CHAPTER (2)

AERODROME DATA

2.1 AERONAUTICAL DATA

2.1.1 Determination and reporting of aerodrome related aeronautical data shall be in accordance with the accuracy and integrity classification required to meet the needs of the end-users of aeronautical data.

2.1.2 Aerodrome mapping data shall be made available to the aeronautical information services for aerodromes deemed relevant by CARC where safety and/or performance-based operations suggest possible benefits.

2.1.3 Where made available in accordance with 1.2, the selection of the aerodrome mapping data features to be collected shall be made with consideration of the intended applications.

Note 1: It is intended that the selection of the features to be collected match a defined operational need.

Note 2: Aerodrome mapping databases can be provided at one of two levels of quality - fine or medium.

2.1.4 Digital data error detection techniques shall be used during the transmission and/or storage of aeronautical data and digital data sets.

2.2 AERODROME REFERENCE POINT

2.2.1 An aerodrome reference point shall be established for an Aerodrome.

2.2.2 The aerodrome reference point shall be located near the initial or planned geometric center of the aerodrome and shall normally remain where first established.

2.2.3 The position of the aerodrome reference point shall be measured and reported to the concerned party responsible for aeronautical information services in degrees, minutes and seconds.

2.3 AERODROME AND RUNWAY ELEVATIONS

2.3.1 The aerodrome elevation and geoid undulation at the aerodrome elevation position shall be measured to the accuracy of one-half meter or foot and reported to the concerned party responsible for aeronautical information services.

2.3.2 For an aerodrome used by international civil aviation for non-precision approaches, the elevation and geoid undulation of each threshold, the elevation of the runway end and any significant high and low intermediate points along the

runway shall be measured to the accuracy of one-half meter or foot and reported to the Aeronautical Information Services.

2.3.3 For precision approach runway, the elevation and geoid undulation of the threshold, the elevation of the runway end and the highest elevation of the touchdown zone shall be measured to the accuracy of one-quarter meter or foot and reported to the Aeronautical Information Services.

Note: Geoid undulation must be measured in accordance with the appropriate system of coordinates.

2.4 AERODROME REFERENCE TEMPERATURE

2.4.1 An aerodrome reference temperature shall be determined for an aerodrome in degrees Celsius.

2.4.2 The aerodrome reference temperature shall be the monthly mean of the daily maximum temperatures for the hottest month of the year (the hottest month being that which has the highest monthly mean temperature). This temperature shall be averaged over a period of ten years.

2.5 AERODROME DIMENSIONS AND RELATED INFORMATION

2.5.1 The following data shall be measured or described, as appropriate, for each facility provided on an aerodrome:

a) runway — true bearing to one-hundredth of a degree, designation number, length, width, displaced threshold location to the nearest meter or foot, slope, surface type, type of runway and, for a precision approach runway category I, the existence of an obstacle free zone when provided;

b) strip
runway end safety area } length, width to the nearest meter or
stopway foot, surface type; and

arresting system — location (which runway end) and description;

c) taxiway — designation, width, surface type;

d) apron — surface type, aircraft stands;

e) the boundaries of the air traffic control service;

f) clearway — length to the nearest meter or foot, ground profile;

g) visual aids for approach procedures, marking and lighting of runways, taxiways and aprons, other visual guidance and control aids on taxiways and aprons, including taxi-holding positions and stopbars, and location and type of visual docking guidance systems;

h) location and radio frequency of any VOR aerodrome check-point;

i) location and designation of standard taxi-routes; and

j) distances to the nearest meter or foot of localizer and glide path elements comprising an instrument landing system (ILS) or azimuth and elevation antenna of microwave landing system (MLS) in relation to the associated runway extremities.

2.5.2 The geographical coordinates of each threshold shall be measured and reported to the Aeronautical Information Services in degrees, minutes, seconds and hundredths of seconds.

2.5.3 The geographical coordinates of appropriate taxiway center line points shall be measured and reported to the aeronautical information services authority in degrees, minutes, seconds and hundredths of seconds.

