

GAMBIA CIVIL AVIATION ACT NO. 7 OF 2018

CIVIL AVIATION AERODROME REGULATIONS, 2024

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SCHEDULES

GAMBIA CIVIL AVIATION ACT, 2018

Act No. 7 of 2018

CIVIL AVIATION AERDROME REGULATIONS, 2024

IN EXERCISE of the powers conferred on the Director General by section 148 of the Gambia Civil Aviation Act 2018, these Regulations are made.

PART I PRELIMINARY

1. Citation

These Regulations may be cited as the Civil Aviation Aerodrome Regulations, 2024.

2. Interpretation

(1) In these Regulations--

“Act” means the Gambia Civil Aviation Act 2018

“accountable manager” means the person acceptable to the Authority who has corporate authority for ensuring that all activities can be financed and carried out to the standard required by the Authority and any additional requirements defined by the aerodrome authority;

“AEP” means aerodrome emergency plan;

“aerodrome” means a defined area on land or water including any building, installations and equipment, intended to be used either wholly or in part for the arrival, departure, and surface movement of aircraft;

“aerodrome beacon” means aeronautical beacon used to indicate the location of an aerodrome from the air;

“aerodrome certificate (AC)” means the certificate issued by the Authority under these regulations for the operation of an aerodrome;

“aerodrome elevation” means the elevation of the highest point of the landing area;

“aerodrome identification sign” means a sign placed on an aerodrome to aid in identifying the aerodrome from the air;

“aerodrome maintenance manager” means a person who shall be responsible for ensuring that the aerodrome’s maintenance programmes for safety critical infrastructure comply with the requirements of these regulations;

“aerodrome manual” means the manual that forms part of the application for an aerodrome certificate pursuant to these regulations, including any amendments thereto approved by the Authority;

“aerodrome mapping data” means data collected for the purpose of compiling aerodrome mapping information for aeronautical uses;

“aerodrome mapping database” means a collection of aerodrome mapping data organized and arranged as a structured data set;

“aerodrome operations manager” means a person who shall be responsible for ensuring that the aerodrome and its operation comply with the requirements of these regulations;

“aerodrome operator” means the owner or provider of an aerodrome that is certified for operations by the Authority; In relation to a certificated aerodrome, means the aerodrome certificate holder;

“aerodrome reference code” means a code used for planning purposes to classify an aerodrome with respect to the critical aircraft characteristics for which the aerodrome is intended;

“aerodrome reference point” means the designated geographical location of an aerodrome;

“aerodrome safety manager” means a person who shall be the responsible individual and focal point for the development and maintenance of an effective Safety Management System in accordance with these regulations

“ aerodrome traffic density –

- (a) “Light” means where the number of movements in the mean busy hour is not greater than 15 per runway or typically less than 20 total aerodrome movements;
- (b) “Medium” means where the number of movements in the mean busy hour is of the order of 16 to 25 per runway or typically between 20 to 35 total aerodrome movements; and
- (c) “Heavy” means where the number of movements in the mean busy hour is of the order of 26 or more per runway or typically more than 35 total aerodrome movements.

“aeronautical beacon” means an aeronautical ground light visible at all azimuths, either continuously or intermittently, to designate a particular point on the surface of the earth;

“aeronautical ground light” means any light specially provided as an aid to air navigation, other than a light displayed on an aircraft;

“aeroplane reference field length” means the minimum field length required for take-off at maximum certificated take-off mass, sea level, standard atmospheric conditions, still air and zero runway slope, as shown in the appropriate aeroplane flight manual prescribed by the certifying authority or equivalent data from the aeroplane manufacturer. Field length means balanced field length for aeroplanes, if applicable, or take-off distance in other cases;

“aeronautical study” means a study of an aeronautical problem to identify possible solutions and select a solution that is acceptable without degrading safety;

“AIP” means aeronautical information publication;

“AIS” means aeronautical information services;

“AIRAC” means aeronautical information regulation and control

“aircraft classification number (ACN)” means a number expressing the relative effect of an aircraft on a pavement for a specified standard subgrade category;

“aircraft classification rating (ACR)” means the number expressing the relative effect of an aircraft on a pavement for a certified standard subgrade category;

“aircraft stand” means a designated area on an apron intended to be used for parking an aircraft.

“APAPI” means abbreviated precision approach path indicator;

“apron” means a defined area on an aerodrome, intended to accommodate aircraft for purposes of loading or unloading passengers, mail or cargo, fuelling, parking or maintenance;

“apron management service” means a service provided to regulate the activities and the movement of aircraft and vehicles on an apron;

“arresting system” means a system designed to decelerate an aeroplane overrunning the runway;

“ATC” means air traffic control;

“ATS” means air traffic services;

“AT-VASIS” means abbreviated T visual approach slope indicator system;

“Authority” means to the Gambia Civil Aviation Authority;

“Autonomous runway incursion warning systems (ARIWS)” means a system which provides autonomous detection of a potential incursion or of the occupancy of an active runway and a direct warning to a flight crew or vehicle operator;

“aviation height clearance (AHC)” means an official permission granted by the Authority to an applicant prior to the commencement of construction or erection of a structure within the Gambian Airspace;

“balked landing” means a landing manoeuvre that is unexpectedly discontinued at any point below the obstacle clearance altitude or height;

“barrette” means three or more aeronautical ground lights closely spaced in a transverse line so that from a distance they appear as a short bar of light;

“BRS” means baggage reconciliation system;

“calendar” means a discrete temporal reference system that provides the basis for defining temporal position to a resolution of one day;

“CBR” means California bearing ratio;

“cd” means candela;

“certified aerodrome” means an aerodrome whose operator has been granted an Aerodrome Certificate by the Authority

“Chief Fire Officer” means a person who has the responsibility of establishing and effectively managing all aspects of Rescue and Firefighting Services as per the requirements of these regulations

“CIE” means Commission Internationale de l’Éclairage;

“clearway” means a defined rectangular area on the ground or water under the control of the appropriate authority, selected or prepared as a suitable area over which an aeroplane may make a portion of its initial climb to a specified height;

“cm” means centimetre;

“conical surface” means a surface sloping upwards and outwards from the periphery of the inner horizontal surface;

“cyclic redundancy check (CRC)” means a mathematical algorithm applied to the digital expression of data that provides a level of assurance against loss or alteration of data;

“data accuracy” means a degree of conformance between the estimated or measured value and the true value.

“data integrity (assurance level)” means a degree of assurance that an aeronautical data and its value has not been lost or altered since the origination or authorized amendment;

“data quality” means a degree or level of confidence that the data provided meet the requirements of the data user in terms of accuracy, resolution and integrity (or equivalent assurance level), traceability, timeliness, completeness and format;

“datum” means any quantity or set of quantities that may serve as a reference or basis for the calculation of other quantities.

“de-icing/anti-icing facility” means a facility where frost, ice or snow is removed (de-icing) from the aeroplane to provide clean surfaces, or where clean surfaces of the aeroplane receive protection (anti-icing) against the formation of frost or ice and accumulation of snow or slush for a limited period of time.

“de-icing/anti-icing pad” means an area comprising an inner area for the parking of an aeroplane to receive de-icing/anti-icing treatment and an outer area for the manoeuvring of two or more mobile de-icing/anti-icing equipment.

“declared distances” means –

- (a) Take-off run available (TORA): The length of runway declared available and suitable for the ground run of an aeroplane taking off.
- (b) Take-off distance available (TODA): The length of the take-off run available plus the length of the clearway, if provided.
- (c) Accelerate-stop distance available (ASDA): The length of the take-off run available plus the length of the stopway, if provided.
- (d) Landing distance available (LDA): The length of runway which is declared available and suitable for the ground run of an aeroplane landing.

“dependent parallel approaches” means simultaneous approaches to parallel or near-parallel instrument runways where radar separation minima between aircraft on adjacent extended runway centre lines are prescribed;

“displaced threshold” means a threshold not located at the extremity of a runway;

“DME” means distance measuring equipment;

“effective intensity (for a flashing light)” is equal to the intensity of a fixed light of the same colour which will produce the same visual range under identical conditions of observation;

“ellipsoid height (geodetic height)” means the height related to the reference ellipsoid, measured along the ellipsoidal outer normal through the point in question.

“ELT” means emergency locator transmitter;

“emergency operations centre (EOC)” means a designated area on the aerodrome used in supporting and coordinating operations at aerodrome emergencies;

“fixed light” means a light having constant luminous intensity when observed from a fixed point;

“foreign object debris (FOD)” means an inanimate object within the movement area which has no operational or aeronautical function and which has the potential to be a hazard to aircraft operations;

“frangible object” means an object of low mass designed to break, distort, or yield on impact so as to present the minimum hazard to aircraft;

“ft” means foot or feet;

“full-scale emergency exercise” means assembling and utilisation of all the resources that would be available and used in a real emergency;

“geodetic datum” means a minimum set of parameters required to define location and orientation of the local reference system with respect to the global reference system/frame;

“geoid” means the equipotential surface in the gravity field of the Earth which coincides with the undisturbed mean sea level (MSL) extended continuously through the continents;

“geoid undulation” means the distance of the geoid above (positive) or below (negative) the mathematical reference ellipsoid;

“gregorian calendar” means the calendar in general use; first introduced in 1582 to define a year that more closely approximates the tropical year than the Julian calendar

“ground handling service” means services necessary for an aircraft’s arrival at, and departure from, an airport, other than air traffic services;

“hazard beacon” means an aeronautical beacon used to designate a danger to air navigation;

“heliport” means an aerodrome or a defined area on a structure intended to be used wholly or in part for the arrival, departure and surface movements of helicopters;

“high rise structure” means any building, mast, tower, hills, trees, crane, hangar, etc. (natural or man-made, permanent or temporary) considered to be of prominent height above ground level;

“holding bay” means a defined area where aircraft can be held, or bypassed, to facilitate efficient surface movement of aircraft;

“holdover time” means the estimated time the anti-icing fluid (treatment) will prevent the formation of ice and frost and the accumulation of snow on the protected (treated) surfaces of an aeroplane;

“hot spot” means a location on an aerodrome movement area with a history or potential risk of collision or runway incursion, and where heightened attention by pilots/drivers is necessary;

“human factors principles” means principles which apply to aeronautical design, certification, training, operations and maintenance and which seek safe interface between the human and other system components by proper consideration to human performance;

“human performance” means human capabilities and limitations which have an impact on the safety and efficiency of aeronautical operations;

“ICAO” means International Civil Aviation Organization;

“identification beacon” means an aeronautical beacon emitting a coded signal by means of which a particular point of reference can be identified;

“ILS” means instrument landing system;

“IMC” means instrument meteorological conditions;

“independent parallel approaches” means simultaneous approaches to parallel or near-parallel instrument runways where radar separation minima between aircraft on adjacent extended runway centre lines are not prescribed.

“independent parallel departures” means simultaneous departures from parallel or near-parallel instrument runways.

“inner approach surface” means a rectangular portion of the approach surface immediately preceding the threshold;

“inner horizontal surface” means a surface located in a horizontal plane above an aerodrome and its environs;

“inner transitional surface” means a surface similar to the transitional surface but closer to the runway;

“instrument runway” means one of the following types of runways intended for the operation of aircraft using instrument approach procedures:

- (a) non-precision approach runway – a runway served by visual aids and non-visual aid(s) intended for landing operations following an instrument approach operation type A and a visibility not less than 1000 m
- (b) precision approach runway, category I – a runway served by visual aids and non-visual aid(s) intended for landing operations following an instrument approach operation type B with a decision height (DH) not lower than 60 m or 200 ft and either a visibility not less than 800 m or a runway visual range not less than 550 m.

- (c) precision approach runway, category II – a runway served by visual aids and non-visual aid(s) intended for landing operations following an instrument approach operation type B with a decision height (DH) lower than 60 m or 200 ft but not lower than 30 m or 100 ft and a runway visual range not less than 300 m.
- (d) precision approach runway, category III – a runway served by visual aids and non-visual aid(s) intended for landing operations following an instrument approach operation type B with a decision height (DH) lower than 30m or 100ft, or no decision height and a runway visual range less than 300m, or no runway visual range limitation.

“integrity classification (aeronautical data)” means classification based upon the potential risk resulting from the use of corrupted data. Aeronautical data is classified as –

- (a) routine data: there is a very low probability when using corrupted routine data that the continued safe flight and landing of an aircraft would be severely at risk with the potential for catastrophe;
- (b) essential data: there is a low probability when using corrupted essential data that the continued safe flight and landing of an aircraft would be severely at risk with the potential for catastrophe; and
- (c) critical data: there is a high probability when using corrupted critical data that the continued safe flight and landing of an aircraft would be severely at risk with the potential for catastrophe.

“intermediate holding position” means a designated position intended for traffic control at which taxiing aircraft and vehicles shall stop and hold until further cleared to proceed, when so instructed by the aerodrome control tower;

“kg” means kilogram;

“km” means kilometer;

“km/h” means kilometer per hour;

“kts” means knots;

“L” means litre;

“landing area” means the part of a movement area intended for the landing or take-off of aircraft;

“landing direction indicator” means a device to indicate visually the direction currently designated for landing and for take-off;

“laser-beam critical flight zone (LCFZ)” means airspace in the proximity of an aerodrome but beyond the laser-beam free flight zone where the irradiance is restricted to a level unlikely to cause glare effects.

“laser-beam free flight zone (LFFZ)” means airspace in the immediate proximity of the aerodrome where the irradiance is restricted to a level unlikely to cause any visual disruption.

“laser-beam sensitive flight zone (LSFZ)” means airspace outside, and not necessarily contiguous with, the LFFZ and LCFZ where the irradiance is restricted to a level unlikely to cause flash-blindness or after-image effects.

“lighting system reliability” means the probability that the complete installation operates within the specified tolerances and that the system is operationally usable.

“m” means metre;

“m/s” means meters per second

“manoeuvring area” means that part of an aerodrome to be used for the take-off, landing, and taxiing of aircraft, excluding aprons;

“marker” means an object displayed above ground level in order to indicate an obstacle or delineate a boundary;

“marking” means a symbol or group of symbols displayed on the surface of the movement area in order to convey aeronautical information;

“mast” means a tall structure designed to support antennas/aerials for telecommunication and broadcasting; including electricity pylons and poles for wind turbines;

“movement area” means that part of an aerodrome to be used for the take-off, landing, and taxiing of aircraft, consisting of the manoeuvring area and the apron;

“MLS” means microwave landing system;

“mm” means millimetre;

“MN” means meganewton;

“MPa” means megapascal;

“MSL” means mean sea level;

“near-parallel runways” means non-intersecting runways whose extended centre lines have an angle of convergence or divergence of 15 degrees or less.

“NM” means nautical mile;

“non-instrument runway” means a runway intended for the operation of aircraft using visual approach procedures or an instrument approach procedure to a point beyond which the approach may continue in visual meteorological conditions.

“NOTAM” means notice to airmen;

“obstacle” means all fixed (whether temporary or permanent) and mobile objects, or parts thereof, that are located on an area intended for the surface movement of aircraft ; or that extend above a defined surface intended to protect aircraft in flight ; or stand outside those defined surfaces and that have been assessed as being a hazard to air navigation;

“obstacle free zone (OFZ)” means the airspace above the inner approach surface, inner transitional surfaces and balked landing surface and that portion of the strip bounded by these surfaces, which is not penetrated by any fixed obstacle other than a low-mass and frangibly mounted one required for air navigation purposes;

“obstacle limitation surfaces (OLS)” means series of surfaces that define the volume of airspace at and around an aerodrome to be kept free of obstacle in order to permit the intended aircraft operations to be conducted safely and to prevent the aerodrome from becoming unusable by the growth of obstacles around the aerodrome;

“on-scene commander” means person designated to take charge of the overall emergency operations;

“orthometric height” means height of a point related to the geoid, generally presented as an MSL elevation;

“outer main gear wheel span (OMGWS)” means the distance between the outside edges of the main gear wheels;

“PAPI” means precision approach path indicator;

“pavement classification number (PCN)” means a number expressing the bearing strength of a pavement for unrestricted operations;

“pavement classification rating (PCR)” means a number expressing the bearing strength of a pavement;

“primary runway” means a runway used in preference to others whenever conditions permit;

“protected flight zones” means airspace specifically designated to mitigate the hazardous effects of laser radiation.

“quality assurance manager” means a person who shall be responsible for the provision of a quality assurance system, to ensure compliance with, and the adequacy of, the procedures required by regulations, and for the continuance in improvement of standard;

“RFF” means rescue and firefighting;

“road” means an established surface route on the movement area meant for the exclusive use of vehicles;

“road-holding position” means a designated position at which vehicles may be required to hold;

“runway” means a defined rectangular area on a land aerodrome prepared for the landing and take-off of aircraft;

“runway condition assessment matrix (RCAM)” means a matrix allowing the assessment of the runway condition code, using associated procedures, from a set of observed runway surface condition(s) and pilot report of braking action;

“runway condition code (RWYCC)” means a number describing the runway surface condition to be used in the runway condition report;

“runway condition report (RCR)” means a comprehensive standardized report relating to runway surface condition(s) and its effect on the aeroplane landing and take-off performance;

“runway end safety area (RESA)” means an area symmetrical about the extended runway centre line and adjacent to the end of the strip primarily intended to reduce the risk of damage to an aeroplane undershooting or overrunning the runway;

“runway guard lights” means a light system intended to caution pilots or vehicle drivers that they are about to enter an active runway.

“runway-holding position” means a designated position intended to protect a runway, an obstacle limitation surface, or an ILS/MLS critical/sensitive area at which taxiing aircraft and vehicles shall stop and hold, unless otherwise authorized by the aerodrome control tower.

“runway strip” means a defined area including the runway and stop way, if provided, intended-

- (a) to reduce the risk of damage to aircraft running off a runway; and
- (b) to protect aircraft flying over it during take-off or landing operations.

“runway surface condition” means a description of the condition of the runway surface used in the runway condition report which establishes the basis for the determination of the runway condition code for aeroplane performance purposes;

- (a) “dry runway” a runway is considered dry if its surface is free of visible moisture and not contaminated within the area intended to be used;

- (b) “wet runway” means a runway surface which is covered by any visible dampness or water up to and including 3 mm deep within the intended area of use;
- (c) “slippery wet runway” means a wet runway where the surface friction characteristics of a significant portion of the runway have been determined to be degraded;
- (d) “contaminated runway” mean a runway is contaminated when a significant portion of the runway surface area, (whether in isolated areas or not), within the length and width being used is covered by one or more of the substances listed in the runway surface condition descriptors
- (e) “Runway surface condition descriptors” means
 - (i) “compacted snow” means snow that has been compacted into a solid mass such that aeroplane tires, at operating pressures and loadings, will run on the surface without significant further compaction or rutting of the surface;
 - (ii) “dry snow” means snow from which a snowball cannot readily be made;
 - (iii) “frost” means a mass that consists of ice crystals formed from airborne moisture on a surface whose temperature is below freezing;
 - (iv) “ice” means water that has frozen or compacted snow that has transitioned into ice, in cold and dry conditions;
 - (v) “slush” means snow that is so water-saturated that water will drain from it when a handful is picked up or will splatter if stepped on forcefully;
 - (vi) “standing water” means water of depth greater than 3 mm;
 - (vii) “wet ice” means ice with water on top of it or ice that is melting
 - (viii) “wet snow” means snow that contains enough water content to be able to make a well-compacted, solid snowball, but water will not squeeze out;

“runway turn pad” means a defined area on a land aerodrome adjacent to a runway for the purpose of completing a 180-degree turn on a runway.

“runway visual range (RVR)” means the range over which the pilot of an aircraft on the centre line of a runway can see the runway surface markings or the lights delineating the runway or identifying its centre line;

“safety area” means a defined area made up of either a runway or taxiway and the surrounding surfaces that are prepared or suitable for reducing the risk of damage to aircraft in the event of an undershoot, overshoot, or excursion from a runway or the unintentional departure from a taxiway.

“safety management system (SMS)” means a systematic approach to managing safety including the necessary organizational structure, accountabilities, policies and procedures.

“segregated parallel operations” means simultaneous operations on parallel or near-parallel instrument runways in which one runway is used exclusively for approaches and the other runway is used exclusively for departures.

“shoulder” means an area adjacent to the edge of a pavement so prepared as to provide a transition between the pavement and the adjacent surface;

“sign” means –

(a) Fixed message sign – a sign presenting only one message.

(b) Variable message sign – a sign capable of presenting several predetermined messages or no message, as applicable.

“signal area” means an area on an aerodrome used for the display of ground signals;

“station declination” means an alignment variation between the zero degree radial of a very high frequency omni-directional radio range (VOR) and true north, determined at the time the VOR station is calibrated.

“stopway” means a defined rectangular area on the ground at the end of take-off run available prepared as a suitable area in which an aircraft can be stopped in the case of an abandoned take-off;

“switch-over time (light)” means the time required for the actual intensity of a light measured in a given direction to fall from 50 per cent and recover to 50 per cent during a power supply changeover, when the light is being operated at intensities of 25 per cent or above;

“take-off climb surface” means an inclined plane or other specified surface beyond the end of a runway or clearway

“take-off runway” means a runway intended for take-off only;

“taxiway” means a defined path on a land aerodrome established for the taxiing of aircraft and intended to provide a link between one part of the aerodrome and another, including:

(a) aircraft stand taxilane. A portion of an apron designated as a taxiway and intended to provide access to aircraft stands only.

(b) apron taxiway. A portion of a taxiway system located on an apron and intended to provide a through taxi-route across the apron.

(c) rapid exit taxiway. A taxiway connected to a runway at an acute angle and designed to allow landing aeroplanes to turn off at higher speeds than are achieved on other exit taxiways thereby minimizing runway occupancy times.

“taxiway intersection” means a junction of two or more taxiways;

“taxiway strip” means an area including a taxiway intended to protect an aircraft operating on a taxiway and to reduce the risk of damage to an aircraft accidentally running off the taxiway;

“threshold” means the beginning of that portion of the runway usable for landing.

“touchdown zone” means the portion of a runway, beyond the threshold, where the intended landing aeroplanes first contact the runway.

“transitional surface” means a complex surface along the side of the strip and part of the side of the approach surface, that slopes upwards and outwards to the inner horizontal surface

“T-VASIS” means T visual approach slope indicator system;

“unservicable area” means a part of the movement area that is unfit and unavailable for use by aircraft;

“usability factor” means the percentage of time during which the use of a runway or system of runways is not restricted because of the crosswind component;

“VASIS” means visual approach slope indicator system;

“VOR” means very high frequency omni-directional radio range;

“WGS-84” means World Geodetic System – 1984;

“work area” means a part of an aerodrome in which maintenance or construction works are in progress;

“wildlife hazard” means a potential for a damaging aircraft collision with birds or animals on or near an aerodrome.

(2) Unless the context otherwise requires, the words and expressions used in these Regulations shall have the same meanings as in the Gambia Civil Aviation Act, 2018.

3. Applicability

These Regulations shall apply to-

(a) civil aerodromes intended for international operations or for public use;

- (b) those portions of aerodromes under the control of an individual or civil entity and serving civil aircraft operations of any class or category; and
- (c) providers of ground handling service at aerodromes outlined in sub-regulations (a) and (b) above.

PART II GENERAL

4. Establishment of a Common Reference System

The following common reference system shall be use, as applicable –

- (1) WGS-84 shall be used as the horizontal geodetic reference system. All reported aeronautical geographical coordinates indicating latitude and longitude expressed in terms of the WGS-84 geodetic reference datum.
- (2) MSL datum, which gives the relationship of gravity-related height to a surface known as the geoid, shall be used as the vertical reference system.
- (3) The Gregorian calendar and Coordinated Universal Time shall be used as the temporal reference system.
- (4) Any person who uses a different temporal reference system other than (3) above, shall have such information indicated in the AIP.

5. Establishment of Aerodromes

- (1) The Minister may approve the establishment and development of aerodromes anywhere in The Gambia.
- (2) Roads, approaches, apparatus, equipment, buildings and other accommodations in connection to such aerodromes shall be maintained by the owners in conformity with these regulations and any other requirement as may be prescribed by the Authority from time to time.

6. Design and Operation of Aerodrome

- (1) No person shall commence construction or reconstruction of an aerodrome without approval of the Authority
- (2) Pursuant to Regulation 5(1), an applicant shall submit to the Authority the following for evaluation —
 - (a) aerodrome layout plan, pavements profile, electrical systems, control tower, terminal and other operational buildings;

- (b) meteorological data from an approved meteorological organisation and detailed wind rose analysis for the runway orientation;
 - (c) pavement markings, lights and signs plans; and
 - (d) proof of pavement bearing strength determination.
- (3) No person shall operate an aerodrome in the Gambia for international operations or for public use unless such person is a holder of an Aerodrome Certificate granted by the Authority under these Regulations.

7. Inspection Authority

- (1) The Aerodrome Operator shall, without charge, at the request of an Aviation Safety Inspector, allow unlimited, unrestricted and unimpeded access and provide the equipment necessary to conduct any inspections, including unannounced inspections, or conduct tests of aerodrome facilities, equipment or operating procedures at the aerodrome to determine compliance with applicable parts of these Regulations for the purpose of ensuring the safety of aircraft.
- (2) Each aerodrome operator shall allow the Authority, or its authorised agents, access to any part of the aerodrome or any aerodrome facilities, equipment or records for the purpose of ensuring the safety of aerodrome operations.
- (3) Each aerodrome operator shall allow the Authority to conduct special inspections to ensure aviation safety:
- (a) as soon as practicable after any aircraft accident or incident;
 - (b) during the period of construction or repair of the aerodrome facilities or equipment that is critical to the safety of aerodrome operation; and
 - (c) during any other aerodrome conditions that could affect aviation safety.
- (4) The Authority shall –
- (a) give reasonable notice of any tests or inspection to be conducted at an aerodrome; and
 - (b) carry out the tests or inspection at a reasonable time.
- (5) Where unannounced inspections are to be conducted by the Authority, sub-regulation (4) (a) shall not apply.

8. Expenses

Any expense incurred by reason of anything done during the course of investigations, approval procedures, supervision, certification, inspections or any other reason which requires the intervention of the Authority in connection with an aerodrome, their

personnel, any of their equipment, or any services performed there, shall be paid by or be recoverable from the holder of the Aerodrome Certificate.

9. Restrictions

(1) The Authority shall restrict or prohibit flights by night from, or at any aerodrome at which adequate facilities for night flights are lacking; or where the terrain or other objects in the vicinity of the aerodrome could cause a hazard to the operation of aeroplanes or helicopters used in night flights.

(2) The Authority shall restrict or prohibit operation at an aerodrome either absolutely or subject to any exceptions or conditions that the Authority shall specify, if the restriction is necessary for aviation safety or in the public interest or both.

10. Prohibitions

(1) Except with the approval of the aerodrome operator, no aircraft operator shall park or abandon used or unused aircraft on the airside of the aerodrome.

(2) Except with the approval of the aerodrome operator, no person shall -

(a) drive a vehicle into restricted areas of the aerodrome, or the terminal building; or

(b) obstruct an entrance to or passage in the terminal building in such a manner as to inconvenience other aerodrome users.

(3) No person shall, on a certified aerodrome -

(a) obstruct or interfere with the authorised use of the aerodrome;

(b) obstruct any employee of the aerodrome operator acting in the execution of his or her duty in relation to the aerodrome;

(c) throw, leave, or drop anything capable of causing injury to any person or damage to property;

(d) dump any waste matter whatsoever elsewhere other than a place designated and approved for the purpose by the aerodrome operator;

(e) commit any nuisance, disorderly, or indecent act, write, draw or affix any profane, obscene or abusive materials;

(f) spill or release substances capable of causing air, water, or soil pollution.

(4) Except with permission of the aerodrome operator, no person shall -

(a) interfere or tamper with any part of the aerodrome or any equipment associated with the operation of the aerodrome;

- (b) gain access through restricted structures;
 - (c) carry out trade of any level and magnitude including foreign exchange;
 - (d) advertise in the aerodrome;
 - (e) handle passengers and baggage, or confront passengers and aerodrome users for unsolicited service.
- (5) Except with the approval of the aerodrome operator, no person shall supply any fuel to any aircraft except at a place and in a manner approved by the aerodrome operator.
- (6) The aerodrome operator shall subject any approval granted under this subsection to compliance with such conditions as the aerodrome operator may impose in order to safeguard the safety of persons and property on the aerodrome.

11. Exemptions

- (1) An applicant or a certificate holder may petition the Authority for an exemption from any requirement of this part if deemed necessary for the operation of airport provided that equivalent safety measure is ensured.
- (2) A petition filed under this regulation shall —
- (a) be submitted in writing at least 120 (one hundred and twenty) days before the proposed effective date of the exemption;
 - (b) explain the interest of the certificate holder in the action requested, including the nature and extent of relief sought; and
 - (c) contain information, views, or arguments that demonstrate that the requirements of a section of these Regulations being sought would be unreasonably costly, burdensome, or impractical.
- (3) The Authority may, by an instrument, exempt an aerodrome operator from complying with specific provisions of these Regulations.
- (4) The exemption process shall be in accordance with Part 1, Chapter 4 of the Gambia Civil Aviation Regulations 2018.
- (5) Before granting an exemption, the Authority shall take into account all relevant considerations relating to the interests of the safety of air navigation
- (6) An exemption is subject to the aerodrome operator complying with the conditions and procedures specified by the Authority in the exemption instrument as being necessary in the interest of safety.

(7) An exemption shall not relieve the aerodrome operator from his full responsibility for providing safe operating environment for aircraft using the aerodrome and all other activities on the aerodrome

(8) If the Authority gives the operator an exemption in accordance with the provisions of these Regulations, the aerodrome operator shall provide the following information in the Aerodrome Operations Manual-

(a) any identifying number given to the exemption by the Authority;

(b) the date on which the exemption came into effect; and

(c) any condition subject to which the exemption is granted.

(9) When an aerodrome does not meet the requirement for the grant of an Aerodrome Certificate, the Authority may determine, after evaluating the aeronautical studies conducted by the Aerodrome Operator, the conditions and procedures that are necessary to ensure a level of safety equivalent to that established by the relevant Regulations.

12. Deviations

(1) An aerodrome operator may deviate from a provision of these Regulations or from a procedure set out in the Aerodrome Manual in emergency conditions requiring immediate action for the protection of life, property, or safety of aircraft, to the extent required to meet that emergency.

(2) An aerodrome operator who deviates from a provision of these Regulations or from a procedure set out in the Aerodrome Manual shall, within 14 (fourteen) days after the deviation was made, notify the Authority, in writing, of the nature, extent, and duration of the deviation.

PART III OBSTACLE MANAGEMENT

13. Obstacle Restriction, Alteration and Removal

(1) The Authority may regulate or prohibit any structure which by virtue of its height, location or position is considered to constitute a hazard to air navigation.

(2) A person proposing any kind of construction or alteration described in sub-regulation (4) below shall obtain prior approval of the Authority by submitting an Application.

(3) The Application shall specify the locations, coordinates in WGS-84, heights, and the natural ground level above mean sea level of the construction or alteration for which approval is required.

(4) Any person who proposes to operate, construct or an alteration of any of the following shall apply to the Authority for approval -

- (a) any high-rise construction or alteration that shall result in an overall height of the structure above the ground level of –
 - (i) more than 10 (ten) meters at its site and within 5000 (five thousand) meters radius of an existing or proposed aerodrome; or
 - (ii) 46 (forty six) meters or more at its site and within a (ten) 10 nautical miles radius of an existing or proposed aerodrome
- (b) any construction or alteration which extends above an obstacle limitation surface;
- (c) any highway, railroad or other transverse way for mobile objects of which if adjusted upwards 4.8m (four meters and eight tenths) for roads and highways, 5.4m (five meters and four tenths) for railroads or the height of the highest mobile object that would traverse the road will exceed the standards prescribed in sub-regulation (a)(i) and (ii) above;
- (d) any object that would be in an instrument approach area;
- (e) any object located within an IFR en-route obstacle clearance area, and would necessitate an increase in an existing or planned minimum obstacle clearance altitude;
- (f) any structure that may discharge efflux at a velocity in excess of 4.3m/s (four meters and three tenths per second) within an obstacle limiting surface or higher than 60m (sixty meters) above ground level; or
- (g) any construction or alteration on any of the following-
 - (i) aerodrome or landing strip; or
 - (ii) an aerodrome under construction that is subject of a notice or proposal on file with the Authority.

(5) A person proposing to operate a light or laser within 18500m (eighteen thousand five hundred meters) of an airport reference point and below 3000m (three thousand meters) above ground level shall apply for approval from the Authority if -

- (a) its glare may affect a pilot's vision or the light or laser is liable to endanger aircraft;
- (b) the laser would produce exposures in navigable airspace exceeding the maximum permissible exposure defined for that Laser; or
- (c) it is likely to endanger aircraft by being mistaken for—

- (i) a light or part of a system of lights established or approved for display at or near an aerodrome; or
- (ii) a light marking a hazard in navigable airspace.

(6) An aerodrome operator shall monitor and report to the Authority any erection of high-rise man-made structures outside the boundary of aerodrome operator's aerodrome to ensure the safety of airspace for aircraft operations.

(7) An aeronautical study shall be conducted by the Authority of any construction or alteration for which a notice is submitted under sub-regulations (4)(a) to (g) above to determine the effect of the proposal upon the operation of air navigation facilities and the safe and efficient use of the navigable airspace.

(8) The study may include the physical and electromagnetic radiation effect the proposal may have on the operation of air navigation facility.

14. Evaluation of Structures at Aerodromes

Aerodrome owners and operators shall ensure that all structures including permanent or temporary in nature are evaluated by the Authority prior to commencement of work.

15. Notice of Use of Weapons and Pyrotechnics

(1) Any person proposing to use a weapon that fires or launches a projectile that has a trajectory higher than the following shall apply for, and obtain, approval of the Authority –

- (a) 45m (forty-five meters) if within 10km (ten kilometers) from the aerodrome reference point; or
- (b) 20m (twenty meters) if more than 15km (fifteen kilometers) from an aerodrome reference point.

(2) Any appropriate authority proposing to allow the use of weapons that will fire or launch a projectile that will have a trajectory higher than 45m (forty-five meters) within 15km (fifteen kilometers) from an aerodrome reference point shall notify the Authority of the proposal.

(3) No person shall engage in pyrotechnics displays that will involve the firing or launching of a projectile that will have a trajectory higher than 60m (sixty meters) within 15km (fifteen kilometers) from an aerodrome reference point.

(4) Any person who proposes to stage a pyrotechnics display that will involve the firing or launching of a projectile that will have a trajectory higher the following shall apply, and obtain, the approval of the Authority –

- (a) 45m (forty-five meters) if within 10km (ten kilometers) from an aerodrome reference point; or
- (b) 120m (one hundred and twenty meters) if more than 15km (fifteen kilometers) from an aerodrome reference point.

(5) A non-aeronautical ground light which, by reason of its intensity, configuration or colour, might be mistaken for aeronautical ground lights or which might endanger the safety of aircraft, shall be extinguished, screened or otherwise modified so as to eliminate such a possibility.

16. Requirement for an Aviation Height Clearance

(1) No person shall put up a structure, within the navigable airspace of the Gambia unless such a person is a holder of an Aviation Height Clearance granted under these Regulations.

(2) An application for an Aviation Height Clearance shall be in the form and manner prescribed by the Authority and the applicant shall pay the Authority's prescribed fees.

(3) The application letter shall contain the following information for "Off Aerodrome" proposal -

- (a) owner of the proposed structure;
- (b) address of the proposed structure;
- (c) WGS 84 coordinates of the site;
- (d) elevation above MSL of the site;
- (e) proposed height of the structure including antennas or other appurtenances; and
- (f) sketches and drawings showing the type of construction or alteration being proposed.

(4) The application letter shall contain the following supplemental information for "On-Aerodrome" proposal -

- (a) drawing, preferably scaled, showing location of the object in relation to nearest active runways;
- (b) perpendicular distance of the proposed structure to the nearest active runway centreline;
- (c) actual or extended distance along centreline from runway end to the perpendicular intercepts point;

- (d) ground elevation at the site of the proposed structure;
- (e) WGS 84 coordinates of the site;
- (f) proposed height of the structure including antennas or other appurtenances; and
- (g) sketches and drawings showing the type of construction or alteration being proposed.

17. Aeronautical Study for Construction and Erection of High Rise Structures

(1) The Authority shall conduct an aeronautical study when -

- (a) requested by the sponsor of any proposed construction or alteration for which an application is submitted;
- (b) the Authority determines a study is necessary; or
- (c) the study serves as the basis for-
 - (i) evaluating the effect of the construction or alteration on operating procedures;
 - (ii) determining the potential hazardous effect of the proposed construction on air navigation;
 - (iii) identifying mitigating measures to enhance safe air navigation;
 - (iv) Charting of new objects; or
 - (v) Such other factors as may be determined by the Authority.

(2) The Authority may conduct an aeronautical study to determine the impact of-

- (a) a proposed structure or
- (b) an existing structure that has not yet been studied by the Authority; or
- (c) an alteration of an existing structure on aeronautical operations, procedures, and the safety of flight.

(3) These studies shall include evaluating-

- (a) the impact on arrival, departure, and en route procedures for aircraft operating under visual flight rules;
- (b) the impact on arrival, departure, and en route procedures for aircraft operating under instrument flight rules;
- (c) the impact on existing and planned public use aerodromes;

- (d) aerodrome traffic capacity of existing public use aerodromes and public use aerodrome development plans received before the issuance of the final determination;
- (e) minimum obstacle clearance altitudes, minimum instrument flight rules altitudes, approved or planned instrument approach procedures, and departure procedures;
- (f) the potential effect on ATC radar, direction finders, ATC tower line-of-sight visibility, and physical or electromagnetic effects on air navigation, communication facilities, weather observation facilities and other surveillance systems;
- (g) the aeronautical effects resulting from the cumulative impact of a proposed construction or alteration of a structure when combined with the effects of other existing or proposed structures.

18. Site Inspection

A proposed site shall be assessed by the Authority to verify the accuracy of the information submitted by the applicant and for effective aeronautical studies of the structures.

19. Determinations

(1) The Authority shall issue a Determination stating whether the proposed construction or alteration would be a hazard to air navigation and will advise the applicant or any known interested persons.

(2) A Determination issued by the Authority shall state whether an evaluation of the proposed construction or alteration has resulted in a determination that the construction or alteration –

- (a) would not exceed any specification of these Regulations and would not be a hazard to air navigation;
- (b) would exceed a specification of these Regulations but would not be a hazard to air navigation;
- (c) would exceed a specification of these Regulations but would not be a hazard to air navigation subject to certain conditions;
- (d) would exceed a specification of these Regulations and would be a hazard to air navigation; or
- (e) would exceed a specification of these Regulations and requires further aeronautical study, subject to payment of a prescribed aeronautical

study fee by the applicant to determine whether it would be a hazard to air navigation

20. Refusal to Grant Aviation Height Clearance

(1) The Authority shall not grant AHC to any structure when the aeronautical study concludes that the proposed construction or alteration will exceed an obstruction standard and would have a substantial aeronautical impact.

(2) Notwithstanding sub-regulation (1), the Authority may grant an AHC when the aeronautical study concludes that a temporary structure will exceed an obstruction standard but would not have a substantial aeronautical impact to air navigation, provided all relevant conditional provisions, notice requirements, operational hours, marking and lightings as appropriate to prevent potential problems are put in place.

21. Grant of Aviation Height Clearance to Erect Structures

The Authority shall issue an AHC if the result of aeronautical study carried out indicates that the erection of the structure on the proposed site –

- (a) would not exceed any specification of these Regulations and would not be a hazard to air navigation;
- (b) would exceed a specification of these Regulations but would not be a hazard to air navigation; or
- (c) would exceed a specification of these Regulations but would not be a hazard to air navigation subject to certain conditions provided the precedent conditions are satisfactory fulfilled.

22. Dismantling of Structures

The Authority shall use all legal means of ensuring the removal of any structure which is erected or constructed without compliance with the provisions of these Regulations.

23. Obligations of Aviation Height Clearance Holder

The holder of an AHC shall ensure –

- (1) that the height of the structure does not exceed the height for which AHC has been granted;
- (2) that the structure is appropriately marked and lighted as stipulated in the conditions for granting the AHC; and

- (3) that the painting and warning lights to be used on the approved structures conform to appropriate standards for conspicuity that would better serve aviation safety.

24. Markings and Lights

The holder of an AHC shall ensure the following objects are lighted in periods of low visibility or at night –

- (1) any structure which is more than 10m (ten meters) above an aerodrome and located within 2km (two kilometers) from the closest edge of a runway or helipad;
- (2) any structure which is more than 20m (twenty meters) above an aerodrome and is located within 6km (six kilometers) from the closest edge of a runway or helipad;
- (3) any structure which is more than 30m (thirty meters) above an aerodrome and is located within 10km (ten kilometers) from the closest edge of a runway or helipad; or
- (4) any structure which is more than 45m (forty-five meters) above ground at its location

25. Markers

The holder of an AHC shall ensure –

- (1) markers are used to highlight structures when it is impractical to make them conspicuous by painting or when additional conspicuity is necessary for aviation safety.
- (2) markers are –
 - (a) displayed in conspicuous positions on or adjacent to the structures so as to retain the general definition of the structure;
 - (b) distinctly shaped spherical, or cylindrical so they are not mistaken for items that are used to convey other information and shall be recognizable in clear air from a distance of at least 4000ft (four thousand feet) and in all directions from which aircraft are likely to approach.

26. Maintenance

The holder of an AHC shall ensure –

- (1) structure surfaces are repainted when the colour changes noticeably or its effectiveness is reduced by scaling, oxidation, chipping, or layers of contamination.
- (2) markers are replaced when faded or otherwise deteriorated and obstruction warning lights shall be closely monitored by visual or automatic means to ensure that burnt lights are replaced without delay.

27. Period of Validity and Renewal for Temporary Structures

The AHC shall remain in force for a period stated in the clearance when it shall be due for renewal unless suspended or cancelled by the Authority.

28. Surveillance Inspection of Structures in Gambian Airspace

The Authority shall carry out surveillance inspection of existing structures within the Gambian Airspace on aerodrome or off aerodrome to ascertain the compliance level of the structures with safety measures in terms of painting, markers, lightings and approved heights for the structures.

29. Suspension or Cancellation

- (1) The Authority shall suspend or cancel an AHC if there is a variation in the approved height of a structure without notification to the Authority or the holder of the AHC fails to carry out appropriate maintenance regarding the painting, markers and warning lights on the structure.
- (2) The holder of a suspended or cancelled AHC shall ensure that the anomalies that caused the suspension or cancellation are addressed within 21 (twenty-one) days or have the structure dismantled.

30. Change of Ownership

- (1) The holder of AHC shall notify the Authority whenever there is a change in ownership of a structure.
- (2) The Authority may approve the transfer of an AHC to the new owner of a structure if:
 - (a) the current holder of the AHC notifies the Authority in writing of the change in ownership of the structure together with the details of the proposed transferee; and
 - (b) the proposed transferee applies to the Authority further to requirements of Regulation 12.

PART IV AERODROME CERTIFICATION

31. Requirements for an Aerodrome Certificate

- (1) All Aerodromes in the Gambia used for international operations or for public use shall be certified in accordance with these Regulations.
- (2) No person may operate an aerodrome intended for international operations or for public use without an Aerodrome Certificate granted by the Authority in accordance with this Part.
- (3) As part of the certification process, an applicant shall submit an aerodrome manual which will include all pertinent information on the aerodrome site, facilities, services, equipment, operating procedures, organization and management including a safety management system for approval or acceptance prior to granting of the aerodrome certificate
- (4) No person shall operate an aerodrome without an Aerodrome Certificate where the Authority is of the opinion that the nature of the aerodrome operations requires certification.
- (5) The operator of an aerodrome for which an Aerodrome Certificate is not required shall nevertheless apply to the Authority for a Landing Strip Certificate.

32. Register of Aerodromes and Aerodrome Certificates

- (1) The Authority shall maintain a register of all Aerodrome Certificates issued under these Regulations.
- (2) The Authority shall also maintain a register of all aerodromes situated in The Gambia whether certified or not.
- (3) The registers shall contain the following particulars-
 - (a) the full name, and if any, the trade name of the holder of the certificate;
 - (b) the postal address of the holder of the certificate or owner of the aerodrome;
 - (c) the name and the location of the aerodrome;
 - (d) the number of the certificate issued for certified aerodromes;
 - (e) the nationality of the holder of the certificate or owner of the aerodrome;
and
 - (f) file reference number of the initial and each subsequent safety inspection record and audit report in respect of each aerodrome certified.

(4) The particulars referred to in sub-regulation (3) will be recorded in the register within 7 (seven) days from the date on which the certificate was issued by the Authority.

(5) Persons who intend to access the register for the purpose of obtaining information shall apply in writing to the Authority and shall pay a record search fee as prescribed by the Authority.

33. Application for an Aerodrome Certificate

(1) An applicant for an Aerodrome Certificate shall submit an application to the Authority in the form and manner prescribed by the Authority.

(2) An application for an Aerodrome Certificate shall include -

- (a) aerodrome manual which will include all pertinent information on the aerodrome site, facilities, services, equipment, operating procedures, organization and management including a safety management system;
- (b) Statement of Compliance demonstrating that the aerodrome operator's Aerodrome Manual is in compliance with the relevant provisions of these Regulations;
- (c) the plans of the Aerodrome as specified in Schedule 1.1 including obstacle charts showing details of obstacles, obstruction marking and lighting;
- (d) Evidence of lawful entitlement to the land;
- (e) security clearance from the Government;
- (f) Environmental Impact Assessment and Management Plan approval from the National Environment Agency;
- (g) the proof of payment of appropriate fee as prescribed by the Authority;
- (h) adequate insurance cover; and
- (i) particulars of non-compliance with, or deviations from the standards prescribed in these Regulations.

34. Grant of an Aerodrome Certificate

(1) Subject to the provisions in (2) below and Regulation 35, the Authority may approve the application and approve the aerodrome manual submitted under Regulation 47 and grant an Aerodrome Certificate to the applicant.

(2) Before granting an Aerodrome Certificate, the Authority shall be satisfied that -

- (a) the applicant and his or her staff have the necessary competence and experience to operate and maintain the aerodrome properly;
- (b) the aerodrome manual prepared for the applicant's aerodrome accurately describes the facilities, services and equipment at the aerodrome;
- (c) the aerodrome facilities, services and equipment conforms with the standards specified in these Regulations;
- (d) aerodrome operating procedures make satisfactory provision for the safety of aircraft; and
- (e) an acceptable safety management system is in place at the aerodrome.

(3) The Authority may request for additional documents in support of the application where it deems it necessary and an applicant shall provide such requested documents.

35. Refusal to Grant an Aerodrome Certificate

(1) The Authority may refuse to grant an Aerodrome Certificate to an applicant.

(2) Where the Authority refuses to grant an Aerodrome Certificate to an applicant, the Authority shall give the applicant a written notice stating the reasons for the refusal, not later than 14 (fourteen) days after the date of refusal.

36. Aerodrome Certificate

(1) An Aerodrome Certificate shall consist of the following two documents -

- (a) a one-paged certificate signed by the Authority; and
- (b) a multi-paged operations specification signed by the Authority and the aerodrome operator containing the terms, conditions and authorisations.

(2) An Aerodrome Certificate shall contain the following items and be in a format as shown in Schedule 1.2-

- (a) the certificate number;
- (b) name and address of the aerodrome;
- (c) latitude and longitude;
- (d) date of issue and period of validity; and
- (e) authority's signature

(3) The operation specifications shall contain-

- (a) the certificate number;

- (b) effective date;
- (c) terms, conditions, authorizations and deviations; and
- (d) authority signature.

(4) The certificate issued to each aerodrome operator must be available on the premises for inspection by the Authority and the public.

37. Endorsement of Conditions of an Aerodrome Certificate

(1) The Authority, when granting the Aerodrome Certificate shall endorse the operating conditions for the type, use, and other details of the aerodrome.

(2) The Authority may impose conditions, sanctions or operating restrictions on an aerodrome certificate in response to any non-compliance with these Regulations and unresolved safety concerns. Such conditions, sanctions or operating restrictions may be imposed or withdrawn as the result of an aerodrome audit, inspections or other surveillance activity undertaken by the Authority

38. Duration of an Aerodrome Certificate

An Aerodrome Certificate remains in force for a period of 3 (three) years, unless it is amended, suspended or revoked by the Authority.

39. Amendment of an Aerodrome Certificate

The Authority shall amend an Aerodrome Certificate, provided that the requirements of Regulation 34(2) have been met, where-

- (1) there is a change in the ownership or management of the aerodrome;
- (2) there is a change in the use or operation of the aerodrome;
- (3) there is a change in the boundaries of the aerodromes; or
- (4) the holder of the Aerodrome Certificate requests an amendment.

40. Renewal of an Aerodrome Certificate

(1) An aerodrome operator shall ensure that renewal of his or her Aerodrome Certificate is commenced not less than 90 (ninety) days to the date of expiration of his or her certificate.

(2) An aerodrome certificate shall be renewed by the Authority upon applicant meeting the conditions on which it was granted and any other requirements that may be applicable at the time of renewal.

41. Suspension of an Aerodrome Certificate

(1) The Authority may, by written notice to the holder of an Aerodrome Certificate, suspend an Aerodrome Certificate if-

- (a) a condition to which the certificate in subject has been breached;
- (b) the aerodrome facilities, operations or maintenance are not of the standard required in the interests of the safety of air navigation;
- (c) the aerodrome operator's safety management system is found to be inadequate;
- (d) it is in the interest of operational safety;
- (e) all other means for timely correction of the unsafe condition or ensuring safe aircraft operations have not yielded the required results;
- (f) the technical proficiency or qualifications of the aerodrome operator to perform the duties to meet the critical safety requirements in accordance with the regulations are found inadequate;
- (g) the operator resists or is unwilling to take action to correct or mitigate the condition affecting aviation safety; or
- (h) the operator wilfully fails to perform an already agreed upon corrective action and suspension of the certificate is the last resort to avoid unsafe operations in the aerodrome movement area.

(2) Before suspending an Aerodrome Certificate, the Authority shall give to the holder a show cause notice that -

- (a) sets out the facts and circumstances that, in the opinion of the Authority, would justify the suspension; and
- (b) invite the holder to show cause, in writing within 14 (fourteen) days after the date of the notice, why the certificate should not be suspended.

(3) The Authority shall take into account any written submission that the holder makes to the Authority within the time allowed.

42. Transfer of an Aerodrome Certificate

(1) The Authority may approve the transfer of an Aerodrome Certificate when –

- (a) the current holder of the Aerodrome Certificate notifies the Authority, in writing, at least 90 (ninety) days before ceasing to operate the Aerodrome, that the current holder will cease to operate the aerodrome as of the date specified in the notice;
- (b) the current holder of the Aerodrome Certificate notifies the Authority in writing, of the name of the transferee;

(c) the transferee applies to the Authority in writing, within 90 (ninety) days before the current holder of the Aerodrome Certificate ceases to operate the aerodrome; and

(d) the requirements set out in Regulation 34 (2) are met by the transferee.

(2) If the Authority does not consent to the transfer of an Aerodrome Certificate, it shall notify the transferee in writing, of its reasons not later than 30 (thirty) days before the current holder plans to cease operation of the aerodrome.

43. Surrender of an Aerodrome Certificate

(1) The holder of an Aerodrome Certificate shall give the Authority not less than 90 (ninety) days written notice of the date on which the certificate is to be surrendered in order that suitable action can be taken.

(2) The Authority shall cancel the certificate on the date specified in the notice.

44. Interim Aerodrome Certificate

(1) The Authority may issue an Interim Aerodrome Certificate to the applicant referred to in Regulation 33 or the proposed transferee of an Aerodrome Certificate referred to in Regulation 42 authorizing the applicant or transferee to operate an Aerodrome if the Authority is satisfied that-

(a) an Aerodrome Certificate in respect of the aerodrome will be issued to the applicant or transferred to the transferee as soon as the application procedure for the grant or transfer of an Aerodrome Certificate has been completed; and

(b) the grant of the Interim Certificate is in the public interest and is not detrimental to aviation safety.

(2) An Interim Aerodrome Certificate issued pursuant to sub-regulation (1) shall expire on-

(a) the date on which the Aerodrome Certificate is issued or transferred, or

(b) the expiry date specified in the interim Aerodrome Certificate;

whichever is earlier.

(3) An Interim Aerodrome Certificate shall be valid for a period of 180 (one hundred and eighty) days unless it is revoked by the Authority

(4) These Regulations apply to an Interim Aerodrome Certificate in the same manner as they apply to an Aerodrome Certificate

45. Revocation of an Aerodrome Certificate

(1) The Authority shall, by written notice given to the holder of an Aerodrome Certificate, revoke an Aerodrome Certificate if-

- (a) an aerodrome operator is incapable, or unwilling to carry out corrective action, or has committed, or repeated serious violations;
- (b) an aerodrome operator has demonstrated a lack of responsibility, such as deliberate and flagrant acts of non-compliance or falsification of records jeopardizing aviation safety; or
- (c) an aerodrome operator has made it convincingly clear that the continued operation of the aerodrome will be detrimental to the public interest.

(2) Before revoking an Aerodrome Certificate, the Authority shall give to the holder a "show cause notice" that-

- (a) sets out the facts and circumstances that, in the opinion of the Authority, would justify the revocation; and
- (b) invites the holder to show cause, in writing, within 14 (fourteen) days after the date of the notice, why the certificate should not be revoked.

(3) Notwithstanding the provisions of sub-regulation (2) above, if the Authority finds that immediate revocation is required for the safety of air transportation, the Authority may revoke the Aerodrome Certificate, without stay on the date stipulated by the Authority.

(4) The Authority shall take into account any written submission that the holder makes to the Authority within the time allowed.

46. Management Personnel Requirements

(1) Prior to the grant of an Aerodrome Certificate and on an on-going basis, an aerodrome operator shall engage, employ or contract:

- (a) sufficient and qualified personnel for the planned tasks and activities to be performed related to the operation, maintenance and management of the aerodrome in accordance with the applicable requirements and the aerodrome operator's training programme; and
- (b) sufficient number of supervisors to defined duties and responsibilities, taking into account the structure of the organisation and the number of personnel employed.

(2) An aerodrome operator shall appoint an accountable manager, acceptable to the Authority, who has full control of the resources, final authority over operations under the certificate the organization and ultimate responsibility and accountability for the establishment, implementation and maintenance of the SMS; safety policies and the resolution of all safety issues.

(3) An aerodrome operator shall nominate post holders, acceptable to the Authority, who are responsible for the management and supervision of safety critical aspects for the aerodrome operation.

(4) If fixed wing operations occur at the aerodrome, an aerodrome operator shall have qualified personnel, with proven competency and acceptable to the Authority, available and serving full-time in the following positions or their equivalent-

- (a) Aerodrome Safety Manager;
- (b) Aerodrome Operations Manager;
- (c) Aerodrome Maintenance Manager;
- (d) Chief Fire Officer; and
- (e) Quality Assurance Manager

(5) The Authority may approve positions or number of positions other than those listed, if the aerodrome operator is able to show that it can perform the operations of the aerodrome with the highest degree of safety under the direction of few or different categories of management personnel due to the size, nature and complexity of the organization.

(6) Additional management personnel requirements are contained in Schedule 1.3

(7) An aerodrome operator shall ensure that any change of a nominated Post Holder is notified to the Authority with supporting evidence.

(8) An aerodrome operator shall update its Aerodrome Manual including the organizational structure with respect to accepted post holders.

(9) An aerodrome operator shall establish and implement a training programme to maintain the competency of the safety critical personnel

(10) An aerodrome operator shall maintain appropriate qualification training and proficiency check records to demonstrate compliance with the requirements in sub-regulation (9).

PART V AERODROME MANUAL

47. Preparation of the Aerodrome Manual

(1) An applicant for an Aerodrome Certificate shall submit to the Authority an aerodrome manual for approval.

(2) The Aerodrome Manual shall-

- (a) be typewritten or printed, and signed by the aerodrome operator;

- (b) be in a format that is easy to revise;
- (c) have a system for recording the current pages and any amendments thereto, including a page for logging revisions;
- (d) be organised in a manner that facilitates the preparation, review and acceptance or approval process;
- (e) contain all pertinent information concerning the aerodrome site, facilities, services, equipment, operating procedures, organization and management; and
- (f) demonstrate that the aerodrome conforms with the requirements and specifications in these Regulations.

(3) The Aerodrome Operator shall include the particulars provided in Schedule 1.1 in an aerodrome manual.

(4) If a required particular is not included in the aerodrome manual because it is not applicable to the aerodrome, the aerodrome operator must state in the manual the reason for non-applicability of the particular.

48. Approval of the Aerodrome Manual

The Authority shall approve the Aerodrome Manual and any amendments thereto, provided they meet the requirement of these Regulations.

49. Location of the Aerodrome Manual

(1) The aerodrome operator shall provide the Authority with a complete and current copy of the Aerodrome Manual.

(2) The aerodrome operator shall keep at least one complete and current copy of the Aerodrome Manual at the aerodrome and one copy at the operator's principal place of business if other than the aerodrome.

(3) The aerodrome operator shall make a copy of the Aerodrome Manual available for inspection by authorized officers of the Authority.

50. Aerodrome Manual Controller

The aerodrome operator shall appoint a person to be the Aerodrome Manual Controller, whose functions shall include-

- (1) keeping a record of persons who hold copies of the whole or part of the Aerodrome Manual; and
- (2) updating of information in the manual given to those holders referred to in sub-regulation (1).

51. Amendment of the Aerodrome Manual

- (1) To maintain the accuracy of the Aerodrome Manual, the Authority may issue a written directive to an aerodrome operator requiring the operator to alter or amend the manual in accordance with that directive.
- (2) An aerodrome operator shall alter or amend the Aerodrome Manual, whenever necessary, in order to maintain the accuracy of the information in the manual.
- (3) An aerodrome operator shall submit in writing a proposed amendment to its Aerodrome Manual to the Authority at least 30 (thirty) days before the proposed effective date of the amendment or alteration, unless a shorter filing period is allowed by the Authority.
- (4) In the case of amendments initiated by the Authority, the Authority shall notify the operator of the aerodrome of the proposed amendment, in writing, fixing a reasonable period within which the operator may submit written information, views, and arguments on the amendment. After considering all relevant materials presented, the Authority shall notify the operator within 30 (thirty) days of any amendment adopted, or rescind the notice. The amendment becomes effective not less than 30 (thirty) days after the operator receives notice of it.
- (5) Notwithstanding the provisions of sub-regulation (4), if the Authority finds there is an emergency requiring immediate action with respect to the safety of air transportation, the Authority shall issue an amendment, effective without stay on the date the operator receives notice of it and the Authority shall incorporate the findings of the emergency and a brief statement of the reason for the findings in the notice of the amendment.

PART VI OBLIGATIONS OF AN AERODROME OPERATOR

52. General Obligations of the Aerodrome Operator

The grant of an Aerodrome Certificate obliges the aerodrome operator to ensure the safety, regularity and efficiency of operations at the aerodrome, to allow authorized officers of the Authority access to the aerodrome to carry out safety audits, inspections and testing and to be responsible for notifying and reporting to the Authority as prescribed in these Regulations.

53. Compliance with Standards and Practices

- (1) An aerodrome operator shall comply with the standards and practices specified in these Regulations and with any conditions endorsed in the Aerodrome Certificate.

(2) An applicant for, or a holder of, an Aerodrome Certificate shall integrate architectural and infrastructure-related requirements for the optimum implementation of international civil aviation security measures into the design and construction of new facilities and alterations to existing facilities at an aerodrome.

(3) An applicant for, or a holder of, an Aerodrome Certificate shall take into account, where appropriate, land-use and environmental control measures in the design of aerodromes.

54. Compliance with Aerodrome Design Requirements

(1) An applicant for, or a holder of, an Aerodrome Certificate shall provide the Authority with the following in the aerodrome manual-

- (a) aerodrome data
- (b) physical characteristics;
- (c) obstacle limitation surface;
- (d) visual aids for navigation, denoting obstacle and the restricted use areas;
- (e) aerodrome equipment and installation;
- (f) electrical systems and aerodrome maintenance.
- (g) an airspace classification appropriate to the characteristics of the aircraft it intends to serve, the lowest meteorological minima for each runway, and the ambient light conditions expected during the operation of aircraft
- (h) the physical characteristics, obstacle limitation surfaces, visual aids, equipment and installation, electrical system, shall comply with the aerodrome design standards of these Regulations.

(2) The airfield lighting electrical system at an aerodrome shall be designed in such a way as to ensure that every approach, runway and taxiway lighting systems shall be interleaved up to at least two series circuits to ensure visual guidance in the event of power failure on any of the circuits.

55. Establishment of an Aerodrome Reference Code

(1) An aerodrome operator shall establish an aerodrome reference code for aerodrome planning purposes, consisting of a code number and code letter, in accordance with the characteristics of the aeroplane for which the aerodrome facility is intended to serve.

(2) An aerodrome operator shall determine an aerodrome reference code in accordance with the specifications set out in Schedule 2.1 .

(3) An aerodrome operator's aerodrome reference code number and letter shall have the same meanings as assigned in Schedule 2.1.

(4) An aerodrome operator's aerodrome reference code number for element 1 shall be the code number which corresponds to the highest value of the aeroplane reference field length of the aeroplane for which the runway is intended as determined from code element 1 of Schedule 2.1.

(5) An aerodrome operator's aerodrome reference code letter for element 2 shall be the code letter which corresponds to the greatest wingspan of the aeroplane for which the aerodrome facility is intended as determined from code element 2 of Schedule 2.1.

56. Competence of Operational and Maintenance Personnel

(1) An aerodrome operator shall employ adequate numbers of qualified and skilled personnel to perform all critical activities for aerodrome operation and maintenance.

(2) An aerodrome operator shall train all personnel who access movement and safety areas and perform duties in compliance with the requirements of these Regulations.

(3) The training shall be completed prior to the initial performance of such duties for all personnel.

(4) All personnel shall be retrained at least once every 3 (three) years.

(5) The curriculum for initial and recurrent training shall include at least the following areas-

- (a) aerodrome familiarisation, including aerodrome marking, lighting, and signs system;
- (b) procedures for access to, and operation in, movement areas and safety areas;
- (c) aerodrome emergency plan;
- (d) aerodrome communications, including radio communication between the air traffic control tower and personnel,
- (e) use of the common traffic advisory frequency if there is no air traffic control tower or the tower is not in operation, and procedures for reporting unsafe aerodrome conditions;
- (f) duties required under the Aerodrome Manual and the requirements of this Regulation;
- (g) any additional subject areas required under Regulations 71, 73, 206 and 225 as appropriate;

- (h) in respect of aerodrome maintenance, the training of personnel shall include the following areas as appropriate-
 - (i) maintenance of paved and unpaved areas;
 - (ii) aerodrome safety areas;
 - (iii) aerodrome drainage and fencing;
 - (iv) aerodrome visual aids and electrical systems;
 - (v) passenger and cargo building facilities.
- (i) make a record of all training completed by each individual in compliance with this section that includes, at a minimum, a description and date of training received and provide the Authority with a copy, upon request;
- (j) as appropriate, comply with the following training requirements-
 - (i) Aircraft Rescue and Fire Fighting operational requirements,
 - (ii) Ground Vehicles and Pedestrians,
 - (iii) Aerodrome Inspection programme,
 - (iv) Wildlife Hazard management.

(6) Where the Authority requires competency certification for the Aerodrome Operator's personnel, it shall employ only those persons possessing such certificates

(7) An aerodrome operator shall implement an approved program to upgrade the competency of its personnel.

(8) An aerodrome operator shall submit to the Authority for approval the training programme for maintenance and operational personnel.

57. Aerodrome Operations and Maintenance

(1) Subject to any directives that the Authority shall issue, the aerodrome operator shall operate and maintain the aerodrome in accordance with the procedures set out in the Aerodrome Manual.

(2) The Authority shall give written directives to an aerodrome operator to alter the procedures set out in the Aerodrome Manual, to ensure the safety of aircraft and maintenance of the aerodrome facilities.

(3) An aerodrome operator shall-

- (a) ensure proper and efficient maintenance of the aerodrome facilities;
- (b) provide and maintain navigational visual aids which include: wind direction indicators, Airfield Lightings, Markings, Markers and Signs on the runway;

- (c) provide and maintain runway surfaces including but not limited to surfacing and resurfacing, frictional coefficients, aqua planning and pavement bearing strength values of the runway;
 - (d) submit and implement a corrective action plan for mitigating the safety concerns at an aerodrome;
 - (e) maintain heliport surfaces and provide proof of friction test on helideck with a minimum friction coefficient of 0.65 (sixty-five hundredths); and
 - (f) carry out 75kg (seventy-five kilogrammes) hammer drop test on helideck safety net.
- (4) An aerodrome operator shall notify ATC that a runway or portion thereof may be slippery when wet.
- (5) A runway or portion thereof shall be determined as being slippery when wet, when the friction measurements show that the runway surface friction characteristics as measured by a continuous friction measuring device are below the minimum friction level specified in these Regulations.
- (6) The Aerodrome operator shall coordinate with the ATS provider in order to be satisfied that appropriate air traffic services are available to ensure the safety of aircraft in the airspace associated with the aerodrome.
- (7) The coordination shall cover other areas related to safety such as aeronautical information services, air traffic services, designated meteorological authorities and security.
- (8) An Aerodrome operator shall-
- (a) ensure that any person accessing the airside, whether for work or inspection purposes, shall wear a yellow reflective jacket except orange reflective jacket for marshallers.
 - (b) ensure proper and efficient maintenance of the aerodrome facilities.
 - (c) carry out checks, preventive maintenance and repairs on the aerodrome facilities, using a maintenance programme.
 - (d) coordinate work and ensure compliance with safety requirements for routine maintenance, minor or major construction, or maintenance work at the aerodrome.

58. Aerodrome Operator's Safety Management System

- (1) An aerodrome operator shall establish and implement a SMS, acceptable to the Authority.

(2) Pursuant to sub-regulation (1), the structure of the organization, duties, powers and responsibilities of the officials in the organizational structure shall be described, with a view to ensuring that operations are carried out in a demonstrably controlled way and are improved where necessary.

(3) An aerodrome operator shall require all users of the aerodrome to comply with its approved SMS and the requirements laid down by the aerodrome operator with regard to safety at the aerodrome and the aerodrome operator shall monitor such compliance.

(4) An aerodrome operator shall require all users of the aerodrome to cooperate in the program to promote safety at, and the safe use of, the aerodrome by immediately informing it of any accidents, incidents, defects and faults which have a bearing on safety.

(5) An aerodrome operator may also arrange for an external audit and inspection programme for evaluating other users, including fixed-based operators, ground handling agencies and other organizations working at the Aerodrome.

59. Aerodrome Operator's Internal Safety Audits and Safety Reporting

(1) An aerodrome operator shall arrange for an audit of the SMS including inspection of the aerodrome facilities and equipment. The audit shall cover the aerodrome operator's own functions. An aerodrome operator shall also arrange for an external audit and inspection programme for evaluating other users, including fixed-base operators, ground handling agencies and other organizations working at the aerodrome.

(2) The audits referred to in sub-regulation (1), shall be carried out every 12 (twelve) months or as agreed with the Authority.

(3) An aerodrome operator shall ensure that the audit reports, including the report of the aerodrome facilities, services and equipment, are prepared by suitably qualified safety experts.

(4) An aerodrome operator shall retain a copy of the reports referred to in sub-regulation (3), for a minimum period of 24 (twenty-four) months. The Authority may request a copy of the reports for its review and reference.

(5) The reports shall be prepared and signed by the person who carried out the audits and inspections.

60. Quality Control Programme

(1) An aerodrome operator shall implement a quality control programme.

(2) The quality control programme shall include-

- (a) the maintenance of aerodrome installations, equipment and terminal building facilities;
- (b) the delivery of quality service to passengers and aircraft operators; and
- (c) the measurement of the quality of service.

(3) An aerodrome operator shall, when developing the quality control programme, pay attention to-

- (a) departing and arriving passengers and baggage clearing time;
- (b) the provision of flight information to aerodrome users;
- (c) sanitation;
- (d) directional signs;
- (e) lighting; and
- (f) ambient temperature conditions.

61. Briefing Room

(1) An aerodrome operator shall provide suitable and easily accessible space to be used for the purpose of crew briefing at the aerodrome.

(2) A heliport operator shall provide a briefing room for passenger safety briefing

62. Continued Surveillance and Inspections

(1) Personnel so authorized by the Authority shall inspect and carry out tests on the aerodrome facilities, services and equipment, inspect the aerodrome operator's documents and records and verify the aerodrome operator's safety management system before the Aerodrome Certificate is granted or renewed and, subsequently, at any other time, for the purpose of ensuring safety at the aerodrome.

(2) The Authority shall carry out periodic inspections and audits of aerodrome operators and service providers including aerodrome facilities, services and equipment in order to meet its continuing surveillance obligation and ensure safety of aerodrome operations.

(3) An aerodrome operator shall, at the request of the person referred to in sub-regulation (1), allow access to any part of the aerodrome or any aerodrome facility, including equipment, records, documents and operational personnel, for the purpose referred to in sub-regulation (1).

(4) The aerodrome operator shall cooperate with personnel so authorized by the Authority in conducting the activities referred to in sub-regulation (1).

63. Removal of Obstructions from the Aerodrome Surface

An aerodrome operator shall remove from the aerodrome surface any vehicle or other obstruction that is likely to be hazardous.

64. Special Inspections

An aerodrome operator shall inspect an aerodrome, as circumstances require, to ensure aviation safety –

- (a) as soon as practicable after any aircraft accident or incident;
- (b) during any period of construction or repair of the aerodrome facilities or equipment that is critical to the safety of aircraft operation;
- (c) after any period of adverse weather; and
- (d) at any other time when there are conditions at the aerodrome that could affect aviation safety.

65. Notifying and Reporting

(1) An aerodrome operator shall adhere to the requirements of notifying and reporting to the Authority, ATC, and pilots within the specified time limits required by these Regulations.

(2) An aerodrome operator shall

- (a) review all AIPs, AIP Supplements, AIP Amendments, NOTAMs, Pre-flight Information Bulletins and Aeronautical Information Circulars issued by the AIS;
- (b) on receipt thereof pursuant to paragraph (a) and immediately after such reviews, notify the Authority of any inaccurate information contained therein that pertains to the Aerodrome.

(3) An aerodrome operator shall notify the Authority, in writing, at least 60 (sixty) days before effecting any change to the aerodrome facility or equipment or the level of service at the Aerodrome that has been planned in advance and which is likely to affect the accuracy of the information contained in any AIS publication.

(4) An aerodrome operator shall arrange for the Air Traffic Control and the Authority to receive immediate notice detailing any of the following circumstances of which the operator has knowledge of-

- (a) any projections by an object through an obstacle limitation surface relating to the Aerodrome;
- (b) the existence of any obstruction or hazardous condition affecting aviation safety at or near the Aerodrome;

- (c) reduction in the level of service at the Aerodrome as set out in any of the AIS publications;
- (d) closure of any part of the movement area of the Aerodrome; and
- (e) any other condition that could affect aviation safety at the aerodrome and against which precautions are warranted.

(5) When it is not feasible for an Aerodrome operator to arrange for the air traffic control unit and the Authority to receive notice of a circumstance referred to in sub-regulation(4) the operator shall give immediate notice direct to the pilots who may be affected by that circumstance.

(6) An aerodrome operator shall submit immediately to the Authority, mandatory occurrence report of any accident or incident at the aerodrome.

66. Notifying and Reporting Information to Aircraft Operators

- (1) An aerodrome operator shall develop and implement procedures for briefing aircraft operators of the necessary safety and regulatory requirements for aircraft before operating in the Gambian airspace.
- (2) The airport briefing shall include, but not be limited to, at least the following requirements:
 - (a) provision of up to date aerodrome information as contained in the AIP to be available to the flight crew;
 - (b) for the aircraft operator to follow correct ICAO flight planning principles including the provision of aircraft registration and correct ICAO designators;
 - (c) for the aircraft operator to report either flight or ground based incidents to the Authority, including bird or wildlife strikes or near misses;
 - (d) for the aircraft to be adequately equipped in accordance with the rules and regulations governing the airspace in which it will be flying.

67. Obligations to Restrict Certain Aircraft

(1) An aerodrome operator shall ensure that procedures are developed to negate aircraft operators from operating at their aerodrome when such aircraft operators cannot meet the regulatory requirements

(2) Notwithstanding sub-regulation(1), an aerodrome operator may subject aircraft operators to:

- (a) a ban based upon the origin of registry as notified by the Authority;
- (b) a cease and desist order as notified by the Authority; or

- (c) when the aircraft is subject to a grounding order as notified by the Authority.
- (3) The procedures above shall include immediate notification to the Authority of actions taken against such aircraft or aircraft operators.
- (4) An aerodrome operator shall monitor and ensure that third parties at the aerodrome comply with such procedures.

68. Warning Notices

Where low flying aircraft, at or in the vicinity an aerodrome or taxiing aircraft are likely to be hazardous to pedestrian or vehicular traffic, the aerodrome operator shall -

- (a) post hazard warning notices on any public way that is adjacent to the manoeuvring area; or
- (b) if such a public way is not controlled by the aerodrome operator, inform the appropriate body responsible for posting the notices on the public way that there is a hazard.

69. Retention of Records

The Aerodrome operator shall establish and retain personnel training records as prescribed under Regulation 56 (2)(h) and safety inspection records as prescribed in these Regulations.

70. Works on Aerodrome

An aerodrome operator shall-

- (a) prepare and submit to the Authority for approval a work safety plan before commencement of works to ensure that the works carried out on the Aerodrome do not endanger aircraft operations;
- (b) appoint one or more trained works safety officers to ensure full compliance with the procedures and precautions in sub-regulation (1);
- (c) coordinate work and ensure compliance with safety requirements and standards for routine maintenance, minor or major construction or maintenance works at its aerodrome;
- (d) provide liaison between any maintenance team or contractor, ATC and safety works officer so as to ensure compliance with safety rules in the areas of-
 - (i) Radiotelephony procedures to be used;
 - (ii) Isolation of work areas;

- (iii) General working rules;
 - (iv) Hazards to personnel working on the Aerodrome;
 - (v) Marking and Lighting on cranes or equipment that is likely to penetrate the obstacle clearance limitation;
 - (vi) Effect on navigational aids and other electronic landing aids; and
 - (vii) Paved area cleanliness after work;
- (e) carry out works on aerodrome as prescribed in these regulations.

71. Apron Control and Management Services

An aerodrome operator shall -

- (a) ensure that the Aerodrome control service and the apron control service work in harmony to facilitate safe transition of aircraft between apron control and aerodrome control;
- (b) ensure close liaison and co-operation between the apron control unit and ATS unit through radio communication and monitoring devices;
- (c) keep an accurate record of movement information including aircraft arrival times, landings and take-offs;
- (d) provide marshalling and leader van services and aircraft stand allocation, where necessary;
- (e) provide serviceable avio-bridges and docking devices where passenger loading is done through bridges;
- (f) control apron movements of ground vehicles using the aerodrome operator's apron safety rules as stipulated in the approved Aerodrome Manual;
- (g) provide blast fences to protect personnel and vehicles from jet blast and propeller slipstreams, where necessary;
- (h) ensure that aircraft operators and fuel companies adhere strictly to the aerodrome operator's procedures during the fuelling of aircraft;
- (i) ensure that apron is swept clean and degreased regularly and when necessary;
- (j) keep records of activities and dissemination of same to appropriate establishments when necessary; and

- (k) provide apron control and management services as prescribed in these regulations.

72. Ground Vehicles and Pedestrians

(1) An aerodrome operator shall-

- (a) restrict access to movement areas and safety areas only to those ground or operations vehicles in possession of airside vehicle permit, company logo, drivers with airside driver's permit and pedestrians necessary for Aerodrome and aircraft operations.

- (b) provide adequate procedures for the safe and orderly access to, and operation on the Aerodrome operational areas, by ground vehicles and pedestrians.

- (c) establish and implement provisions identifying the consequences of non-compliance with the procedures in sub-regulation (2), by an employee, tenant or contractor.

- (d) ensure that, when an air traffic control service is in operation, each ground vehicle or pedestrian in movement areas or safety areas is controlled by-

- (i) two-way radio communications between each ground vehicle or pedestrian and the control tower;

- (ii) an escort vehicle with two-way communication with the control tower;

- (iii) adequate measures authorised by the Authority for controlling ground vehicles and pedestrians, such as markings, signs, signals or guards, when it is not operationally practicable to have two-way radio communications between the tower and the ground vehicle, escort or pedestrian;

- (e) ensure that each employee, tenant, or contractor is trained on the procedures required in this Regulation prior to moving on foot, or in a ground vehicle, in the movement areas or safety areas of the Aerodrome.

- (f) maintain the following records-

- (i) a description and date of training for personnel and use of ground vehicles on movement areas and safety areas;

- (ii) a record for each vehicle and individual access to movement areas;

- (iii) a description and date of any accident or incident in the movement areas involving aircraft and ground vehicle, or aircraft and aircraft, or aircraft and pedestrians;

(g) ensure ground vehicles and pedestrian operations are as prescribed in these regulations.

73. Protection of Navigation and Landing Aids

An aerodrome operator shall -

- (a) prevent the construction of facilities on the Aerodrome that would adversely affect the operation of any electronic or visual navigation aid or air traffic service;
- (b) prevent, as far as it is within its authority, an interruption of the visual or electronic signals of navigation aids; and
- (c) provide protection of navigation and landing aids as prescribed in these regulations.

74. Aerodrome Inspection Programme

(1) An aerodrome operator shall carry out special inspections -

- (a) as soon as practicable after an aircraft accident or incident;
- (b) during any period of construction or repair of the Aerodrome facilities or equipment that is critical to the safety of aircraft operations;
- (c) at any time when there are conditions at the aerodrome such as strong winds and rain, that could affect aviation safety; or
- (d) after construction, repair, or maintenance works have been carried out on Aerodrome facilities and equipment.

(2) An aerodrome operator shall carry out daily serviceability inspections;

(3) An aerodrome operator shall provide initial and recurrent training every 3 (three) years for any person who has duties in respect of the aerodrome inspection programme in at least the following areas-

- (a) Aerodrome familiarisation, including aerodrome signs, marking and lighting;
- (b) AEP;
- (c) NOTAM notification procedures;
- (d) Procedures for pedestrians and ground vehicles in movement areas and safety areas;
- (e) Procedures for reporting changes in movement area condition.

(4) An aerodrome operator shall maintain a reporting system to ensure prompt correction of unsafe aerodrome facilities noted during the inspection, including wildlife strikes.

(5) An aerodrome operator shall maintain a record of each person's training for a period of 5 (five) years and provide the Authority with a copy of any record, if requested.

75. Aeronautical Studies

(1) An applicant or holder of an Aerodrome Certificate shall carry out an aeronautical study to assess the impact of deviations from these regulations in order to-

- (a) provide justification for a deviation from the standards on the grounds that an equivalent level of safety shall be attained by other means;
- (b) present alternative means of ensuring the safety of aircraft operations;
- (c) estimate the effectiveness of each alternative; and
- (d) recommend procedures to compensate for the deviation.

(2) An aerodrome operator shall seek and obtain approval of the Authority, for any deviation and publish it in the AIP.

(3) An applicant or holder of an Aerodrome Certificate shall engage reputable expertise with practical experience and specialized knowledge in relevant areas in the conduct of technical analysis.

(4) An aerodrome operator shall notify promptly pilots, AIS and the Authority, where the only reasonable means of providing an equivalent level of safety is to adopt suitable procedures with cautionary advice.

(5) An applicant or holder of an Aerodrome Certificate shall carry out aeronautical studies as prescribed in these regulations and associated guidance material.

