence patterns.	Limited vocabulary range consisting only of isolated words and memorised phrases.	Can produce very short, isolated, memorised utterances with frequent pausing and a distracting use of fillers to search for expressions and articulate less familiar words.	Comprehension is limited to isolated, memorised phrases when they are carefully and slowly articulated.	Response time is slow, and often inappropriate. Interaction is limited to simple routine exchanges.
Pre-Elementary (Level 1)	Performs at a level below the elementary level.	Performs at a level below the elementary level.	Performs at a level below the elementary level.	Performs at a level below the elementary level.	Performs at a level below the elementary level.	Performs at a level below the elementary level.

Note: Operational level (Level 4) is the minimum required proficiency level for radiotelephony communication.

Levels 1 through 3 describe pre-elementary, elementary and pre-operational levels of language proficiency respectively, all of which describe a level below the language proficiency requirement.

Levels 5 and 6 describe extended and expert levels at levels of proficiency more advanced than the minimum required standard.

AMC1 ADR.OPS.B.029(e) Language proficiency**GENERAL**

- (a) The language competence assessment should be designed to reflect a range of tasks undertaken by vehicle drivers but with special focus on the knowledge of the language rather than knowledge of the operational procedures.
- (b) The assessment should determine the applicant's ability to:
 - (1) communicate effectively using standard radiotelephony phraseology;
 - (2) deliver and understand messages in plain language in both usual and unusual situations that necessitate departure from standard radiotelephony phraseology; and
 - (3) deal with an unexpected turn of events and solve apparent misunderstandings.

AMC2 ADR.OPS.B.029(e) Language proficiency**ASSESSMENT**

- (a) The assessment should comprise the following three elements:
 - (1) listening: assessment of comprehension;
 - (2) speaking: assessment of pronunciation, fluency, structure and vocabulary; and
 - (3) interaction.
- (b) The switch between phraseology and plain language should be assessed in relation to listening and speaking proficiency.
- (c) When the assessment is not conducted in a face-to-face situation, appropriate technologies should be used for the assessment of the person's abilities to listen and speak, and to enable interactions.
- (d) The assessment may also be conducted during training activities or during proficiency checks, with prior notification given to the person concerned.
- (e) The assessment should be conducted using the rating scale in AMC1 ADR.OPS.B.029(b).

AMC3 ADR.OPS.B.029(e) Language proficiency**LANGUAGE PROFICIENCY ASSESSORS**

- (a) Persons responsible for language competency assessment ('assessors') should be suitably trained, including in the requirements specific to the language proficiency assessment, and qualified. They should be either aviation specialists or language specialists with additional aviation-related training.

- (b) Language proficiency assessors should undergo regular refresher training on language assessment skills.
- (c) The assessors should not conduct language proficiency assessments of persons to whom they have provided language training, or whenever, for any other reason, their objectivity may be affected.

AMC4 ADR.OPS.B.029(e) Language proficiency**CRITERIA FOR THE ACCEPTABILITY OF LANGUAGE ASSESSMENT ORGANISATIONS**

- (a) If the language assessment organisation also provides language training, there should be a clear and documented separation between the two activities.
- (b) The language assessment organisation should employ a sufficient number of qualified interlocutors and language proficiency assessors to administer the tests.
- (c) The assessment documentation should include at least the following:
 - (1) assessment objectives;
 - (2) assessment layout, timescale, technologies used, assessment samples, voice samples;
 - (3) assessment criteria and standards (at least for the operational, extended and expert level of the rating scale mentioned in AMC1 ADR.OPS.B.029(b));
 - (4) documentation demonstrating the assessment validity, relevance and reliability for the operational, extended and expert level;
 - (5) procedures to ensure that language assessments are standardised within the organisation and across the aerodrome organisations;
 - (6) assessment procedures and responsibilities:
 - (i) preparation of individual assessment;
 - (ii) administration: location(s), identity check and invigilation, assessment discipline, confidentiality/security;
 - (iii) reporting and documentation provided to the aerodrome operator or to the applicant, including sample certificate; and
 - (iv) retention of documents and records.
- (d) The assessment documentation and records should be kept for a period of time determined by the Competent Authority and made available to the Competent Authority upon request.

GM1 ADR.OPS.B.029(e) Language proficiency**LANGUAGE PROFICIENCY ASSESSMENT**

The aim of the assessment is to determine the ability of a person to speak and understand the language(s) used for radiotelephony communications.

- (a) The assessment includes:
 - (1) voice-only or face-to-face situations;
 - (2) common, concrete and work-related topics for vehicle drivers.
- (b) The assessment determines the applicant's speaking and listening abilities. A mere assessment of the grammatical knowledge, reading and writing is not appropriate.
- (c) The assessment determines the language skills of the applicant in the following areas:
 - (1) pronunciation:
 - (i) the extent to which the pronunciation, stress, rhythm and intonation are influenced by the applicant's first language or national variations;
 - (ii) how much they interfere with ease of understanding.
 - (2) structure:
 - (i) the ability of the applicant to use both basic and complex grammatical structures;
 - (ii) the extent to which the applicant's errors interfere with the meaning.
 - (3) vocabulary:
 - (i) the range and accuracy of the vocabulary used;
 - (ii) the ability of the applicant to paraphrase successfully when lacking vocabulary.
 - (4) fluency:
 - (i) tempo;
 - (ii) hesitancy;
 - (iii) rehearsed versus spontaneous speech;
 - (iv) use of discourse markers and connectors.
 - (5) comprehension:
 - (i) on common, concrete and work-related topics;
 - (ii) when confronted with a linguistic or situational complication or an unexpected turn of events.
 - (6) interactions:
 - (i) quality of response (immediate, appropriate, and informative);
 - (ii) the ability to initiate and maintain exchanges:
 - (A) on common, concrete and work-related topics;

- (B) when dealing with an unexpected turn of events;
- (iii) the ability to deal with apparent misunderstandings by checking, confirming or clarifying.

The accent or variety of accents used in the test material should be sufficiently intelligible for an international community of users.

GM2 ADR.OPS.B.029(e) Language proficiency

LANGUAGE PROFICIENCY ASSESSORS

- (a) The preferred approach for an assessment would be to form an assessment team consisting of an operational expert and a language expert.
- (b) The language proficiency assessors need to be trained in the requirements specific to the language proficiency assessment, and assessment and interlocution techniques.

GM3 ADR.OPS.B.029(e) Language proficiency

Further guidance on the assessment of language proficiency may be found in ICAO Doc 9835 'Manual on the Implementation of ICAO Language Proficiency Requirements'.

AMC1 ADR.OPS.B.029(f) Language proficiency

LANGUAGE TRAINING

- (a) Language training should contain communication in a job-related context particularly to handle abnormal and emergency situations and conduct non-routine coordination with air traffic controllers, colleagues and other technical staff.
- (b) Emphasis should be placed on listening comprehension, speaking interaction and vocabulary building.

GM1 ADR.OPS.B.029(f) Language proficiency

LANGUAGE TRAINING

A purely routine use of the language through phraseology, standard procedures and limited social contact only maintains a restricted core usage of the language which might be inadequate for managing unexpected and abnormal situations.

Language proficiency erosion (language attrition) occurs rapidly over time; the lower the initial level, the faster the rate of erosion unless systematic strategies and a high degree of motivation counteract this trend.

It is documented that one's language and communicative proficiency, even in one's native language, deteriorates sharply under stress; therefore, participation in available language training is recommended.

AMC1 ADR.OPS.B.029(g) Language proficiency

SAFETY ASSESSMENT WHEN PROFFICIENCY IN THE ENGLISH LANGUAGE IS NOT DEMONSTRATED

The safety assessment required by point (g) of ADR.OR.B.029 should be conducted prior to the issuance of a formal decision of a Member State not to require the demonstration of language proficiency in the English language by vehicle drivers.

The safety assessment of the impact of not demonstrating language proficiency in the English language should be conducted in an independent, impartial and comprehensive manner and should, in particular, take into account the following:

- (a) the opinion of the competent authorities for aerodromes and the air navigation services providers in the Member State, including results of relevant oversight activities, for each aerodrome concerned;
- (b) the opinion of the aerodrome operators and the air navigation services providers concerned, including the results of relevant safety assessments conducted by the organisations concerned in the context of their management systems with regard to runway incursion prevention;
- (c) the opinion of the local runway safety team established at each aerodrome;
- (d) the aerodrome design, and operating conditions of each aerodrome concerned, including the number of frequencies used in the manoeuvring area;
- (e) the traffic structure (national, international) of each individual aerodrome, including seasonal traffic peaks;
- (f) any relevant occurrence reports, at least at EU level. For this purpose, the European Central Repository referred to in Article 8 of Regulation (EU) No 376/2014 should also be consulted; and

The assessment should be made publicly available and should be reviewed regularly.

AMC1 ADR.OPS.B.030(b) Surface movement guidance and control system

STANDARD TAXI ROUTES

- (a) Where established, such routes should:

- (1) cover aircraft taxiing between runways, aprons, and maintenance areas (if available);
 - (2) be direct, simple and, where practicable, designed to avoid conflicts with the routes of other aircraft or vehicles and capable of being used in all weather conditions;
 - (3) be identified by designators distinctively different from those of the runways and air traffic services routes; and
 - (4) be adequate and suitable for the largest aircraft likely to use them, taking as a minimum into account its interaction with the aerodrome facilities, navigation aids, aerodrome surfaces, jet blast effects, and the operation of other aircraft.
- (b) Where standard taxi routes are provided, details of such routes should be published in the AIP and shown on aerodrome charts, or ground movement chart, depending on the complexity of the movement area, available aids and facilities.

Where a route includes taxiing between different areas of responsibility, (e.g. areas under control of air traffic services and the apron management services), the transition points should be indicated on either the aerodrome chart or ground movement chart.

GM1 ADR.OPS.B.030(b) Surface movement guidance and control system

STANDARD TAXI ROUTES

Standard taxi routes may be provided in order to maintain or increase safety, regularity, and efficiency of operations especially in low-visibility conditions or high traffic, by minimising the amount of control intervention and the consequent volume of radiotelephony communications and workload.

However, as not all aerodromes:

- (a) serve the same level of traffic or have the same traffic density;
- (b) are operated in the same pattern, or under the same visibility conditions;
- (c) have the same size, design and complexity,

the aerodrome operator needs to assess, in coordination with the air traffic services provider, the need to establish standard taxi routes. In this process, the views of the aerodrome users may also be sought, through the aerodrome's local runway safety team.

Further guidance for the development of standard taxi routes may be found in Chapters 3 and 6 of ICAO Doc 9476 'Manual of Surface Movement Guidance and Control Systems (SMGCS)'.