2.5.4 The geographical coordinates of each aircraft stand shall be measured and reported to the concerned party responsible for aeronautical information services in degrees, minutes, seconds and hundredths of seconds.

2.5.5 The geographical coordinates of obstacles in Area 2 (the part within the aerodrome boundary) and in Area 3 shall be measured and reported to the concerned party responsible for aeronautical information services in degrees, minutes, seconds and tenths of seconds. In addition, the top elevation, type, marking and lighting (if any) of obstacles shall be reported to the concerned party responsible for aeronautical information services.

Note: Appendix 5 of this Part provides requirements for obstacle data determination in Areas 2 and 3.

2.6 STRENGTH OF PAVEMENTS

2.6.1 The bearing strength of a pavement shall be determined.

2.6.2 The bearing strength of a pavement intended for aircraft of apron (ramp) mass greater than 5 700 kg shall be made available using the aircraft classification number - pavement classification number (ACN-PCN) method by reporting all of the following information:

a) the pavement classification number (PCN);

b) pavement type for ACN-PCN determination;

c) subgrade strength category;

d) maximum allowable tire pressure category or maximum allowable tire pressure value; and

e) evaluation method.

If necessary, PCNs may be published to an accuracy of one-tenth of a whole number.

2.6.3 The pavement classification number (PCN) reported shall indicate that an aircraft with an aircraft classification number (ACN) equal to or less than the reported PCN can operate on the pavement subject to any limitation on the tire pressure, or aircraft all-up mass for specified aircraft type(s).

Note: Different PCNs may be reported if the strength of the pavement is subject to significant seasonal variation.

2.6.4 The ACN of an aircraft shall be determined in accordance with the standard procedures associated with the ACN-PCN method.

Note: The standard procedures for determining the ACN of an aircraft are given in the CARC Guidance Material Pavement Design 34/PAVD. For convenience several aircraft types currently in use have been evaluated on rigid and flexible pavements founded on the four subgrade categories in 6.6 b) below and the results tabulated in that manual.

2.6.5 For the purposes of determining the ACN, the behavior of a pavement shall be classified as equivalent to a rigid or flexible construction.

2.6.6 Information on pavement type for ACN-PCN determination, subgrade strength category, maximum allowable tire pressure category and evaluation method shall be reported using the following codes:

a) Pavement type for ACN-PCN determination:

	Code
Rigid pavement	R
Flexible pavement	F

Note: If the actual construction is composite or nonstandard, include a note to that effect (see example 2 below).

b) Subgrade strength category:

	Code
High strength: characterized by K = 150 MN/m^3 and representing all K values above 120 MN/m^3 for rigid pavements, and by CBR = 15 and representing all CBR values above 13 for flexible pavements.	A
Medium strength: characterized by K = 80 MN/m^3 and representing a range in K of 60 to 120 MN/m^3 for rigid pavements, and by CBR = 10 and representing a range in CBR of 8 to 13 for flexible pavements.	B

Low strength: characterized by K = 40 MN/m^3 and representing a range in K of 25 to 60 MN/m^3 for rigid pavements, and by CBR = 6 and representing a range in CBR of 4 to 8 for flexible pavements.	C
Ultra low strength: characterized by K = 20 MN/m^3 and representing all K values below 25 MN/m^3 for rigid pavements, and by CBR = 3 and representing all CBR values below 4 for flexible pavements.	D

c) Maximum allowable tire pressure category:

	Code
Unlimited : no pressure limit	W
High: pressure limited to 1.75 MPa	X
Medium: pressure limited to 1.25 MPa	Y
Low: pressure limited to 0.50 MPa	Z

Note: See Note 5 to Chapter 10, Section 10.2.1 where the pavement is used by aircraft with tire pressures in the upper categories.

d) Evaluation method:

	Code
Technical evaluation: representing a specific study of the pavement characteristics and application of pavement behavior technology	T
Using aircraft experience: representing a knowledge of the specific type and mass of aircraft satisfactorily being supported under regular use.	U

Note: The following examples illustrate how pavement strength data are reported under the ACN-PCN method.