76. Environmental Protection

(1) An aerodrome operator shall ensure the implementation of its approved environmental management plan.

(2) The plan referred in sub-regulation (1) shall include-

- (a) measures of handling of all types of wastes, oil and grease spills, air, noise and water pollution;
- (b) regular environmental audit by independent qualified experts to ensure the appropriateness and compliance with the environmental management plan; and

(c) records showing compliance with extant environmental protection laws, regulations, guidelines and directives of relevant government agencies.

(3) An aerodrome operator shall make such records available to the Authority whenever requested.

77. Physical Characteristics

(1) An aerodrome operator shall not operate an aerodrome unless the physical characteristics of the aerodrome comply with the standards specified under Part VII of these regulations and any standards as may be published or approved by the Authority.

(2) A heliport operator shall provide at least one final approach and takeoff area, one touchdown and liftoff area, helicopter clearway where necessary, safety areas, helicopter ground taxiways, air taxiways, air transit routes and apron with particular attention to the following-

- (a) Class of helicopters the heliport can serve;
- (b) Local conditions such as elevation, temperature and visual or general meteorological conditions; and
- (c) The standards and specifications prescribed in these Regulations.

PART VII AERONAUTICAL DATA

78. Aeronautical Data

(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) Aerodrome mapping data shall be made available to the AIS for aerodromes where safety or performance-based operations or both suggest possible benefits.

(3) Where data is made available in accordance with (2) above, the selection of the aerodrome mapping data features to be collected shall be made with consideration of the intended applications.

(4) Digital data error detection techniques shall be used during the transmission or storage of aeronautical data sets or both.

79. Aerodrome Reference Point

(1) An Aerodrome Operator shall ensure that an aerodrome reference point shall be established for each aerodrome.

(2) The aerodrome reference point shall be located near the initial or planned geometric centre of the aerodrome and shall normally remain where first established.

(3) The position of the aerodrome reference point shall be measured in degrees, minutes and seconds by the Aerodrome Operator and reported to the Authority for verification and onward transmission to the AIS.

80. Aerodrome and Runway Elevations

(1) An aerodrome operator shall ensure that the aerodrome elevation and geoid undulation at the aerodrome elevation position shall be measured to the accuracy of 0.5m (one-half meters) and reported to the Authority for verification and onward transmission to the aeronautical information services.

(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 0.5m (one-half meters).

(3)) The measurement referred to in sub-regulation (2) shall be reported to the Authority for verification and onward transmission to the aeronautical information services.

(4) 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 0.25m (one-quarter meters).

(5) The measurement referred to in sub-regulation (4) shall be reported to the Authority for verification and onward transmission to the AIS.

81. Aerodrome Reference Temperature

(1) An Aerodrome Operator shall ensure that an aerodrome reference temperature shall be determined for an aerodrome in Degrees Celsius.

(2) The aerodrome reference temperature shall be the monthly mean of the daily maximum temperatures for the hottest month of the year.

(3) In accordance with sub-regulation (2), the hottest month being that which has the highest monthly mean temperature.

(4) The temperature referred to in sub-regulation (3) shall be averaged over a period of years.

82. Aerodrome Dimensions and Related Information

(1) An Aerodrome Operator shall ensure that the following data shall be measured or described, as appropriate, for each facility provided on any aerodrome:

- (a) runway, true bearing to one-hundredth of a degree, designation number, length, width, displaced threshold location to the nearest metre, 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 and stopways, length, width to the nearest metre, surface type;
 - (c) arresting system- location and description;
 - (d) taxiway, designation, width, surface type;
 - (e) apron, surface type, aircraft stands;
 - (f) the boundaries of the air traffic control service;
 - (g) clearway, length to the nearest meter, ground profile;
 - (h) 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;
 - (i) location and radio frequency of any VOR aerodrome checkpoint;
 - (j) location and designation of standard taxi-routes; and
 - (k) distances to the nearest meter of localizer and glide path elements comprising an instrument landing system or azimuth and elevation antenna of a microwave landing system in relation to the associated runway extremities.
- (2) The geographical coordinates of each threshold shall be measured and reported to Authority for verification and onward transmission to the AIS Section in degrees, minutes, seconds and hundredths of seconds.
- (3) The geographical coordinates of appropriate taxiway centre line points shall be measured and reported to the Authority for verification and onward transmission to the AIS Section in degrees, minutes, seconds and hundredths of seconds.
- (4) The geographical coordinates of each aircraft stand shall be measured and reported to the Authority for verification and onward transmission to the AIS Section in degrees, minutes, seconds and hundredths of seconds.
- (5) The geographical coordinates of obstacles in Area 2 and in Area 3 shall be measured and reported to the Authority for verification and onward transmission to the AIS Section in degrees, minutes, seconds and tenths of seconds.
- (6) The top elevation, type, marking and lighting of obstacles shall be reported to the aeronautical information services.

83. Strength of Pavements

(1) An Aerodrome Operator shall ensure that bearing strength of a pavement is determined.

(2) The bearing strength of a pavement intended for aircraft of apron mass greater than 5 700kg (five thousand seven hundred kilogrammes) shall be made available using the ACR-PCR method by reporting all of the following information:

- (a) PCR and numerical value;
- (b) pavement type for ACR-PCR determination;
- (c) subgrade strength category;
- (d) maximum allowable tyre pressure category or maximum allowable tyre pressure value; and
- (e) evaluation method.

(3) The PCR reported shall indicate that an aircraft with an ACR equal to or less than the reported PCR can operate on the pavement subject to any limitation on the tyre pressure or aircraft all-up mass for specified aircraft types.

(4) The ACR of an aircraft shall be determined in accordance with the standard procedures associated with the ACR-PCR method.

(5) For the purposes of determining the ACR, the behaviour of a pavement shall be classified as equivalent to a rigid or flexible construction.

(6) Information on pavement type for ACR-PCR determination, subgrade strength category, maximum allowable tyre pressure category and evaluation method shall be reported using the codes specified in Schedule 2.60.

(7) A criteria shall be established to regulate the use of a pavement by an aircraft with an ACR higher than the PCR reported for that pavement in accordance with sub-regulation (2) and (3).

(8) The bearing strength of a pavement intended for aircraft of apron mass equal to or less than 5 700 kg (five thousand seven hundred kilogrammes) shall be made available by reporting the following information:

- (a) maximum allowable aircraft mass; and
- (b) maximum allowable tyre pressure.

84. Pre-Flight Altimeter Check Location

(1) One or more pre-flight altimeter check locations shall be established by the Aerodrome Operator for each aerodrome subject to approval by the Authority.

(2) A pre-flight check location shall be located on an apron to enable an altimeter check to be made prior to obtaining taxi clearance and eliminates the need for stopping for that purpose after leaving the apron.

(3) The elevation of a pre-flight altimeter check location shall be given as the average elevation, rounded to the nearest metre, of the area on which it is located. The elevation of any portion of a pre-flight altimeter check location shall be within 3m (three meters) of the average elevation for that location.

85. Declared Distances

The following distances shall be calculated to the nearest metre for a runway intended for use by international commercial air transport:

- (a) take-off run available;
- (b) take-off distance available;
- c) accelerate-stop distance available; and
- (d) landing distance available.

86. Condition of the Movement Area and Related Facilities

(1) An Aerodrome Operator shall ensure that information on the condition of the movement area and the operational status of related facilities shall be provided to the AIS Section, and similar information of operational significance to the ATS 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 reported without delay.

(2) The condition of the movement area and the operational status of related facilities shall be monitored by the Aerodrome Operator, 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) water, snow, slush, ice or frost on a runway, a taxiway or an apron;
- (d) anti-icing or de-icing liquid chemicals or other contaminants on a runway, taxiway or apron;
- (e) snow banks or drift adjacent to a a runway, taxiway or apron;
- (f) other temporary hazards, including parked aircraft;
- (g) failure or irregular operation of part or all of the aerodrome visual aids; and

- (h) failure of the normal or secondary power supply.
- (3) To facilitate compliance with sub-regulation (1) and (2) above, an aerodrome operator shall ensure that the following inspections are carried out each day:
- (a) for movement area, at least once where the aerodrome reference code number is 1 (one) or 2 (two) and at least twice where the aerodrome reference code number is 3 (three) or 4 (four); and
 - (b) for runway inspections in addition to sub-regulation (3)(a) above, whenever the runway surface conditions may have changed significantly due to meteorological conditions.
- (4) Personnel assessing and reporting runway surface conditions required in sub-regulation (2) and (5) shall be trained and competent to perform their duties.
- (5) An aerodrome operator shall assess the runway surface condition and report the runway condition code (RWYCC) using the descriptions outlined in Schedule 1.13.
- (6) An aerodrome operator shall ensure that whenever an operational runway is contaminated, an assessment of the contaminant depth and coverage over each third of the runway is made and reported
- (7) An aerodrome operator shall ensure that information that a runway or portion thereof is slippery wet is made available.
- (8) Notification shall be given to relevant aerodrome users when the friction level of a paved runway or portion thereof is less than that specified in these Regulations.

87. Disabled Aircraft Removal

- (1) An aerodrome operator shall establish and implement a plan for the removal of disabled aircraft on, or adjacent to, the movement area and shall designate a coordinator for the implementation of the plan.
- (2) The disabled aircraft removal plan shall be based on the characteristics of the aircraft that may normally be expected to operate at the aerodrome, and include among other things:
- (a) a list of equipment and personnel on, or in the vicinity of, the aerodrome which would be available for such purpose; and
 - (b) arrangements for the rapid receipt of aircraft recovery equipment kits available from other aerodromes.
- (3) An aerodrome operator shall, upon request, provide aircraft operators with the names, roles and contact details of persons responsible for arranging for the removal of disabled aircraft on or adjacent to the movement area.

(4) An aerodrome operator shall provide the capacity of removing disabled aircraft and shall publish information concerning its capability to remove an aircraft disabled on, or adjacent to, the movement area.

(5) The capacity referred to in sub-regulation (4) may be expressed in terms of the largest type of aircraft which the aerodrome is equipped to remove.

(6) An aerodrome operator shall, during disabled aircraft removal process, designate an experienced and competent officer representing the aerodrome operator to coordinate and liaise with ATS, the Accident Investigation Bureau, the Authority, the aircraft operator, Customs and Immigration Departments;

(7) An aerodrome operator shall secure the scene of a disabled aircraft with security personnel and keep records of all events, and photographs of the scene.

88. Rescue and Firefighting

(1) An Aerodrome Operator shall ensure that information concerning the level of protection provided at an aerodrome for aircraft rescue and firefighting purposes is published.

(2) The level of protection normally available at an aerodrome shall be expressed in terms of the category of the rescue and firefighting services as described in Part IXX of these Regulations and in accordance with the types and amounts of extinguishing agents normally available at the aerodrome.

(3) Changes in the level of protection normally available at an aerodrome for rescue and firefighting shall be notified to the ATS Section and AIS Section to enable those sections to provide the necessary information to arriving and departing aircraft.

(4) The above sections referred to in sub-regulation (3) shall be advised accordingly when such a change has been corrected..

(5) Any modification shall be expressed in terms of the new category of the rescue and firefighting service available at the aerodrome.

89. Visual Approach Slope Indicator Systems

An aerodrome operator shall ensure that the following information concerning a visual approach slope indicator system installation is made available:

(a) associated runway designation number;

(b) type of system, such as the side of the runway on which the lights are installed, left or right, shall be given for an AT-VASIS, PAPI or APAPI installation;

- (c) the angle of displacement and the direction of displacement, left or right, shall be indicated where the axis of the system is not parallel to the runway centre line;
- (d) nominal approach slope angle where the angle shall be according to Schedule 2.32 for a T-VASIS or an AT-VASIS;
- (e) a PAPI and an APAPI shall be angle $(B + C) \div 2$ and $(A + B) \div 2$ (B plus C divided by two and A plus B divided by two), respectively as in Schedule 2.34;
- (f) minimum eye height over the threshold of the on-slope signal;
- (g) a T-VASIS or an AT-VASIS shall be the lowest height at which only the wing bars are visible;
- (h) the additional heights at which the wing bars 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;
- (i) a PAPI shall be the setting angle of the third unit from the runway minus 2' (two minutes);
- (j) paragraph (i) refers to angle B minus 2' (two minutes);
- (k) an APAPI shall be the setting angle of the unit farther from the runway minus 2' (two minutes);
- (l) paragraph (i) refers to angle A minus 2' (two minutes).

90. Coordination between Aeronautical Information Services and Aerodrome Operator

- (1) The aeronautical information services section shall make arrangements with the aerodrome operator responsible for aerodrome services to report to the responsible aeronautical information services unit, with a minimum of delay.
- (2) The arrangements referred to in sub-regulation (1) above shall ensure that aeronautical information services section obtains information to enable them to provide up-to-date pre-flight information and to meet the need for in-flight information,
- (3) the requirements in sub-regulation (1) shall include
 - (a) information on the status of certification of aerodromes and aerodrome conditions;
 - (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.

- (4) Due account of the time needed by the AIS Section for the preparation, production and issue of relevant material for publication, shall be taken into consideration before introducing changes to the air navigation system.
- (5) Close coordination between those services concerned shall be required to ensure timely provision of the information to AIS.
- (6) Predetermined, internationally agreed AIRAC effective dates in addition to 14 (fourteen) days postage time shall be observed by the aerodrome operator
- (7) Sub-regulation (6) shall be observed when submitting the raw information or data to AIS Section in respect of Changes to aeronautical information that affect charts or computer-based navigation systems or both, which qualify to be notified by the AIRAC system.
- (8) The aerodrome services responsible for the provision of raw aeronautical information and aeronautical data to the AIS section shall do that while taking into account accuracy and integrity requirements necessary to meet the needs of the end-user of aeronautical data.

PART VIII PHYSICAL CHARACTERISTICS

91. Runways

- (1) An aerodrome operator shall ensure that the number and orientation of runways at an aerodrome shall be such that the usability factor of the aerodrome is not less than 95% (ninety-five per cent) for the aeroplanes that the aerodrome is intended to serve.
- (2) The siting and orientation of runways at an aerodrome shall, where possible, be such that the arrival and departure tracks minimize interference with areas approved for residential use and other noise-sensitive areas close to the aerodrome in order to avoid future noise problems.
- (3) Pursuant to the provisions of sub-regulation (1), under normal circumstances there shall be no landing or take-off of aeroplanes if the value of the crosswind component exceeds:
 - (a) 37 km/h (thirty-seven kilometers per hour) in the case of aeroplanes whose reference field length is 1500m (one thousand five hundred meters) or over, except that when poor runway braking action owing to an insufficient longitudinal coefficient of friction is experienced with some frequency, a crosswind component not exceeding 24 km/h (twenty-four kilometers per hour) should be assumed;

- (b) 24 km/h (twenty-four kilometers per hour) in the case of aeroplanes whose reference field length is 1200m (one thousand two hundred meters) or up to but not including 1500m (one thousand five hundred meters); and
 - (c) 19 km/h (nineteen kilometers per hour) in the case of aeroplanes whose reference field length is less than 1200m (one thousand two hundred meters).
- (4) The selection of data to be used for the calculation of the usability factor shall be based on reliable wind distribution statistics that extend over as long a period as possible, preferably of not less than 5 (five) years.
- (5) The observations used shall be made at least eight times daily and spaced at equal intervals of time.
- (6) An Aerodrome Operator shall ensure that the runway threshold shall be located at the extremity of a runway unless operational considerations justify the choice of another location which justification shall be subject to the approval of the Authority.
- (7) When it is necessary to displace a threshold, either permanently or temporarily, from its normal location, account shall be taken of the various factors which may have a bearing on the location of the threshold.
- (8) Where this displacement is due to an unserviceable runway condition, a cleared and graded area of at least 60m (sixty meters) in length shall be available between the unserviceable area and the displaced threshold.
- (9) pursuant to the provisions of sub-regulation (7), additional distance shall also be provided to meet the requirements of the runway end safety area as appropriate.
- (10) Except as provided in (8) below, an Aerodrome Operator shall ensure that the actual runway length to be provided for a primary runway shall be adequate to meet the operational requirements of the aeroplanes for which the runway is intended
- (11) The actual length referred to in sub-regulation (10) shall not be less than the longest length determined by applying the corrections for local conditions to the operations and performance characteristics of the relevant aeroplanes.
- (12) The length of a secondary runway shall be determined similarly to primary runways except that it need only to be adequate for those aeroplanes which require to use that secondary runway in addition to the other runway or runways in order to obtain a usability factor of at least 95% (ninety-five per cent).
- (13) Where a runway is associated with a stopway or clearway, an actual runway length less than that resulting from application of sub-regulation (7) or (11) above, as appropriate, shall be considered satisfactory.

(14) Pursuant to sub-regulation (13) above any combination of runway, stopway and clearway provided shall permit compliance with the operational requirements for take-off and landing of the aeroplanes the runway is intended to serve.

(15) An Aerodrome Operator shall ensure that the width of a runway shall be not less than the appropriate dimension specified in the Schedule 2.2:

(16) Where parallel non-instrument runways are intended for simultaneous use, the minimum distance between their centre lines shall be:

- (a) 210m (two hundred and ten meters) where the higher code number is 3 (three) or 4 (four);
- (b) 150m (one hundred and fifty meters) where the higher code number is 2 (two); and
- (c) 120m (one hundred and twenty meters) where the higher code number is 1 (one).

(17) Where parallel instrument runways are intended for simultaneous use, the minimum distance between their centre lines shall be:

- (a) 1035m (one thousand and thirty-five meters) for independent parallel approaches;
- (b) 915m (nine hundred and fifteen meters) for dependent parallel approaches;
- (c) 760m (seven hundred and sixty meters) for independent parallel departures;
- (d) 760m (seven hundred and sixty meters) for segregated parallel operations;

except that:

- (a) for segregated parallel operations the specified minimum distance:
 - (i) may be decreased by 30m (thirty meters) for each 150m (one hundred and fifty meters) that the arrival runway is staggered toward the arriving aircraft, to a minimum of 300m (three hundred meters); and
 - (ii) shall be increased by 30m (thirty meters) for each 150m (one hundred and fifty meters) that the arrival runway is staggered away from the arriving aircraft;
- (b) for independent parallel approaches, combinations of minimum distances and associated conditions may be applied when it is determined that such combinations would not adversely affect the safety of aircraft operations.

(18) Longitudinal slopes shall be the slope computed by dividing the difference between the maximum and minimum elevation along the runway centre line by the runway length

(19) The longitudinal slopes shall not exceed:

- (a) 1% (one per cent) where the code number is 3 (three) or 4 (four); and
- (b) 2% (two per cent) where the code number is 1 (one) or 2 (two).

(20) Along no portion of a runway shall the longitudinal slope exceed:

- (a) 1.25% (one and quarter per cent) where the code number is 4 (four), except that for the first and last quarter of the length of the runway the longitudinal slope should not exceed 0.8% (eight tenths per cent);
- (b) 1.5% (one and a half per cent) where the code number is 3 (three), except that for the first and last quarter of the length of a precision approach runway Category II or III the longitudinal slope should not exceed 0.8% (eight tenths per cent); and
- (c) 2% (two per cent) where the code number is 1 (one) or 2 (two).

(21) Where slope changes cannot be avoided, a slope change between two consecutive slopes shall not exceed:

- (a) 1.5% (one and a half per cent) where the code number is 3 (three) or 4 (four); and
- (b) 2% (two per cent) where the code number is 1 (one) or 2 (two).

(22) The transition from one slope to another shall be accomplished by a curved surface with a rate of change not exceeding:

- (a) 0.1% (one tenth per cent) per 30m (thirty meters) with a minimum radius of curvature of 30,000m (thirty thousand meters), where the code number is 4 (four);
- (b) 0.2% (two tenths per cent) per 30m (thirty meters) with a minimum radius of curvature of 15,000m (fifteen thousand meters) where the code number is 3 (three); and
- (c) 0.4% (four tenths per cent) per 30m (thirty meters) with a minimum radius of curvature of 7 500m (seven thousand five hundred meters) where the code number is 1 (one) or 2 (two).

(23) Where slope changes cannot be avoided, they shall be such that there will be an unobstructed line of sight from:

- (a) any point 3m (three meters) above a runway to all other points 3m (three meters) above the runway within a distance of at least half the length of the runway where the code letter is C, D, E or F;

- (b) any point 2m (two meters) above a runway to all other points 2m (two meters) above the runway within a distance of at least half the length of the runway where the code letter is B; and
 - (c) any point 1.5m (one and a half meters) above a runway to all other points 1.5m (one and a half meters) above the runway within a distance of at least half the length of the runway where the code letter is A.
- (24) Undulations or appreciable changes in slopes located close together along a runway shall be avoided by an aerodrome operator.
- (25) The distance between the points of intersection of two successive curves should not be less than:
- (a) the sum of the absolute numerical values of the corresponding slope changes multiplied by the appropriate value as follows:
 - (i) 30,000m (thirty thousand meters) where the code number is 4 (four);
 - (ii) 15,000m (fifteen thousand meters) where the code number is 3 (three); and
 - (iii) 5000m (five thousand meters) where the code number is 1 (one) or 2 (two); or
 - (b) 45m (forty-five meters);
- whichever is greater.
- (26) To promote the most rapid drainage of water, an Aerodrome Operator shall ensure that the runway surface shall, if practicable, be cambered except where a single crossfall from high to low in the direction of the wind most frequently associated with rain would ensure rapid drainage.
- (27) The transverse slope shall ideally be:
- (a) 1.5% (one and a half per cent) where the code letter is C, D, E or F; and
 - (b) 2% (two per cent) where the code letter is A or B;
- (28) The traverse slope shall not exceed 1.5% (one and a half per cent) or 2% (two per cent), as applicable, nor be less than 1% (one per cent) except at runway or taxiway intersections where flatter slopes may be necessary.
- (29) The transverse slope on each side of the centre line shall be symmetrical in case of a cambered surface.
- (30) The transverse slope shall be substantially the same throughout the length of a runway except at an intersection with another runway or a taxiway where an even transition should be provided taking account of the need for adequate drainage.

(31) An Aerodrome Operator shall ensure that a runway shall be capable of withstanding the traffic of aeroplanes the runway is intended to serve.

(32) An Aerodrome Operator shall ensure that the surface of a runway shall be constructed without irregularities that would impair the runway surface friction characteristics or otherwise adversely affect the take-off or landing of an aeroplane.

(33) An Aerodrome Operator shall ensure that a paved runway shall be so constructed or resurfaced as to provide surface friction characteristics at or above the minimum friction level set by the Authority.

(34) The surface of a paved runway shall be evaluated when constructed or resurfaced to determine that the surface friction characteristics achieve the design objectives.

(35) Measurements of the surface friction characteristics of a new or resurfaced paved runway shall be made with a continuous friction measuring device using self-wetting features.

(36) The average surface texture depth of a new surface shall be not less than 1mm (one millimeter).

(37) An Aerodrome Operator shall ensure that when the surface is grooved or scored, the grooves or scorings shall be either perpendicular to the runway centre line or parallel to non-perpendicular transverse joints, where applicable.

92. Runway Shoulders

(1) An aerodrome operator shall ensure that Runway shoulders shall be provided for a runway where the code letter is D, E or F.

(2) For aeroplanes with OMGWS from 9m (nine meters) up to but not including 15m (fifteen meters), the runway shoulders shall extend symmetrically on each side of the runway so that the overall width of the runway and its shoulders is not less than:

(a) 60m (sixty meters) where the code letter is D or E;

(b) 60m (sixty meters) where the code letter is F with 2 (two) or 3 (three) engined aeroplanes; and

(c) 75m (seventy-five meters) where the code letter is F, with 4 (four) or more engined aeroplanes.

(3) An Aerodrome Operator shall ensure that surface of the shoulder that abuts the runway shall be flush with the surface of the runway and its transverse slope should not exceed 2.5% (two and a half per cent).

(4) An Aerodrome Operator shall ensure that the portion of a runway shoulder between the runway edge and a distance of 30m (thirty meters) from the runway centerline shall be prepared or constructed

(5) The purpose of preparation and construction referred to in sub-regulation (4) is to be capable, in the event of an aeroplane running off the runway, of supporting the aeroplane without inducing structural damage to the aeroplane and of supporting ground vehicles which may operate on the shoulder.

(6) An Aerodrome Operator shall ensure that a runway shoulder is prepared or constructed so as to resist erosion and the ingestion of the surface material by aeroplane engines.

(7) An Aerodrome Operator shall ensure that runway shoulder for code letter F aeroplanes should be paved to a minimum overall width of runway and shoulder of not less than 60m (sixty meters).

93. Runway Turn Pads

(1) An aerodrome operator shall ensure that where the end of a runway is not served by a taxiway or a taxiway turnaround and where the code letter is D, E or F, a runway turn pad shall be provided to facilitate a 180° (one hundred and eighty degrees) turn of aeroplanes as shown in Schedule 2.3.

(2) Where the end of a runway is not served by a taxiway or a taxiway turnaround and where the code letter is A, B or C, a runway turn pad shall be provided to facilitate a 180° (one hundred and eighty degrees) turn of aeroplanes to reduce taxiing time and distance for aeroplanes which may not require the full length of the runway.

(3) An Aerodrome Operator shall ensure that runway turn pad shall be located on either the left or right side of the runway and adjoining the runway pavement at both ends of the runway and at some intermediate locations where deemed necessary.

(4) An Aerodrome Operator shall ensure that intersection angle of the runway turn pad with the runway shall not exceed 30° (thirty degrees).

(5) An Aerodrome Operator shall ensure that the nose wheel steering angle to be used in the design of the runway turn pad shall not exceed 45° (forty-five degrees) degrees.

(6) An Aerodrome Operator shall ensure that the design of a runway turn pad shall be such that, when the cockpit of the aeroplane for which the turn pad is intended remains over the turn pad marking, the clearance distance between any wheel of the aeroplane landing gear and the edge of the turn pad shall be not less than that given in Schedule 2.4

(7) An Aerodrome Operator shall ensure that longitudinal and transverse slopes on a runway turn pad shall be sufficient to prevent the accumulation of water on the surface and facilitate rapid drainage of surface water.

(8) The slopes referred to in sub-regulation (7) shall be the same as those on the adjacent runway pavement surface.

(9) An Aerodrome Operator shall ensure that strength of a runway turn pad should be at least equal to that of the adjoining runway which it serves, due consideration being given to the fact that the turn pad will be subjected to slow-moving traffic making hard turns and consequent higher stresses on the pavement.

(10) An aerodrome operator shall ensure that the surface of a runway turn pad shall not have surface irregularities that may cause damage to an aeroplane using the turn pad.

(11) The surface of a runway turn pad shall be so constructed or resurfaced as to provide surface friction characteristics at least equal to that of the adjoining runway.

(12) An aerodrome operator shall ensure that the runway turn pads shall be provided with shoulders of such width as is necessary to prevent surface erosion by the jet blast of the most demanding aeroplane for which the turn pad is intended, and any possible foreign object damage to the aeroplane engines.

(13) The strength of runway turn pad shoulders shall be capable of withstanding the occasional passage of the aeroplane it is designed to serve without inducing structural damage to the aeroplane and to the supporting ground vehicles that may operate on the shoulder.

94. Runway Strips

(1) An aerodrome operator shall ensure that a runway and any associated stopways shall be included in a strip.

(2) An aerodrome operator shall ensure that a strip shall extend before the threshold and beyond the end of the runway or stopway for a distance of at least:

(a) 60m (sixty meters) where the code number is 2 (two), 3 (three) or 4 (four);

(b) 60m (sixty meters) where the code number is 1 (one) and the runway is an instrument one; and

(c) 30m (thirty meters) where the code number is 1 (one) and the runway is a non-instrument one.

(3) An Aerodrome Operator shall ensure that a strip including a precision approach runway shall, wherever practicable, extend laterally to a distance of at least:

- (a) 140m (one hundred and forty meters) where the code number is 3 (three) or 4 (four); and

- (b) 70m (seventy meters) where the code number is 1 (one) or 2 (two);

on each side of the centre line of the runway and its extended centre line throughout the length of the strip.

(4) A strip including a non-precision approach runway shall extend laterally to a distance of at least:

- (a) 140m (one hundred and forty meters) where the code number is 3 (three) or 4 (four); and

- (b) 70m (seventy meters) where the code number is 1 (one) or 2 (two);

on each side of the centre line of the runway and its extended centre line throughout the length of the strip.

(5) A strip including a non-instrument runway should extend on each side of the centre line of the runway and its extended centre line throughout the length of the strip, to a distance of at least:

- (a) 75m (seventy-five meters) where the code number is 3 (three) or 4 (four);

- (b) 40m (forty meters) where the code number is 2 (two); and

- (c) 30m (thirty meters) where the code number is 1 (one).

(6) An aerodrome operator shall ensure that an object situated on a runway strip which may endanger aeroplanes shall be regarded as an obstacle and shall, as far as practicable, be removed.

(7) No fixed object, other than visual aids required for air navigation or those required for aircraft safety purposes and which are sited on the runway strip, and satisfying the relevant frangibility requirement in these Regulations, shall be permitted on any part of a runway strip of a precision approach runway delineated by the lower edges of the inner transitional surfaces:

(8) No mobile object shall be permitted on this part of the runway strip during the use of the runway for landing or take-off.

(9) An aerodrome operator shall ensure:

- (a) that portion of a strip of an instrument runway within a distance of at least:

- (i) 75m (seventy-five meters) where the code number is 3 (three) or 4 (four); and

- (ii) 40m (forty meters) where the code number is 1 (one) or 2 (two);

from the centre line of the runway and its extended centre line shall provide a graded area for aeroplanes which the runway is intended to serve in the event of an aeroplane running off the runway.

(b) that portion of a strip of a non-instrument runway within a distance of at least:

- (i) 75m (seventy-five meters) where the code number is 3 (three) or 4 (four);
- (ii) 40m (forty meters) where the code number is 2 (two); and
- (iii) 30m (thirty meters) where the code number is 1 (one);

from the centre line of the runway and its extended centre line shall provide a graded area for aeroplanes which the runway is intended to serve in the event of an aeroplane running off the runway.

(c) the surface of that portion of a strip that abuts a runway, shoulder or stopway shall be flush with the surface of the runway, shoulder or stopway.

(d) that portion of a strip to at least 30m (thirty meters) before the start of a runway shall be prepared against blast erosion in order to protect a landing aeroplane from the danger of an exposed edge.

(e) where the areas in (d) above have paved surfaces, an Aerodrome Operator shall ensure that they shall be able to withstand the occasional passage of the critical aeroplane for runway pavement design.

(10) An Aerodrome Operator shall ensure that:

(a) a longitudinal slope along that portion of a strip to be graded shall not exceed:

- (i) 1.5% (one and a half per cent) where the code number is 4 (four);
- (ii) 1.75% (one and three quarters per cent) where the code number is 3 (three); and
- (iii) 2% (two per cent) where the code number is 1 (one) or 2 (two).

(b) slope changes on that portion of a strip to be graded shall be as gradual as practicable and abrupt changes or sudden reversals of slopes avoided.

(c) transverse slopes on that portion of a strip to be graded shall be adequate to prevent the accumulation of water on the surface but should not exceed:

- (i) 2.5% (two and a half per cent) where the code number is 3 (three) or 4 (four); and
- (ii) 3% (three per cent) where the code number is 1 (one) or 2 (two);

except that to facilitate drainage the slope for the first 3m (three meters) outward from the runway, shoulder or stopway edge should be negative as measured in the direction away from the runway and may be as great as 5% (five per cent).

- (d) the transverse slopes of any portion of a strip beyond that to be graded shall not exceed an upward slope of 5% (five per cent) as measured in the direction away from the runway.

(11) An Aerodrome Operator shall ensure that:

- (a) portion of a strip of an instrument runway within a distance of at least:

- (i) 75m (seventy-five meters) where the code number is 3 (three) or 4 (four); and
- (ii) 40m (forty meters) where the code number is 1 (one) or 2 (two);

from the centre line of the runway and its extended centre line shall be so prepared or constructed as to minimize hazards arising from differences in load-bearing capacity to aeroplanes which the runway is intended to serve in the event of an aeroplane running off the runway.

- (b) portion of a strip containing a non-instrument runway within a distance of at least:

- (i) 75m (seventy-five meters) where the code number is 3 (three) or 4 (four);
- (ii) 40m (forty meters) where the code number is 2 (two); and
- (iii) 30m (thirty meters) where the code number is 1 (one);

from the centre line of the runway and its extended centre line shall be so prepared or constructed as to minimize hazards arising from differences in load-bearing capacity to aeroplanes which the runway is intended to serve in the event of an aeroplane running off the runway.

95. Runway End Safety Areas

(1) An Aerodrome Operator shall ensure that a runway end safety area shall:

- (a) be provided at each end of a runway strip.

- (b) extend from the end of a runway strip to a distance of at least 90m (ninety meters) where:
 - (i) the code number is 3 (three) or 4 (four); and
 - (ii) the code number is 1 (one) or 2 (two) and the runway is an instrument one.
- (2) If an arresting system is installed, the above length may be reduced, based on the design specification of the system, subject to acceptance by Authority.
- (3) A runway end safety area should, as far as practicable, extend from the end of a runway strip to a distance of at least:
 - (a) 240m (two hundred and forty meters) where the code number is 3 (three) or 4 (four); or a reduced length when an arresting system is installed;
 - (b) 120m (one hundred and twenty meters) where the code number is 1 (one) or 2 (two) and the runway is an instrument one;
 - (c) or a reduced length when an arresting system is installed; and
 - (d) 30m (thirty meters) where the code number is 1 (one) or 2 (two) and the runway is a non-instrument one.
- (4) An Aerodrome Operator shall ensure that the width of a runway end safety area shall be at least twice that of the associated runway and wherever practicable, be equal to that of the graded portion of the associated runway strip.
- (5) An object situated on a runway end safety area which may endanger aeroplanes shall be regarded as an obstacle and shall, as far as practicable, be removed.
- (6) An Aerodrome Operator shall ensure that a runway end safety area shall provide a cleared and graded area for aeroplanes which the runway is intended to serve in the event of an aeroplane undershooting or overrunning the runway.
- (7) An Aerodrome Operator shall ensure that:
 - (a) the slopes of a runway end safety area shall be such that no part of the runway end safety area penetrates the approach or take-off climb surface;
 - (b) the longitudinal slopes of a runway end safety area shall not exceed a downward slope of 5% (five per cent);
 - (c) Longitudinal slope changes shall be as gradual as practicable and abrupt changes or sudden reversals of slopes avoided;
 - (d) the transverse slopes of a runway end safety area shall not exceed an upward or downward slope of 5% (five per cent).

- (e) Transitions between differing slopes should be as gradual as practicable; and
- (f) A runway end safety area shall be so prepared or constructed as to reduce the risk of damage to an aeroplane undershooting or overrunning the runway; and
- (g) aeroplane deceleration and the facilitation of the movement of rescue and firefighting vehicles as required by these Regulations are enhanced.

96. Clearways

(1) An Aerodrome Operator shall ensure that:

- (a) the origin of a clearway shall be at the end of the take-off run available;
- (b) the length of a clearway shall not exceed half the length of the take-off run available;
- (c) a clearway shall extend laterally on each side of the extended centre line of the runway, to a distance of at least-
 - (i) 75m (seventy-five meters) for instrument runways; and
 - (ii) half the width of the runway strip for non-instrument runways.
- (d) the ground in a clearway shall not project above a plane having an upward slope of 1.25% (one and a quarter per cent), the lower limit of this plane being a horizontal line which:
 - (i) is perpendicular to the vertical plane containing the runway centre line; and
 - (ii) passes through a point located on the runway centre line at the end of the take-off run available.
- (e) abrupt upward changes in slope shall be avoided when the slope on the ground in a clearway is relatively small or when the mean slope is upward.

(2) If situations referred to in sub-regulation (1)(e) occur, in that portion of the clearway within a distance of 22.5m (twenty-two and a half meters) or half the runway width whichever is greater on each side of the extended centre line, the slopes, slope changes and the transition from runway to clearway shall generally conform with those of the runway with which the clearway is associated; and

(3) An object situated on a clearway which may endanger aeroplanes in the air shall be regarded as an obstacle and should be removed.

97. Stopways

An Aerodrome Operator shall ensure that-

- a) a stopway shall have the same width as the runway with which it is associated;
- (b) slopes and changes in slope on a stopway, and the transition from a runway to a stopway, shall comply with the specifications of Regulation 91 (18) to (29) for the runway with which the stopway is associated except that:
 - (i) the limitation in Regulation 91(20) of a 0.8% (eight tenths per cent) slope for the first and last quarter of the length of a runway need not be applied to the stopway; and
 - (ii) at the junction of the stopway and runway and along the stopway the maximum rate of slope change may be 0.3% (three tenths per cent) per 30m (thirty meters) with a minimum radius of curvature of 10,000m (ten thousand meters) for a runway where the code number is 3 (three) or 4 (four).
- (c) a stopway shall be prepared or constructed so as to be capable, in the event of an abandoned take-off, of supporting the aeroplane which the stopway is intended to serve without inducing structural damage to the aeroplane;
- (d) the surface of a paved stopway shall be so constructed or resurfaced as to provide surface friction characteristics at or above those of the associated runway.

98. Radio Altimeter Operating Area

- (1) An Aerodrome Operator shall ensure that a radio altimeter operating area shall:
 - (a) be established in the pre-threshold area of a precision approach runway;
 - (b) extend before the threshold for a distance of at least 300m (three hundred meters);
 - (c) extend laterally, on each side of the extended centre line of the runway, to a distance of 60m (sixty meters), except that, when special circumstances so warrant, the distance may be reduced to no less than 30m (thirty meters) if an aeronautical study indicates that such reduction would not affect the safety of operations of aircraft; and
- (2) slope changes shall be avoided or kept to a minimum.
- (3) Where slope changes cannot be avoided, the slope changes shall be as gradual as practicable.
- (4) Abrupt changes or sudden reversals of slopes avoided so the rate of change between two consecutive slopes will not exceed 2% (two per cent) per 30m (thirty meters).

99. Taxiways

(1) An Aerodrome Operator shall provide -

- (a) taxiways to permit the safe and expeditious surface movement of aircraft.
- (b) sufficient entrance and exit taxiways for a runway to expedite the movement of aeroplanes to and from the runway; and
- (c) rapid exit taxiways considered when traffic volumes are high.

(2) The design of a taxiway shall be such that, when the cockpit of the aeroplane for which the taxiway is intended remains over the taxiway centre line markings, the clearance distance between the outer main wheel of the aeroplane and the edge of the taxiway shall be not less than that given in Schedule 2.5.

(3) An Aerodrome Operator shall ensure that a straight portion of a taxiway shall have a width of not less than that given in Schedule 2.6

(4) An Aerodrome Operator shall ensure that:

- (a) changes in direction of taxiways shall be as few and small as possible;
- (b) the radii of the curves shall be compatible with the manoeuvring capability and normal taxiing speeds of the aeroplane for which the taxiway is intended;
- (c) the design of the curve shall be such that, when the cockpit of the aeroplane remains over the taxiway centre line markings, the clearance distance between the outer main wheels of the aeroplane and the edge of the taxiway shall not be less than those specified in sub-regulation (2).
- (d) the fillets shall be provided at junctions and intersections of taxiways with runways, aprons and other taxiways in order to facilitate the movement of aeroplanes;
- (e) the design of the fillets shall ensure that the minimum wheel clearances specified in sub-regulation (2), are maintained when aeroplanes are manoeuvring through the junctions or intersections.
- (f) the separation distance between the centre line of a taxiway and the centre line of a runway, the centre line of a parallel taxiway or an object shall not be less than the appropriate dimension specified in Schedule 2.7, except that it may be permissible to operate with lower separation distances at an existing aerodrome if an aeronautical study indicates that such lower separation distances would not adversely affect the safety or significantly affect the regularity of operations of aeroplanes.
- (g) the longitudinal slope of a taxiway shall not exceed:

- (i) 1.5% (one and a half per cent) where the code letter is C, D, E or F; and
 - (ii) 3% (three per cent) where the code letter is A or B.
- (5) Where slope changes on a taxiway cannot be avoided, the transition from one slope to another slope shall be accomplished by a curved surface with a rate of change not exceeding:
 - (a) 1% (one per cent) per 30m (thirty meters) which is minimum radius of curvature of 3000m (three thousand meters) where the code letter is C, D, E or F; and
 - (b) 1% (one per cent) per 25m (twenty-five meters) which is minimum radius of curvature of 2500m (two thousand five hundred meters) where the code letter is A or B
- (6) where a change in slope on a taxiway cannot be avoided, the change shall be such that, from any point:
 - (a) 3m (three meters) above the taxiway, it will be possible to see the whole surface of the taxiway for a distance of at least 300m (three hundred meters) from that point, where the code letter is C, D, E or F;
 - (b) 2m (two meters) above the taxiway, it will be possible to see the whole surface of the taxiway for a distance of at least 200m (two hundred meters) from that point, where the code letter is B; and
 - (c) 1.5m (one and a half meters) above the taxiway, it will be possible to see the whole surface of the taxiway for a distance of at least 150m (one hundred and fifty meters) from that point, where the code letter is A.
- (7) The transverse slopes of a taxiway shall be sufficient to prevent the accumulation of water on the surface of the taxiway but shall not exceed:
 - (a) 1.5% (one and a half per cent) where the code letter is C, D, E or F; and
 - (b) 2% (two per cent) where the code letter is A or B.
- (8) An aerodrome operator shall ensure that the strength of a taxiway shall be at least equal to that of the runway it serves.
- (9) An aerodrome operator shall give due consideration to the fact that a taxiway will be subjected to a greater density of traffic and, as a result of slow moving and stationary aeroplanes, to higher stresses than the runway it serves.
- (10) An Aerodrome Operator shall ensure that:
 - (a) the surface of a taxiway shall not have irregularities that cause damage to aeroplane structures;

- (b) the surface of a paved taxiway shall be so constructed or resurfaced as to provide suitable surface friction characteristics;
 - (c) a rapid exit taxiway shall be designed with a radius of turn-off curve of at least:
 - (i) 550m (five hundred and fifty meters) where the code number is 3 (three) or 4 (four); and
 - (ii) 275m (two hundred and seventy-five meters) where the code number is 1 (one) or 2 (two);
 - (d) the radius of the fillet on the inside of the curve at a rapid exit taxiway shall be sufficient to provide a widened taxiway throat in order to facilitate early recognition of the entrance and turn-off onto the taxiway;
 - (e) a rapid exit taxiway shall include a straight distance after the turn-off curve sufficient for an exiting aircraft to come to a full stop clear of any intersecting taxiway;
 - (f) the intersection angle of a rapid exit taxiway with the runway shall not be greater than 45° (forty-five degrees) nor less than 25° (twenty-five degrees) and preferably should be 30° (thirty degrees).
- (11) An aerodrome operator shall ensure -
- (a) to enable exit speeds under wet conditions of:
 - (i) 93km/h (ninety-three kilometers per hour) where the code number is 3 (three) or 4 (four); and
 - (ii) 65km/h (sixty-five kilometers per hour) where the code number is 1 (one) or 2 (two).
- (12) An Aerodrome Operator shall when designing taxiways on bridges, ensure that
- (a) the width of that portion of a taxiway bridge capable of supporting aeroplanes, as measured perpendicularly to the taxiway centre line, shall not be less than the width of the graded area of the strip provided for that taxiway, unless a proven method of lateral restraint is provided which shall not be hazardous for aeroplanes for which the taxiway is intended;
 - (b) access shall be provided to allow rescue and firefighting vehicles to intervene in both directions within the specified response time to the largest aeroplane for which the taxiway bridge is intended; and
 - (c) a bridge shall be constructed on a straight section of the taxiway with a straight section on both ends of the bridge to facilitate the alignment of aeroplanes approaching the bridge.

100. Taxiway Shoulders

(1) An aerodrome operator shall ensure that straight portions of a taxiway where the code letter is C, D, E or F, are provided with shoulders which extend symmetrically on each side of the taxiway so that the overall width of the taxiway and its shoulders on straight portions is not less than:

- (a) 44m (forty-four meters) where the code letter is F;
- (b) 38m (thirty-eight meters) where the code letter is E;
- (c) 34m (thirty-four meters) where the code letter is D; and
- (d) 25m (twenty-five meters) where the code letter is C.

(2) the shoulder width shall be not less than that on the adjacent straight portions of the taxiway. on taxiway curves and on junctions or intersections where increased pavement is provided,

(3) The surface of the taxiway shoulder shall be so prepared as to resist erosion and the ingestion of the surface material by aeroplane engines when a taxiway is intended to be used by turbine-engined aeroplanes,

101. Taxiway Strips

(1) An Aerodrome Operator shall ensure that

- (a) a taxiway, other than an aircraft stand taxilane, shall be included in a strip;
- (b) a taxiway strip shall extend symmetrically on each side of the centre line of the taxiway throughout the length of the taxiway to at least the distance from the centre line given in Schedule 2.7.
- (c) the taxiway strip shall provide an area clear of objects which may endanger taxiing aeroplanes.

(2) The centre portion of a taxiway strip shall provide a graded area to a distance from the centre line of the taxiway of not less than that given by the following tabulation:

- (a) 10.25m (ten and a quarter meters) where the OMGWS is up to but not including 4.5m (four and a half meters)
- (b) 11m (eleven meters) where the OMGWS is 4.5m (four and a half meters) up to but not including 6m (six meters);
- (c) 12.50m (twelve and a half meters) where the OMGWS is 6m (six meters) up to but not including 9m (nine meters);

- (d) 18.50m (eighteen and a half meters) where the OMGWS is 9m (nine meters) up to but not including 15m (fifteen meters), where the code letter is D;
 - (e) 19m (nineteen meters) where the OMGWS is 9m (nine meters) up to but not including 15m (fifteen meters) where the code letter is E; and
 - (f) 22m (twenty-two meters) where the OMGWS is 9m (nine meters) up to but not including 15m (fifteen meters), where the code letter is F.
- (3) The surface of the strip shall be flush at the edge of the taxiway or shoulder, if provided, and the graded portion shall not have an upward transverse slope exceeding:
- (a) 2.5% (two and a half per cent) for strips where the code letter is C, D, E or F; and
 - (b) 3% (three per cent) for strips of taxiways where the code letter is A or B;
 - (c) the upward slope being measured with reference to the transverse slope of the adjacent taxiway surface and not the horizontal.
- (4) The downward transverse slope shall not exceed 5% (five per cent) measured with reference to the horizontal.
- (5) The transverse slopes on any portion of a taxiway strip beyond that to be graded shall not exceed an upward or downward slope of 5% (five per cent) as measured in the direction away from the taxiway.

102. Holding Bays, Runway-Holding Positions, Intermediate Holding Positions and Road-Holding Positions

- (1) An aerodrome operator shall ensure that:
- (a) holding bays shall be provided when the traffic density is medium or heavy;
 - (b) runway-holding positions are established:
 - (i) on the taxiway, at the intersection of a taxiway and a runway; and
 - (ii) at an intersection of a runway with another runway when the former runway is part of a standard taxi-route.
 - (c) a runway-holding position is established on a taxiway if the location or alignment of the taxiway is such that a taxiing aircraft or vehicle can infringe an obstacle limitation surface or interfere with the operation of radio navigation aids;

- (d) an intermediate holding position is established on a taxiway at any point other than a runway-holding position where it is desirable to define a specific holding limit.
 - (e) a road-holding position shall be established at an intersection of a road with a runway.
- (2) An aerodrome operator shall ensure that:
- (a) the distance between a holding bay, runway-holding position established at a taxiway or runway intersection or road-holding position and the centre line of a runway shall be in accordance with Schedule 2.8.
 - (b) Pursuant to paragraph (a), in the case of a precision approach runway, such that a holding aircraft or vehicle will not interfere with the operation of radio navigation aids;
 - (c) at elevations greater than 700m (seven hundred meters) the distance of 90m (ninety meters) specified in Schedule 2.8 for a precision approach runway code number 4 (four) shall be increased as follows:
 - (i) up to an elevation of 2000m (two thousand meters); 1m (one meter) for every 100m (one hundred meters) in excess of 700m (seven hundred meters);
 - (ii) elevation in excess of 2000m (two thousand meters) and up to 4000m (four thousand meters); 13m (thirteen meters) plus 1.5m (one and a half meters) for every 100m (one hundred meters) in excess of 2000m (two thousand meters); and
 - (iii) elevation in excess of 4000m (four thousand meters) and up to 5000m (five thousand meters); 43m (forty-three meters) plus 2m (two meters) for every 100m (one hundred meters) in excess of 4000m (four thousand meters).
- (3) The distance of 90m (ninety meters) or 107.5m (one hundred and seven and a half meters), as appropriate, specified in Schedule 2.8 shall be further increased by 5m (five meters) for every meter the bay or position is higher than the threshold, if a holding bay, runway-holding position or road-holding position for a precision approach runway code number 4 (four) is at a greater elevation compared to the threshold.
- (4) The location of a runway-holding position established in accordance with 1(c) above, shall be such that a holding aircraft or vehicle will not infringe the obstacle free zone, approach surface, take-off climb surface or ILS or MLS critical or sensitive area or interfere with the operation of radio navigation aids.

103. Aprons

- (1) An aerodrome operator shall provide aprons where necessary to permit the on- and off-loading of passengers, cargo or mail as well as the servicing of aircraft without interfering with the aerodrome traffic.
- (2) The total apron area shall be adequate to permit expeditious handling of the aerodrome traffic at its maximum anticipated density.
- (3) Each part of an apron shall be capable of withstanding the traffic of the aircraft it is intended to serve.
- (4) An aerodrome operator shall give due consideration to the fact that some portions of the apron will be subjected to a higher density of traffic and, as a result of slow moving or stationary aircraft, to higher stresses than a runway.
- (5) An aerodrome operator shall ensure that:
 - (a) slopes on an apron, including those on an aircraft stand taxilane, shall be sufficient to prevent accumulation of water on the surface of the apron but shall be kept as levelled as drainage requirements permit;
 - (b) on an aircraft stand the maximum slope shall not exceed 1% (one per cent);
 - (c) an aircraft stand provides the minimum clearances specified in Schedule 2.9 between an aircraft entering or exiting the stand and any adjacent building, aircraft on another stand and other objects:
- (6) When special circumstances so warrant and subject to the approval of the Authority, clearances referred to in paragraph (c) above, may be reduced at a nose-in aircraft stand, where the code letter is D, E or F:
 - (a) between the terminal, including any fixed passenger bridge, and the nose of an aircraft; and
 - (b) over any portion of the stand provided with azimuth guidance by a visual docking guidance system.

104. Isolated Aircraft Parking Position

- (1) An aerodrome operator shall ensure-
 - (a) that an isolated aircraft parking position is designated or
 - (b) the aerodrome control tower shall be advised of an area or areas suitable for the parking of an aircraft which is known or believed to be the subject of unlawful interference, or which for other reasons needs isolation from normal aerodrome activities.

- (2) The isolated aircraft parking position shall be located at the maximum distance practicable and shall not be less than 100m (one hundred meters) from other parking positions, buildings or public areas.
- (3) The position referred to in sub-regulation (2) above, shall not be located over underground utilities such as gas and aviation fuel and, to the extent feasible, electrical or communication cables.

PART IX OBSTACLE RESTRICTION AND REMOVAL

105. Obstacle Limitation Surfaces

- (1) The limits of the conical surface shall comprise:
 - (a) a lower edge coincident with the periphery of the inner horizontal surface; and
 - (b) an upper edge located at a specified height above the inner horizontal surface.
- (2) The slope of the conical surface shall be measured in a vertical plane perpendicular to the periphery of the inner horizontal surface.
- (3) The radius or outer limits of the inner horizontal surface shall be measured from a reference point or points established for such purpose.
- (4) The height of the inner horizontal surface shall be measured above an elevation datum established for such purpose.
- (5) The limits of the approach surface shall comprise:
 - (a) an inner edge of specified length, horizontal and perpendicular to the extended centre line of the runway and located at a specified distance before the threshold;
 - (b) two sides originating at the ends of the inner edge and diverging uniformly at a specified rate from the extended centre line of the runway;
 - (c) an outer edge parallel to the inner edge; and
- (6) the above surfaces shall be varied when lateral offset, offset or curved approaches are utilized, specifically, two sides originating at the ends of the inner edge and diverging uniformly at a specified rate from the extended centre line of the lateral offset, offset or curved ground track.
- (7) The elevation of the inner edge shall be equal to the elevation of the midpoint of the threshold.

(8) The slope of the approach surface shall be measured in the vertical plane containing the centre line of the runway and shall continue containing the centre line of any lateral offset or curved ground track.

(9) The limits of the inner approach surface shall comprise:

- (a) an inner edge coincident with the location of the inner edge of the approach surface but of its own specified length;
- (b) two sides originating at the ends of the inner edge and extending parallel to the vertical plane containing the centre line of the runway; and
- (c) an outer edge parallel to the inner edge.

(10) The limits of a transitional surface shall comprise:

- (a) a lower edge beginning at the intersection of the side of the approach surface with the inner horizontal surface and extending down the side of the approach surface to the inner edge of the approach surface and from there along the length of the strip parallel to the runway centre line; and
- (b) an upper edge located in the plane of the inner horizontal surface.

(11) The elevation of a point on the lower edge shall be:

- (a) along the side of the approach surface; equal to the elevation of the approach surface at that point; and
- (b) along the strip; equal to the elevation of the nearest point on the centre line of the runway or its extension.

(12) The slope of the transitional surface shall be measured in a vertical plane at right angles to the centre line of the runway.

(13) The limits of an inner transitional surface shall comprise:

- (a) a lower edge beginning at the end of the inner approach surface and extending down the side of the inner approach surface to the inner edge of that surface, from there along the strip parallel to the runway centre line to the inner edge of the balked landing surface and from there up the side of the balked landing surface to the point where the side intersects the inner horizontal surface; and
- (b) an upper edge located in the plane of the inner horizontal surface.

(14) The elevation of a point on the lower edge shall be:

- (a) along the side of the inner approach surface and balked landing surface equal to the elevation of the particular surface at that point; and

- (b) along the strip equal to the elevation of the nearest point on the centre line of the runway or its extension.
- (15) The slope of the inner transitional surface shall be measured in a vertical plane at right angles to the centre line of the runway.
- (16) The limits of the balked landing surface shall comprise:
- (a) an inner edge horizontal and perpendicular to the centre line of the runway and located at a specified distance after the threshold;
 - (b) two sides originating at the ends of the inner edge and diverging uniformly at a specified rate from the vertical plane containing the centre line of the runway; and
 - (c) an outer edge parallel to the inner edge and located in the plane of the inner horizontal surface.
- (17) The elevation of the inner edge shall be equal to the elevation of the runway centre line at the location of the inner edge.
- (18) The slope of the balked landing surface shall be measured in the vertical plane containing the centre line of the runway.
- (19) The limits of the take-off climb surface shall comprise:
- (a) an inner edge horizontal and perpendicular to the centre line of the runway and located either at a specified distance beyond the end of the runway or at the end of the clearway when such is provided and its length exceeds the specified distance;
 - (b) two sides originating at the ends of the inner edge, diverging uniformly at a specified rate from the take-off track to a specified final width and continuing thereafter at that width for the remainder of the length of the take-off climb surface; and
 - (c) an outer edge horizontal and perpendicular to the specified take-off track.
- (20) The elevation of the inner edge shall be equal to the highest point on the extended runway centre line between the end of the runway and the inner edge, except that when a clearway is provided the elevation shall be equal to the highest point on the ground on the centre line of the clearway.
- (21) In the case of a straight take-off flight path, the slope of the take-off climb surface shall be measured in the vertical plane containing the centre line of the runway.
- (22) In the case of a take-off flight path involving a turn, the take-off climb surface shall be a complex surface containing the horizontal normals to its centre line, and the slope of the centre line shall be the same as that for a straight take-off flight path.

106. Obstacle Limitation Requirements for a Non-Instrument Runway

(1) An aerodrome operator shall establish the following obstacle limitation surfaces for a non-instrument runway:

- (a) conical surface;
- (b) inner horizontal surface;
- (c) approach surface; and
- (d) transitional surfaces.

(2) An aerodrome operator shall further ensure that:

- (a) the heights and slopes of the surfaces shall not be greater than, and their other dimensions not less than, those specified in Schedule 2.12;
- (b) new objects or extensions of existing objects shall not be permitted above an approach or transitional surface except when, in the opinion of the appropriate authority, the new object or extension would be shielded by an existing immovable object;
- (c) new objects or extensions of existing objects shall not be permitted above the conical surface or inner horizontal surface except when, in the opinion of the appropriate authority, the object would be shielded by an existing immovable object, or
- (d) after aeronautical study it is determined that the object would not adversely affect the safety or significantly affect the regularity of operations of aeroplanes;
- (e) existing objects above any of the surfaces required by (1) above shall as far as practicable be removed except when, in the opinion of the appropriate authority, the object is shielded by an existing immovable object, or
- (f) after aeronautical study it is determined that the object would not adversely affect the safety or significantly affect the regularity of operations of aeroplanes;
- (g) in considering proposed construction, account shall be taken of the possible future development of an instrument runway and consequent requirement for more stringent obstacle limitation surfaces.

107. Obstacle Limitation Requirements for Non-Precision Approach Runway

(1) An Aerodrome Operator shall establish the following obstacle limitation surfaces for a non-precision approach runway:

- (a) conical surface;
- (b) inner horizontal surface;
- (c) approach surface; and
- (d) transitional surfaces.

(2) An aerodrome operator shall further ensure that:

- (a) the heights and slopes of the surfaces shall not be greater than, and their other dimensions not less than, those specified in Schedule 2.12, except in the case of the horizontal section of the approach surface;
- (b) the approach surface shall be horizontal beyond the point at which the 2.5% (two and a half per cent) slope intersects:
 - (i) a horizontal plane 150m (one hundred and fifty meters) above the threshold elevation; or
 - (ii) the horizontal plane passing through the top of any object that governs the obstacle clearance altitude or height;whichever is the higher.
- (c) new objects or extensions of existing objects shall not be permitted above an approach surface within 3000m (three thousand meters) of the inner edge or above a transitional surface except when the Authority is of the opinion that the new object or extension would be shielded by an existing immovable object.
- (d) new objects or extensions of existing objects shall not be permitted above the approach surface beyond 3000m (three thousand meters) from the inner edge, the conical surface or inner horizontal surface except when, in the opinion of the Authority, the object would be shielded by an existing immovable object, or
- (e) after aeronautical study it is determined that the object would not adversely affect the safety or significantly affect the regularity of operations of aeroplanes;
- (f) existing objects above any of the surfaces required by (1) above shall as far as practicable be removed except where the Authority is of the opinion that the object is shielded by an existing immovable object, or
- (g) after aeronautical study it is determined that the object would not adversely affect the safety or significantly affect the regularity of operations of aeroplanes.

108. Obstacle Limitation Requirements for Precision Approach Runway

(1) An aerodrome operator shall establish the following obstacle limitation surfaces for a precision approach runway category I, II or III:

- (a) conical surface;
- (b) inner horizontal surface;
- (c) approach surface and inner approach surface;
- (d) transitional surfaces.
- (e) inner transitional surfaces; and
- (f) balked landing surface.

(2) An Aerodrome Operator shall further ensure that:

- (a) the heights and slopes of the surfaces shall not be greater than, and their other dimensions not less than, those specified in Schedule 2.12, except in the case of the horizontal section of the approach surface;
- (b) the approach surface shall be horizontal beyond the point at which the 2.5% (two and a half per cent) slope intersects:
 - (i) a horizontal plane 150m (one hundred and fifty meters) above the threshold elevation; or
 - (ii) the horizontal plane passing through the top of any object that governs the obstacle clearance limit;

whichever is the higher.

- (c) fixed objects shall not be permitted above the inner approach surface, the inner transitional surface or the balked landing surface, except for frangible objects which because of their function must be located on the strip.
- (d) Mobile objects shall not be permitted above these surfaces during the use of the runway for landing;
- (e) new objects or extensions of existing objects shall not be permitted above an approach surface or a transitional surface except when, in the opinion of the Authority, the new object or extension would be shielded by an existing immovable object;
- (f) new objects or extensions of existing objects shall not be permitted above the conical surface and the inner horizontal surface except when, in the opinion of the Authority, an object would be shielded by an existing immovable object, or

- (g) after aeronautical study it is determined that the object would not adversely affect the safety or significantly affect the regularity of operations of aeroplanes.
- (h) existing objects above an approach surface, a transitional surface, the conical surface and inner horizontal surface shall as far as practicable be removed except when, in the opinion of the Authority, an object is shielded by an existing immovable object, or
- (i) after aeronautical study it is determined that the object would not adversely affect the safety or significantly affect the regularity of operations of aeroplanes.

109. Obstacle Limitation Requirements for Runways meant for Take-off

- (1) An aerodrome operator shall establish a take-off climb surface obstacle limitation for a runway meant for take-off.
- (2) An aerodrome operator shall further ensure that:
 - (a) the dimensions of the surface shall be not less than the dimensions specified in Schedule 2.11, except that a lesser length may be adopted for the take-off climb surface where such lesser length would be consistent with procedural measures adopted to govern the outward flight of aeroplanes;
 - (b) the operational characteristics of aeroplanes for which the runway is intended shall be examined to see if it is desirable to reduce the slope specified in Schedule 2.11 when critical operating conditions are to be catered to.
 - (c) corresponding adjustment in the length of the take-off climb surface shall be made so as to provide protection to a height of 300m (three hundred meters) if the specified slope is reduced;
 - (d) the slope specified in Schedule 2.13 may be reduced when local conditions differ widely from sea level standard atmospheric conditions;
 - (e) the degree of this reduction referred to in paragraph (d) depends on the divergence between local conditions and sea level standard atmospheric conditions, and on the performance characteristics and operational requirements of the aeroplanes for which the runway is intended;
 - (f) new objects or extensions of existing objects shall not be permitted above a take-off climb surface except when, in the opinion of the Authority, the new object or extension would be shielded by an existing immovable object;

- (g) new objects shall be limited to preserve the existing obstacle free surface or a surface down to a slope of 1.6% (one and six tenths percent) if no object reaches the 2% (two per cent) take-off climb surface;
- (h) existing objects that extend above a take-off climb surface shall as far as practicable be removed except when, in the opinion of the Authority, an object is shielded by an existing immovable object, or
- (i) after aeronautical study it is determined that the object would not adversely affect the safety or significantly affect the regularity of operations of aeroplanes;

110. Objects outside the Obstacle Limitation Surfaces

(1) No person shall carry out any proposed construction works beyond the limits of the obstacle limitation surfaces that extend above a height established by the Authority without an application for aeronautical study and prior authorization by the Authority.

(2) In areas beyond the limits of the obstacle limitation surfaces, at least those objects which extend to a height of 150m (one hundred and fifty meters) or more above ground elevation shall be regarded as obstacles, unless a special aeronautical study indicates that they do not constitute a hazard to aeroplanes.

111. Other Objects

(1) An aerodrome operator shall remove, as far as practicable, objects which do not project through the approach surface but which would nevertheless adversely affect the optimum siting or performance of visual or non-visual aids.

(2), that object shall be regarded as an obstacle and shall be removed in so far as practicable where following the conduct of an aeronautical study, the Authority is of the opinion that the object may endanger aeroplanes on the movement area or in the air within the limits of the inner horizontal and conical surfaces.

PART X VISUAL AIDS FOR NAVIGATION – INDICATORS AND SIGNALLING DEVICES

112. Wind Direction Indicator

(1) An aerodrome shall be equipped with at least one wind direction indicator which shall be located so as to be visible from aircraft in flight or on the movement area and in such a way as to be free from the effects of air disturbances caused by nearby objects.

(2) A wind direction indicator shall be in the form of a truncated cone made of fabric and shall have a length of not less than 3.6m (three and six tenths meters) and a diameter, at the larger end, of not less than 0.9m (nine tenths meters).

(3) A wind direction indicator shall be constructed so that it gives a clear indication of the direction of the surface wind and a general indication of the wind speed.

(4) The colour or colours shall be so selected as to make the wind direction indicator clearly visible and understandable from a height of at least 300m (three hundred meters), having regard to background.

(5) Where practicable, a single colour, preferably white or orange, should be used.

(6) Where a combination of 2 (two) colours is required to give adequate conspicuity against changing backgrounds, they shall preferably be orange and white, red and white, or black and white, and shall be arranged in 5 (five) alternate bands, the first and last bands being the darker colour.

(7) The location of at least 1 (one) wind direction indicator shall be marked by a circular band 15m (fifteen meters) in diameter and 1.2m (one and two tenths meters) wide.

(8) The band referred to in sub-regulation (7) shall be centred about the wind direction indicator support and shall be in a colour chosen to give adequate conspicuity, preferably white.

(9) Provisions shall be made for illuminating at least one wind direction indicator for aerodromes intended for night use.

113. Landing Direction Indicator

(1) An aerodrome operator shall, when providing a landing direction indicator, ensure that

- (a) it is located in a conspicuous place on the aerodrome;
- (b) it is in the form of a "T" as shown in Schedule 2.14; and
- (c) the landing "T" is either illuminated or outlined by white lights when the aerodrome is intended for night use:

(2) A landing direction indicator shall be in the form of a "T" having minimum dimensions as shown in Schedule 2.14 and be either white or orange, the choice being dependent on the colour that contrasts best with the background against which the indicator will be viewed.

114. Signalling Lamp

(1) An aerodrome operator shall provide a signalling lamp, in the control tower of a controlled aerodrome, which shall be capable of producing red, green and white signals, and able to:

- (a) be aimed manually at any target as required;
- (b) give a signal in any one colour followed by a signal in either of the two other colours; and
- (c) transmit a message in any one of the three colours by Morse Code up to a speed of at least four words per minute.

(2) A beam spread shall be not less than 1° (one degree) nor greater than 3° (three degrees), with negligible light beyond 3° (three degrees).

(3) The intensity of the coloured light shall be not less than 6000cd (six thousand candela) when a signalling lamp is intended for use in the daytime

PART XI VISUAL AIDS FOR NAVIGATION – MARKINGS

115. Interruption of Runway Markings

(1) An aerodrome operator shall ensure that at the intersection of:

- (a) 2 (two) or more runways, the markings of the more important runway, except for the runway side stripe marking, shall be displayed and the markings of the other runways shall be interrupted. The runway side stripe marking of the more important runway may be either continued across the intersection or interrupted;
- (b) a runway and taxiway, the markings of the runway shall be displayed, and the markings of the taxiway interrupted, except that runway side stripe markings may be interrupted.

(2) The order of importance of runways for the display of runway markings should be as follows:

- (a) 1st - precision approach runway;
- (b) 2nd - non-precision approach runway; and
- (c) 3rd - non-Instrument Runway.

(3) The colour and conspicuity of markings shall be:

- (a) white for runways;
- (b) yellow for taxiways, runway turn pads and aircraft stands including as far as practicable unpaved taxiways;

- (c) for apron safety lines, of a conspicuous colour which shall contrast with that used for aircraft stands;
- (d) for aerodromes where night operations take place, pavement markings shall be made with reflective materials designed to enhance the visibility of the markings, except where the line is co-located with airfield ground lighting.

116. Runway Designation Markings

- (1) An aerodrome operator shall provide runway designation markings at the thresholds of paved runways and as far as practicable for unpaved runways.
- (2) Designation markings referred to in sub-regulation (1) shall be located at a threshold as shown in Schedule 2.15 as appropriate
- (3) A runway designation marking shall consist of
 - (a) a two-digit number and on parallel runways shall be supplemented with a letter;
 - (b) on a single runway, dual parallel runways and triple parallel runways the two-digit number shall be the whole number nearest the one-tenth of the magnetic North when viewed from the direction of approach;
 - (c) on 4 (four) or more parallel runways, one set of adjacent runways shall be numbered to the nearest one-tenth magnetic azimuth and the other set of adjacent runways numbered to the next nearest one-tenth of the magnetic azimuth.
- (4) When the above rule would give a single digit number, it shall be preceded by a zero.
- (5) In the case of parallel runways, each runway designation number shall be supplemented by a letter as follows, in the order shown from left to right when viewed from the direction of approach:
 - (a) for 2 (two) parallel runways: "L" "R";
 - (b) for 3 (three) parallel runways: "L" "C" "R";
 - (c) for 4 (four) parallel runways: "L" "R" "L" "R";
 - (d) for 5 (five) parallel runways: "L" "C" "R" "L" "R" or "L" "R" "L" "C" "R"; and
 - (e) for six parallel runways: "L" "C" "R" "L" "C" "R".
- (6) The numbers and letters shall be in the form and proportion shown in Schedule 2.16.

(7) The dimensions shall be not less than those shown in Schedule 2.16, but where the numbers are incorporated in the threshold marking, larger dimensions shall be used in order to fill adequately the gap between the stripes of the threshold marking.

117. Runway Centre Line Markings

(1) An aerodrome operator shall provide runway centre line markings on paved runways which shall be located along the centre line of the runway between the runway designation markings as shown in Schedule 2.15, except when interrupted in compliance with Regulation 115 (1).

(2) A runway centre line marking shall consist of a line of uniformly spaced stripes and gaps.

(3) The length of a stripe plus a gap shall be not less than 50m (fifty meters) or more than 75m (seventy-five meters).

(4) The length of each stripe shall be at least equal to the length of the gap or 30m (thirty meters), whichever is greater.

(5) The width of the stripes shall be not less than:

(a) 0.90m (nine tenths meters) on Precision Approach Category II and III runways;

(b) 0.45m (forty-five hundredths meters) on non-precision approach runways where the code number is 3 (three) or 4 (four), and Precision Approach Category I runways; and

(c) 0.30m (three tenths meters) on non-precision approach runways where the code number is 1 (one) or 2 (two), and on Non-Instrument Runways.

118. Threshold Markings

(1) An aerodrome operator shall provide threshold markings at the threshold of paved runways where the code number is 3 (three) or 4 (four) and as far as practicable for unpaved runways while ensuring that the stripes of the threshold marking commence 6m (six meters) from the threshold.

(2) A runway threshold marking shall consist of a pattern of longitudinal stripes of uniform dimensions disposed symmetrically about the centre line of a runway as shown in Schedule 2.15 (A) and (B) for a runway width of 45m (forty-five meters).

(3) The number of stripes shall be in accordance with the runway width as specified in Schedule 2.17

(4) Except that on non-precision approach and Non-Instrument Runways 45m (forty-five meters) or greater in width, they may be as shown in Schedule 2.15 (C).

(5) The stripes shall extend laterally to within 3m of the edge of a runway or to a distance of 27m (twenty-seven meters) on either side of a runway centre line, whichever results in the smaller lateral distance.

(6) Where a runway designation marking is placed above a threshold marking, the stripes shall be continued across the runway.

(7) The stripes shall be at least 30m (thirty meters) long and approximately 1.80m (one and eight tenths meters) wide with spacings of approximately 1.80m (one and eight tenths meters) between them except that, where the stripes are continued across a runway, a double spacing shall be used to separate the two stripes nearest the centre line of the runway.

(8) Where the designation marking is included within the threshold marking this spacing shall be 22.5m (twenty-two and a half meters).

(9) Where a threshold is displaced from the extremity of a runway or where the extremity of a runway is not square with the runway centre line, a transverse stripe which is not less than 1.80m (one and eight tenths meters) wide shall be added to the threshold marking as shown in Schedule 2.18 (B).

(10) Where a runway threshold is permanently displaced, arrows conforming to Schedule 2.18 (B) shall be provided on the portion of the runway before the displaced threshold.

(11) When a runway threshold is temporarily displaced from the normal position, it shall be marked as shown in Schedule 2.18 (A) or (B) and all markings prior to the displaced threshold shall be obscured except the runway centre line marking, which shall be converted to arrows.

119. Aiming Point Markings

(1) An aerodrome operator shall provide aiming point markings at each approach end of paved instrument runways where the code number is 2 (two), 3 (three) or 4 (four) and when additional conspicuity of the aiming point is desirable, at:

(a) paved non-instrument runways where the code number is 3 (three) or 4 (four),

(b) paved instrument runways where the code number is 1 (one).

(2) Aiming point markings shall commence no closer to the threshold than the distance indicated in the appropriate column of Schedule 2.15, except that, on a runway equipped with a visual approach slope indicator system, the beginning of the marking shall be coincident with the visual approach slope origin.

(3) Aiming point markings shall consist of two conspicuous stripes.

- (4) The dimensions of the stripes and the lateral spacing between their inner sides shall be in accordance with the provisions of the appropriate column of Schedule 2.15.
- (5) Where a touchdown zone marking is provided, the lateral spacing between the markings shall be the same as that of the touchdown zone marking.
- (6) The greater dimensions of the specified ranges are intended to be used where increased conspicuity is required.
- (7) The lateral spacing may be varied within these limits to minimize the contamination of the marking by rubber deposits.

120. Touchdown Zone Markings

- (1) An aerodrome operator shall provide touchdown zone markings in the touchdown zone of paved runways where the code number is 3 (three) or 4 (four) and additional conspicuity of the touchdown zone is desirable.
- (2) A touchdown zone marking shall consist of pairs of rectangular markings symmetrically disposed about the runway centre line with the number of such pairs related to the landing distance available.
- (3) Where the marking is to be displayed at both the approach directions of a runway, the distance between the thresholds shall be as specified in Schedule 2.20:
- (4) A touchdown zone marking shall conform to either of the two patterns shown in Schedule 2.21.
- (5) For the pattern shown in Schedule 2.21(A), the markings shall be not less than 22.5m (twenty-two and a half meters) long and 3m (three meters) wide.
- (6) For the pattern shown in Schedule 2.21 (B), each stripe of each marking shall be not less than 22.5m (twenty-two and a half meters) long and 1.8m (one and eight tenths meters) wide with a spacing of 1.5m (one and a half meters) between adjacent stripes.
- (7) The lateral spacing between the inner sides of the rectangles shall be equal to that of the aiming point marking where provided.
- (8) Where an aiming point marking is not provided, the lateral spacing between the inner sides of the rectangles shall correspond to the lateral spacing specified for the aiming point marking in Schedule 2.15.
- (9) The pairs of markings shall be provided at longitudinal spacings of 150m (one hundred and fifty meters) beginning from the threshold.
- (10) Pairs of touchdown zone markings coincident with or located within 50m (fifty meters) of an aiming point marking shall be deleted from the pattern.

(11) An additional pair of touchdown zone marking stripes shall be provided 150m (one hundred and fifty meters) beyond the beginning of the aiming point marking on a non-precision approach runway where the Code Number is 2 (two).

121. Runway Side Stripes Markings

(1) An aerodrome operator shall provide runway side stripe markings:

- (a) between the thresholds of paved runways where there is a lack of contrast between the runway edges and the shoulders or the surrounding terrain;
- (b) on a precision approach runway irrespective of the contrast between the runway edges and the shoulders or the surrounding terrain.

(2) A runway side stripe marking shall consist of two stripes, one placed along each edge of the runway with the outer edge of each stripe approximately on the edge of the runway

(3) the stripes referred to in sub-regulation (2) shall be located 30m (thirty meters) from the runway centre line where the runway is greater than 60m (sixty meters) in width,.

(4) The runway side stripe marking shall be continued between the runway and the runway turn pad where a runway turn pad is provided,.

(5) A runway side stripe shall have an overall width of at least 0.9m (nine tenth meters) on runways 30m (thirty meters) or more in width and at least 0.45m (forty-five hundredths meters) on narrower runways.

122. Taxiway Centre Line Markings

(1) An aerodrome operator shall provide taxiway centre line markings on paved taxiways and aprons in such a way as to provide continuous guidance between the runway centre line and aircraft stands.

(2) Taxiway centre line markings shall be provided on paved runways when the runway is part of a standard taxi-route and:

- (a) there is no runway centre line marking; or
- (b) where the taxiway centre line is not coincident with the runway centre line.

(3) Enhanced taxiway centre line markings shall be installed at each taxiway or runway intersection to denote the proximity of runway-holding positions as shown in Schedule 2.23 when deemed necessary.

(4) The taxiway centre line markings, on a straight section of a taxiway, shall be located along the taxiway centre line.

(5) On a taxiway curve, the marking shall continue from the straight portion of the taxiway at a constant distance from the outside edge of the curve.

(6) At an intersection of a taxiway with a runway where the taxiway serves as an exit from the runway, the taxiway centre line marking shall be curved into the runway centre line marking as shown in Schedule 2.22 and 2.41

(7) The taxiway centre line marking shall be extended parallel to the runway centre line marking for a distance of at least 60m (sixty meters) beyond the point of tangency where the code number is 3 (three) or 4 (four), and for a distance of at least 30m (thirty meters) where the code number is 1 (one) or 2. (two).

(8) Where taxiway centre line marking is provided on a runway in accordance with sub-regulation (2), the marking shall be located on the centre line of the designated taxiway.

(9) A taxiway centre line marking shall be at least 15cm (fifteen centimeters) in width and continuous in length except where it intersects with a runway-holding position marking or an Intermediate Holding Position marking as shown in Schedule 2.22.

(10) Where provided:

- (a) an enhanced taxiway centre line marking shall extend from the runway-holding position pattern A, as shown in Schedule 2.22, to a distance of up to 47m (forty-seven meters) in the direction of travel away from the runway as in Schedule 2.23 (a);
- (b) if the enhanced taxiway centre line marking intersects another runway-holding position marking, such as for a precision approach category II or III runway, that is located within 47m (forty-seven meters) of the first runway-holding position marking, the enhanced taxiway centre line marking shall be interrupted 0.9m (nine tenths meters) prior to and after the intersected runway-holding position marking. The enhanced taxiway centre line marking shall continue beyond the intersected runway-holding position marking for at least three dashed line segments or 47m (forty-seven meters) from start to finish, whichever is greater, as depicted in Schedule 2.23 (b).
- (c) if the enhanced taxiway centre line marking continues through a taxiway or taxiway intersection that is located within 47m (forty-seven meters) of the runway- holding position marking, the enhanced taxiway centre line marking shall be interrupted 1.5m (one and a half meters) prior to and after the point where the intersected taxiway centre line crosses the enhanced taxiway centre line.
- (d) The enhanced taxiway centre line marking shall continue beyond the taxiway or taxiway intersection for at least three dashed line segments or

47m (forty-seven meters) from start to finish, whichever is greater as depicted in Schedule 2.23 (c).

- (e) where two taxiway centre lines converge at or before the runway-holding position marking, the inner dashed line shall not be less than 3m (three meters) in length as depicted in Schedule 2.23 (d).
- (f) where there are two opposing runway-holding position markings and the distance between the markings is less than 94m (ninety-four meters), the enhanced taxiway centre line markings shall extend over this entire distance.
- (g) the enhanced taxiway centre line markings shall not extend beyond either runway-holding position marking, see Schedule 2.23 (e).

123. Runway Turn Pad Markings

- (1) An aerodrome operator shall when providing runway turn pad markings ensure they provide continuous guidance to enable an aircraft to complete a 180° (one hundred and eighty degrees) turn and align with the runway centre line.
- (2) A runway turn pad marking shall be curved from the runway centre line into the turn pad.
- (3) The radius of the curve shall be compatible with the manoeuvring capability and normal taxiing speeds of the aeroplane for which the runway turn pad is intended.
- (4) The intersection angle of the runway turn pad marking with the runway centre line shall not be greater than 30° (thirty degrees).
- (5) A runway turn pad marking shall be extended parallel to the runway centre line marking for a distance of at least 60m (sixty meters). beyond the point of tangency where the code number is 3 (three) or 4 (four), and for a distance of at least 30m (thirty meters) where the code number is 1 (one) or 2 (two).
- (6) A runway turn pad marking shall guide the aeroplane in such a way as to allow a straight portion of taxiing before the point where a 180° (one hundred and eighty degrees) turn is to be made.
- (7) The straight portion of the runway turn pad marking shall be parallel to the outer edge of the runway turn pad.
- (8) The design of the curve allowing the aeroplane to negotiate a 180° (one hundred and eighty degrees) turn shall be based on a nose wheel steering angle not exceeding 45° (forty-five degrees).
- (9) The design of the turn pad marking shall be such that, when the cockpit of the aircraft remains over the runway turn pad marking, the clearance distance between

any wheel of the aeroplane landing gear and the edge of the runway turn pad shall be not less than those specified in Regulation 93 (6).