AMC1 ADR.OPS.B.030(c) Surface movement guidance and control system

USE OF AIRCRAFT TRANSPONDER

The transponder operating procedures and the relevant information that need to be sent to the aeronautical information services provider for publication in the AIP should include:

- the phases and areas of the aerodrome at which the transponder needs to be used when an aircraft is on the movement area of the aerodrome; and
- measures to prevent causing false ACAS II Resolution Advisories to airborne aircraft in the vicinity of the aerodrome.

Such information should be published in the local aerodrome regulations in the AIP, following coordination with the Competent Authority. Until the publication of the information in the AIP, the aerodrome operator may additionally request the broadcast of relevant information via the local automated terminal information service (ATIS).

GM1 ADR.OPS.B.031(b) Communications

SITUATIONAL AWARENESS

Improving the situational awareness of vehicle drivers operating on the manoeuvring area is important, as it may also affect the situational awareness and decision-making of the air traffic services personnel and flight crews. Situational awareness is improved by conducting communications in a common frequency and language, whenever this is possible.

AMC1 ADR.OPS.B.031(b)(4) Communications

RADIO COMMUNICATION FAILURE

- (a) The signals to be used in case of radio communication failure between air traffic services and vehicles or pedestrians authorised to operate on the manoeuvring area should have the following meaning:

LIGHTS SIGNAL FROM AIR TRAFFIC SERVICES	MEANING
Green flashes	Permission to cross landing area or to move onto taxiway
Steady red	Stop
Red flashes	Move off the landing area or taxiway and watch out for aircraft
White flashes	Vacate manoeuvring area in accordance with local instructions

- (b) In emergency conditions or if the signals in point (a) are not observed, the signal given below will be used for runways or taxiways equipped with a lighting system and should have the following meaning:

LIGHT SIGNAL	MEANING
Flashing runway or taxiway lights	Vacate the runway and observe the tower for light signal

- (c) Care should be taken to ensure that the procedures address the case where, due to the prevailing visibility conditions, the light signals may not be seen by the driver or the pedestrian authorised to operate on the manoeuvring area.
- (d) In case of agreement with the air traffic services provider to use other/additional communication means in the event of radio communication feature (e.g. mobile phones), the procedures should also cover the necessary practical details (e.g. telephone numbers to be used), as well as the order of the use of the agreed solutions.

AMC1 ADR.OPS.B.033(a) Control of pedestrians

GENERAL

- (a) The procedures to prevent unauthorised access to the movement area and other operational areas of the aerodrome of persons who are not allowed to have access to such areas should be coordinated with the appropriate authority responsible for security.
- (b) In case passengers are embarking/disembarking on the apron, or if no transportation means is used for their transfer to/from the terminal building or from one stand to the other, then, apart from the need to ensure that passengers are always escorted, the procedures should, amongst others, include measures to ensure that:
- (1) passengers do not pass under aircraft wings or beneath fuel vents, or close to the propellers or rotors of the aircraft they are boarding/disembarking or those of aircraft on adjacent stands;
 - (2) passengers remain clear of vehicular traffic around the aircraft, electrical cables, fuel hoses and other equipment;
 - (3) passengers use predetermined routes while moving from/to or across the apron; and
 - (4) passengers and any other persons on the apron are protected from the effects of engine jet-blast or downwash during their presence on the apron, including by restricting aircraft engine use.

Depending on the configuration of the apron, physical moveable barriers may also be used to indicate the desired route to follow and facilitate the control and movement of passengers on the apron. When not in use, such equipment should be properly stowed to ensure that it does not become a source of FOD.

AMC1 ADR.OPS.B.033(b) Control of pedestrians**PERSONNEL OPERATING ON THE MANOEUVRING AREA**

- (a) Personnel allowed access to the manoeuvring area without the use of a vehicle should be equipped at least with personal protective equipment, suitable charts of the aerodrome, a radio for two-way communication on the appropriate air traffic services frequency (and other means of communication as per the radio-communication failure procedure — see AMC1 ADR.OPS.B.031(b)(4)) with the air traffic services unit, and other appropriate means to conduct their duties suitable to the situation and local conditions.
- (b) The procedures should, as a minimum, provide information as to:
- (1) which personnel can enter the manoeuvring area and for which purposes;
 - (2) the points from which entry to the manoeuvring area can take place;
 - (3) the hours and minimum visibility conditions that such an entry is allowed;
 - (4) communication with the air traffic services unit prior to entering the manoeuvring area and afterwards;
 - (5) communication with the respective unit of the aerodrome operator;
 - (6) actions to be taken in the event of radio communication failure (see AMC1 ADR.OPS.B.031(b)(4)); and
 - (7) right of way between vehicles, pedestrians and aircraft.
- (c) The procedures should be coordinated with the air traffic services unit.

AMC1 ADR.OPS.B.035 is deleted.

AMC1 ADR.OPS.B.035(a) Operations in winter conditions**AERODROME SNOW PLAN**

The aerodrome snow plan should reflect the exposure of the aerodrome to winter conditions and should include the following:

- (a) the Snow Committee members and the person in charge of the winter operation, with a chain of command giving a breakdown in duties;
- (b) methods of communication between aerodrome operations, air traffic services, and the MET provider;
- (c) the equipment available for snow clearance and surface treatment. This should include equipment for ploughing, sweeping, and blowing snow and application of materials;
- (d) priority of surfaces to be cleared, and clearance limits for aircraft using the aerodrome;

- (e) collection of information for RCR and dissemination of this information;
- (f) designated snow dumping or melting areas;
- (g) an alerting system in order that sufficient warning is given to all bodies concerned;
- (h) the manpower available, including staff for equipment maintenance arrangements for shifts, and call-out procedures;
- (i) deployment of equipment and tactical approaches to be used;
- (j) general principles to be followed in deciding when to close runways for snow clearance and designation of management personnel authorised to take the decision;
- (k) methods of assessing and reporting the surface conditions; and
- (l) criteria for the suspension of runway operations.

GM1 ADR.OPS.B.035 is deleted.

AMC2 ADR.OPS.B.035(a) Operations in winter conditions

ESTABLISHMENT OF PRIORITIES

The aerodrome operator should establish the order of priority for snow, slush and ice clearance, from the movement area, in consultation with the air traffic services, rescue and firefighting services and aircraft operators.

AMC1 ADR.OPS.B.035(a)(1) Operations in winter conditions

USE OF MATERIALS FOR DE/ANTI-ICING OF PAVED SURFACES

- (a) The aerodrome operator should use materials to remove or to prevent the formation of ice and frost on aerodrome pavements or to improve runway surface friction characteristics when conditions indicate that their use could be effective. Caution should be exercised in the application of the materials so as not to create more slippery conditions.
- (b) The aerodrome operator should, as far as practicable, avoid harmful effects on environment, aircraft or pavements when using chemicals to remove snow, slush, or ice from operational surfaces.

AMC1 ADR.OPS.B.035(a)(2) Operations in winter conditions**REMOVAL OF CONTAMINANTS**

The aerodrome operator should ensure that:

- (a) snow, slush, and ice are removed from the surface of a paved runway, as rapidly and completely as possible, to minimise accumulation;
- (b) operational taxiways are kept clear of snow slush or ice to the extent necessary to enable aircraft to be taxied to and from an operational runway; and
- (c) those parts of the apron which are intended to be used by aircraft are kept clear of snow, slush or ice, to the extent necessary to enable aircraft to manoeuvre safely, or where appropriate, to be towed or pushed.

GM1 ADR.OPS.B.035(b)(3) Operation in winter conditions**INFORMATION ON ALKALI-ORGANIC RUNWAY DE-/ANTI-ICING SUBSTANCES**

During winter operations, the aircraft carbon brakes and open wheel/bay are exposed to alkali-organic salt runway de-/anti-icing substances during taxi, take-off and landing. A slush mixture of snow and alkali-organic salt de-/anti-icing substances could freeze onto the landing gear and inside the wheel well/bay. After landing gear retraction, the frozen slush deposits begin to melt. The resulting liquid flows into the core of the carbon brake, further contaminating the carbon discs. The presence of the alkali-organic salt creates a catalytic condition lowering the oxidation temperature of the carbon, resulting in structural deterioration of the carbon disc material and reducing the service life and long-term efficiency of the brakes.

It is very important that aircraft operators have information on the de-/anti-icing substances used at the aerodrome that they operate to and from, in order to assess the exposure of their aircraft to these substances and adjust their maintenance programme.

The information, when provided in the RCR or in the AIP, should be given using the following abbreviations/words:

- (a) KAC, for potassium acetate fluids;
- (b) KFOR, for potassium formate fluids;
- (c) GAC, for glycerine acetate fluids;
- (d) NAFO, for sodium formate solids;
- (e) NAAC, for sodium acetate solids;
- (f) EG, for ethylene glycol fluids;
- (g) PG, for propylene glycol fluids;
- (h) UREA; and
- (i) SAND.

AMC1 ADR.OPS.B.036(b)(1)(i) Operations on specially prepared winter runways**PROCEDURES FOR USE OF SAND OR GRIT**

The aerodrome operator, when using sand or grit, should:

- (a) if the runway is contaminated with compacted snow:
 - (1) use sand or grit at an application rate appropriate to achieve the desired effect;
 - (2) use sand or grit where the grain passes through a 4.75 mm sieve; and
 - (3) remove as completely as possible any loose contaminants;
- (b) if the runway is contaminated with ice:
 - (1) remove as completely as possible any loose contaminants;
 - (2) use sand or grit at an application rate appropriate to achieve the desired effect; when the air temperature is stable and the surface temperature is below freezing, consider using frozen sand or grit; and
 - (3) use sand or grit where the grain passes through a 4.75 mm sieve;
- (c) ensure that sand or grit maintains the required specifications until application.

GM1 ADR.OPS.B.036(b)(1)(i) Operations on specially prepared winter runways**PROCEDURES FOR USE OF SAND OR GRIT**

The application rate depends on several parameters including temperature, wind speed, vehicle speed, the quality of the material, wear and tear from operations and local experience. Consideration needs to be given to the application rate in order to achieve the desired effect. Very low application rate may only tolerate a very limited number of operations or pass by the sweeping machines, whereas higher application rates may be detrimental to the effectiveness of the treatment.

In order to ensure that the sand or grit is in contact with the aeroplane tyres during operations, the surface needs to be free of any loose contaminants. In practical terms, sand or grit is visible during operations.

Light precipitation or drifting snow needs to be removed to ensure the effectiveness of the treatment.

The need to ensure that the material maintains the required specification until application requires that actions be taken in order to ensure that no foreign objects are mixed with the sand or grit from origin to the dispenser vehicle, and storage is in a suitable environment to avoid the formation of frozen lumps.