Example 1 — If the bearing strength of a rigid pavement, resting on a medium strength subgrade, has been assessed by technical evaluation to be PCN 80 and there is no tire pressure limitation, then the reported information would be:

PCN 80 / R / B / W / T

Example 2 — If the bearing strength of a composite pavement, behaving like a flexible pavement and resting on a high strength subgrade, has been assessed by using aircraft experience to be PCN 50 and the maximum tire pressure allowable is 1.25 MPa, then the reported information would be:

PCN 50 / F / A / Y / U

Note: Composite construction.

Example 3 — If the bearing strength of a flexible pavement, resting on a medium strength subgrade, has been assessed by technical evaluation to be PCN 40 and the maximum allowable tire pressure is 0.80 MPa, then the reported information would be:

PCN 40 / F / B / 0.80 MPa /T

Example 4 — If a pavement is subject to a B747-400 all-up mass limitation of 390 000 kg, then the reported information would include the following note.

The reported PCN is subject to a B747-400 all-up mass limitation of 390 000 kg.

2.6.7 Criteria to regulate the use of a pavement by an aircraft with an ACN higher than the PCN reported for that pavement in accordance with 6.2 and 6.3 is established in Attachment A.

Note: Attachment A Section 20, which details a simple method for regulating overload operations while the CARC Guidance Material Pavement Design 34/PAV, includes the descriptions of more detailed procedures for evaluation of pavements and their suitability for restricted overload operations.

2.6.8 The bearing strength of a pavement intended for aircraft of apron (ramp) mass equal to or less than 5 700 kg shall be made available by reporting the following information:

a) maximum allowable aircraft mass; and

b) maximum allowable tire pressure.

Example: 4 000 kg/0.50 MPa.

2.7 PRE-FLIGHT ALTIMETER CHECK LOCATION

2.7.1 One or more pre-flight altimeter check locations shall be established for an aerodrome.

2.7.2 A pre-flight check location shall be located on an apron.

Note 1: Locating a pre-flight altimeter check location on an apron enables an altimeter check to be made prior to obtaining taxi clearance and eliminates the need for stopping for that purpose after leaving the apron.

Note 2: Normally an entire apron can serve as a satisfactory altimeter check location.

2.7.3 The elevation of a pre-flight altimeter check location shall be given as the average elevation, rounded to the nearest meter or foot, of the area on which it is

located. The elevation of any portion of a pre-flight altimeter check location shall be within 3 m (10 ft) of the average elevation for that location.

2.8 DECLARED DISTANCES

2.8.1 The following distances shall be calculated to the nearest meter or foot for a runway intended for use by international and/or domestic commercial air transport:

a) take-off run available;

b) take-off distance available;

c) accelerate-stop distance available; and

d) landing distance available.

Note: Guidance on calculation of declared distances is given in Attachment A, Section 3.

2.9 CONDITION OF THE MOVEMENT AREA AND RELATED FACILITIES

2.9.1 Information on the condition of the movement area and the operational status of related facilities shall be provided to the appropriate aeronautical information service units, and similar information of operational significance to the air traffic services units, to enable those units to provide the necessary information to arriving and departing aircraft. The information shall be kept up to date and changes in conditions shall be reported without delay.

2.9.2 The condition of the movement area and the operational status of related facilities shall accordingly be monitored and reports on matters of operational significance affecting aircraft and aerodrome operations shall be provided in order to take appropriate action, 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.

Note 1: Other contaminants may include mud, dust, sand, volcanic ash, oil and rubber. Annex 6, Part 1, Attachment C provides guidance on the description of runway surface conditions. Additional guidance is included in the CARC Guidance Material Pavement Surface Condition 34/PSC.

Note 2: Particular attention would have to be given to the simultaneous presence of snow, slush, ice, wet ice, snow on ice with anti-icing or de-icing liquid chemicals.

Note 3: See 2.9.11 for a list of winter contaminants to be reported.

2.9.3 To facilitate compliance with 2.9.1 and 2.9.2, inspections of the movement area shall be carried out at least twice each day.