(10) A runway turn pad marking shall be at least 15cm (fifteen centimeters) in width and continuous in length and designed as shown in Schedule 2.24.

124. Runway Holding Position Markings

(1) An aerodrome operator shall ensure that runway-holding position markings are displayed along runway-holding positions.

(2) At an intersection of a taxiway and a non-instrument, non-precision approach or take-off runway, the runway-holding position marking shall be as shown in Schedule 2.22, pattern A.

(3) Where a single runway-holding position is provided at an intersection of a taxiway and a Precision Approach Category I, II or III runway, the runway-holding position marking shall be as shown in Schedule 2.22 pattern A.

(4) Where 2 (two) or 3 (three) runway-holding positions are provided at such an intersection, the runway-holding position marking closest to the runway shall be as shown in Schedule 2.22 pattern A.

(5) The markings farther from the runway shall be as shown in Schedule 2.22 pattern B.

(6) The runway-holding position marking displayed at a runway-holding position established in accordance with Regulation 102 (1)(c) shall be as shown in Schedule 2.22 pattern A.

(7) Where increased conspicuity of the runway-holding position is required, the runway-holding position marking shall be as shown in Schedule 2.25 pattern A or pattern B, as appropriate.

(8) Where a pattern B runway-holding position marking is located on an area where it would exceed 60m (sixty meters) in length, the term "CAT II" or "CAT III" as appropriate shall be marked on the surface at the ends of the runway-holding position marking and at equal intervals of 45m (forty-five meters) maximum between successive marks.

(9) The letters shall be not less than 1.8m (one and eight tenths meters) high and shall be placed not more than 0.9m (nine tenths meters) beyond the holding position marking.

(10) The runway-holding position marking displayed at a runway or runway intersection shall be perpendicular to the centre line of the runway forming part of the standard taxi-route.

(11) The pattern of the marking shall be as shown in Schedule 2.25 pattern A.

125. Intermediate Holding Position Markings

- (1) An aerodrome operator shall ensure that an intermediate holding position marking consisting of a single broken line is displayed along an intermediate holding position as shown in Schedule 2.22.
- (2) Where an intermediate holding position marking is displayed at an intersection of two paved taxiways, it shall be located across the taxiway at sufficient distance from the near edge of the intersecting taxiway to ensure safe clearance between taxiing aircraft.
- (3) The intermediate holding position shall be coincident with a stop bar or Intermediate Holding Position lights, where provided.
- (4) The distance between an intermediate holding position marking at the exit boundary of a remote holding facility and the centre line of the adjoining taxiway shall not be less than the dimension specified in Column 11 of Schedule 2.7.

126. VOR Aerodrome Checkpoint Markings

- (1) Whenever a VOR aerodrome checkpoint is established, an aerodrome operator shall ensure that it is indicated by a VOR aerodrome checkpoint marking and sign centred on the spot at which an aircraft is to be parked to receive the correct VOR signal.
- (2) A VOR aerodrome checkpoint marking shall consist of a circle 6m (six meters) in diameter and have a line width of 15cm (fifteen centimeters) as shown in Schedule 2.26 (A).
- (3) A line shall be provided that passes through the centre of the circle on the desired azimuth when it is preferable for an aircraft to be aligned in a specific direction,
- (4) The line referred to in sub-regulation (3) shall extend 6m (six meters) outside the circle in the desired direction of heading and terminate in an arrowhead.
- (5) The width of the line referred to in sub-regulation (3) shall be 15cm (fifteen centimeters) as shown in Schedule 2.26 (B).
- (6) A VOR aerodrome checkpoint marking shall preferably be white but shall differ from the colour used for the taxiway markings.

127. Aircraft Stand Markings

- (1) An aerodrome operator shall provide aircraft stand markings for designated parking positions on paved aprons, so located as to provide the clearances specified in Regulations 103 (4)(c) when the nose wheel follows the stand marking.

- (2) Aircraft stand markings shall include as a minimum such elements as stand identification, lead-in line, stop block and lead-out line, as are required by the parking configuration and to complement other parking aids.
- (3) An aircraft stand identification letter or number or both, shall be included in the lead-in line a short distance after the beginning of the lead-in line.
- (4) The height of the identification shall be adequate to be readable from the cockpit of aircraft using the stand.
- (5) Where two sets of aircraft stand markings are superimposed on each other in order to permit more flexible use of the apron and it is difficult to identify which stand marking shall be followed, or safety would be impaired if the wrong marking was followed, then identification of the aircraft for which each set of markings is intended shall be added to the stand identification.
- (6) Lead-in, turning and lead-out lines shall be continuous in length and have a width of not less than 15cm (fifteen centimeters).
- (7) The lines shall be continuous for the most demanding aircraft and broken for other aircraft where one or more sets of stand markings are superimposed on a stand marking.
- (8) The curved portions of lead-in, turning and lead-out lines shall have radii appropriate to the most demanding aircraft type for which the markings are intended.
- (9) Arrows pointing in the direction to be followed shall be added as part of the lead-in and lead-out lines where it is intended that an aircraft proceed in one direction only,.
- (10) A turn bar where provided, shall be located at right angles to the lead-in line, abeam the left pilot position at the point of initiation of any intended turn.
- (11) A turn bar shall have a length and width of not less than 6m (six meters) and 15cm (fifteen centimeters), respectively, and include an arrowhead to indicate the direction of turn.
- (12) If more than one turn bar or stop line or both is required, they shall be coded with aircraft type.
- (13) An alignment bar, where provided shall be placed so as to be coincident with the extended centre line of the aircraft in the specified parking position and visible to the pilot during the final part of the parking manoeuvre.
- (14) An alignment bar shall have a width of not less than 15cm (fifteen centimeters).
- (15) A stop line shall be located at right angles to the alignment bar, abeam the left pilot position at the intended point of stop.

(16) A stop line shall have a length and width of not less than 6m (six meters) and 15cm (fifteen centimeters), respectively.

128. Apron Safety Lines

(1) An aerodrome operator shall provide apron safety lines on paved aprons as required by the parking configurations and ground facilities, so located as to define the areas intended for use by ground vehicles and other aircraft servicing equipment, to provide safe separation from aircraft.

(2) Apron safety lines shall include such elements as wing tip clearance lines and service road boundary lines as required by the parking configurations and ground facilities and be continuous in length and at least 10cm (ten centimeters) in width.

129. Road-Holding Position Markings

An aerodrome operator shall provide road-holding position markings at all road entrances to a runway and locate them across the road at the holding position in accordance with the road traffic regulations.

130. Mandatory Instruction Markings

(1) An aerodrome operator shall ensure that where:

- (a) it is impracticable to install a mandatory instruction sign in accordance with Regulation 162, a mandatory instruction marking shall be provided on the surface of the pavement;
- (b) operationally required, such as on taxiways exceeding 60m (sixty meters) in width, a mandatory instruction sign shall be supplemented by a mandatory instruction marking.

(2) The mandatory instruction marking on taxiways where the code letter is A, B, C or D shall be located across the taxiway equally placed about the taxiway centre line and on the holding side of the runway-holding position marking as shown in Schedule 2.27 (A).

(3) The mandatory instruction marking on taxiways where the code letter is E or F shall be located on both sides of the taxiway centre line marking and on the holding side of the runway-holding position marking as shown in Schedule 2.27 (B).

(4) The distance between the nearest edge of the mandatory instruction marking and the runway-holding position marking or the taxiway centre line marking shall be not less than 1m.

(5) A mandatory instruction marking shall consist of an inscription in white on a red background except for a no entry marking, the inscription shall provide information identical to that of the associated mandatory instruction sign.

(6) A no entry marking shall consist of an inscription in white reading NO ENTRY on a red background.

(7) Where there is insufficient contrast between the marking and the pavement surface, the mandatory instruction marking shall include an appropriate border, preferably white or black.

(8) The character height shall be 4m (four meters) for inscriptions where the code letter is C, D, E or F, and 2m (two meters) where the code letter is A or B.

(9) The inscriptions shall be in the form and proportions shown in Schedule 5.

(10) The background should be rectangular and extend a minimum of 0.5m (half a meter) laterally and vertically beyond the extremities of the inscription.

131. Information Marking

(1) An aerodrome operator shall ensure that where:

- (a) an information sign would normally be installed and it is impractical to install, as determined by the Authority, an information marking shall be displayed on the surface of the pavement;
- (b) operationally required, an information sign shall be supplemented by an information marking.

(2) A location or direction marking shall be displayed prior to and following complex taxiway intersections and where operational experience has indicated the addition of a taxiway location marking could assist flight crew ground navigation.

(3) A location marking shall be displayed on the pavement surface at regular intervals along taxiways of great length.

(4) The information marking shall be displayed across the surface of the taxiway or apron where necessary and positioned so as to be legible from the cockpit of an approaching aircraft.

(5) An information marking shall consist of:

- (a) an inscription in yellow upon a black background, when it replaces or supplements a location sign; and
- (b) an inscription in black upon a yellow background, when it replaces or supplements a direction or destination sign.

(6) Where there is insufficient contrast between the marking background and the pavement surface, the marking shall include:

- (a) a black border where the inscriptions are in black; and

- (b) a yellow border where the inscriptions are in yellow.
- (7) The character height shall be 4m (four meters).
- (8) The inscriptions shall be in the form and proportions shown in Schedule 5.

PART XII VISUAL AIDS FOR NAVIGATION – LIGHTS

132. Lights – General

- (1) No person shall install or use a non-aeronautical ground light near an aerodrome which might endanger the safety of aircraft without prior authorization from the Authority.
- (2) When after the conduct of an aeronautical safety risk assessment, the Authority concludes that the non-aeronautical ground light poses might endanger the safety of aircraft, the light shall be extinguished, screened or otherwise modified so as to eliminate the source of danger.
- (3) The Authority shall establish the following protected zones around aerodromes to protect the safety of aircraft against the hazardous effects of laser emitters:
 - (a) a laser-beam free flight zone
 - (b) a laser-beam critical flight zone
 - (c) a laser-beam sensitive flight zone.
- (4) Where the Authority is of the opinion that a non-aeronautical ground light, by reason of its intensity, configuration or colour, might prevent, or cause confusion in the clear interpretation of aeronautical ground lights, it shall extinguish, screen or otherwise modify the said ground light so as to eliminate such a possibility.
- (5) Attention shall be directed to a non-aeronautical ground light visible from the air within the areas described hereunder:
 - (a) instrument runway code number 4 (four); within the areas before the threshold and beyond the end of the runway extending at least 4500m (four thousand five hundred meters) in length from the threshold and runway end and 750m (seven hundred and fifty meters) either side of the extended runway centre line in width;
 - (b) instrument runway code number 2 (two) or 3 (three); as in (a) above, except that the length should be at least 3000m (three thousand meters);
 - (c) instrument runway code number 1 (one) and non-instrument runway; within the approach area.

(6) Elevated approach lights and their supporting structures shall be frangible except that, in that portion of the approach lighting system beyond 300m (three hundred meters) from the threshold:

- (a) where the height of a supporting structure exceeds 12m (twelve meters), the frangibility requirement shall apply to the top 12m (twelve meters) only; and
- (b) where a supporting structure is surrounded by non-frangible objects, only that part of the structure that extends above the surrounding objects shall be frangible.

(7) When an approach light fixture or supporting structure is not in itself sufficiently conspicuous, it shall be suitably marked.

(8) Elevated runway, stopway and taxiway lights shall be frangible and their height be sufficiently low to preserve clearance for propellers and for the engine pods of jet aircraft.

(9) Light fixtures inset in the surface of runways, stopways, taxiways and aprons shall be so designed and fitted as to withstand being run over by the wheels of an aircraft without damage either to the aircraft or to the lights themselves.

(10) The temperature produced by conduction or radiation at the interface between an installed inset light and an aircraft tyre shall not exceed 160°C (one hundred and sixty degrees Celsius) during a 10 (ten) minute period of exposure.

(11) The intensity of runway lighting shall be adequate for the minimum conditions of visibility and ambient light in which use of the runway is intended, and compatible with that of the nearest section of the approach lighting system when provided.

(12) Where a high-intensity lighting system is provided, a suitable intensity control shall be incorporated to allow for adjustment of the light intensity to meet the prevailing conditions.

(13) Separate intensity controls or other suitable methods shall be provided to ensure that the following systems, when installed, can be operated at compatible intensities:

- (a) approach lighting system;
- (b) runway edge lights;
- (c) runway threshold lights;
- (d) runway end lights;
- (e) runway centre line lights;
- (f) runway touchdown zone lights; and
- (g) taxiway centre line lights.

(14) On the perimeter of and within the ellipse defining the main beam in Schedule 4, Figures A2-1 to A2-10, the maximum light intensity value shall not be greater than three times the minimum light intensity value measured in accordance with Schedule 4, collective notes for Figures A2-1 to A2-11 and A2-26, Note 2.

(15) On the perimeter of and within the rectangle defining the main beam in Schedule 4, Figures A2-12 to A2-20, the maximum light intensity value shall not be greater than three times the minimum light intensity value measured in accordance with Schedule 4, collective notes for Figures A2-12 to A2-21, Note 2.

133. Emergency Lighting

(1) An Aerodrome Operator shall ensure that, at an aerodrome provided with runway lighting and without a secondary power supply, sufficient emergency lights are conveniently available for installation on at least the primary runway in the event of failure of the normal lighting system.

(2) When installed on a runway, the emergency lights shall, as a minimum, conform to the configuration required for a non-instrument runway.

(3) The colour of the emergency lights shall conform to the colour requirements for runway lighting, except that, where the provision of coloured lights at the threshold and the runway end is not practicable, all lights may be variable white or as close to variable white as practicable.

134. Aeronautical Beacons

(1) An Aerodrome Operator shall provide, where operationally necessary, an aerodrome beacon or an identification beacon at each aerodrome intended for use at night.

(2) The operational requirement shall be determined having regard to the requirements of the air traffic using the aerodrome, the conspicuity of the aerodrome features in relation to its surroundings and the installation of other visual and non-visual aids useful in locating the aerodrome.

(3) An aerodrome beacon shall be provided at an aerodrome intended for use at night if one or more of the following conditions exist:

- (a) aircraft navigate predominantly by visual means;
- (b) reduced visibilities are frequent; or
- (c) it is difficult to locate the aerodrome from the air due to surrounding lights or terrain.

- (4) An aerodrome beacon shall be located on or adjacent to the aerodrome in an area of low ambient background lighting and be such that the beacon is not shielded by objects in significant directions and does not dazzle a pilot approaching to land.
- (5) An aerodrome beacon shall show either coloured flashes alternating with white flashes, or white flashes only.
- (6) The frequency of total flashes shall be from 20 (twenty) to 30 (thirty) per minute.
- (7) Where used, the coloured flashes emitted by beacons at land aerodromes shall be green, and coloured flashes emitted by beacons at water aerodromes shall be yellow.
- (8) In the case of a combined water and land aerodrome, coloured flashes, if used, shall have the colour characteristics of whichever section of the aerodrome is designated as the principal facility.
- (9) The light from the beacon shall show at all angles of azimuth with the vertical light distribution extending upwards from an elevation of not more than 1° (one degree) to an elevation determined by the Authority to be sufficient to provide guidance at the maximum elevation at which the beacon is intended to be used.
- (10) The effective intensity of the flash shall be not less than 2000cd (two thousand candelas).
- (11) An Aerodrome Operator shall ensure that an identification beacon shall be provided at an aerodrome which is intended for use at night and cannot be easily identified from the air by other means.
- (12) An identification beacon shall be located on the aerodrome in an area of low ambient background lighting and be such that the beacon is not shielded by objects in significant directions and does not dazzle a pilot approaching to land.
- (13) An identification beacon at a land aerodrome shall show at all angles of azimuth.
- (14) The vertical light distribution shall extend upwards from an elevation of not more than 1° (one degree) to an elevation determined by the appropriate authority to be sufficient to provide guidance at the maximum elevation at which the beacon is intended to be used.
- (15) The effective intensity of the flash shall be not less than 2000cd (two thousand candelas).
- (16) An identification beacon shall show flashing-green at a land aerodrome and flashing- yellow at a water aerodrome while transmitting identification characters in the International Morse Code.

(17) The speed of transmission shall be between 6 (six) and 8 (eight) words per minute with the corresponding range of duration of the Morse dots being from 0.15 (fifteen hundredths) to 0.2 (two tenths) seconds per dot.

135. Approach Lighting Systems

(1) An aerodrome operator shall provide, where physically practicable, a simple approach lighting system as specified in sub-regulation (3) and (4) to serve:

- (a) a non- instrument runway where the code number is 3 (three) or 4 (four) and intended for use at night; and
- (b) a non-precision approach runway;
- (c) except when the runway is used only in conditions of good visibility and sufficient guidance is provided by other visual aids;

(2) An aerodrome operator shall provide, where physically practicable:

- (a) a precision approach Category I lighting system as specified in sub-regulation (5) and (6) to serve a precision approach runway category I.
- (b) a precision approach Category II and III lighting system as specified in sub-regulation (7) to (9) to serve a precision approach runway category II or III.

(3) An aerodrome operator shall ensure that for a simple approach lighting system:

- (a) it consist of a row of lights on the extended centre line of the runway extending, whenever possible, over a distance of not less than 420m (four hundred and twenty meters) from the threshold with a row of lights forming a crossbar 18m (eighteen meters) or 30m (thirty meters) in length at a distance of 300m (three hundred meters) from the threshold.
- (b) the lights forming the crossbar shall be as nearly as practicable in a horizontal straight line at right angles to, and bisected by, the line of the centre line lights
- (c) the lights of the crossbar shall be spaced so as to produce a linear effect, except that, when a crossbar of 30m (thirty meters) is used, gaps may be left on each side of the centre line.
- (d) the gaps referred to in paragraph (c) above shall be kept to a minimum to meet local requirements and each shall not exceed 6m (six meters).
- (e) the lights forming the centre line shall be placed at longitudinal intervals of 60m (sixty meters), except that, when it is desired to improve the guidance, an interval of 30m (thirty meters) may be used;

- (f) the innermost light shall be located either 60m (sixty meters) or 30m (thirty meters) from the threshold, depending on the longitudinal interval selected for the centre line lights.
 - (g) the centre line shall be extended to 300m (three hundred meters) if it is not physically possible to provide a centre line extending for a distance of 420m (four hundred and twenty meters) from the threshold, so as to include the crossbar.
 - (h) the centre line lights shall be extended as far as practicable, and each centre line light shall then consist of a barrette at least 3m (three meters) in length if the above requirement in paragraph (g) is not possible;
 - (i) Subject to the approach system having a crossbar at 300m (three hundred meters) from the threshold, an additional crossbar may be provided at 150m (one hundred and fifty meters) from the threshold.
 - (j) the system shall lie as nearly as practicable in the horizontal plane passing through the threshold
 - (k) no object other than an ILS or MLS azimuth antenna shall protrude through the plane of the approach lights within a distance of 60m (sixty meters) from the centre line of the system; and
 - (l) no light other than a light located within the central part of a crossbar or a centre line barrette and not their extremities shall be screened from an approaching aircraft.
- (4) An Aerodrome Operator shall ensure that the lights of a simple approach lighting system are characterized as follows:
- (a) be fixed lights and the colour of the lights be such as to ensure that the system is readily distinguishable from other aeronautical ground lights; and
 - (b) from extraneous lighting if present, with each centre line light consisting of either:
 - (i) a single source; or
 - (ii) a barrette at least 3m (three meters) in length.
 - (c) where provided for a non-instrument runway, the lights show at all angles in azimuth necessary to a pilot on base leg and final approach;
 - (d) the intensity of the lights shall be adequate for all conditions of visibility and ambient light for which the system has been provided.
 - (e) where provided for a non-precision approach runway, the lights show at all angles in azimuth necessary to the pilot of an aircraft which on final

approach does not deviate by an abnormal amount from the path defined by the non-visual aid;

(f) the lights shall be designed to provide guidance during both day and night in the most adverse conditions of visibility and ambient light for which it is intended that the system should remain usable.

(5) An aerodrome operator shall ensure that for a precision approach category I lighting system:

- (a) it consist of a row of lights on the extended centre line of the runway extending, wherever possible, over a distance of 900m (nine hundred meters) from the runway threshold with a row of lights forming a crossbar 30m (thirty meters) in length at a distance of 300m (three hundred meters) from the runway threshold.
- (b) the lights forming the crossbar be as nearly as practicable in a horizontal straight line at right angles to, and bisected by, the line of the centre line lights.
- (c) the lights of the crossbar shall be spaced so as to produce a linear effect, except that gaps may be left on each side of the centre line.
- (d) the gaps referred to in paragraph (c) above shall be kept to a minimum to meet local requirements and each shall not exceed 6m.
- (e) the lights forming the centre line shall be placed at longitudinal intervals of 30m (thirty meters) with the innermost light located 30m (thirty meters) from the threshold.
- (f) the system shall lie as nearly as practicable in the horizontal plane passing through the threshold, provided that:
 - (i) no object other than an ILS or MLS azimuth antenna shall protrude through the plane of the approach lights within a distance of 60m (sixty meters) from the centre line of the system; and
 - (ii) no light other than a light located within the central part of a crossbar or a centre line barrette and not their extremities shall be screened from an approaching aircraft.

(6) An Aerodrome Operator shall ensure that the lights of a precision approach category I lighting system are characterized as follows:

- (a) the centre line and crossbar lights are fixed lights showing variable white where every centre line light position shall consist of either:
 - (i) a single light source in the innermost 300m (three hundred meters) of the centre line, two light sources in the central 300m (three

hundred meters) of the centre line and three light sources in the outer 300m (three hundred meters) of the centre line to provide distance information; or

- (ii) a barrette.
- (b) where the serviceability level of the approach lights specified as a maintenance objective in Regulation 202 (10) can be demonstrated, each centre line light position may consist of either:
- (i) a single light source; or
 - (ii) a barrette.
- (c) the barrettes be at least 4m (four meters) in length.
- (d) the lights be uniformly spaced at intervals of not more than 1.5m (one and a half meters) when barrettes are composed of lights approximating to point sources.
- (e) the centre line consists of barrettes as described in sub-regulation (6)(a) or (b) above with each barrette supplemented by a flashing light, except where such lighting is considered unnecessary taking into account the characteristics of the system and the nature of the meteorological conditions.
- (f) each flashing light as described in sub-regulation (6)(e) above be flashed twice a second in sequence, beginning with the outermost light and progressing toward the threshold to the innermost light of the system.
- (g) the design of the electrical circuit shall be such that these lights can be operated independently of the other lights of the approach lighting system.
- (h) if the centre line consists of lights as described in sub-regulation (6)(a) or (b) above, additional crossbars of lights to the crossbar provided at 300m (three hundred meters) from the threshold be provided at 150m (one hundred and fifty meters), 450m (four hundred and fifty meters), 600m (six hundred meters) and 750m (seven hundred and fifty meters) from the threshold;
- (i) the lights forming each crossbar shall be as nearly as practicable in a horizontal straight line at right angles to, and bisected by, the line of the centre line lights;
- (j) the lights shall be spaced so as to produce a linear effect, except that gaps may be left on each side of the centre line;

- (k) the gaps referred to in paragraph (j) above shall be kept to a minimum to meet local requirements and each shall not exceed 6m (six meters).
 - (l) where the additional crossbars as described in sub-regulation (6)(h) above are incorporated in the system, the outer ends of the crossbars lie on two straight lines that either are parallel to the line of the centre line lights or converge to meet the runway centre line 300m (three hundred meters) from threshold.
 - (m) the lights shall be in accordance with the specifications of Schedule 4, Figure A2-1.
- (7) An aerodrome operator shall ensure that for a precision approach category II and III lighting system:
- (a) the approach lighting system consist of a row of lights on the extended centre line of the runway, extending, wherever possible, over a distance of 900m (nine hundred meters) from the runway threshold;
 - (b) the system shall have two side rows of lights, extending 270m (two hundred and seventy meters) from the threshold, and two crossbars, one at 150m (one hundred and fifty meters) and one at 300m from the threshold, all as shown in Schedule 2.28.
 - (c) Where the serviceability level of the approach lights specified as maintenance objectives in Regulation 202 (6) can be demonstrated, the system may have two side rows of lights, extending 240m (two hundred and forty meters) from the threshold, and two crossbars, one at 150m (one hundred and fifty meters) and one at 300m (three hundred meters) from the threshold, all as shown in Schedule 2.29.
 - (d) the lights forming the centre line be placed at longitudinal intervals of 30m (thirty meters) with the innermost lights located 30m (thirty meters) from the threshold.
 - (e) the lights forming the side rows be placed on each side of the centre line, at a longitudinal spacing equal to that of the centre line lights and with the first light located 30m (thirty meters) from the threshold;
 - (f) where the serviceability level of the approach lights specified as maintenance objectives in Regulation 202 (6) can be demonstrated, lights forming the side rows may be placed on each side of the centre line, at a longitudinal spacing of 60m (sixty meters) with the first light located 60m (sixty meters) from the threshold
 - (g) the lateral spacing or gauge between the innermost lights of the side rows shall be not less than 18m (eighteen meters) nor more than 22.5m

(twenty-two and a half meters), and preferably 18m (eighteen meters), but in any event shall be equal to that of the touchdown zone lights.

- (h) the crossbar provided at 150m (one hundred and fifty meters) from the threshold shall fill in the gaps between the centre line and side row lights.
 - (i) the crossbar provided at 300m (three hundred meters) from the threshold shall extend on both sides of the centre line lights to a distance of 15m (fifteen meters) from the centre line.
 - (j) additional crossbars of lights shall be provided at 450m (four hundred and fifty meters), 600m (six hundred meters) and 750m (seven hundred and fifty meters) from the threshold if the centre line beyond a distance of 300m (three hundred meters) from the threshold consists of lights as described in sub-regulation (9)(b)(ii) and (c)(ii) below,.
 - (k) where the additional crossbars described in sub-regulation (7)(j) above are incorporated in the system, the outer ends of these crossbars lie on two straight lines that either are parallel to the centre line or converge to meet the runway centre line 300m (three hundred meters) from the threshold.
 - (l) the system lie as nearly as practicable in the horizontal plane passing through the threshold, provided that:
 - (i) no object other than an ILS or MLS azimuth antenna shall protrude through the plane of the approach lights within a distance of 60m (sixty meters) from the centre line of the system; and
 - (ii) no light other than a light located within the central part of a crossbar or a centre line barrette shall be screened from an approaching aircraft.
- (8) Any ILS or MLS azimuth antenna protruding through the plane of the lights shall be treated as an obstacle and marked and lighted accordingly.
- (9) An Aerodrome Operator shall ensure that the lights of a precision approach category II and III lighting system are characterized as follows:
- (a) the centre line of a precision approach category II and III lighting system for the first 300m (three hundred meters) from the threshold consist of barrettes showing variable white;
 - (b), except that, where the threshold is displaced 300m (three hundred meters) or more, the centre line may consist of single light sources showing variable white;
 - (c) where the serviceability level of the approach lights specified as maintenance objectives in Regulation 202(6) can be demonstrated, the centre

line of a precision approach category II and III lighting system for the first 300m (three hundred meters) from the threshold may consist of:

- (i) barrettes, where the centre line beyond 300m (three hundred meters) from the threshold consists of barrettes as described in sub-regulation (9)(c)(i),; or
 - (ii) alternate single light sources and barrettes, where the centre line beyond 300m (three hundred meters) from the threshold consists of single light sources as described in sub-regulation (9)(c)(ii), with the innermost single light source located 30m (thirty meters) and the innermost barrette located 60m (sixty meters) from the threshold; or
 - (iii) single light sources where the threshold is displaced 300m (three hundred meters) or more all of which shall show variable white; .
- (d) beyond 300m (three hundred meters) from the threshold each centre line light position consists of either:
- (i) a barrette as used on the inner 300m (three hundred meters); or
 - (ii) two light sources in the central 300m (three hundred meters) of the centre line and 3 (three) light sources in the outer 300m (three hundred meters) of the centre line all of which shall show variable white;
- (e) where the serviceability level of the approach lights specified as maintenance objectives in Regulation 202(6) can be demonstrated, beyond 300m (three hundred meters) from the threshold each centre line light position may consist of either:
- (i) a barrette; or
 - (ii) a single light source, all of which shall show variable white;
- (f) the barrettes be at least 4m (four meters) in length;
- (g) the lights shall be uniformly spaced at intervals of not more than 1.5m (one and a half meters) when barrettes are composed of lights approximating to point sources,.
- (h) if the centre line beyond 300m (three hundred meters) from the threshold consists of barrettes as described in sub-regulation (9)(d)(i) or (ii) above each barrette beyond 300m (three hundred meters) be supplemented by a flashing light, except where such lighting is considered unnecessary taking into account the characteristics of the system and the nature of the meteorological conditions.

- (i) each flashing light as described sub-regulation (9)(h) above shall be flashed twice a second in sequence, beginning with the outermost light and progressing toward the threshold to the innermost light of the system.
- (j) the design of the electrical circuit shall be such that these lights can be operated independently of the other lights of the approach lighting system.
- (k) the side row consists of barrettes showing red;
- (l) the length of a side row barrette and the spacing of its lights shall be equal to those of the touchdown zone light barrettes.
- (m) the lights forming the crossbars be fixed lights showing variable white.
- (n) the lights shall be uniformly spaced at intervals of not more than 2.7m (two and seven tenth meters).
- (o) the intensity of the red lights be compatible with the intensity of the white lights.
- (p) the lights shall be in accordance with the specifications of Schedule 4, Figures A2-1 and A2-2.

136. Visual Approach Slope Indicator Systems

(1) A visual approach slope indicator system shall be provided to serve the approach to a runway whether or not the runway is served by other visual approach aids or by non- visual aids, where one or more of the following conditions exist:

- (a) the runway is used by turbojet or other aeroplanes with similar approach guidance requirements;
- (b) the pilot of any type of aeroplane may have difficulty in judging the approach due to:
 - (i) inadequate visual guidance such as is experienced during an approach over water or featureless terrain by day; or
 - (ii) in the absence of sufficient extraneous lights in the approach area by night; or
 - (iii) misleading information such as is produced by deceptive surrounding terrain or runway slopes;
- (c) the presence of objects in the approach area may involve serious hazard if an aeroplane descends below the normal approach path, particularly if there are no non- visual or other visual aids to give warning of such objects;

- (d) physical conditions at either end of the runway present a serious hazard in the event of an aeroplane undershooting or overrunning the runway; and
 - (e) terrain or prevalent meteorological conditions are such that the aeroplane may be subjected to unusual turbulence during approach.
- (2) A standard visual approach slope indicator system shall consist of the following:
- (a) T-VASIS and AT-VASIS conforming to the specifications contained in sub-regulations (5) to (10) and (11)(a) to (d) inclusive;
 - (b) PAPI and APAPI systems conforming to the specifications contained in sub-regulations (11)(e), 12 to 17, and to 18(a) to (e) inclusive;
- as shown in Schedule 2.30.
- (3) PAPI, T-VASIS or AT-VASIS shall be provided where the code number is 3 (three) or 4 (four) when one or more of the conditions specified in sub-regulation 136(1) exist.
- (4) PAPI or APAPI shall be provided where the code number is 1 (one) or 2 (two) when one or more of the conditions specified in sub-regulation 136(1) exist.
- (5) Where a runway threshold is temporarily displaced from the normal position and one or more of the conditions specified in sub-regulation 136(1) exist, a PAPI shall be provided except that where the code number is 1 (one) or 2 (two) and APAPI may be provided.
- (6) A T-VASIS shall consist of 20 (twenty) light units symmetrically disposed about the runway centre line in the form of 2 (two) wing bars of 4 (four) light units each, with bisecting longitudinal lines of 6 (six) lights, as shown in Schedule 2.31.
- (7) An AT-VASIS shall consist of 10 (ten) light units arranged on one side of the runway in the form of a single wing bar of 4 (four) light units with a bisecting longitudinal line of 6 (six) lights.
- (8) The light units for T-VASIS and AT-VASIS shall be constructed and arranged in such a manner that the pilot of an aeroplane during an approach will:
- (a) when above the approach slope, see the wing bar(s) white, and one, two or three fly-down lights, the more fly-down lights being visible the higher the pilot is above the approach slope;
 - (b) when on the approach slope, see the wing bar(s) white;
 - (c) when below the approach slope, see the wing bar(s) and one, two or three fly-up lights white, the more fly-up lights being visible the lower the pilot is below the approach slope; and when well below the approach slope, see the wing bar(s) and the three fly-up lights red. when on or

above the approach slope, no light shall be visible from the fly-up light units; and

- (d) when on or below the approach slope, no light shall be visible from the fly-down light units.
- (9) The light units of T-VASIS and AT-VASIS shall be located as shown in Schedule 2.31, subject to the installation tolerances given therein.
- (10) An Aerodrome Operator shall ensure that the light units of T-VASIS and AT-VASIS are characterized as follows:
- (a) the systems be suitable for both day and night operations.
 - (b) the light distribution of the beam of each light unit be of fan shape showing over a wide arc in azimuth in the approach direction.
 - (c) the wing bar light units shall produce a beam of white light from 1°54' (one degree, fifty-four minutes) vertical angle up to 6° (six degrees) vertical angle and a beam of red light from 0° (zero degrees) to 1°54' (one degree fifty-four minutes) vertical angle;
 - (d) the fly-down light units shall produce a white beam extending from an elevation of 6° (six degrees) down to approximately the approach slope, where it shall have a sharp cut-off;
 - (e) the fly-up light units shall produce a white beam from approximately the approach slope down to 1°54' (one degree fifty-four minutes) vertical angle and a red beam below a 1°54' (one degree fifty-four minutes) vertical angle;
 - (f) the angle of the top of the red beam in the wing bar units and fly-up units may be increased to comply with sub-regulation 11(g).
 - (g) the light intensity distribution of the fly-down, wing bar and fly-up light units shall be as shown in Schedule 4, Figure A2-22.
 - (h) the colour transition from red to white in the vertical plane shall be such as to appear to an observer, at a distance of not less than 300m (three hundred meters), to occur over a vertical angle of not more than 15' (fifteen minutes).
 - (i) at full intensity the red light shall have a Y coordinate not exceeding 0.320 (three hundred and twenty thousandths).
 - (j) a suitable intensity control shall be provided to allow adjustments to meet the prevailing conditions and to avoid dazzling the pilot during approach and landing.

- (k) the light units forming the wing bars, or the light units forming a fly-down or a fly-up matched pair, shall be mounted so as to appear to the pilot of an approaching aeroplane to be substantially in a horizontal line.
 - (l) the light units shall be mounted as low as possible and shall be frangible.
 - (m) the light units shall be so designed that deposits of condensation or dirt on optically transmitting or reflecting surfaces shall interfere to the least possible extent with the light signals;
 - (n) the requirements in paragraph (m) above shall in no way affect the elevation of the beams or the contrast between the red and white signals;
 - (o) the construction of the light units shall be such as to minimize the probability of the slots being wholly or partially blocked by snow or ice where these conditions are likely to be encountered.
- (11) An aerodrome operator shall ensure that for the approach slope and elevation setting of light beams for T-VASIS and AT-VASIS:
- (a) the approach slope shall be appropriate for use by the aeroplanes using the approach.
 - (b) when the runway on which a T-VASIS is provided is equipped with an ILS or MLS or both, the siting and elevations of the light units shall be such that the visual approach slope conforms as closely as possible with the glide path of the ILS or the minimum glide path of the MLS or both, as appropriate.
 - (c) the elevation of the beams of the wing bar light units on both sides of the runway shall be the same;
 - (d) the elevation of the top of the beam of the fly-up light unit nearest to each wing bar, and that of the bottom of the beam of the flydown light unit nearest to each wing bar, shall be equal and shall correspond to the approach slope;
 - (e) the cut-off angle of the top of the beams of successive fly-up light units shall decrease by 5' (five minutes) of arc in angle of elevation at each successive unit away from the wing bar;
 - (f) the cut-in angle of the bottom of the beam of the fly-down light units shall increase by 7' (seven minutes) of arc at each successive unit away from the wing bar as shown in Schedule 2.32
 - (g) the elevation setting of the top of the red light beams of the wing bar and fly-up light units shall be such that, during an approach, the pilot of an aeroplane to whom the wing bar and three fly-up light units are visible

would clear all objects in the approach area by a safe margin if any such light did not appear red.

- (h) the azimuth spread of the light beam shall be suitably restricted where an object located outside the obstacle protection surface of the system, but within the lateral limits of its light beam, is found to extend above the plane of the obstacle protection surface and an aeronautical study indicates that the object could adversely affect the safety of operations;
 - (i) the extent of the restriction shall be such that the object remains outside the confines of the light beam.
- (12) A PAPI system shall consist of a wing bar of 4 (four) sharp transition multi-lamp or paired single lamp units equally spaced.
- (13) The system referred to in sub-regulation (12) shall be located on the left side of the runway unless it is physically impracticable to do so.
- (14) An APAPI system shall consist of a wing bar of 2 (two) sharp transition multi-lamp or paired single lamp units.
- (15) The system referred to in sub-regulation (14) shall be located on the left side of the runway unless it is physically impracticable to do so.
- (16) A wing bar of a PAPI shall be constructed and arranged in such a manner that a pilot making an approach will:
- (a) when on or close to the approach slope, see the two units nearest the runway as red and the two units farthest from the runway as white;
 - (b) when above the approach slope, see the one unit nearest the runway as red and the 3 (three) units farthest from the runway as white; and when further above the approach slope, see all the units as white; and
 - (c) when below the approach slope, see the 3 (three) units nearest the runway as red and the unit farthest from the runway as white; and when further below the approach slope, see all the units as red.
- (17) A wing bar of an APAPI shall be constructed and arranged in such a manner that a pilot making an approach will:
- (a) when on or close to the approach slope, see the unit nearer the runway as red and the unit farther from the runway as white;
 - (b) when above the approach slope, see both the units as white; and
 - (c) when below the approach slope, see both the units as red.
- (18) The light units of PAPI and APAPI shall be located as in the basic configuration illustrated in Schedule 2.33, subject to the installation tolerances given therein.

(19) The units forming a wing bar shall be mounted so as to appear to the pilot of an approaching aeroplane to be substantially in a horizontal line.

(20) The light units shall be mounted as low as possible and shall be frangible.

(21) An aerodrome operator shall ensure that the light units of PAPI and APAPI are characterized as follows:

- (a) the system shall be suitable for both day and night operations;
- (b) the colour transition from red to white in the vertical plane shall be such as to appear to an observer, at a distance of not less than 300m (three hundred meters), to occur within a vertical angle of not more than 3' (three minutes);
- (c) at full intensity the red light shall have a Y coordinate not exceeding 0.320 (three hundred and twenty thousandths);
- (d) the light intensity distribution of the light units shall be as shown in Schedule 4, Figure A2-23;.
- (e) suitable intensity control shall be provided so as to allow adjustment to meet the prevailing conditions and to avoid dazzling the pilot during approach and landing;
- (f) each light unit shall be capable of adjustment in elevation so that the lower limit of the white part of the beam may be fixed at any desired angle of elevation between 1°30' (one degree thirty minutes) and at least 4°30' (four degrees and thirty minutes) above the horizontal;
- (g) the light units shall be so designed that deposits of condensation, dust or dirt on optically transmitting or reflecting surfaces shall interfere to the least possible extent with the light signals and shall not affect the contrast between the red and white signals and the elevation of the transition sector.

(22) An aerodrome operator shall ensure that for the approach slope and elevation setting of T-VASIS and AT-VASIS light units:

- (a) the approach slope as defined in Schedule 2.34 shall be appropriate for use by the aeroplanes using the approach;
- (b) when the runway is equipped with an ILS or MLS or both, the siting and the angle of elevation of the light units shall be such that the visual approach slope conforms as closely as possible with the glide path of the ILS or the minimum glide path of the MLS or both, as appropriate;
- (c) the angle of elevation settings of the light units in a PAPI wing bar shall be such that, during an approach, the pilot of an aeroplane observing a

signal of 1 (one) white and 3 (three) reds will clear all objects in the approach area by a safe margin as shown in Schedule 2.28

- (d) the angle of elevation settings of the light units in an APAPI wing bar shall be such that, during an approach, the pilot of an aeroplane observing the lowest on slope signal, i.e. 1 (one) white and 1 (one) red, will clear all objects in the approach area by a safe margin as shown in Schedule 2.28
 - (e) the azimuth spread of the light beam shall be suitably restricted where an object located outside the obstacle protection surface of the PAPI or APAPI system, but within the lateral limits of its light beam, is found to extend above the plane of the obstacle protection surface and an aeronautical study indicates that the object could adversely affect the safety of operations;
 - (f) the extent of the restriction shall be such that the object remains outside the confines of the light beam;
 - (g) where wing bars are installed on each side of the runway to provide roll guidance, corresponding units shall be set at the same angle so that the signals of each wing bar change symmetrically at the same time.
- (23) An aerodrome operator shall ensure that for obstacle protection surface of T-VASIS, AT-VASIS, PAPI and APAPI:
- (a) an obstacle protection surface shall be established when it is intended to provide a visual approach slope indicator system;
 - (b) the characteristics of the obstacle protection surface, which is origin, divergence, length and slope, shall correspond to those specified in the relevant column of Schedule 2.29 and in Schedule 2.37
 - (c) new objects or extensions of existing objects shall not be permitted above an obstacle protection surface except when, in the opinion of the appropriate authority, the new object or extension would be shielded by an existing immovable object; and
 - (d) existing objects above an obstacle protection surface shall be removed except when, in the opinion of the appropriate authority, the object is shielded by an existing immovable object, or after aeronautical study it is determined that the object would not adversely affect the safety of operations of aeroplanes.
- (24) Where an aeronautical study indicates that an existing object extending above an obstacle protection surface could adversely affect the safety of operations of aeroplanes, an aerodrome operator shall take one or more of the following measures:

- (a) remove the object;
- (b) suitably raise the approach slope of the system;
- (c) reduce the azimuth spread of the system so that the object is outside the confines of the beam;
- (d) displace the axis of the system and its associated obstacle protection surface by no more than 5°(five degrees); and
- (e) suitably displace the system upwind of threshold such that the object no longer penetrates the obstacle protection surface.

137. Circling Guidance Lights

(1) An aerodrome operator shall provide circling guidance lights when existing approach and runway lighting systems do not satisfactorily permit identification of the runway or approach area, or both, to a circling aircraft in the conditions for which it is intended the runway be used for circling approaches.

(2) Circling guidance lights shall be so located and adequate to enable a pilot, as appropriate, to:

- (a) join the downwind leg or align and adjust the aircraft's track to the runway at a required distance from it and to distinguish the threshold in passing; and
- (b) keep in sight the runway threshold or other features, or both, which will make it possible to judge the turn on to base leg and final approach, taking into account the guidance provided by other visual aids.

(3) Circling guidance lights shall consist of:

- (a) lights indicating the extended centre line of the runway or parts of any approach lighting system, or both; or
- (b) lights indicating the position of the runway threshold; or
- (c) lights indicating the direction or location of the runway; or a combination of such lights as is appropriate to the runway under consideration.

(4) An aerodrome operator shall ensure circling guidance lights are characterized as follows:

- (a) be fixed or flashing lights of an intensity and beam spread adequate for the conditions of visibility and ambient light in which it is intended to make visual circling approaches;
- (b) the flashing lights shall be white, and the steady lights either white or gaseous discharge lights.

- (c) be designed and installed in such a manner that they will not dazzle or confuse a pilot when approaching to land, taking off or taxiing.

138. Runway Lead-In Lighting Systems

- (1) An aerodrome operator shall provide a runway lead-in lighting system where it is desired to provide visual guidance along a specific approach path, for reasons such as avoiding hazardous terrain or for purposes of noise abatement.
- (2) A runway lead-in lighting system shall consist of groups of lights positioned so as to define the desired approach path and so that one group may be sighted from the preceding group.
- (3) The interval between adjacent groups should not exceed approximately 1600m (one thousand six hundred meters).
- (4) A runway lead-in lighting system shall extend from a point as determined by the appropriate authority, up to a point where the approach lighting system, if provided, or the runway or the runway lighting system is in view.
- (5) An aerodrome operator shall ensure a runway lead-in lighting system is characterized as follows:
 - (a) each group of lights of a runway lead-in lighting system shall consist of at least 3 (three) flashing lights in a linear or cluster configuration;
 - (b) the system may be augmented by steady burning lights where such lights would assist in identifying the system;
 - (c) the flashing lights and the steady burning lights shall be white; and
 - (d) where practicable, the flashing lights in each group shall flash in sequence towards the runway.

139. Runway Threshold Identification Lights

- (1) An aerodrome operator shall install runway threshold identification lights:
 - (a) at the threshold of a non-precision approach runway when additional threshold conspicuity is necessary or where it is not practicable to provide other approach lighting aids; and
 - (b) where a runway threshold is permanently displaced from the runway extremity or temporarily displaced from the normal position and additional threshold conspicuity is necessary.
- (2) Runway threshold identification lights shall be located symmetrically about the runway centre line, in line with the threshold and approximately 10m (ten meters) outside each line of runway edge lights.

(3) The lights shall be visible only in the direction of approach to the runway and be flashing white lights with a flash frequency between 60 (sixty) and 120 (one hundred and twenty) per minute.

140. Runway Edge Lights

(1) An aerodrome operator shall provide runway edge lights for a:

- (a) runway intended for use at night; or
- (b) precision approach runway intended for use by day or night; or
- (c) runway intended for take-off with an operating minimum below an RVR of the order of 800m (eight hundred meters) by day.

(2) Runway edge lights shall be placed along the:

- (a) full length of the runway and shall be in two parallel rows equidistant from the centre line; and
- (b) edges of the area declared for use as the runway or outside the edges of the area at a distance of not more than 3m (three meters).

(3) Where the width of the area which could be declared as runway exceeds 60m (sixty meters), the distance between the rows of lights shall be determined taking into account the nature of the operations, the light distribution characteristics of the runway edge lights, and other visual aids serving the runway.

(4) The lights shall be uniformly spaced in rows at intervals of not more than 60m (sixty meters) for an instrument runway, and at intervals of not more than 100m (one hundred meters) for a non-instrument runway.

(5) The lights on opposite sides of the runway axis shall be on lines at right angles to that axis.

(6) At intersections of runways, lights may be spaced irregularly or omitted, provided that adequate guidance remains available to the pilot.

(7) Runway edge lights shall be fixed lights showing variable white, except that:

- (a) in the case of a displaced threshold, the lights between the beginning of the runway and the displaced threshold shall show red in the approach direction; and
- (b) a section of the lights 600m (six hundred meters) or one-third of the runway length, whichever is the less, at the remote end of the runway from the end at which the take-off run is started, may show yellow.

(8) The runway edge lights shall show at all angles in azimuth necessary to provide guidance to a pilot landing or taking off in either direction.

(9) When the runway edge lights are intended to provide circling guidance, they shall show at all angles in azimuth Regulation 137(1)

(10) In all angles of azimuth required in sub-regulations (8) and (9) above, runway edge lights shall show at angles up to 15° (fifteen degrees) above the horizontal with an intensity adequate for the conditions of visibility and ambient light in which use of the runway for take-off or landing is intended.

(11) The intensity shall be at least 50cd (fifty candelas) except that at an aerodrome without extraneous lighting, the intensity of the lights may be reduced to not less than 25cd (twenty-five candelas) to avoid dazzling the pilot.

(12) Runway edge lights on a precision approach runway shall be in accordance with the specifications of Schedule 4, Figure A2-9 or A2-10.

141. Runway Threshold and Wing Bar Lights

(1) An aerodrome operator shall provide runway threshold lights for a runway equipped with runway edge lights, except on a non-instrument or non-precision approach runway where the threshold is displaced and wing bar lights are provided.

(2) Runway threshold lights shall:

- (a) when a threshold is at the extremity of a runway, be placed in a row at right angles to the runway axis as near to the extremity of the runway as possible and, in any case, not more than 3m (three meters) outside the extremity; and
- (b) when a threshold is displaced from the extremity of a runway, be placed in a row at right angles to the runway axis at the displaced threshold and consist of
 - (i) at least 6 (six) lights on a non-instrument or non-precision approach runway;
 - (ii) on a precision approach runway Category I, at least the number of lights that would be required if the lights were uniformly spaced at intervals of 3m (three meters) between the rows of runway edge lights; and
 - (iii) on a precision approach runway Category II or III, lights uniformly spaced between the rows of runway edge lights at intervals of not more than 3m (three meters).

(3) The lights prescribed in sub-regulations (2)(a) and (b) above shall be either:

- (a) equally spaced between the rows of runway edge lights; or

- (b) symmetrically disposed about the runway centre line in 2 (two) groups, with the lights uniformly spaced in each group and with a gap between the groups equal to the gauge of the touchdown zone marking or lighting, where such is provided, or otherwise not more than half the distance between the rows of runway edge lights.
- (4) An aerodrome operator shall provide wing bar lights on a:
 - (a) precision approach runway when additional conspicuity is considered desirable; and
 - (b) non-instrument or non-precision approach runway where the threshold is displaced and runway threshold lights are required, but are not provided.
- (5) Wing bar lights shall be symmetrically disposed about the runway centre line at the threshold in two groups.
- (6) Each wing bar shall be formed by at least five lights extending at least 10m outward from, and at right angles to, the line of the runway edge lights, with the innermost light of each wing bar in the line of the runway edge lights.
- (7) An Aerodrome Operator shall ensure runway threshold and wing bar lights are characterized as follows:
 - (a) runway threshold and wing bar lights shall be fixed unidirectional lights showing green in the direction of approach to the runway;
 - (b) the intensity and beam spread of the lights shall be adequate for the conditions of visibility and ambient light in which use of the runway is intended.
 - (c) runway threshold lights on a precision approach runway shall be in accordance with the specifications of Schedule 4, Figure A2-3; and
 - (d) threshold wing bar lights on a precision approach runway shall be in accordance with the specifications of Schedule 4, Figure A2-4.

142. Runway End Lights

- (1) An aerodrome operator shall provide runway end lights for a runway equipped with runway edge lights and such lights shall be placed on a line at right angles to the runway axis as near to the end of the runway as possible and, in any case, not more than 3m (three meters) outside the end.
- (2) Runway end lighting shall consist of at least six lights which shall be either:
 - (a) equally spaced between the rows of runway edge lights; or
 - (b) symmetrically disposed about the runway centre line in two groups with the lights uniformly spaced in each group and with a gap between the

groups of not more than half the distance between the rows of runway edge lights.

(3) For a precision approach runway Category III, the spacing between runway end lights, except between the two innermost lights if a gap is used, should not exceed 6m (six meters).

(4) Runway end lights shall:

- (a) be fixed unidirectional lights showing red in the direction of the runway;
- (b) the intensity and beam spread of the lights shall be adequate for the conditions of visibility and ambient light in which use of the runway is intended; and
- (c) on a precision approach runway be in accordance with the specifications of Schedule 4, Figure A2-8.

143. Runway Centre Line Lights

(1) An aerodrome operator shall provide runway centre line lights:

- (a) on a precision approach runway Category II or III;
- (b) on a precision approach runway Category I, particularly when the runway is used by aircraft with high landing speeds or where the width between the runway edge lights is greater than 50m (fifty meters);
- (c) on a runway intended to be used for take-off with an operating minimum below an RVR of the order of 400m (four hundred meters);
- (d) on a runway intended to be used for take-off with an operating minimum of an RVR of the order of 400m (four hundred meters) or higher when used by aeroplanes with a very high take-off speed, particularly where the width between the runway edge lights is greater than 50m (fifty meters).

(2) Runway centre line lights shall be located along the centre line of the runway, except that the lights may be uniformly offset to the same side of the runway centre line by not more than 60cm (sixty centimeters) where it is not practicable to locate them along the centre line.

(3) The lights shall be located from the threshold to the end at longitudinal spacing of approximately 15m (fifteen meters).

(4) Where the serviceability level of the runway centre line lights specified as maintenance objectives in Regulation 202(6) to (11), as appropriate, can be demonstrated and the runway is intended for use in runway visual range conditions

of 350m (three hundred and fifty meters) or greater, the longitudinal spacing may be approximately 30m (thirty meters).

(5) Centre line guidance for take-off from the beginning of a runway to a displaced threshold shall be provided by:

- (a) an approach lighting system if its characteristics and intensity settings afford the guidance required during take-off and it does not dazzle the pilot of an aircraft taking off; or
- (b) runway centre line lights; or
- (c) barrettes of at least 3m (three meters) in length and spaced at uniform intervals of 30m (thirty meters), as shown in Schedule 2.38, designed so that their photometric characteristics and intensity setting afford the guidance required during take-off without dazzling the pilot of an aircraft taking off;
- (d) where necessary, provision should be made to extinguish those centre line lights specified in (b) above or reset the intensity of the approach lighting system or barrettes when the runway is being used for landing; and
- (e) in no case should only the single source runway centre line lights show from the beginning of the runway to a displaced threshold when the runway is being used for landing.

(6) Runway centre line lights shall be fixed lights showing:

- (a) variable white from the threshold to the point 900m (nine hundred meters) from the runway end;
- (b) alternate red and variable white from 900m (nine hundred meters) to 300m (three hundred meters) from the runway end; and
- (c) red from 300m (three hundred meters) to the runway end, except that for runways less than 1800m (one thousand eight hundred meters) in length, the alternate red and variable white lights shall extend from the midpoint of the runway usable for landing to 300m (three hundred meters) from the runway end.

(7) Runway centre line lights shall be in accordance with the specifications of Appendix 2, Figure A2-6 or A2-7.

144. Runway Touchdown Zone Lights

(1) An aerodrome operator shall provide touchdown zone lights, in the touchdown zone of a precision approach runway category II or III, which shall extend from the threshold for a longitudinal distance of 900m (nine hundred meters), except that, on

runways less than 1800m (one thousand eight hundred meters) in length, the system shall be shortened so that it does not extend beyond the midpoint of the runway.

(2) The pattern shall be formed by pairs of barrettes symmetrically located about the runway centre line.

(3) The lateral spacing between the innermost lights of a pair of barrettes shall be equal to the lateral spacing selected for the touchdown zone marking.

(4) The longitudinal spacing between pairs of barrettes shall be either 30m (thirty meters) or 60m (sixty meters).

(5) Touchdown zone lights shall be characterized as follows:

(a) a barrette shall be composed of at least three lights with a spacing between the lights of not more than 1.5m (one and a half meters);

(b) a barrette shall be not less than 3m (three meters) nor more than 4.5m (four and a half meters) in length;

(c) shall be fixed unidirectional lights showing variable white; and

(d) shall be in accordance with the specifications of Schedule 4, Figure A2-5.

145. Simple Touchdown Zone Lights

(1) Except where TDZ lights are provided in accordance with Regulation 144 at an aerodrome where the approach angle is greater than 3.5° (three and a half degrees) or the Landing Distance Available, or both, combined with other factors increases the risk of an overrun, simple touchdown zone lights shall be provided.

(2) Simple touchdown zone lights shall:

(a) be a pair of lights located on each side of the runway centre line 0.3m (three tenths meters) beyond the upwind edge of the final touchdown zone marking;

(b) the lateral spacing between the inner lights of the two pairs of lights shall be equal to the lateral spacing selected for the touchdown zone marking;

(c) the spacing between the lights of the same pair shall not be more than 1.5m (one and a half meters) or half the width of the touchdown zone marking, whichever is greater, as shown in Schedule 2.39; and

(d) where provided on a runway without TDZ markings, simple touchdown zone lights shall be installed in such a position that provides the equivalent TDZ information.

(3) Simple touchdown zone lights shall:

- (a) be fixed unidirectional lights showing variable white, aligned so as to be visible to the pilot of a landing aeroplane in the direction of approach to the runway; and
- (b) be in accordance with the specifications in Schedule 4, Figure A2-5.

146. Rapid Exit Taxiway Indicator Lights

- (1) An aerodrome operator shall provide rapid exit taxiway indicator lights on a runway intended for use in RVR conditions less than a value of 350m (three hundred and fifty meters) or where the traffic density is heavy, or both, but shall not be displayed in the event of any lamp failure or other failure that prevents the display of the light pattern depicted in Schedule 2.40, in full.
- (2) A set of rapid exit taxiway indicator lights shall be located on the runway on the same side of the runway centre line as the associated rapid exit taxiway, in the configuration shown in Schedule 2.40.
- (3) In each set, the lights shall be located 2m (two meters) apart and the light nearest to the runway centre line shall be displaced 2m (two meters) from the runway centre line.
- (4) Where more than one rapid exit taxiway exists on a runway, the set of rapid exit taxiway indicator lights for each exit shall not overlap when displayed.
- (5) Rapid exit taxiway indicator lights shall be:
 - (a) fixed unidirectional yellow lights, aligned so as to be visible to the pilot of a landing aeroplane in the direction of approach to the runway;
 - (b) in accordance with the specifications in Schedule 4, Figure A2-6 or Figure A2-7, as appropriate.
 - (c) supplied with power on a separate circuit to other runway lighting so that they may be used when other lighting is switched off.

147. Stopway Lights

- (1) An Aerodrome Operator shall provide stopway lights for a stopway intended for use at night, which shall be placed along the full length of the stopway and shall be in two parallel rows that are equidistant from the centre line and coincident with the rows of the runway edge lights.
- (2) Stopway lights shall also be provided across the end of a stopway on a line at right angles to the stopway axis as near to the end of the stopway as possible and, in any case, not more than 3m (three meters) outside the end.
- (3) Stopway lights shall be fixed unidirectional lights showing red in the direction of the runway.

148. Taxiway Centre Line Lights

(1) An Aerodrome Operator shall provide taxiway centre line lights:

- (a) on an exit taxiway, taxiway, and apron intended for use in runway visual range conditions less than a value of 350m (three hundred and fifty meters) in such a manner as to provide continuous guidance between the runway centre line and aircraft stands, except that these lights need not be provided where the traffic density is light and taxiway edge lights and centre line marking provide adequate guidance;
- (b) on a taxiway intended for use at night in runway visual range conditions of 350m (three hundred and fifty meters) or greater, and particularly on complex taxiway intersections and exit taxiways, except that these lights need not be provided where the traffic density is light and taxiway edge lights and centre line marking provide adequate guidance;
- (c) on an exit taxiway, taxiway, and apron in all visibility conditions where specified as components of an advanced surface movement guidance and control system in such a manner as to provide continuous guidance between the runway centre line and aircraft stands;
- (d) on a runway forming part of a standard taxi-route and intended for taxiing in runway visual range conditions less than a value of 350m (three hundred and fifty meters), except that these lights need not be provided where the traffic density is light and taxiway edge lights and centre line marking provide adequate guidance; and
- (e) in all visibility conditions on a runway forming part of a standard taxi-route where specified as components of an advanced surface movement guidance and control system.

(2) Except as provided for in sub-regulation (5) below, taxiway centre line lights on a taxiway other than an exit taxiway and on a runway forming part of a standard taxi-route shall be fixed lights showing green with beam dimensions such that the light is visible only from aeroplanes on or in the vicinity of the taxiway.

(3) Taxiway centre line lights on an exit taxiway shall be fixed lights.

(4) Alternate taxiway centre line lights shall show green and yellow from their beginning near the runway centre line to the perimeter of the ILS or MLS critical or sensitive area or the lower edge of the inner transitional surface, whichever is farthest from the runway; and thereafter all lights shall show green as depicted in Schedule 2.41.

(5) The first light in the exit centre line shall always show green, and the light nearest to the perimeter shall always show yellow.

(6) Where it is necessary to denote the proximity to a runway, taxiway centre line lights shall be fixed lights showing alternating green and yellow from the perimeter of the ILS or MLS critical or sensitive area or the lower edge of the inner transitional surface, whichever is farthest from the runway, to the runway and continue alternating green and yellow until:

- (a) their end point near the runway centre line; or
- (b) in the case of the taxiway centre line lights crossing the runway, to the opposite perimeter of the ILS or MLS critical or sensitive area or the lower edge of the inner transitional surface, whichever is farthest from the runway.

(7) Taxiway centre line lights shall be in accordance with the specifications of:

- (a) Schedule 4, Figure A2-12, A2-13, or A2-14, for taxiways intended for use in runway visual range conditions of less than a value of 350m (three hundred and fifty meters); and
- (b) Schedule 4, Figure A2-15 or A2-16, for other taxiways.

(8) Where higher intensities are required, from an operational point of view, taxiway centre line lights on rapid exit taxiways intended for use in runway visual range conditions less than a value of 350m (three hundred and fifty meters) shall be in accordance with the specifications of Schedule 4, Figure A2-12.

(9) The number of levels of brilliancy settings for these lights shall be the same as that for the runway centre line lights.

(10) Where taxiway centre line lights are specified as components of an advanced surface movement guidance and control system and where, from an operational point of view, higher intensities are required to maintain ground movements at a certain speed in very low visibilities or in bright daytime conditions, taxiway centre line lights shall be in accordance with the specifications of Schedule 4, Figure A2-17, A2-18 or A2-19.

(11) Taxiway centre line lights shall normally be located on the taxiway centre line marking, except that they may be offset by not more than 30cm (thirty centimeters) where it is not practicable to locate them on the marking.

(12) Taxiway centre line lights shall:

- (a) on a straight section of a taxiway be spaced at longitudinal intervals of not more than 30m (thirty meters), except that:
 - (i) larger intervals not exceeding 60m (sixty meters) may be used where, because of the prevailing meteorological conditions, adequate guidance is provided by such spacing;

- (ii) intervals less than 30m (thirty meters) should be provided on short straight sections; and
 - (iii) on a taxiway intended for use in RVR conditions of less than a value of 350m (three hundred and fifty meters), the longitudinal spacing should not exceed 15m (fifteen meters).
 - (b) on a taxiway curve continue from the straight portion of the taxiway at a constant distance from the outside edge of the taxiway curve; and
 - (c) the lights shall be spaced at intervals such that a clear indication of the curve is provided.
- (13) On a taxiway intended for use in RVR conditions of less than a value of 350m (three hundred and fifty meters), the lights on a curve shall not exceed a spacing of 15m (fifteen meters).
- (14) On a curve of less than 400m (four hundred meters) radius the lights shall be spaced at intervals of not greater than 7.5m (seven and a half meters).
- (15) The spacing referred to sub-regulation (14) shall extend for 60m (sixty meters) before and after the curve.
- (16) Taxiway centre line lights on a rapid exit taxiway shall commence at a point at least 60m (sixty meters) before the beginning of the taxiway centre line curve and continue beyond the end of the curve to a point on the centre line of the taxiway where an aeroplane can be expected to reach normal taxiing speed.
- (17) The lights on that portion parallel to the runway centre line shall always be at least 60cm (sixty centimeters) from any row of runway centre line lights, as shown in Schedule 2.42.
- (18) Taxiway centre line lights –
- (a) on a rapid exit taxiway shall be spaced at longitudinal intervals of not more than 15m (fifteen meters), except that, where runway centre line lights are not provided, a greater interval not exceeding 30m (thirty meters) may be used;
 - (b) on exit taxiways other than rapid exit taxiways shall commence at the point where the taxiway centre line marking begins to curve from the runway centre line, and follow the curved taxiway centre line marking at least to the point where the marking leaves the runway; and
 - (c) on a runway forming part of a standard taxi-route and intended for taxiing in runway visual range conditions less than a value of 350m (three hundred and fifty meters) shall be spaced at longitudinal intervals not exceeding 15m (fifteen meters).

(19) The first light shall be at least 60cm from any row of runway centre line lights, as shown in Schedule 2.42 and be spaced at longitudinal intervals of not more than 7.5m (seven and a half meters).

149. Taxiway Edge Lights

(1) An aerodrome operator shall provide taxiway edge lights:

- (a) at the edges of a runway turn pad, holding bay, apron, intended for use at night and on a taxiway not provided with taxiway centre line lights and intended for use at night, except that taxiway edge lights need not be provided where, considering the nature of the operations, adequate guidance can be achieved by surface illumination or other means; and
- (b) on a runway forming part of a standard taxi- route and intended for taxiing at night where the runway is not provided with taxiway centre line lights.

(2) Taxiway edge lights shall:

- (a) on a straight section of a taxiway and on a runway forming part of a standard taxi-route, be spaced at uniform longitudinal intervals of not more than 60m (sixty meters);
- (b) on a curve, be spaced at intervals less than 60m (sixty meters) so that a clear indication of the curve is provided;
- (c) on a holding bay, apron, be spaced at uniform longitudinal intervals of not more than 60m (sixty meters).
- (d) on a runway turn pad, be spaced at uniform longitudinal intervals of not more than 30m (thirty meters).
- (e) be located as near as practicable to the edges of the taxiway, runway turn pad, holding bay, apron or runway, or outside the edges at a distance of not more than 3m (three meters).

(3) Taxiway edge lights shall be characterized as follows:

- (a) be fixed lights showing blue;
- (b) show up to at least 75° (seventy-five degrees) above the horizontal and at all angles in azimuth necessary to provide guidance to a pilot taxiing in either direction;
- (c) at an intersection, exit or curve, be shielded as far as practicable so that they cannot be seen in angles of azimuth in which they may be confused with other lights; and

- (d) the intensity be at least 2cd (two candelas) from 0° to 6° (zero to six degrees) vertical, and 0.2cd (two candelas) at any vertical angles between 6° and 75° (six and seventy-five degrees).

150. Runway Turn Pad Lights

(1) An aerodrome operator shall provide runway turn pad lights for continuous guidance on a runway turn pad intended for use in runway visual range conditions less than a value of 350m (three hundred and fifty meters) or intended for use at night, to enable an aeroplane to complete a 180° (one hundred and eighty degrees) turn and align with the runway centre line.

(2) Runway turn pad lights shall:

- (a) normally be located on the runway turn pad marking, except that they may be offset by not more than 30cm (thirty centimeters) where it is not practicable to locate them on the marking;
- (b) on a straight section of the runway turn pad marking, be spaced at longitudinal intervals of not more than 15m (fifteen meters);
- (c) on a curved section of the runway turn pad marking, not exceed a spacing of 7.5m (seven and a half meters).

(3) Runway turn pad lights shall be unidirectional fixed lights showing green with beam dimensions such that the light is visible only from aeroplanes on or approaching the runway turn pad and be in accordance with the specifications of Schedule 4, Figure A2-13, A2-14 or A2-15, as appropriate.

151. Stop Bars

(1) A stop bar shall be provided at every runway-holding position serving a runway when it is intended that the runway will be used in runway visual range conditions less than a value of 350m (three hundred and fifty meters), except where:

- (a) appropriate aids and procedures are available to assist in preventing inadvertent incursions of traffic onto the runway; or
- (b) operational procedures exist to limit, in runway visual range conditions less than a value of 550m (five hundred and fifty meters), the number of:
 - (i) aircraft on the manoeuvring area to one at a time; and
 - (ii) vehicles on the manoeuvring area to the essential minimum.

(2) A stop bar shall be provided at every runway-holding position serving a runway when it is intended that the runway will be used in runway visual range conditions of values between 350m (three hundred and fifty meters), and 550m (five hundred and fifty meters), except where:

- (a) appropriate aids and procedures are available to assist in preventing inadvertent incursions of traffic onto the runway; or
- (b) operational procedures exist to limit, in runway visual range conditions less than a value of 550m (five hundred and fifty meters), the number of:
 - (i) aircraft on the manoeuvring area to one at a time; and
 - (ii) vehicles on the manoeuvring area to the essential minimum.
- (3) Where there is more than one stop bar associated with a taxiway or runway intersection, only one shall be illuminated at any given time.
- (4) A stop bar shall be provided at an intermediate holding position when it is desired to supplement markings with lights and to provide traffic control by visual means.
- (5) Stop bars shall be located across the taxiway at the point where it is desired that traffic stop.
- (6) Where the additional lights specified in sub-regulation (7)(b) below are provided, these lights shall be located not less than 3m (three meters) from the taxiway edge.
- (7) Stop bars shall be characterized as follows:
 - (a) consist of lights spaced at uniform intervals of no more than 3m (three meters) across the taxiway, showing red in the intended direction of approach to the intersection or runway-holding position;
 - (b) a pair of elevated lights shall be added to each end of the stop bar where the in pavement stop bar lights might be obscured from a pilot's view, for example, by snow or rain, or where a pilot may be required to stop the aircraft in a position so close to the lights that they are blocked from view by the structure of the aircraft;
 - (c) be unidirectional and show red in the direction of approach to the runway for stop bars installed at a runway-holding position;
 - (d) where the additional lights sub-regulation (6)(b) above are provided, these lights shall have the same characteristics as the lights in the stop bar, but shall be visible to approaching aircraft up to the stop bar position;
 - (e) the intensity in red light and beam spreads of stop bar lights shall be in accordance with the specifications in Schedule 4, Figures A2-12 through A2-16, as appropriate.
 - (f) where stop bars are specified as components of an advanced surface movement guidance and control system and where, from an operational point of view, higher intensities are required to maintain ground movements at a certain speed in very low visibilities or in bright daytime conditions, the intensity in red light and beam spreads of stop bar lights

shall be in accordance with the specifications of Schedule 4, Figure A2-17, A2-18 or A2-19.

- (g) where a wide beam fixture is required, the intensity in red light and beam spreads of stop bar lights shall be in accordance with the specifications of Schedule 4, Figure A2-17 or A2-19; and
- (h) the lighting circuit shall be designed so that:
 - (i) stop bars located across entrance taxiways are selectively switchable;
 - (ii) stop bars located across taxiways intended to be used only as exit taxiways are switchable selectively or in groups;
 - (iii) when a stop bar is illuminated, any taxiway centre line lights installed beyond the stop bar shall be extinguished for a distance of at least 90m (ninety meters); and
 - (iv) stop bars are interlocked with the taxiway centre line lights so that when the centre line lights beyond the stop bar are illuminated the stop bar is extinguished and vice versa.

152. Intermediate Holding Position Lights

- (1) Except where a stop bar has been installed, intermediate holding position lights shall be provided at an intermediate holding position intended for use in runway visual range conditions less than a value of 350m (three hundred and fifty meters) and at an intermediate holding position where there is no need for stop-and-go signals as provided by a stop bar.
- (2) Intermediate holding position lights shall be located along the intermediate holding position marking at a distance of 0.3m (three tenths meters) prior to the marking.
- (3) Intermediate holding position lights shall consist of three fixed unidirectional lights showing yellow in the direction of approach to the intermediate holding position with a light distribution similar to taxiway centre line lights if provided.
- (4) The lights referred to in sub-regulation (3) shall be disposed symmetrically about and at right angle to the taxiway centre line, with individual lights spaced 1.5m (one and a half meters) apart.

153. Runway Guard Lights

- (1) An aerodrome operator shall provide runway guard lights:
 - (a) Configuration A at each taxiway or runway intersection associated with a runway intended for use in:

- (i) runway visual range conditions less than a value of 550m (five hundred and fifty meters) where a stop bar is not installed; and
 - (ii) runway visual range conditions of values between 550m (five hundred and fifty meters) and 1200m (one thousand two hundred meters) where the traffic density is heavy.
 - (b) as part of runway incursion prevention measures, Configuration A or B, shall be provided at each taxiway or runway intersection where runway incursion hot spots have been identified, and used under all weather conditions during day and night; and
 - (c) configuration B shall not be collocated with a stop bar.
- (2) Where more than one runway-holding positions exist at a runway or taxiway intersection, only the set of runway guard lights associated with the operational runway-holding position shall be illuminated
- (3) Runway guard lights-
- (a) Configuration A, shall be located at each side of the taxiway on the holding side of the runway-holding position marking; and
 - (b) Configuration B, shall be located across the taxiway on the holding side of the runway-holding position marking.
- (4) Runway guard lights Configuration A shall:
- (a) consist of 2 (two) pairs of yellow lights;
 - (b) where there is a need to enhance the contrast between the on and off state intended for use during the day, a visor of sufficient size to prevent sunlight from entering the lens without interfering with the function of the fixture shall be located above each lamp;
 - (c) for the intensity in yellow light and beam spreads of lights, be in accordance with the specifications in Schedule 4, Figure A2-24.
 - (d) where intended for use during the day, the intensity in yellow light and beam spreads of lights of shall be in accordance with the specifications in Schedule 4, Figure A2-25.
 - (e) where runway guard lights are specified as components of an advanced surface movement guidance and control system where higher light intensities are required, the intensity in yellow light and beam spreads of lights shall be in accordance with the specifications in Schedule 4, Figure A2-25;
 - (f) illuminated the lights in each unit alternately.

(5) Runway guard lights, Configuration B, shall:

- (a) consist of yellow lights spaced at intervals of 3m (three meters) across the taxiway;
- (b) for the intensity in yellow light and beam spreads of lights, be in accordance with the specifications in Schedule 4, Figure A2-12.
- (c) where runway guard lights are intended for use during the day, the intensity in yellow light and beam spreads of lights shall be in accordance with the specifications in Schedule 4, Figure A2-20.
- (d) where runway guard lights are specified as components of an advanced surface movement guidance and control system where higher light intensities are required, the intensity in yellow light and beam spreads of lights shall be in accordance with the specifications in Schedule 4, Figure A2-20.
- (e) illuminated adjacent lights alternately and alternative lights in unison.

(6) The light beam of runway guard lights shall be unidirectional and show yellow in the direction of approach to the runway holding position.

(7) The lights referred to in sub-regulation (6) shall be illuminated between 30 (thirty) and 60 (sixty) cycles per minute with the light suppression and illumination periods equal and opposite in each light.

154. Apron Floodlighting

(1) An aerodrome operator shall provide apron floodlighting on an apron, and on a designated isolated aircraft parking position intended to be used at night.

(2) An aerodrome operator shall ensure that apron floodlights shall be located so as to provide adequate illumination on all apron service areas, with a minimum of glare to pilots of aircraft in flight and on the ground, aerodrome and apron controllers, and personnel on the apron.

(3) The arrangement and aiming of floodlights shall be such that an aircraft stand receives light from two or more directions to minimize shadows.

(4) The spectral distribution of apron floodlights shall be such that the colours used for aircraft marking connected with routine servicing, and for surface and obstacle marking, can be correctly identified, with average illuminance of at least the following:

- (a) aircraft stand:
 - (i) horizontal illuminance of 20 (twenty) lux with a uniformity ratio of not more than 4:1 (four to one); and

- (ii) vertical illuminance of 20 (twenty) lux at a height of 2m (two meters) above the apron in relevant directions.
- (b) other apron areas; horizontal illuminance of 50% (fifty per cent) of the average illuminance on the aircraft stands with a uniformity ratio of not more than 4:1 (four to one).

155. Visual Docking Guidance System

(1) An aerodrome operator shall provide a visual docking guidance system when it is intended to indicate, by a visual aid, the precise positioning of an aircraft on an aircraft stand and other alternative means, such as marshallers, are not practicable.

(2) A visual docking guidance system shall provide both azimuth and stopping guidance where:

- (a) the azimuth guidance unit and the stopping position indicator shall be adequate for use in all weather, visibility, background lighting and pavement conditions for which the system is intended, both by day and night, but shall not dazzle the pilot;
- (b) the azimuth guidance unit and the stopping position indicator shall be of a design such that:
 - (i) a clear indication of malfunction of either or both is available to the pilot; and
 - (ii) they can be turned off.
- (c) the azimuth guidance unit and the stopping position indicator shall be located in such a way that there is continuity of guidance between the aircraft stand markings, the aircraft stand manoeuvring guidance lights, if present, and the visual docking guidance system;
- (d) the accuracy of the system shall be adequate for the type of loading bridge and fixed aircraft servicing installations with which it is to be used;
- (e) the system shall be usable by all types of aircraft for which the aircraft stand is intended, preferably without selective operation.

(3) If selective operation is required to prepare the system for use by a particular type of aircraft, then the system shall provide an identification of the selected aircraft type to both the pilot and the system operator as a means of ensuring that the system has been set properly.

(4) An azimuth guidance unit shall:

- (a) be located on or close to the extension of the stand centre line ahead of the aircraft so that its signals are visible from the cockpit of an aircraft

throughout the docking manoeuvre and aligned for use by the pilots occupying both the left and right seats;

- (b) provide unambiguous left or right guidance which enables the pilot to acquire and maintain the lead-in line without over-controlling; and
- (c) where azimuth guidance is indicated by colour change, green shall be used to identify the centre line and red for deviations from the centre line.

(5) A stopping position indicator shall:

- (a) be located in conjunction with, or sufficiently close to, the azimuth guidance unit so that a pilot can observe both the azimuth and stop signals without turning the head;
- (b) be usable at least by the pilots occupying both the left and right seats;
- (c) when position information is provided by the indicator for a particular aircraft type, account for the anticipated range of variations in pilot eye height or viewing angle, or both;
- (d) show the stopping position for the aircraft for which guidance is being provided and shall provide closing rate information to enable the pilot to gradually decelerate the aircraft to a full stop at the intended stopping position;
- (e) provide closing rate information over a distance of at least 10m (ten meters);
- (f) when stopping guidance is indicated by colour change, green shall be used to show that the aircraft can proceed and red to show that the stop point has been reached, except that for a short distance prior to the stop point a third colour may be used to warn that the stopping point is close.

156. Advanced Visual Docking Guidance System

(1) An A-VDGS shall:

- (a) be provided where it is operationally desirable to confirm the correct aircraft type for which guidance is being provided or to indicate the stand centre line in use, or both, where more than one is provided for;
- (b) be suitable for use by all types of aircraft for which the aircraft stand is intended.
- (c) be used only in conditions in which its operational performance is specified; and

- (d) for docking guidance information provided by an A-VDGS, not conflict with that provided by a conventional visual docking guidance system on an aircraft stand if both types are provided and are in operational use.
- (2) A method of indicating that the A-VDGS is not in operational use or is unserviceable shall be provided.
- (3) An A-VDGS shall be located such that unobstructed and unambiguous guidance is provided to the person responsible for, and persons assisting, the docking of the aircraft throughout the docking manoeuvre.
- (4) The characteristics of an A-VDGS shall be as follows:
- (a) provide, at minimum, the following guidance information at the appropriate stage of the docking manoeuvre:
 - (i) an emergency stop indication;
 - (ii) the aircraft type and model for which the guidance is provided;
 - (iii) an indication of the lateral displacement of the aircraft relative to the stand centre line;
 - (iv) the direction of azimuth correction needed to correct a displacement from the stand centre line;
 - (v) an indication of the distance to the stop position;
 - (vi) an indication when the aircraft has reached the correct stopping position; and
 - (vii) a warning indication if the aircraft goes beyond the appropriate stop position.
 - (b) be capable of providing docking guidance information for all aircraft taxi speeds encountered during the docking manoeuvre;
 - (c) the time taken from the determination of the lateral displacement to its display shall not result in a deviation of the aircraft, when operated in normal conditions, from the stand centre line greater than 1m (one meter);
 - (d) the information on displacement of the aircraft relative to the stand centre line and distance to the stopping position; when displayed, shall be provided with the accuracy specified in Schedule 2.30;
 - (e) symbols and graphics used to depict guidance information shall be intuitively representative of the type of information provided;

- (f) information on the lateral displacement of the aircraft relative to the stand centre line shall be provided at least 25m (twenty-five meters) prior to the stop position;
- (g) continuous closure distance and closure rate shall be provided from at least 15m (fifteen meters) prior to the stop position;
- (h) where provided, closure distance displayed in numerals shall be provided in metre integers to the stop position and displayed to 1 (one) decimal place at least 3m (three meters) prior to the stop position;
- (i) throughout the docking manoeuvre, provide an appropriate means on the A-VDGS to indicate the need to bring the aircraft to an immediate halt. In such an event, which includes a failure of the A-VDGS, no other information shall be displayed;
- (j) provision to initiate an immediate halt to the docking procedure shall be made available to personnel responsible for the operational safety of the stand;
- (k) the word “stop” in red characters shall be displayed when an immediate cessation of the docking manoeuvre is required.