AMC1 ADR.OPS.B.036(b)(1)(ii) Operations on specially prepared winter runways**METEOROLOGICAL PARAMETERS**

In order to ensure the effectiveness of the use of materials, the aerodrome operator should establish limitations and ranges for when the procedures may be applied using the following meteorological parameters:

- (a) air temperature;
- (b) surface temperature (when available);
- (c) dew point; and
- (d) wind speed and direction.

GM1 ADR.OPS.B.036(b)(1)(iii) Operations on specially prepared winter runways**MANAGEMENT OF LOOSE SAND OR GRIT**

Excess sand or grit no longer adhering to the surface can reduce aircraft braking performance and could be ingested by engines. When using sand or grit, it is essential that the aerodrome operator monitors the situation and removes loose sand or grit from the operational surfaces as soon as possible. Excess sand or grit can be efficiently removed by mechanical sweeping and blowing.

AMC1 ADR.OPS.B.036(b)(1)(iv) Operations on specially prepared winter runways**ASSESSMENT OF ACHIEVED RESULTS**

- (a) The procedures should define the operational objectives for specially prepared winter runways.
- (b) The aerodrome operator, when operating in accordance with the requirements for specially prepared winter runways, should monitor continuously and assess the achieved results.
- (c) In case of deviations from operational objectives when materials are applied, the aerodrome operator should take mitigating actions to correct the achieved results and inform aeroplane operators as necessary.

GM1 ADR.OPS.B.036(b)(1)(iv) Operations on specially prepared winter runways**ASSESSMENT OF ACHIEVED RESULTS**

The operational objectives are aligned with the need to establish a runway surface at least with friction characteristics commensurate with RWYCC 4. This could mean a need to apply materials (sand, grit or chemicals) and to assess whether frozen sand can be applied.

If it is assessed that the treatment (frozen sand or other method) has not achieved the desired results (i.e. at least the equivalent of RWYCC 4), a specially prepared winter runway is reported with the appropriately downgraded RWYCC, and in the RCR free text field, the word 'DOWNGRADED' is used.

Depending on the actual weather and traffic conditions, the continuous monitoring and assessment of the achieved results may be carried out by the same staff operating the equipment for surface treatment or by staff operating an independent vehicle in contact with the equipment operator.

AMC1 ADR.OPS.B.036(b)(2) Operations on specially prepared winter runways

AEROPLANE DATA

The aeroplane data related to stopping performance should:

- (a) include a timestamp for each flight and be related to the subject runway;
- (b) contain all necessary parameters for the chosen method of analysis, recorded with an appropriate frequency; and
- (c) permit the isolation of the effective braking action.

If available, braking action information identified by a third party from aeroplane data may be used when it can be related to specific landings on the subject runway.

GM1 ADR.OPS.B.036(b)(2) Operations on specially prepared winter runways

AEROPLANE DATA ANALYSIS

The analysis of aeroplane performance data for the purpose of deducing available braking action usually implies the isolation of the total friction force. Either isolating the friction coefficient or comparing the actual stopping capability with a reference capability permits identification of a RWYCC experienced by the aeroplane. Typically, this requires a technical or simulation model of the aeroplane performance produced by the manufacturer. The analysis may be performed through a third party or through the resources of the aeroplane manufacturer. The aeroplane operator planning to perform operations on a specially prepared winter runway needs to set up the arrangement with the aeroplane manufacturer.

AMC1 ADR.OPS.B.036(b)(3) Operations on specially prepared winter runways

DEMONSTRATION OF CAPABILITY TO ESTABLISH THE RUNWAY SURFACE CONDITION IN ACCORDANCE WITH A GIVEN RUNWAY CONDITION CODE

In order to demonstrate the capability to establish the runway surface condition in accordance with a given RWYCC, the aerodrome operator should demonstrate with a statistical level of confidence of 95

per cent that the actual braking action indicated by aeroplane data is consistently the same as or better than that expected for the reported RWYCC.

GM1 ADR.OPS.B.036(b)(3) Operations on specially prepared winter runways

DEMONSTRATION OF CAPABILITY TO ESTABLISH THE RUNWAY SURFACE CONDITION IN ACCORDANCE WITH A GIVEN RUNWAY CONDITION CODE

The statistical level of confidence is established by analysing data obtained from aeroplane operators and data from aerodrome operators. The analysis is done by the aerodrome operator.

The experienced RWYCC is compared with the RWYCC reported by the aerodrome operator. An analysis is performed to calculate the statistical level of confidence for the number of landings when the reported RWYCC was deemed the same as or better than the experienced RWYCC.

To obtain statistical significance, a representative number of landings on a winter-contaminated surface prepared such as intended to benefit from the improved braking action used in the demonstration should be as large as possible, but not less than 30.

GM1 ADR.OPS.B.036(b)(4) Operations on specially prepared winter runways**MAINTENANCE PROGRAMME**

- (a) The maintenance programme should include at least the following equipment:
- (1) sand spreaders including heating and pre-wetting equipment; and
 - (2) chemical spreaders.
- (b) The maintenance programme should include regular verification of the accuracy of distribution rates and temperature measurements for material spreaders.

AMC1 ADR.OPS.B.036(c) Operations on specially prepared winter runways**MONITORING PROGRAMME — PERFORMANCE INDICATORS**

The aerodrome operator should:

- (a) establish a system of performance indicators to systematically monitor the effectiveness of the procedures which are applied to support operations on specially prepared winter runways;
- (b) record the performance indicators on a monthly basis during the winter season for each runway and review them on an annual basis; and
- (c) prepare and make available an annual report, which includes comparison with the performance indicators of at least the previous 3 years.

GM1 ADR.OPS.B.036(c) Operations on specially prepared winter runways**MONITORING PROGRAMME — PERFORMANCE INDICATORS**

The following performance indicators may be used in order to monitor the success in correctly assessing and reporting the runway surface condition:

- (a) Proportion of landings on reported RWYCC 4 versus total number of landings on specially prepared winter runways. The indicator aims to measure the frequency of operations on specially prepared winter runways where no downgrade has been used;
- (b) Proportion of landings identified under (a) where the braking action computed based on aeroplane data was one RWYCC worse than the RCRs issued by the aerodrome operator;
- (c) Proportion of landings identified under (a) where the braking action computed based on aeroplane data was two RWYCCs worse than the RCRs issued by the aerodrome operator.
- (d) Number of movements on a contaminated runway (RWYCC 1–4) per total number of movements. This number provides an indication of the exposure of the aerodrome to winter conditions. Information concerning the contamination of the runway can be derived from the RCRs.

The indicators mentioned in (a), (b) and (c) provide information concerning the quality of the runway surface condition assessment.

Performance indicators should be recorded on a monthly basis.

AMC1 ADR.OPS.B.037(a) Assessment of runway surface condition and assignment of runway condition code (RMT.0704)

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	<ul style="list-style-type: none"> FROST WET (The runway surface is covered by any visible dampness or water up to and including 3 mm depth) <p>Up to and including 3 mm depth:</p> <ul style="list-style-type: none"> SLUSH DRY SNOW WET SNOW 	Braking deceleration is normal for the wheel braking effort AND directional control is normal	GOOD
4	<ul style="list-style-type: none"> SPECIALLY PREPARED WINTER RUNWAY <p>-15°C and lower outside temperature</p> <ul style="list-style-type: none"> COMPACTED SNOW 	Braking deceleration OR directional control is between good and medium	GOOD TO MEDIUM
3	<ul style="list-style-type: none"> SLIPPERY WET DRY SNOW or WET SNOW (any depth) ON TOP OF COMPACTED SNOW <p>More than 3 mm depth:</p> <ul style="list-style-type: none"> DRY SNOW WET SNOW <p>Higher than -15°C outside air temperature:</p> <ul style="list-style-type: none"> COMPACTED SNOW 	Braking deceleration is noticeably reduced for the wheel braking effort applied OR directional control is noticeably reduced	MEDIUM

2	More than 3 mm: <ul style="list-style-type: none"> STANDING WATER SLUSH 	Braking deceleration OR directional control is between medium and poor	MEDIUM TO POOR
1	<ul style="list-style-type: none"> ICE 	Braking deceleration is significantly reduced for the wheel braking effort applied OR directional control is significantly reduced	POOR
0	<ul style="list-style-type: none"> WET ICE 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

Aerodromes which never experience or never report snow and ice conditions, may use the following simplified form of RCAM:

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	<ul style="list-style-type: none"> WET (The runway surface is covered by any visible dampness or water up to and including 3 mm depth) 	Braking deceleration is normal for the wheel braking effort AND directional control is normal	GOOD
4		Braking deceleration OR directional control is between good and medium	GOOD TO MEDIUM
3	<ul style="list-style-type: none"> SLIPPERY WET 	Braking deceleration is noticeably reduced for the wheel braking effort applied OR directional control is noticeably reduced	MEDIUM
2	More than 3 mm: <ul style="list-style-type: none"> STANDING WATER 	Braking deceleration OR directional control is between medium and poor	MEDIUM TO POOR
1		Braking deceleration is significantly reduced for the wheel braking effort applied OR directional control is significantly reduced	POOR
0		Braking deceleration is minimal to non-existent for the wheel braking effort applied OR directional control is uncertain	LESS THAN POOR

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. Therefore, 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 why 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 need to 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.

(f) The aerodrome operator, when the primary assignment of the RWYCC in accordance with RCAM does not reflect the prevailing conditions accurately, and is supported by other observations, experience and local knowledge, should downgrade or upgrade the RWYCC. In this case:

- (1) the RWYCC should be the downgraded or upgraded RWYCC following the overall assessment;
- (2) the description of the runway surface contaminant will reflect the actual condition; and
- (3) in the plain language remarks section of the RCR, the terms 'UPGRADED' or 'DOWNGRADED' should be used.

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.