Note: Guidance on carrying out daily inspections of the movement area is given in the CARC Guidance Materials, Aerodrome Operational Services 34/ADOS and Surface Movement and Guidance System 34/SMGCS.

2.9.4 Personnel assessing and reporting runway surface conditions required in 2.9.2 and 2.9.8 shall be trained and competent to meet criteria set by the CARC.

Note: Guidance on criteria is included in the CARC Guidance Material Airport Operational Services 34/ADOS.

Water on a Runway

2.9.5 Whenever water is present on a runway, a description of the runway surface conditions shall be made available using the following terms:

- **DAMP:** The surface shows a change of color due to moisture.

- **WET:** The surface is soaked but there is no standing water.

- **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.

2.9.6 Information that a runway or portion thereof may be slippery when wet shall be made available.

Note: The determination of a runway or portion thereof may be slippery when wet is not based solely on the friction measurement obtained using a continuous friction measuring device. Supplementary tools to undertake this assessment are described in the CARC Guidance Material Pavement Surface Conditions 34/PSC.

2.9.7 Notification shall be given to aerodrome users when the friction level of a paved runway or portion thereof is less than that specified by the CARC in accordance with chapter 10 paragraph 10.2.3

Note: Guidance on conducting a runway surface friction characteristics evaluation programme that includes determining and expressing the minimum friction level is provided in Attachment A, Section 7.

Snow, slush, ice or frost on a runway

Note: Runway surface condition sensors may be used to detect and continuously display current or predicted information on surface conditions such as the presence of moisture, or imminent formation of ice on pavements.

2.9.8 Whenever an operational runway is contaminated by snow, slush ice, or frost the runway surface condition shall be assessed, and reported.

Note: Guidance on assessment of snow- and ice-covered paved surfaces is provided in Attachment A, Section 6.

2.9.9 Runway surface friction measurements made on a runway that is contaminated by slush, wet snow or wet ice shall not be reported unless the reliability of the measurement relevant to its operational use can be assured.

Note: Contaminant drag on the equipment's measuring wheel, amongst other factors, may cause readings obtained in these conditions to be unreliable.

2.9.10 When friction measurements are taken as part of the assessment, the performance of the friction measuring device on compact snow, or ice-covered surfaces shall meet the standard and correlation criteria set or agreed by the CARC.

Note: Guidance on criteria for, and correlation between, friction measuring devices is included in the CARC Guidance Material Pavement Surface Conditions 34/PSC.

2.9.11 Whenever snow, slush, ice or frost is present and reported, the description of the runway surface condition shall use the following terms:

— DRY SNOW;

— WET SNOW;

— COMPACTED SNOW;

— WET COMPACTED SNOW;

— SLUSH;

— ICE;

— WET ICE;

— FROST;

— DRY SNOW ON ICE;

— WET SNOW ON ICE;

— CHEMICALLY TREATED;

— SANDED.

and shall include, where applicable, the assessment of contaminant depth.

2.9.12 Whenever dry snow, wet snow or slush is present on a runway, an assessment of the mean depth over each third of the runway shall be made to an accuracy of approximately 2 cm for dry snow, 1 cm for wet snow and 0.3 cm for slush.

2.10 DISABLED AIRCRAFT REMOVAL

Note: Refer to Chapter 9 paragraph 9.3 for information on disabled aircraft removal services.

2.10.1 The telephone/telex number(s) of the office of the aerodrome coordinator of operations for the removal of an aircraft disabled on or adjacent to the movement area shall be made available, on request, to aircraft operators.

2.10.2 Information concerning the capability to remove an aircraft disabled on or adjacent to the movement area shall be made available.

Note: The capability to remove a disabled aircraft may be expressed in terms of the largest type of aircraft which the aerodrome is equipped to remove.

2.11 RESCUE AND FIRE FIGHTING

Note: Refer to Chapter 9 paragraph 9.2 for information on rescue and fire fighting services.

2.11.1 Information concerning the level of protection provided at an aerodrome for aircraft rescue and fire fighting purposes shall be made available.