157. Aircraft Stand Manoeuvring Guidance Lights

(1) An aerodrome operator shall provide aircraft stand manoeuvring guidance lights, collocated with the aircraft stand markings, to facilitate the positioning of an aircraft on an aircraft stand on a paved apron intended for use in poor visibility conditions, unless adequate guidance is provided by other means.

(2) The characteristics of aircraft stand manoeuvring guidance lights shall be such that:

- (a) other than those indicating a stop position, be fixed yellow lights, visible throughout the segments within which they are intended to provide guidance.
- (b) the lights used to delineate lead-in, turning and lead-out lines shall be spaced at intervals of not more than 7.5m (seven and a half meters) on curves and 15m (fifteen meters) on straight sections.
- (c) the lights indicating a stop position shall be fixed unidirectional lights showing red;
- (d) the intensity of the lights shall be adequate for the condition of visibility and ambient light in which the use of the aircraft stand is intended;

- (e) the lighting circuit shall be designed so that the lights may be switched on to indicate that an aircraft stand is to be used and switched off to indicate that it is not to be used.

158. Road-Holding Position Light

(1) An aerodrome operator shall provide a road-holding position light at each road-holding position serving a runway when it is intended that the runway will be used in runway visual range conditions less than a value of 550m (five hundred and fifty meters).

(2) The lights referred to in sub-regulation (1) above shall be located adjacent to the holding position marking 1.5m (one and a half meters) within ± 0.5 m (plus or minus half meter) from one edge of the road, either left or right as appropriate to the local traffic Regulations.

(3) A road-holding position light shall

(a) comprise of:

- (i) a controllable red stop or green go traffic light; or
- (ii) a flashing-red light.

(b) be unidirectional and aligned so as to be visible to the driver of a vehicle approaching the holding position;

(c) have a light beam intensity adequate for the conditions of visibility and ambient light in which the use of the holding position is intended, but shall not dazzle the driver; and

(d) have the flash frequency of the flashing-red light be between 30 and 60 (thirty and sixty) flashes per minute.

159. No-Entry Bar

(1) An aerodrome operator shall provide a no-entry bar across a taxiway which is intended to be used as an exit only taxiway to assist in preventing inadvertent access of traffic to that taxiway.

(2) The bar referred to in sub-regulation (1) above shall be located across the taxiway at the end of an exit only taxiway where it is desired to prevent traffic from entering the taxiway in the wrong direction.

(3) A no-entry bar shall be collocated with a no-entry sign or no-entry markings, or both.

(4) A no-entry bar shall have the following characteristics:

- (a) consist of unidirectional lights spaced at uniform intervals of more than 3m (three meters) showing red in the intended direction of approach to the runway;
 - (b) a pair of elevated lights shall be added to each end of the no-entry bar where the in- pavement no entry bar lights might be obscured from a pilot's view, by snow or rain and the like, or where a pilot may be required to stop the aircraft in a position so close to the lights that they are blocked from view by the structure of the aircraft.
 - (c) the intensity in red light and beam spreads of no-entry bar lights shall be in accordance with the specifications in Schedule 4, Figures A2-12 through A2-16, as appropriate.
 - (d) where no-entry bars are specified as components of an advanced surface movement guidance and control system and where, from an operational point of view, higher intensities are required to maintain ground movements at a certain speed in very low visibilities or in bright daytime conditions, the intensity in red light and beam spreads of no-entry bar lights shall be in accordance with the specifications of Schedule 4, Figure A2-17, A2-18 or A2-19; and
 - (e) where a wide beam fixture is required, the intensity in red light and beam spreads of no-entry bar lights shall be in accordance with the specifications of Schedule 4, Figure A2-17 or A2-19.
- (5) A taxiway centre line lights installed beyond the no-entry bar, looking in the direction of the runway, shall not be visible when viewed from the taxiway.

160. Runway Status Lights

(1) Where provided RELs shall:

- (a) be offset 0.6m (six tenths meters) from the taxiway centre line on the opposite side to the taxiway centre line lights and begin 0.6m (six tenths meters) before the runway holding position extending to the edge of the runway;
- (b) consist of at least five light units and shall be spaced at a minimum of 3.8 (three and eight tenths meters) m and a maximum of 15.2m (fifteen and two tenths meters) longitudinally, depending upon the taxiway length involved, except for a single light installed near the runway centre line.
- (c) consist of a single line of fixed in pavement lights showing red in the direction of aircraft approaching the runway;
- (d) illuminate as an array at each taxiway or runway intersection where they are installed less than two seconds after the system determines a

warning is needed; and the intensity and beam spread of RELs shall be in accordance with the specifications of Schedule 4, Figures A2-12 and A2-14.

(2) An additional single light shall be placed on the runway 0.6m (six tenths meters) from the runway centre line and aligned with the last 2 (two) taxiway RELs;

(3) Where provided THLs shall:

(a) be offset 1.8m (one and eight tenths meters) on each side of the runway centre line lights and extend, in pairs, starting at a point 115m (one hundred and fifty meters) from the beginning of the runway and, thereafter, every 30m (thirty meters) for at least 450m (four hundred and fifty meters);

(b) consist of 2 (two) rows of fixed in pavement lights showing red facing the aircraft taking off;

(c) illuminate as an array on the runway less than two seconds after the system determines a warning is needed and the intensity and beam spread of THLs shall be in accordance with the specifications of Schedule 4, Figure A2-26.

(3) RELs and THLs shall be automated to the extent that the only control over each system will be to disable one or both systems.

PART XIII VISUAL AIDS FOR NAVIGATION – SIGNS

161. Signs – General

(1) An aerodrome operator shall provide signs to convey a mandatory instruction, information on a specific location or destination on a movement area or to provide other information to meet the requirements of Regulation 192

(2) Signs shall have the following characteristics:

(a) be frangible;

(b) those located near a runway or taxiway shall be sufficiently low to preserve clearance for propellers and the engine pods of jet aircraft;

(c) the installed height of the sign shall not exceed the dimension shown in the appropriate column of Schedule 2.44;

(d) be rectangular, as shown in Schedule 2.45 and Schedule 2.46 with the longer side horizontal;

- (e) only signs on the movement area utilizing red shall be mandatory instruction signs;
- (f) inscriptions on a sign shall be in accordance with the provisions of Schedule 6.
- (g) be illuminated in accordance with the provisions of Schedule 6 when intended for use:
 - (i) in runway visual range conditions less than a value of 800m (eight hundred meters); or
 - (ii) at night in association with instrument runways; or
 - (iii) at night in association with non-instrument runways where the code number is 3 (three) or 4 (four).
- (h) be retroreflective or illuminated, or both, in accordance with the provisions of Schedule 6 when intended for use at night in association with non-instrument runways where the code number is 1 (one) or 2 (two);
- (i) a variable message sign shall be provided where:
 - (i) the instruction or information displayed on the sign is relevant only during a certain period of time; or
 - (ii) there is a need for variable predetermined information to be displayed on the sign to meet the requirements of Regulation 192;
 - (iii) or for both conditions
- (j) a variable message sign shall show a blank face when not in use;
- (k) in case of failure, a variable message sign shall not provide information that could lead to unsafe action from a pilot or a vehicle driver;
- (l) the time interval to change from one message to another on a variable message sign shall be as short as practicable and shall not exceed 5 (five) seconds.

162. Mandatory Instruction Signs

- (1) An aerodrome operator shall provide a mandatory instruction sign to identify a location beyond which an aircraft taxiing or vehicle shall not proceed unless authorized by the aerodrome control tower
- (2) The mandatory instruction sign shall include runway designation signs, category I, II or III holding position signs, runway-holding position signs, road-holding position signs and NO ENTRY signs.

(3) An aerodrome operator shall ensure the following:

- (a) a pattern “A” runway-holding position marking is supplemented at a taxiway or runway intersection or a runway or runway intersection with a runway designation sign;
- (b) a pattern “B” runway-holding position marking is supplemented with a Category I, II or III holding position sign;
- (c) a pattern “A” runway-holding position marking at a runway-holding position established in accordance with Regulation 102(1)(c) is supplemented with a runway-holding position sign;
- (d) a runway designation sign at a taxiway or runway intersection is supplemented with a location sign in the outboard position furthest from the taxiway, as appropriate;
- (e) a NO ENTRY sign is provided when entry into an area is prohibited;
- (f) a runway designation sign at a taxiway or runway intersection or a runway or runway intersection shall be located on each side of the runway-holding position marking facing the direction of approach to the runway;
- (g) a Category I, II or III holding position sign shall be located on each side of the runway-holding position marking facing the direction of the approach to the critical area;
- (h) a NO ENTRY sign shall be located at the beginning of the area to which entrance is prohibited on each side of the taxiway as viewed by the pilot; and
- (i) a runway-holding position sign shall be located on each side of the runway-holding position established in accordance with Regulation 102(1)(c), facing the approach to the obstacle limitation surface or ILS or MLS critical or sensitive area, as appropriate.

(4) A mandatory instruction sign shall have the following characteristics:

- (a) consist of an inscription in white on a red background;
- (b) where, owing to environmental or other factors, the conspicuity of the inscription on a mandatory instruction sign needs to be enhanced;
- (c) the outside edge of the white inscription shall be supplemented by a black outline measuring 10mm (ten millimeters) in width for runway code numbers 1 (one) and 2 (two), and 20mm (twenty millimeters) in width for runway code numbers 3 (three) and 4 (four).

- (d) the inscription on a runway designation sign shall consist of the runway designations of the Intersecting runway properly oriented with respect to the viewing position of the sign, except that a runway designation sign installed in the vicinity of a runway extremity may show the runway designation of the concerned runway extremity only.
- (e) the inscription on a Category I, II, III, joint II or III or joint I, II or III holding position sign shall consist of the runway designator followed by CAT I, CAT II, CAT III, CAT II or III or CAT I, II or III, as appropriate.
- (f) the inscription on a NO ENTRY sign shall be in accordance with Schedule 2.45 the inscription on a runway-holding position sign at a runway-holding position established in accordance with Regulation 102(1)(c) shall consist of the taxiway designation and a number.
- (g) where installed, the inscriptions or symbol of Schedule 2.45 shall be used.

163. Information Signs

(1) An aerodrome operator shall provide an information sign where there is an operational need to identify by a sign, a specific location, or routing information and it shall include:

- (a) direction signs;
- (b) location signs;
- (c) destination signs;
- (d) runway exit signs;
- (e) runway vacated signs; and
- (f) intersection take-off signs.

(2) An aerodrome operator shall be provided the following information signs:

- (a) a runway exit sign where there is an operational need to identify a runway exit;
- (b) a runway vacated sign where the exit taxiway is not provided with taxiway centre line lights and there is a need to indicate to a pilot leaving a runway the perimeter of the ILS /MLS critical or sensitive area or the lower edge of the inner transitional surface, whichever is farther from the runway centre line;
- (c) an intersection take-off sign when there is an operational need to indicate the remaining take-off run available for intersection take-offs;

- (d) where necessary, a destination sign to indicate the direction to a specific destination on the aerodrome, including a cargo area, general aviation;
 - (e) a combined location and direction sign when it is intended to indicate routing information prior to a taxiway intersection;
 - (f) a direction sign when there is an operational need to identify the designation and direction of taxiways at an intersection;
 - (g) a location sign:
 - (i) at an intermediate holding position; or
 - (ii) in conjunction with a runway designation sign except at a runway or runway intersection; or
 - (iii) in conjunction with a direction sign, except that it may be omitted where an aeronautical study indicates that it is not needed;
 - (iv) where necessary, to identify taxiways exiting an apron or taxiways beyond an intersection; and where a taxiway ends at an intersection such as a “T” and it is necessary to identify this, a barricade, direction sign or other appropriate visual aid, or both, shall be used.
- (3) Except as sub-regulations (4)(a) and (10) below information signs shall -
- (a) wherever practicable, be located on the left-hand side of the taxiway in accordance with Schedule 2.46.
 - (b) at a taxiway intersection, be located prior to the intersection and in line with the intermediate holding position marking;
 - (c) where there is no intermediate holding position marking, the signs shall be installed at least 60m (sixty meters) from the centre line of the intersecting taxiway where the code number is 3 (three) or 4 (four), and at least 40m (forty meters) where the code number is 1 (one) or 2 (two);
 - (d) other than location signs shall not be collocated with mandatory instruction signs.
- (4) A runway exit sign shall be located:
- (a) on the same side of the runway as the exit is located, either left or right, and positioned in accordance with Schedule 2.46.
 - (b) prior to the runway exit point in line with a position at least 60m (sixty meters) prior to the point of tangency where the code number is 3 (three) or 4 (four), and at least 30m (thirty meters) where the code number is 1 (one) or 2 (two).
- (5) A runway vacated sign shall be located at least on one side of the taxiway.

(6) The distance between the sign and the centre line of a runway shall be not less than the greater of the following:

- (a) the distance between the centre line of the runway and the perimeter of the ILS or MLS critical or sensitive area; or
- (b) the distance between the centre line of the runway and the lower edge of the inner transitional surface.

(7) Where provided in conjunction with a runway vacated sign, the taxiway location sign shall be positioned outboard of the runway vacated sign.

(8) An intersection take-off sign shall be located at the left-hand side of the entry taxiway.

(9) The distance between the sign and the centre line of the runway shall be not less than 60m (sixty meters) where the code number is 3 (three) or 4 (four), and not less than 45m (forty-five meters) where the code number is 1 (one) or 2 (two).

(10) A taxiway location sign installed in conjunction with a runway designation sign shall be positioned outboard of the runway designation sign.

(11) A destination sign shall not normally be collocated with a location or direction sign.

(12) A direction sign, barricade or other appropriate visual aid, or both, used to identify a “T” intersection shall be located on the opposite side of the intersection facing the taxiway.

(13) Information signs shall be characterized as follows:

- (a) an information sign other than a location sign shall consist of an inscription in black on a yellow background;
- (b) a location sign shall consist of an inscription in yellow on a black background and where it is a stand-alone sign shall have a yellow border;
- (c) the inscription on a runway exit sign shall consist of the designator of the exit taxiway and an arrow indicating the direction to follow;
- (d) the inscription on a runway vacated sign shall depict the pattern A runway-holding position marking as shown in Schedule 2.46;
- (e) the inscription on an intersection take-off sign shall consist of a numerical message indicating the remaining take-off run available in meters plus an arrow, appropriately located and oriented, indicating the direction of the take-off as shown in Schedule 2.46.

- (f) the inscription on a destination sign shall comprise an alpha, alphanumerical or numerical Message identifying the destination plus an arrow indicating the direction to proceed as shown in Schedule 2.46;
- (g) the inscription on a direction sign shall comprise an alpha or alphanumerical message identifying the taxiway plus an arrow or arrows appropriately oriented as shown in Schedule 2.46;
- (h) the inscription on a location sign shall comprise the designation of the location taxiway, runway or other pavement the aircraft is on or is entering and shall not contain arrows;
- (i) where it is necessary to identify each of a series of intermediate holding positions on the same taxiway, the location sign shall consist of the taxiway designation and a number;
- (j) where a location sign and direction signs are used in combination:
 - (i) all direction signs related to left turns shall be placed on the left side of the location sign;
 - (ii) all direction signs related to right turns shall be placed on the right side of the location sign;
 - (iii) where the junction consists of one intersecting taxiway, the location sign may alternatively be placed on the left- hand side;
 - (iv) the direction signs shall be placed such that the direction of the arrows departs increasingly from the vertical with increasing deviation of the corresponding taxiway;
 - (v) an appropriate direction sign shall be placed next to the location sign where the direction of the location taxiway changes significantly beyond the intersection; and
 - (vi) adjacent direction signs shall be delineated by a vertical black line as shown in Schedule 2.46;
- (k) a taxiway shall be identified by a designator comprising a letter, letters or a combination of a letter or letters followed by a number, but the use of words such as “inner” and “outer” shall be avoided wherever possible.
- (l) when designating taxiways, the use of the letters I, O or X and the use of words such as inner and outer shall be avoided wherever possible to avoid confusion with the numerals 1, 0 and closed marking;
- (m) the use of numbers alone on the manoeuvring area shall be reserved for the designation of runways and
- (n) apron stand designators shall not be the same as taxiway designators.

164. VOR Aerodrome Checkpoint Sign

(1) When a VOR aerodrome checkpoint is established, it shall be indicated by a VOR aerodrome checkpoint marking and sign which shall be located as near as possible to the checkpoint.

(2) The inscriptions shall be visible from the cockpit of an aircraft properly positioned on the VOR aerodrome checkpoint marking.

(3) The VOR aerodrome checkpoint sign shall consist of an inscription in black on a yellow background which shall be in accordance with one of the alternatives shown in Schedule 2.47 in which:

- (a) VOR is an abbreviation identifying this as a VOR checkpoint;
- (b) 116.3 (one one six point three) is an example of the radio frequency of the VOR concerned;
- (c) 147° (one hundred and forty-seven degrees) is an example of the VOR bearing, to the nearest degree, which should be indicated at the VOR checkpoint; and
- (d) 4.3nm (four point three nautical miles) is an example of the distance in nautical miles to a DME collocated with the VOR concerned.

165. Aerodrome Identification Sign

(1) An aerodrome operator shall provide an aerodrome identification sign at an aerodrome where there is insufficient alternative means of visual identification and it shall be placed on the aerodrome so as to be legible, in so far as is practicable, at all angles above the horizontal.

(2) An aerodrome identification sign shall:

- (a) consist of the name of the aerodrome;
- (b) have the colour selected for the sign give adequate conspicuity when viewed against its background; and
- (c) have character heights of not less than 3m (three meters).

166. Aircraft Stand Identification Signs

(1) An aerodrome operator shall supplement an aircraft stand identification with an aircraft stand identification sign where feasible and locate it so as to be clearly visible from the cockpit of an aircraft prior to entering the aircraft stand.

(2) An aircraft stand identification sign shall consist of an inscription in black on a yellow background.

167. Road-Holding Position Sign

(1) An aerodrome operator shall provide a road-holding position sign at all road entrances to a runway and locate it 1.5m (one and a half meters) from one edge of the road (left or right as appropriate to the local traffic Directives) at the holding position.

(2) A road-holding position sign shall be characterized as follows:

- (a) consist of an inscription in white on a red background;
- (b) the inscription on a road-holding position sign shall be in English language, be in conformity with the national road traffic regulations and include the following:
 - (i) a requirement to stop; and
 - (ii) where appropriate, a requirement to obtain ATC clearance and location designator.
- (c) a road-holding position sign intended for night use shall be retro-reflective or illuminated.

PART XIV VISUAL AIDS FOR NAVIGATION – MARKERS**168. Markers – General**

An aerodrome operator shall ensure that markers are frangible and those located near a runway or taxiway are sufficiently low to preserve clearance for propellers and for the engine pods of jet aircraft.

169. Unpaved Runway Edge Markers

(1) An aerodrome operator shall provide markers when the extent of an unpaved runway is not clearly indicated by the appearance of its surface compared with that of the surrounding ground.

(2) Where runway lights are provided, the markers shall be incorporated in the light fixtures, but where there are no lights, markers of flat rectangular or conical shape shall be placed so as to delimit the runway clearly.

(3) Flat rectangular markers shall have a minimum size of 1m x 3m (one by three meters) and be placed with their long dimension parallel to the runway centre line.

(4) Conical markers shall have a height not exceeding 50cm (fifty centimeters).

170. Stopway Edge Markers

An aerodrome operator shall provide stopway edge markers when the extent of a stopway is not clearly indicated by its appearance compared with that of the surrounding ground and the markers shall be sufficiently different from any runway edge markers used to ensure that the two types of markers cannot be confused.

171. Taxiway Edge Markers

(1) An aerodrome operator shall provide taxiway edge markers on a taxiway where the code number is 1 (one) or 2 (two) and taxiway centre line or edge lights or taxiway centre line markers are not provided.

(2) Taxi edge markers shall be:

- (a) installed at least at the same locations as would the taxiway edge lights had they been used;
- (b) retroreflective blue; and
- (c) frangible, and their height sufficiently low to preserve clearance for propellers and for the engine pods of jet aircraft.

(3) The marked surface as viewed by the pilot shall be a rectangle and shall have a minimum viewing area of 150cm² (one hundred and fifty centimeters square).

172. Taxiway Centre Line Markers

(1) An aerodrome operator shall provide taxiway centre line markers:

- (a) on a taxiway where the code number is 1 (one) or 2 (two) and taxiway centre line or edge lights or taxiway edge markers are not provided; and
- (b) on a taxiway where the code number is 3 (three) or 4 (four) and taxiway centre line lights are not provided if there is a need to improve the guidance provided by the taxiway centre line marking;

(2) Taxiway centre line markers shall:

- (a) be installed at least at the same location as would taxiway centre line lights had they been used;
- (b) normally be located on the taxiway centre line marking except that they may be offset by not more than 30cm (thirty centimeters) where it is not practicable to locate them on the marking;
- (c) be retro-reflective green; and
- (d) be so designed and fitted as to withstand being run over by the wheels of an aircraft without damage either to the aircraft or to the markers.

(3) The marked surface as viewed by the pilot shall be a rectangle and shall have a minimum viewing area of 20cm² (twenty centimeters square).

173. Unpaved Taxiway Edge Markers

An aerodrome operator shall:

- (a) where the extent of an unpaved taxiway is not clearly indicated by its appearance compared with that of the surrounding ground, provide markers;
- (b) where taxiway lights are provided, incorporated the markers in the light fixtures; and
- (d) where there are no lights, markers of conical shape shall be placed so as to delimit the taxiway clearly.

174. Boundary Markers

(1) An aerodrome operator shall provide boundary markers at an aerodrome where the landing area has no runway and such markers shall be spaced along the boundary of the landing area at intervals of not more than 200m (two hundred meters), if the type shown in Schedule 2.48 is used, or approximately 90m (ninety meters), if the conical type is used with a marker at any corner.

(2) Boundary markers shall:

- (a) be of a form similar to that shown in Schedule 2.48; or
- (b) be in the form of a cone not less than 50cm (fifty centimeters) high and not less than 75cm (seventy-five centimeters) in diameter at the base;
- (c) be coloured to contrast with the background against which they will be seen;
- (d) be a single colour, orange or red, or 2 (two) contrasting colours, orange and white or alternatively red and white, except where such colours merge with the background.

PART XV VISUAL AIDS FOR DENOTING OBSTACLES

175. Objects to be Marked, Lighted, or Marked and Lighted

(1) An aerodrome operator shall mark or light, or both, the following objects which fall within the lateral boundaries of the obstacle limitation surfaces:

- (a) vehicles and other mobile objects, excluding aircraft, on the movement area of an aerodrome are obstacles and shall be marked and, if the

vehicles and aerodrome are used at night or in conditions of low visibility, lighted, except that aircraft servicing equipment and vehicles used only on aprons may be exempt;

- (b) elevated aeronautical ground lights within the movement area shall be marked so as to be conspicuous by day;
- (c) obstacle lights shall not be installed on elevated ground lights or signs in the movement area;
- (d) all obstacles within the distance specified in Schedule 2.7, Column 11 or 12, from the centre line of a taxiway, an apron taxiway or aircraft stand taxilane shall be marked and, if the taxiway, apron taxiway or aircraft stand taxilane is used at night, lighted;
- (e) a fixed obstacle that extends above a take-off climb surface within 3000m (three thousand meters) of the inner edge of the take-off climb surface shall be marked and, if the runway is used at night, lighted, except that:
 - (i) such marking and lighting may be omitted when the obstacle is shielded by another fixed obstacle;
 - (ii) the marking may be omitted when the obstacle is lighted by medium-intensity obstacle lights, Type A, by day and its height above the level of the surrounding ground does not exceed 150m (one hundred and fifty meters);
 - (iii) the marking may be omitted when the obstacle is lighted by high-intensity obstacle lights by day; and
 - (iv) the lighting may be omitted where the obstacle is a lighthouse and an aeronautical study indicates the lighthouse light to be sufficient.
- (f) a fixed object, other than an obstacle, adjacent to a take-off climb surface shall be marked and, if the runway is used at night, lighted, if such marking and lighting is considered necessary to ensure its avoidance, except that the marking may be omitted when:
 - (i) the object is lighted by medium-intensity obstacle lights, Type A, by day and its height above the level of the surrounding ground does not exceed 150m (one hundred and fifty meters); or
 - (ii) the object is lighted by high-intensity obstacle lights by day.
- (g) a fixed obstacle that extends above an approach surface within 3000m (three thousand meters) of the inner edge or above a transitional surface shall be marked and, if the runway is used at night, lighted, except that:

- (i) such marking and lighting may be omitted when the obstacle is shielded by another fixed obstacle;
 - (ii) the marking may be omitted when the obstacle is lighted by medium-intensity obstacle lights, Type A, by day and its height above the level of the surrounding ground does not exceed 150m (one hundred and fifty meters);
 - (iii) the marking may be omitted when the obstacle is lighted by high-intensity obstacle lights by day; and
 - (iv) the lighting may be omitted where the obstacle is a lighthouse and an aeronautical study indicates the lighthouse light to be sufficient.
- (h) a fixed obstacle that extends above a horizontal surface shall be marked and, if the aerodrome is used at night, lighted, except that (i) such marking and lighting may be omitted when:
 - (i) the obstacle is shielded by another fixed obstacle; or
 - (ii) for a circuit extensively obstructed by immovable objects or terrain, procedures have been established to ensure safe vertical clearance below prescribed flight paths; or
 - (iii) an aeronautical study shows the obstacle not to be of operational significance;
 - (iv) the obstacle is lighted by medium-intensity obstacle lights, Type A, by day and its height above the level of the surrounding ground does not exceed 150 m (one hundred and fifty meters);
 - (v) the obstacle is lighted by high-intensity obstacle lights by day; and
 - (vi) the obstacle is a lighthouse and an aeronautical study indicates the lighthouse light to be sufficient.
- (j) a fixed object that extends above an obstacle protection surface shall be marked and, if the runway is used at night, lighted.
- (k) other objects inside the obstacle limitation surfaces shall be marked or lighted, or both, if an aeronautical study indicates that the object could constitute a hazard to aircraft;
- (l) objects referred to in paragraph (k) above, include objects adjacent to visual routes like a waterway or highway.
- (m) overhead wires or cables, crossing a river, waterway, valley or highway shall be marked and their supporting towers marked and lighted if an aeronautical study indicates that the wires or cables could constitute a hazard to aircraft.

(2) An aerodrome operator shall mark and or light the following objects which are outside the lateral boundaries of the obstacle limitation surfaces-

- (a) obstacles in accordance with Regulation 110(2) shall be marked and lighted, except that the marking may be omitted when the obstacle is lighted by high-intensity obstacle lights by day;
- (b) other objects outside the obstacle limitation surfaces shall be marked or lighted, or both, if an aeronautical study indicates that the object could constitute a hazard to aircraft,;
- (c) objects referred to in paragraph (b) above, include objects adjacent to visual routes like a waterway or highway.
- (d) overhead wires or cables, crossing a river, waterway, valley or highway shall be marked and their supporting towers marked and lighted if an aeronautical study indicates that the wires or cables could constitute a hazard to aircraft.

176. Marking and Lighting of Objects

An aerodrome operator shall ensure that:

- (a) the presence of objects which must be lighted, as specified in Regulation 178, shall be indicated by low-, medium- or high intensity obstacle lights, or a combination of such lights;
- (b) low-intensity obstacle lights, Types A B, C, D and E, medium-intensity obstacle lights, Types A, B and C, high-intensity obstacle lights Type A and B, shall be in accordance with the specifications in Schedule 2.49 and Schedule 3;
- (c) the number and arrangement of low-, medium- or high-intensity obstacle lights at each level to be marked shall be such that the object is indicated from every angle in azimuth;
- (d) where a light is shielded in any direction by another part of the object, or by an adjacent object, additional lights shall be provided on that adjacent object or the part of the object that is shielding the light, in such a way as to retain the general definition of the object to be lighted; and
- (e) where the shielded light does not contribute to the definition of the object to be lighted, it may be omitted.

177. Marking and Lighting of Mobile Objects

(1) An aerodrome operator shall ensure that all mobile objects to be marked are coloured with a single conspicuous colour, preferably red or yellowish green for emergency vehicles and yellow for service vehicles or shall display flags

(2) Such flags shall:

- (a) be displayed around, on top of, or around the highest edge of the object;
- (b) not increase the hazard presented by the object they mark;
- (c) not be less than 0.9m (nine tenths meters) on each side and shall consist of a chequered pattern, each square having sides of not less than 0.3m (three tenths meters);
- (d) be such that the colours of the pattern contrast each with the other and with the background against which they will be seen; and
- (e) use orange and white or alternatively red and white, except where such colours merge with the background.

(3) An aerodrome operator shall light all mobile objects as follows:

- (a) low-intensity obstacle lights, Type C, shall be displayed on vehicles and other mobile objects excluding aircraft;
- (b) low-intensity obstacle lights, Type C, displayed on vehicles associated with emergency or security shall be flashing-blue and those displayed on other vehicles shall be flashing- yellow;
- (c) low-intensity obstacle lights, Type D, shall be displayed on follow-me vehicles;
- (d) 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 Schedule 2.49;
- (e) 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.

178. Marking and Lighting of Fixed Objects

(1) An aerodrome operator shall ensure that all fixed objects to be marked are, whenever practicable, coloured.

(2) Where the requirement in sub-regulation (1) is not practicable, markers or flags shall be displayed on or above them, except that objects that are sufficiently conspicuous by their shape, size or colour need not be otherwise marked.

(3) Marking by colour shall be as follows:

- (a) an object shall be coloured to show a chequered pattern if it has essentially unbroken surfaces and its projection on any vertical plane equals or exceeds 4.5m (four and a half meters) in both dimensions;
 - (b) the chequered pattern shall consist of rectangles of not less than 1.5m (one and a half meters) and not more than 3m (three meters) on a side, the corners being of the darker colour;
 - (c) the colours of the pattern should contrast each with the other and with the background against which they will be seen;
 - (d) orange and white or alternatively red and white should be used, except where such colours merge with the background as shown in Schedule 2.50;
 - (e) an object shall be coloured to show alternating contrasting bands if:
 - (i) it has essentially unbroken surfaces and has one dimension, horizontal or vertical, greater than 1.5m (one and a half meters), and the other dimension, horizontal or vertical, less than 4.5m (four and a half meters); or
 - (ii) it is of skeletal type with either a vertical or a horizontal dimension greater than 1.5m (one and a half meters);
 - (iii) the bands shall be perpendicular to the longest dimension and have a width approximately $\frac{1}{7}$ (one seventh) of the longest dimension or 30m (thirty meters), whichever is less.
 - (f) the colours of the bands shall contrast with the background against which they will be seen;
 - (g) orange and white shall be used, except where such colours are not conspicuous when viewed against the background;
 - (h). the bands on the extremities of the object shall be of the darker colour, as shown in Schedule 2.50 and 2.51.
 - (i) an object shall be coloured in a single conspicuous colour if its projection on any vertical plane has both dimensions less than 1.5m (one and a half meters);
 - (j) orange or red shall be used, except where such colours merge with the background.
- (4) Flag marking fixed objects shall:
- (a) be displayed around, on top of, or around the highest edge of, the object;

- (b) when used to mark extensive objects or groups of closely spaced objects, be displayed at least every 15m (fifteen meters);
 - (c) not increase the hazard presented by the object they mark;
 - (d) not be less than 0.6m (six tenths meters) on each side;
 - (e) be orange in colour or a combination of two triangular sections, one orange and the other white, or one red and the other white, except that where such colours merge with the background, other conspicuous colours should be used.
- (5) An aerodrome operator shall ensure that for marking of fixed objects:
- (a) markers displayed on or adjacent to objects shall be located in conspicuous positions so as to retain the general definition of the object and shall be recognizable in clear weather from a distance of at least 1000m (one thousand meters) for an object to be viewed from the air and 300m (three hundred meters) for an object to be viewed from the ground in all directions in which an aircraft is likely to approach the object;
 - (b) the shape of markers shall be distinctive to the extent necessary to ensure that they are not mistaken for markers employed to convey other information, and they shall be such that the hazard presented by the object they mark is not increased; and
 - (c) a marker shall be of one colour and when installed, white and red, or white and orange markers shall be displayed alternately and the colour selected should contrast with the background against which it will be seen.
- (6) An aerodrome operator shall ensure that all fixed objects are lighted as follows:
- (a) in the case of an object to be lighted, one or more low-, medium- or high-intensity obstacle lights shall be located as close as practicable to the top of the object;
 - (b) in the case of chimney or other structure of like function, the top lights shall be placed sufficiently below the top so as to minimize contamination by smoke and the like, as shown in Schedule 2.51;
 - (c) in the case of a tower or antenna structure indicated by high-intensity obstacle lights by day with an appurtenance, such as a rod or an antenna, greater than 12m (twelve meters) where it is not practicable to locate a high-intensity obstacle light on the top of the appurtenance, such a light shall be located at the highest practicable point and, if practicable, a medium-intensity obstacle light, Type A, mounted on the top;

- (d) in the case of an extensive object or of a group of closely spaced objects to be lighted that are:
 - (i) penetrating a horizontal obstacle limitation surface (OLS) or located outside an OLS, the top lights shall be so arranged as to at least indicate the points or edges of the object highest in relation to the obstacle limitation surface or above the ground, and so as to indicate the general definition and the extent of the objects; and
 - (ii) penetrating a sloping OLS, the top lights shall be so arranged as to at least indicate the points or edges of the object highest in relation to the OLS, and so as to indicate the general definition and the extent of the objects.
 - (e) where two or more edges are of the same height, the edge nearest the landing area shall be marked;
 - (f) when the obstacle limitation surface concerned is sloping and the highest point above the OLS is not the highest point of the object, additional obstacle lights shall be placed on the highest point of the object;
 - (g) where lights are applied to display the general definition of an extensive object or a group of closely spaced objects, and:
 - (i) low-intensity lights are used, they shall be spaced at longitudinal intervals not exceeding 45m (forty-five meters); and
 - (ii) medium-intensity lights are used, they shall be spaced at longitudinal intervals not exceeding 900m (nine hundred meters).
 - (h) high-intensity obstacle lights, Type A, and medium-intensity obstacle lights, Types A and B, located on an object shall flash simultaneously;
 - (i) the installation setting angles for high-intensity obstacle lights, Type A, shall be in accordance with Schedule 2.51.
 - (j) where the use of high-intensity obstacle lights, Type A, or medium-intensity obstacle lights, Type A, at night may dazzle pilots in the vicinity of an aerodrome within approximately 10,000m (ten thousand meters) radius, or cause significant environmental concerns, a dual obstacle lighting system shall be provided; and
 - (k) the dual OLS shall be composed of high-intensity obstacle lights, Type A, or medium-intensity obstacle lights, Type A, as appropriate, for daytime and twilight use and medium-intensity obstacle lights, Type B or C, for night-time use.
- (7) Lighting of fixed objects with a height less than 45m (forty-five meters) above ground level shall be as follows:

- (a) low-intensity obstacle lights, Type A or B, shall be used where the object is a less extensive one and its height above the surrounding ground is less than 45m (forty-five meters);
 - (b) where the use of low-intensity obstacle lights, Type A or B, would be inadequate or an early special warning is required, then medium- or high-intensity obstacle lights shall be used;
 - (c) low-intensity obstacle lights, Type B, shall be used either alone or in combination with medium-intensity obstacle lights, Type B, in accordance with sub-paragraph (e) below;
 - (d) medium-intensity obstacle lights, Type A, B or C, should be used where the object is an extensive one; and
 - (e) medium-intensity obstacle lights, Types A and C, should be used alone, whereas medium-intensity obstacle lights, Type B, shall be used either alone or in combination with low-intensity obstacle lights, Type B.
- (8) Lighting of fixed objects with a height 45m (forty-five meters) to a height less than 150m (one hundred and fifty meters) above ground level shall be as follows:
- (a) medium-intensity obstacle lights, Type A, B or C, shall be used;
 - (b) medium-intensity obstacle lights, Types A and C, shall be used alone, whereas medium-intensity obstacle lights, Type B, shall be used either alone or in combination with low-intensity obstacle lights, Type B;
 - (c) where an object is indicated by medium-intensity obstacle lights, Type A, and the top of the object is more than 105m (one hundred and five meters) above the level of the surrounding ground or the elevation of tops of nearby buildings, when the object to be marked is surrounded by buildings, additional lights shall be provided at intermediate levels;
 - (d) the additional intermediate lights as indicated in paragraph (c) shall be spaced as equally as practicable, between the top lights and ground level or the level of tops of nearby buildings, as appropriate, with the spacing not exceeding 105m (one hundred and five meters);
 - (e) where an object is indicated by medium-intensity obstacle lights, Type B, and the top of the object is more than 45m (forty-five meters) above the level of the surrounding ground or the elevation of tops of nearby buildings, when the object to be marked is surrounded by buildings, additional lights shall be provided at intermediate levels;
 - (f) the additional intermediate lights as indicated in paragraph (e) shall be alternately low-intensity obstacle lights, Type B, and medium-intensity obstacle lights, Type B, and shall be spaced as equally as practicable between the top lights and ground level or the level of tops of nearby

buildings, as appropriate, with the spacing not exceeding 52m (fifty-two meters);

- (g) where an object is indicated by medium-intensity obstacle lights, Type C, and the top of the object is more than 45m (forty-five meters) above the level of the surrounding ground or the elevation of tops of nearby buildings, when the object to be marked is surrounded by buildings, additional lights shall be provided at intermediate levels;
 - (h) the additional intermediate lights as indicated in paragraph (g) shall be spaced as equally as practicable, between the top lights and ground level or the level of tops of nearby buildings, as appropriate, with the spacing not exceeding 52m (fifty-two meters);
 - (i) where high-intensity obstacle lights, Type A, are used, they shall be spaced at uniform intervals not exceeding 105m (one hundred and five meters) between the ground level and the top light specified in sub-regulation (6)(a) above; and
 - (j) notwithstanding paragraph (i) above where an object to be marked is surrounded by buildings, the elevation of the tops of the buildings may be used as the equivalent of the ground level when determining the number of light levels.
- (9) Lighting of fixed objects with a height of 150m (one hundred and fifty meters) or more above ground level shall be as follows:
- (a) high-intensity obstacle lights, Type A, shall be used to indicate the presence of an object if its height above the level of the surrounding ground exceeds 150m (one hundred and fifty meters) and an aeronautical study indicates such lights to be essential for the recognition of the object by day;
 - (b) where high-intensity obstacle lights, Type A, are used, they shall be spaced at uniform intervals not exceeding 105m (one hundred and five meters) between the ground level and the top lights specified in sub-regulation (6)(a) above;
 - (c) notwithstanding paragraph (b) above where an object to be marked is surrounded by buildings, the elevation of the tops of the buildings may be used as the equivalent of the ground level when determining the number of light levels;
 - (d) where, in the opinion of the appropriate authority, the use of high-intensity obstacle lights, Type A, at night may dazzle pilots in the vicinity of an aerodrome, within approximately 10,000m (ten thousand meters) radius or cause significant environmental concerns, medium-intensity obstacle lights, Type C, shall be used alone;

- (e) pursuant to paragraph (d) above medium intensity obstacle lights, Type B, shall be used either alone or in combination with low-intensity obstacle lights, Type B;
- (f) where an object is indicated by medium-intensity obstacle lights, Type A, additional lights shall be provided at intermediate levels;
- (g) the additional intermediate lights as indicated in paragraph (f) above shall be spaced as equally as practicable, between the top lights and ground level or the level of tops of nearby buildings, as appropriate, with the spacing not exceeding 105m (one hundred and five meters);
- (h) where an object is indicated by medium-intensity obstacle lights, Type B, additional lights shall be provided at intermediate levels
- (i) the additional intermediate lights as indicated in paragraph (h) above shall be alternately low-intensity obstacle lights, Type B, and medium-intensity obstacle lights, Type B, and shall be spaced as equally as practicable between the top lights and ground level or the level of tops of nearby buildings, as appropriate, with the spacing not exceeding 52m (fifty-two meters);
- (j) where an object is indicated by medium-intensity obstacle lights, Type C, additional lights shall be provided at intermediate levels; and
- (k) the additional intermediate lights as indicated in paragraph (j) above shall be spaced as equally as practicable, between the top lights and ground level or the level of tops of nearby buildings, as appropriate, with the spacing not exceeding 52m (fifty-two meters).

179. Marking and Lighting of Wind Turbines

(1) A wind turbine shall be marked or lighted, or both, if it is determined by the Authority to be an obstacle and the markings of rotor blades, nacelle and upper 2/3 (two thirds) of the supporting mast of wind turbines shall be painted white, unless otherwise indicated by an aeronautical study.

(2) When lighting is deemed necessary, in the case of a wind farm, which includes a group of two or more wind turbines, the wind farm shall be regarded as an extensive object and the lights shall be installed:

- (a) to identify the perimeter of the wind farm;
- (b) respecting the maximum spacing, in accordance with Regulation 178(5)(f) between the lights along the perimeter, unless a dedicated assessment shows that a greater spacing can be used;
- (c) so that, where flashing lights are used, they flash simultaneously throughout the wind farm;

- (d) so that, within a wind farm, any wind turbines of significantly higher elevation are also identified wherever they are located; and
 - (e) at locations prescribed in paragraphs (a), (b) and (d) above, respecting the following criteria:
 - (i) for wind turbines of less than 150m (one hundred and fifty meters) in overall height medium-intensity which includes hub height plus vertical blade height, lighting on the nacelle should be provided;
 - (ii) for wind turbines from 150m (one hundred and fifty meters) to 315m (three hundred and fifteen meters) in overall height, in addition to the medium-intensity light installed on the nacelle, a second light serving as an alternate should be provided in case of failure of the operating light;
 - (iii) the lights shall be installed to assure that the output of either light is not blocked by the other; and
 - (iv) for wind turbines from 150m (one hundred and fifty meters) to 315m (three hundred and fifteen meters) in overall height, an intermediate level at half the nacelle height of at least three low-intensity Type E lights, as specified in Regulation 179(3), shall be provided; and
 - (v) where an aeronautical study shows that low-intensity Type E lights are not suitable, low-intensity Type A or B lights may be used.
- (3) The obstacle lights shall be installed on the nacelle in such a manner as to provide an unobstructed view for aircraft approaching from any direction.
- (4) Where lighting is deemed necessary for a single wind turbine or short line of wind turbines, the installation shall be in accordance with Regulation 179(2)(e) or as determined by an aeronautical study.

180. Marking and Lighting of Overhead Wires, Cables, and the likes Supporting Towers

- (1) The wires, cables and the like to be marked shall be equipped with markers and the supporting tower coloured.
- (2) The supporting towers of overhead wires, cables and the like that require marking shall be marked in accordance with Regulation 178 (1) and (2),
- (3) Notwithstanding sub-regulation (2) above, the marking of the supporting towers may be omitted when they are lighted by high- intensity obstacle lights by day.
- (4) Marking by markers shall:

- (a) where displayed on or adjacent to objects, be located in conspicuous positions so as to retain the general definition of the object and shall be recognizable in clear weather from a distance of at least 1000m (one thousand meters) for an object to be viewed from the air and 300m (three hundred meters) for an object to be viewed from the ground in all directions in which an aircraft is likely to approach the object.
 - (b) where displayed on an overhead wire, cable and the like be spherical and have a diameter of not less than 60cm (sixty centimeters);
 - (c) be of one colour; and
 - (d) when installed, white and red, or white and orange be displayed alternately.
- (5) High-intensity obstacle lights, Type B, shall be provided on their supporting towers of an overhead wire, cable and the like when it is determined that they need to be marked and it is not practicable to install markers
- (6) The shape of markers shall be distinctive to the extent necessary to ensure that they are not mistaken for markers employed to convey other information, and they shall be such that the hazard presented by the object they mark is not increased;
- (7) Pursuant to sub-regulation (4)(d) above, the colour selected shall contrast with the background against which it will be seen;
- (8) The spacing between 2 (two) consecutive markers or between a marker and a supporting tower shall be appropriate to the diameter of the marker, and in no case shall the spacing exceed:
- (a) 30m (thirty meters) where the marker diameter is 60cm (sixty centimeters) progressively increasing with the diameter of the marker;
 - (b) 35m (thirty-five meters) where the marker diameter is 80cm (eighty centimeters) and further progressively increasing to a maximum; and
 - (c) 40m (forty meters) where the marker diameter is of at least 130cm (one hundred and thirty centimeters).
- (9) Where multiple wires, cables and the like are involved, a marker shall be located not lower than the level of the highest wire at the point marked.
- (10) High-intensity obstacle lights, Type B, shall be used to indicate the presence of a tower supporting overhead wires, cables and the like where:
- (a) an aeronautical study indicates such lights to be essential for the recognition of the presence of wires, cables and the like, or
 - (b) it has not been found practicable to install markers on the wires, cables and the like.

(11) Where high-intensity obstacle lights, Type B, are used, they shall be located at three levels:

- (a) at the top of the tower;
- (b) at the lowest level of the catenary of the wires, cables and the like; and
- (c) at approximately midway between these two levels.

(12) High-intensity obstacle lights, Type B, indicating the presence of a tower supporting overhead wires, cables and the like, shall flash sequentially as follows;

- (a) the middle light;
- (b) the top light; and
- (c) the bottom light.

(13) The intervals between flashes of the lights should approximate the ratios as specified in Schedule 2.52:

(14) Where, in the opinion of the Authority, the use of high-intensity obstacle lights, Type B, at night may dazzle pilots in the vicinity of an aerodrome, or within approximately 10000m (ten thousand meters) radius or cause significant environmental concerns, a dual obstacle lighting system shall be provided.

(15) This system referred to in sub-regulation (14) above, shall be composed of high-intensity obstacle lights, Type B, for daytime and twilight use and medium-intensity obstacle lights, Type B, for night-time use.

(16) Where medium-intensity lights are used they shall be installed at the same level as the high-intensity obstacle light Type B.

(17) The installation setting angles for high-intensity obstacle lights, Type B, shall be in accordance with Schedule 2.53.

PART XVI VISUAL AIDS FOR DENOTING RESTRICTED USE AREAS

181. Closed Runways and Taxiways, or Parts Thereof

(1) An aerodrome operator shall ensure that a closed marking is displayed on a:

- (a) runway or taxiway or portion thereof which is permanently closed to the use of all aircraft; and
- (b) temporarily closed runway or taxiway or portion thereof, except that such marking may be omitted when the closing is of short duration and adequate warning by air traffic services is provided.

(2) A closed marking shall:

- (a) on a runway, be placed at each end of the runway, or portion thereof, declared closed, and additional markings shall be so placed that the maximum interval between markings does not exceed 300m (three hundred meters);
- (b) on a taxiway be placed at least at each end of the taxiway or portion thereof closed;
- (c) be of the form and proportions as detailed in Schedule 2.54, Illustration a), when displayed on a runway;
- (d) be of the form and proportions as detailed in Schedule 2.54, Illustration b), when displayed on a taxiway;
- (e) be white when displayed on a runway and yellow when displayed on a taxiway;

(3) Where an area is temporarily closed, frangible barriers or markings utilizing materials other than paint or other suitable means may be used to identify the closed area;

(4) Where a runway or taxiway or portion thereof is permanently closed, all normal runway and taxiway markings shall be obliterated.

(5) Lighting on a closed runway or taxiway or portion thereof shall not be operated, except as required for maintenance purposes.

(6) Where closed markings, when the runway or taxiway or portion thereof closed is intercepted by a usable runway or taxiway which is used at night, unserviceability lights shall be placed across the entrance to the closed area at intervals not exceeding 3m (three meters).

182. Non-Load-Bearing Surfaces

(1) An aerodrome operator shall ensure that shoulders for taxiways, runway turn pads, holding bays and aprons and other non-load-bearing surfaces which cannot readily be distinguished from load-bearing surfaces and which, if used by aircraft, might result in damage to the aircraft, have the boundary between such areas and the load-bearing surface marked by a taxi side stripe marking.

(2) A taxi side stripe marking shall be placed along the edge of the load-bearing pavement, with the outer edge of the marking approximately on the edge of the load-bearing pavement

(3) The markings referred to in sub-regulation (2) above, shall consist of a pair of solid lines, each 15cm (fifteen centimeters) wide and spaced 15cm (fifteen centimeters) apart and the same colour as the taxiway centre line marking.

183. Pre-Threshold Area

(1) An aerodrome operator shall ensure that when the surface before a threshold is paved and exceeds 60m (sixty meters) in length and is not suitable for normal use by aircraft, the entire length before the threshold shall be marked with a chevron marking.

(2) A chevron marking shall:

- (a) point in the direction of the runway and be placed as shown in Schedule 2.55;
- (b) be of conspicuous colour and contrast with the colour used for the runway markings; and
- (c) preferably be yellow and have an overall width of at least 0.9m (nine tenth meters).

184. Unserviceable Areas

(1) An aerodrome operator shall ensure that unserviceability markers are displayed wherever any portion of a taxiway, apron or holding bay is unfit for the movement of aircraft but it is still possible for aircraft to bypass the area safely.

(2) Unserviceability lights shall be used on a movement area used at night,.

(3) Unserviceability markers shall:

- (a) be placed at intervals sufficiently close so as to delineate the unserviceable area; and
- (b) consist of conspicuous upstanding devices such as flags, cones or marker boards;

(4) Unserviceability lights shall:

- (a) be placed at intervals sufficiently close so as to delineate the unserviceable area;
- (b) consist of a red fixed light; and

have an intensity sufficient to ensure conspicuity considering the intensity of the adjacent lights and the general level of illumination against which it would normally be viewed,

(5) The intensity referred to in sub-regulation (4)(c) above shall not be less than 10cd (ten candelas) of red light.

(6) An unserviceability cone shall be at least 0.5m (half a meter) in height and red, orange or yellow or any one of these colours in combination with white.

(7) An unserviceability flag shall be at least 0.5m (half a meter) square and red, orange or yellow or any one of these colours in combination with white.

(8) An unserviceability marker board shall be at least 0.5m (half a meter) in height and 0.9m (nine tenths meters) in length, with alternate red and white or orange and white vertical stripes.

PART XVII ELECTRICAL SYSTEMS

185. Electrical Power Supply Systems for Air Navigation Facilities

(1) An aerodrome operator shall ensure that:

- (a) adequate primary power supply is available at aerodromes for the safe functioning of air navigation facilities;
- (b) the design and provision of electrical power systems for aerodrome visual and radio navigation aids is such that an equipment failure will not leave the pilot with inadequate visual and non-visual guidance or misleading information;
- (c) electric power supply connections to those facilities for which secondary power is required is so arranged that the facilities are automatically connected to the secondary power supply on failure of the primary source of power;
- (d) the time interval between failure of the primary source of power and the complete restoration of the services required Regulation 186(1)(e) is as short as practicable, except that for visual aids associated with non-precision, precision approach or take-off runways the requirements of Schedule 2.56 for maximum switch-over times shall apply;

(2) For secondary power supplies, the electric power supply connections to those facilities for which secondary power is required shall be so arranged that the facilities are capable of meeting the requirements Schedule 2.56 for maximum switch-over times.

186. Visual Aids for Electrical Systems

(1) An aerodrome operator shall ensure that:

- (a) for a precision approach runway, a secondary power supply capable of meeting the requirements of Schedule 2.56 for the appropriate category of precision approach runway shall be provided;
- (b) electric power supply connections to those facilities for which secondary power is required are so arranged that the facilities are automatically

connected to the secondary power supply on failure of the primary source of power;

- (c) for a runway meant for take-off in runway visual range conditions less than a value of 800m (eight hundred meters), A secondary power supply capable of meeting the relevant requirements of Schedule 2.56 shall be provided;
 - (d) at an aerodrome where the primary runway is a non-precision approach runway, a secondary power supply capable of meeting the requirements of Schedule 2.56 shall be provided except that a secondary power supply for visual aids need not be provided for more than one non-precision approach runway;
 - (e) at an aerodrome where the primary runway is a non-instrument runway, a secondary power supply capable of meeting the requirements of Regulation 185(1)(d) shall be provided, except that a secondary power supply for visual aids need not be provided when an emergency lighting system in accordance with the specification of Regulation 133 is provided and capable of being deployed in 15 (fifteen) minutes.
 - (f) the following aerodrome facilities shall be provided with a secondary power supply capable of supplying power when there is a failure of the primary power supply:
 - (i) the signalling lamp and the minimum lighting necessary to enable air traffic services personnel to carry out their duties;
 - (ii) all obstacle lights which, in the opinion of the appropriate authority, are essential to ensure the safe operation of aircraft;
 - (iii) approach, runway and taxiway lighting as specified in Regulation 186(1)(a) to (d) meteorological equipment;
 - (iv) essential security lighting, if provided in accordance with Regulation 194(6);
 - (v) essential equipment and facilities for the aerodrome responding emergency agencies;
 - (vi) floodlighting on a designated isolated aircraft parking position if provided in accordance with Regulation 154(1); and
 - (vii) illumination of apron areas over which passengers may walk.
- (2) Requirements for a secondary power supply shall be met by either of the following:

- (a) independent public power, which is a source of power supplying the aerodrome service from a substation other than the normal substation through a transmission line following a route different from the normal power supply route and such that the possibility of a simultaneous failure of the normal and independent public power supplies is extremely remote; or
- (b) standby power units, which are engine generators, batteries and the like from which electric power can be obtained.

187. System Design

An aerodrome operator shall ensure that:

- (a) for a runway meant for use in runway visual range conditions less than a value of 550m (five hundred and fifty meters), the electrical systems for the power supply, lighting and control of the lighting systems included in Schedule 2.56 shall be so designed that an equipment failure will not leave the pilot with inadequate visual guidance or misleading information;
- (b) where the secondary power supply of an aerodrome is provided by the use of duplicate feeders, such supplies shall be physically and electrically separate so as to ensure the required level of availability and independence;
- (c) where a runway forming part of a standard taxi-route is provided with runway lighting and taxiway lighting, the lighting systems shall be interlocked to preclude the possibility of simultaneous operation of both forms of lighting.

188. Monitoring

(1) An aerodrome operator shall ensure that:

- (a) a system of monitoring is employed to indicate the operational status of the lighting systems;
- (b) where lighting systems are used for aircraft control purposes, such systems shall be monitored automatically so as to provide an indication of any fault which may affect the control functions;
- (c) where a change in the operational status of lights has occurred, an indication shall be provided within two seconds for a stop bar at a runway-holding position and within five seconds for all other types of visual aids;
- (d) for a runway meant for use in runway visual range conditions less than a value of 550m (five hundred and fifty meters), the lighting systems detailed in Schedule 2.56 shall be monitored automatically so as to provide an indication when the serviceability level of any element falls below the minimum serviceability level specified in Regulation 202(6) to (11); as appropriate.

(e) for a runway meant for use in runway visual range conditions less than a value of 550m (five hundred and fifty meters), the lighting systems detailed in Schedule 2.56 shall be monitored automatically to provide an indication when the serviceability level of any element falls below the minimum level specified by the appropriate authority below which operations shall not continue.

(2). The information referred to in paragraph (b) shall be automatically relayed to the air traffic services unit.

(3) The information referred to in paragraph (d) shall be automatically relayed to the maintenance crew.

(4) The information referred to in paragraph (e) shall be automatically relayed to the air traffic services unit and displayed in a prominent position

PART XVIII AERODROME OPERATIONAL SERVICES, EQUIPMENT AND INSTALLATIONS

189. Apron Management Service

(1) An appropriate apron management service shall be provided on an apron by an aerodrome ATS unit, by another aerodrome operating agency, or by a cooperative combination of these when warranted by the volume of traffic and operating conditions,, in order to:

- (a) regulate movement with the objective of preventing collisions between aircraft, and between aircraft and obstacles;
- (b) regulate entry of aircraft into, and coordinate exit of aircraft from, the apron with the aerodrome control tower; and
- (c) ensure safe and expeditious movement of vehicles and appropriate directive of other activities.

(2) When the aerodrome control tower does not participate in the apron management service, procedures shall be established to facilitate the orderly transition of aircraft between the apron management unit and the aerodrome control tower.

(3) An apron management service shall be provided with radiotelephony communications facilities.

(4) Where low visibility procedures are in effect, persons and vehicles operating on an apron shall be restricted to the essential minimum.

(5) An emergency vehicle responding to an emergency shall be given priority over all other surface movement traffic.

(6) A vehicle operating on an apron shall:

- (a) give way to an emergency vehicle; an aircraft taxiing, about to taxi, or being pushed or towed; and
- (b) give way to other vehicles in accordance with local Directives.

(7) An aircraft stand shall be visually monitored to ensure that the recommended clearance distances are provided to an aircraft using the stand.

190. Handling and Storage of Aviation Fuel and Ground Servicing of Aircraft

(1) An aerodrome operator shall maintain standards authorized by the Authority for protecting against fire and explosions in storing, dispensing, and otherwise handling fuel on the aerodrome.

(2) The standards referred to in sub-regulation (1) shall cover facilities, procedures, and personnel training and shall address at least the following -

- (a) bonding;
- (b) public protection;
- (c) control of access to storage areas;
- (d) fire safety in fuel farm and storage areas;
- (e) fire safety in mobile fuellers, fuelling pits, and fuelling cabinets;
- (f) training of fuelling personnel in fire safety in accordance with sub-regulation (5); and
- (g) the fire code of the public body having jurisdiction over the aerodrome.

(3) An aerodrome operator shall-

- (a) require all fuelling agents operating on the aerodrome to comply with, the standards established under sub-regulation (1) and (2) above;
- (b) perform reasonable surveillance of all fuelling activities on the aerodrome with respect to those standards;
- (c) inspect the physical facilities of each aerodrome tenant fuelling agent at least once every 3 (three) consecutive months for compliance with sub-regulation (1) and (2) above and maintain a record of that inspection for at least 12 (twelve) consecutive calendar months;
- (d) provide fire extinguishing equipment suitable for at least initial intervention in the event of fuel fire and personnel trained in its use shall be readily available during the ground servicing of an aircraft; and

- (e) have a means of quickly summoning the rescue and fire-fighting service in the event of a fire or major fuel spill.
- (4) During aircraft refuelling operations while passengers are embarking on board or disembarking, ground equipment shall be positioned so as to allow-
 - (a) the use of a sufficient number of aircraft exits for expeditious evacuation; and
 - (b) a ready escape route from each of the exits to be used in an emergency.
- (5) The training required in sub-regulation (2)(f) shall include at least the following-
 - (a) at least one supervisor with each fuelling agent shall have completed an aviation fuel training course in fire safety that is authorized by the Authority and such individuals shall be trained prior to initial performance of duties;
 - (b) enrolled in an authorized aviation fuel training course that should be completed within 90 (ninety) days of initiating duties, and receive recurrent instruction at least every 24 (twenty-four) consecutive calendar months; and
 - (c) all other employees who fuel aircraft, accept fuel shipments, or otherwise handle fuel shall receive at least initial on-the-job training and recurrent instruction every 24 (twenty-four) consecutive calendar months in fire safety from the supervisor trained in accordance with paragraph (a) or (b).
- (6) An aerodrome operator shall obtain a written confirmation every 12 (twelve) consecutive calendar months from each fuelling agent that the training required by sub-regulation (5) has been accomplished.
- (7) This written confirmation shall be maintained for 12 (twelve) consecutive calendar months and when requested, made available to the Authority for inspection.
- (8) Unless otherwise authorised by the Authority, an aerodrome operator shall require each fuelling agent to take immediate corrective action whenever the aerodrome operator becomes aware of non-compliance with a standard required by sub-regulation (3).
- (9) The aerodrome operator shall notify the Authority immediately when non-compliance is discovered.

191. Aerodrome Vehicle Operations

- (1) An aerodrome operator shall ensure that roads located on the movement area of the aerodrome are restricted for the exclusive use of aerodrome personnel and other authorised personnel.

- (2) An aerodrome operator shall ensure that a vehicle is operated:
- (a) on a manoeuvring area only as authorized by the aerodrome control tower; and
 - (b) on an apron only as authorized by the appropriate designated authority.
- (3) A driver of a vehicle on the movement area on any aerodrome shall comply with all mandatory instructions conveyed by markings and signs unless otherwise authorized by:
- (a) the aerodrome control tower when on the manoeuvring area; or
 - (b) the appropriate designated authority when on the apron.
- (4) A driver of a vehicle on the movement area on any aerodrome shall comply with all mandatory instructions conveyed by lights.
- (5) A driver of a vehicle on the movement area of an aerodrome shall be appropriately trained for the tasks to be performed and shall comply with the instructions issued by:
- (a) the aerodrome control tower, when on the manoeuvring area; and
 - (b) the appropriate designated authority, when on the apron.
- (6) A driver of a radio-equipped vehicle shall establish satisfactory two-way radio communication with the aerodrome control tower before entering the manoeuvring area and with the appropriate designated authority before entering the apron.
- (7) The driver referred to in sub-regulation (6) shall maintain a continuous listening watch on the assigned frequency when on the movement area.

192. Surface Movement and Guidance Control Systems

- (1) An aerodrome operator shall provide a surface movement guidance and control system at an aerodrome to assist in the prevention of inadvertent incursions of aircraft and vehicles onto an active runway and to assist in the prevention of collisions between aircraft, and between aircraft and vehicles or objects, on any part of the Movement Area.
- (2) The design of a SMGCS shall take into account:
- (a) the density of air traffic;
 - (b) the visibility conditions under which operations are intended;
 - (c) the need for pilot orientation;
 - (d) the complexity of the aerodrome layout; and

(e) movements of vehicles.

(3) The visual aid components of a SMGCS, including the markings, lights and signs shall be designed to conform with the relevant specifications specified in these Regulations.

(4) Where a SMGCS is provided by selective switching of stop bars and taxiway centreline lights, the following requirements shall be met:

- (a) taxiway routes which are indicated by illuminated taxiway centreline lights shall be capable of being terminated by an illuminated stop bar;
- (b) the control circuits shall be so arranged that when a stop bar located ahead of an aircraft is illuminated, the appropriate section of taxiway centreline lights beyond it is suppressed; and
- (c) the taxiway centreline lights are activated ahead of an aircraft when the stop bar is suppressed.

(5) An aerodrome operator shall provide surface movement radar for the manoeuvring area of an aerodrome –

- (a) intended for use in RVR conditions less than a value of 350m (three hundred and fifty meters);
- (b) when traffic density and operating conditions are such that regularity of traffic flow cannot be maintained by alternative procedures and facilities; or
- (c) in the absence of visual observation of all or part of the manoeuvring area from an aerodrome control tower.

(6) An aerodrome operator shall ensure that human factors principles and human-machine interface issues are taken into account with design and implementation of a SMGCS.

(7) An aerodrome operator shall establish fall-back procedures to address failures of essential components of the SMGCS.

193. Siting of Equipment and Installations on Operational Areas

(1) An aerodrome operator shall ensure that, unless its function requires it to be there for air navigation or for aircraft safety purposes, no equipment or installation is:

- (a) on a runway strip, a Runway End Safety Area, a taxiway strip or within the distances specified in Schedule 2.7, Column 11, if it would endanger an aircraft; or
- (b) on a clearway if it would endanger an aircraft in the air.

(2) An aerodrome operator shall ensure that, any equipment or installation required for air navigation or for aircraft safety purposes is fragile and mounted as low as possible if it is located:

- (a) on that portion of a runway strip within:
 - (i) 75m (seventy-five meters) of the runway centre line where the Code Number is 3 (three) or 4 (four); or
 - (ii) 45m (forty-five meters) of the runway centre line where the Code Number is 1 (one) or 2 (two) ; or
- (b) on a Runway End Safety Area, a taxiway strip or within the distances specified in Schedule 2.7; or
- (c) on a clearway and which would endanger an aircraft in the air.

(3) An aerodrome operator shall regard any equipment or installation required for air navigation or for aircraft safety purposes which must be located on the non-graded portion of a runway strip as an obstacle and shall ensure it is frangible and mounted as low as possible.

(4) An aerodrome operator shall ensure, unless its function requires it to be there for air navigation purposes or for aircraft safety, no equipment or installation is located within 240m (two hundred and forty meters) from the end of the strip and within-

- (a) 60m (sixty meters) of the extended centre line where the Code Number is 3 (three) or 4 (four); or

45m (forty-five meters) of the extended centre line where the Code Number is 1 (one) or 2 (two) of a Precision Approach Runway Category I, II or III.

(5) An aerodrome operator shall ensure any equipment or installation required for air navigation or for aircraft safety purposes which must be located on or near a strip of a Precision Approach Runway Category I, II or III and which:

- (a) is situated on that portion of the strip within 77.5 m (seventy-seven and a half meters) of the runway centreline where the Code Number is 4 (four) and the Code Letter is F; or
- (b) is situated within 240m (two hundred and forty meters) from the end of the strip and within:
 - (i) 60m (sixty meters) of the extended runway centreline where the Code Number is 3 (three) or 4 (four); or
 - (ii) 45m (forty-five meters) of the extended runway centreline where the Code Number is 1 (one) or 2 (two); or

- (c) penetrates the Inner Approach Surface, the Inner Transitional Surface or the Balked Landing Surface;

shall be frangible and mounted as low as possible.

(6) An aerodrome operator shall ensure any equipment or installation required for air navigation purposes or for aircraft safety purposes which is an obstacle penetrating the conical, inner horizontal, approach slope more than 3000m (three hundred meters) from the inner edge, or take-off surface, shall be frangible and mounted as low as possible.

194. Fencing and Security Lighting

(1) An aerodrome operator shall provide a fence or other suitable barrier on an aerodrome to prevent the entrance to the movement area of animals large enough to be a hazard to aircraft, and to deter the inadvertent or premeditated access of an unauthorised person onto a non-public area of the aerodrome.

(2) An aerodrome operator shall ensure the fence or barrier is located so as to separate the movement area and other facilities or zones on the aerodrome vital to the safe operation of aircraft from areas open to public access.

(3) An aerodrome operator shall, when deemed necessary by the Authority, provide a cleared area on both sides of the fence or barrier to facilitate the work of patrols and to make trespassing more difficult.

(4) An aerodrome operator shall, when deemed necessary, provide a perimeter road inside the aerodrome fencing for the use of both maintenance personnel and security patrols.

(5) An aerodrome operator shall provide suitable means of protection to deter the inadvertent or premeditated access of unauthorised persons into ground installations and facilities essential for the safety of civil aviation located off the aerodrome.

(6) An aerodrome operator shall, when requested by the Authority or when deemed desirable for security reasons, provide illumination for fences and barriers at least a minimum essential level.

(7) The illumination referred to in sub-regulation (6) shall ensure the ground area on both sides of the fence or barrier, particularly at access points, are illuminated.

PART XIX AERODROME MAINTENANCE

195. Aerodrome Maintenance Programme

(1) An Aerodrome Operator shall establish and implement a maintenance programme, including preventative maintenance, to maintain the aerodrome facilities, such as pavements, visual aids, fencing, drainage, electrical systems and buildings,

in a condition that does not impair the safety, security, regularity or efficiency of air navigation.

(2) An Aerodrome Operator shall ensure that the design and application of the maintenance programme observe human factors principles and that all maintenance records are documented, including information on and construction of aircraft pavements and aerodrome lighting.

(3) The documentation referred to in sub-regulation (2) shall be in a system that allows for easy retrieval.

196. Runway and Movement Area Inspections

(1) An aerodrome operator shall ensure that inspections of the Movement Area are carried out each day at least twice to assess its operational status and when there is a potential for an increase in FOD, the inspection rate shall be increased.

(2) An aerodrome operator shall increase the minimum number of inspections by one where Aerodrome Traffic Density is considered to be Medium or Heavy.

(3) An aerodrome operator shall inspect an aerodrome, as the circumstances require, to ensure aviation safety:

- (a) as soon as practicable, after any Aircraft Accident or Incident;
- (b) during any period of construction or repair of the aerodrome facilities or equipment that is critical to the safety of aircraft operation;
- (c) after any period of adverse weather; or
- (d) at any other time when there are conditions at the aerodrome that could affect aviation safety.

197. Foreign Object Debris

(1) An Aerodrome Operator shall develop and implement specific procedures for the elimination of the risk of FOD and further ensure that any third party on the aerodrome can demonstrate a satisfactory level of FOD awareness and that their working procedures do not increase the likelihood of FOD.

(2) All Aerodrome and aircraft operators, maintenance and ground handling organisations shall include FOD prevention in their induction and continuation training programmes, for all airside, maintenance and hangar staff.

198. Pavement Maintenance Programme

(1) An Aerodrome Operator shall ensure that surfaces of all Movement Areas including pavements, runways, taxiways, aprons and adjacent areas are inspected and their condition monitored regularly as part of an aerodrome preventive and

corrective maintenance programme with the objective of avoiding and eliminating any foreign object debris that might cause damage to aircraft or impair the operation of aircraft systems.

(2) An aerodrome operator shall maintain the surface of a runway in a condition such as to prevent formation of harmful irregularities and where a taxiway is used by jet turbine powered aeroplanes, the surface of the taxiway shoulders shall be maintained so as to be free of any loose stones or other objects that could be ingested by the aeroplane engines.

199. Pavement Surface Inspections

(1) An aerodrome operator shall maintain all paved runways in a condition so as to provide surface friction characteristics at or above the minimum friction level specified by the Authority.

(2) An aerodrome operator shall periodically measure runway surface friction characteristics for maintenance purpose with a continuous friction measuring device using self-wetting features and documented.

(3) The frequency of these measurements referred to in sub-regulation (2) shall be sufficient to determine the trend of the surface friction characteristics of the runway.

(4) An aerodrome operator shall ensure that when runway surface friction measurements are made for maintenance purposes using a self-wetting continuous friction measuring device, the performance of the device shall meet the standard set or agreed by the Authority and also ensure that personnel measuring runway surface friction are trained to fulfil their duties.

(5) An aerodrome operator shall take corrective maintenance action to prevent the runway surface friction characteristics for either the entire runway or a portion thereof from falling below minimum friction level.

(6) An aerodrome operator shall, when there is reason to believe that the drainage characteristics of a runway or portions thereof are poor due to slopes or depressions, visually assess, as necessary, under natural or simulated rain conditions for ponding or poor drainage and where required, take corrective maintenance actions.

200. Removal of Contaminants

(1) An aerodrome operator shall remove standing water, mud, dust, sand, oil, rubber deposits and other contaminants from the surface of runways in use as rapidly and completely as possible to minimise accumulation.

(2) An aerodrome operator shall keep taxiways and aprons clear of contaminants to the extent necessary to enable aircraft to be taxied to and from an operational runway, to manoeuvre safely or, where appropriate, to be towed or pushed.

(3) Whenever the clearance of contaminants from the various parts of the Movement Area cannot be carried out simultaneously, the order of priority after the runway in use shall be set in consultation with the affected parties, such as rescue and firefighting service, and documented.

(4) An aerodrome operator shall not use chemicals to remove or prevent contaminants when such chemicals may have harmful effects on aircraft, pavements or toxic effects on the aerodrome environment.

201. Runway Pavement Overlays

(1) An aerodrome operator shall, during runway pavement overlays, ensure that the longitudinal slope of a temporary ramp, measured with reference to the existing runway surface or previous overlay course, is:

- (a) 0.5-1.0% (half to one per cent) for overlays up to and including 5cm (five centimeters) in thickness; and
- (b) not more than 0.5% (half per cent) for overlays more than 5cm (five centimeters) in thickness.

(2) An aerodrome operator shall ensure that:

- (a) overlaying proceeds from one end of the runway toward the other end so that based on runway utilization most aircraft operations will experience a down ramp; and
- (b) the entire width of the runway is overlaid during each work session.

(3) Prior to returning a runway being overlaid to a temporary operational status, an aerodrome operator shall ensure that a runway centre line marking conforming to the specifications in Regulation 117 is provided and the location of any temporary threshold is also identified by a 3.6m (three and six tenth meters) wide transverse stripe.

(4) An aerodrome operator shall ensure that overlays are constructed and maintained above the minimum friction level.

202. Maintenance of Visual Aids

(1) An aerodrome operator shall deem a light as unserviceable when the main beam average intensity is less than 50% (fifty per cent) of the value specified in the appropriate figure in Schedule 4, and for light units where the designed main beam average intensity is above the value shown in Schedule 4, the 50% (fifty per cent) value shall be related to that design value.

(2) An aerodrome operator shall employ a system of preventive maintenance of visual aids that ensure lighting and marking system reliability.

(3) An aerodrome operator shall employ a system of preventive maintenance for a precision approach runway Category II or III that include at least the following checks:

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

(4) An aerodrome operator shall ensure that measurement of intensity, beam spread and orientation of lights included in approach and runway lighting systems for a precision approach runway Category II or III:

- (a) conforms with the applicable specification of Schedule 4, by measuring all lights as far as practicable; and
- (b) is undertaken using a mobile measuring unit of sufficient accuracy to analyse the characteristics of the individual lights.

(5) An aerodrome operator shall ensure that the frequency of measurement of lights for a precision approach runway category II or III is based on:

- (a) traffic density;
- (b) the local pollution level;
- (c) the reliability of the installed lighting equipment; and
- (d) the continuous assessment of the results of the in-field measurements

(6) Pursuant to sub-regulation (5) above, the frequency shall not be less than twice a year for in-pavement lights and not less than once a year for other lights.

(7) An aerodrome operator shall employ a system of preventive maintenance for a precision approach runway category II or III, which ensures that, during any period of category II or III operations, all approach and runway lights are serviceable, and that in any event at least:

- (a) 95% (ninety-five per cent) of the lights are serviceable in each of the following particular significant elements:
 - (i) precision approach category II and III lighting system, the inner 450m (four hundred and fifty meters);
 - (ii) runway centre line lights;

- (iii) runway threshold lights; and
 - (iv) runway edge lights;
 - (b) 90% (ninety per cent) of the lights are serviceable in the Touchdown Zone lights;
 - (c) 85% (eighty-five per cent) of the lights are serviceable in the approach lighting system beyond 450m (four hundred and fifty meters); and
 - (d) 75% (seventy-five per cent) of the lights are serviceable in the runway end lights.
- (8) An aerodrome operator shall ensure continuity of guidance is provided by not permitting the allowable percentage of unserviceable lights to be in such a way as to alter the basic pattern of the lighting system.
- (9) An aerodrome operator shall ensure an unserviceable light is not permitted adjacent to another unserviceable light, except in a barrette or a crossbar where two adjacent unserviceable lights may be permitted.
- (10) An aerodrome operator shall employ a system of preventive maintenance, for a stop bar provided at a runway-holding position used in conjunction with a runway intended for operations in RVR conditions less than a value of 350m (three hundred and fifty meters), having the following objectives:
- (a) no more than two lights will remain unserviceable; and
 - (b) two adjacent lights will not remain unserviceable unless the light spacing is significantly less than that specified.
- (11) An aerodrome operator shall employ a system of preventive maintenance for a taxiway intended for use in RVR conditions less than a value of 350m (three hundred and fifty meters), to ensure that no two adjacent taxiway centre line lights be unserviceable.
- (12) An aerodrome operator shall employ a system of preventive maintenance for a precision approach runway Category I, which ensures that, during any period of category I operations, all approach and runway lights are serviceable, and that in any event at least 85% (eighty-five per cent) of the lights are serviceable in each of the following:
- (a) precision approach category I lighting system;
 - (b) runway threshold lights;
 - (c) runway edge lights; and
 - (d) runway end lights.

and ensure continuity of guidance is provided by not permitting an unserviceable light to be located adjacent to another unserviceable light unless the light spacing is significantly less than that specified.

(13) An aerodrome operator shall employ a system of preventive maintenance, for a runway meant for take-off in RVR conditions less than a value of 550m (five hundred and fifty meters), which ensures that, during any period of operations, all runway lights are serviceable and that in any event:

- (a) at least 95% (ninety-five per cent) of the lights are serviceable in the runway centre line lights, where provided, and in the runway edge lights; and
- (b) at least 75% (seventy-five per cent) of the lights are serviceable in the runway end lights.

(14) An aerodrome operator shall employ a system of preventive maintenance for a runway meant for take-off in RVR conditions of a value of 550m (five hundred and fifty meters), or greater, which ensures that, during any period of operations, all runway lights are serviceable and that, in any event, at least 85% (eighty-five per cent) of the lights are serviceable in the runway edge lights and runway end lights.

(15) An aerodrome operator shall ensure continuity of guidance is provided by not permitting an unserviceable light to be located adjacent to another unserviceable light.

(16) During low visibility procedures, an aerodrome operator shall restrict construction or maintenance activities in the proximity of aerodrome electrical systems.

PART XX AERODROME EMERGENCY PLANNING AND RESPONSE

203. Aerodrome Emergency Plan

(1) An aerodrome operator shall develop and maintain an aerodrome emergency plan commensurate with the aircraft operations and other activities conducted at the aerodrome and the plan shall -

- (a) the emergencies that can reasonably be expected to occur at the aerodrome or in its vicinity and that could be a threat to the safety of persons or to the operation of the aerodrome;
- (b) coordinate the response or the participation of all existing agencies, which in the opinion of the appropriate authority, could be of assistance in responding to an emergency;

- (c) the cooperation and coordination with the rescue coordination centre, as necessary;
 - (d) the measures to activate the emergency plan for each type of emergency;
 - (e) the community organisations and existing agencies capable of providing assistance in an emergency; and
 - (f) any additional resources available at the aerodrome and in the surrounding area.
- (2) An aerodrome operator shall consult with representatives of air operators that use the aerodrome and with community organizations that may be of assistance during emergency operations at the aerodrome or in its vicinity in developing the emergency plan under sub-regulation (1).
- (3) An aerodrome operator shall establish a degree of supervision and control sufficient to manage the size and complexity of an emergency.
- (4) An aerodrome operator shall maintain at the aerodrome, in the format of a manual, a copy of an updated version of the emergency plan; and provide a copy to the Authority.
- (5) An aerodrome operator shall-
- (a) update the emergency plan as necessary to ensure its effectiveness in emergency operations; and
 - (b) review the plan and make any required updates at least once a year after consultation with a representative sample of the air operators that use the aerodrome and the community organizations identified in the plan.

204. Contents of Aerodrome Emergency Plan

- (1) An aerodrome operator's emergency plan shall, at a minimum,-
- (a) identify the types of potential emergencies planned for, including:
 - (i) an aircraft accident or incident within the aerodrome boundaries and within a critical rescue and fire-fighting access area that extends 1000m (one thousand meters) beyond the ends of a runway and 150m (one hundred and fifty meters) at 90° (ninety degrees) outwards from the centreline of the runway including any part of that area outside the aerodrome boundaries;
 - (ii) an aircraft emergency declared by either air traffic services or a pilot;
 - (iii) a fuel spill that spreads at least 1.5m (one and a half meters) in any direction or exceeds 12mm (twelve millimeters) in depth;

- (iv) a medical emergency;
 - (v) a fire in which aerodrome operations or passenger safety is threatened;
 - (vi) an emergency that is related to a special aviation event and that might have an impact on aerodrome operations;
 - (vii) a natural disaster; and
 - (viii) any other emergency that is a threat or is likely to be a threat to the safety of persons or to the operation of the aerodrome.
- (b) Identify the agencies, at the aerodrome and the community organisations, that are involved in the plan and capable of providing assistance during an emergency at an aerodrome or in its vicinity
 - (c) provide the telephone numbers and other contact information for each organisation and describe the type of assistance each can provide.
 - (d) identify the responsibility and role of each agency, the emergency operations centre and the command post, for each type of emergency;
 - (e) provide information on names and telephone numbers of offices or people to be contacted in the case of a particular emergency
 - (f) identify the other resources available at the aerodrome and in the surrounding communities for use during emergency response or recovery operations and provide their telephone numbers and other contact information.
 - (g) describe for emergency situations, the lines of authority and the relationships between the organisations identified in the emergency plan and describe how actions will be coordinated among all and within each of the organisations.
 - (h) identify for emergency situations, the supervisors and describe the responsibilities of each.
 - (i) specify the positions occupied by the aerodrome personnel who will respond to an emergency and describe the specific emergency response duties of each.
 - (j) identify the on-scene commander and describe the commander's emergency response duties.
 - (k) provide Authorisation for a person to act as an on-scene commander or a supervisor if they are not aerodrome personnel.