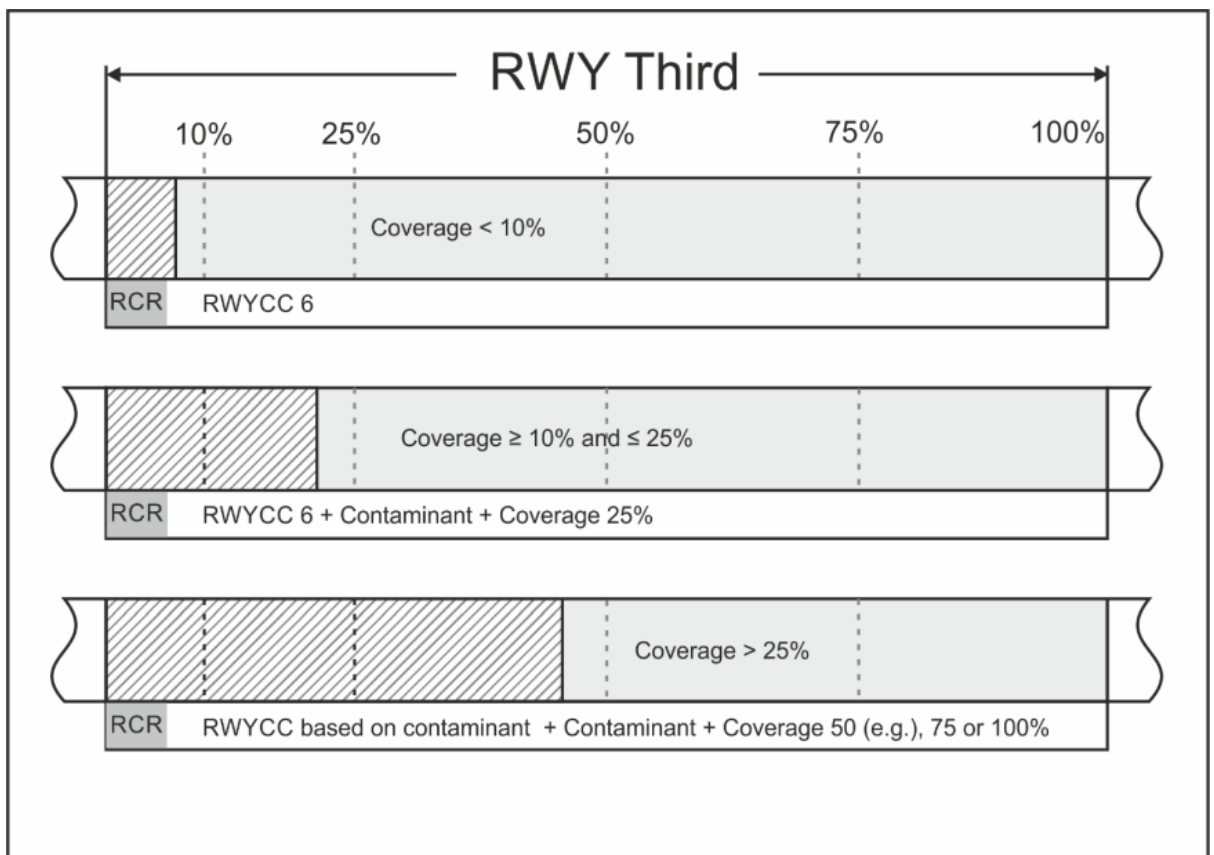


Figure 1: Single contaminant

- (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.
- (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 needs to exist pointing towards the higher RWYCC.
- (e) When a friction measuring device is used for upgrading purposes, a preponderance of evidence needs to exist. In order to upgrade a RWYCC 0 or 1 to no higher than RWYCC 3, the friction

measuring device needs to 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 needs to 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.

AMC1 ADR.OPS.B.065 Visual aids and aerodrome electrical systems

GENERAL

- (a) The aerodrome operator should establish a monitoring system of aerodrome ground lights so as to inform the air traffic services provider when safe operation is no longer possible.

- (b) The aerodrome operator should establish procedures for the operation of visual aids and, in coordination with the air traffic services provider, procedures to be implemented in the event of unserviceability of stop bars. The procedures should cover the situation where the stop bars cannot be turned off because of a technical problem, and the measures to be taken should not undermine the principle that a lit stop bar must not be crossed.
- (c) The aerodrome operator should establish procedures for the provision and removal of temporary markings, lights and signs.

GM1 ADR.OPS.B.065 Visual aids and aerodrome electrical systems

UNSERVICEABILITY OF STOP BARS

In situations where the stop bars cannot be turned off because of a technical problem, the following contingency measures may, inter alia, be considered:

- (a) physically disconnecting the respective lit stop bar from its power supply;
- (b) physically obscuring the lights of the lit stop bar; and
- (c) using a different route, until the malfunctioning system has been repaired.

In case of implementation of (a) or (b), a marshaller or a follow-me vehicle may need to be provided to lead the aircraft to cross the stop bar. Moreover, in case of implementation of (b), care is necessary to ensure correct implementation of the measure to avoid misunderstandings by the flight crew.

In any case, the measures taken do not undermine the principle that a lit stop bar must not be crossed, while maintenance action needs to be taken as soon as possible.

AMC1 ADR.OPS.B.070 Aerodrome works safety

GENERAL

[...]

- (c) The scope of work, physical extent, and time period should be notified to the concerned relevant parties concerned. If such work will render limitations to the use of a particular runway, additional measures should be implemented to ensure safety. In case the works necessitate the temporary change of the declared distances of the runway, a recalculation of the declared distances should be performed, in accordance with an established procedure, and the relevant information should be provided to the Competent Authority, the air traffic services and aeronautical information services unit, before the implementation of the new declared distances. The aerodrome operator should also request the broadcast of relevant information via the local ATIS.

[...]

AMC2 ADR.OPS.B.070 Aerodrome works safety**RUNWAY PAVEMENT OVERLAYS**

The aerodrome operator should ensure that:

- (a) When a runway is to be returned temporarily to an operational status before resurfacing is complete, the longitudinal slope of the temporary ramp, measured with reference to the existing runway surface or previous overlay course, should be:
 - (1) 0.5 to 1.0 % for overlays up to and including 5 cm in thickness; and
 - (2) not more than 0.5 % for overlays more than 5 cm in thickness.
- (b) Runway overlaying proceeds from one end of the runway towards the other end so that based on runway utilisation, most aircraft operations will experience a down ramp.
- (c) The entire width of the runway is overlaid during each work session.
- (d) ~~(b)~~ Before a runway being overlaid is returned to a temporary operational status, a runway centre line marking, conforming to the applicable specifications included in the aerodrome certification basis of the aerodrome, should be provided.
- (e) ~~(c)~~ The location of any temporary threshold should be identified by a 3.6 m wide transverse stripe.

AMC4 ADR.OPS.B.070 Aerodrome works safety**CLOSED RUNWAYS AND TAXIWAYS, OR PARTS THEREOF**

The aerodrome operator should ensure that:

[...]

- (c) in addition to closed markings, when the runway, taxiway, or portion thereof is closed and is intercepted by a usable runway or taxiway which is used at night, unserviceability lights as defined in CS ADR-DSN.R.870(c) should be placed across the entrance to the closed area at intervals not exceeding 3 m; and
- (d) a closed runway or taxiway marking as defined in CS ADR-DSN.R.855(c), or a portion thereof, is displayed on new runways and taxiways that are still under construction.

GM6 ADR.OPS.B.070 Aerodrome works safety**CLOSED RUNWAY AND TAXIWAY MARKINGS — AVOIDING THE LACK OF CONTRAST**

- (a) In certain circumstances, e.g. due to the colour of the material used during construction works, there may be insufficient contrast between the colour of the surface of the runway or taxiway

and the colour of the respective closed runway or taxiway marking, even though the latter conforms to the applicable specifications.

This may result in the closed runway or taxiway markings not fulfilling their purpose. To avoid the lack of contrast, the closed runway or taxiway markings need to be included in an appropriate border, whose colour is black.

- (b) At aerodromes where operations take place at night, the closed runway or taxiway markings would be made with reflective materials designed to enhance their visibility. Guidance on reflective materials is given in Part 4 'Visual Aids' of ICAO Doc 9157 'Aerodrome Design Manual'.

AMC1 ADR.OPS.B.075 Safeguarding of aerodromes

GENERAL

- (a) The aerodrome operator should have procedures to monitor the changes in the obstacle environment, marking and lighting, and in human activities or land use on the aerodrome and the areas around the aerodrome, as defined in coordination with the Competent Authority. The scope, limits, tasks and responsibilities for the monitoring should be defined in coordination with the relevant air traffic services providers and with the Competent Authority and other relevant authorities, and should ensure the protection of the sight lines from the established air traffic control tower, apron management services unit, and watch-room of the RFFS station(s), from permanent or temporary obstacles or activities.

[...]

AMC1 ADR.OPS.B.080 is deleted.

GM1 ADR.OPS.B.080 is deleted.

AMC1 ADR.OPS.B.080(a) Marking and lighting of vehicles and other mobile objects

MARKING OF VEHICLES

- (a) Vehicles to be marked should be coloured or display flags as follows:
- (1) Red or yellowish green colour should preferably be used for marking emergency vehicles and yellow colour for service vehicles.
 - (2) When flags are used to mark vehicles, they should:

- (i) be displayed around, on top of, or around the highest edge of the vehicle. Flags should not increase the hazard presented by the vehicle they mark;
- (ii) not be less than 0.9 m on each side and should consist of a chequered pattern, each square having sides of not less than 0.3 m. The colours of the pattern should contrast each with the other and with the background against which they will be seen. Orange and white, or alternatively red and white should be used, except where such colours merge with the background.

LIGHTING OF VEHICLES

(b) Lighting of vehicles should be as follows:

- (1) Low-intensity obstacle lights, Type C, should be displayed on vehicles;
- (2) Low-intensity obstacle lights, Type C, displayed on vehicles associated with emergency or security should be flashing blue and those displayed on other vehicles should be flashing yellow;
- (3) Low-intensity obstacle lights, Type D, should be displayed on follow-me vehicles.

(c) Low-intensity obstacle lights, Types C and D should be in accordance with the specifications contained in Table Q-1, CS ADR-DSN.U.930 and Figure U-1A or U-1B of CS-ADR-DSN, as appropriate.

AMC2 ADR.OPS.B.080(a) Marking and lighting of vehicles and other mobile objects**MARKING OF MOBILE OBJECTS OTHER THAN VEHICLES**

(a) Mobile objects, other than vehicles, to be marked should be coloured or display flags as follows:

- (1) When they are marked by colour, conspicuous colours should be used.
- (2) When they are marked by flags, the flags should:
 - (i) be displayed around, on top of, or around the highest edge of the object. Flags should not increase the hazard presented by the object they mark; and
 - (ii) not be less than 0.9 m on each side and should consist of a chequered pattern, each square having sides of not less than 0.3 m. The colours of the pattern should contrast each with the other and with the background against which they will be seen. Orange and white, or alternatively red and white should be used, except where such colours merge with the background.

LIGHTING OF MOBILE OBJECTS OTHER THAN VEHICLES

(b) Lighting of mobile objects, other than vehicles, should be as follows:

- (1) Low-intensity obstacle lights, Type C, should be displayed on mobile objects;
- (2) Low-intensity obstacle lights on objects with limited mobility, such as aerobridges, shall be fixed-red, and as a minimum be in accordance with the specifications for low-intensity

obstacle lights, Type A, in Table Q-1 of CS-ADR-DSN. The intensity of the lights shall be sufficient to ensure conspicuity considering the intensity of the adjacent lights and the general levels of illumination against which they would normally be viewed.