2.11.2 The level of protection normally available at an aerodrome shall be expressed in terms of the category of the rescue and fire fighting services as described in Chapter 9 paragraph 9.2 and in accordance with the types and amounts of extinguishing agents normally available at the aerodrome.

2.11.3 Changes in the level of protection normally available at an aerodrome for rescue and fire fighting shall be notified to the CEO and the appropriate air traffic services units and aeronautical information units to enable those units to provide the necessary information to arriving and departing aircraft. When such a change has been corrected, the above units shall be advised accordingly.

Note: Changes in the level of protection from that normally available at the aerodrome could result from a change in the availability of extinguishing agents, equipment to deliver the agents or personnel to operate the equipment, etc.

2.11.4 A change shall be expressed in terms of the new category of the rescue and fire fighting service available at the aerodrome.

2.12 VISUAL APPROACH SLOPE INDICATOR SYSTEMS

The following information concerning a visual approach slope indicator system installation shall be made available:

a) associated runway designation number;

b) type of system according to chapter 5 paragraph 5.3.5.2. For an AT-VASIS, PAPI or APAPI installation, the side of the runway on which the lights are installed, i.e. left or right, shall be given;

c) where the axis of the system is not parallel to the runway center line, the angle of displacement and the direction of displacement, i.e. left or right shall be indicated;

d) nominal approach slope angle(s). For a T-VASIS or an AT-VASIS this shall be angle θ according to the formula in Figure 5-17 and for a PAPI and an APAPI this shall be angle (B + C) ÷2 and (A + B)÷2, respectively as in Figure 5-19; and

e) minimum eye height(s) over the threshold of the on-slope signal(s). For a T-VASIS or an AT-VASIS this shall be the lowest height at which only the wing bar(s) are visible; however, the additional heights at which the wing bar(s) plus one, two or three fly down light units come into view may also be reported if such information would be of benefit to aircraft using the approach. For a PAPI this shall be the setting angle of the third unit from the runway minus 2′, i.e. angle B minus 2′, and for an APAPI this shall be the setting angle of the unit farther from the runway minus 2′, i.e. angle A minus 2′.

2.13 COORDINATION BETWEEN AERONAUTICAL INFORMATION SERVICES AND AERODROME AUTHORITIES AND/OR AERODROME OPERATOR

2.13.1 To ensure that aeronautical information services units obtain information to enable them to provide up-to-date pre-flight information and to meet the need for in-flight information, arrangements shall be made between aeronautical information services and aerodrome authorities and/or aerodrome operators responsible for aerodrome services to report to the responsible aeronautical information services unit, with a minimum of delay:

a) information on the status of certification of aerodromes and aerodrome conditions (ref. 2.3, 2.9, 2.10, 2.11 and 2.12);

b) the operational status of associated facilities, services and navigation aids within their area of responsibility;

c) any other information considered to be of operational significance.

2.13.2 Before introducing changes to the air navigation system, due account shall be taken by the services responsible for such changes of the time needed by the aeronautical information service for the preparation, production and issue of relevant material for promulgation. To ensure timely provision of the information to the aeronautical information service, close coordination between those services concerned is therefore required.

2.13.3 Of a particular importance are changes to aeronautical information that affect charts and/or computer based navigation systems which qualify to be notified by the ICAO aeronautical information regulation and control (AIRAC) system, as specified in ICAO Annex 15, Chapter 6. The predetermined, internationally agreed AIRAC effective dates shall be observed by the responsible aerodrome services when submitting the raw information/data to aeronautical information services.

2.13.4 The aerodrome services responsible for the provision of raw aeronautical information/data to the aeronautical information services shall do that while taking into account accuracy and integrity requirements required to meet the needs of the end-user of aeronautical data.

2.13.5 The aerodrome operator shall report the information contained in this chapter to the AIS.

Note 1: AIRAC information is distributed by the AIS at least 42 days in advance of the AIRAC effective dates with the objective of reaching recipients at least 28 days in advance of the effective date.

Note 2: The schedule of the predetermined internationally agreed AIRAC common effective dates at intervals of 28 days, including 6 November 1997.