- (l) set out the criteria to be used for positioning the on-scene commander within visual range of an emergency scene.
- (m) set out the measures to be taken to make the on-scene commander easily identifiable at all times by all persons responding to an emergency.
- (n) where initial on-scene control has been assumed by a person from a responding organisation, describe the procedure for transferring control to the on-scene commander.
- (o) describe any training and qualifications required for the on-scene commander and the aerodrome personnel identified in the emergency plan.
- (p) describe the method for recording any training provided to the on-scene commander and aerodrome personnel.
- (q) describe the communication procedures and specify the radio frequencies to be used to link the operator of the aerodrome with-
 - (i) the on-scene commander; and
 - (ii) the providers of ground traffic control services, where applicable, and air traffic control services or any other flight information unit at the aerodrome.
- (r) describe the communication procedures allowing the on-scene commander to communicate with the organisations identified in the emergency plan.
- (s) identify the alerting procedures that-
 - (i) activate the emergency plan;
 - (ii) establish the necessary level of response;
 - (iii) allow immediate communication with the organisations identified in the emergency plan in accordance with the required level of response;
 - (iv) where applicable, confirm the dispatch of each responding organisation;
 - (v) establish the use of standard terminology in communications; and
 - (vi) establish the use of the appropriate radio frequencies as set out in the emergency plan;
- (t) specify-
 - (i) the aerodrome communication equipment testing procedures;

- (ii) a schedule for the testing; and
 - (iii) the method of keeping records of the tests
 - (iv) the location of the emergency coordination centre used to provide support to the on-scene commander
- (u) describe the measures for dealing with adverse climatic conditions and darkness for each potential emergency set out in sub-regulation (1)(a).
- (v) describe the procedures to assist persons who have been evacuated if their safety is threatened or airside operations are affected
- (w) describe the procedures respecting the review and confirmation of the following to permit the return of the aerodrome to operational status after an emergency situation-
 - (i) emergency status reports;
 - (ii) co-ordination with appropriate judicial authorities and the investigator designated by the accident investigation entity regarding the accident site conditions;
 - (iii) disabled aircraft removal;
 - (iv) airside inspection results;
 - (v) accident or incident site conditions; and
 - (vi) air traffic services and NOTAM coordination.
- (x) describe the procedures for controlling vehicular flow during an emergency to ensure the safety of vehicles, aircraft and persons.
- (y) specify the procedures for issuing a NOTAM in the event of an emergency affecting the critical category for firefighting required under Regulation 223 or changes or restrictions in facilities or services at the aerodrome during and after an emergency.
- (z) describe the procedures for preserving evidences as it relates to-
 - (i) aircraft or aircraft part removal; and
 - (ii) the site of the accident or incident;
- (aa) describe the procedures to be followed, after any exercise set out in Regulation 203 or the activation of the plan for an emergency that requires a full emergency standby, in the following cases-
 - (i) a post-emergency debriefing session with all participating organizations;

- (ii) the recording of the minutes of the debriefing session;
- (iii) an evaluation of the effectiveness of the emergency plan to identify deficiencies;
- (iv) changes, if any, to be made in the emergency plan; and
- (v) partial testing subsequent to the modification of an emergency plan;

(ab) Describe-

- (i) the process for an annual review and update of the emergency plan;
- (ii) the administrative procedure for the distribution of copies of an updated version of the emergency plan to the Authority, aerodrome personnel who require them and to the community organisations identified in the plan; and
- (iii) the procedures to assist in locating an aircraft when the aerodrome receives notification that an ELT or any advanced system of tracking aircraft in an emergency has been activated;

(2) An aerodrome operator shall also include a copy of the following documents in the emergency plan -

- (a) the signed agreements, between the aerodrome operator and the community organisations that provide emergency response services to the aerodrome, and
- (b) a grid map of the aerodrome and its immediate vicinity.

(3) The emergency plan shall observe Human Factors principles to ensure optimum response by all existing agencies participating in emergency operations.

205. EOC and Command Post

(1) An aerodrome operator shall maintain a fixed EOC and a mobile command post available for use during an emergency.

(2) The EOC shall be a part of the aerodrome facilities and shall be responsible for the overall coordination and general direction of the response to an emergency.

(3) The command post shall be a facility capable of being moved rapidly to the site of an emergency, when required, and shall undertake the local coordination of those agencies responding to the emergency.

(4) An aerodrome operator shall assign a person to assume control of the EOC and, when appropriate, another person for the mobile command post.

206. On-Scene Commander

- (1) An aerodrome operator shall establish procedures that make the on-scene commander easily identifiable by all persons responding to an emergency.
- (2) The on-scene commander shall be at the emergency site and shall not have other duties during an emergency, unless the life of a person is in danger nearby and the on-scene commander is alone and has the ability to assist the person.

207. Aircraft Crash Charts and Aerodrome Grid Maps

- (1) For aircraft operating in a passenger or cargo configuration, an aerodrome operator shall make available to the emergency coordination centre, aircraft crash charts specific to the aircraft used by the air operators that use the aerodrome, and shall provide copies of the charts to the organisations responsible for fire-fighting services that are identified in the emergency plan; and the on-scene commander.
- (2) In the case of aircraft that have or may have a seating configuration of not more than nine passenger seats, the aerodrome operator may use, instead of the aircraft crash charts referred to sub-regulation (1), other documents containing equivalent information.
- (3) An aerodrome operator shall develop, review and update annually, an aerodrome grid map that includes a minimum of -
 - (a) an area covering at least 1km (one kilometer) around each runway;
 - (b) the aerodrome access roads and gate; and
 - (c) the location of meeting points to which persons and vehicles that are responding to an emergency situation shall proceed in order to receive instructions.
- (4) An aerodrome operator shall provide copies of the aerodrome grid map to the aerodrome personnel and organizations identified in the aerodrome emergency plan.

208. Personnel and Training

- (1) An aerodrome operator shall assign specific emergency response duties, other than those of an on-scene commander or a supervisor, only to those aerodrome personnel who are identified in the emergency plan and who -
 - (a) are knowledgeable of their duties as described in the plan; and
 - (b) have the skills to carry out their duties.
- (2) An aerodrome operator shall assign to act as an on-scene commander or a supervisor only those aerodrome personnel, or other persons authorised by the operator in the emergency plan, who are-

- (a) knowledgeable about the contents of the emergency plan,
 - (b) familiar with the procedures for the overall coordination of emergency operations at an emergency site, and
 - (c) trained for the particular role that they perform.
- (3) An aerodrome operator shall establish procedures to ensure that all participants with allocated duties in any aerodrome emergency are familiar with and are properly trained for their assignments.
- (4) An aerodrome operator shall-
- (a) keep records of the training that was received by persons to meet the requirements of sub-regulations (1) and (2);
 - (b) preserve the records of training for five years after the day on which the training was received; and
 - (c) submit a copy of the training records to the Authority on request.

209. Communication System

An aerodrome operator shall provide an adequate communication systems linking the command post and the emergency operations centre with each other and with the participating agencies in accordance with the plan and consistent with the particular requirements of the aerodrome.

210. Aerodrome Emergency Exercise

- (1) The plan shall contain procedures for periodic testing of the adequacy of the plan and for reviewing the results in order to improve its effectiveness.
- (2) An aerodrome operator shall test the emergency plan by conducting –
- (a) a full-scale emergency exercise at intervals not exceeding 2 (two) years and partial emergency exercises in the intervening year to ensure that any deficiencies found during the full-scale aerodrome emergency exercise have been corrected; or
 - (b) a series of modular tests commencing in the first year and concluding in a full-scale aerodrome emergency exercise at intervals not exceeding three years;
- and reviewed thereafter, or after an actual emergency, so as to correct any deficiency found during such exercises or actual emergency
- (3) An aerodrome operator shall conduct full-scale emergency exercises based on scenarios that relate to a major aircraft accident and, at a minimum; the exercises

shall include the assembly and deployment of firefighting, policing and medical services organisations.

(4) An aerodrome operator, when conducting a partial emergency exercise, shall have-

- (a) an up-to-date list of the participants and their telephone numbers and the radio frequencies used to communicate;
- (b) fully operational communication equipment; and
- (c) a copy of the aerodrome grid map.

(5) An aerodrome operator shall base the partial emergency exercises on scenarios that include an aircraft accident or incident.

(6) An aerodrome operator shall provide the Authority with a notice in writing of the date and time when a partial or full-scale exercise is to be carried out at least 30 (thirty) days before the day of the exercise.

(7) The Authority shall observe the testing of an emergency plan

(8) After each exercise, the aerodrome operator shall conduct a debriefing with all the organisations identified in the plan and a representative of the aerodrome personnel who participated to evaluate the effectiveness of the emergency plan and identify deficiencies.

(9) An aerodrome operator shall implement an action plan to correct any deficiencies in the emergency plan that was identified during a debriefing session.

(10) An aerodrome operator shall record -

- (a) the date of an exercise;
- (b) the type of exercise;
- (c) the minutes of the debriefing session after the exercise; and
- (d) any action plans to correct deficiencies that were identified during a debriefing session.

(11) An aerodrome operator shall keep an exercise record for 10 (ten) years after the day on which the record is made.

(12) An aerodrome operator shall submit debriefing minutes and corrective action plans relating to an exercise to the Authority on request.

211. Emergencies in Difficult Environments

(1) The emergency plan shall include the ready availability of, and coordination with, appropriate specialist rescue services to be able to respond to emergencies where

an aerodrome is located close to water or swampy areas, or both, and where a significant portion of approach or departure operations takes place over these areas.

(2) At those aerodromes located close to water or swampy areas, or both, or difficult terrain, the aerodrome emergency plan shall include the establishment, testing and assessment at regular intervals of a predetermined response for the specialist rescue services.

(3) An assessment of the approach and departure areas within 1000m (one thousand meters) of the runway threshold shall be carried out to determine the options available for intervention

212. Emergency Exercise Waiver

The Authority may, on application by an aerodrome operator, provide to the operator written authorisation not to conduct the full-scale exercise during an interval set out in Regulation 210 if the operator demonstrates that the testing requirements for a full-scale exercise have been met through an activation of the emergency plan in response to an emergency during that interval.

213. Rescue and Firefighting at Aerodromes

(1) An aerodrome operator shall provide rescue and firefighting equipment, services, and personnel that correspond to the critical category for firefighting, as published in the AIP, to respond to an aircraft emergency at the aerodrome when serving commercial air transport operation.

(2) Where an aerodrome is located close to water or swampy areas, or difficult terrain, and where a significant portion of approach or departure operations take place over these areas, the aerodrome operator shall make available specialist rescue services and firefighting equipment appropriate to the hazard and risk.

(3) The level of protection provided at an aerodrome for rescue and firefighting shall be appropriate to the aerodrome category determined using the principles in these Regulations, except that, where the number of movements of the aeroplanes in the highest category normally using the aerodrome is less than 700 (seven hundred) in the busiest consecutive 3 (three) months, the level of protection provided shall be not less than one category below the determined category.

214. Hours of Operation of an Aircraft Firefighting Service

(1) An aerodrome operator shall establish the hours of operation of an aircraft firefighting service and ensure that those hours coincide with the hours of movements of operating aircraft at the aerodrome; and ensure that the critical category for firefighting and the hours of operation of an aircraft fire fighting service are published in the AIP and in a NOTAM, where the NOTAM is published later.

(2) An aerodrome operator shall provide aircraft fire-fighting service until the aircraft operating at the aerodrome has taken off or landed or the flight has been cancelled.

215. Aerodrome Category for Firefighting

(1) An aerodrome operator shall establish an aerodrome category for firefighting in accordance with Schedule 2.57 based on the longest aircraft normally using the aerodrome and fuselage width:

(2) If, after selecting the category appropriate to the longest aircraft's overall length, that aircraft's fuselage width is greater than the maximum width in Schedule 2.57, column III for that category, then the category for that aircraft shall be one category higher.

(3) During anticipated periods of reduced activity, the level of protection available shall be no less than that needed for the highest category of aeroplane planned to use the aerodrome during that time irrespective of the number of movements.

(4) The level of rescue and firefighting protection provided at an aerodrome shall be equal to the aerodrome category determined in accordance with sub-regulations (1) and (2).

(5) A heliport operator shall determine the level of protection to be provided for rescue and firefighting based on the overall size of the largest helicopter that uses the heliport.

216. Extinguishing Agents

(1) An aerodrome operator shall provide its aircraft firefighting service with both the principal and the complementary extinguishing agents and the equipment to deliver the agents.

(2) The principal extinguishing agent should normally be:

- (a) a foam meeting the minimum performance level A; or
- (b) a foam meeting the minimum performance level B; or
- (c) a foam meeting the minimum performance level C; or
- (d) a combination of these agents;

except that the principal extinguishing agent for aerodromes in categories 1 (one) to 3 (three) should preferably meet a performance level B or C foam.

(3) The complementary extinguishing agent should be a dry chemical powder suitable for extinguishing hydrocarbon fires or other agents having equivalent firefighting capability.

(4) The amounts of water for foam production and the complementary agents to be provided on the rescue and firefighting vehicles shall be in accordance with the aerodrome category determined in accordance with these regulations except that for aerodrome categories 1 and 2 (one and two) up to 100% (one hundred per cent) of the water may be substituted with complementary agent.

(5) For the purpose of agent substitution, 1 kg (one kilogram) of complementary agent shall be taken as equivalent to 1.0L (one liter) of water for production of a foam meeting performance level A.

(6) Where operations by aeroplanes larger than the average size in a given category are planned, the quantities of water shall be recalculated and the amount of water for foam production and the discharge rates for foam solution shall be increased accordingly.

(7) The quantity of foam concentrates separately provided on vehicles for foam production shall be in proportion to the quantity of water provided and the foam concentrate selected.

(8) The discharge rate of the foam solution and complementary agents shall not be less than the rates shown in Schedule 2.58.

(9) The complementary agents shall comply with the appropriate specifications of the International Organization for Standardization

217. Response Time

(1) The rescue and firefighting service at an aerodrome shall be capable of reaching any point of each operational runway, in optimum visibility and surface condition, in a response time not exceeding 3 (three) minutes.

(2) Any vehicles, other than the first responding vehicle, required to deliver the amounts of extinguishing agents specified in Schedule 2.58 shall ensure continuous agent application and shall arrive no more than four minutes from the initial call.

218. Communication and Alerting System

An aerodrome operator shall provide -

(a) a discrete communication system linking the fire station with the control tower and the rescue and firefighting vehicles; and

(b) an alerting system for rescue and firefighting personnel, capable of being operated from the fire station and the aerodrome control tower.

219. Number of Rescue and Firefighting Vehicles

An aerodrome operator shall provide the following minimum number of rescue and firefighting vehicles at an aerodrome in accordance with the aerodrome category of Schedule 2.59.

220. Rescue and Firefighting Personnel Requirements

- (1) An aerodrome operator shall ensure that during the hours of operation of the aircraft fire-fighting service, trained and competent aircraft fire-fighting personnel are available at their assigned post and in sufficient numbers to ride the aircraft fire-fighting vehicles and to operate the equipment at maximum capacity.
- (2) In determining the minimum number of rescue and firefighting personnel required, an aerodrome operator shall complete a task resource analysis and the level of staffing documented in the Aerodrome Manual.
- (3) An aerodrome operator shall ensure that all personnel assigned to rescue and firefighting duties are properly trained to perform their duties in an efficient manner.
- (4) The training of personnel RFF personnel shall include:
 - (a) 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 fires; and
 - (b) human performance; and
 - (c) team coordination.
- (5) An aerodrome operator shall ensure that training of aerodrome RFF personnel are conducted at an approved Aerodrome Fire-fighting Training Organization.
- (6) An aerodrome operator shall provide all personnel assigned to aircraft firefighting duties with the equipment, protective clothing and respiratory equipment necessary to effectively perform their duties.
- (7) An aerodrome operator shall ensure that personnel are deployed in a way that ensures that minimum response times can be achieved and that continuous agent application at the appropriate rate can be fully maintained whilst giving consideration for personnel use of hand lines, ladders and other rescue and firefighting equipment normally associated with aircraft rescue and firefighting operations.
- (8) An aerodrome operator shall not permit a person to act, and no person shall act as an aircraft firefighter at an aerodrome unless the person has within the previous 12 (twelve) months successfully completed the training specified in Schedule 1.4.

221. Response Test

- (1) An aerodrome operator shall carry out a response test to evaluate the response time and effectiveness of the aircraft fire-fighting service required to be maintained

during the hours of operation specified every 12 (twelve) months and at any time at the request of the Authority, where the Authority has reasonable grounds to believe that the aircraft fire-fighting service at the aerodrome does not meet the requirements of these Regulations.

(2) An aerodrome operator shall give the Authority at least 30 (thirty) days written notice of the date on which a response test is to be carried out.

(3) An aerodrome operator shall provide the Authority with a copy of the results of a response test within 14 (fourteen) days after the date of the test.

(4) A response test at an aerodrome has a satisfactory result if within three minutes after an alarm is sounded, aircraft fire-fighting vehicles in a number sufficient for applying the principal extinguishing agent at 50% (fifty percent) of the total discharge capacity required are dispatched from their assigned position and, under optimum surface and visibility conditions at the aerodrome, reach any point of each operational runway, or another predetermined point of comparable distance and terrain.

(5) An aerodrome operator shall record the results of a response test and shall preserve the records for two years after the date of the test.

(6) If a response test does not have a satisfactory result, the aerodrome operator shall-

- (a) within six hours after the test, identify the deficiencies that caused the result and notify the appropriate air traffic control unit or any other flight information unit of the critical category for firefighting that corresponds to the level of service that can be provided, for publication in a NOTAM ; and
- (b) within seven days after the test, if any deficiency is not corrected, submit a plan to the Authority specifying the measures necessary to obtain a satisfactory result and the dates by which they must be taken, which shall be as early as practicable given the circumstances.

(7) An aerodrome operator shall implement the submitted plan by the dates specified in the plan.

222. Statistics on the Number of Passengers and Aircraft Movements

(1) An aerodrome operator shall compile monthly statistics in respect of the number of enplaned and deplaned passengers.

(2) An aerodrome operator shall compile monthly statistics setting out number of movements by operating aircraft in each aircraft category for firefighting.

(3) An aerodrome operator shall, at least once every six months, review the monthly statistics for the twelve months preceding the date of the review and determine the

three consecutive months with the highest total number of movements by operating aircraft in all aircraft categories for firefighting.

(4) Where the review shows more than one period of three consecutive months having the same total number of movements by operating aircraft, the period to be used for the purposes of Regulation 223 is the period involving the highest aircraft category for firefighting or where those periods involve the same highest aircraft category for firefighting, the period involving the greatest number of movements in that category.

(5) The operator of a designated aerodrome shall retain the monthly statistics referred to in sub-regulations (1) and (2), for five years after the date of the review; and provide them to the Authority upon request.

223. Critical Category for Firefighting

(1) An aerodrome operator shall determine a critical category for firefighting for the aerodrome based on the number of movements at the aerodrome during the three-month period determined in accordance with sub-regulations (3) or (4) by operating aircraft in the highest and the next highest aircraft categories for firefighting.

(2) Where, during the period referred to in sub-regulation (1), the number of movements at an aerodrome by aircraft in the highest aircraft category for firefighting is 700 (seven hundred) or more, the critical category for firefighting is equivalent to that highest aircraft category for firefighting.

(3) Where, during the period referred to sub-regulation (1), the number of movements at an aerodrome by aircraft in the highest aircraft category for firefighting is less than 700 (seven hundred), the critical category for firefighting shall be determined by decreasing the highest aircraft category for firefighting by one category.

(4) Where the aerodrome operator anticipates a period of one or more hours of movements of aircraft of a lower aircraft category for firefighting only, the operator may reduce the critical category for firefighting to the highest aircraft category for firefighting anticipated for that period.

(5) Pursuant to sub-regulation (4), the aerodrome operator shall document the anticipated situation and notify the appropriate air traffic control unit or any other flight information unit of the reduced critical category for firefighting for publication in a NOTAM.

224. Adjustment to Higher Requirements

Where an increase in the number of movements by, or in the size of, operating aircraft at an aerodrome results in the establishment for the aerodrome of a higher critical category for fire-fighting than the previous category, the operator of the aerodrome shall meet the requirements for that higher category as set out in Schedule 2.59 within one year after the date of establishing the higher critical category for firefighting.

225. Rescue and Firefighting Personnel Training Records

An aerodrome operator shall-

- (1) maintain, for each aircraft firefighter, a training record containing the information specified in Schedule 1.5
- (2) preserve the training record for 3 (three) years after the aircraft fire fighter leaves the services of the aerodrome operator; and
- (3) provide the Authority with a copy of the training record, upon request.

226. Aerodrome Wildlife Management Plan

(1) An aerodrome operator shall-

- (a) conduct a wildlife strike hazard study and assessment for the aerodrome;
- (b) develop an aerodrome wildlife management plan in accordance with Schedule 1.7;
- (c) submit the plan to the Authority, upon request;
- (d) keep a copy of the plan at the aerodrome;
- (e) implement the plan; and
- (f) review the plan every 2 (two) years.

(2) An aerodrome operator shall amend the wildlife management plan and submit the amended plan to the Authority within 30 (thirty) days of the amendment if-

- (a) the amendment is necessary as a result of a review;
- (b) an incident has occurred in which a turbine-powered aircraft collided with wildlife other than a bird and suffered damage, collided with more than one bird, or ingested a bird through an engine;
- (c) a variation in the presence of wildlife hazards has been observed in the aerodrome flight pattern or movement area; or
- (d) there has been a change-

- (i) In the wildlife management procedures or in the methods used to manage or mitigate wildlife hazards,
- (ii) in the types of aircraft at the aerodrome, or
- (iii) in the types of aircraft operations at the aerodrome.

227. Wildlife Strikes

(1) An aerodrome operator shall keep records of all wildlife strikes at the aerodrome, including those reported by-

- (a) pilots;
- (b) ground personnel; and
- (c) aircraft maintenance personnel when they identify damage to an aircraft as having been caused by a wildlife strike.

(2) An aerodrome operator shall treat wildlife remains found within 60m (sixty meters) of a runway or an airside pavement area as wildlife strike unless another cause of death is identified.

(3) An aerodrome operator shall submit a written and dated report to the Authority using the ICAO IBIS form for each wildlife strike, within 7 (seven) days of its occurrence.

228. Risk Analysis

(1) An aerodrome operator shall assess the wildlife strike hazard on, or in the vicinity of, an aerodrome through:

- (a) the establishing a procedure for recording and reporting wildlife strikes to aircraft;
- (b) the collection of information from aircraft operators, aerodrome personnel and other sources on the presence of wildlife on or around the aerodrome constituting a potential hazard to aircraft operations; and
- (c) an ongoing evaluation of the wildlife hazard by competent personnel.

(2) An aerodrome operator shall establish procedures for data collection on wildlife hazards for the implementation of wildlife control measures.

(3) An aerodrome operator shall, after consultation with operators that use the aerodrome, conduct a risk analysis that evaluates the collected information.

(4) An aerodrome operator's risk analysis shall be in writing and include-

- (a) an analysis of the risks associated with the wildlife hazards; and

- (b) the measures that are necessary to manage or remove the hazards or to manage or mitigate the risks.
- (5) An aerodrome operator shall provide to the Authority, the risk analysis, upon request.

229. Content of the Aerodrome Wildlife Management Plan

An aerodrome wildlife management plan shall-

- (a) identify and describe the risks associated with all wildlife hazards, including those referred to in Schedule 1.8, at or near the aerodrome that might affect the safe operation of aircraft, including the proximity of any waste disposal facility or migration route affecting wildlife populations near the aerodrome;
- (b) specify the particular measures that are used by the aerodrome operator to manage or mitigate the risks;
- (c) identify and describe the actions that are used by the aerodrome operator to satisfy the requirements set out in Schedule 1.8 in respect of wildlife strikes, wildlife management logs, and evaluations of habitats, land uses and food sources at or near the aerodrome.
- (d) set out procedures-
 - (a) for the management of aerodrome habitats that might attract wildlife;
 - (b) that prohibits the feeding of wildlife and the exposure of food wastes; and
 - (c) to ensure all endangered or protected wildlife at the aerodrome are inventoried;
- (e) identify the role of the personnel and agencies involved in wildlife management issues and provide the contact numbers for each; and
- (f) provide details of any wildlife hazard awareness program.

230. Wildlife Personnel Training Requirements

(1) An aerodrome operator shall-

- (a) provide recurrent training for any person who has duties in respect of the aerodrome wildlife management plan every two years regarding their assigned duties and the matters set out in Schedule 1.9; and

- (b) ensure that any person who has duties in respect of the aerodrome wildlife management plan holds any required firearm permit.
- (2) An aerodrome operator shall maintain a record of each person's training for a period of ten years and provide the Authority with a copy, upon request.

231. Communication and Alerting Procedure

An aerodrome operator shall establish a communication and alerting procedure for wildlife management personnel in accordance with Schedule 1.10, to alert pilots as soon as possible of the wildlife hazards at the aerodrome and the risks associated with those hazards.

232. Wildlife Hazard Reduction

An aerodrome operator shall:

- (1) take action to decrease the risk to aircraft operations by adopting measures to minimize the likelihood of collisions between wildlife and aircraft;
- (2) take action to eliminate or to prevent the establishment of garbage disposal dumps or any other source which may attract wildlife to the aerodrome, or its vicinity, unless an appropriate wildlife assessment indicates that they are unlikely to create conditions conducive to a wildlife hazard problem; and
- (3) where the elimination of existing sites is not possible, ensure that any risk to aircraft posed by these sites is assessed and reduced to as low as reasonably practicable.

PART XXI GROUND HANDLING SERVICES

233. Requirements for a Ground Handling Certificate

- (1) No person may provide ground handling services at an aerodrome located within The Gambia without a Ground Handling Certificate issued by the Authority in accordance with this Part.
- (2) No person shall provide any support service at an aerodrome without a Ground Handling Certificate where the Authority is of the opinion that the nature of the support service being provided requires certification.
- (3) All air operator certificate holders and ground handling organizations shall ensure that ground handling services and activities are conducted to, or provided in accordance with the requirements set out in these Regulations.

(4) Ground handling services may be conducted as part of an air operator certificate holder's organization or under contractual agreement with a certified ground handling organization, holding a valid Ground Handling Certificate, rated for the type of activity to be conducted.

234. Application for a Ground Handling Certificate

(1) An applicant for a Ground Handling Certificate shall submit an application to the Authority in the form and manner prescribed by the Authority.

(2) An application for a Ground Handling Certificate shall include -

- (a) ground handling manual which will include all pertinent information on the applicant's site, facilities, services, equipment, operating procedures, organization and management including a safety management system;
- (b) Statement of Compliance demonstrating that the applicant's ground handling manual is in compliance with the relevant provisions of these Regulations;
- (c) clearance from the Government to provide ground handling services;
- (d) proof of payment of appropriate fee as prescribed by the Authority;
- (e) adequate insurance policy covering the liability of the applicant towards third parties; and
- (f) particulars of non-compliance with, or deviations from the standards prescribed in these Regulations, as applicable.

235. Grant of a Ground Handling Certificate

(1) Subject to the provisions in (2) below, the Authority may approve the application and grant a Ground Handling Certificate to the applicant.

(2) Before granting a Ground Handling Certificate, the Authority shall be satisfied that:

- (a) the applicant and his or her staff have the necessary competence and experience to provide the services;
- (b) the ground handling manual submitted by the applicant accurately describes the procedures, facilities, services and equipment of the applicant;
- (c) the applicant has established ground handling equipment, facilities, services, procedures, and training appropriate for the scope of the proposed operation including ground handling of Dangerous Goods, which conform with the requirements specified in these Regulations;

- (d) the applicant has an acceptable safety management system in place; and
- (e) the applicant has contracted an adequate insurance policy covering third party liability, appropriate to the scope and type of operation intended to be certified.

(3) The Authority may request for additional documents in support of the application where it deems it necessary and an applicant shall provide such requested documents.

236. Refusal to Grant a Ground Handling Certificate

- (1) The Authority may refuse to grant a Ground Handling Certificate to an applicant.
- (2) Where the Authority refuses to grant a Ground Handling Certificate to an applicant, the Authority shall give the applicant a written notice stating the reasons for the refusal, not later than 14 days after the date of refusal.

237. Endorsement of Conditions on a Ground Handling Certificate

- (1) The Authority, when granting the Ground Handling Certificate, may endorse operating conditions, restrictions or other details on the certificate.
- (2) The Authority may impose conditions, sanctions or operating restrictions on a Ground Handling Certificate in response to any non-compliance with these Regulations and unresolved safety concerns.
- (3) The conditions, sanctions or operating restrictions referred to in sub-regulation (2) may be imposed or withdrawn as the result of an audit, inspections or other surveillance activity undertaken by the Authority.

238. Duration of a Ground Handling Certificate

A Ground Handling Certificate remains in force for a period of 3 (three) years, unless it is amended, suspended or revoked by the Authority.

239. Amendment of a Ground Handling Certificate

The Authority may amend a Ground Handling Certificate where –

- (a) there is a change in the ownership or management of the certificate holder;
- (b) there is a change in the scope of operations of the certificate holder; or
- (c) the certificate holder requests an amendment.

240. Renewal of a Ground Handling Certificate

(1) A Ground Handling Certificate holder shall ensure that renewal of the certificate is commenced not less than 90 (ninety) days to the date of expiration of the certificate.

(2) A Ground Handling Certificate may be renewed by the Authority upon applicant meeting the conditions on which it was granted and any other requirements that may be applicable at the time of renewal.

241. Suspension of a Ground Handling Certificate

(1) The Authority shall, by written notice to the holder of a Ground Handling Certificate, suspend a Ground Handling Certificate if-

- (a) a condition to which the certificate is subject has been breached;
- (b) the certificate holder's facilities, equipment and operational procedures are not of the standard required in the interests of safety;
- (c) the certificate holder's safety management system is found to be inadequate;
- (d) it is in the interest of operational safety;
- (e) all other means for timely correction of an unsafe condition have not yielded the required results;
- (f) the certificate holder resists or is unwilling to take action to correct or mitigate the condition affecting aviation safety; or
- (g) the certificate holder wilfully fails to perform an already agreed upon corrective action and suspension of the certificate is the last resort to avoid unsafe operations.

(2) Before suspending a Ground Handling Certificate, the Authority shall give to the holder a show cause notice that -

- (a) sets out the facts and circumstances that, in the opinion of the Authority, would justify the suspension; and
- (b) invite the holder to show cause, in writing within 14 (fourteen) days after the date of the notice, why the certificate should not be suspended.

(3) The Authority shall take into account any written submission that the holder makes to the Authority within the time allowed.

242. Transfer of a Ground Handling Certificate

(1) The Authority may approve the transfer of a Ground Handling Certificate when –

- (a) the current certificate holder notifies the Authority, in writing, at least 90 (ninety) days before ceasing to operate, that the current holder will cease to operate as of the date specified in the notice;
- (b) the current certificate holder notifies the Authority, in writing, of the intention to transfer the certificate and the name of the transferee; and
- (c) the transferee applies to the Authority in writing, within 90 (ninety) days before the current certificate holder ceases to operate.

(2) Where the Authority does not consent to the transfer of a Ground Handling Certificate, it shall notify the transferee in writing, of its reasons not later than 30 (thirty) days before the current holder plans to cease operations.

243. Surrender of a Ground Handling Certificate

(1) The holder of a Ground Handling Certificate shall give the Authority not less than 90 days written notice of the date on which the certificate is to be surrendered in order that suitable action can be taken.

(2) The Authority shall cancel the certificate on the date specified in the notice.

244. Revocation of a Ground Handling Certificate

(1) The Authority may, by written notice, revoke a Ground Handling Certificate if-

- (a) the certificate holder is incapable, or unwilling to carry out corrective action, or has committed, or repeated serious violations;
- (b) the certificate holder has demonstrated a lack of responsibility, such as deliberate and flagrant acts of non-compliance; or
- (c) actions of the certificate holder has made it convincingly clear that the continued operation of the certificate holder will be detrimental to safety or to public interest.

(2) Before revoking a Ground Handling Certificate, the Authority shall give to the holder a show cause notice that-

- (a) sets out the facts and circumstances that, in the opinion of the Authority, would justify the revocation;
- (b) invites the holder to show cause, in writing, within 14 (fourteen) days after the date of the notice, why the certificate should not be revoked; and
- (c) the Authority shall take into account any written submission that the holder makes to the Authority within the time allowed

(3) Notwithstanding the provisions of sub-regulation (2) above, if the Authority finds that immediate revocation is required in the interest of safety, the Authority may

revoke a Ground Handling Certificate, without stay on the date stipulated by the Authority.

245. Obligations of a Ground Handling Certificate Holder

- (1) The issuance of a Ground Handling Certificate obliges the certificate holder to ensure safety, regularity and efficiency of its operations.
- (2) The holder of a Ground Handling Certificate shall give uninterrupted access to authorized officers of the Authority for the purpose of carrying out safety audits and inspections.
- (3) A ground handling organisation shall ensure proper upkeep of its facilities and equipment.

246. Compliance with a Ground Handling Manual

- (1) An applicant for a Ground Handling Certificate shall submit to the Authority a Ground Handling Manual for approval.
- (2) A Ground Handling Manual shall be a fundamental requirement for the certification of a ground handling organisation.
- (3) A Ground Handling Manual may be issued in one or more parts and shall-
 - (a) be typewritten or printed, and signed by the ground handling organisation;
 - (b) be in a format that is easy to revise;
 - (c) have a system for recording the current pages and any amendments thereto, including a page for logging revisions;
 - (d) be organised in a manner that facilitates the preparation, review and acceptance or approval process;
 - (e) contain all pertinent information concerning the ground handling organisation's facilities, services, equipment, operating procedures, training programs, organizational structure and safety management system; and
 - (f) demonstrate that the ground handling organisation's operations conforms with the requirements and specifications in these Regulations.
- (4) A ground handling organisation shall include the particulars provided in Schedule 1.12 in a Ground Handling Manual.
- (5) Where a required particular is not included in the Ground Handling Manual because it is not applicable to the operations of a ground handling organisation's

operations, the ground handling organisation must state in the manual the reason for non-applicability of the particular.

(6) A ground handling organisation shall conduct operations in accordance with the procedures set forth in its Ground Handling Manual approved by the Authority.

(7) The Authority shall give directions to a ground handling organisation for amendment of procedures contained in its Ground Handling Manual in order to ensure safety of passengers and aircraft.

247. Approval of the Ground Handling Manual

The Authority shall approve the Ground Handling Manual and any amendments thereto, provided they meet the requirement of these Regulations.

248. Location of the Ground Handling Manual

(1) A ground handling organisation shall provide the Authority with a complete and current copy of the Ground Handling Manual.

(2) A ground handling organisation shall keep at least one complete and current copy of the Ground Handling Manual at each aerodrome it operates at and one copy at the organisation's principal place of business, if other than the aerodrome.

(3) A ground handling organisation shall avail all relevant personnel a copy of the Ground Handling Manual.

(4) A ground handling organisation shall make a copy of the Ground Handling Manual available for inspection by authorized officers of the Authority.

249. Amendment of the Ground Handling Manual

(1) The Authority may issue a written directive to a ground handling organisation requiring the organisation to alter or amend the manual in accordance with said directive in order to maintain the accuracy of the Ground Handling Manual.

(2) A ground handling organisation shall alter or amend the Ground Handling Manual, whenever necessary, in order to maintain the accuracy of the information in the manual.

(3) A ground handling organisation shall submit in writing a proposed amendment to its Ground Handling Manual to the Authority at least 30 days before the proposed effective date of the amendment or alteration, unless a shorter filing period is allowed by the Authority.

(4) In the case of amendments initiated by the Authority, the Authority shall notify the organisation of the proposed amendment, in writing, fixing a reasonable period within which the organisation may submit written information, views, and arguments on the amendment.

(5) The Authority shall notify the organisation within 30 (thirty) days of any amendment adopted or rescind the notice after considering all relevant materials presented.

(6) Notwithstanding sub-regulation (4) and (5), where the Authority finds there is an emergency requiring immediate action with respect to the safety of air transportation, the Authority shall issue amendment, effective without stay on the date an organisation receives notice of it.

(7) Pursuant to sub-regulation (6), the Authority shall incorporate the findings of the emergency and a brief statement of the reason for the findings in the notice of the amendment.

250. Ground Handling Organisation's Safety Management System

(1) A ground handling organisation shall establish a safety management system applicable to the size, scope and complexity of its handling activities with a view to ensure that operations are carried out in a controlled and safe manner.

(2) A ground handling organisation shall ensure that all management and operations personnel comply with safety requirements applicable at the airports in accordance with the Authority's standards and shall monitor such compliance.

251. Training and Competence of Personnel

(1) A ground handling organisation shall employ adequate numbers of qualified and skilled personnel for performing all activities in its operations.

(2) Where the Authority, or other State organization, has established security and competency requirements for personnel, a ground handling organisation shall employ only those persons possessing documented evidence of certificate attesting they meet the applicable requirements.

(3) A ground handling organisation shall implement a system to maintain the competency of its personnel.

(4) A ground handling organisation shall establish minimum training requirements geared towards providing personnel with requisite skills and knowledge to handle ground handling operations efficiently in order to ensure safety of all personnel engaged in airside activities.

(5) A ground handling organisation shall implement training programs that include initial, recurrent and upgrade training of personnel.

(6) All personnel engaged in airside activity shall undergo recurrent training periodically in order to maintain ongoing competence.

(7) A ground handling organisation shall equip personnel with sufficient resources needed to comply with the requirements of this Part.

(8) A ground handling organisation's training programme shall cover both theoretical and practical skills to verify the personnel understanding of the task being trained.

(9) All training records shall be documented and made available for review by authorized person of the Authority.

252. Incident and Accident Reporting

(1) A ground handling organisation shall establish and implement a reporting system which ensures that all accidents and incidents are recorded.

(2) A ground handling organisation shall ensure that all its personnel cooperate in the promotion of safety at an aerodrome by immediately reporting to the Authority, the aerodrome service provider and all other relevant parties, accidents, incidents, defects and faults which may have an impact on safety

(3) A ground handling organisation shall report all accidents and incidents, including damage events, to the Authority and all relevant parties as soon as possible and in any case, within 48 (forty-eight) hours after such occurrence.

(4) A ground handling organisation shall maintain and forward to the Authority periodically records of all safety findings including, remedial and corrective actions taken.

253. Internal Audits

(1) A ground handling organisation shall arrange for an internal airside safety performance audit in accordance with applicable standards and recommended practices.

(2) The audit, referred to in sub-regulation (1) above, shall be carried out every 12 (twelve) months and results should be submitted to the Authority upon request.

(3) A ground handling organisation shall ensure that the audit is conducted by suitably qualified personnel.

254. Emergency Response

(1) A ground handling organisation shall establish a formal emergency procedure and train its personnel on the implementation of such procedures.

(2) Emergency response contact information shall be available to all ground handling organisation's personnel in order to enable timely response in case of an emergency or incident requiring response action.

255. Ground Handling Annual Status Report

A ground handling organisation shall submit the following information to Authority on annual basis or as directed by the Authority, from time to time:

- (a) changes in management structure and qualified personnel;
- (b) alteration in the ground support equipment vis-à-vis scope of service;
- (c) compliance with required training programs;
- (d) mitigation of safety findings of ground accidents and incidents;
- (e) copy of latest insurance policy; and
- (f) an internal audit report, in the form and manner specified by the Authority.

256. Inspection Authority

(1) A ground handling operator shall, without charge, at the request of an Aviation Safety Inspector, allow unlimited, unrestricted and unimpeded access and provide the equipment necessary to conduct any inspections, including unannounced inspections, or conduct tests of ground handling facilities, equipment or operating procedures of the ground handling organisation to determine compliance with these Regulations for aircraft safety.

(2) A ground handling operator shall allow access to the Authority to all parts of the ground handling facilities, equipment or records for the purposes of sub-regulation (1).

(3) The Authority shall –

- (a) give reasonable notice of any tests to be conducted on a ground handling service provider; and
- (b) carry out the tests within and at a reasonable time.

(4) Where unannounced inspections are to be conducted by the Authority, sub-regulation (3) will not apply.

SCHEDULE 1

SUPPLEMENTARY PROVISIONS RELATING TO REGULATION 33, 36, 46, 47, 220, 225, 226, 229-231 AND 246

1.1 Information to be included in the Aerodrome Manual

An aerodrome operator shall include the following particulars in an aerodrome manual as provided in these Regulations, to the extent that they are applicable to the aerodrome, under the following parts -

- (1) PART 1- GENERAL- general information shall include the following-
 - (a) table of contents, list of amendments, list of effective pages and distribution list;
 - (b) name, position and contact details of the person who has overall responsibility for aerodrome certification and safety issues;
 - (c) purpose and scope of the aerodrome manual;
 - (d) the legal requirement for an Aerodrome Certificate and an aerodrome manual as prescribed in these Regulations;
 - (e) conditions for use of the aerodrome, including-
 - (i) a statement to indicate that the aerodrome shall at all times, when it is available for the take-off and landing of aircraft, be also available to all persons on equal terms and conditions;
 - (ii) a statement of the Aerodrome Reference Code, indicating the largest aircraft type the aerodrome facility is intended to serve;
 - (iii) category of runways provided;
 - (iv) different runways and their associated level of service;
 - (v) nature of aviation Activities
 - (vi) type of traffic permitted to use the aerodrome; and
 - (vii) lowest meteorological conditions permitted for aircraft arrivals and departures at the aerodrome.
 - (f) the available aeronautical information systems and procedures for its promulgation;
 - (g) the system for recording aircraft movements;

- (h) obligations of the Aerodrome Operator;
- (i) co-ordination Policy with other relevant agencies; and
- (j) any limitations on the operation of the aerodrome including areas excluded from use by commercial aircraft

(2) PART 2- PARTICULARS OF THE AERODROME SITES- General information, including the following -

- (a) a plan of the aerodrome showing the main aerodrome facilities for the operation of the aerodrome including -
 - (i) the location of each Wind Direction Indicator;
 - (ii) Aerodrome Reference Point with elevation and WGS 84 geographical coordinate labelled;
 - (iii) runways with dimensions labelled;
 - (iv) runway surface types labelled;
 - (v) runway end elevations;
 - (vi) runway strip with dimensions labelled;
 - (vii) stopway with stopway end elevation;
 - (viii) clearway with dimensions labelled, and clearway end elevations;
 - (ix) Runway End Safety Area ;
 - (x) approach lighting;
 - (xi) taxiways with names;
 - (xii) taxiway surface types labelled;
 - (xiii) apron with names;
 - (xiv) navigational aids labelled with type showing critical and sensitive areas identified where possible;
 - (xv) localizer array aerals with critical and sensitive areas shown;
 - (xvi) glide path aerals with critical and sensitive areas shown;
 - (xvii) airside roads;
 - (xviii) terminal buildings;

- (xix) airport fire stations;
- (xx) aerodrome control tower;
- (xxi) power supply buildings;
- (xxii) other main buildings relevant to the operation of the aerodrome;
- (xxiii) airside and landside perimeter fence;
- (xxiv) airside and landside perimeter gates with gate numbers labelled;
- (xxv) meteorological facilities including wind indicators;
- (xxvi) boundary of the air traffic control service; and
- (xxvii) any part of the Movement Area permanently unsuitable for aircraft and clearly marked as such.

(b) Apron Plan- a plan of the apron including:

- (i) apron with identifying names;
- (ii) bearing strengths or aircraft type restrictions;
- (iii) apron markings associated with the movement and parking of aircraft;
- (iv) aircraft parking bay designations clearly labelled;
- (v) apron markings associated with the parking of vehicles and equipment;
- (vi) apron markings associated with the operation of vehicles;
- (vii) location of any nose in guidance system;
- (viii) any run-up bays or engine start points
- (ix) the limits of the apron area
- (x) the boundary of the air traffic control service;
- (xi) any buildings that front onto the apron;
- (xii) access gates to the airside area;
- (xiii) a table showing the maximum aircraft code, type, or size permitted to park on each aircraft stand;

- (xiv) helicopter landing sites and helicopter aiming points; and
 - (xv) any part of the apron area permanently unsuitable for aircraft and clearly marked as such.
- (c) Ground Movement Plan- a plan of the ground movement area including:
 - (i) All runway markings;
 - (ii) Markings in pre-threshold areas; and
 - (iii) Taxiway and taxilane markings
- (d) Lighting Plan- a plan of the aerodrome lighting including:
 - (i) Approach lights;
 - (ii) runway threshold lights;
 - (iii) runway threshold identification lights;
 - (iv) runway edge lighting;
 - (v) runway end lighting;
 - (vi) stopway lights;
 - (vii) visual landing aids;
 - (viii) turning bay lights;
 - (ix) runway guard lights;
 - (x) stop bar and intermediate taxiway holding position lighting;
 - (xi) taxiway lighting;
 - (xii) apron flood lighting;
 - (xiii) obstacle lights on the aerodrome; and
 - (xiv) illuminated windsocks.
- (e) a plan of the aerodrome showing the aerodrome boundaries;
- (f) a plan showing the distance of the aerodrome from the city or other populous area, and the location of any aerodrome facilities and equipment outside the boundaries of the aerodrome; and
- (g) particulars of the title of the aerodrome site. If the boundaries of the aerodrome are not defined in the title documents, particulars of

the title to or interest in the property on which the aerodrome is located and a plan showing the boundaries and position of the aerodrome

(3) PART 3 - PARTICULARS OF THE AERODROME REQUIRED TO BE REPORTED TO THE AERONAUTICAL INFORMATION SERVICE

(a) General Information including the following:

- (i) the name of the aerodrome;
- (ii) the location of the aerodrome;
- (iii) the geographical coordinates of the Aerodrome reference point determined in terms of the WGS-84 reference datum;
- (iv) the aerodrome elevation and geoid undulation;
- (v) the elevation of each threshold and geoid undulation, the elevation of the runway end and any significant high and low points along the runway, and the highest elevation of the touchdown zone of a precision approach runway;
- (vi) the aerodrome reference temperature
- (vii) details of the aerodrome beacon; and
- (viii) the name, address and contact details at which the aerodrome operator may be contacted at all times.

(b) Aerodrome Dimensions and Related Information- general information, including the following-

- (i) runway true bearing, designation number, length, width, displaced threshold location, slope, surface type, type of runway and, for a precision approach runway, the existence of an obstacle free zone;
- (ii) length, width and surface type of strip, runway end safety areas, stop ways;
- (iii) length, width and surface type of taxiways;
- (iv) apron surface type and aircraft stands;
- (v) clearway length and ground profile;
- (vi) visual aids for approach procedures, viz, approach lighting type and visual approach slope indicator system;
- (vii) marking and lighting of runways, taxiways, and aprons;
- (viii) other visual guidance and control aids on taxiways (including runway holding positions, intermediate holding positions and stop bars) and aprons, location and type of

- visual docking guidance system;
- (ix) availability of standby power for lighting;
- (x) the location and radio frequency of VOR aerodrome checkpoints;
- (xi) the location and designation of standard taxi routes;
- (xii) the geographical co-ordinates of each threshold;
- (xiii) the geographical co-ordinates of appropriate taxiway centre line points;
- (xiv) the geographical co-ordinates of each aircraft stand;
- (xv) the geographical coordinates and the top elevation of significant obstacles in the approach and take-off areas, in the circling area and in the vicinity of the aerodrome;
- (xvi) pavement surface type and bearing strength using the Aircraft Classification Number - Pavement Classification Number (ACN-PCN) method;
- (xvii) one or more pre-flight altimeter check locations established on an apron and their elevation;
- (xviii) declared distances take-Off Run Available, Take-Off Distance Available (TODA), Accelerate-Stop Distance Available (ASDA), Landing Distance Available (LDA);
- (xix) disabled aircraft removal plan and the contact details of the aerodrome coordinator responsible for the removal of a disabled aircraft on or adjacent to the movement area, information on the capability to remove a disabled aircraft, expressed in terms of the largest type of aircraft which the aerodrome is equipped to remove; and
- (xx) rescue and firefighting including the level of protection provided, expressed in terms of the category of the rescue and firefighting services, which should be in accordance with the longest aeroplane normally using the aerodrome and the type and amount of extinguishing agents normally available at the aerodrome.

(4) PART 4 – PARTICULARS OF THE AERODROME OPERATING PROCEDURES AND SAFETY MEASURES

- (a) Aerodrome Reporting- particulars of the procedures for reporting

any changes to the aerodrome information set out in the AIP and procedures for requesting the issue of NOTAMs, including the following -

- (i) arrangement for reporting any changes to the Authority and recording the reporting of changes during and outside the normal hours of aerodrome operations;
 - (ii) procedures for checking the accuracy of information, both prior to and following promulgation;
 - (iii) procedure for issuing NOTAMs during and outside normal hours of aerodrome operation;
 - (iv) procedures for changing information on the AIP;
 - (v) procedures for providing aerodrome briefing to aircraft operators;
 - (vi) the names and roles of persons responsible for notifying the changes, and their contact details during and outside the normal hours of aerodrome operations; and
 - (vii) the address and contact details, as provided by the Authority, of the place where changes are to be reported to the Authority.
- (b) Access to the Aerodrome Movement Area- particulars of the procedures that have been developed and are to be followed in coordination with the agency responsible for preventing unlawful interferences in civil aviation at the aerodrome and for preventing unauthorized entry of persons, vehicles, equipment, animals or other things into the movement area, including the following -
- (i) the role of the aerodrome operator, the aircraft operator, aerodrome fixed base operators, the aerodrome security entity, the Authority and other government departments, as applicable;
 - (ii) the names and roles of the personnel responsible for controlling access to the aerodrome and their contact details during and after working hours;
 - (iii) the role of each agency with a key responsibility for aerodrome security;
 - (iv) control of access to personnel and contractors; and
 - (v) control of access of vehicles and equipment, including

issuing of approval for vehicles to operate.

- (c) Aerodrome Emergency Plan- particulars of the aerodrome emergency plan, including the following -
 - (i) plans for dealing with emergencies occurring at the aerodrome or in its vicinity, including the malfunction of aircraft in flight, structural fire, sabotage, including bomb threats (aircraft or structure); unlawful seizure of aircraft, accidental spillage of hazardous materials, and incidents on the aerodrome covering “during the emergency” and “after the emergency” considerations;
 - (ii) details of test for aerodrome facilities and equipment to be used in emergencies, including the frequency of those tests;
 - (iii) details of exercises to test emergency plans, including the frequency of those exercises;
 - (iv) a list of organisations, agencies and persons of authority, both on and off aerodrome, for site roles; their contact details;
 - (v) policy statement of distance aerodrome operator would respond to an aircraft accident of the aerodrome; and
 - (vi) arrangements for determining and implementing plans that ensure the integrated management of response to an aircraft incident or accident.
- (d) Rescue and Firefighting- particulars of the facilities, equipment, personnel and procedures for meeting the rescue and firefighting requirements, including -
 - (i) the names and roles of the persons responsible for dealing with rescue and firefighting services at the aerodrome and their contact details, during and after working hours;
 - (ii) rescue and firefighting category to be provided and actions necessary to upgrade the category;
 - (iii) definition of rescue and firefighting objectives;
 - (iv) definition of how the adequacy of response time capability is monitored and maintained throughout all locations;
 - (v) policy regarding reliance on third parties provision of equipment essential for ensuring safe operation of the aerodrome and contingency plans in event of non-

availability;

- (vi) policy on recruitment and retention of RFF personnel as well as initial and continued competence of RFF personnel; and
 - (vii) policy on RFF facility's response to domestic services and the procedure for managing the impact on normal operations
- (e) Inspection of the Aerodrome Movement Area and Obstacle Limitation Surface by the Aerodrome Operator-particulars of the procedures for the inspection of the aerodrome movement area and obstacle limitation surfaces, including the following-
- (i) arrangement for carrying out inspections, including runway friction and water-depth measurements on runways and taxiways, during and outside the normal hours of aerodrome operations;
 - (ii) description of inspections undertaken and their frequencies;
 - (iii) arrangement and means of communicating with the Aerodrome Air Traffic Control unit during an inspection;
 - (iv) arrangements for keeping an inspection logbook, and the location of the logbook;
 - (v) details of inspection intervals and times;
 - (vi) inspection checklist;
 - (vii) arrangement for reporting the results of inspections and for taking prompt follow-up actions to ensure correction of unsafe conditions;
 - (viii) procedures for restricting aircraft operations on portions of the aerodrome where an unsafe condition exists;
 - (ix) the names and roles of persons responsible for carrying out inspections, and their contact details during and after working hours;
 - (x) procedure to monitor and report the condition of movement areas;
 - (xi) procedure to report the presence of water on runway; and
 - (xii) procedures to report slippery runway condition.
- (f) Visual Aids and Aerodrome Electrical Systems- particulars of the

procedures for the inspection and maintenance of aeronautical lights, signs, markers and aerodrome electrical systems, including the following -

- (i) description of the aerodrome electrical distribution and airfield lighting systems;
 - (ii) arrangement for carrying out inspections during and outside the normal hours of aerodrome operation, and the checklist for such inspection;
 - (iii) arrangements for recording the results of inspections and for taking follow up action to correct deficiencies;
 - (iv) arrangements for carrying out routine maintenance and emergency maintenance;
 - (v) arrangements for secondary power supplies, if any, and, if applicable, the particulars of any other method of dealing with partial or total system failure;
 - (vi) description of method of testing and frequency of the secondary power system;
 - (vii) the names and roles of the persons responsible for the inspection and maintenance of the lighting, electrical systems, signs and markings and their contact details during and after working hours;
 - (viii) description of preventive maintenance measures undertaken; and
 - (ix) description of the emergency maintenance procedures
- (g) Maintenance of the Movement Area- particulars of the facilities and procedures for the maintenance of the movement area, including-
- (i) details of paved areas including year of construction, pavement type and strength and year of most recent major rehabilitation for each applicable area;
 - (ii) inspection schedule and type of inspections, surveys or assessments conducted for paved and unpaved areas including runway and taxiway strips
 - (iii) details concerning friction testing, assessment and corrective programme for removal of rubber build up or surface rehabilitation on the runway

- (iv) arrangements for maintaining the paved areas;
 - (v) arrangements for maintaining the unpaved runways and taxiways;
 - (vi) arrangements for maintaining the runway and taxiway strips; and
 - (vii) arrangements for the maintenance of aerodrome drainage and ensuring it is adequate and serviceable.
- (h) Aerodrome Works Safety- particulars of the procedures for planning and carrying out construction and maintenance work, safely, including work that may have to be carried out at short notice, on or in the vicinity of the movement area which may extend above an obstacle limitation surface, including the following-
 - (i) description of methodology used for implementing works safety plan including use of works notification systems and work authority permits
 - (ii) arrangements for communicating with the aerodrome Air Traffic Control unit during the progress of such work;
 - (iii) the names, contact details and roles of the persons and organizations responsible for planning and carrying out the work, and arrangements for contacting those persons and organizations at all times;
 - (iv) the names and contact details, during and after working hours, of the aerodrome fixed-based operators, ground handling agents and aircraft operators who are to be notified of the work;
 - (v) a distribution list for work plans, if required; and
 - (vi) description of procedures used for closing off, reopening areas for aircraft use and the formal acceptance of Work Areas prior to returning them to serviceability on a daily basis.
- (i) Apron Management- particulars of the apron management procedures, including the following-
 - (i) arrangements between Air Traffic Control and the apron management units;

- (ii) arrangements for allocating aircraft parking positions;
 - (iii) arrangements for initiating engine start and ensuring clearance of aircraft push-back; and
 - (iv) marshalling service and details of who provides follow me vehicle service if required, and how instructions are relayed between the control service, vehicles and aircraft
- (j) Apron Safety Management- procedures to ensure apron safety, including -
 - (i) protection from jet blast;
 - (ii) enforcement of safety precautions during aircraft refuelling operations;
 - (iii) protection from foreign object debris;
 - (iv) description of contingency measures in place for response to spillages of hydrocarbon substances including cleaning of apron surfaces;
 - (v) arrangement for reporting incidents and accidents on the apron;
 - (vi) arrangements for auditing the safety compliance of all personnel working on the apron; and
 - (vii) the names and roles of persons responsible for apron safety oversight including their contact details during and after working hours.
- (k) Airside Vehicle Control- particulars of the procedure for the control of surface vehicles operating on or in the vicinity of the movement area, including the following-
 - (i) details of the applicable traffic rules, including speed limits and the means of enforcing the rules;
 - (ii) details for vehicle serviceability requirements;
 - (iii) the method of issuing driving permits for operating vehicles in the movement area;
 - (iv) a description of the method for issuing vehicle permits for vehicles and ground service equipment. Special attention needs to be given for the types of vehicles or equipment that will remain airside; and

- (v) the names and roles of person(s) responsible for airside driving including their contact details during working hours.
- (l) Wildlife Hazard Management- particulars of the procedures to deal with the danger posed to aircraft operations by the presence of bird or mammals in the aerodrome flight pattern or movement area, including the following -
 - (i) arrangements for assessing wildlife hazards;
 - (ii) arrangements for implementing wildlife control programmes; and
 - (iii) the names and roles of the persons responsible for dealing with wildlife hazards, and their contact details during and after working hour
- (m) Obstacle Control- particulars setting out the procedures for-
 - (i) monitoring the obstacle limitation surfaces and Type A Chart for obstacle in the take-off surface;
 - (ii) controlling obstacles within the authority of the operator;
 - (iii) monitoring the height of buildings or structures within the boundaries of the obstacle limitation surfaces;
 - (iv) controlling new developments in the vicinity of aerodromes; and notifying the Authority of the nature and location of obstacles and any subsequent addition or removal of obstacles for action as necessary, including amendment of the AIS publications;
 - (v) description of the system in place to obtain and report obstacles and terrain data to the Authority in the applicable data collection areas; and
 - (vi) names and roles of the persons responsible for aerodrome safeguarding and the management and control of obstacles at the aerodrome, and their contact details during and after working hours.
- (n) Removal of Disabled Aircraft- particulars of the procedures for removing a disabled aircraft on or adjacent to the movement area, including the following -
 - (i) the roles of the aerodrome operator and the aircraft operator;

- (ii) arrangements for notifying the aircraft operator;
 - (iii) arrangements for liaising with the aerodrome Air Traffic Control unit;
 - (iv) arrangements for obtaining equipment and personnel to remove the disabled aircraft; and
 - (v) the names, roles and contact details of persons responsible for arranging for the removal of disabled aircraft.
- (o) Handling of Hazardous Materials- particulars of the procedures for the safe handling and storage of hazardous material on the aerodrome, including the following-
 - (i) arrangements for special areas on the aerodrome to be set up for the storage of inflammable liquids (including aviation fuels) and any other hazardous materials;
 - (ii) the method to be followed for the delivery, storage, dispensing and handling of hazardous materials;
 - (iii) description of the system in place to test the quality of aviation fuel; and
 - (iv) description of the procedures in place on the apron to ensure safety during aircraft refuelling or defueling operations
- (p) Low-Visibility and Adverse Weather Operations- particulars of procedures to be introduced for low-visibility and adverse operations including -
 - (i) a statement of operation providing detail as to what the lowest meteorological condition limit for which aircraft approaches and departures are approved for the aerodrome;
 - (ii) details of how measurement and reporting of Runway Visual Range is made;
 - (iii) a description of measures undertaken prior to the commencement of operations in low visibility conditions and at what stage they are to be implemented; and
 - (iv) description of system used to control aircraft and vehicles during low visibility operations.
 - (v) overview of the methodology in determining adverse

weather conditions such as high-winds, heavy rains or sandstorms;

- (vi) description of procedure or system used to notify aerodrome stakeholders of adverse weather conditions; and
 - (vii) names and roles of the persons responsible for control of the procedures related to adverse weather conditions at the aerodrome, and their contact details during and after working hours
- (q) Protection of Sites for Radar and Navigational Aids- particulars of the procedures for the protection of sites for radar and radio navigational aids located on the aerodrome to ensure that their performance will not be degraded, including the following-
- (i) description of aerodrome navigation aids;
 - (ii) details of inspection schedule, type of inspection and calibration conducted;
 - (iii) a copy of the checklists used;
 - (iv) details of record keeping arrangements, including corrective actions taken;
 - (v) procedures for reporting the results of the inspection to units responsible for control of aircraft on the movement area, and parties responsible for rectification of any deficiencies found, and follow up;
 - (vi) description of maintenance schedule and preventative maintenance measures undertaken;
 - (vii) details of the number of personnel involved including shift structure to maintain the navigation aids for the aerodrome;
 - (viii) arrangements for the control of activities in the vicinity of radar and navaids installations to ensure there is no interference of signals;
 - (ix) arrangements for ground maintenance in the vicinity of these installations;
 - (x) arrangements for the supply and installation of signs warning of hazardous microwave radiation; and
 - (xi) names and roles of persons responsible for operations and maintenance of radio navigation aids on the aerodrome

including contact details for contact during and after work hours.

(5) PART 5 –AERODROME ADMINISTRATION AND SAFETY MANAGEMENT SYSTEM

(a) Aerodrome Administration and Safety Management System- Particulars of the aerodrome administration, including the following-

- (i) an aerodrome organisational chart showing the names and positions of key personnel, including their responsibilities;
- (ii) the name, position and contact details of the person who has overall responsibility for aerodrome safety;
- (iii) aerodrome committees;

(b) Safety Management System- Particulars of the safety management system established for ensuring compliance with all safety requirements and achieving continuous improvement in safety performance, the essential features being-

- (i) the safety policy, insofar as applicable, on the safety management process and its relation to the operational and maintenance process;
- (ii) the structure or organisation of the SMS, including staffing and the assignment of individual and group responsibilities for safety issues;
- (iii) SMS strategy and planning, such as setting safety performance targets, allocating priorities for implementing safety initiatives and providing a framework for controlling the risks to as low a level as is reasonably practicable keeping always in view the requirements of the Standards and Recommended Practices in Volume I of Annex 14 to the Convention on International Civil Aviation, and the national regulations, standards, rules or orders;
- (iv) SMS implementation, including facilities, methods and procedures for the effective communication of safety messages and the enforcement of safety requirements;
- (v) a system for the implementation of, and action on, critical safety areas which require a higher level of safety management integrity;
- (vi) measures for safety promotion and accident prevention and

a system for risk control involving analysis and handling of accidents, incidents, complaints, defects, faults, discrepancies and failures, and continuing safety monitoring;

- (vii) the internal safety audit and review system detailing the systems and programmes for quality control of safety;
- (viii) the system for documenting all safety-related aerodrome facilities as well as aerodrome operational and maintenance records, including information on the design and construction of aircraft pavements and aerodrome lighting. The system should enable easy retrieval of records including charts;
- (ix) staff training and competency, including the review and evaluation of the adequacy of training provided to staff on safety-related duties and of the certification system for testing their competency; and
- (x) the incorporation and enforcement of safety-related clauses in the contracts for construction work at the aerodrome. The safety policy should include a statement:
 - A. of intent about maintaining or improving current safety performance;
 - B. of intent to minimize the risks of an accident occurring;
 - C. of intent to implement an effective formal safety system;
 - D. about individual and management accountability and responsibility for safety performance;
 - E. about the priority ascribed to flight safety relative to commercial, operational, environmental and working practice pressures;
 - F. about compliance with safety standards and regulatory requirements; and
 - G. about ensuring sub-contractor meet company safety standards and requirements.

1.2 Aerodrome Certificate

- (1) An Aerodrome Certificate and its associated operations specifications shall contain the minimum information required in a standardized format.
- (2) An Aerodrome Certificate shall be based on the following template:

FSS-AGA-CERT 001	
1. THE REPUBLIC OF THE GAMBIA	
	
MINISTRY OF TRANSPORT, WORKS AND INFRASTRUCTURE	
GAMBIA CIVIL AVIATION AUTHORITY	
AERODROME CERTIFICATE	
Name of Airport BANJUL INTERNATIONAL AIRPORT	Certificate Number AC – XXX / YYYY
Latitude/Longitude	Address
This aerodrome certificate is issued by the Director General pursuant the Civil Aviation Aerodrome Regulations 2023 under authority of the Civil Aviation Act, 2018 and authorizes the operator named in the approved Aerodrome Manual to operate this aerodrome. The Director General may suspend or cancel this aerodrome certificate at any time where the Aerodrome Operator fails to comply with the provisions set forth in the Act, the Regulations or for other grounds as set out in the Act. This certificate is subject to any conditions established by the Director General pursuant to the Regulations as well as the approved aerodrome manual. This aerodrome certificate is not transferable and shall remain in effect until transferred, suspended, cancelled or expired.	
Date of Issue	Date of Expiry
_____ Director General, Gambia CAA Any erasure or alteration to this document renders it null and void	
FSS-AWS-FORM 000	September 2023
Page 1 of 1	

1.3 Management Personnel Requirements

The minimum qualification requirements for aerodrome management personnel are as follows:

(1) Accountable Manager-

- (a) Knowledge and understanding of the documents that prescribe relevant aerodrome safety standards;
- (b) Understanding of the requirements for competence of aerodrome management personnel, so as to ensure that competent persons are in place;
- (c) Knowledge and understanding of safety, quality, and security management systems related principles and practices, and how these are applied within the organization;
- (d) Knowledge and understanding of the key issues of risk management within the aerodrome;
- (e) Knowledge of the regulatory framework and SMS;

(2) Aerodrome Safety Manager

- (a) Educated, trained and experienced in safety and quality management
- (b) Comprehensive knowledge of Aerodrome and SMS Manuals
- (c) Technical background to understand the systems that support operations
- (d) Knowledge of the regulatory framework, Aerodrome Certification Process and Enforcement Process

(3) Aerodrome Operations Manager

- (a) Educated, trained and experienced in safety and quality management
- (b) Practical experience and expertise in aerodrome operations or maintenance or similar areas respectively
- (c) Comprehensive knowledge of the applicable requirements in the area of aerodromes
- (d) Appropriate level of knowledge of safety and quality management
- (e) Knowledge of the regulatory framework, Aerodrome Certification Process and Enforcement Process

(4) Aerodrome Maintenance Manager-

- (a) Educated, trained and experienced in safety and quality

management

- (b) Qualified in the role with appropriate education, experience and certification
 - (c) Practical experience and expertise in aerodrome maintenance
 - (d) Comprehensive knowledge of the applicable requirements in the areas of electrical systems, aeronautical ground lighting and pavements
 - (e) Comprehensive knowledge of the Aerodrome and SMS Manuals
 - (f) Knowledge of applicable ICAO guidance materials such as Aerodrome Design Manual
 - (g) Knowledge of the regulatory framework, Aerodrome Certification Process and Enforcement Process
 - (h) Knowledge of the process for the reporting and follow-up of accidents, incidents and emergencies on the aerodrome.
- (5) Rescue Firefighting Service Manager (Chief Fire Officer)
- (a) Educated, trained and experienced in safety and quality management
 - (b) Qualified in the role with appropriate education, experience and certification
 - (c) Practical experience and expertise in aerodrome RFF
 - (d) Comprehensive knowledge of the applicable requirements in the areas of RFF and aerodromes
 - (e) Comprehensive Knowledge of the Aerodrome and SMS Manuals
 - (f) Knowledge of the regulatory framework, Aerodrome Certification Process and Enforcement Process
 - (g) Knowledge of the process for the reporting and follow-up of accidents, incidents and emergencies on the aerodrome
- (6) Quality Assurance Manager
- (a) Educated, trained and experienced in safety and quality management
 - (b) Comprehensive knowledge of the Aerodrome and SMS Manuals
 - (c) Technical background to understand the systems that support

operation

- (d) Knowledge of the regulatory framework, Aerodrome Certification Process and Enforcement Process

1.4 Rescue and Firefighting Personnel Requirements

Training for RFF personnel shall be provided in the following areas:

- (a) fire dynamics, toxicity and basic first aid;
- (b) extinguishing agents and firefighting techniques;
- (c) handling of vehicles, vessels and equipment;
- (d) airfield layout and aircraft construction;
- (e) operational tactics and manoeuvres;
- (f) emergency communication;
- (g) leadership performance;
- (h) physical fitness; and
- (i) auxiliary modules

1.5 Rescue and Firefighting Personnel Training Records

An aerodrome operator shall maintain individual training records for each firefighter, which shall contain as a minimum -

- (a) the name of the individual being trained;
- (b) the date of training;
- (c) the place where training is received;
- (d) the subjects covered and course methodology;
- (e) the climatic conditions, in the case of practical training;
- (f) the duration of training;
- (g) any instructor comments;
- (h) the performance evaluation;

- (i) the name of the instructor; and
- (j) the signature of the student.

1.6 Communication and Alerting System

(1) An aerodrome operator shall provide a communication and alerting system that meets the aircraft firefighting requirements as specified below:

- (a) A discrete communication system that links fire stations on the aerodrome with the control tower and RFF vehicles;
- (b) Direct communication shall be provided between ATC, the activating agency or authority, the fire station, to ensure prompt dispatch of RFF vehicles in the event of an aircraft emergency;
- (c) Communication between ATC and RFF crews en route to, or in attendance at, an aircraft accident or incident to provide guidance to the RFF vehicles;
- (d) Each aircraft firefighting vehicle shall be provided with communication equipment capable of communicating with at least -
 - (i) every other aircraft firefighting vehicle;
 - (ii) the fire station exercising operational control as specified in the Aerodrome Emergency Plan
 - (iii) the air traffic services unit, or the aerodrome traffic frequency; and
 - (iv) an aircraft in a situation of emergency using an established discreet frequency.
- (e) A communication system that ensures the prompt and dependable transmission of alarms and other essential emergency information.
- (f) An alerting system for rescue and firefighting personnel capable of being operated from fire stations on the aerodrome and the control tower; and
- (g) The alerting system required in sub-paragraph (f) above, shall allow the activating agency to alert the personnel and dispatch the aircraft firefighting vehicles.

(2) An aerodrome operator shall provide a secondary power supply or alternate system as a contingency in the event of a primary system failure.

1.7 Aerodrome Wildlife Management Plan

An aerodrome operator shall submit the aerodrome wildlife management plan to the Authority. The plan shall be developed to:

- (a) assess the potential bird strike risk;
- (b) reduce wildlife infestation on the aerodrome as much as practicable;
- (c) implement a safeguarding system to identify, and, where possible, address existing and planned developments within 13 kilometres from the Aerodrome Reference Point, that may have the potential to increase the birdstrike risk;
- (d) monitor and address wildlife activity, strike events; and
- (e) strive to improve the effectiveness of the plan through on-going evaluation by competent personnel

1.8 Content of Aerodrome Wildlife Management Plan

An Aerodrome Wildlife Management Plan shall include at a minimum:

- (a) description for assessing any wildlife hazards;
- (b) description for preventative or corrective action to mitigate risks;
- (c) description for bird hazard/risk management;
- (d) description for preventative/corrective action for bird risks;
- (e) description for reporting bird strikes to the Authority for assessing the potential bird strike risk;
- (f) Bird Hazard Circle Map radiating outward 13 km from the Aerodrome Reference Point; and
- (g) procedure for promulgating information to AIS in regard to the presence of birds constituting a potential hazard to aircraft operations.

1.9 Wildlife Personnel Training Requirements

An aerodrome operator shall provide the following training to persons having duties in respect of aerodrome wildlife management -

- (1) nature and extent of the wildlife management problem;
- (2) regulations, standards and guidance material related to aerodrome wildlife management programmes;

- (3) bird ecology and biology;
- (4) bird identification, including the use of field guides;
- (5) mammal ecology and biology;
- (6) mammal identification, including the use of field guides;
- (7) rare and endangered species and species of special concern;
- (8) habitat management;
- (9) off-aerodrome land use issues;
- (10) active wildlife control measures;
- (11) wildlife removal techniques;
- (12) firearm safety;
- (13) wildlife management planning ; and
- (14) development of awareness programs

1.10 Communication and Alerting Procedure

An aerodrome operator's communication and alerting procedure to be used in order to alert pilots as soon as possible of the wildlife hazards at an aerodrome and associated risks may include -

- (1) Where the aerodrome has air traffic services, bilateral radio communications or broadcast of airport advisories;
- (2) If an immediate alert is required, direct radio contact can be used, when available.
- (3) Publication of a NOTAM in respect of the aerodrome, whether in combination or not with the procedure referred to in (1) or (2) above.

1.11 Aerodrome Data Reporting

An aerodrome operator shall include the following particulars, to the extent that they are applicable, in the aeronautical data to be provided to the Authority for publication:

- (a) Aerodrome Geographical Coordinates – Geographical coordinates indicating latitude and longitude for ground positions at aerodromes shall

be determined and reported in WGS-84 geodetic reference datum.

- (b) Aerodrome Reference Point – An aerodrome reference point shall be established for an aerodrome which shall be located near the initial or planned geometric centre of the aerodrome and shall normally remain where first established. The position of the aerodrome reference point shall be measured and reported in degrees, minutes and seconds.
- (c) Aerodrome and Runway Elevations – The aerodrome elevation and geoid undulation at the aerodrome shall be measured and reported in accordance with specifications prescribed in the Manual of Aerodrome Standards.
- (d) Aerodrome Reference Temperature – The aerodrome reference temperature should 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 should be averaged over a period of years. An aerodrome reference temperature shall be determined for an aerodrome in degrees Celsius.
- (e) Aerodrome Dimensions and Related Information – The following data shall be measured or described, as appropriate, for each facility provided on an aerodrome:
 - (i) runway – true bearing to one-hundredth of a degree, designation number, length, width, displaced threshold location to the nearest metre, slope, surface type, type of runway and, for a precision approach runway category I, the existence of an obstacle free zone when provided;
 - (ii) strip, runway end safety area, stopway – length, width to the nearest metre, surface type;
 - (iii) taxiway – designation, width, surface type;
 - (iv) apron – surface type, aircraft stands;
 - (v) the boundaries of the air traffic control service;
 - (vi) Clearway – length to the nearest metre, ground profile;
 - (vii) visual aids for approach procedures, marking and lighting of runways, taxiways and aprons, other visual guidance and control aids on taxiways and aprons, including runway-holding positions and stop bars, and location and type of visual docking guidance systems;
 - (viii) location and radio frequency of any VOR aerodrome check-point;

- (ix) location and designation of standard taxi-routes; and
 - (x) distances to the nearest metre of localizer and glide path elements comprising an instrument landing system or azimuth and elevation antenna of microwave landing system in relation to the associated runway extremities.
 - (xi) The geographical coordinates of each threshold, appropriate taxiway centre line points and each aircraft stand measured and reported in degrees, minutes, seconds and hundredths of seconds.
 - (xii) The geographical coordinates of significant obstacles in the approach and take-off areas, in the circling area and in the vicinity of an aerodrome measured and reported in degrees, minutes, seconds and tenths of seconds, and in addition, the top elevation rounded up to the nearest metre, type, marking and lighting of the significant obstacles shall be reported
- (f) Strength of Pavements – The bearing strength of a pavement at an aerodrome shall be determined and reported using guidelines prescribed in these regulations.
- (g) Pre-flight Altimeter Check Location – One or more pre-flight altimeter check locations shall be established for the aerodrome and at least a check location shall be located on an apron. The elevation of a pre-flight altimeter check location shall be given as the average elevation, rounded to the nearest metre, of the area on which it is located. The elevation of any portion of a pre-flight altimeter check location shall be within 3m of the average elevation for that location
- (h) Declared Distances – The following distances shall be calculated to the nearest metre for a runway intended for use by international commercial air transport —
- (i) take-off run available;
 - (ii) take-off distance available;
 - (iii) accelerate-stop distance available; and
 - (iv) landing distance available.
- (i) Condition of the Movement Area and Related Facilities – information on the condition of the movement area and the operational status of related facilities shall be monitored and reported in accordance with the requirements specified in these Regulations including information of operational significance to the air navigation service units without delay.

Reports shall include matters of operational significance or affecting aircraft performance, particularly in respect of the following —

- (i) construction or maintenance work;
 - (ii) rough or broken surfaces on a runway, taxiway or an apron;
 - (iii) water on a runway, a taxiway or an apron - The presence of water on a runway including a description of the runway surface conditions and the water depth, where applicable, shall be reported 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 stagnant water; water patches – significant patches of standing water are visible; and
 - (C) flooded – extensive standing water is visible
 - (iv) other temporary hazards, including parked aircraft;
 - (v) failure or irregular operation of part or all of the aerodrome visual aids; and
 - (vi) failure of the normal or secondary power supply.
- (j) Disabled Aircraft Removal – information relating to disabled aircraft removal including the following:
- (a) contact details of the officer of the aerodrome responsible for the coordination of operations for the removal of an aircraft disabled on or adjacent to the movement area; and
 - (b) information concerning the capability to remove an aircraft disabled on or adjacent to the movement area expressed in terms of the largest type of aircraft which the aerodrome is equipped to remove.
- (k) Rescue and Fire Fighting – information relating to aircraft rescue firefighting capability including:
- (a) the level of protection provided for aircraft rescue and firefighting purposes;
 - (b) the level of protection normally available at the aerodrome expressed in terms of the category of the rescue and firefighting services and in accordance with the types and amounts of extinguishing agents normally available at the aerodrome; and

- (c) changes in the level of protection normally available, including information on the new level available, and corrections to such changes.
- (l) Visual Approach Slope Indicator Systems – information concerning the status of the visual approach slope indicator system installed including:
 - (i) associated runway designation number;
 - (ii) type of system installed and on the side of the runway on which the lights are installed;
 - (iii) where the axis of the system is not parallel to the runway centre line, the angle of displacement and the direction of displacement;
 - (iv) nominal approach slope angle; and
 - (v) minimum edge heights over the threshold of the on-slope signal.
- (m) Coordination between the Aerodrome Operator and the Aeronautical Information Services – information regarding the arrangements between the aerodrome operator and the AIS regarding provision of information to the AIS to enable them to provide up-to-date pre-flight information and to meet the need for in-flight information, and to report, with a minimum of delay:
 - (i) information on aerodrome conditions;
 - (ii) the operational status of associated facilities, services and navigation aids within their area of responsibility;
 - (iii) any other information considered to be of operational significance;
 - (iv) due account taken by the aerodrome operator before introducing any changes to the air navigation system with regards to the time needed by the AIS for preparation, production and issue of relevant material for promulgation; and
 - (v) coordination regarding aerodrome operator responsible for the provision of raw aeronautical information and data to the AIS which takes into account specified accuracy and integrity requirements for aeronautical data.