GM1 ADR.OPS.B.080(a) Marking and lighting of vehicles and other mobile objects

MOBILE OBJECTS OTHER THAN VEHICLES

The term 'mobile objects' covers all mobile equipment, such as passenger stairs, generators, as well as other similar equipment, which are not self-powered, and whose presence is required on the apron for the ground servicing of aircraft.

It also covers objects of reduced mobility, such as aerobridges, which are attached to the terminal building.

Moreover, it covers any other mobile equipment that may be needed to be used in the manoeuvring area for specific purposes.

SUBPART C – AERODROME MAINTENANCE (ADR.OPS.C)**AMC1 ADR.OPS.C.005 General****MAINTENANCE PROGRAMME**

- (a) The aerodrome operator should ensure that a the maintenance programme; ~~is established and implemented, including preventive maintenance where appropriate, to maintain aerodrome facilities in a condition which does not impair the safety of aeronautical operations. The scope of the maintenance programme should include, but may not be limited to, the following items:~~
- ~~(a) visual aids and other lighting systems required for the safety of aerodrome operations;~~
 - ~~(b) power supply and other electrical systems;~~
 - ~~(c) pavements, other ground surfaces, and drainage systems;~~
 - ~~(d) fencing and other access control devices;~~
 - ~~(e) equipment and vehicles, including those used by rescue and firefighting services, which are necessary for the safety of aerodrome operations; and~~
 - ~~(f) buildings which are necessary for the safety of aerodrome operations:~~
 - (1) specifies the aerodrome facilities, systems, installations and equipment subject to maintenance;
 - (2) contains the necessary information for its timely and correct implementation including but not limited to:
 - (i) the type of inspections/checks to be carried out (e.g. visual inspection, cleaning of equipment, equipment stability/alignment, calibration, etc.) for each facility, system, installation and equipment, taking also into account factors such as their location and meteorological phenomena;
 - (ii) the frequency of inspections/checks for each facility, system, installation and equipment;
 - (iii) the tools and equipment required for each type of inspection/check; and
 - (iv) the periodic replacement of parts that may be required in accordance with the maintenance instructions of the manufacturer of the respective facility, system, installation and equipment, as appropriate.
- (b) The aerodrome operator should ensure that arrangements are in place for timely corrective maintenance actions. Such arrangements should cover the cases of maintenance needs that are:
- (1) identified either during preventive maintenance activities; or
 - (2) raised at any other time (e.g. due to equipment malfunction or failure).

GM1 ADR.OPS.C.005 General**HUMAN FACTORS MAINTENANCE PROGRAMME**

~~The design and application of the maintenance programme should observe human factors principles.~~

The maintenance programme also includes maintenance of communication and alerting systems, fences and access control devices, perimeter roads and lighting, passenger boarding bridges, etc.

AMC1 ADR.OPS.C.007(a) Maintenance of vehicles**MAINTENANCE OF VEHICLES — GENERAL**

The maintenance of the vehicles may be performed by the aerodrome operator or by a contracted organisation. The maintenance programme should be individual for each vehicle, depending on its function and characteristics. The maintenance programme should take into account the following:

- (a) regulatory requirements (e.g. certification of pressure vessels, hoses, roadworthiness certificates);
- (b) the manufacturer's maintenance recommendations;
- (c) local environmental conditions (e.g. heat versus cold winters);
- (d) the need to ensure the serviceability of the equipment installed on the vehicle (e.g. radio, transponders or equivalent systems); and
- (e) regular performance test results, if appropriate.

AMC1 ADR.OPS.C.007(a)(1) Maintenance of vehicles**PREVENTIVE MAINTENANCE**

- (a) As part of the preventive maintenance programme, the aerodrome operator should determine the items that need to be checked daily, prior to the operation of the vehicle. As a minimum, the following items should be checked on a daily basis, prior to the operation of a vehicle:
 - (1) malfunction/warning indications;
 - (2) steering wheel;
 - (3) lighting system;
 - (4) braking system;
 - (5) communication systems, including transponder (or equivalent) if applicable;
 - (6) tyre condition;
 - (7) external mirrors;
 - (8) windscreen wipers (as appropriate);

- (9) items that need to be secured on the vehicle;
 - (10) leaks; and
 - (11) new external damages to the vehicle.
- (b) A feedback mechanism should be established to ensure that any defects identified are communicated to the unit responsible for the maintenance of the vehicle.

GM1 ADR.OPS.C.007(a)(2) Maintenance of vehicles

As part of the maintenance programme for all its other vehicles, the aerodrome operator may, in the interest of safety, determine the items that need to be checked daily prior to their use, and communicate any defects identified during such checks to the unit responsible for the maintenance of the vehicle.

AMC1 ADR.OPS.C.007(b)(1) Maintenance of vehicles**MAINTENANCE PROCEDURES — GENERAL**

Maintenance procedures should be established to ensure a standardised manner in which vehicles are maintained and should cover as a minimum:

- (a) activities to be undertaken to ensure that disruption to aerodrome services (e.g. RFFS) is minimised;
- (b) the frequency of maintenance services;
- (c) activities to be undertaken at each type of maintenance service (e.g. visual check, inspections, measurements, etc.);
- (d) arrangements for technical support from the manufacturer;
- (e) spare parts that should be kept on site;
- (f) procedures to ensure the safety of maintenance personnel;
- (g) environmental procedures, including appropriate disposal procedures for old parts, and other material; and
- (h) documentation and reporting of any defects that have been identified by operational and/or maintenance personnel.

AMC1 ADR.OPS.C.007(b)(2) Maintenance of vehicles**MAINTENANCE FACILITIES — GENERAL**

If maintenance services and/or facilities are provided by a contracted organisation (located at the aerodrome or elsewhere), the aerodrome operator should have in place arrangements, to allow the timely maintenance of the vehicles in order to avoid disruptions to aerodrome operations.

Irrespective of the solution chosen, the aerodrome operator should ensure:

- (a) the adequacy of the facilities for the maintenance activities and the storage of spare parts and other material;
- (b) the provision of tools and equipment necessary for the maintenance activities, especially for RFFS vehicles and related equipment;
- (c) the availability of maintenance documentation; and
- (d) the provision of appropriate and adequate training to the personnel involved in maintenance activities.

AMC1 ADR.OPS.C.007(b)(3) Maintenance of vehicles**MAINTENANCE RECORDS**

The maintenance records, as a minimum, should include the following:

- (a) maintenance type (preventive/corrective);
- (b) items checked/repared;
- (c) maintenance date (entry/exit date to/from the workshop); and
- (d) name of the person that conducted the inspection/repair.

AMC1 ADR.OPS.C.007(c) Maintenance of vehicles**MAINTENANCE OF VEHICLES — OTHER ORGANISATIONS**

The aerodrome operator should establish and implement an audit programme and/or control mechanism that allows ensuring compliance of the organisations operating or providing services at the aerodrome.

A feedback mechanism should be established with the aerodrome unit responsible for authorising the operation of vehicles as per ADR.OPS.B.026, to enable it to take appropriate action.

AMC2 ADR.OPS.C.007(c) Maintenance of vehicles**MAINTENANCE OF VEHICLES — OTHER ORGANISATIONS**

- (a) The maintenance programme should be individual for each vehicle, depending on its function and characteristics. The maintenance programme should take into account the following:
- (1) applicable regulatory requirements;
 - (2) the manufacturer's maintenance recommendations;
 - (3) local environmental conditions (e.g. heat versus cold winters);
 - (4) the need to ensure the serviceability of the equipment installed on the vehicle (e.g. radio, transponders); and
 - (5) regular performance test results, if appropriate.
- (b) With regard to maintenance procedures, they should include at least specify:
- (1) the frequency of the maintenance services;
 - (2) activities to be undertaken at each type of maintenance service (e.g. visual check, inspections, etc.); and
 - (3) environmental procedures, including appropriate disposal procedures for old parts and other material.
- (c) With regard to preventive maintenance, AMC2 ADR.OPS.C.007(a) applies.
- (d) With regard to record-keeping, AMC1 ADR.OPS.C.007(b)(3) applies.

GM1 ADR.OPS.C.007(d) Maintenance of vehicles**UNINTENDED USE OF UNSERVICEABLE VEHICLES**

Apart from the obligation to ensure that an unserviceable vehicle is removed from operations, measures also need to be taken to avoid the unintended use of an unserviceable vehicle. The latter may include the placing of a warning placard inside the vehicle to inform about the unserviceability of the vehicle, and the establishment of a method for the provision of such information to the relevant personnel, especially those of the next shift.

AMC1 ADR.OPS.C.010 Maintenance of pavements, other ground surfaces, and drainage**GENERAL**

- (a) ~~The aerodrome operator should maintain the surface of a paved runway in a condition so as to provide good friction characteristics and low rolling resistance.~~ Mud, dust, sand, oil, rubber deposits, and other pollutants should be removed, as rapidly and completely as possible, to minimise accumulation.

- (b) Taxiways and aprons should be kept clear of pollutants to the extent necessary to enable aircraft to be taxied to and from an operational runway.
- (c) Drainage systems and storm water collection systems should be periodically checked and, if necessary cleaned or maintained, to ensure efficient water run-off.
- ~~(d) The aerodrome operator should measure the runway surface friction characteristics for maintenance purpose with a continuous friction measuring device using self wetting features. The frequency of these measurements should be sufficient to determine the trend of the surface friction characteristics of the runway.~~
- ~~(e) The aerodrome operator should take corrective maintenance action to prevent the runway surface friction characteristics for either the entire runway, or a portion thereof from falling below the minimum friction level specified by the State.~~
- ~~(f) When the friction of a significant portion of a runway is found to be below the minimum friction level value, the aerodrome operator should report such information in order to promulgate it in a NOTAM specifying which portion of the runway is below the minimum friction level and its location on the runway, and take immediate corrective action.~~
- (g) The surface of a paved runway should be evaluated when constructed or resurfaced to determine that the surface friction characteristics achieve the design objectives.

GM21 ADR.OPS.C.010(b)(1) Pavements, other ground surfaces, and drainage

[...]

GM31 ADR.OPS.C.010(b)(2) Pavements, other ground surfaces, and drainage

[...]

AMC1 ADR.OPS.C.010(b)(3) Maintenance of pavements, other ground surfaces and drainage
MAINTENANCE PLANNING AND MINIMUM STANDARDS

- (a) When friction measuring devices are used in order to evaluate the condition of the runway surface for maintenance purposes, the maintenance planning and minimum friction levels should be according to the following table:

	65 km/h		95 km/h	
	Minimum	Maintenance planning	Minimum	Maintenance planning
Airport Surface Friction Tester	0.50	0.60	0.34	0.47
Dynatest Consulting Inc. Dynatest Runway Friction Tester	0.50	0.60	0.41	0.54
Findlay, Irvine, Ltd Griptester Friction Meter	0.43	0.53	0.24	0.36
Halliday Technologies RT3	0.45	0.55	0.42	0.52
Moventor Oy Inc. BV-11 Skiddometer	0.50	0.60	0.34	0.47
Mu Meter	0.42	0.52	0.26	0.38
NAC Dynamic Friction Tester	0.42	0.52	0.28	0.38
Norsemeter RUNAR (operated at fixed 16 % slip)	0.45	0.52	0.32	0.42
Automatic Friction Measuring Device (Instrument de Mesure Automatique de Glissance) – IMAG	0.30	0,40	0.20	0.30

Table 1

- (b) Other friction measuring devices can be used, provided they have been correlated with, at least, one test equipment mentioned in the table above.
- (c) Measurements at or below the maintenance planning level trigger a complete survey of the texture, contaminant and drainage state of the affected runway third.
- (d) A complete survey should ensure that the runway surface is able to create enough grip by the aeroplane tyre to ensure adequate aeroplane stopping and crosswind capability for the desired operation on a wet runway. This is achieved by ensuring that:
- (1) exposed texture can indent the tyre rubber; and
 - (2) water drains from the runway pavement.
- (e) In order to achieve the objectives of point (d), an inspection of the surface friction characteristics should, as a minimum, ensure:
- (1) the presence of exposed microtexture by touching the aggregates, if the polished or rubber coated extends to 100 m in the zone used by aeroplanes;

- (2) the presence of macrotexture;
- (3) that grooves, if present, are open and within set limits according to their design;
- (4) that porous friction course, if present, drains according to its design; and
- (5) that slopes are above minimum design specifications.

GM1 ADR.OPS.C.010(b)(3) is replaced by the following:

GM1 ADR.OPS.C.010(b)(3) Maintenance of pavements, other ground surfaces and drainage

MONITORING OF PHYSICAL PARAMETERS

The following table describes how the physical parameters of the runway surface are monitored.

Physical parameter	How to monitor
Microtexture	Presence of microtexture is ensured by touching the pavement surface. If it feels smooth, there is a lack of microtexture, most commonly due to rubber deposits which normally should be visually detectable or by polishing. In either case, the amount of free exposed microtexture should be assessed.
Macrotexture	Can be measured using volumetric or profile measurement method and expressed by ESDU classification. ESDU 15002 groups runways into five classifications labelled A through E with A being the smoothest and E the most heavily textured. The classification can be used to compare the runway texture relevant to the recommended texture depth which is 1.0 mm.
Drainage	Slopes are within the certification specifications. If the slope falls below the minimum values, then the runway becomes more susceptible to standing water during heavy rainfalls.
Ponding	Visually, during and after rain storm events as the runway dries up.
Rutting	Visually, during and after rain storm events. The degree of rutting can be measured using a straight edge.
Sand and vegetation	Visually during and after rain storm events. Normally, ordinary maintenance activities should prevent sand to accumulate and vegetation to form alongside the runway to such a degree that it becomes a hazard.

AMC1 ADR.OPS.C.010(b)(4) Maintenance of pavements, other ground surfaces and drainage**PERIODIC ASSESSMENTS OF RUNWAY SURFACE FRICTION CHARACTERISTICS**

The aerodrome operator when establishing a plan of periodic assessments of runway surface friction characteristics, should take into consideration the number of jet aircraft movements per runway end, the weight of the aircraft, the type and age of the surface of the runway as well as climatic conditions.

AMC2 ADR.OPS.C.010(b)(4) Maintenance of pavements, other ground surfaces and drainage**TREND MONITORING OF RUNWAY SURFACE FRICTION CHARACTERISTICS**

The aerodrome operator should monitor the trend of degradation of runway surface friction characteristics that is caused by:

- (a) rubber deposits;
- (b) surface polishing; and
- (c) poor drainage.

AMC3 ADR.OPS.C.010(b)(4) Maintenance of pavements, other ground surfaces and drainage**FUNCTIONAL FRICTION EVALUATIONS WITH CONTINUOUS FRICTION MEASURING DEVICES**

The aerodrome operator when conducting functional friction evaluations with continuous friction measuring device, should:

- (a) for friction evaluations on runways at 65 km/h, begin recording the data 150 m from the threshold end to allow for adequate acceleration distance and terminate approximately 150 m from the opposite end of the runway to allow for adequate distance to safely decelerate the vehicle;
- (b) for friction evaluations on runways at 95 km/h, begin recording the data 300 m from the threshold end to allow for adequate acceleration distance and terminate approximately 300 m from the opposite end of the runway to allow for adequate distance to safely decelerate the vehicle; and
- (c) conduct the surveys at a distance from the runway centre line that is representative of the wheel span of the aeroplanes operating on the runway.

The aerodrome layout or other circumstances may dictate other distances in order to ensure the personal safety of the operator of the friction measuring device.

AMC4 ADR.OPS.C.010(b)(4) Maintenance of pavements, other ground surfaces and drainage**RUNWAY SURFACE FRICTION CHARACTERISTICS EVALUATION WITHOUT FRICTION MEASURING DEVICES**

- (a) The evaluation should be conducted for the full width and length of the pavement and should focus on:
- (1) slopes;
 - (2) texture; and
 - (3) drainage.
- (b) The area symmetrical from the centre line representative of the wheel span of the aeroplanes operating on the runway should be inspected with special focus on:
- (1) rubber deposits;
 - (2) polishing of aggregates; and
 - (3) amount of exposed texture.

GM1 ADR.OPS.C.010(b)(4) Maintenance of pavements, other ground surfaces and drainage**TREND MONITORING PROGRAMME**

- (a) The objective of the trend monitoring programme is to ensure that the surface friction characteristics for the entire runway remain at or above the minimum standards, to avoid the runway becoming slippery wet.
- (b) Degradation is typically caused by rubber deposits, surface polishing or poor drainage. These can be mitigated as follows:
- (1) Accumulation trend of rubber can be managed through a rubber removal programme.
 - (2) Polishing trend of the surface can be managed by monitoring loss of sharpness and retexturing/resurfacing programme.
 - (3) Drainage trend can be managed by monitoring changes in geometry and blocking of drainage channels and reshaping programme.
- (c) In the construction of new runways or the resurfacing of existing runways, the construction of surfaces with adequate slopes and aggregate of angular fragments from crushed gravel or stone so as to provide a sharp texture will help to ensure surface friction characteristics providing good braking action in wet conditions. The surface friction characteristics of a new constructed or resurfaced runway surface establish the normal starting point for trend monitoring; however, trend monitoring can also start at any given time through the lifespan of a pavement.
- (d) The determination that a runway or portion thereof is slippery wet stems from various methods used by themselves or in combination. Additionally, substandard runways or portion thereof can be identified through repeated reports by aeroplane operators based upon flight crew experience or through analysis of aeroplane stopping performance. When such reports are

received, it is an indication that the surface friction characteristics are likely to be severely degraded and immediate remedial action is necessary.

GM2 ADR.OPS.C.010(b)(4) Maintenance of pavements, other ground surfaces and drainage

FRICION EVALUATIONS WITH CONTINUOUS FRICTION MEASURING DEVICES

- (a) The lateral location on the runway for performing friction measurements is based on the type and/or mix of aircraft operating on the runway:
- (1) For runways serving only narrow-body aircraft, friction measurements are conducted 3 m to 5 m from the runway centre line.
 - (2) For runways serving narrow-body and wide-body aircraft, friction measurements are conducted 3 m and 6 m from the runway centre line to determine the worst-case condition. If the worst-case condition is found to be consistently to one track, future measurements may be limited to this track. Care needs to be exercised, however, to account for any future and/or seasonal changes in aircraft mix.
- (b) The measurements are performed using a self-wetting continuous friction measuring device on a dry runway surface.
- (c) Interpretation of comparative self-wetting friction measurements
- (1) The texture of the tyre pavement contact patch area in direct contact with aircraft tyre penetrates the rubber of the aircraft tyre and creates horizontal forces in the aircraft tyre and creates grip. Grip is a micro-movement of the rubber over the texture indenting the rubber. This micro-movement is called slippage. On a free-rolling aircraft tyre, there is no relative movement between the aircraft tyre and the pavement regardless of the rolling speed. The amount of exposed texture, and the quality thereof, both micro and macrotexture, defines the ability of the pavement surface to create wet grip performance of the aircraft tyre.
 - (2) If the aircraft wheel is braked and the horizontal forces applied on the aircraft tyre are higher than those produced by the grip, the aircraft tyre starts to skid.
 - (3) The friction coefficient that can be calculated is a dynamic friction coefficient. The dynamic friction coefficient is lower than the static friction coefficient (maximum tyre grip that can be achieved). Related to stopping performance of the aircraft, the operation has become friction-limited when a tyre starts skidding.
 - (4) The basic assumption for the using a self-wetting continuous friction measuring device with a forced skid is to mirror a braked skidding aircraft tyre on a wet pavement surface. This is an oversimplification since the aircraft tyres are controlled by an anti-skid system and the friction measuring devices operate at a fixed slip.
 - (5) It is noted that friction measuring device values are not used to determine and report surface conditions. Joint industry and multi-national government tests have not

established a reliable correlation between runway friction values and the relationship to aeroplane braking performance. However, the measured values can be used in a comparative way to support other survey information collected.

(6) The measured friction coefficient is a dynamic friction coefficient where the surfaces are forced to be in relative motion regardless of the measuring speed. The degree of relative motion is friction measuring device-specific.

(7) A complete survey is, as a minimum, performed at speeds of 65 km/h and 95 km/h.

(8) The measured value is an indication of the overall texture, contaminant and drainage capability of the pavement surface in the tyre pavement contact patch area of a skidding tyre. No single capability can be extracted but certain qualities can be deduced from comparative measurements using the same friction measurement device on the same surface.

(9) The measured values are to be compared with measured values from previous surveys in order to monitor the trend of the texture, contaminant and drainage characteristics of the runway pavement.

(i) Texture

(A) At low speed, the microtexture of the aggregates in the tyre pavement contact patch area penetrates the residual water film between the pavement and the rubber. These are qualities associated with 65 km/h. Lower comparative values at low speed indicate reduced exposed microtexture and are indicative of microtexture cover-up (rubber) and polishing of aggregates.

(B) At higher speed, the microtexture may not penetrate the residual water film. As speed increases, the residual water film may become thicker and reduce the amount of microtexture that penetrates the water film. If no microtexture penetrates the water film, there is no effect of the microtexture on the performance of the aircraft tyre. The tyre then goes into an aquaplaning mode with no stopping and directional control capability. These are qualities associated with 95 km/h, and lower comparative values are indicative of the combined rubber build-up and reduced drainage capability.