1.12 Information to be included in a Ground Handling Manual

A ground handling organisation shall include the following particulars in a Ground Handling Manual as provided in these Regulations, to the extent that they are applicable to the organisation's operations –

(a) Organization and Administration:

- (i) Legal status of the organization
- (ii) Organizational Chart
- (iii) Duties, responsibilities and reporting structure of all management and operations personnel

(b) Description of the Ground Handling Operations

- (i) Scope of ground handling services
- (ii) Capability statements, including aircraft types
- (iii) Facilities and equipment available

(c) Safety Management System

- (i) Safety policy statement
- (ii) Purpose of safety management system
- (iii) Applicability
- (iv) Safety responsibilities
- (v) Safety training
- (vi) Standard operating procedures
- (vii) Human factors
- (viii) Risk management
- (ix) Audits and inspections
- (x) Safety performance monitoring
- (xi) Emergency response

(d) Ground Handling of Dangerous Goods

- (i) Dangerous goods policy statement
- (ii) Packing, labelling and marking
- (iii) Ground handling organization's responsibilities
- (iv) Provision of information
- (v) Establishment of training program
- (vi) Compliance with Dangerous Goods Regulations

- (e) Ground Handling Procedures (as applicable)
 - (i) Passenger handling
 - (ii) Baggage handling
 - (iii) Cargo or mail handling
 - (iv) Aircraft handling and loading
 - (v) Load control
 - (vi) Airside safety and management
 - (vii) Aircraft movement control
 - (viii) Ground handling agreements
 - (ix) Ground support equipment
- (f) Training Program – Initial and Recurrent
 - (i) Safety training
 - (ii) Driver training
 - (iii) Aircraft handling training
- (g) Ground Handling Quality Audit Schedule; and
- (h) Airside Safety Performance Audit Schedules.

1.13 Runway Condition Code

Runway surface condition shall be assessed and reported through a runway condition code (RWYCC) description using the following terms:

- a) COMPACTED SNOW
- b) DRY
- c) DRY SNOW
- d) DRY SNOW ON TOP OF COMPACTED SNOW
- e) DRY SNOW ON TOP OF ICE
- f) FROST
- g) ICE
- h) SLUSH
- i) STANDING WATER
- j) WATER ON TOP OF COMPACTED SNOW
- k) WET
- l) WET ICE
- m) WET SNOW
- n) WET SNOW ON TOP OF COMPACTED SNOW

- o) WET SNOW ON TOP OF ICE
- p) CHEMICALLY TREATED
- q) LOOSE SAND

SCHEDULE 2

SUPPLEMENTARY PROVISIONS RELATING TO REGULATIONS 55, 83,89,91,93,99,101-103, 106-109, 113, 116-120, 122-126, 130, 135, 136 143, 146, 148, 153, 156,161-164, 1174-178, 180, 181, 183, 185, 187, 188, 193, 215-219 AND 224

2.1 Aerodrome Reference Code

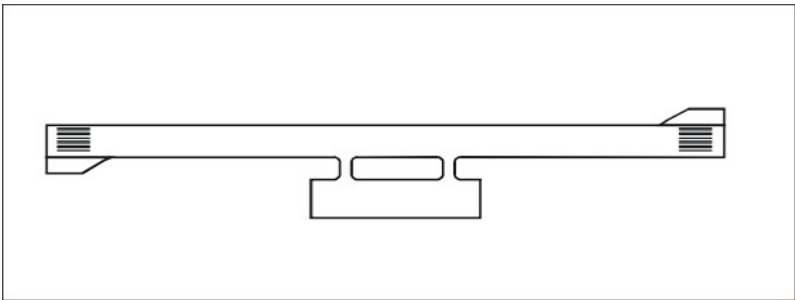
Code element 1	
Code number	Aeroplane reference field length
1	Less than 800 m
2	800 m up to but not including 1 200 m
3	1 200 m up to but not including 1 800 m
4	1 800 m and over
Code element 2	
Code letter	Wingspan
A	Up to but not including 15 m
B	15 m up to but not including 24 m
C	24 m up to but not including 36 m
D	36 m up to but not including 52 m
E	52 m up to but not including 65 m
F	65 m up to but not including 80 m

2.2 Outer Main Gear Wheel Span (Runway)

Outer Main Gear Wheel Span (OMGWS)				
Code number	Up to but not including 4.5 m	4.5 m up to but not including 6 m	6 m up to but not including 9 m	9 m up to but not including 15 m
1 ^a	18 m	18 m	23 m	—
2 ^a	23 m	23 m	30 m	—
3	30 m	30 m	30 m	45 m
4	—	—	45 m	45 m

a. The width of a precision approach runway should be not less than 30 m where the code number is 1 or 2.

2.3 Typical Turn Pad Layout



2.4 Outer Main Gear Wheel Span (Turn pad)

OMGWS				
	Up to but not including 4.5 m	4.5 m up to but not including 6 m	6 m up to but not including 9 m	9 m up to but not including 15 m
Clearance	1.50 m	2.25 m	3 m ^a or 4 m ^b	4 m
^{a.} If the turn pad is intended to be used by aeroplanes with a wheel base less than 18 m.				
^{b.} If the turn pad is intended to be used by aeroplanes with a wheel base equal to or greater than 18 m.				

2.5 Outer Main Gear Wheel Span (Taxiways 1)

OMGWS				
	Up to but not including 4.5 m	4.5 m up to but not including 6 m	6 m up to but not including 9 m	9 m up to but not including 15 m
Clearance	1.50 m	2.25 m	3 m ^{a,b} or 4 m ^c	4 m
^{a.} On straight portions.				
^{b.} On curved portions if the taxiway is intended to be used by aeroplanes with a wheel base of less than 18 m.				
^{c.} On curved portions if the taxiway is intended to be used by aeroplanes with a wheel base equal to or greater than 18 m.				

2.6 Outer Main Gear Wheel Span (Taxiways 2)

OMGWS				
	Up to but not including 4.5 m	4.5 m up to but not including 6 m	6 m up to but not including 9 m	9 m up to but not including 15 m
Taxiway width	7.5 m	10.5 m	15 m	23 m

2.7 Taxiway Minimum Separation Distances

Code letter	Distance between taxiway centre line and runway centre line (metres)								Taxiway centre line to taxiway centre line (metres)	Taxiway, other than aircraft stand taxilane, centre line to object (metres)	Aircraft stand taxilane centre line to aircraft stand taxilane centre line (metres)	Aircraft stand taxilane centre line to object (metres)
	Instrument runways				Non-instrument runways							
	Code number				Code number							
	1	2	3	4	1	2	3	4				
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
A	77.5	77.5	—	—	37.5	47.5	—	—	23	15.5	19.5	12
B	82	82	152	—	42	52	87	—	32	20	28.5	16.5
C	88	88	158	158	48	58	93	93	44	26	40.5	22.5
D	—	—	166	166	—	—	101	101	63	37	59.5	33.5
E	—	—	172.5	172.5	—	—	107.5	107.5	76	43.5	72.5	40
F	—	—	180	180	—	—	115	115	91	51	87.5	47.5

Note 1.— The separation distances shown in columns (2) to (9) represent ordinary combinations of runways and taxiways. The basis for development of these distances is given in the Aerodrome Design Manual (Doc 9157), Part 2.

Note 2.— The distances in columns (2) to (9) do not guarantee sufficient clearance behind a holding aeroplane to permit the passing of another aeroplane on a parallel taxiway. See the Aerodrome Design Manual (Doc 9157), Part 2.

2.8 Minimum distance from the runway centre line to a holding bay, runway-holding position or road holding position

Type of runway	Code number			
	1	2	3	4
Non-instrument	30 m	40 m	75 m	75 m
Non-precision approach	40 m	40 m	75 m	75 m
Precision approach category I	60 m ^b	60 m ^b	90 m ^{a,b}	90 m ^{a,b}
Precision approach categories II and III	—	—	90 m ^{a,b}	90 m ^{a,b}
Take-off runway	30 m	40 m	75 m	75 m

a. If a holding bay, runway-holding position or road-holding position is at a lower elevation compared to the threshold, the distance may be decreased 5 m for every metre the bay or holding position is lower than the threshold, contingent upon not infringing the inner transitional surface.

b. This distance may need to be increased to avoid interference with radio navigation aids, particularly the glide path and localizer facilities. Information on critical and sensitive areas of ILS and MLS is contained in Annex 10, Volume I, Attachments C and G, respectively (see also 3.12.6).

Note 1.— The distance of 90 m for code number 3 or 4 is based on an aircraft with a tail height of 20 m, a distance from the nose to the highest part of the tail of 32.7 m and a nose height of 10 m holding at an angle of 45° or more with respect to the runway centre line, being clear of the obstacle free zone and not accountable for the calculation of OCA/H.

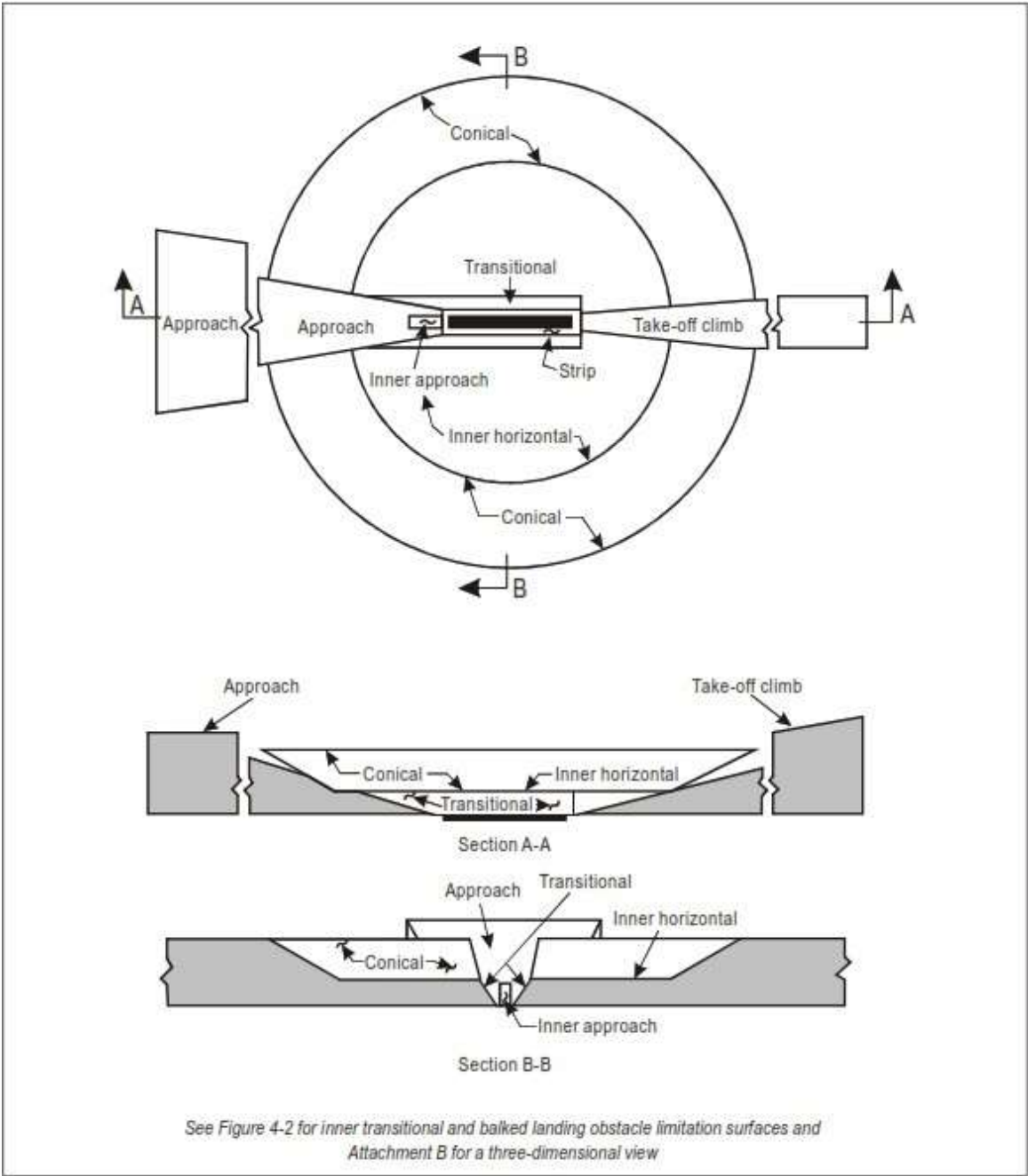
Note 2.— The distance of 60 m for code number 2 is based on an aircraft with a tail height of 8 m, a distance from the nose to the highest part of the tail of 24.6 m and a nose height of 5.2 m holding at an angle of 45° or more with respect to the runway centre line, being clear of the obstacle free zone.

Note 3.— For code number 4 where the width of the inner edge of the inner approach surface is more than 120 m, a distance greater than 90 m may be necessary to ensure that a holding aircraft is clear of the obstacle free zone. For example, a distance of 100 m is based on an aircraft with a tail height of 24 m, a distance from the nose to the highest part of the tail of 62.2 m and a nose height of 10 m holding at an angle of 45° or more with respect to the runway centre line, being clear of the obstacle free zone.

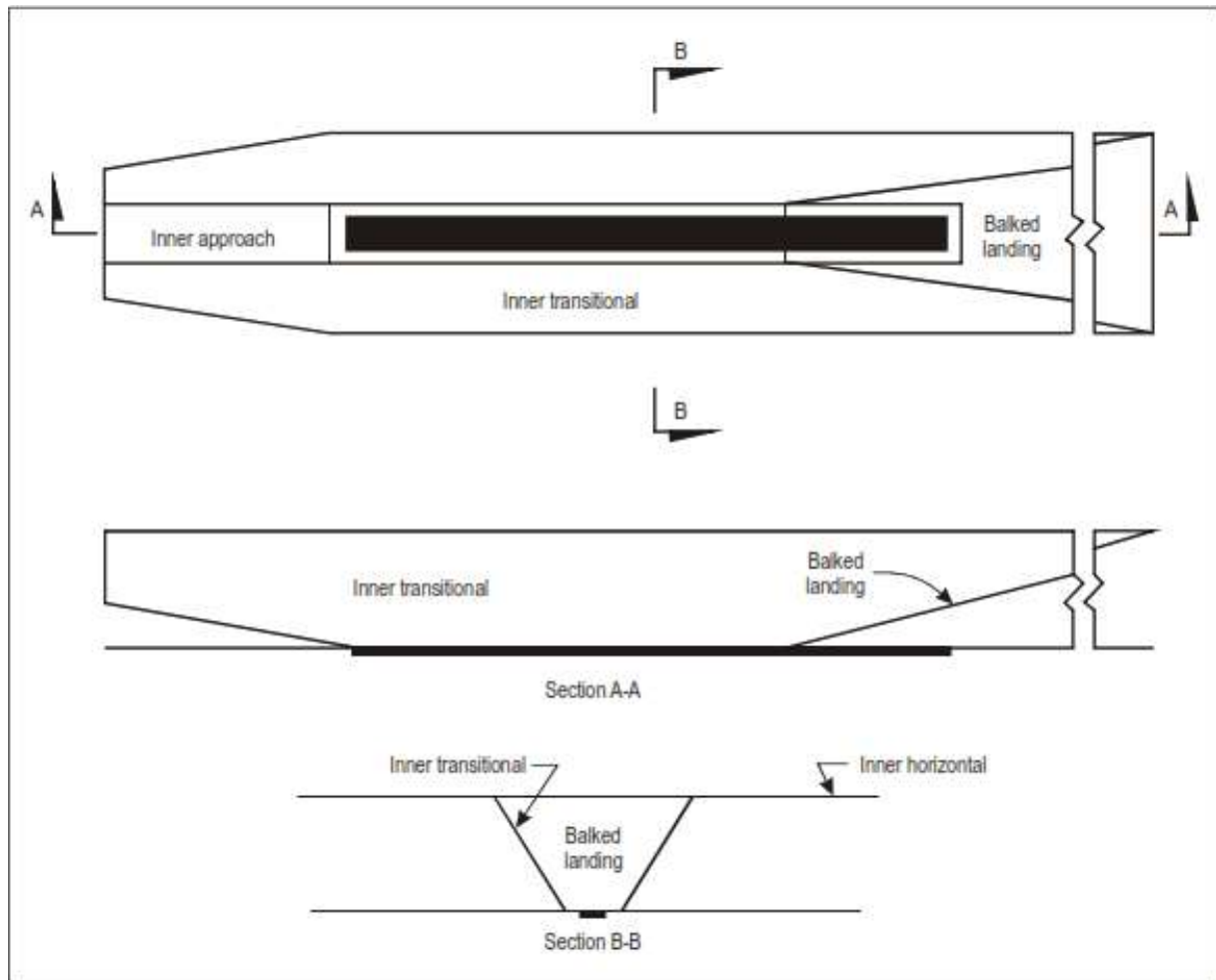
2.9 Minimum clearances between an aircraft entering or exiting the stand and any adjacent building, aircraft on another stand and other objects

Code letter	Clearance
<i>A</i>	<i>3 m</i>
<i>B</i>	<i>3 m</i>
<i>C</i>	<i>4.5 m</i>
<i>D</i>	<i>7.5 m</i>
<i>E</i>	<i>7.5 m</i>
<i>F</i>	<i>7.5 m</i>

2.10 Obstacle Limitation Surfaces



2.11 Inner approach, inner transitional and balked landing obstacle limitation surfaces



2.12 Dimensions and slopes of obstacle limitation surfaces for Approach Runways

Surface and dimensions ^d (1)	RUNWAY CLASSIFICATION									
	Non-instrument				Non-precision approach			Precision approach category		
	Code number				Code number			I		II or III
	1 (2)	2 (3)	3 (4)	4 (5)	1,2 (6)	3 (7)	4 (8)	Code number 1,2 (9)	3,4 (10)	Code number 3,4 (11)
CONICAL										
Slope	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Height	35 m	55 m	75 m	100 m	60 m	75 m	100 m	60 m	100 m	100 m
INNER HORIZONTAL										
Height	45 m	45 m	45 m	45 m	45 m	45 m	45 m	45 m	45 m	45 m
Radius	2 000 m	2 500 m	4 000 m	4 000 m	3 500 m	4 000 m	4 000 m	3 500 m	4 000 m	4 000 m
INNER APPROACH										
Width	—	—	—	—	—	—	—	90 m	120 m ^c	120 m ^c
Distance from threshold	—	—	—	—	—	—	—	60 m	60 m	60 m
Length	—	—	—	—	—	—	—	900 m	900 m	900 m
Slope	—	—	—	—	—	—	—	2.5%	2%	2%
APPROACH										
Length of inner edge	60 m	80 m	150 m	150 m	140 m	280 m	280 m	140 m	280 m	280 m
Distance from threshold	30 m	60 m	60 m	60 m	60 m	60 m	60 m	60 m	60 m	60 m
Divergence (each side)	10%	10%	10%	10%	15%	15%	15%	15%	15%	15%
First section										
Length	1 600 m	2 500 m	3 000 m	3 000 m	2 500 m	3 000 m	3 000 m	3 000 m	3 000 m	3 000 m
Slope	5%	4%	3.33%	2.5%	3.33%	2%	2%	2.5%	2%	2%
Second section										
Length	—	—	—	—	—	3 600 m ^b	3 600 m ^b	12 000 m	3 600 m ^b	3 600 m ^b
Slope	—	—	—	—	—	2.5%	2.5%	3%	2.5%	2.5%
Horizontal section										
Length	—	—	—	—	—	8 400 m ^b	8 400 m ^b	—	8 400 m ^b	8 400 m ^b
Total length	—	—	—	—	—	15 000 m	15 000 m	15 000 m	15 000 m	15 000 m
TRANSITIONAL										
Slope	20%	20%	14.3%	14.3%	20%	14.3%	14.3%	14.3%	14.3%	14.3%
INNER TRANSITIONAL										
Slope	—	—	—	—	—	—	—	40%	33.3%	33.3%
BALKED LANDING SURFACE										
Length of inner edge	—	—	—	—	—	—	—	90 m	120 m ^c	120 m ^c
Distance from threshold	—	—	—	—	—	—	—	c	1 800 m ^d	1 800 m ^d
Divergence (each side)	—	—	—	—	—	—	—	10%	10%	10%
Slope	—	—	—	—	—	—	—	4%	3.33%	3.33%

a. All dimensions are measured horizontally unless specified otherwise.

b. Variable length (see 4.2.9 or 4.2.17).

c. Distance to the end of strip.

d. Or end of runway whichever is less.

e. Where the code letter is F (Table 1-1), the width is increased to 140 m except for those aerodromes that accommodate a code letter F aeroplane equipped with digital avionics that provide steering commands to maintain an established track during the go-around manoeuvre.

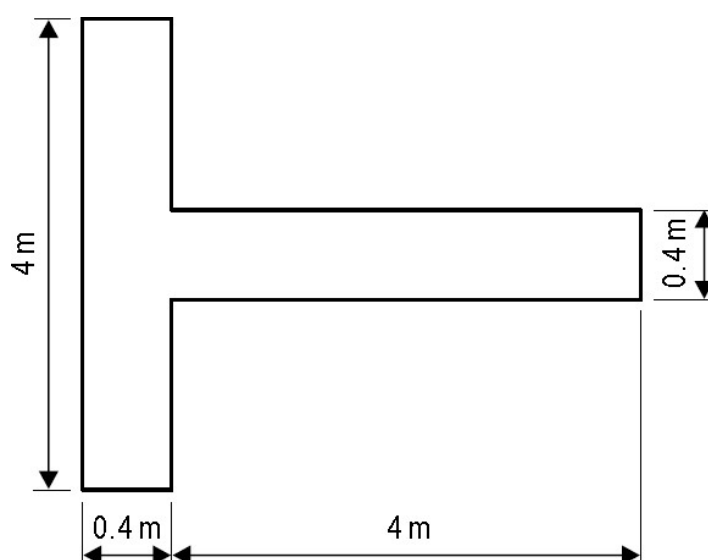
Note.— See Circulars 301 and 345 (forthcoming), and Chapter 4 of the PANS-Aerodromes, Part 1 (Doc 9981) for further information.

2.13 Dimensions and slopes for obstacle limitation surfaces

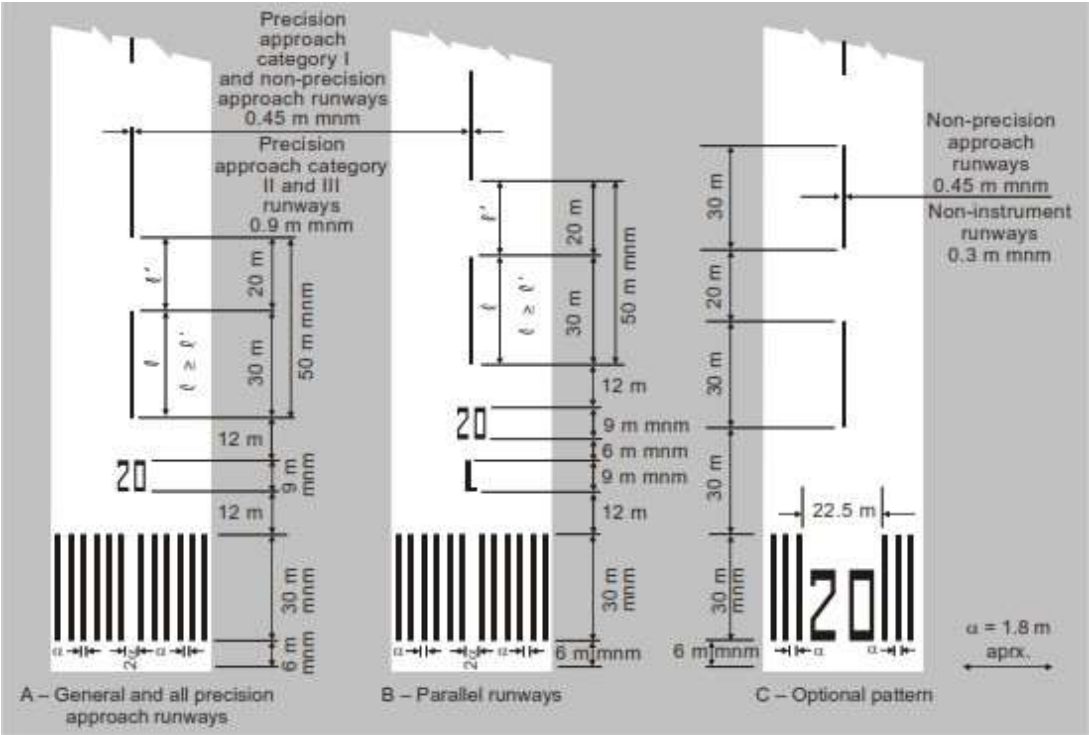
RUNWAYS MEANT FOR TAKE-OFF

Surface and dimensions ^a (1)	Code number		
	1 (2)	2 (3)	3 or 4 (4)
TAKE-OFF CLIMB			
Length of inner edge	60 m	80 m	180 m
Distance from runway end ^b	30 m	60 m	60 m
Divergence (each side)	10%	10%	12.5%
Final width	380 m	580 m	1 200 m 1 800 m ^c
Length	1 600 m	2 500 m	15 000 m
Slope	5%	4%	2% ^d
a. All dimensions are measured horizontally unless specified otherwise. b. The take-off climb surface starts at the end of the clearway if the clearway length exceeds the specified distance. c. 1 800 m when the intended track includes changes of heading greater than 15° for operations conducted in IMC, VMC by night. d. See 4.2.24 and 4.2.26.			

2.14 Landing Direction Indicator



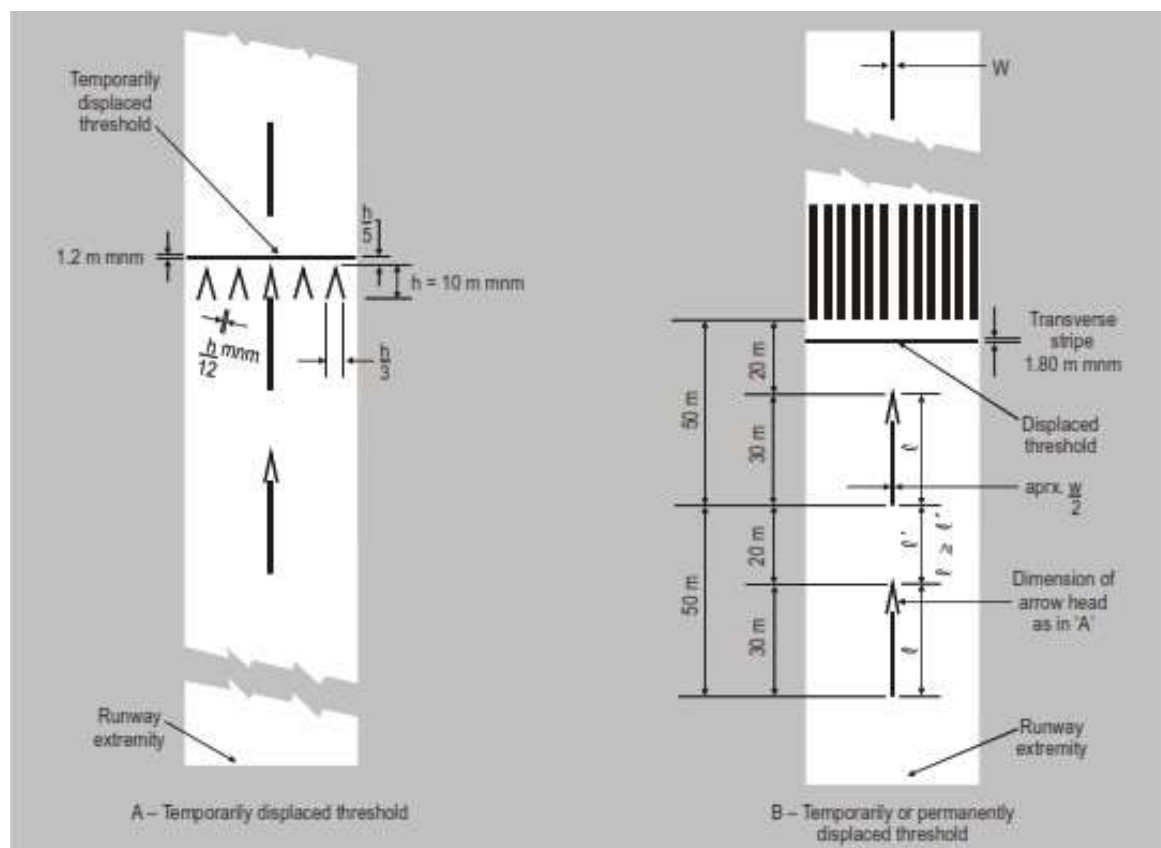
2.15 Runways designation, Centre Line and Threshold Markings



2.17 Runway Width and Number of Stripes

<i>Runway width</i>	<i>Number of stripes</i>
18 m	4
23 m	6
30 m	8
45 m	12
60 m	16

2.18 Displaced Threshold Markings



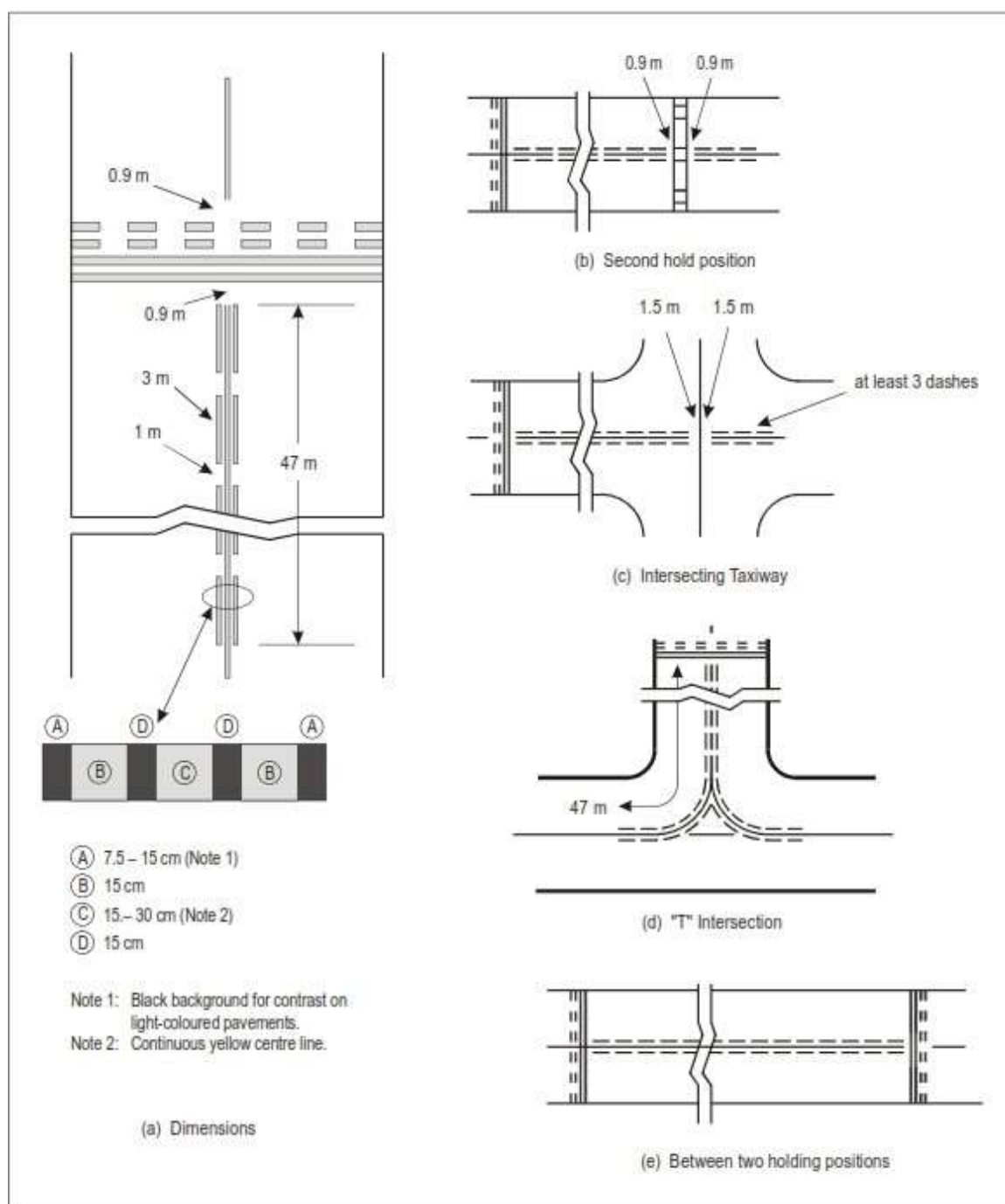
2.19 Location and Dimensions of Aiming Point Marking

Location and dimensions (1)	Landing distance available			
	Less than 800 m (2)	800 m up to but not including 1 200 m (3)	1 200 m up to but not including 2 400 m (4)	2 400 m and above (5)
Distance from threshold to beginning of marking	150 m	250 m	300 m	400 m
Length of stripe ^a	30–45 m	30–45 m	45–60 m	45–60 m
Width of stripe	4 m	6 m	6–10 m ^b	6–10 m ^b
Lateral spacing between inner sides of stripes	6 m ^c	9 m ^c	18–22.5 m	18–22.5 m
a. The greater dimensions of the specified ranges are intended to be used where increased conspicuity is required. b. The lateral spacing may be varied within these limits to minimize the contamination of the marking by rubber deposits. c. These figures were deduced by reference to the outer main gear wheel span which is element 2 of the aerodrome reference code at Chapter 1, Table I-1.				

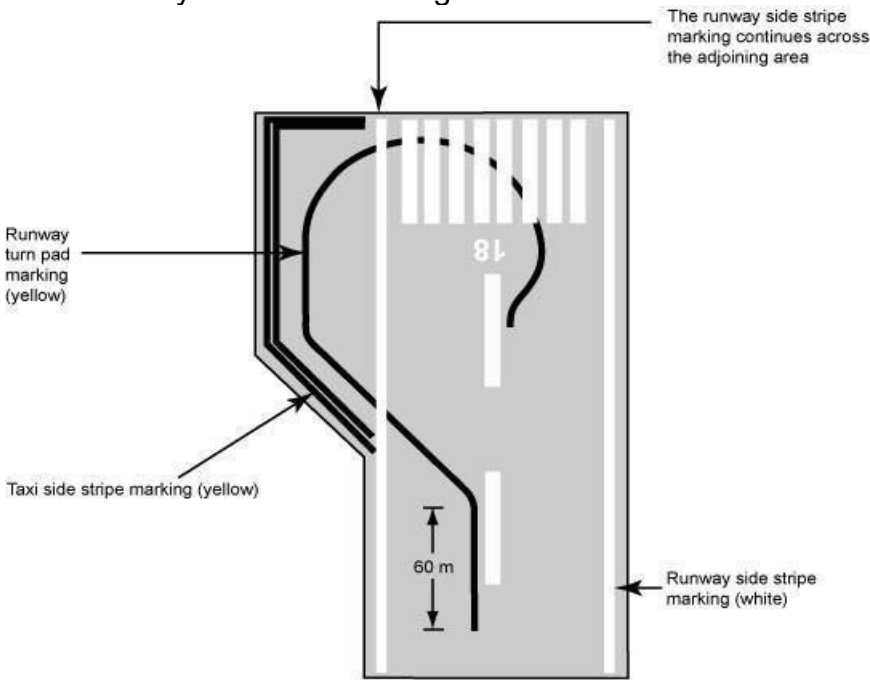
2.20 Landing Distance Available / the distance between thresholds and Pair(s) of markings

<i>Landing distance available or the distance between thresholds</i>	<i>Pair(s) of markings</i>
less than 900 m	1
900 m up to but not including 1 200 m	2
1 200 m up to but not including 1 500 m	3
1 500 m up to but not including 2 400 m	4
2 400 m or more	6

2.23 Enhanced Taxiway Centre Line Marking

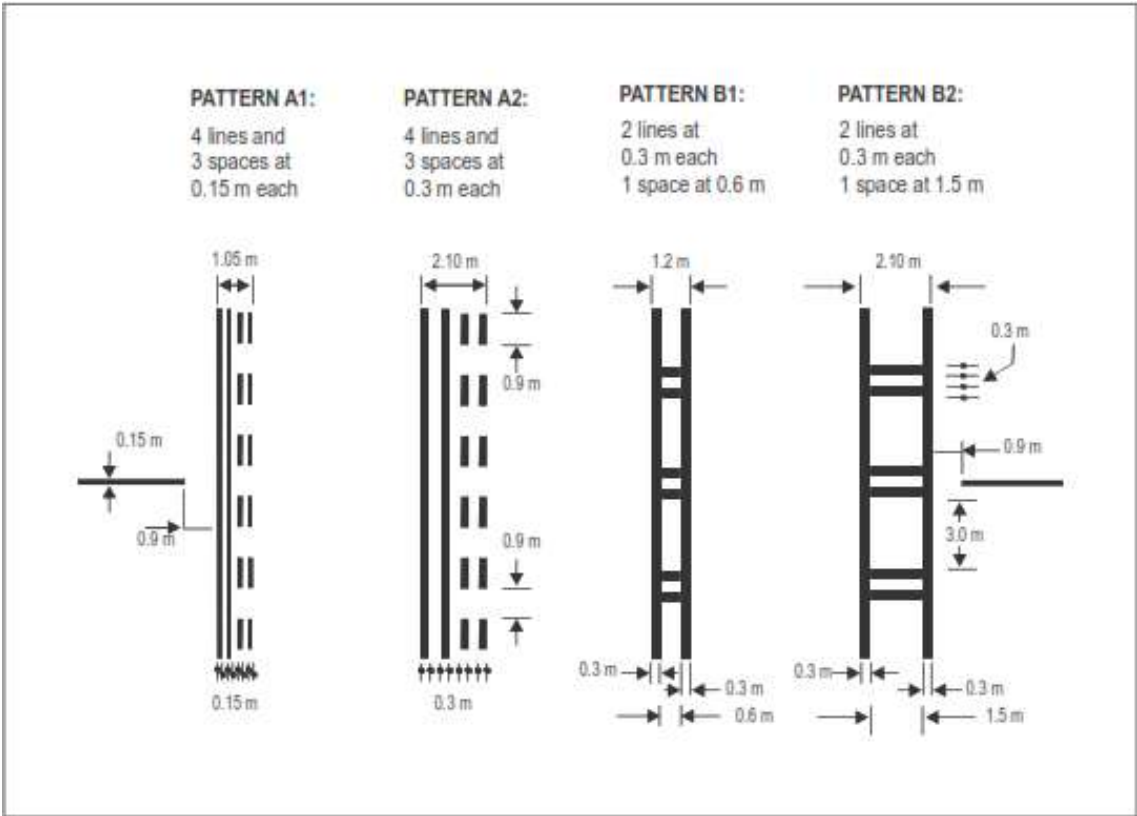


2.24 Runway Turn Pad Markings

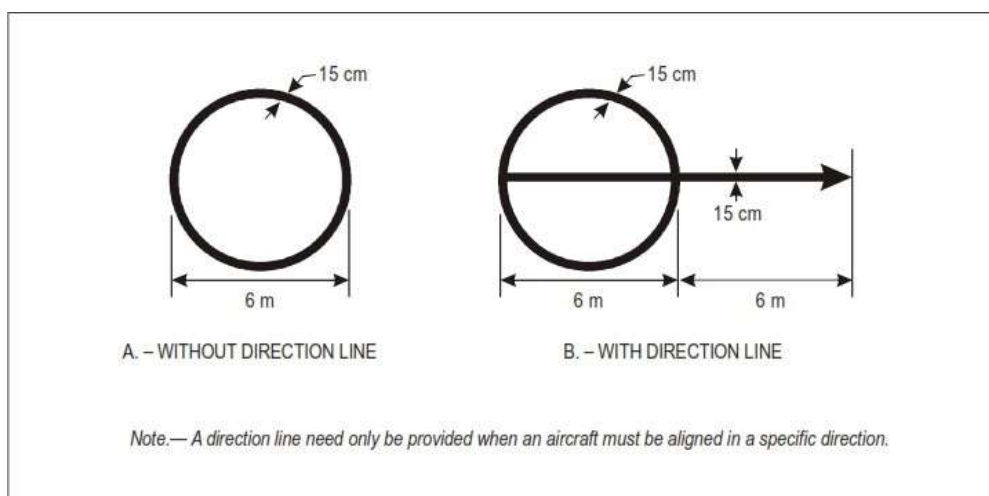


Runway turn pad markings (not to scale)

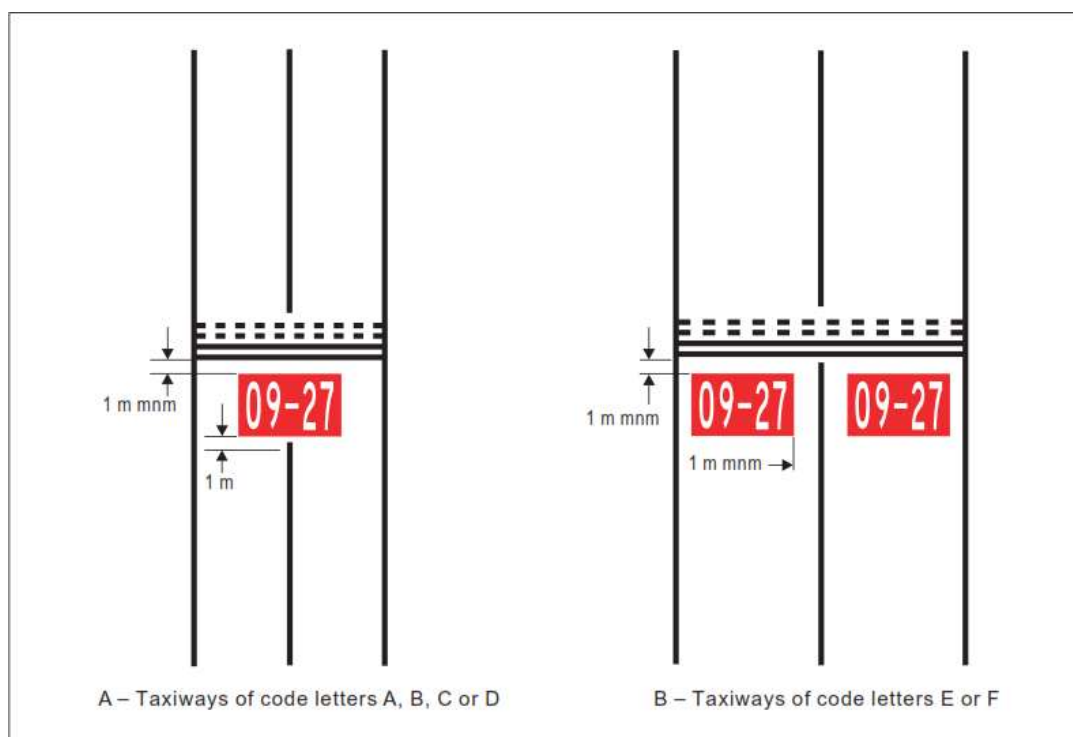
2.25 Runway-holding Position Markings



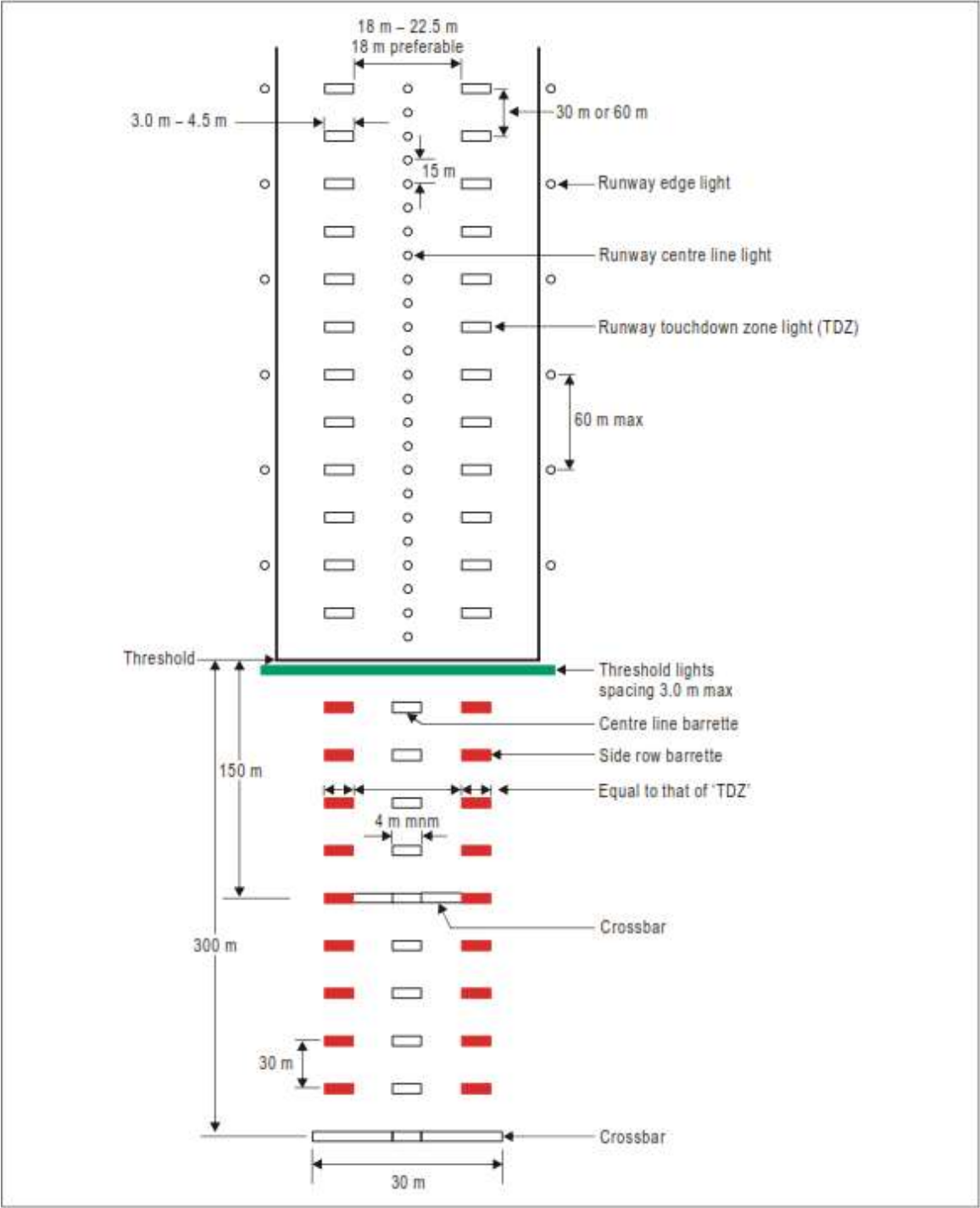
2.26 VOR Aerodrome Checkpoint Marking



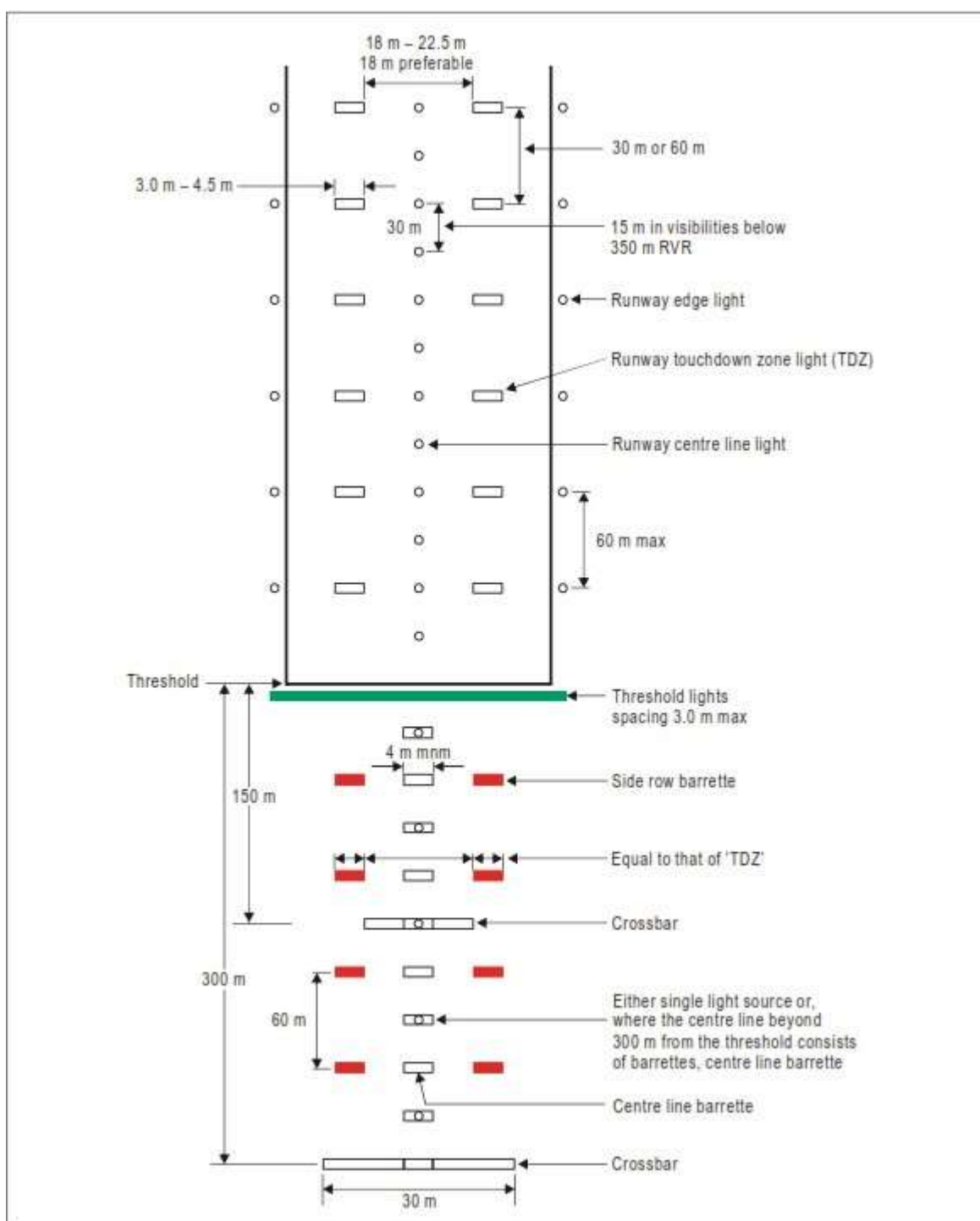
2.27 Mandatory Instruction Marking



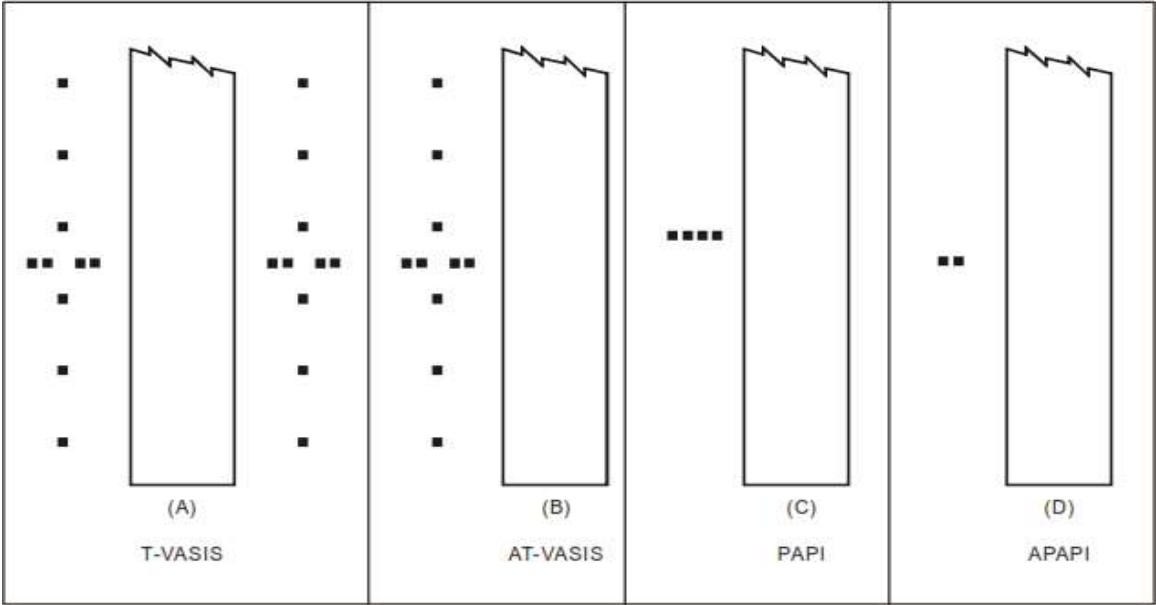
2.28 Inner 300m Approach and Runway Lighting for Precision Approach Runways, Categories II and III



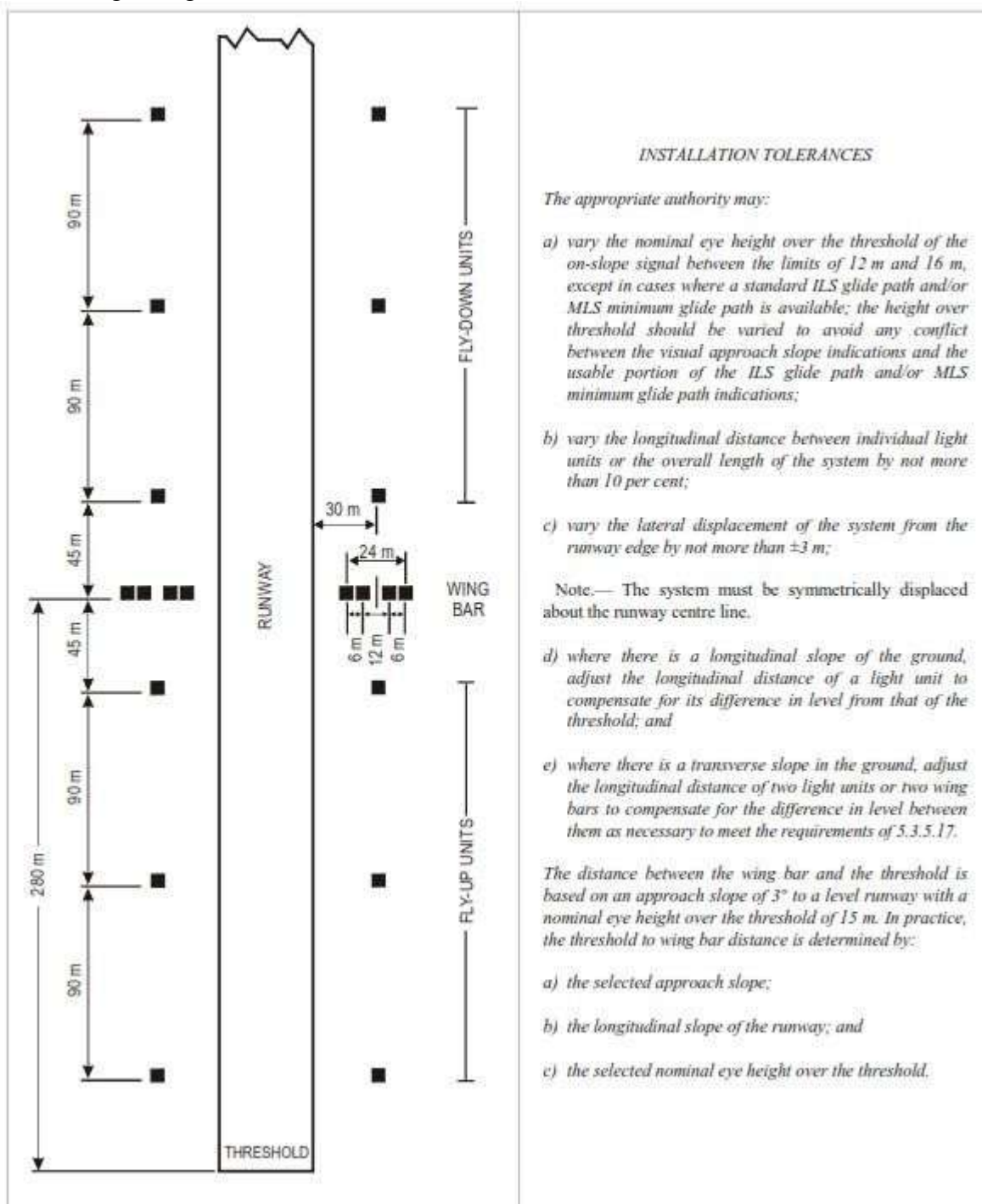
2.29 Inner 300m approach and runway lighting for precision approach runways, categories II and III, where the serviceability levels of the lights specified as maintenance objectives in Part XI can be demonstrated



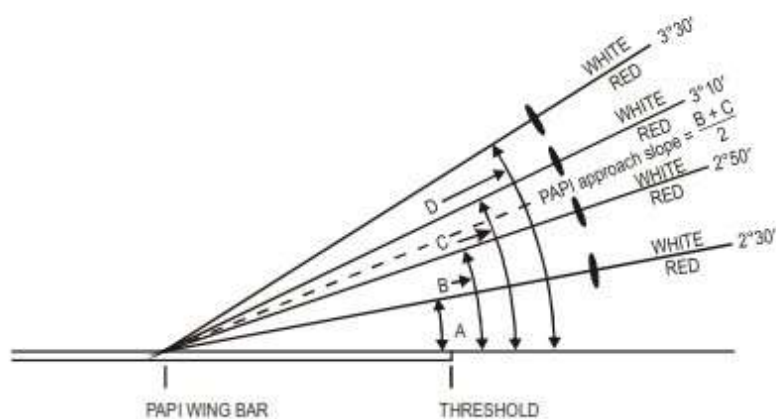
2.30 Visual Approach Slope Indicator Systems



2.31 Siting of Light Units for T-VASIS

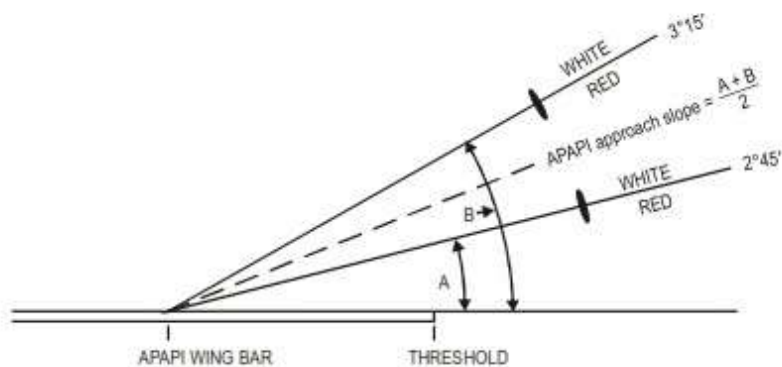


2.34 Light beams and Angle of Elevation Setting of PAPI and APAPI



The height of the pilot's eye above the aircraft's ILS glide path/MLS antenna varies with the type of aeroplane and approach attitude. Harmonization of the PAPI signal and ILS glide path and/or MLS minimum glide path to a point closer to the threshold may be achieved by increasing the on-course sector from 20' to 30'. The setting angles for a 3° glide slope would then be 2°25', 2°45', 3°15' and 3°35'.

A — 3° PAPI ILLUSTRATED



B — 3° APAPI ILLUSTRATED

2.35 Wheel Clearance Over Threshold for PAPI and APAPI

Eye-to-wheel height of aeroplane in the approach configuration ^a	Desired wheel clearance (metres) ^{b,c}	Minimum wheel clearance (metres) ^d
(1)	(2)	(3)
up to but not including 3 m	6	3 ^e
3 m up to but not including 5 m	9	4
5 m up to but not including 8 m	9	5
8 m up to but not including 14 m	9	6

a. In selecting the eye-to-wheel height group, only aeroplanes meant to use the system on a regular basis shall be considered. The most demanding amongst such aeroplanes shall determine the eye-to-wheel height group.

b. Where practicable the desired wheel clearances shown in column (2) shall be provided.

c. The wheel clearances in column (2) may be reduced to no less than those in column (3) where an aeronautical study indicates that such reduced wheel clearances are acceptable.

d. When a reduced wheel clearance is provided at a displaced threshold it shall be ensured that the corresponding desired wheel clearance specified in column (2) will be available when an aeroplane at the top end of the eye-to-wheel height group chosen overflies the extremity of the runway.

e. This wheel clearance may be reduced to 1.5 m on runways used mainly by light-weight non-turbojet aeroplanes.

2.36 Dimensions and Slopes of Obstacle Protection Surfaces

Surface dimensions	Runway type/code number							
	Non-instrument Code number				Instrument Code number			
	1	2	3	4	1	2	3	4
Length of inner edge	60 m	80 m ^a	150 m	150 m	150 m	150 m	300 m	300 m
Distance from the visual approach slope indicator system ^e	D ₁ +30 m	D ₁ +60 m	D ₁ +60 m	D ₁ +60 m	D ₁ +60 m	D ₁ +60 m	D ₁ +60 m	D ₁ +60 m
Divergence (each side)	10%	10%	10%	10%	15%	15%	15%	15%
Total length	7 500 m	7 500 m ^b	15 000 m	15 000 m	7 500 m	7 500 m ^b	15 000 m	15 000 m
<i>Slope</i>								
a) T-VASIS and AT-VASIS	— ^c	1.9°	1.9°	1.9°	—	1.9°	1.9°	1.9°
b) PAPI ^d	—	A-0.57°	A-0.57°	A-0.57°	A-0.57°	A-0.57°	A-0.57°	A-0.57°
c) APAPI ^d	A-0.9°	A-0.9°	—	—	A-0.9°	A-0.9°	—	—

a. This length is to be increased to 150 m for a T-VASIS or AT-VASIS.

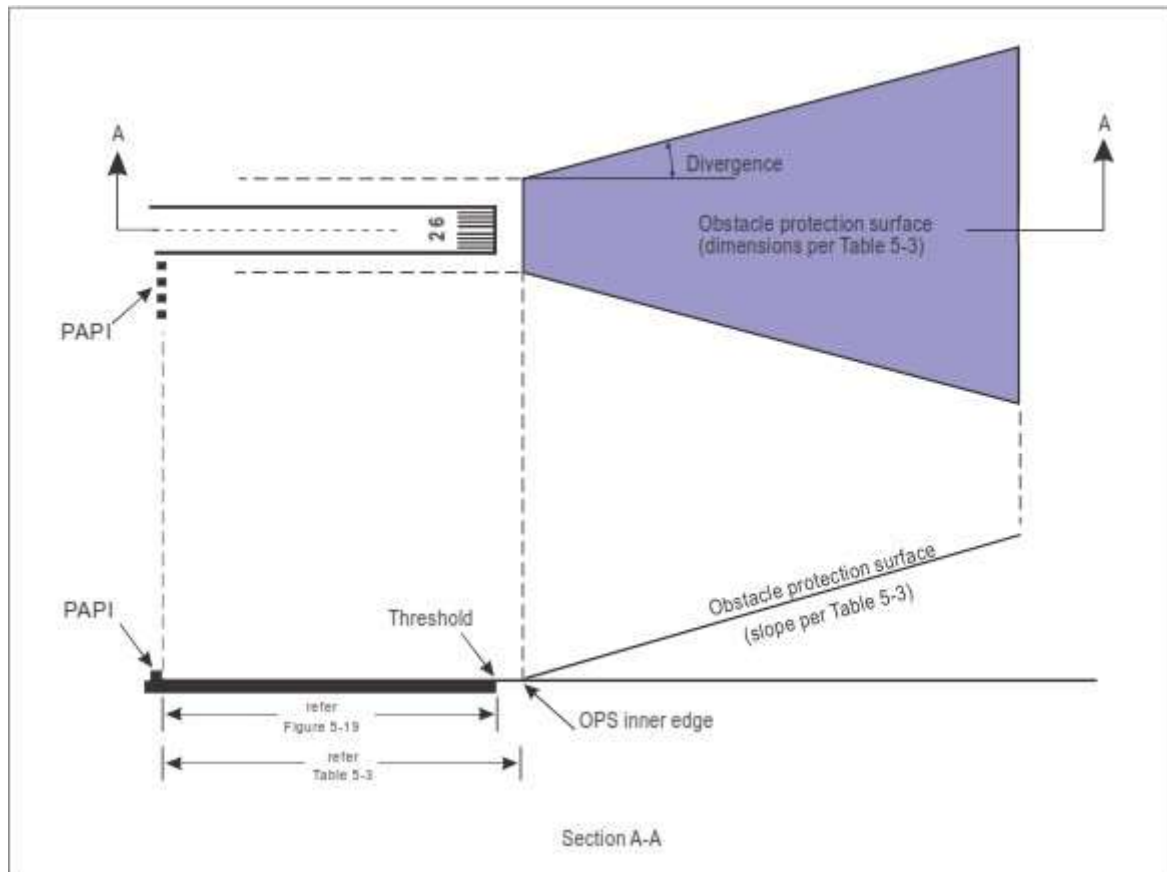
b. This length is to be increased to 15 000 m for a T-VASIS or AT-VASIS.

c. No slope has been specified if a system is unlikely to be used on runway type/code number indicated.

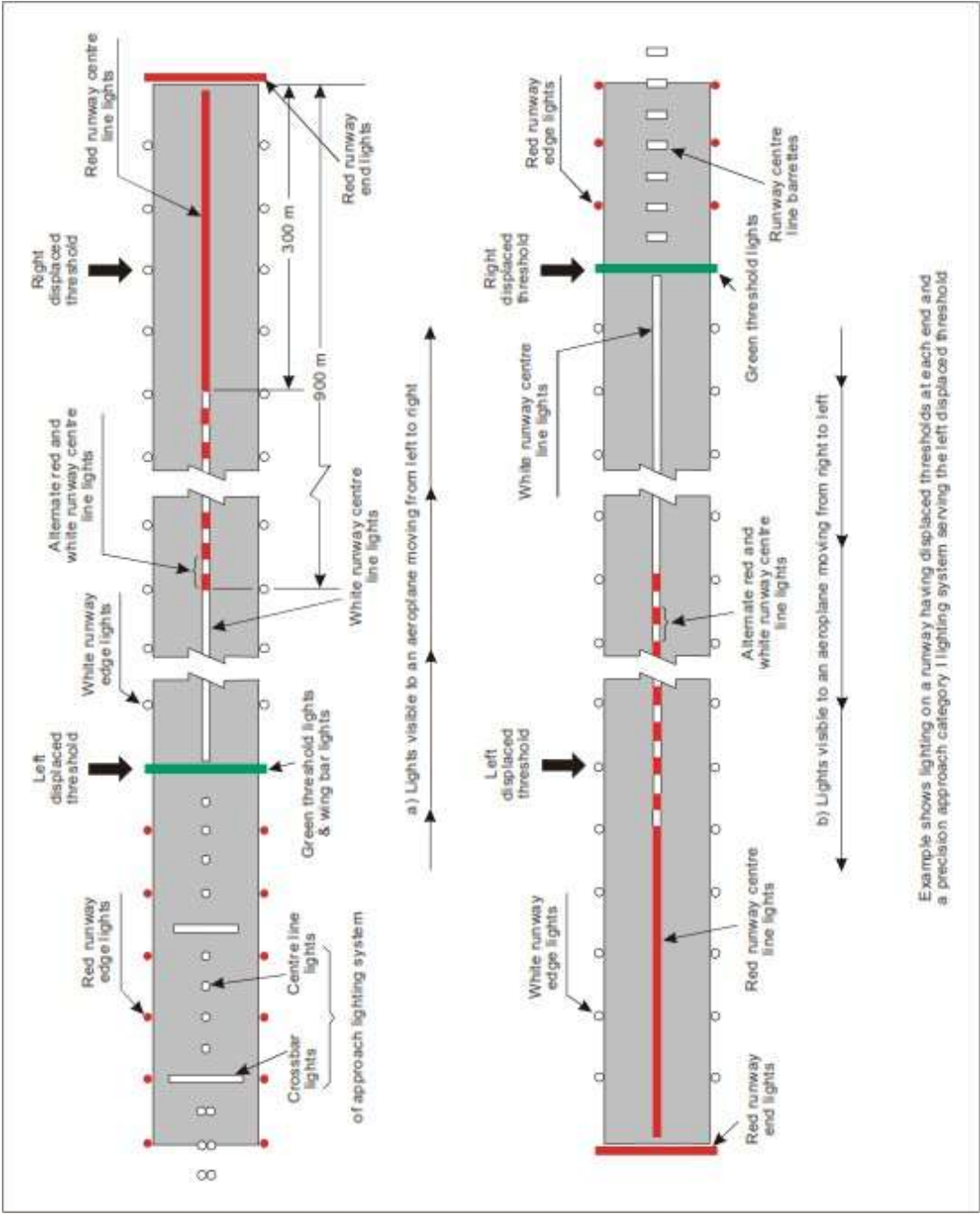
d. Angles as indicated in Figure 5-20.

e. D₁ is the distance of the visual approach slope indicator system from threshold prior to any displacement to remedy object penetration of the OPS (refer Figure 5-19). The start of the OPS is fixed to the visual approach slope indicator system location, such that displacement of the PAPI results in an equal displacement of the start of the OPS. See 5.3.5.46 e).