(C) Macrottexture creates escape channels for bulk water and reduces the susceptibility of the pavement surface to build up water films under the aircraft tyre. Lower comparative values at high speed indicate reduced macrottexture.

(ii) Contaminant

(A) The most common contaminant to consider is the build-up of rubber. Build-up of rubber reduces the amount of exposed microtexture and the fill-up of the macrottexture, and thereby reduces the drainage capability of the

pavement in the tyre pavement contact patch area. Affected areas can readily be identified by the eye.

(B) If the aerodrome operator suspects that the runway has a microtexture problem, this can be identified by the touch; pavement surface does feel 'sandpapery'. This applies to both rubber build-up, where the aggregates get covered, and the polishing of aggregates.

(C) For interpretation of comparative measurements on rubber built-up areas, see (i) *Texture* above.

(10) Drainage

(i) The aircraft tyres' contribution to drainage is the drainage through the longitudinal grooves. The pavements' contribution is the drainage through their macrotexture. This drainage can be in all directions, and in the case of porous friction course drainage downwards, through the porous friction course layer itself. If the pavement is transverse grooved, the drainage in the transverse direction of travel is enhanced. Lower comparative values at high speed indicate reduced drainage capability under the aircraft tyre and reduced macrotexture.

(ii) It should be noted that the effects of drainage defects, such as ponding and rutting, will not be detected by comparative measurements by self-wetting continuous friction measuring devices. As the self-wetting continuous friction measurements are performed on a dry runway, there will be no ponding, nor any water stream in any rutting if the runway has such defects.

AMC1 ADR.OPS.C.015 is deleted.

AMC1 ADR.OPS.C.015(a);(f) Maintenance of visual aids and electrical systems

ELECTRICAL SYSTEMS

(a) Schedules of routine maintenance of the individual elements of the aerodrome's electrical systems should be based on manufacturers' instructions, adjusted to the aerodrome operator's experience regarding the frequency of malfunctions.

(b) The maintenance programme should, as a minimum, include the following:

- (1) power cables and distributors in field;
- (2) transformers and regulators;
- (3) transformer stations for electric power supply;
- (4) relay and switch cabinets;

(5) control cables, monitoring units and control desk;

(6) secondary power supply; and

(7) fixed ground power supply for aircraft,

and should contain the frequency of the scheduled maintenance activities and the elements that should be checked during each inspection.

(c) Checklists to be used during the scheduled maintenance activities should be developed by the aerodrome operator.

(d) The relevant procedures should cover the maintenance activities for each area, including the way such activities should be implemented.

GM1 ADR.OPS.C.015(a);(f) Maintenance of visual aids and electrical systems

ELECTRICAL SYSTEMS

The serviceability and reliability of air navigation equipment and installations are prerequisites for the safe operation of aircraft in the aerodrome area, but also for the regularity and efficiency of the air transportation system.

The required serviceability of installations and equipment can only be achieved if constant power supply is ensured.

To this end, regular maintenance work is required for aerodrome equipment and installations distributing primary power and equipment supplying the secondary power when there is such a need.

Special attention needs to be given to cases where there is interconnection between the electrical systems of the various components of the aerodrome (e.g. terminal building with lighting systems etc.).

Further guidance on the issue may be found in Chapter 3 of Part 9 'Airport Maintenance Practices' of ICAO Doc 9137 'Airport Services Manual'.

GM2 ADR.OPS.C.015(a);(f) Maintenance of visual aids and electrical systems

ELECTRICAL SYSTEMS

Electrical systems, and parts thereof, may also be subject to certain requirements (e.g. national) which address elements or aspects that do not fall within the scope of the requirements contained in Regulation (EU) No 139/2014. Such requirements should not be neglected when determining the maintenance programme.

GM1 ADR.OPS.C.015(b) Maintenance of visual aids and electrical systems
LIGHTING SYSTEMS — ALLOWABLE PERCENTAGES OF SERVICEABLE LIGHTS

The allowable percentages of serviceable lights are shown in Table 1 below.

Light type	CAT II/III approach	CAT I approach	RVR<550 m take-off	RVR>550 m take-off
Approach inner 450 m	95 %	85 %	-	-
Approach outer 450 m	85 %	85 %	-	-
Runway threshold	95 %	85 %	-	-
Runway centre line	95 %	85 %	95 %	85 %
Runway edge	95 %	85 %	95 %	85 %
Runway end	75 %	85 %	75 %	85 %
Touchdown zone	90 %	(85 %) ^a	-	-

Note (a): If touchdown zone lights are available.
Note (b): The table covers only the lighting systems for which the requirement provides for a percentage.

Table 1: Allowable percentages of serviceable lights

GM2 ADR.OPS.C.015(b) Maintenance of visual aids and electrical systems
LED LIGHTS — MAINTENANCE PROGRAMME — ICING AND SNOWING CONDITIONS

- (a) The energy savings of light emitting diodes (LEDs) are due in large part to the fact that they do not produce the infrared heat signature of incandescent lamps.

Thus, operators of aerodromes with presence of ice or snow, who have come to expect their melting by this heat signature, need to evaluate whether or not a modified maintenance schedule is required during such conditions, or evaluate the possible operational value of installing LED fixtures with heating elements. Manufacturers can provide a heater, sometimes referred to as an 'arctic kit', for their LED light units. Whether a heater is needed is dependent upon the site location and the weather conditions to which it is exposed. In some instances, the low-operating temperature is an advantage in that drifting snow does not melt and attach itself to the fixture lens. It is likely that LED PAPI will require some form of lens heater regardless of site location to ensure that condensation/icing does not occur.

- (b) While LEDs could last for many thousands of hours under certain conditions, the life of the LED itself, and more importantly, that of the complete luminaire including the electronics, still depends on the system integration and the actual conditions in which the luminaire is used. Application conditions that could have an impact on the expected life of the luminaire include, primarily, the temperature of operation, on-off cycling patterns and humidity. Because LEDs do not have filaments that break or deteriorate, when operated under normal conditions, they

tend to last for a long time. However, their light output decreases and the colour of their light shifts over time, with the rate of depreciation increasing at higher-operating temperatures. The implication for practice is that at some point in time the loss of light output or the colour shift may render the LED source outside the specifications for a given application or purpose; while the LEDs may technically still be operating, they would no longer be considered useful.

Therefore, the long life of the LED in comparison to that of an incandescent lamp may not be taken as a reason for 'install and forget'. A system of preventive maintenance is necessary as the LED light does eventually fail. In addition, there are other factors that can reduce performance, such as contamination on the lens of in-pavement fixtures.

GM3 ADR.OPS.C.015(b) Maintenance of visual aids and electrical systems

LIGHTING SYSTEMS — SERVICEABILITY LEVELS

Serviceability levels are intended to define the maintenance performance level objectives.

With respect to barrettes, crossbars and runway edge lights, lights are considered adjacent if located consecutively and:

- (a) laterally: in the same barrette or crossbar; or
- (b) longitudinally: in the same row of edge lights or barrettes.

In barrettes and crossbars, guidance is not lost by having two adjacent unserviceable lights.

Further guidance on the development of preventive maintenance programme of lights is given in Chapter 2 of Part 9 'Airport Maintenance Practices' of ICAO Doc 9137 'Airport Services Manual'.

GM1 ADR.OPS.C.015(b);(c) Maintenance of visual aids and electrical systems

UNSERVICEABLE LIGHTS

CS ADR-DSN.U.940 'Aeronautical ground light characteristics' contains the figures for determining the unserviceability of individual lights.

The aerodrome operator needs, however, to consider defining, as part of its maintenance programme, two levels of intensity for individual lights, i.e. a maintenance level and the unserviceability level.

The higher level gives aerodrome maintenance personnel advance warning that a light unit is beginning to produce an output significantly below the required value. This level is always above 50 per cent of the specified intensity, which is the level at which the light is classified as being outside specification tolerance and therefore to have failed from an operational perspective. Once the light output reaches the maintenance level, corrective action can be scheduled. This prevents lights from losing performance to the level where immediate maintenance action must be taken.

AMC1 ADR.OPS.C.015(b);(f) Maintenance of visual aids and electrical systems**LIGHTING SYSTEMS****GROUND CHECKS**

- (a) As part of the maintenance programme, the lighting system maintenance activities should include ground checks. During the daily checks, the lighting systems should be checked at least for light failures, breakage or gross misalignment and correct operation of the intensity control system.

The maintenance programme should identify the frequency of other checks that need to be performed throughout the year, as well as their content. Moreover, irrespective of the runway type, the aerodrome operator should ensure the serviceability of the lights by conducting photometric measurements, at appropriate intervals, as part of the maintenance programme.

- (b) Ground checks of visual approach slope indicator systems (VASIS) should determine their alignment and serviceability. The alignment of VASIS should be checked at defined intervals, taking into account environmental conditions (e.g. rain, drought, etc.) that may affect the stability of the system, using an appropriate intensity setting. Additional checks should be conducted following an aircraft occurrence. Errors in excess of one minute of arc should be corrected. The maintenance programme should also cover the obstacle protection surface of the VASIS to ensure that it is clear of all obstacles.

The serviceability of VASIS should be checked on each runway inspection. With regard to serviceability of the precision approach path indicator (PAPI) and abbreviated precision approach path indicator (APAPI), a unit should be considered to be unserviceable if more than one light is unserviceable and the unit consists of three or more lights; or at least one light is unserviceable and the unit consists of less than three lights. In addition, whenever a red filter does not produce the correct colour light beam, is missing, or is damaged, all the lights associated with that filter should be extinguished until the red filter is rectified.

- (c) For a precision approach runway category II or III:

(1) The system of preventive maintenance employed should include at least the following checks:

- (i) visual inspection and in-field measurement of the intensity, beam spread and orientation of lights included in the approach and runway lighting systems;
- (ii) control and measurement of the electrical characteristics of each circuitry included in the approach and runway lighting systems; and
- (iii) control of the correct functioning of light intensity settings used by air traffic control.

(2) In-field measurement of intensity, beam spread and orientation of lights included in approach and runway lighting systems should be undertaken by measuring all lights, as far as practicable, to ensure conformance with the appropriate figure in CS ADR-DSN.U.940.

- (3) Measurement of intensity, beam spread and orientation of lights included in approach and runway lighting systems should be undertaken using an appropriate measuring unit of sufficient accuracy to analyse the characteristics of the individual lights.
- (4) The frequency of measurement should be based on traffic density, the local pollution level, the reliability of the installed lighting equipment and the continuous assessment of the results of the in-field measurements but, in any event, should not be less than twice a year for in-pavement lights and not less than once a year for other lights.