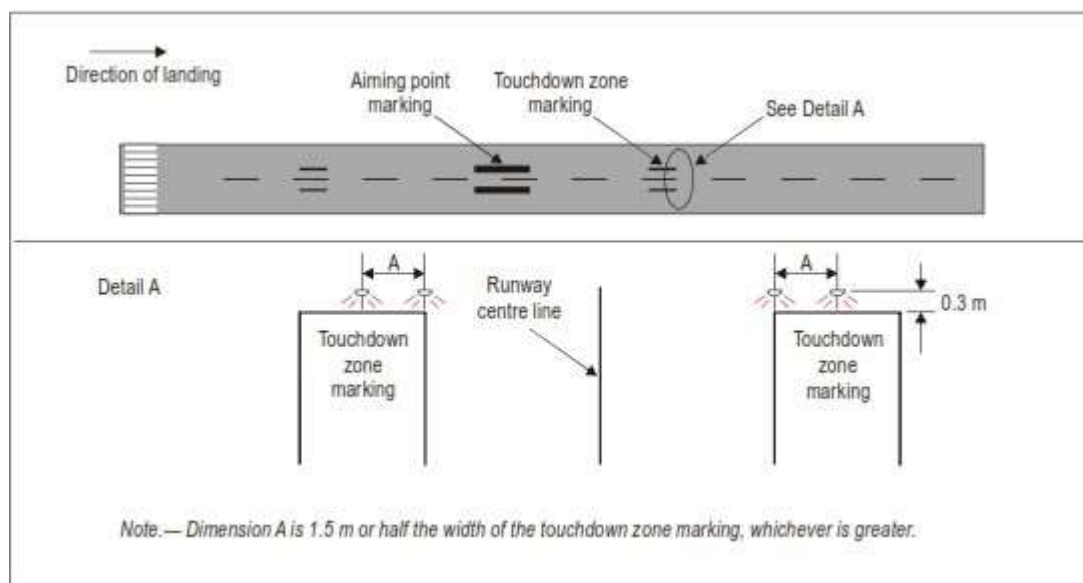
2.37 Obstacle Protection Surface for Visual Approach Slope Indicator Systems



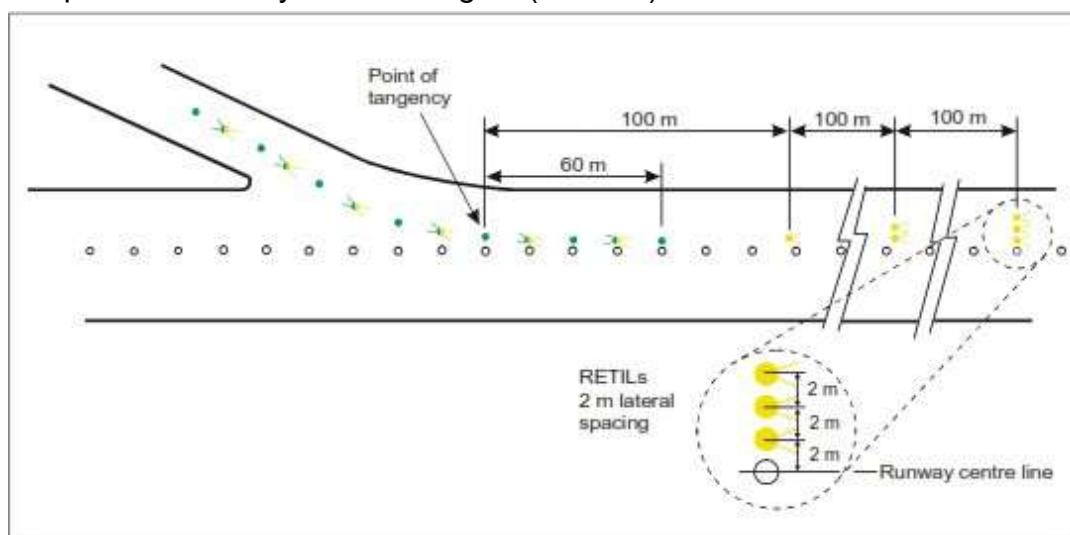
2.38 Example of Approach and Runway Lighting for Runway with Displaced Threshold



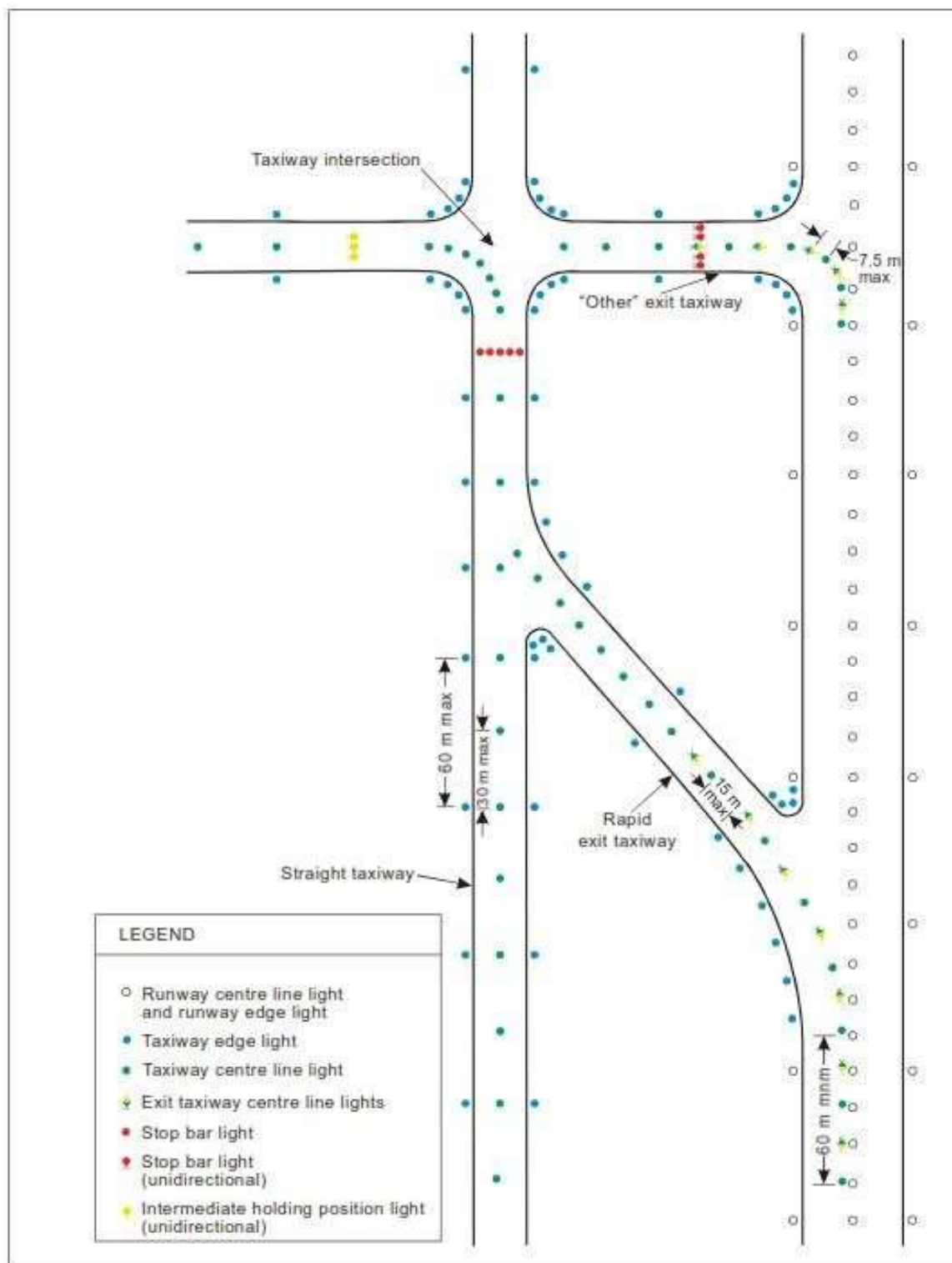
2.39 Simple Touchdown Zone Lighting



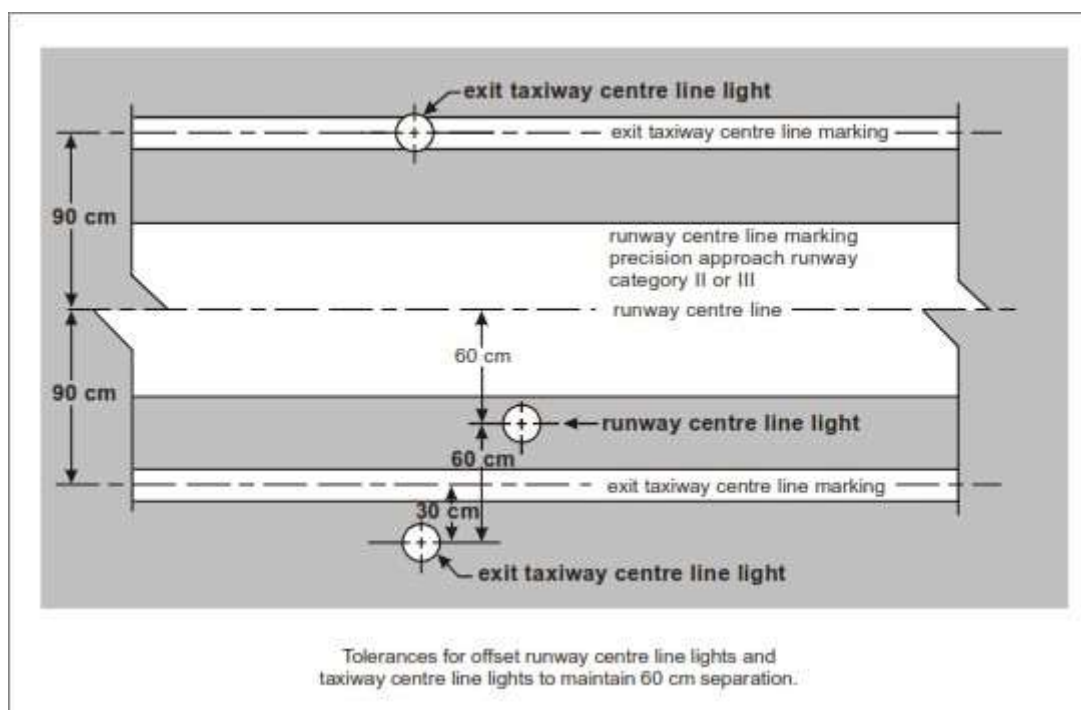
2.40 Rapid Exit Taxiway Indicator Lights (RETILs)



2.41 Taxiway Lighting



2.42 Offset Runway and Taxiway Centre Line Lights



2.43 A-VDGS Recommended Displacement Accuracy

Guidance information	Maximum deviation at stop position (stop area)	Maximum deviation at 9 m from stop position	Maximum deviation at 15 m from stop position	Maximum deviation at 25 m from stop position
Azimuth	±250 mm	±340 mm	±400 mm	±500 mm
Distance	±500 mm	±1 000 mm	±1 300 mm	Not specified

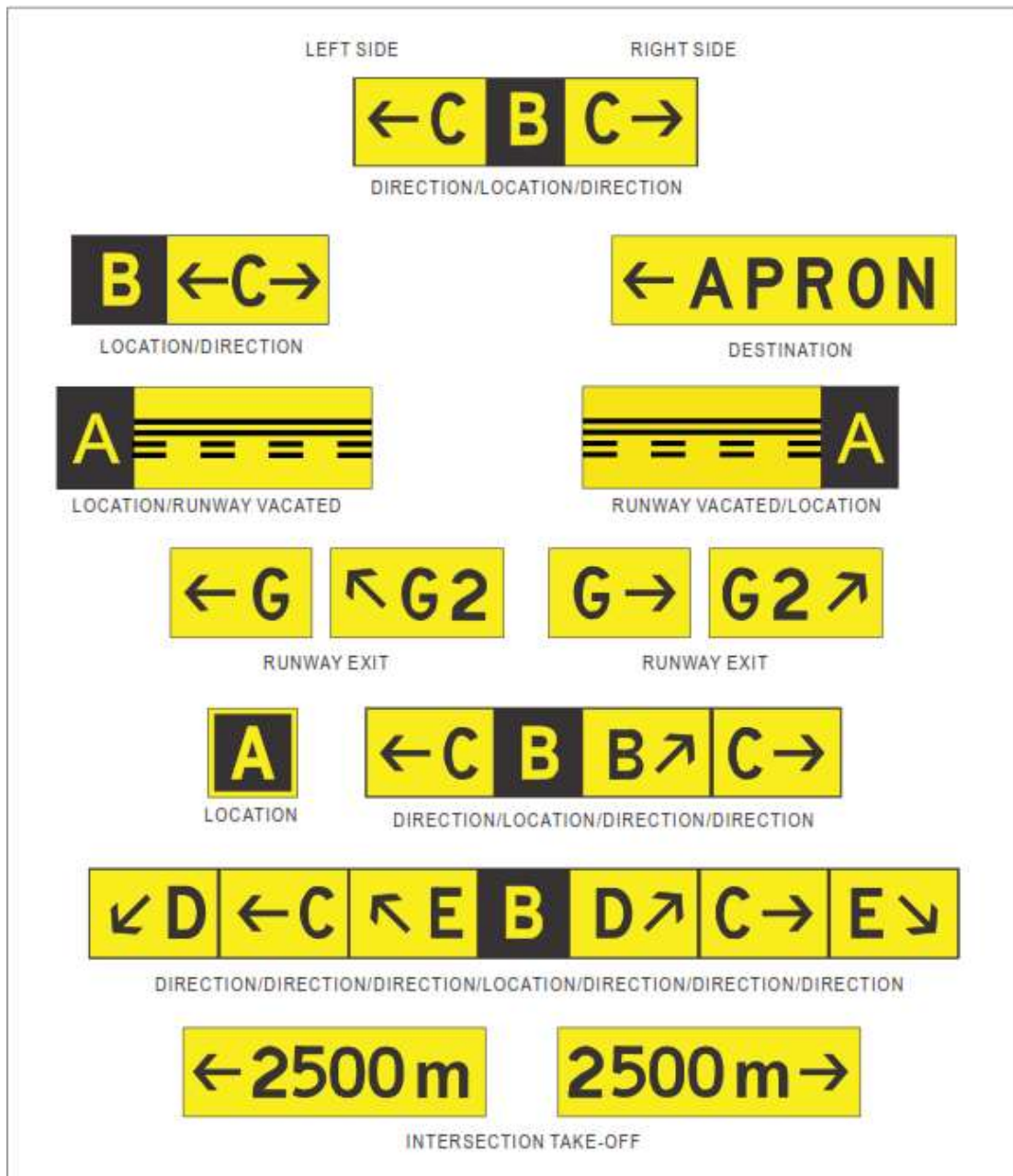
2.44 Location of Distances for Taxiing Guidance Signs Including Runway Exit Signs

Code number	Legend	Sign height (mm)		Perpendicular distance from defined taxiway pavement edge to near side of sign	Perpendicular distance from defined runway pavement edge to near side of sign
		Face (min.)	Installed (max.)		
1 or 2	200	300	700	5–11 m	3–10 m
1 or 2	300	450	900	5–11 m	3–10 m
3 or 4	300	450	900	11–21 m	8–15 m
3 or 4	400	600	1 100	11–21 m	8–15 m

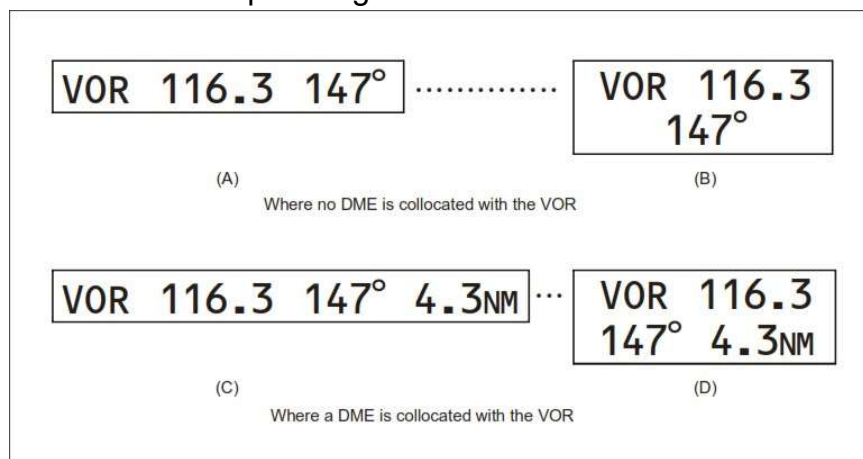
2.45 Mandatory Instruction Signs

Runway designation of a runway extremity (Example)		Indicates a runway-holding position at a runway extremity
Runway designation of both extremities of a runway (Example)		Indicates a runway-holding position located at taxiway/runway intersection other than runway extremity
Category I hold position (Example)		Indicates a category I runway-holding position at the threshold of runway 25
Category II hold position (Example)		Indicates a category II runway-holding position at the threshold of runway 25
Category III hold position (Example)		Indicates a category III runway-holding position at the threshold of runway 25
Category II and III hold position (Example)		Indicates a joint category II and III runway-holding position at the threshold of runway 25
Category I, II and III hold position (Example)		Indicates a joint category I, II and III runway-holding position at the threshold of runway 25
NO ENTRY		Indicates that entry to an area is prohibited
Runway-holding position (Example)		Indicates a runway-holding position (in accordance with 3.12.3)

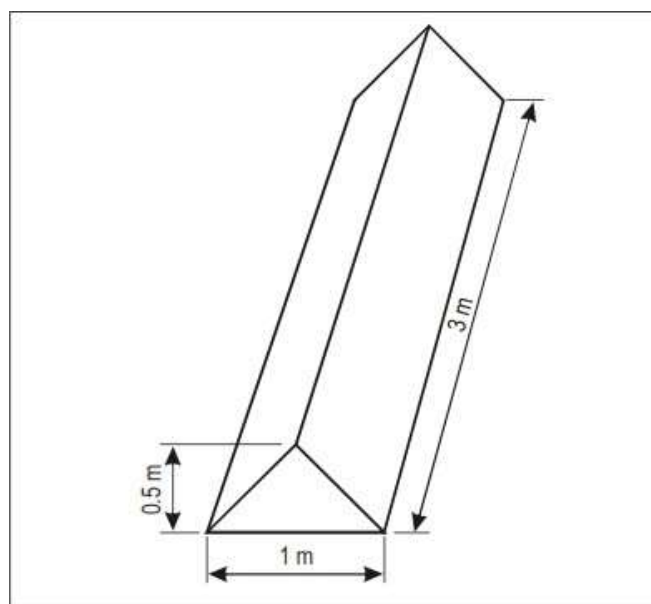
2.46 Information Signs



2.47 VOR Aerodrome Checkpoint Sign



2.48 Boundary Markers



2.49 Characteristics of Obstacle Lights

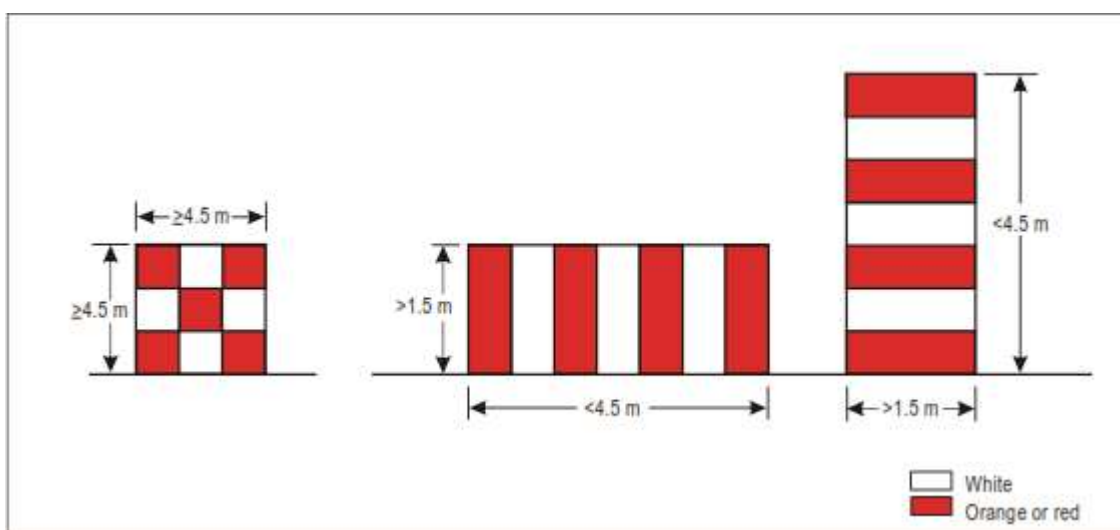
1	2	3	4	5	6	7
Light Type	Colour	Signal type/ (flash rate)	Peak intensity (cd) at given Background Luminance (b)			Light Distribution Table
			Day (Above 500 cd/m ²)	Twilight (50-500 cd/m ²)	Night (Below 50 cd/m ²)	
Low-intensity, Type A (fixed obstacle)	Red	Fixed	N/A	N/A	10	Table 6-2
Low-intensity, Type B (fixed obstacle)	Red	Fixed	N/A	N/A	32	Table 6-2
Low-intensity, Type C (mobile obstacle)	Yellow/Blue (a)	Flashing (60-90 fpm)	N/A	40	40	Table 6-2
Low-intensity, Type D (follow-me vehicle)	Yellow	Flashing (60-90 fpm)	N/A	200	200	Table 6-2
Low-intensity, Type E	Red	Flashing (c)	N/A	N/A	32	Table 6-2 (Type B)
Medium-intensity, Type A	White	Flashing (20-60 fpm)	20 000	20 000	2 000	Table 6-3
Medium-intensity, Type B	Red	Flashing (20-60 fpm)	N/A	N/A	2 000	Table 6-3
Medium-intensity, Type C	Red	Fixed	N/A	N/A	2 000	Table 6-3
High-intensity, Type A	White	Flashing (40-60 fpm)	200 000	20 000	2 000	Table 6-3
High-intensity, Type B	White	Flashing (40-60 fpm)	100 000	20 000	2 000	Table 6-3

a) See 6.2.2.6

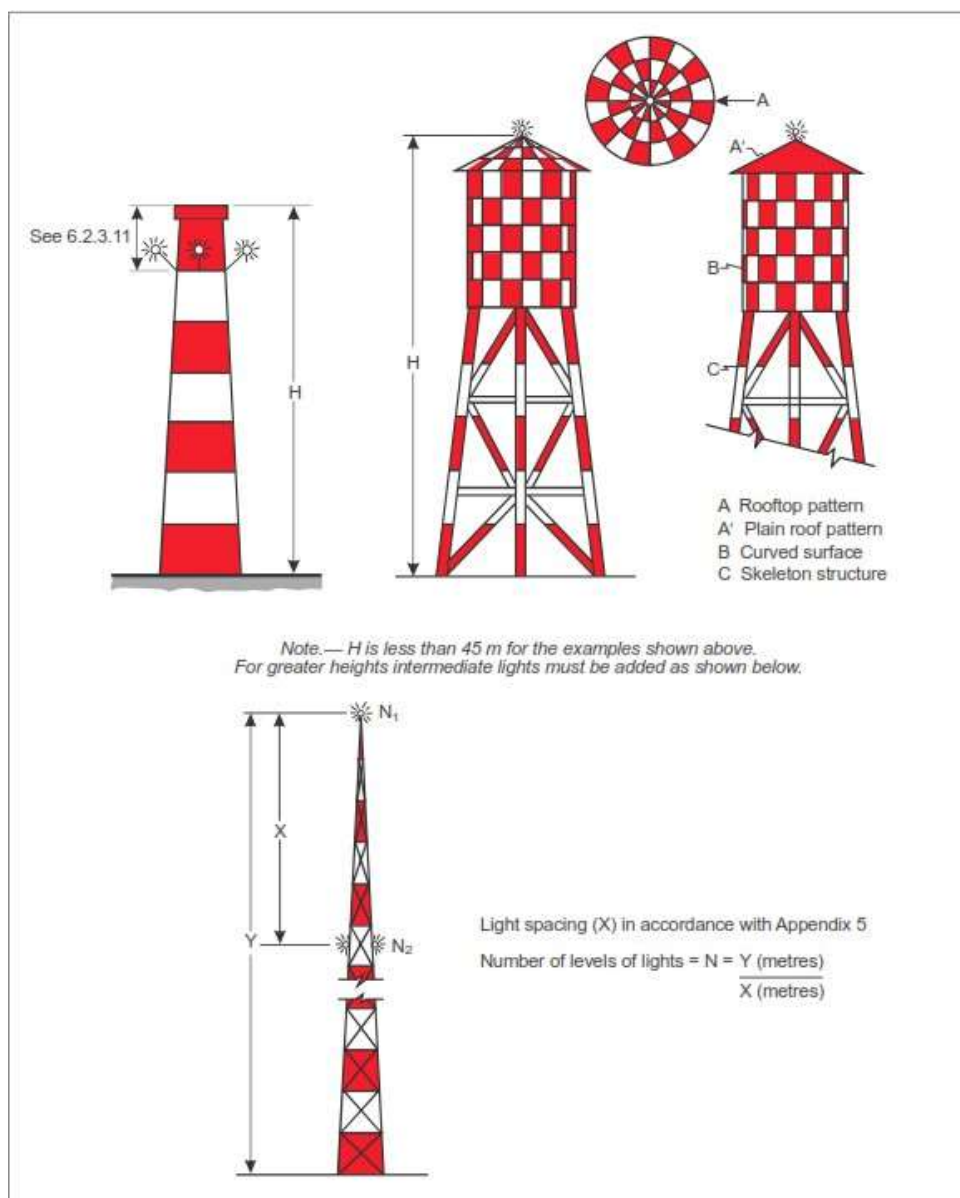
b) For flashing lights, effective intensity as determined in accordance with the *Aerodrome Design Manual* (Doc 9157), Part 4.

c) For wind turbine application, to flash at the same rate as the lighting on the nacelle.

2.50 Basic Marking Patterns



2.51 Examples of Marking and Lighting of Tall Structures



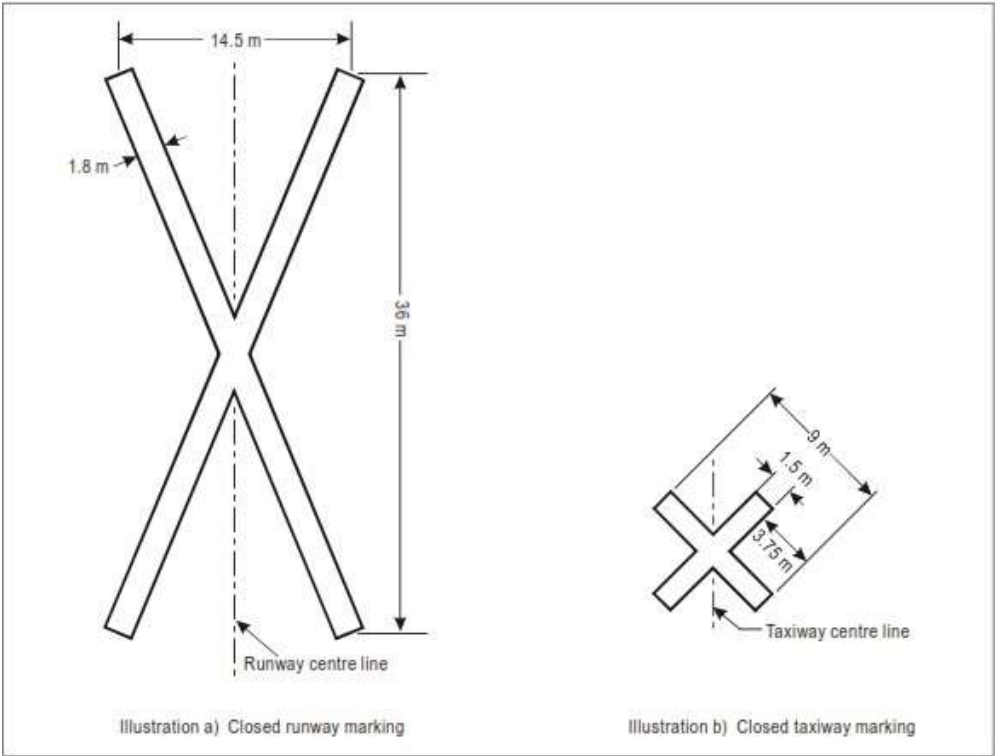
2.52 Intervals Between Flashes of Lights and Ratio of Cycle Time

Flash interval between	Ratio of cycle time
<i>middle and top light</i>	<i>1/13</i>
<i>top and bottom light</i>	<i>2/13</i>
<i>bottom and middle light</i>	<i>10/13.</i>

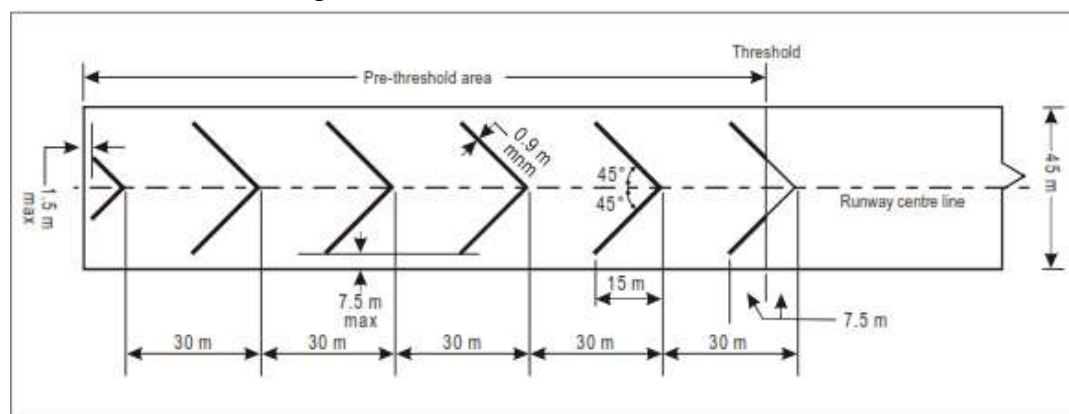
2.53 Installation Setting Angles for High-Intensity Obstacle Lights

Height of light unit above terrain (AGL)		Angle of the peak of the beam above the horizontal
Greater than	Not exceeding	
151 m		0°
122 m	151 m	1°
92 m	122 m	2°
	92 m	3°

2.54 Closed Runway and Taxiway Markings



2.55 Pre-threshold Marking



2.56 Secondary Power Supply Requirements

Runway	Lighting aids requiring power	Maximum switch-over time
Non-instrument	Visual approach slope indicators ^a Runway edge ^b Runway threshold ^b Runway end ^b Obstacle ^a	See 8.1.4 and 8.1.9
Non-precision approach	Approach lighting system Visual approach slope indicators ^{a, d} Runway edge ^d Runway threshold ^d Runway end Obstacle ^d	15 seconds 15 seconds 15 seconds 15 seconds 15 seconds 15 seconds
Precision approach category I	Approach lighting system Runway edge ^d Visual approach slope indicators ^{a, d} Runway threshold ^d Runway end Essential taxiway ^a Obstacle ^d	15 seconds 15 seconds 15 seconds 15 seconds 15 seconds 15 seconds 15 seconds
Precision approach category II/III	Inner 300 m of the approach lighting system Other parts of the approach lighting system Obstacle ^a Runway edge Runway threshold Runway end Runway centre line Runway touchdown zone All stop bars Essential taxiway	1 second 15 seconds 15 seconds 15 seconds 1 second 1 second 1 second 1 second 1 second 15 seconds
Runway meant for take-off in runway visual range conditions less than a value of 800 m	Runway edge Runway end Runway centre line All stop bars Essential taxiway ^a Obstacle ^d	15 seconds ^c 1 second 1 second 1 second 15 seconds 15 seconds

a. Supplied with secondary power when their operation is essential to the safety of flight operation.
b. See Chapter 5, 5.3.2, regarding the use of emergency lighting.
c. One second where no runway centre line lights are provided.
d. One second where approaches are over hazardous or precipitous terrain.

2.57 Aerodrome Category for Firefighting

Aerodrome category (1)	Aeroplane overall length (2)	Maximum fuselage width (3)
1	0 m up to but not including 9 m	2 m
2	9 m up to but not including 12 m	2 m
3	12 m up to but not including 18 m	3 m
4	18 m up to but not including 24 m	4 m
5	24 m up to but not including 28 m	4 m
6	28 m up to but not including 39 m	5 m
7	39 m up to but not including 49 m	5 m
8	49 m up to but not including 61 m	7 m
9	61 m up to but not including 76 m	7 m
10	76 m up to but not including 90 m	8 m

2.58 Minimum Useable Amounts of Extinguishing Agents

Aerodrome category (1)	Foam meeting performance level A		Foam meeting performance level B		Foam meeting performance level C		Complementary agents	
	Water (L) (2)	Discharge rate foam solution/minute (L) (3)	Water (L) (4)	Discharge rate foam solution/minute (L) (5)	Water (L) (6)	Discharge rate foam solution/minute (L) (7)	Dry chemical powders (kg) (8)	Discharge Rate (kg/second) (9)
1	350	350	230	230	160	160	45	2.25
2	1 000	800	670	550	460	360	90	2.25
3	1 800	1 300	1 200	900	820	630	135	2.25
4	3 600	2 600	2 400	1 800	1 700	1 100	135	2.25
5	8 100	4 500	5 400	3 000	3 900	2 200	180	2.25
6	11 800	6 000	7 900	4 000	5 800	2 900	225	2.25
7	18 200	7 900	12 100	5 300	8 800	3 800	225	2.25
8	27 300	10 800	18 200	7 200	12 800	5 100	450	4.5
9	36 400	13 500	24 300	9 000	17 100	6 300	450	4.5
10	48 200	16 600	32 300	11 200	22 800	7 900	450	4.5

Note.— The quantities of water shown in columns 2, 4 and 6 are based on the average overall length of aeroplanes in a given category.

2.59 Number of Rescue and Firefighting Vehicles

Aerodrome category	Rescue and firefighting vehicles
1	1
2	1
3	1
4	1
5	1
6	2
7	2
8	3
9	3
10	3

2.60 ACN-PCN determination, subgrade strength category, maximum allowable tyre pressure category and evaluation method

- | | | |
|----|---|------|
| a) | <i>Pavement type for ACR-PCR determination:</i> | Code |
| | Rigid pavement | R |
| | Flexible pavement | F |
| | Note: If the actual construction is composite or non-standard, a note shall be included to that effect. | |
| b) | <i>Subgrade strength category:</i> | Code |
| | <i>High strength:</i> characterized by $E = 200$ MPa and representing all E values equal to or above 150 MPa, for rigid and flexible pavements. | A |
| | <i>Medium strength:</i> characterized by $E = 120$ MPa and representing a range in E values equal to or above 100 MPa and strictly less than 150 MPa, for rigid and flexible pavements. | B |
| | <i>Low strength:</i> characterized by $E = 80$ MPa and representing a range in E values equal to or above 60 MPa and strictly less than 100 MPa, for rigid and flexible pavements | C |
| | <i>Ultra-low strength:</i> characterized by $E = 50$ MPa and representing all E values strictly less than 60 MPa, for rigid and flexible pavements | D |
| c) | <i>Maximum allowable tyre pressure category</i> | Code |
| | <i>Unlimited:</i> no pressure limit | W |
| | <i>High:</i> pressure limited to 1.75 MPa | X |
| | <i>Medium:</i> pressure limited to 1.25 MPa | Y |
| | <i>Low:</i> pressure limited to 0.50 MPa | Z |
| d) | <i>Evaluation method:</i> | Code |
| | <i>Technical evaluation:</i> : representing a specific study of the pavement characteristics and the types of aircraft which the pavement is intended to serve. | T |
| | <i>Using aircraft experience:</i> representing a knowledge of the specific type and mass of aircraft satisfactorily being supported under regular use. | U |

SCHEDULE 3

SUPPLEMENTARY PROVISION RELATING TO REGULATION 176

3.1 General

The following specifications define the chromaticity limits of colours to be used for aeronautical ground lights, markings, signs and panels. The specifications are in accord with the 1983 specifications of the International Commission on Illumination (CIE), except for the colour orange in Figure A1-2.

It is not possible to establish specifications for colours such that there is no possibility of confusion. For reasonably certain recognition, it is important that the eye illumination be well above the threshold of perception, that the colour not be greatly modified by selective atmospheric attenuations and that the observer's colour vision be adequate. There is also a risk of confusion of colour at an extremely high level of eye illumination such as may be obtained from a high-intensity source at very close range. Experience indicates that satisfactory recognition can be achieved if due attention is given to these factors.

The chromaticities are expressed in terms of the standard observer and coordinate system adopted by the International Commission on Illumination (CIE) at its Eighth Session at Cambridge, England, in 1931.*

The chromaticities for solid state lighting (e.g. LED) are based upon the boundaries given in the standard S 004/E-2001 of the International Commission on Illumination (CIE), except for the blue boundary of white.

3.2. Colours for Aeronautical Ground Lights

3.2.1 Chromaticities for lights having filament-type light sources

3.2.1.1 The chromaticities of aeronautical ground lights with filament-type light sources shall be within the following boundaries:

CIE Equations (see Figure A1-1a):

- a) Red
 - Purple boundary $y = 0.980 - x$
 - Yellow boundary $y = 0.335$, except for visual approach slope indicator systems
 - Yellow boundary $y = 0.320$, for visual approach slope indicator systems
- b) Yellow
 - Red boundary $y = 0.382$
 - White boundary $y = 0.790 - 0.667x$
 - Green boundary $y = x - 0.120$
- c) Green

- Yellow boundary $x = 0.360 - 0.080y$
 White boundary $x = 0.650y$
 Blue boundary $y = 0.390 - 0.171x$
- d) Blue
 Green boundary $y = 0.805x + 0.065$
 White boundary $y = 0.400 - x$
 Purple boundary $x = 0.600y + 0.133$
- e) White
 Yellow boundary $x = 0.500$
 Blue boundary $x = 0.285$
 Green boundary $y = 0.440$ and $y = 0.150 + 0.640x$
 Purple boundary $y = 0.050 + 0.750x$ and $y = 0.382$
- f) Variable white
 Yellow boundary $x = 0.255 + 0.750y$ and $y = 0.790 - 0.667x$
 Blue boundary $x = 0.285$
 Green boundary $y = 0.440$ and $y = 0.150 + 0.640x$
 Purple boundary $y = 0.050 + 0.750x$ and $y = 0.382$

3.2.1.2 Where dimming is not required, or where observers with defective colour vision must be able to determine the colour of the light, green signals should be within the following boundaries:

Yellow boundary	$y = 0.726 - 0.726x$
White boundary	$x = 0.650y$
Blue boundary	$y = 0.390 - 0.171x$

3.2.1.3 Where increased certainty of recognition from white is more important than maximum visual range, green signals should be within the following boundaries:

Yellow boundary	$y = 0.726 - 0.726x$
White boundary	$x = 0.625y - 0.041$
Blue boundary	$y = 0.390 - 0.171x$

3. 2.2 Discrimination between lights having filament-type sources

3.2.2.1 If there is a requirement to discriminate yellow and white from each other, they should be displayed in close proximity of time or space as, for example, by being flashed successively from the same beacon.

3.2.2.2 If there is a requirement to discriminate yellow from green and/or white, as for example on exit taxiway centre line lights, the y coordinates of the yellow light should not exceed a value of 0.40.

3.2.2.3 The colour variable white is intended to be used only for lights that are to be varied in intensity, e.g. to avoid dazzling. If this colour is to be discriminated from yellow, the lights should be so designed and operated that:

- a) the x coordinate of the yellow is at least 0.050 greater than the x coordinate of the white; and
- b) the disposition of the lights will be such that the yellow lights are displayed simultaneously and in close proximity to the white lights.

3.2.3 Chromaticities for lights having a solid state light source

3.2.3.1 The chromaticities of aeronautical ground lights with solid state light sources, e.g. LEDs, shall be within the following boundaries:

CIE Equations (see Figure A1-1b):

- a) Red
 - Purple boundary $y = 0.980 - x$
 - Yellow boundary $y = 0.335$, except for visual approach slope indicator systems
 - Yellow boundary $y = 0.320$, for visual approach slope indicator systems
- b) Yellow
 - Red boundary $y = 0.387$
 - White boundary $y = 0.980 - x$
 - Green boundary $y = 0.727x + 0.054$
- c) Green
 - Yellow boundary $x = 0.310$
 - White boundary $x = 0.625y - 0.041$
 - Blue boundary $y = 0.400$
- d) Blue
 - Green boundary $y = 1.141$
 - White boundary $x - 0.037 y = 0.400 - y$
 - Purple boundary $x = 0.134 + 0.590y$
- e) White
 - Yellow boundary $x = 0.440$
 - Blue boundary $x = 0.320$
 - Green boundary $y = 0.150 + 0.643x$
 - Purple boundary $y = 0.050 + 0.757x$
- f) Variable white
 - The boundaries of variable white for solid state light sources are those of (e) White above.

3.2.3.2 Where observers with defective colour vision must be able to determine the colour of the light, green signals should be within the following boundaries:

Yellow boundary	$y = 0.726 - 0.726x$
White boundary	$x = 0.625y - 0.041$
Blue boundary	$y = 0.400$

3.2.3.3 In order to avoid a large variation of shades of green, if colours within the boundaries below are selected, colours within the boundaries of 2.3.2 should not be used.

Yellow boundary	$x = 0.310$
White boundary	$x = 0.625y - 0.041$
Blue boundary	$y = 0.726 - 0.726x$

3.2.4 Colour measurement for filament-type and solid state-type light sources

3.2.4.1 The colour of aeronautical ground lights shall be verified as being within the boundaries specified in Figure A1-1a or A1-1b, as appropriate, by measurement at five points within the area limited by the innermost isocandela curve (isocandela diagrams in Schedule 4 refer), with operation at rated current or voltage. In the case of elliptical or circular isocandela curves, the colour measurements shall be taken at the centre and at the horizontal and vertical limits. In the case of rectangular isocandela curves, the colour measurements shall be taken at the centre and the limits of the diagonals (corners). In addition, the colour of the light shall be checked at the outermost isocandela curve to ensure that there is no colour shift that might cause signal confusion to the pilot.

Note 1.— *For the outermost isocandela curve, a measurement of colour coordinates should be made and recorded for review and judgement of acceptability by the State.*

Note 2.— *Certain light units may have application so that they may be viewed and used by pilots from directions beyond that of the outermost isocandela curve (e.g. stop bar lights at significantly wide runway-holding positions). In such instances, the State should assess the actual application and if necessary require a check of colour shift at angular ranges beyond the outermost curve.*

3.2.4.2 In the case of visual approach slope indicator systems and other light units having a colour transition sector, the colour shall be measured at points in accordance with 3.2.4.1, except that the colour areas shall be treated separately and no point shall be within 0.5 degrees of the transition sector.

3.3. Colours for markings, signs and panels

Note 1. *The specifications of surface colours given below apply only to freshly coloured surfaces. Colours used for markings, signs and panels usually change with time and therefore require renewal*

Note 3. *The specifications in 3.4 for transilluminated panels are interim in nature and are based on the CIE specifications for transilluminated signs. It is intended that these specifications will be reviewed and updated as and when CIE develops specifications for transilluminated panels.*

3.3.1 The chromaticities and luminance factors of ordinary colours, colours of retroreflective materials and colours of transilluminated (internally illuminated) signs and panels shall be determined under the following standard conditions:

- a) angle of illumination: 45°;

- b) direction of view: perpendicular to surface; and
- c) illuminant: CIE standard illuminant D65

3.3.2 The chromaticity and luminance factors of ordinary colours for markings and externally illuminated signs and panels should be within the following boundaries when determined under standard conditions.

CIE Equations (see Figure A1-2):

- a) Red
 - Purple boundary $y = 0.345 - 0.051x$
 - White boundary $y = 0.910 - x$
 - Orange boundary $y = 0.314 + 0.047x$
 - Luminance factor $\beta = 0.07$ (minimum)
- b) Orange
 - Red boundary $y = 0.285 + 0.100x$
 - White boundary $y = 0.940 - x$
 - Yellow boundary $y = 0.250 + 0.220x$
 - Luminance factor $\beta = 0.20$ (minimum)
- c) Yellow
 - Orange boundary $y = 0.108 + 0.707x$
 - White boundary $y = 0.910 - x$
 - Green boundary $y = 1.35x - 0.093$
 - Luminance factor $\beta = 0.45$ (minimum)
- d) White
 - Purple boundary $y = 0.010 + x$
 - Blue boundary $y = 0.610 - x$
 - Green boundary $y = 0.030 + x$
 - Yellow boundary $y = 0.710 - x$
 - Luminance factor $\beta = 0.75$ (minimum)
- e) Black
 - Purple boundary $y = x - 0.030$
 - Blue boundary $y = 0.570 - x$
 - Green boundary $y = 0.050 + x$
 - Yellow boundary $y = 0.740 - x$
 - Luminance factor $\beta = 0.03$ (max)
- f) Yellowish green
 - Green boundary $y = 1.317x + 0.4$
 - White boundary $y = 0.910 - x$
 - Yellow boundary $y = 0.867x + 0.4$
- g) Green
 - Yellow boundary $x = 0.313$
 - White boundary $y = 0.243 + 0.670x$
 - Blue boundary $y = 0.493 - 0.524x$
 - Luminance factor $\beta = 0.10$ (minimum)

Note. The small separation between surface red and surface orange is not sufficient to ensure the distinction of these colours when seen separately.

3.3.3 The chromaticity and luminance factors of colours of retroreflective materials for markings, signs and panels should be within the following boundaries when determined under standard conditions.

CIE Equations (see Figure A1-3):

- a) Red
 - Purple boundary $y = 0.345 - 0.051x$
 - White boundary $y = 0.910 - x$
 - Orange boundary $y = 0.314 + 0.047x$
 - Luminance factor $\beta = 0.03$ (minimum)
- b) Orange
 - Red boundary $y = 0.265 + 0.205x$
 - White boundary $y = 0.910 - x$
 - Yellow boundary $y = 0.207 + 0.390x$
 - Luminance factor $\beta = 0.14$ (minimum)
- c) Yellow
 - Orange boundary $y = 0.160 + 0.540x$
 - White boundary $y = 0.910 - x$
 - Green boundary $y = 1.35x - 0.093$
 - Luminance factor $\beta = 0.16$ (minimum)
- d) White
 - Purple boundary $y = x$
 - Blue boundary $y = 0.610 - x$
 - Green boundary $y = 0.040 + x$
 - Yellow boundary $y = 0.710 - x$
 - Luminance factor $\beta = 0.27$ (minimum)
- e) Blue
 - Green boundary $y = 0.118 + 0.675x$
 - White boundary $y = 0.370 - x$
 - Purple boundary $y = 1.65x - 0.187$
 - Luminance factor $\beta = 0.01$ (minimum)
- f) Green
 - Yellow boundary $y = 0.711 - 1.22x$
 - White boundary $y = 0.243 + 0.670x$
 - Blue boundary $y = 0.405 - 0.243x$
 - Luminance factor $\beta = 0.03$ (minimum)

3.3.4 The chromaticity and luminance factors of colours for luminescent or transilluminated (internally illuminated) signs and panels should be within the following boundaries when determined under standard conditions.

CIE Equations (see Figure A1-4):

- a) Red
 - Purple boundary $y = 0.345 - 0.051x$
 - White boundary $y = 0.910 - x$
 - Orange boundary $y = 0.314 + 0.047x$
 - Luminance factor(day condition) $\beta = 0.07$ (minimum)

Relative luminance to white (night condition)	5% (minimum) 20% (max)
b) Yellow	
Orange boundary	$y = 0.108 + 0.707x$
White boundary	$y = 0.910 - x$
Green boundary	$y = 1.35x - 0.093$
Luminance factor (day condition)	$\beta = 0.45$ (minimum)
Relative luminance to white (night condition)	30% (minimum) 80% (max)
c) White	
Purple boundary	
Blue boundary	$y = 0.010 + x$
Green boundary	$y = 0.610 - x$
Yellow boundary	$y = 0.030 + x$
Luminance factor(day condition)	$y = 0.710 - x$
Relative luminance to white (night condition)	$\beta = 0.75$ (minimum) 100%
d) Black	
Purple boundary	$y = x - 0.030$
Blue boundary	$y = 0.570 - x$
Green boundary	$y = 0.050 + x$
Yellow boundary	$y = 0.740 - x$
Luminance factor (day condition)	$\beta = 0.03$ (max)
Relative luminance to white (night condition)	0% (minimum) 2% (max)
e) Green	
Yellow boundary	$x = 0.313$
White boundary	$y = 0.243 + 0.670x$
Blue boundary	$y = 0.493 - 0.524x$
Luminance factor: (day conditions)	$\beta = 0.10$ minimum
Relative luminance to white (night conditions)	5% (minimum) 30% (maximum)

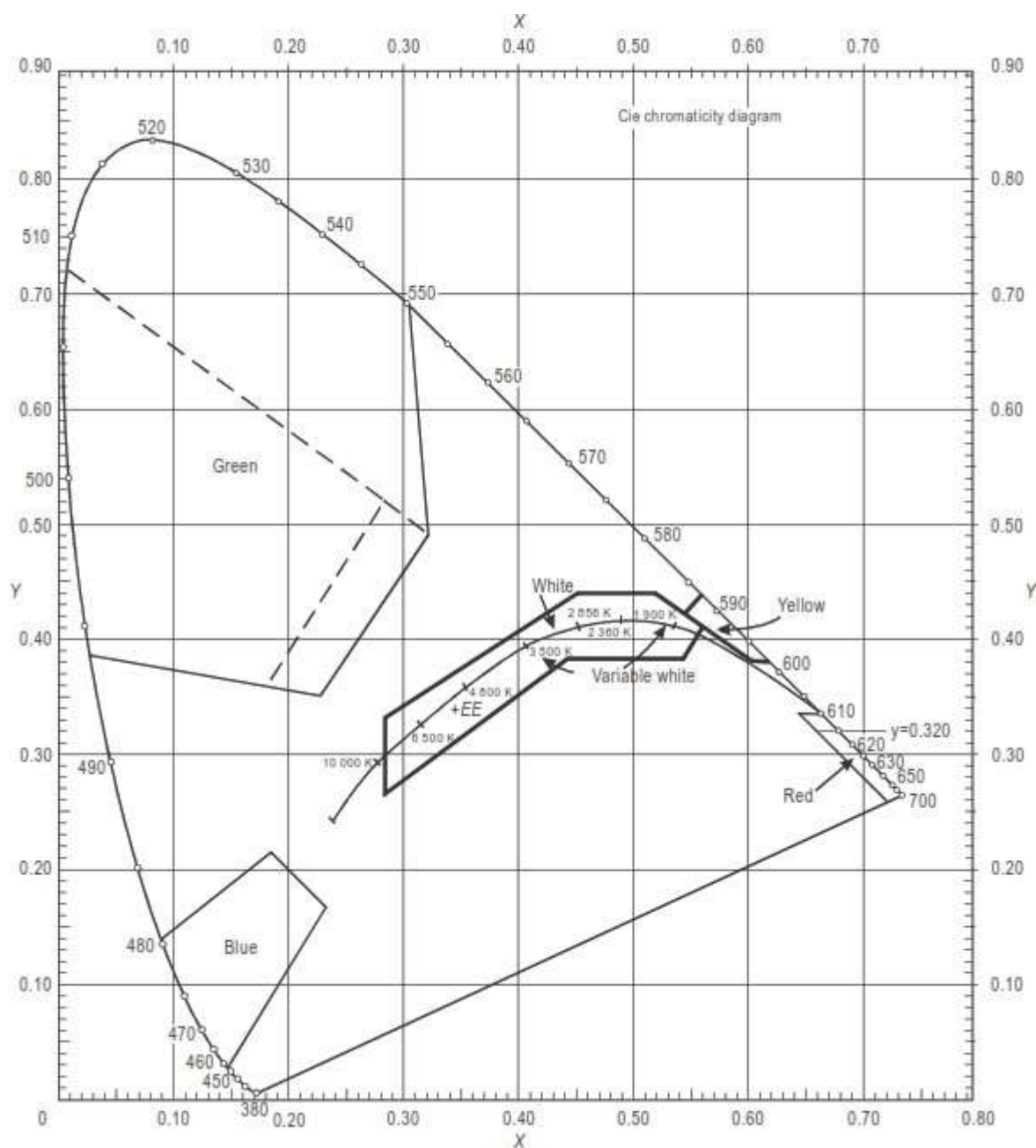
Figure A1-1a. Colours for aeronautical ground lights (filament-type lamps)

Figure A1-1b. Colours for aeronautical ground lights (solid state lighting)

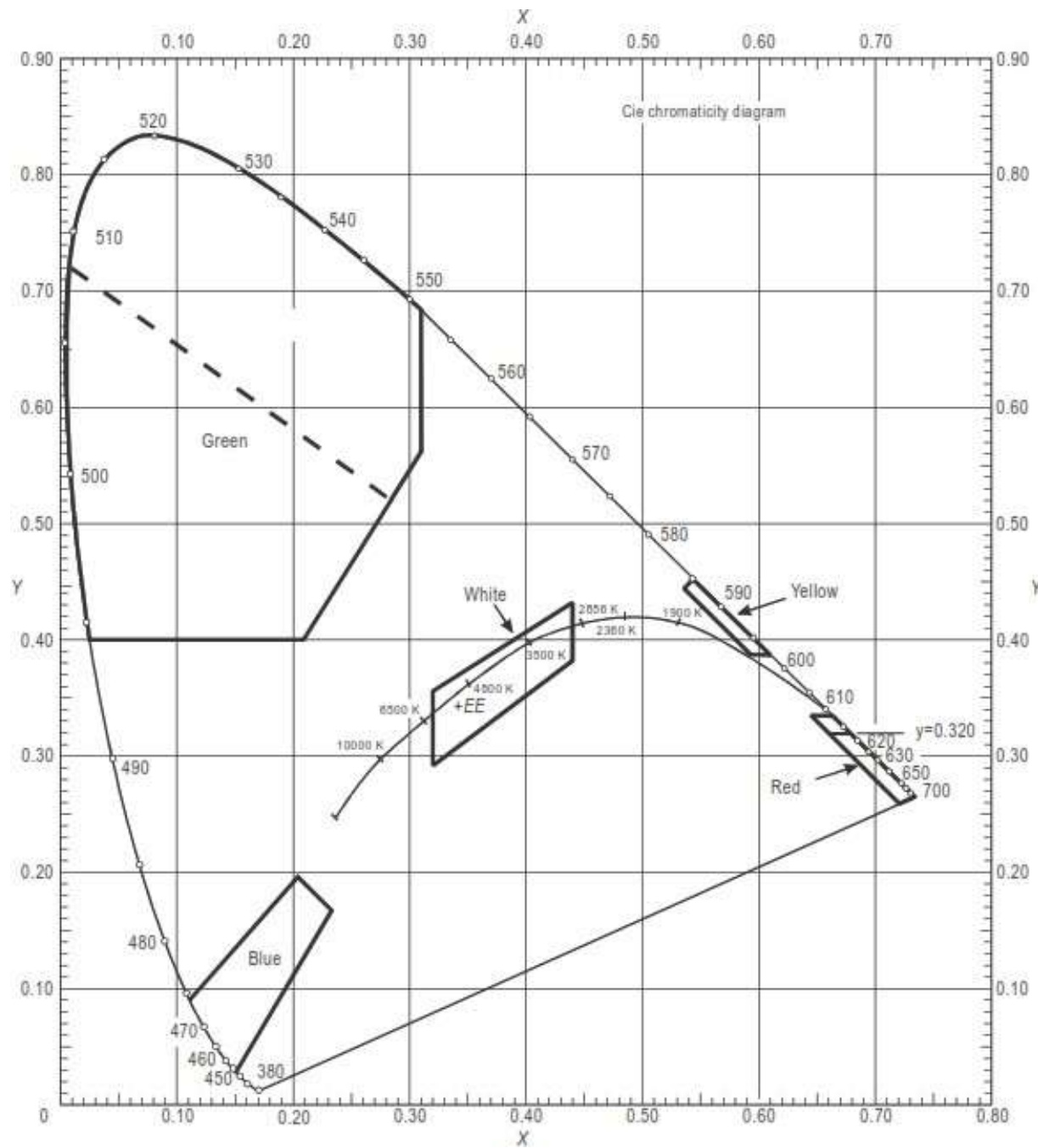


Figure A1-2. Ordinary colours for markings and externally illuminated signs and panels

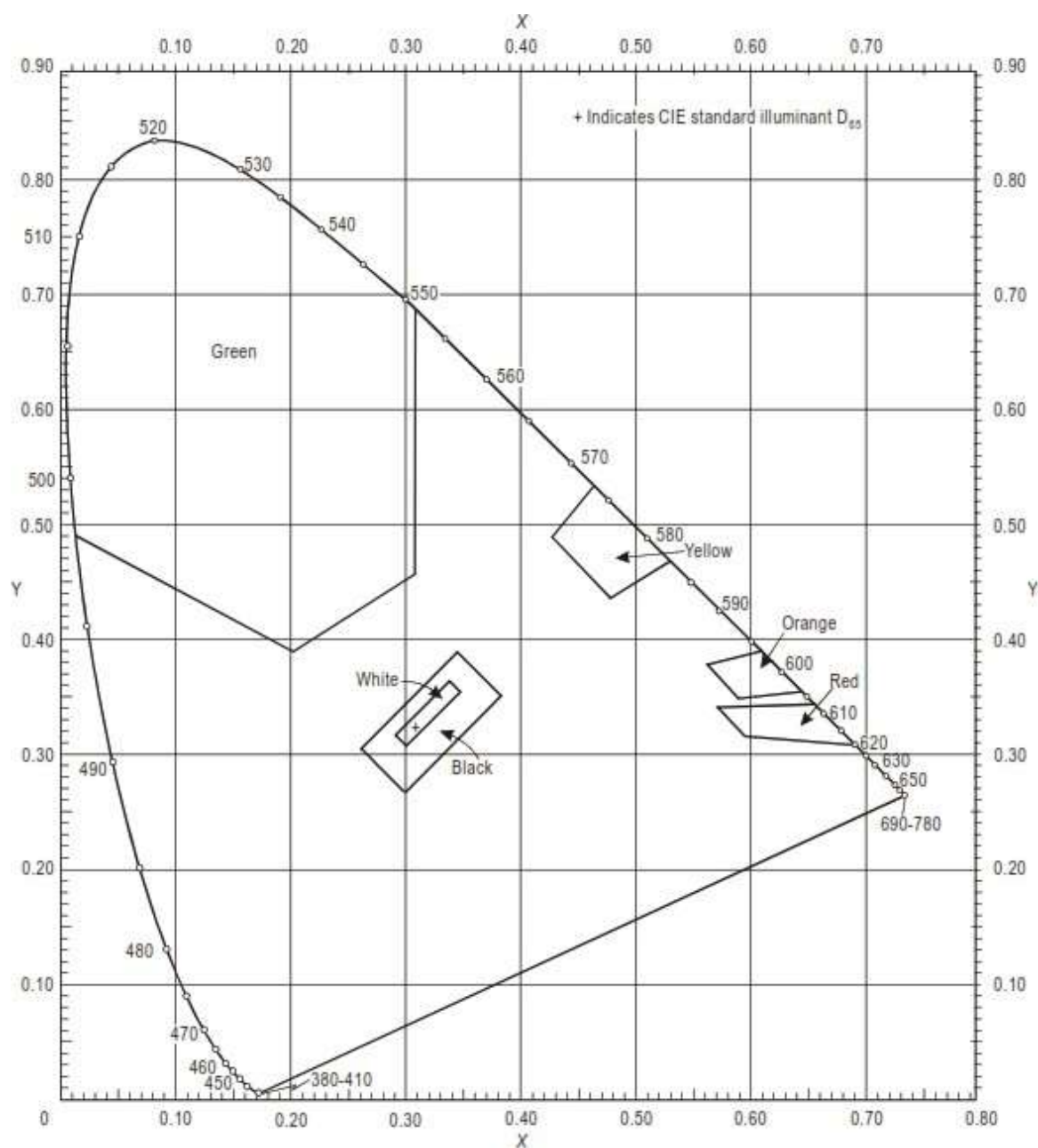


Figure A1-3. Colours of retroreflective materials for markings, signs and panels

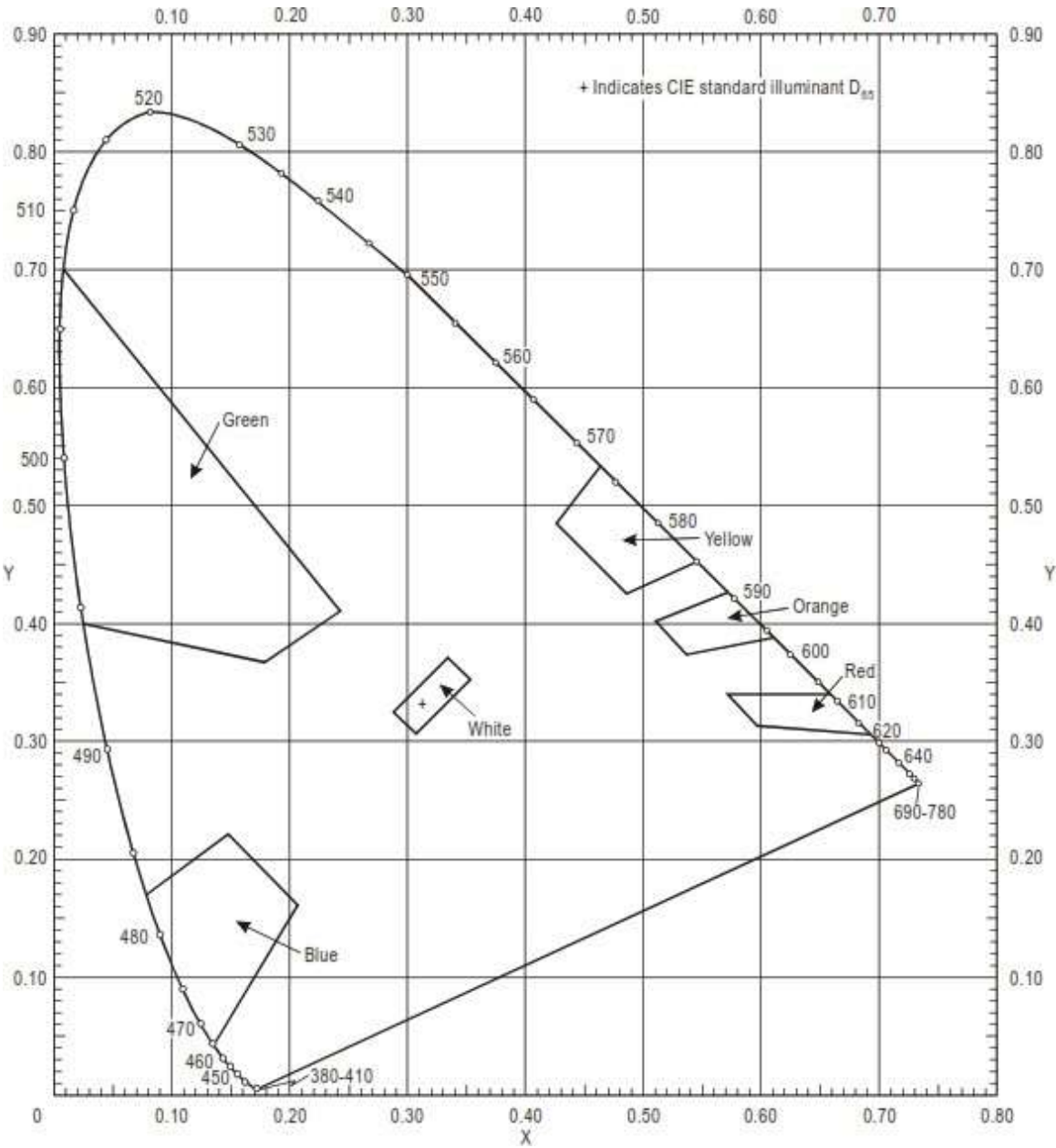
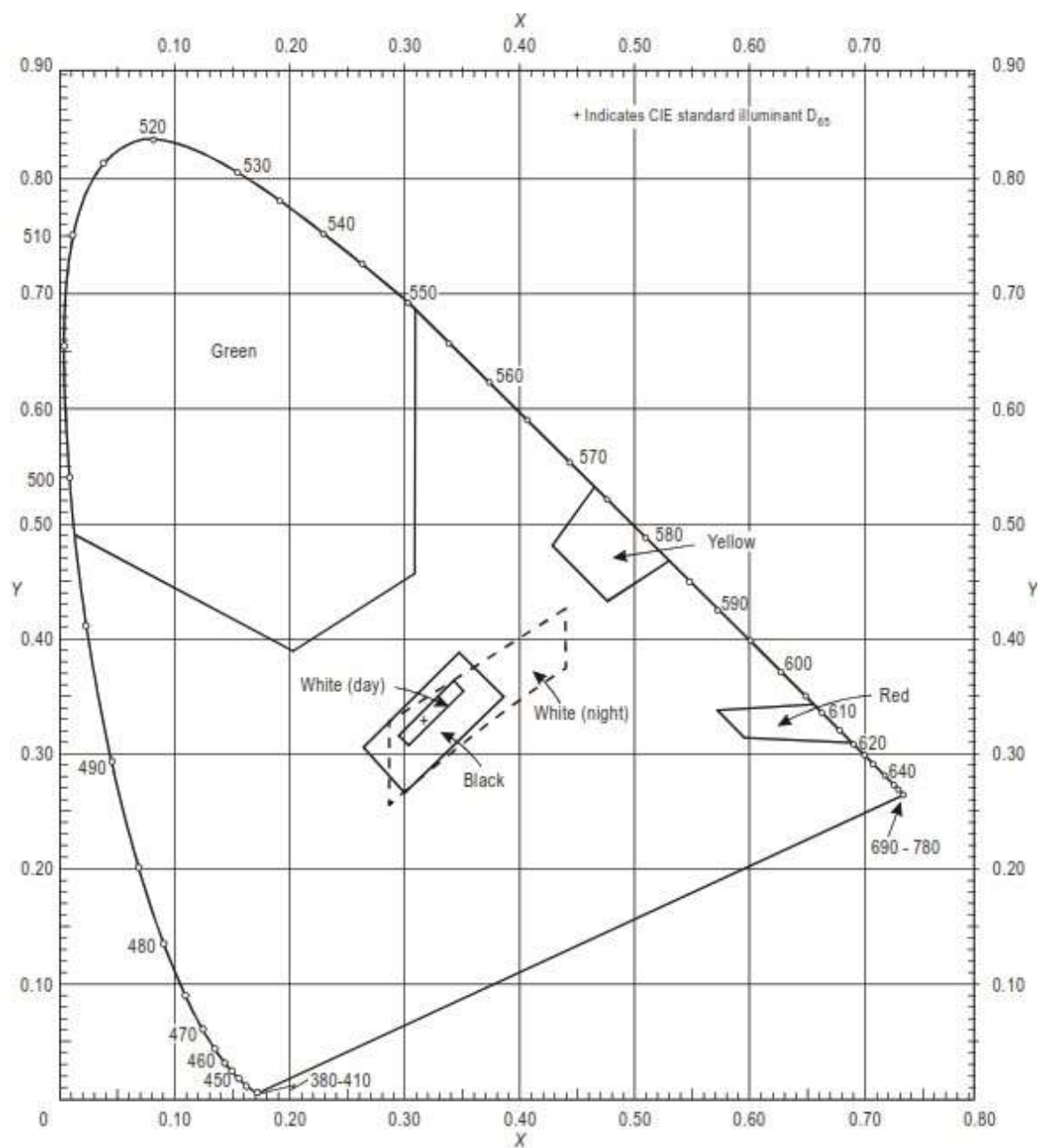


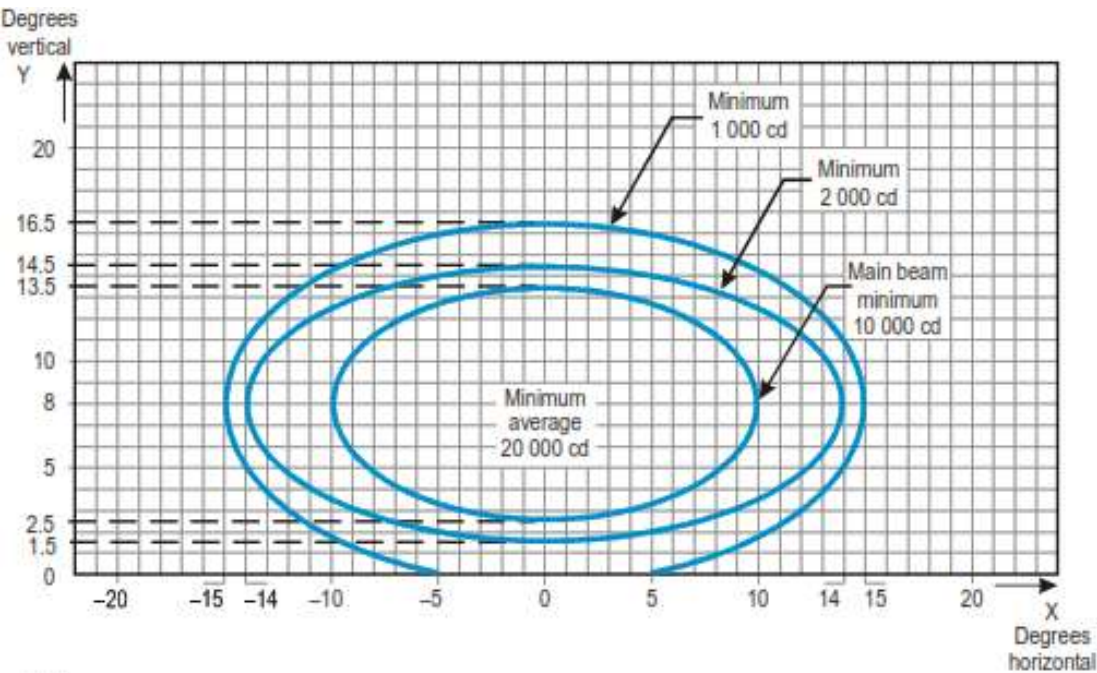
Figure A1-4. Colours of luminescent or transilluminated (internally illuminated) signs and panels



SCHEDULE 4

SUPPLEMENTARY PROVISION RELATING TO REGULATION 132,
135,136,140,141,142,144-146, 148,150,152,153,159 AND 202

Figure A2-1. Isocandela diagram for approach centre line light and crossbars
(white light)



Notes:

1. Curves calculated on formula

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$$

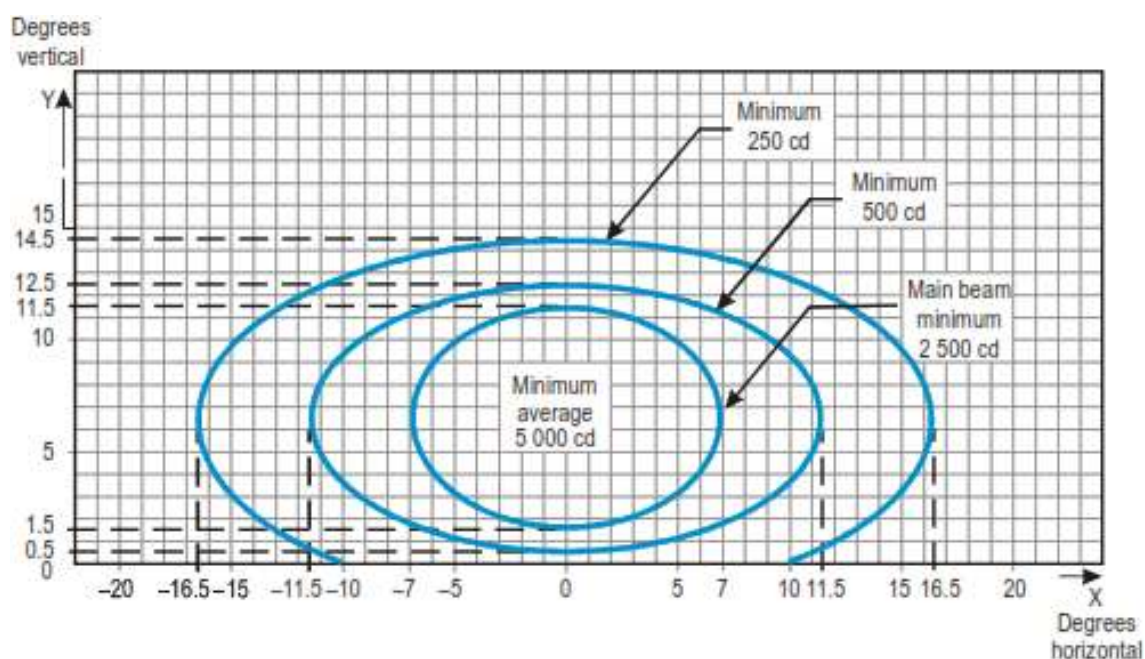
a	10	14	15
b	5.5	6.5	8.5

2. Vertical setting angles of the lights shall be such that the following vertical coverage of the main beam will be met:

distance from threshold	vertical main beam coverage
threshold to 315 m	0° — 11°
316 m to 475 m	0.5° — 11.5°
476 m to 640 m	1.5° — 12.5°
641 m and beyond	2.5° — 13.5° (as illustrated above)

3. Lights in crossbars beyond 22.5 m from the centre line shall be toed-in 2 degrees. All other lights shall be aligned parallel to the centre line of the runway.

4. See collective notes for Figures A2-1 to A2-11 and A2-26.

Figure A2-2. Isocandela diagram for approach side row light (red light).

Notes:

1. Curves calculated on formula

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$$

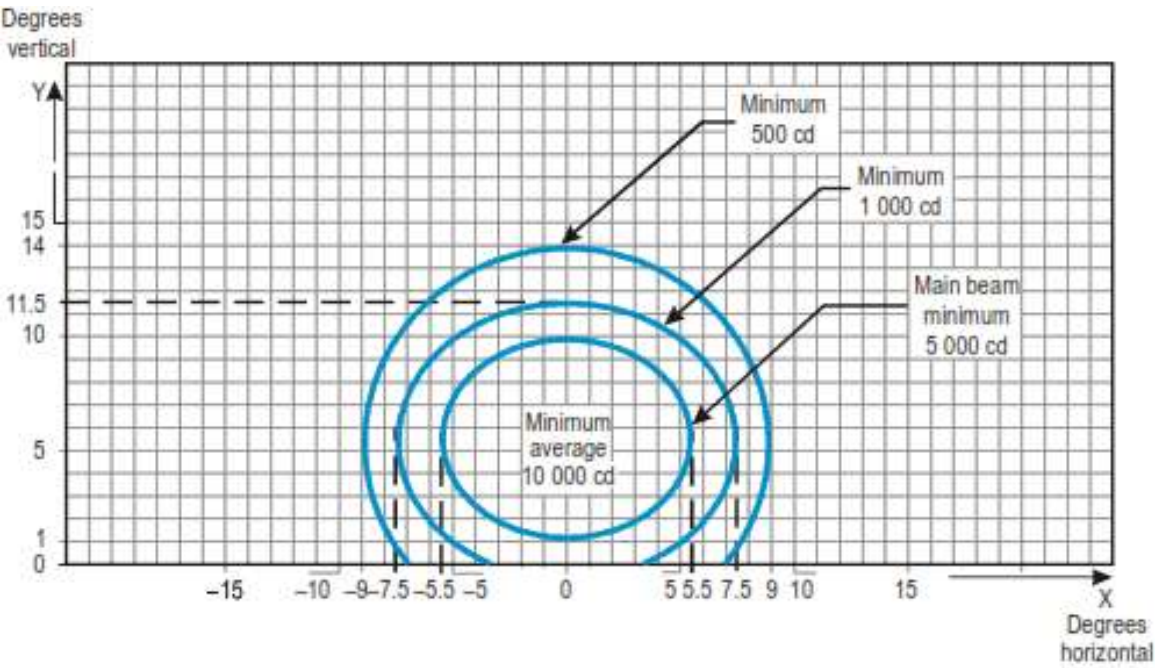
a	7.0	11.5	16.5
b	5.0	6.0	8.0

2. Toe-in 2 degrees
3. Vertical setting angles of the lights shall be such that the following vertical coverage of the main beam will be met:

distance from threshold	vertical main beam coverage
threshold to 115 m	0.5° — 10.5°
116 m to 215 m	1° — 11°
216 m and beyond	1.5° — 11.5° (as illustrated above)

4. See collective notes for Figures A2-1 to A2-11 and A2-26.

Figure A2-3. Isocandela diagram for threshold light (green light)



Notes:

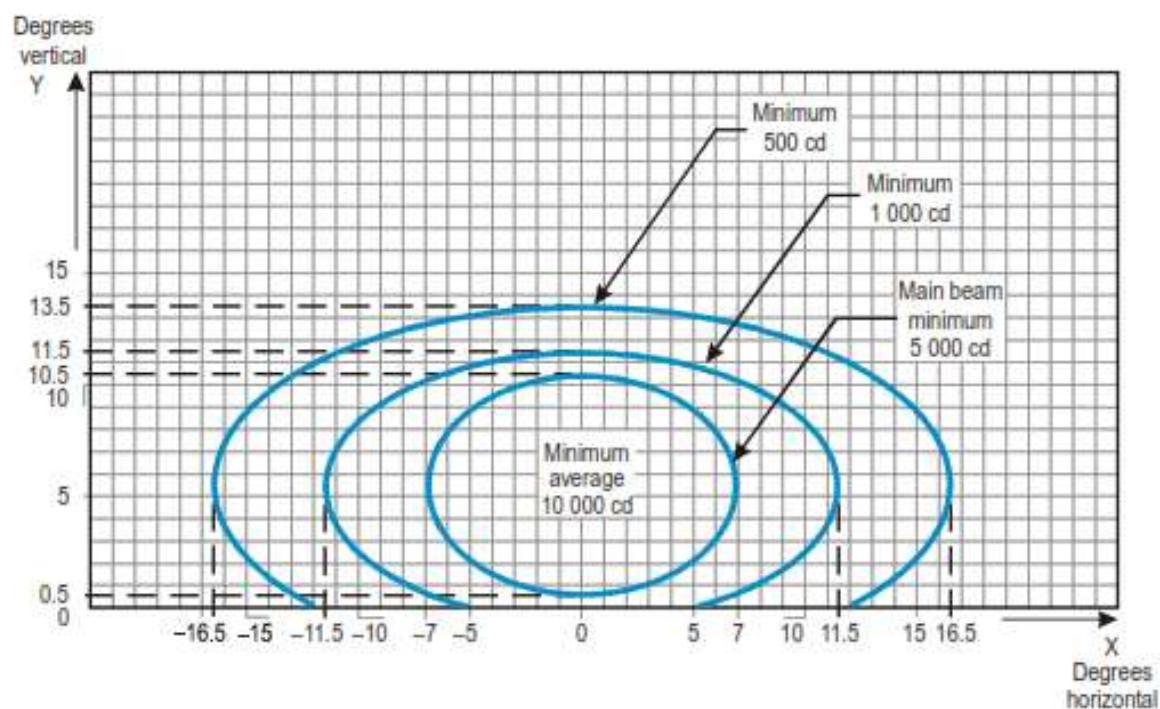
1. Curves calculated on formula

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$$

a	5.5	7.5	9.0
b	4.5	6.0	8.5

2. Toe-in 3.5 degrees

3. See collective notes for Figures A2-1 to A2-11 and A2-26.

Figure A2-4. Isocandela diagram for threshold wing bar light (green light)

Notes:

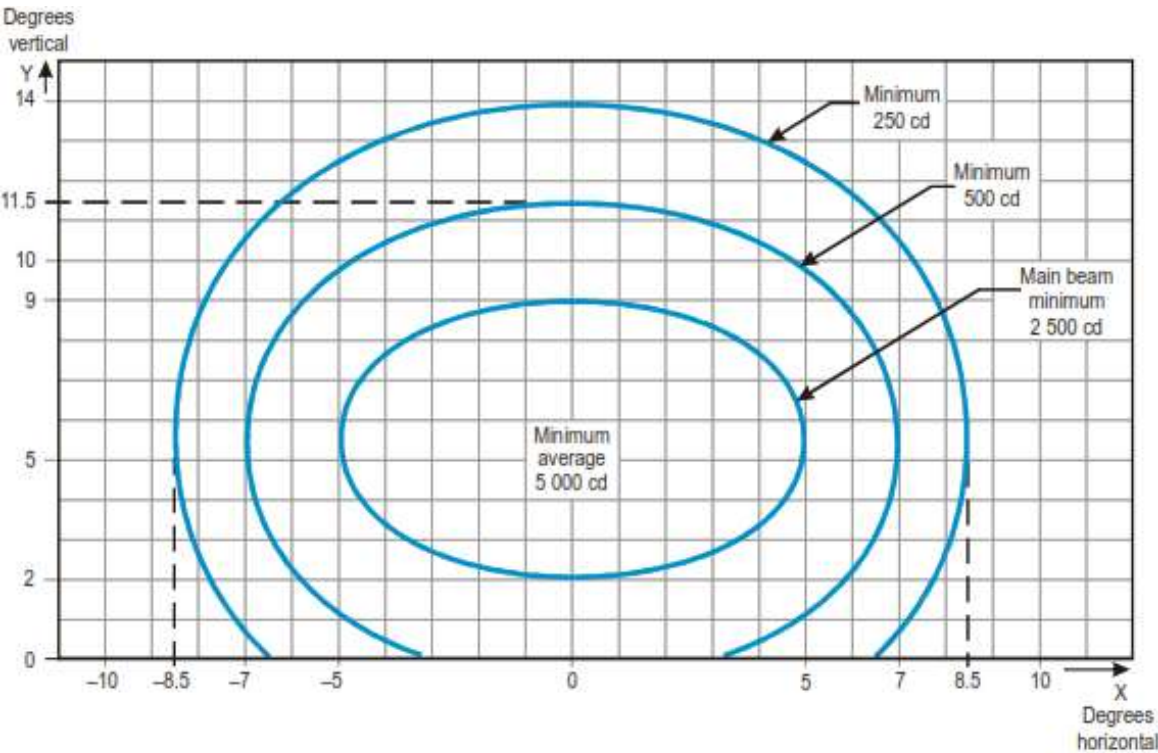
1. Curves calculated on formula

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$$

a	7.0	11.5	16.5
b	5.0	6.0	8.0

2. Toe-in 2 degrees
3. See collective notes for Figures A2-1 to A2-11 and A2-26.

Figure A2-5. Isocandela diagram for touchdown zone light (white light)



Notes:

1. Curves calculated on formula

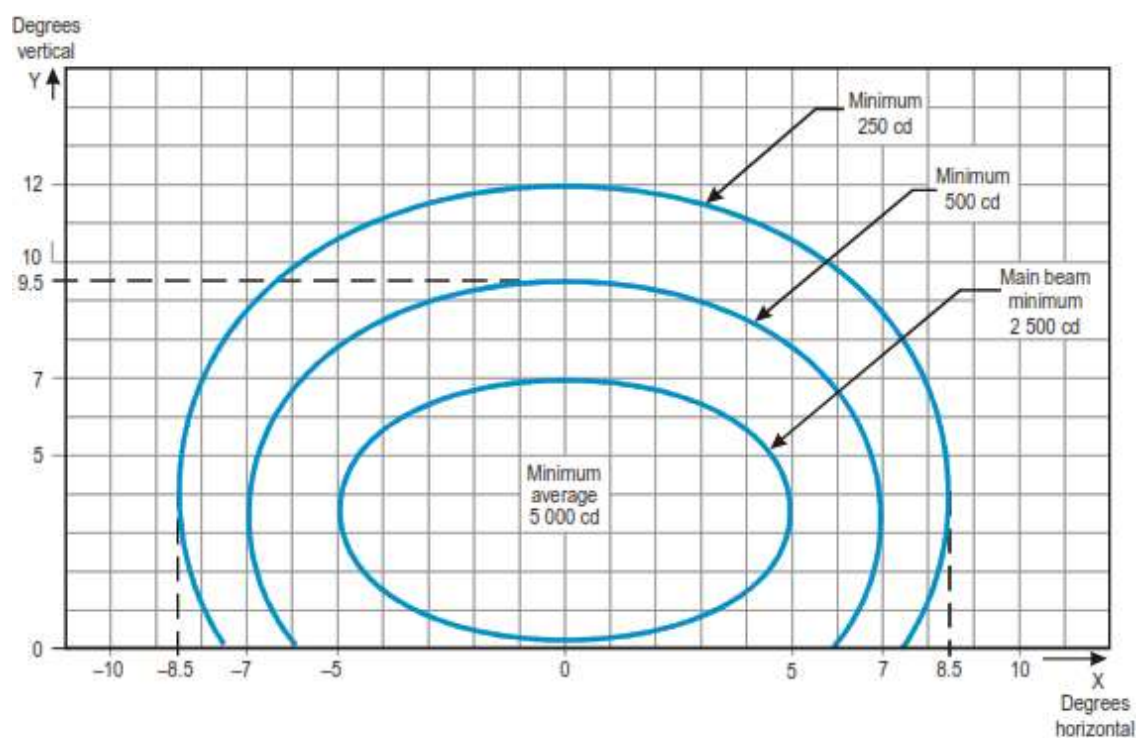
$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$$

a	5.0	7.0	8.5
b	3.5	6.0	8.5

2. Toe-in 4 degrees

3. See collective notes for Figures A2-1 to A2-11 and A2-26.

Figure A2-6. Isocandela diagram for runway centre line light with 30 m longitudinal spacing (white light) and rapid exit taxiway indicator light (yellow light)



Notes:

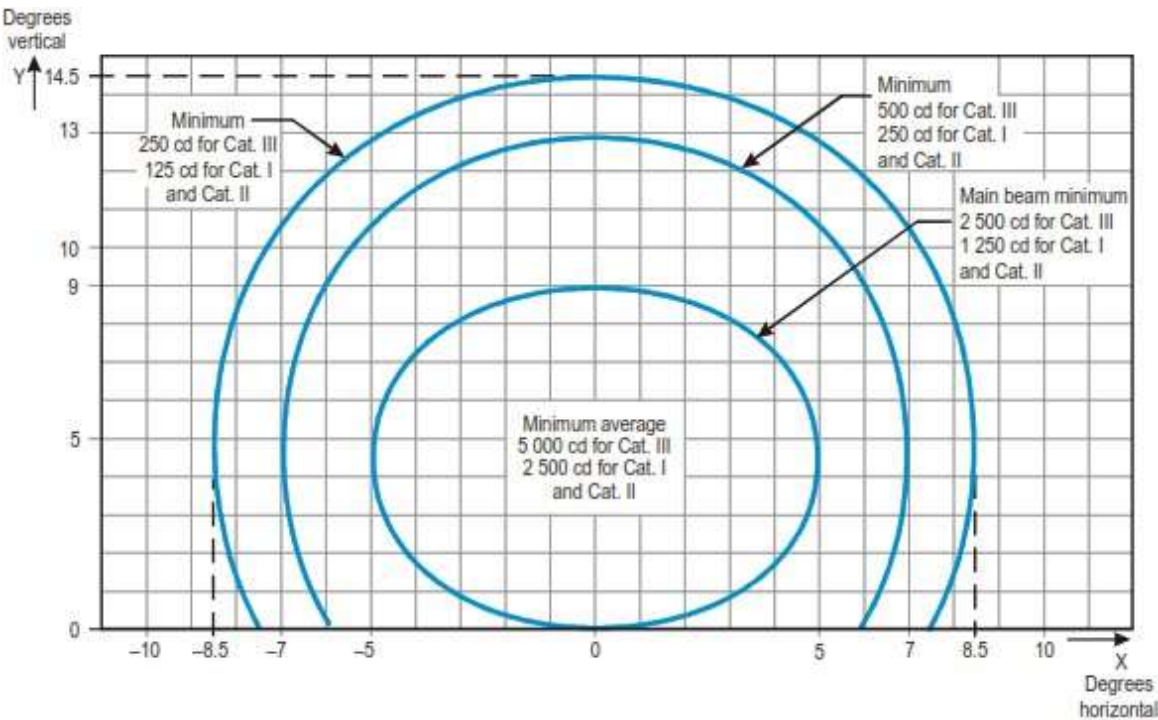
1. Curves calculated on formula

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$$

a	5.0	7.0	8.5
b	3.5	6.0	8.5

2. For red light, multiply values by 0.15.
3. For yellow light, multiply values by 0.40.
4. See collective notes for Figures A2-1 to A2-11 and A2-26.