FLIGHT CHECKS

- (d) As part of the maintenance programme of the lighting systems, flight check of the approach, runway and taxiway lighting systems, VASIS, aerodrome beacon, and the light intensity control system should be carried out at regular intervals, at least on a yearly basis, to ensure that the pattern is correct and that lights are operating properly. Special flight checks should be arranged in case of major maintenance of, or changes to, such systems, as well as before the commissioning of new systems, both at day and night.

GM1 ADR.OPS.C.015(b);(f) Maintenance of visual aids and electrical systems

LIGHTING SYSTEMS

GROUND CHECKS — GENERAL

The ground checks of the lighting system includes a set of different actions that would need to be undertaken at different intervals. These checks include but are not limited to the following:

- (a) broken lights or parts of the unit;
- (b) condition of filters;
- (c) corrosion;
- (d) cleanness;
- (e) tightening of fasteners of units;
- (f) alignment of lights;
- (g) presence of moisture/water;
- (h) electrical connections of lights; and
- (i) condition of structure and the foundation of each unit.

GROUND CHECKS — VASIS

VASIS are used in order to provide correct visual glide slope indication to the flight crews in all variable weather conditions, by day and by night. It is therefore imperative that the maintenance programme ensures the correct alignment of the system, as well as its serviceability at all times. In order to achieve this, a suitable maintenance programme, including the correct frequency of ground checks, needs to be developed and implemented.

During daily checks, the general condition of each unit is checked to determine the following:

- (a) all lights are lighted and illuminated evenly;
- (b) there is no evidence of apparent damages;
- (c) the change from red to white is coincident for all elements in a unit; and
- (d) the lenses are not contaminated.

Regarding the alignment of VASIS, the individual unit setting angles are checked by means of angular measurement, in accordance with the manufacturer's instructions. A visual comparison between all the units in the system set at the same angle may be used to identify a unit in which there is a misalignment between the optical system and the datum plate. The cause of any misalignment of this nature needs to be ascertained and corrected before any adjustment is made to the setting angles.

Where the ground where the VASIS are installed is less stable, or intense weather phenomena such as frost, heavy rain or drought take place, or variations in weather occur, the aerodrome operator needs to adjust the ground checks of the VASIS, as such phenomena may lead to misalignment of the VASIS. In this way, gross alignment errors may be prevented.

FLIGHT CHECKS

Flight checks for precision approach runways are more frequent and detailed than other runway types.

Lights are checked for failures and alignment, while the VASIS are also be checked for correct approach slope, and compatibility with the non-visual aids, if available. Moreover, the balance of light intensity, at all intensity settings, needs to be checked.

During daylight flight checks, an assessment of the markings needs also to take place.

Flight checks may be arranged to be conducted with the planned calibration flights of the no-visual aids. The opportunity is also be taken to identify any confusing or misleading lights in the aerodrome surroundings.

Further guidance on how to conduct a flight check and the items that need to be checked during the flight check may be found in Chapter 5 of Part 8 'Airport Operational Services' of ICAO Doc 9137 'Airport Services Manual', and in Chapter 8 of Part 4 'Visual Aids' of ICAO Doc 9157 'Aerodrome Design Manual'.

AMC1 ADR.OPS.C.015(d) Maintenance of visual aids and electrical systems

REMOVAL OF MARKINGS

Whenever, for maintenance or other purposes (e.g. relocation of markings, redesign of pavements), a marking on the movement area is not needed any longer, the marking should be physically removed. In no case should a non-needed marking be painted over.

The removal of the marking may be accomplished by using various techniques, but irrespectively of the technique used, it should not cause damage to the pavement or parts of the lighting systems.

In order to eliminate the visual appearance of the removed marking(s) on the pavement, the physical removal of any old marking(s) should include a predetermined larger size and shape of the area occupied by the marking(s), that encompasses the old marking(s), and by grouping adjacent markings together into a larger rectangular removal area.

GM1 ADR.OPS.C.015(d) Maintenance of visual aids and electrical systems

REMOVAL OF MARKINGS

A marking may need to be removed for various reasons (marking patterns are changed, physical areas or operating procedures are modified, or the thickness of the layers of paint becomes excessive, etc.)

It has been found that covering markings that need to be removed, with a darker colour (e.g. black or dark grey) in order to make them resemble the colour of the adjacent pavement (e.g. runway, apron, taxiway) is likely to mislead the flight crews, as well as drivers operating in this area because of the reflection of the sun or other sources of light upon the new surface. Moreover, the surface layer of paint will wear away or erode and the lower layers will become visible and this may cause confusion.

Methods used for removing unnecessary markings include but are not limited to water blasting, sand blasting, chemical removal, burning, etc.

If the sand blasting method is used, arrangements are necessary to remove the sand deposited on the pavement as the work progresses, in order to prevent accumulation.

Grinding is not recommended because of the damage to the pavement surface and probable reduction of the friction characteristics.

When chemicals are used for marking removal, a large and continuous source of water is usually needed to reduce potential damage to pavement surfaces and to dilute the chemicals washed into drains or channels. Prior to the use of chemicals, consideration is necessary to the applicable environmental protection requirements.

If burning is used to remove a marking, care is necessary not to damage the pavement surface, as a result of the extended periods of exposure to the heat source.

Examples of predetermined areas that should cover the area of the old marking(s), as well as adjacent markings, appear in Figure 1.

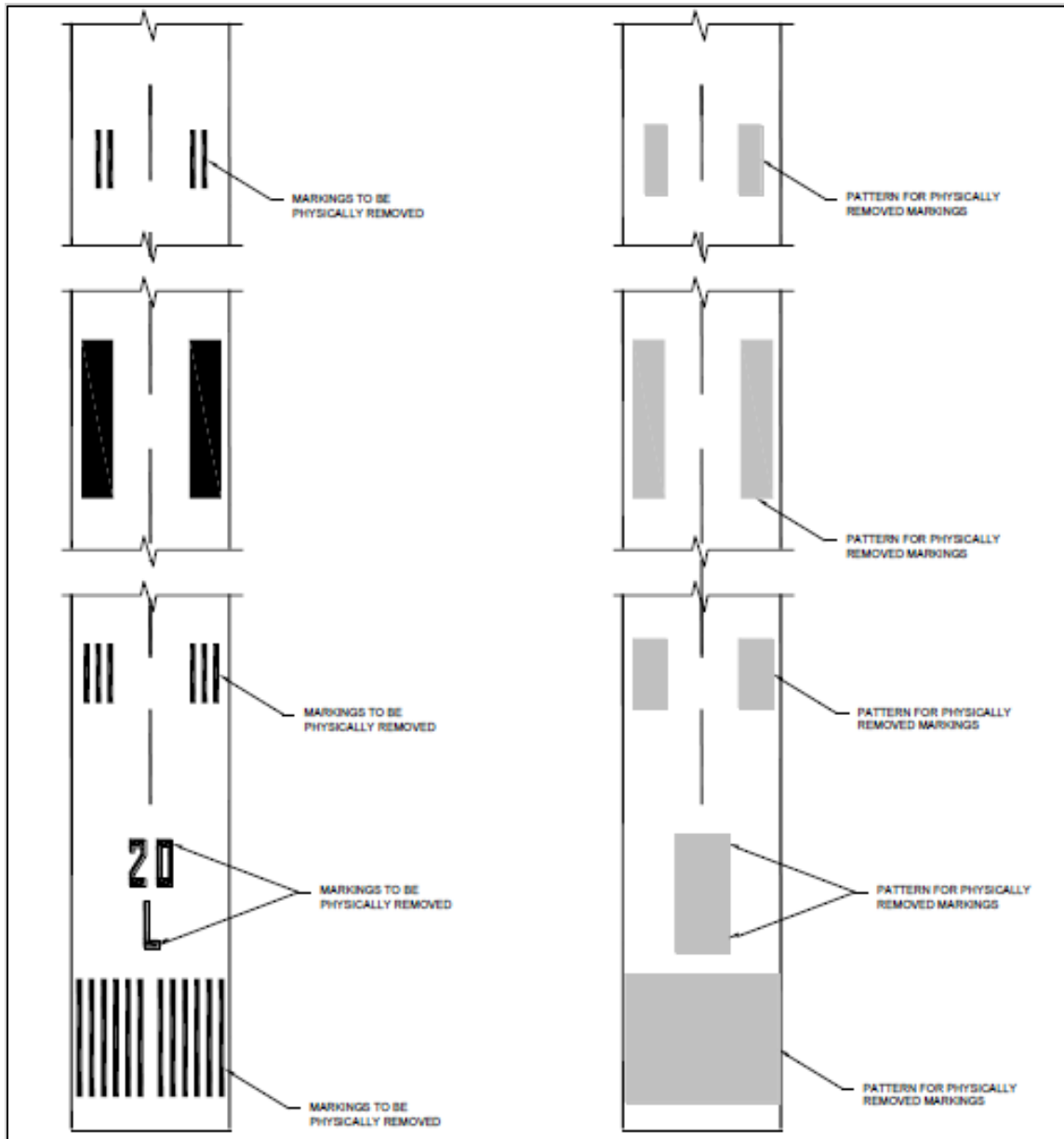


Figure 1

AMC1 ADR.OPS.C.015(d);(f) Maintenance of visual aids and electrical systems

MARKINGS AND SIGNS

(a) Markings

A system of preventive maintenance of visual aids should be employed to ensure marking system reliability, both day and night. All markings should be inspected thoroughly at least semi-annually, depending on local weather conditions, and corrective action should be taken in case of need, such as peeling, discolourment, fading, or accumulation of deposits.

(b) Signs

Maintenance should ensure integrity and perfect legibility of the information provided by the signs. Checks for each sign should be both scheduled (daily, annual) and unscheduled, and should take into account the instructions of the manufacturer.

GM1 ADR.OPS.C.015(d);(f) Maintenance of visual aids and electrical systems**MARKINGS AND SIGNS**

- (a) An assessment of the condition of the signs and markings performed during the night when compared with an assessment performed during the daylight, allows determining the reflectivity of the marking. Therefore, the maintenance programme takes due account of this.
- (b) Daily checks of signs need to focus on the functioning of the lamps, the legibility of inscriptions, damage to the sign panels, fading of the colours, and the removal of possible obstructions. During night inspections, the proper illumination of the signs is also checked.
- (c) Annual checks of signs include:
 - (1) the mounting of both the sign and its lighting; and
 - (2) the sign's structure.
- (d) Unscheduled checks are necessary after weather phenomena that may affect the functioning of a sign, such as snowfalls to remove snow accumulation, storms that may have damaged the signs, etc.

SUBPART D – APRON MANAGEMENT (ADR.OPS.D)

AMC2 ADR.OPS.D.085(f) Training and proficiency check programmes of personnel providing taxi instructions to aircraft through radiotelephony

ASSESSMENT

[...]

- (e) The assessment should be conducted using the rating scale in AMC1 ADR.OPS.B.029(b).