Figure A2-7. Isocandela diagram for runway centre line light with 15 m longitudinal spacing (white light) and rapid exit taxiway indicator light (yellow light)



Notes:

1. Curves calculated on formula

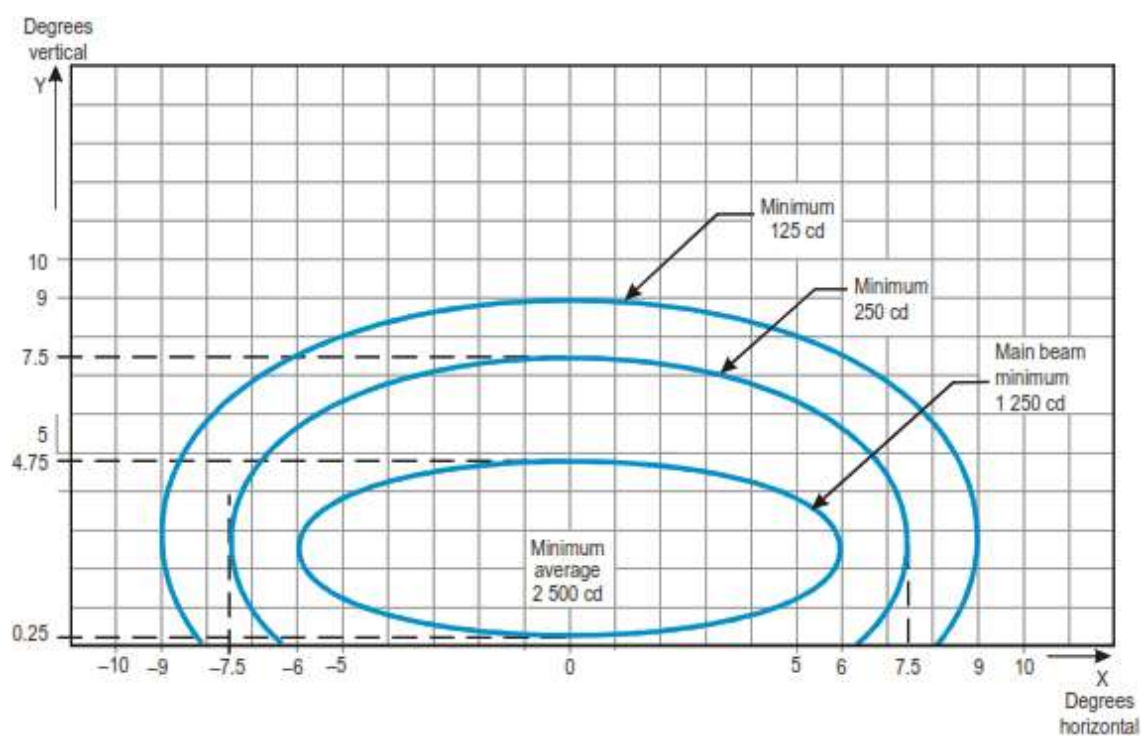
$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$$

a	5.0	7.0	8.5
b	4.5	8.5	10

2. For red light, multiply values by 0.15.

3. For yellow light, multiply values by 0.40.

4. See collective notes for Figures A2-1 to A2-11 and A2-26.

Figure A2-8. Isocandela diagram for runway end light (red light)

Notes:

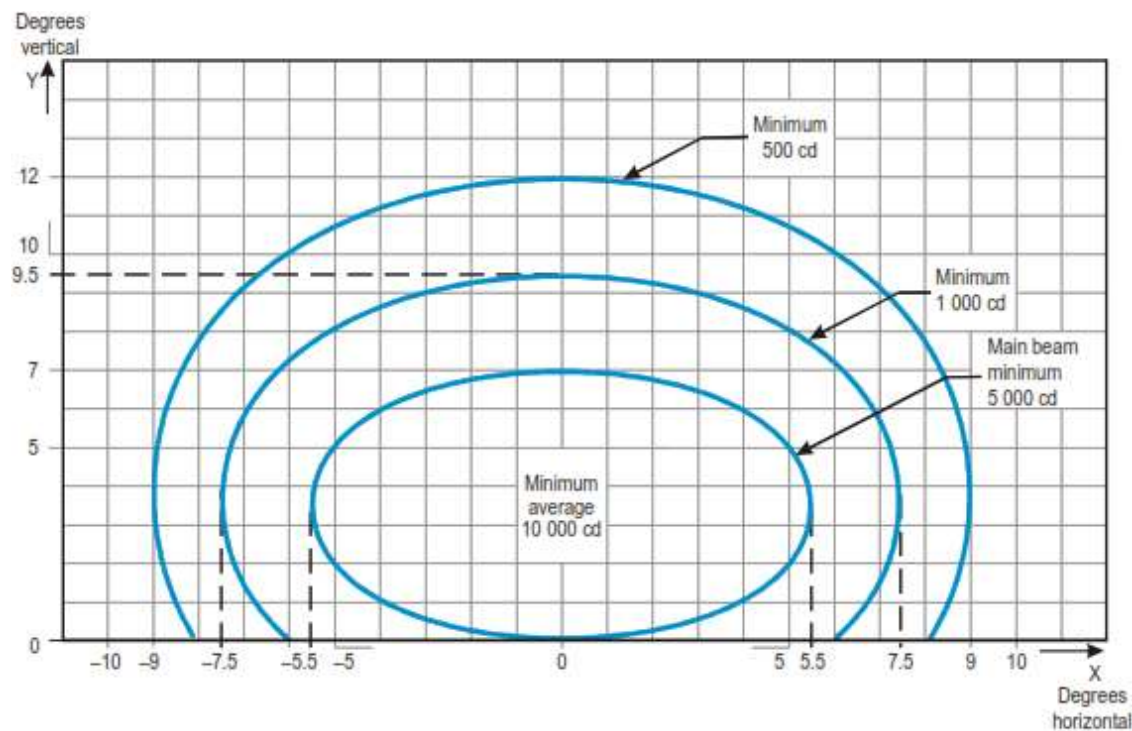
1. Curves calculated on formula

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$$

a	6.0	7.5	9.0
b	2.25	5.0	6.5

2. See collective notes for Figures A2-1 to A2-11 and A2-26.

Figure A2-9. Isocandela diagram for runway edge light where width of runway is 45 m (white light)



Notes:

1. Curves calculated on formula

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$$

a	5.5	7.5	9.0
b	3.5	6.0	8.5

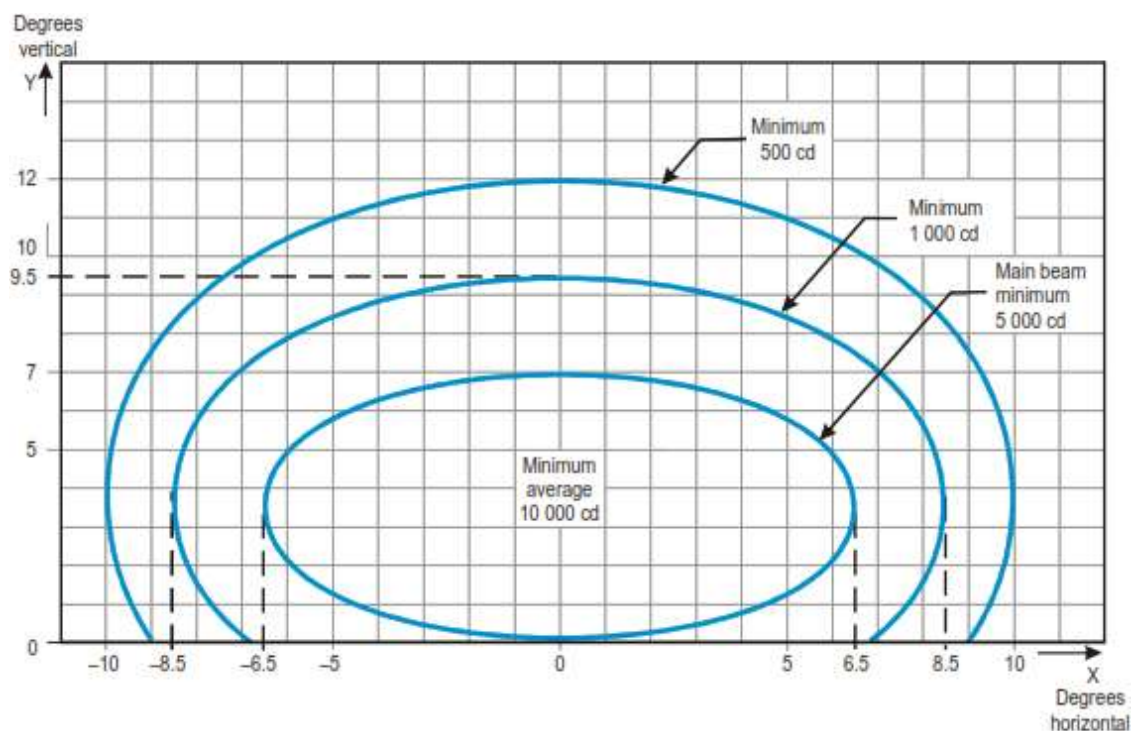
2. Toe-in 3.5 degrees

3. For red light, multiply values by 0.15.

4. For yellow light, multiply values by 0.40.

5. See collective notes for Figures A2-1 to A2-11 and A2-26.

Figure A2-10. Isocandela diagram for runway edge light where width of runway is 60 m (white light)



Notes:

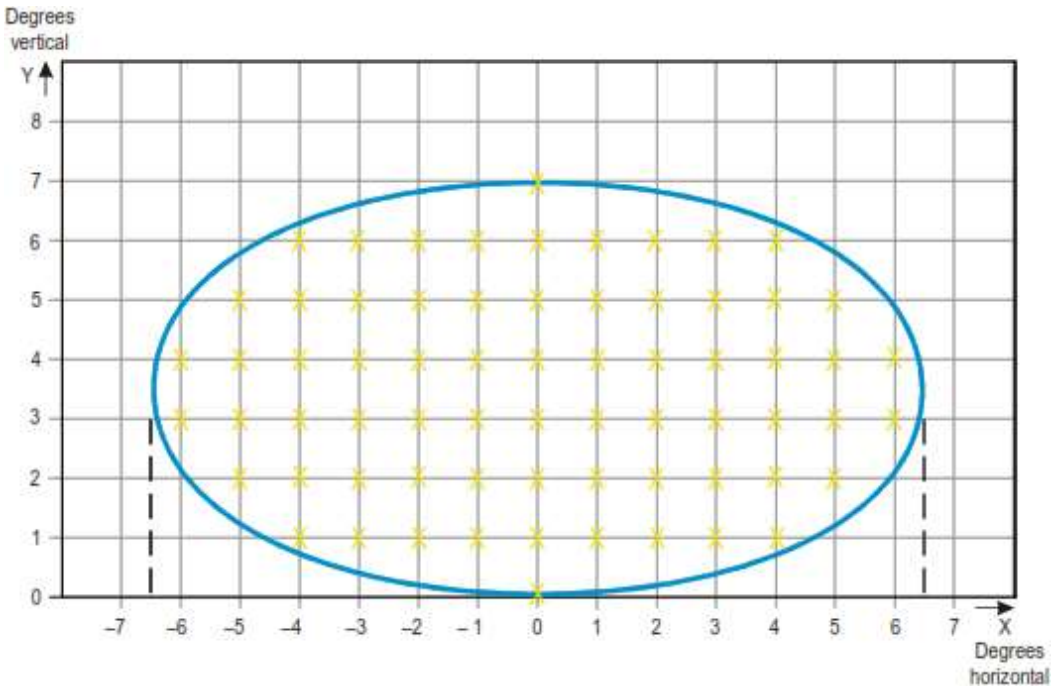
1. Curves calculated on formula

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$$

a	6.5	8.5	10.0
b	3.5	6.0	8.5

2. Toe-in 4.5 degrees
3. For red light, multiply values by 0.15.
4. For yellow light, multiply values by 0.40.
5. See collective notes for Figures A2-1 to A2-11 and A2-26.

Figure A2-11. Grid points to be used for the calculation of average intensity of approach and runway lights



Collective notes to Figures A2-1 to A2-11 and A2-26

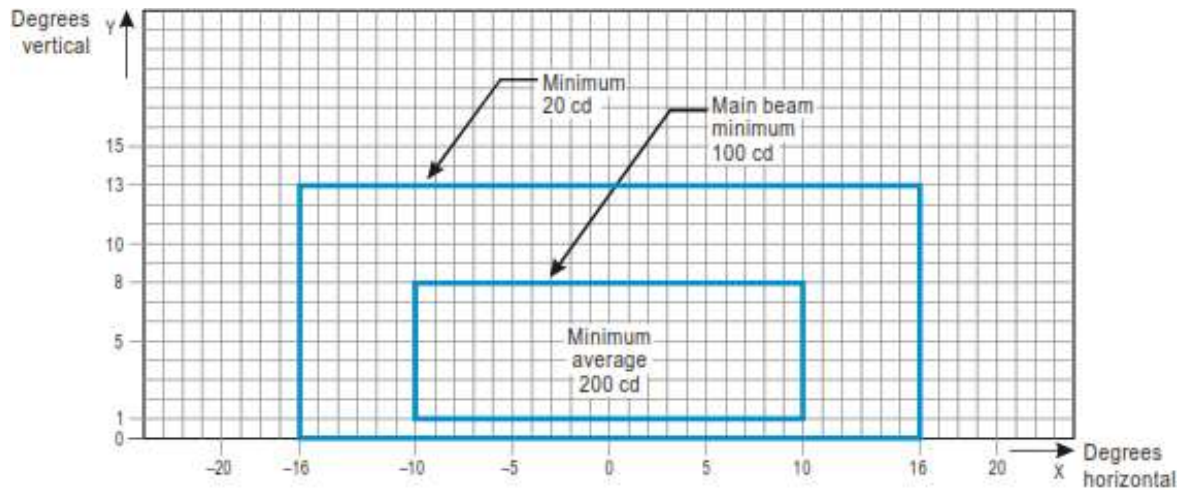
1. The ellipses in each figure are symmetrical about the common vertical and horizontal axes.
2. Figures A2-1 to A2-10, as well as Figure A2-26, show the minimum allowable light intensities. The average intensity of the main beam is calculated by establishing grid points as shown in Figure A2-11 and using the intensity value measures at all grid points located within and on the perimeter of the ellipse representing the main beam. The average value is the arithmetic average of light intensities measured at all considered grid points.
3. No deviations are acceptable in the main beam pattern when the lighting fixture is properly aimed.
4. Average intensity ratio. The ratio between the average intensity within the ellipse defining the main beam of a typical new light and the average light intensity of the main beam of a new runway edge light shall be as follows:

Figure A2-1	Approach centre line and crossbars	1.5 to 2.0 (white light)
Figure A2-2	Approach side row	0.5 to 1.0 (red light)
Figure A2-3	Threshold	1.0 to 1.5 (green light)
Figure A2-4	Threshold wing bar	1.0 to 1.5 (green light)
Figure A2-5	Touchdown zone	0.5 to 1.0 (white light)
Figure A2-6	Runway centre line (longitudinal spacing	0.5 to 1.0 (white light)
Figure A2-7	Runway centre line (longitudinal spacing 15m)	0.5 to 1.0 for CAT III (white light)
Figure A2-8	Runway end	0.25 to 0.5 (red light)
Figure A2-9	Runway edge (45 m runway width)	1.0 (white light)
Figure A2-10	Runway edge (60 m runway width)	1.0 (white light)

5. The beam coverages in the figures provide the necessary guidance for approaches down to an RVR of the order of 150 m and take-offs down to an RVR of the order of 100 m.
6. Horizontal angles are measured with respect to the vertical plane through the runway centre line. For lights other than centre line lights, the direction towards the runway centre line is considered positive. Vertical angles are measured with respect to the horizontal plane.
7. Where, for approach centre line lights and crossbars and for approach side row lights, inset lights are used in lieu of elevated lights, e.g. on a runway with a displaced threshold, the intensity requirements can be met by installing two or three fittings (lower intensity) at each position.
8. The importance of adequate maintenance cannot be overemphasized. The average intensity should never fall to a value less than 50 per cent of the value shown in the figures, and it should be the aim of airport authorities to maintain a level of light output close to the specified minimum average intensity.

9. The light unit shall be installed so that the main beam is aligned within one-half degree of the specified requirement.

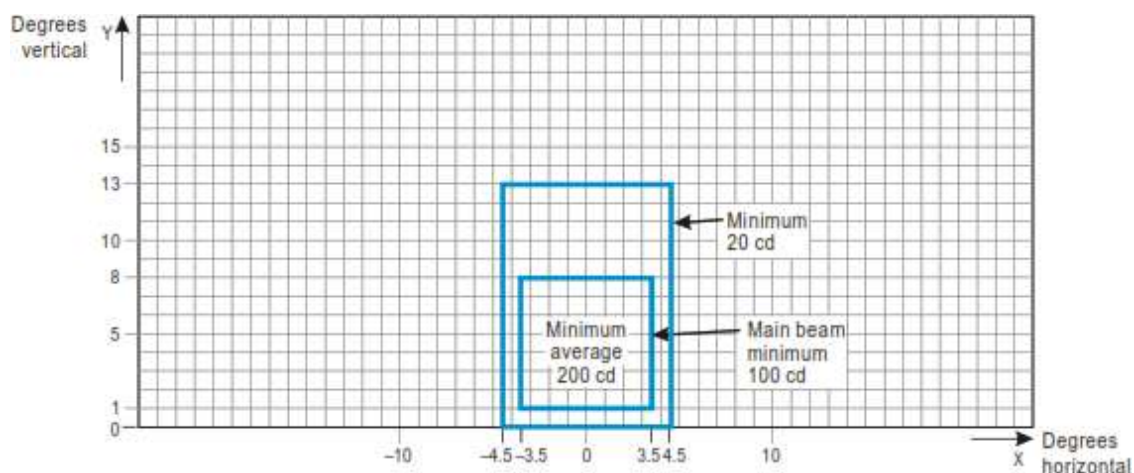
Figure A2-12. Isocandela diagram for taxiway centre line (15 m spacing), RELs, no-entry bar and stop bar lights in straight sections intended for use in runway visual range conditions of less than a value of 350 m where large offsets can occur and for low-intensity runway guard lights, Configuration B



Notes:

1. These beam coverages allow for displacement of the cockpit from the centre line up to distances of the order of 12 m and are intended for use before and after curves.
2. See collective notes for Figures A2-12 to A2-21.
3. Increased intensities for enhanced rapid exit taxiway centre line lights as recommended in 5.3.16.9 are four times the respective intensities in the figure (i.e. 800 cd for minimum average main beam).

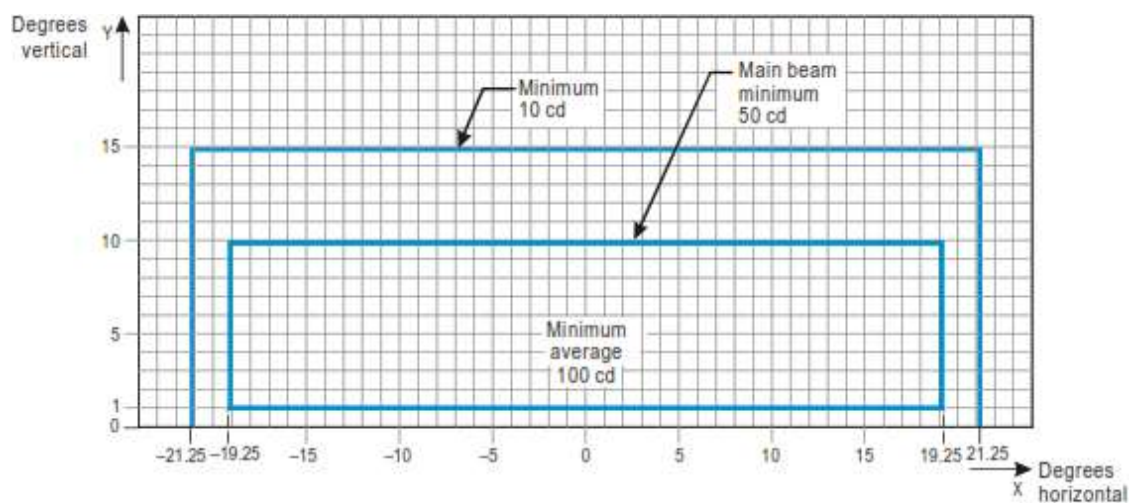
Figure A2-13. Isocandela diagram for taxiway centre line (15 m spacing), no-entry bar and stop bar lights in straight sections intended for use in runway visual range conditions of less than a value of 350 m



Notes:

1. These beam coverages are generally satisfactory and cater for a normal displacement of the cockpit from the centre line of approximately 3 m.
2. See collective notes for Figures A2-12 to A2-21.

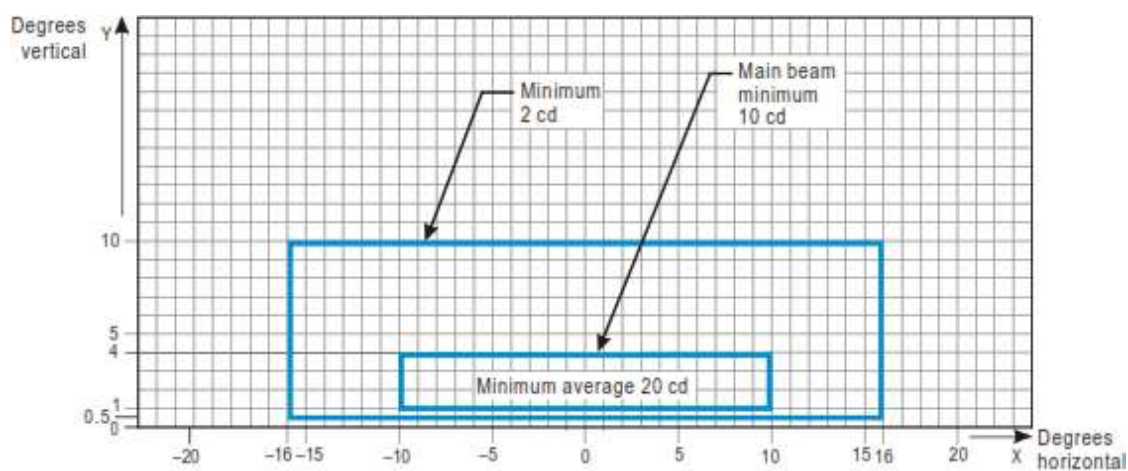
Figure A2-14. Isocandela diagram for taxiway centre line (7.5 m spacing), RELs, no-entry bar and stop bar lights in curved sections intended for use in runway visual range conditions of less than a value of 350



Notes:

1. Lights on curves to be toed-in 15.75 degrees with respect to the tangent of the curve. This does not apply to runway entrance lights (RELs)
2. Increased intensities for RELs shall be twice the specified intensities, i.e., minimum 20 cd, main beam minimum 100 cd and minimum average 200 cd.
3. See collective notes for Figures A2-12 to A2-21.

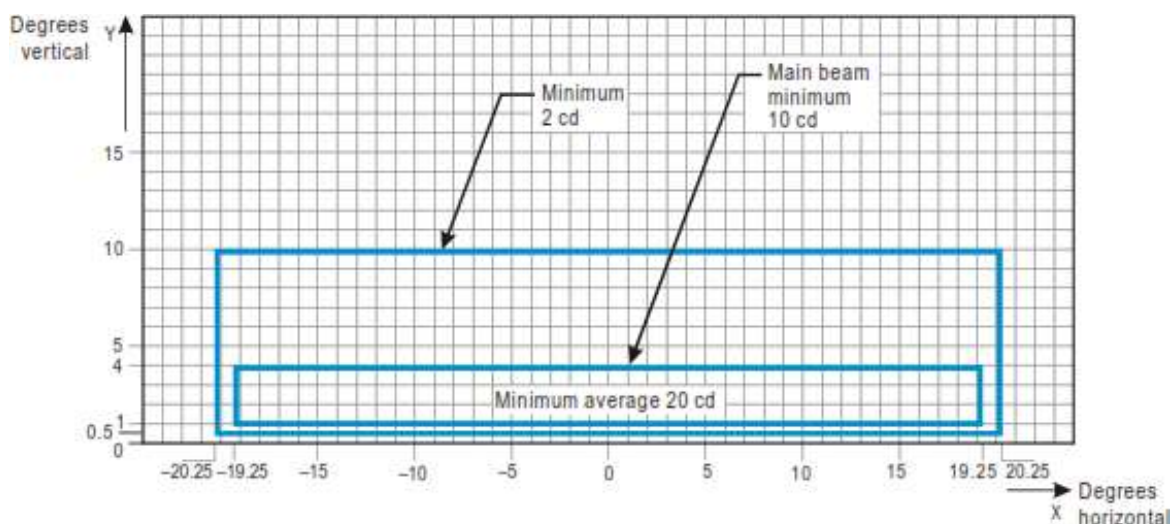
Figure A2-15. Isocandela diagram for taxiway centre line (30 m, 60 m spacing), no-entry bar and stop bar lights in straight sections intended for use in runway visual range conditions of 350 m or greater



Notes:

1. At locations where high background luminance is usual and where deterioration of light output resulting from dust, snow and local contamination is a significant factor, the cd-values should be multiplied by 2.5.
2. Where omnidirectional lights are used they shall comply with the vertical beam requirements in this figure.
3. See collective notes for Figures A2-12 to A2-21.

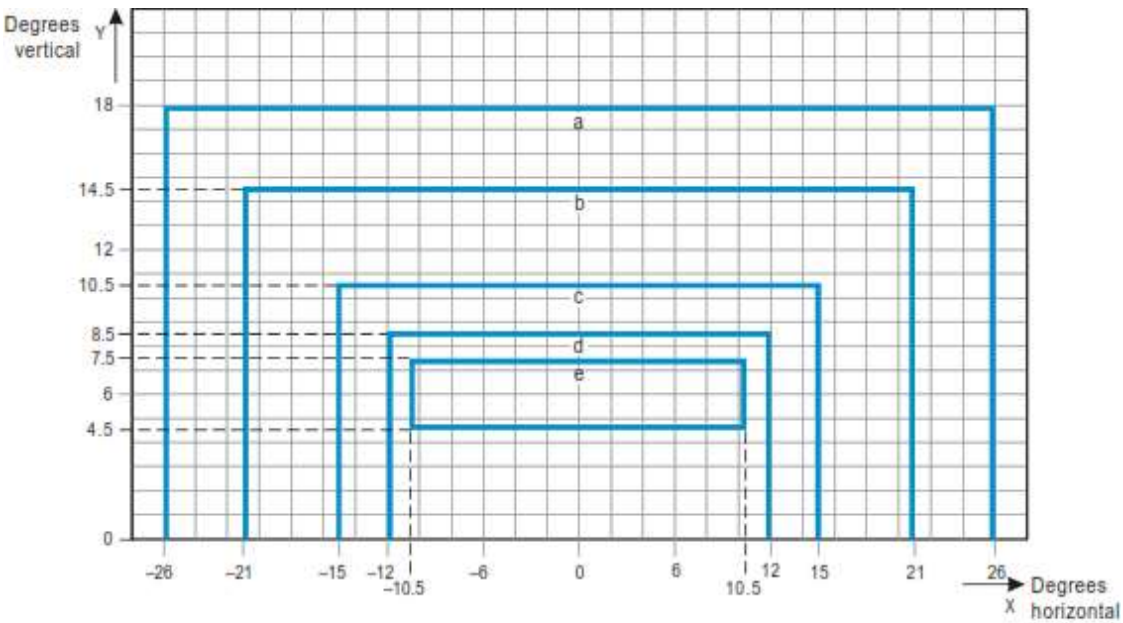
Figure A2-16. Isocandela diagram for taxiway centre line (7.5 m, 15 m, 30 m spacing), no-entry bar and stop bar lights in curved sections intended for use in runway visual range conditions of 350 m or greater



Notes:

1. Lights on curves to be toed-in 15.75 degrees with respect to the tangent of the curve.
2. At locations where high background luminance is usual and where deterioration of light output resulting from dust, snow and local contamination is a significant factor, the cd-values should be multiplied by 2.5.
3. These beam coverages allow for displacement of the cockpit from the centre line up to distances of the order of 12 m as could occur at the end of curves.
4. See collective notes for Figures A2-12 to A2-21.

Figure A2-17. Isocandela diagram for high-intensity taxiway centre line (15 m spacing), no-entry bar and stop bar lights in straight sections intended for use in an advanced surface movement guidance and control system where higher light intensities are required and where large offsets can occur

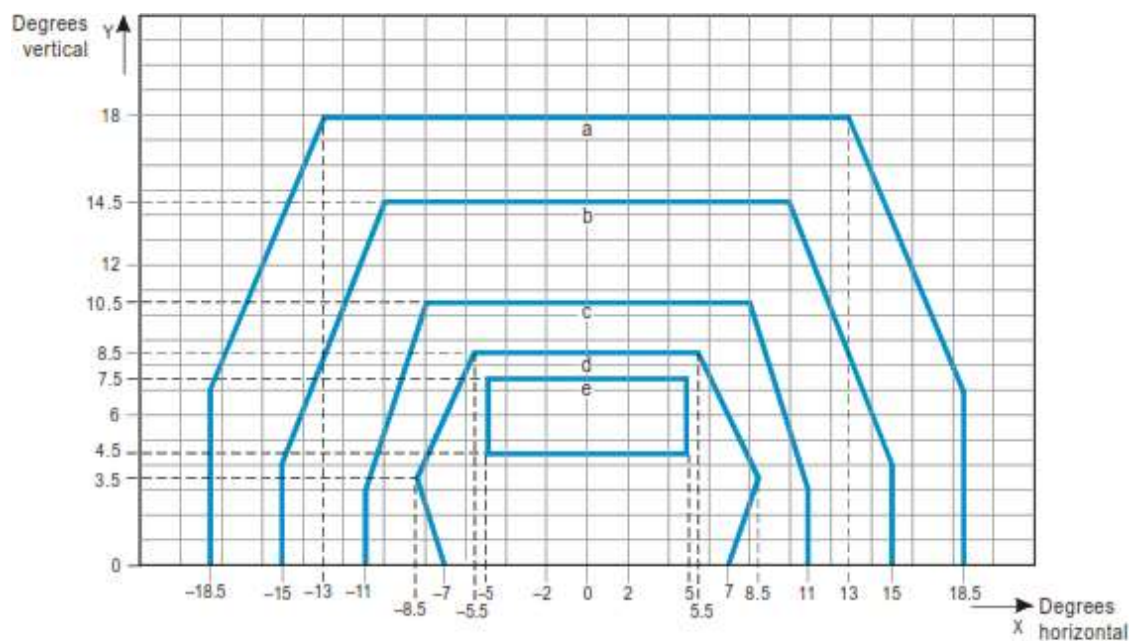


Curve	a	b	c	d	e
Intensity (cd)	8	20	100	450	1 800

Notes:

1. These beam coverages allow for displacement of the cockpit from the centre line up to distances of the order of 12 m and are intended for use before and after curves.
2. See collective notes for Figures A2-12 to A2-21.

Figure A2-18. Isocandela diagram for high-intensity taxiway centre line (15 m spacing), no-entry bar and stop bar lights in straight sections intended for use in an advanced surface movement guidance and control system where higher light intensities are required

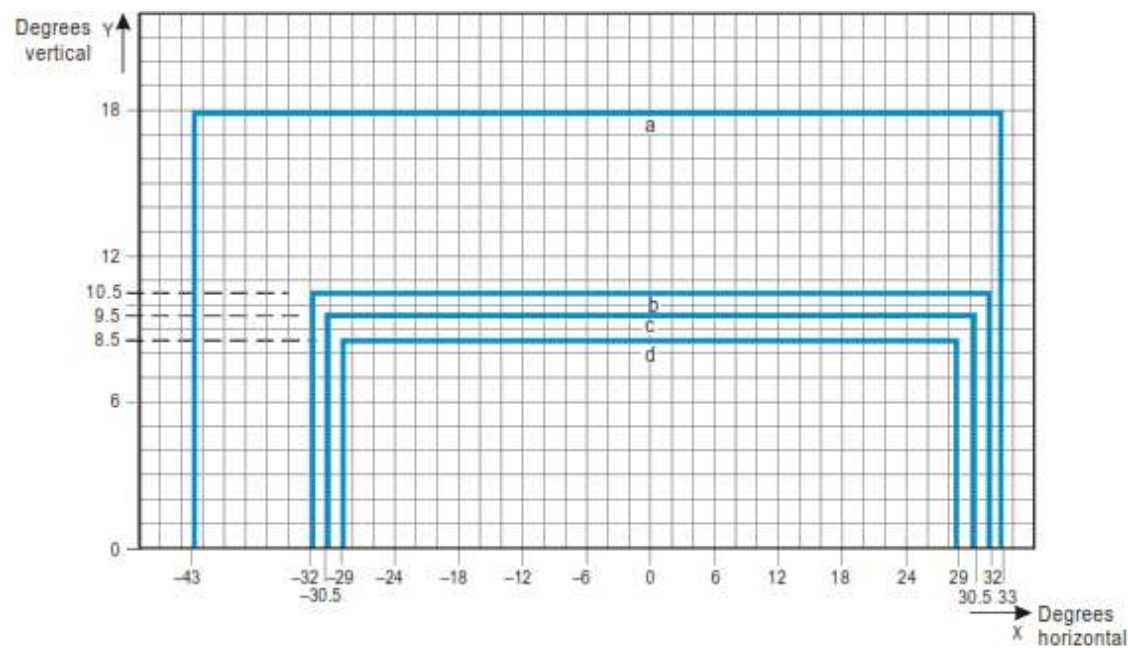


Curve	a	b	c	d	e
Intensity (cd)	8	20	100	450	1 800

Notes:

1. These beam coverages are generally satisfactory and cater for a normal displacement of the cockpit corresponding to the outer main gear wheel on the taxiway edge.
2. See collective notes for Figures A2-12 to A2-21.

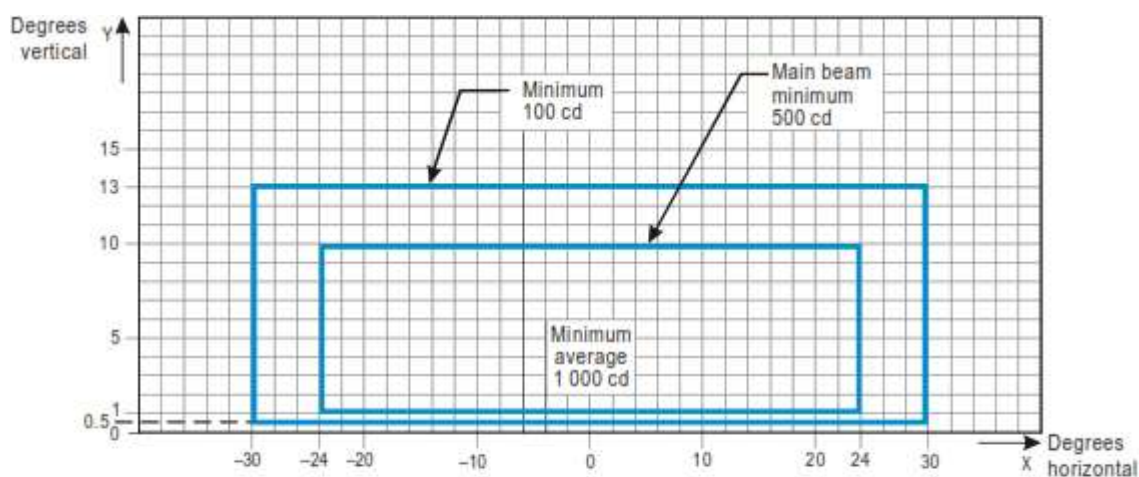
Figure A2-19. Isocandela diagram for high-intensity taxiway centre line (7.5 m spacing), no-entry bar and stop bar lights in curved sections intended for use in an advanced surface movement guidance and control system where higher light intensities are required



Curve	a	b	c	d
Intensity (cd)	8	100	200	400

- Notes:
- 1. Lights on curves to be toed-in 17 degrees with respect to the tangent of the curve.
 - 2. See collective notes for Figures A2-12 to A2-21.

Figure A2-20. Isocandela diagram for high-intensity runway guard lights, Configuration B



Notes:

1. Although the lights flash in normal operation, the light intensity is specified as if the lights were fixed for incandescent lamps.
2. See collective notes for Figures A2-12 to A2-21.

Figure A2-21 Grid points to be used for calculation of average intensity of taxiway centre line and stop bar lights



Collective notes to Figures A2-12 to A2-21

1. The intensities specified in Figures A2-12 to A2-20 are in green and yellow light for taxiway centre line lights, yellow light for runway guard lights and red light for stop bar lights.
2. Figures A2-12 to A2-20 show the minimum allowable light intensities. The average intensity of the main beam is calculated by establishing grid points as shown in Figure A2-21 and using the intensity values measured at all grid points located within and on the perimeter of the rectangle representing the main beam. The average value is the arithmetic average of the light intensities measured at all considered grid points.
3. No deviations are acceptable in the main beam or in the innermost beam, as applicable, when the lighting fixture is properly aimed.
4. Horizontal angles are measured with respect to the vertical plane through the taxiway centre line except on curves where they are measured with respect to the tangent to the curve.
5. Vertical angles are measured from the longitudinal slope of the taxiway surface.
6. The importance of adequate maintenance cannot be overemphasized. The intensity, either average where applicable or as specified on the corresponding isocandela curves, should never fall to a value less than 50 per cent of the value shown in the figures, and it should be the aim of airport authorities to maintain a level of light output close to the specified minimum average intensity.
7. The light unit shall be installed so that the main beam or the innermost beam, as applicable, is aligned within one- half degree of the specified requirement

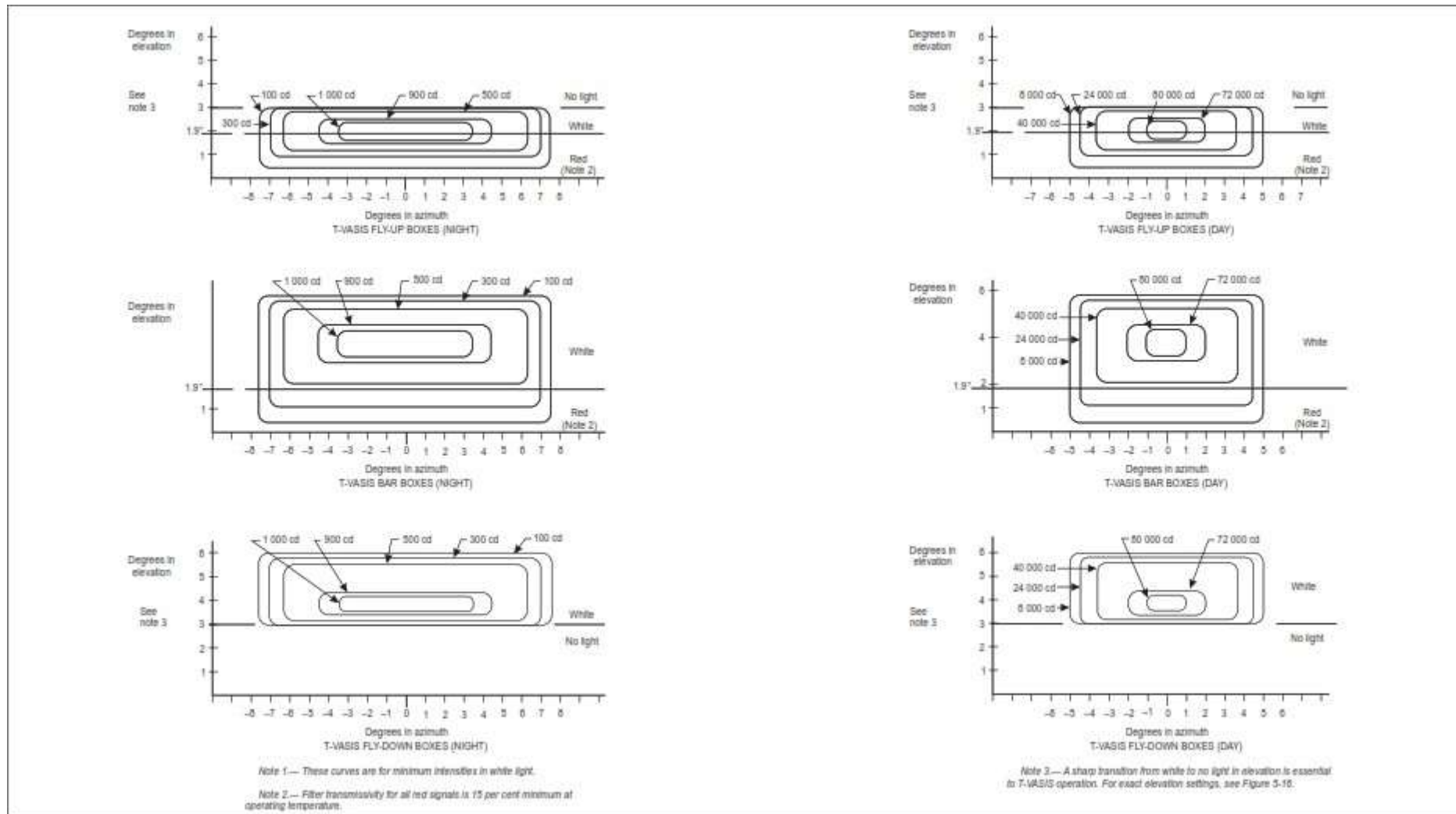
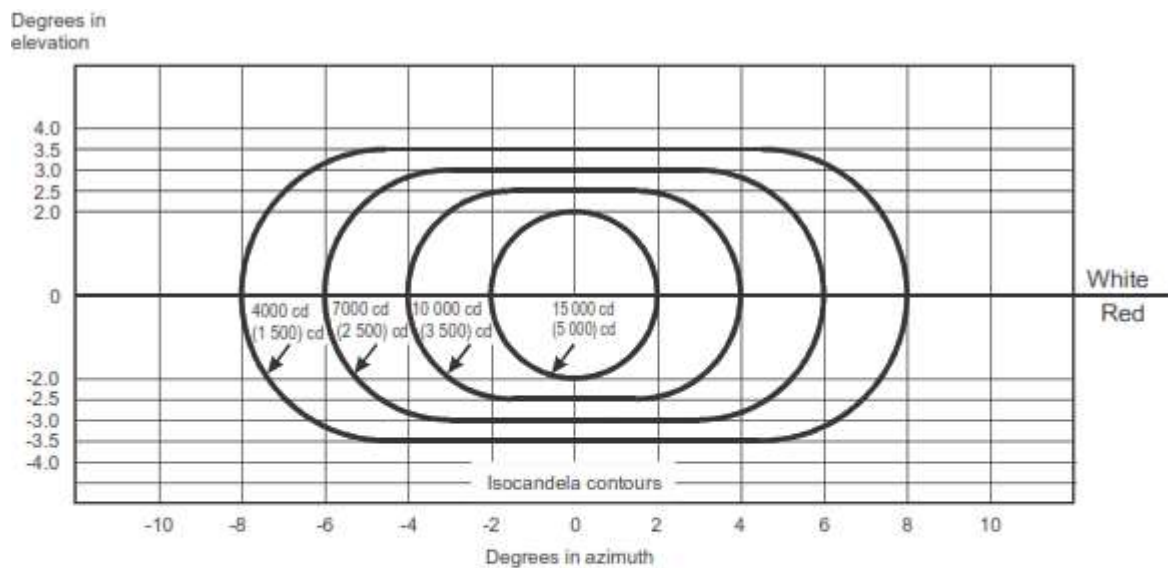
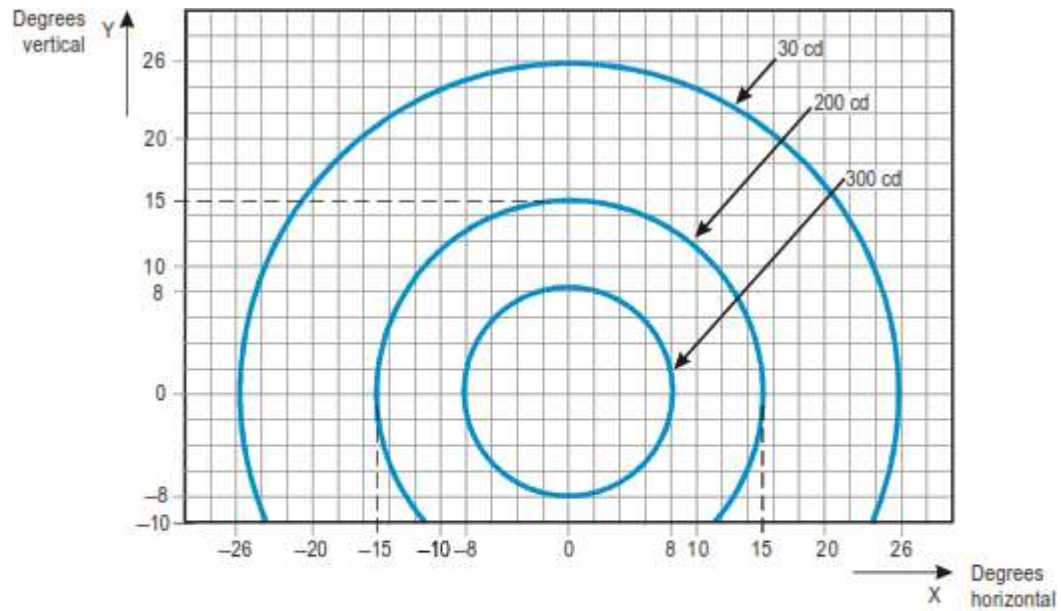
Figure A2.22 Light intensity of T-VASIS and AT-VASIS

Figure A2-23. Light intensity distribution of PAPI and APAPI**Notes:**

1. These curves are for minimum intensities in red light.
2. The intensity value in the white sector of the beam is no less than 2 and may be as high as 6.5 times the corresponding intensity in the red sector.
3. The intensity values shown in brackets are for APAPI.

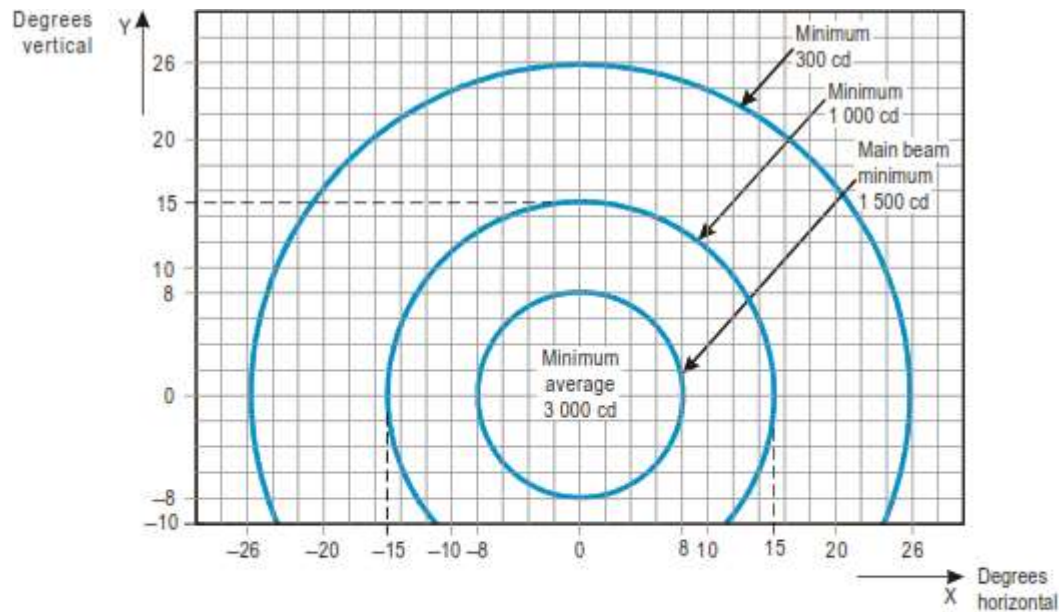
Figure A2-24. Isocandela diagram for each light in low-intensity runway guard lights, Configuration A



Notes:

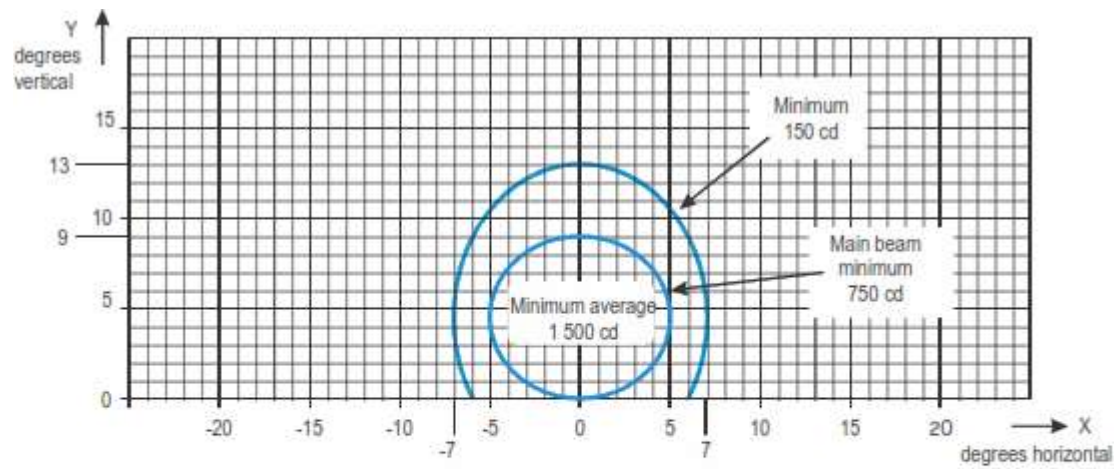
1. Although the lights flash in normal operation, the light intensity is specified as if the lights were fixed for incandescent lamps.
2. The intensities specified are in yellow light.

Figure A2-25. Isocandela diagram for each light in high-intensity runway guard lights, Configuration A



Notes:

1. Although the lights flash in normal operation, the light intensity is specified as if the lights were fixed for incandescent lamps.
2. The intensities specified are in yellow light.

Figure A2-26. Isocandela diagram for take-off and hold lights (THL) (red light)**Notes:**

1. Curves calculated on formula

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$$

a	5.0	7.0
b	4.5	8.5

2. See collective notes for Figures A2-1 to A2-11 and A2-26.

SCHEDULE 5

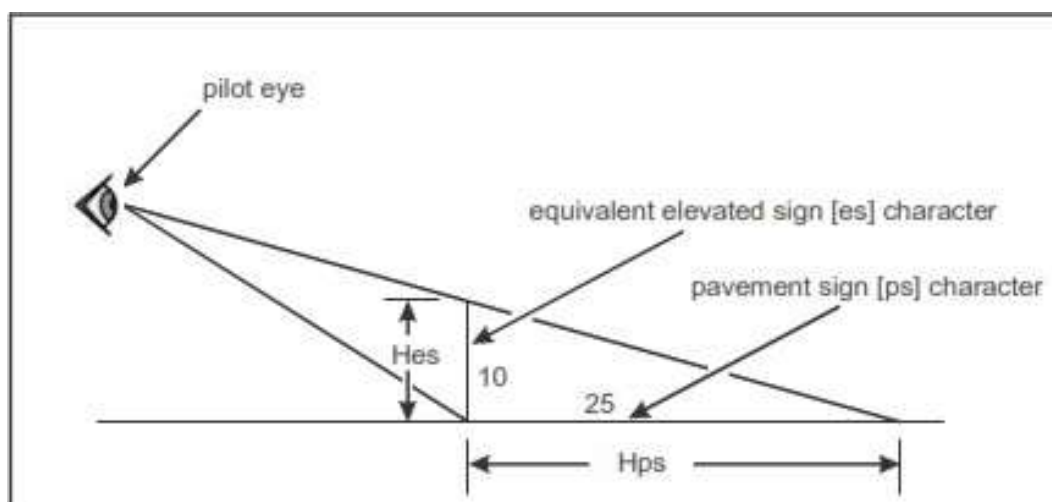
SUPPLEMENTARY PROVISION RELATING TO REGULATION 130 AND 131

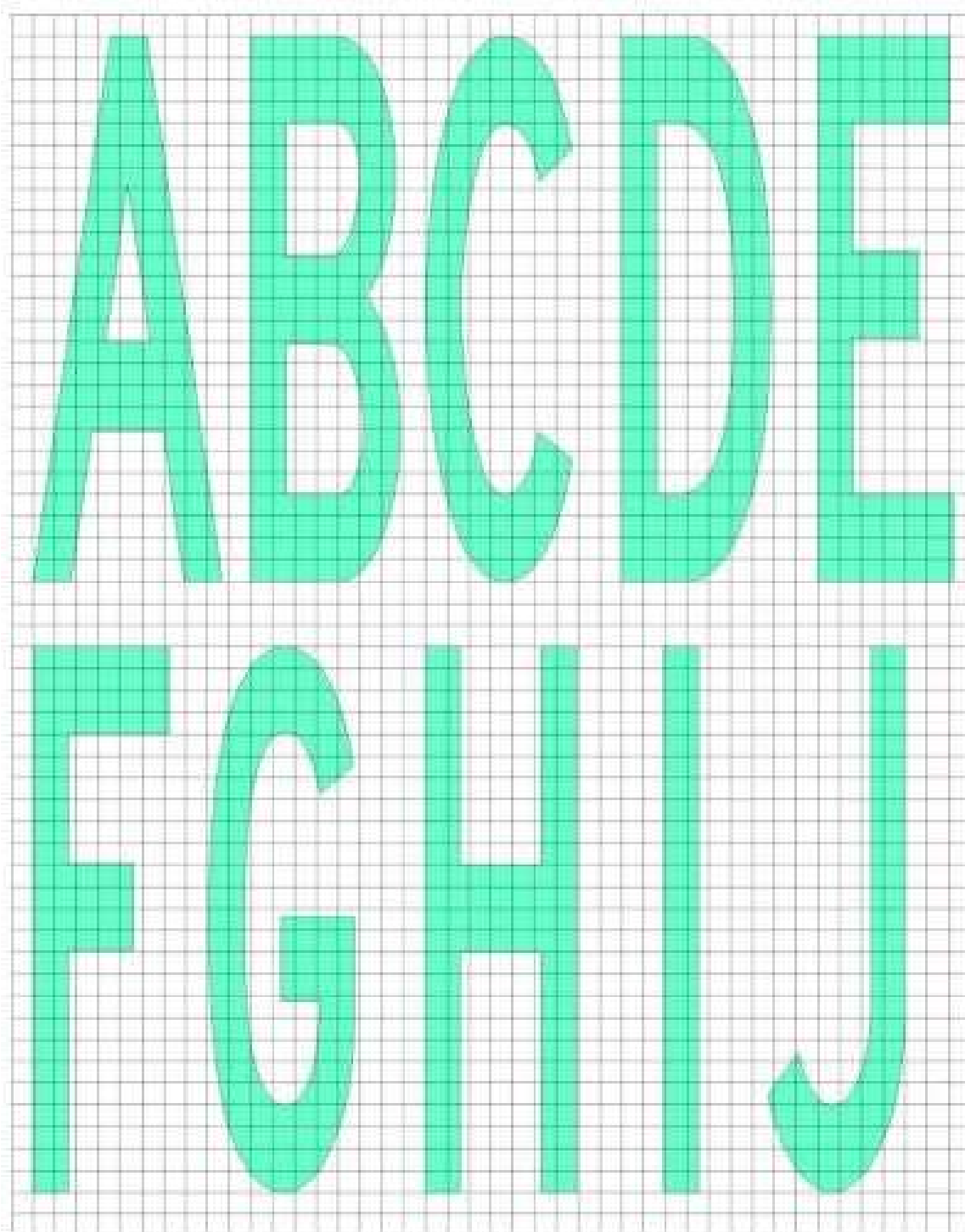
Note 1.— This appendix details the form and proportions of the letters, numbers and symbols of mandatory instruction markings and information markings on a grid.

Note 2.— The mandatory instruction markings and information markings on pavements are formed as if shadowed (i.e., stretched) from the characters of an equivalent elevated sign by a factor of 2.5 as shown in Figure A3-1. The shadowing, however, only affects the vertical dimension. Therefore, the spacing of characters for pavement marking is obtained by first determining the equivalent elevated sign character height and then proportioning from the spacing values given in Table A4-1.

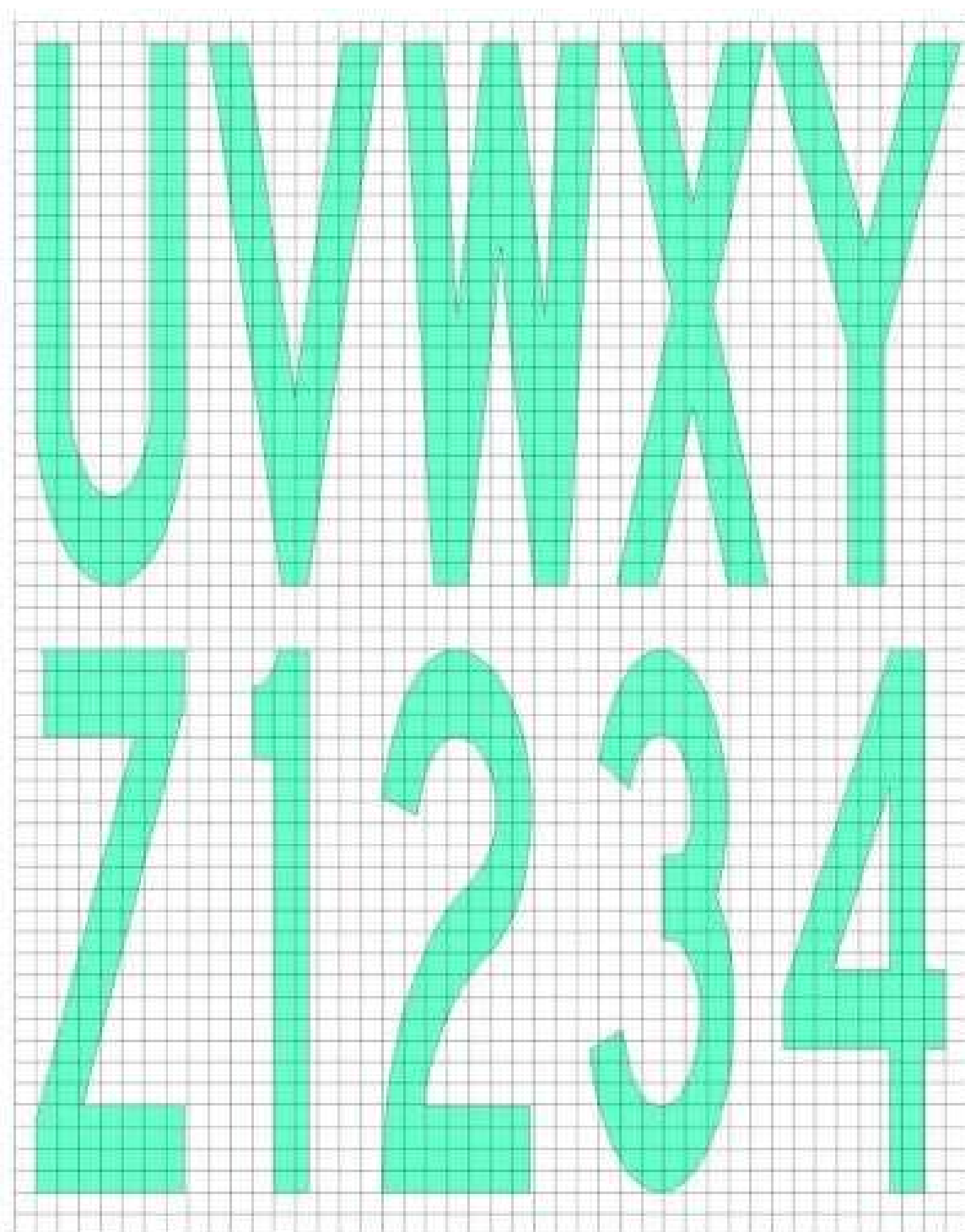
For example, in the case of the runway designator “10” which is to have a height of 4 000 mm (H_{ps}), the equivalent elevated sign character height is $4\,000/2.5=1\,600$ mm (H_{es}). Table A4-1(b) indicates numeral to numeral code 1 and from Table A4-1(c) this code has a dimension of 96 mm, for a character height of 400 mm. The pavement marking spacing for “10” is then $(1\,600/400)*96=384$ mm.

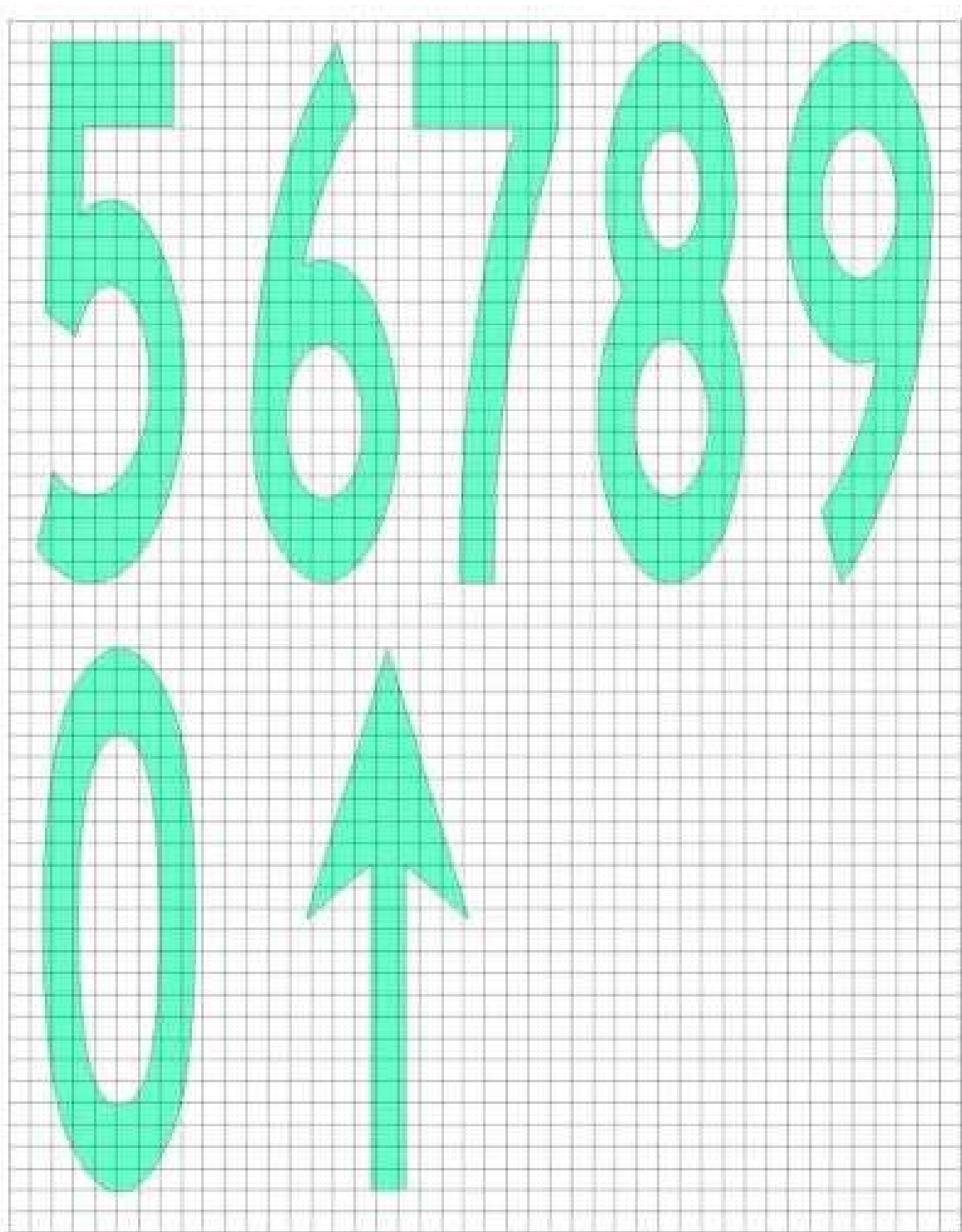
Figure A3-1











SCHEDULE 6**SUPPLEMENTARY PROVISION RELATING TO REGULATION 161**

6.1. Inscription heights shall conform to the following tabulation.

Runway code number	Minimum character height		
	Mandatory instruction sign	Information sign	
		Runway exit and runway vacated signs	Other signs
1 or 2	300 mm	300 mm	200 mm
3 or 4	400 mm	400 mm	300 mm

Note. Where a taxiway location sign is installed in conjunction with a runway designation sign, the character size shall be that specified for mandatory instruction signs.

6.2 Arrow dimensions shall be as follows:

Legend Height	Stroke
200mm	32mm
300mm	48mm
400mm	64mm

6.3 Stroke width for single letter shall be as follows:

Legend Height	Stroke
200mm	32mm
300mm	48mm
400mm	64mm

6.4 Sign luminance shall be as follows:

- a) Where operations are conducted in runway visual range conditions less than a value of 800 m, average sign luminance shall be at least:

Red	30 cd/m ²
Yellow	150 cd/m ²
White	300 cd/m ²

b) Where operations are conducted average sign luminance shall be at least:

Red	10 cd/m ²
Yellow	50 cd/m ²
White	100 cd/m ²

Note.— *In runway visual range conditions less than a value of 400 m, there will be some degradation in the performance of signs.*

6.5 The luminance ratio between red and white elements of a mandatory sign shall be between 1:5 and 1:10.

6.6 The average luminance of the sign is calculated by establishing grid points as shown in Figure A4-1 and using the luminance values measured at all grid points located within the rectangle representing the sign.

6.7 The average value is the arithmetic average of the luminance values measured at all considered grid points.

6.8 The ratio between luminance values of adjacent grid points shall not exceed 1.5:1. For areas on the sign face where the grid spacing is 7.5 cm, the ratio between luminance values of adjacent grid points shall not exceed 1.25:1. The ratio between the maximum and minimum luminance value over the whole sign face shall not exceed 5:1.

6.9 The forms of characters, i.e. letters, numbers, arrows and symbols, shall conform to those shown in Figure A4-2. The width of characters and the space between individual characters shall be determined as indicated in Table A4-1.

6.10 The face height of signs shall be as follows:

Legend Height	Face Height (m in)
200mm	300mm
300mm	450mm
400mm	600mm

6.11 The face width of signs shall be determined using Figure A4-4 except that, where a mandatory instruction sign is provided on one side of a taxiway only, the face width shall not be less than:

- a) 1.94 m where the code number is 3 or 4; and
- b) 1.46 m where the code number is 1 or 2.

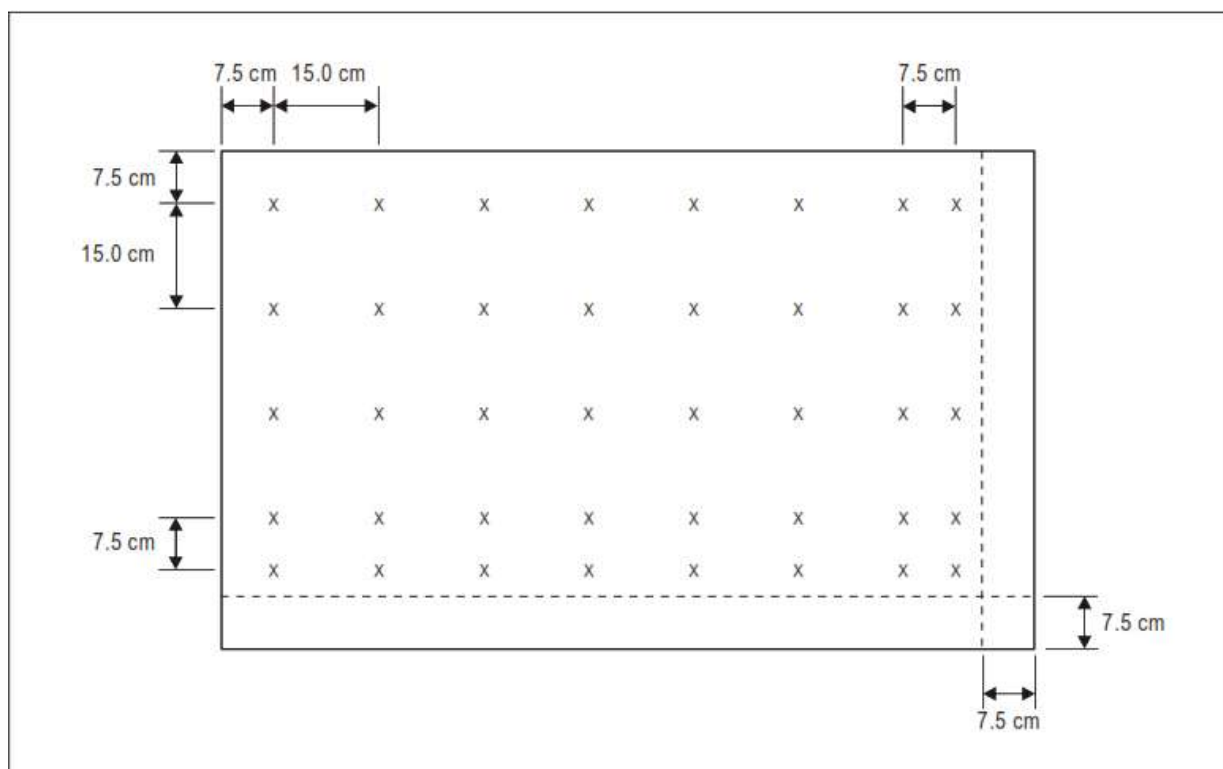
6.12 Borders

- a) The black vertical delineator between adjacent direction signs should have a width of approximately 0.7 of the stroke width.

- b) The yellow border on a stand-alone location sign should be approximately 0.5 stroke width.

6.13. The colours of signs shall be in accordance with the appropriate specifications in Schedule 3.

Figure A4-1. Grid points for calculating average luminance of a sign



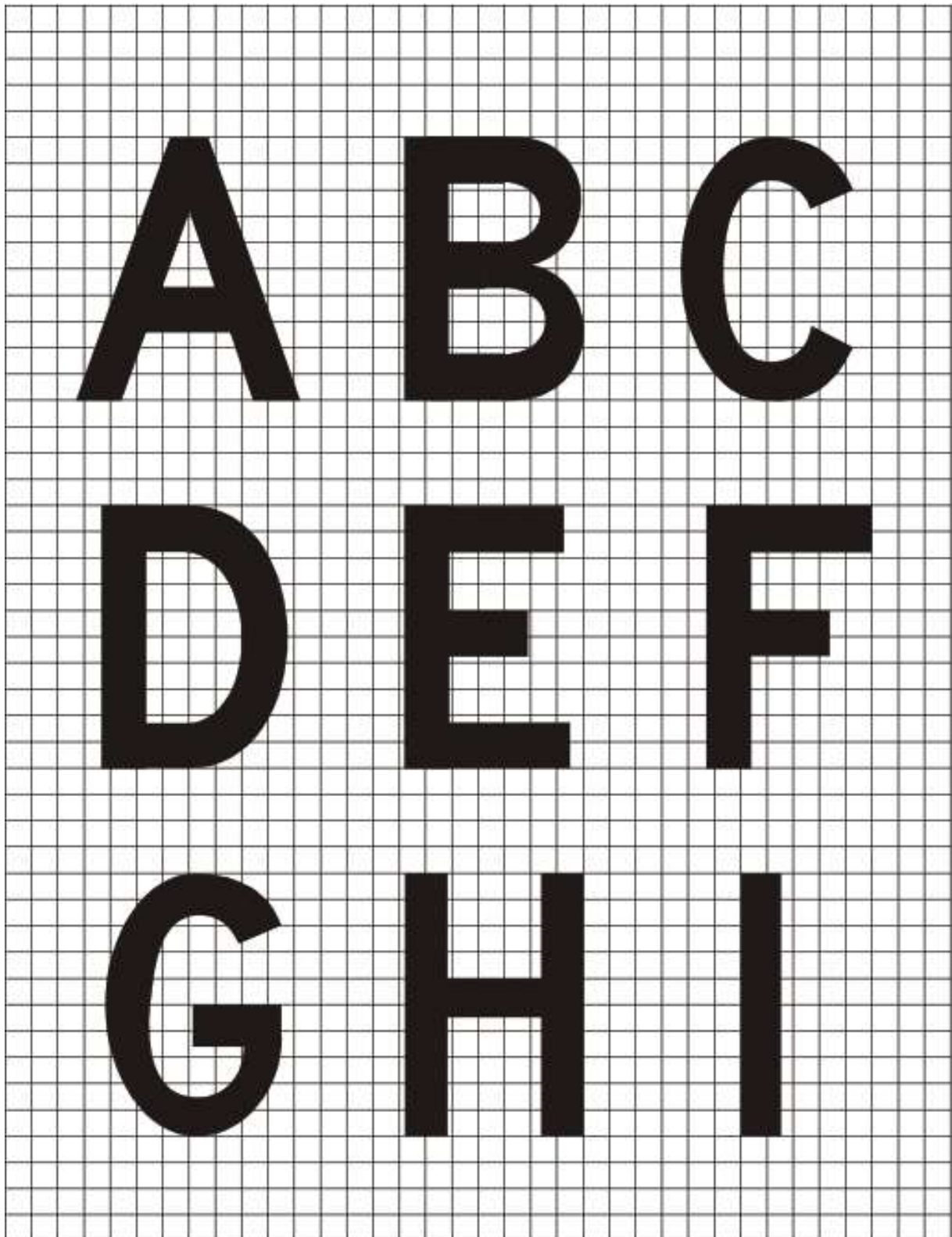
Note 1.— The average luminance of a sign is calculated by establishing grid points on a sign face showing typical inscriptions and a background of the appropriate colour (red for mandatory instruction signs and yellow for direction and destination signs) as follows:

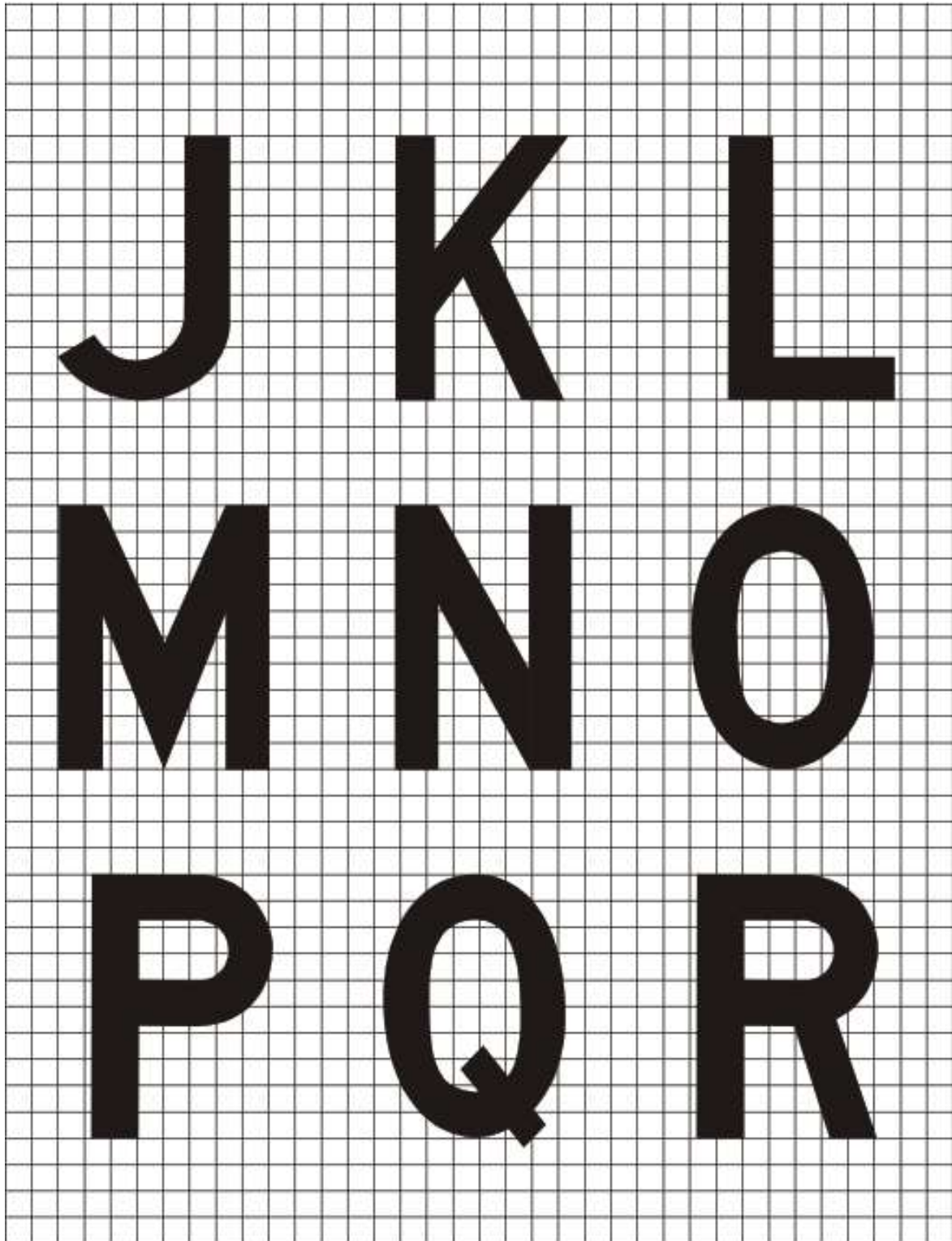
- Starting at the top left corner of the sign face, establish a reference grid point at 7.5 cm from the left edge and the top of the sign face.
- Create a grid of 15 cm spacing horizontally and vertically from the reference grid point. Grid points within 7.5 cm of the edge of the sign face shall be excluded.
- Where the last point in a row/column of grid points is located between 22.5 cm and 15 cm from the edge of the sign face (but not inclusive), an additional point shall be added 7.5 cm from this point.
- Where a grid point falls on the boundary of a character and the background, the grid point shall be slightly shifted to be completely outside the character.

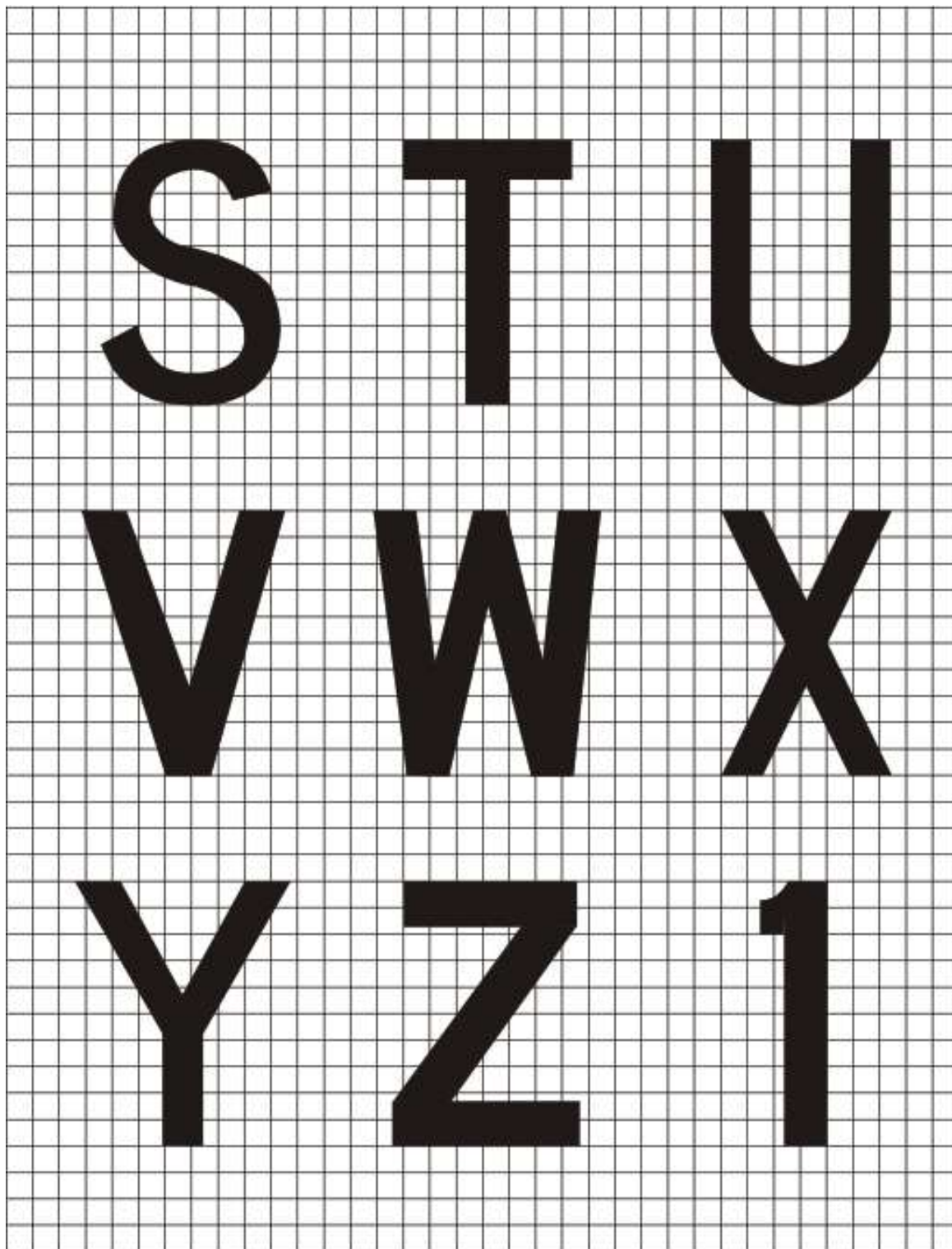
Note 2.— Additional grid points may be required to ensure that each character includes at least five evenly spaced grid points.

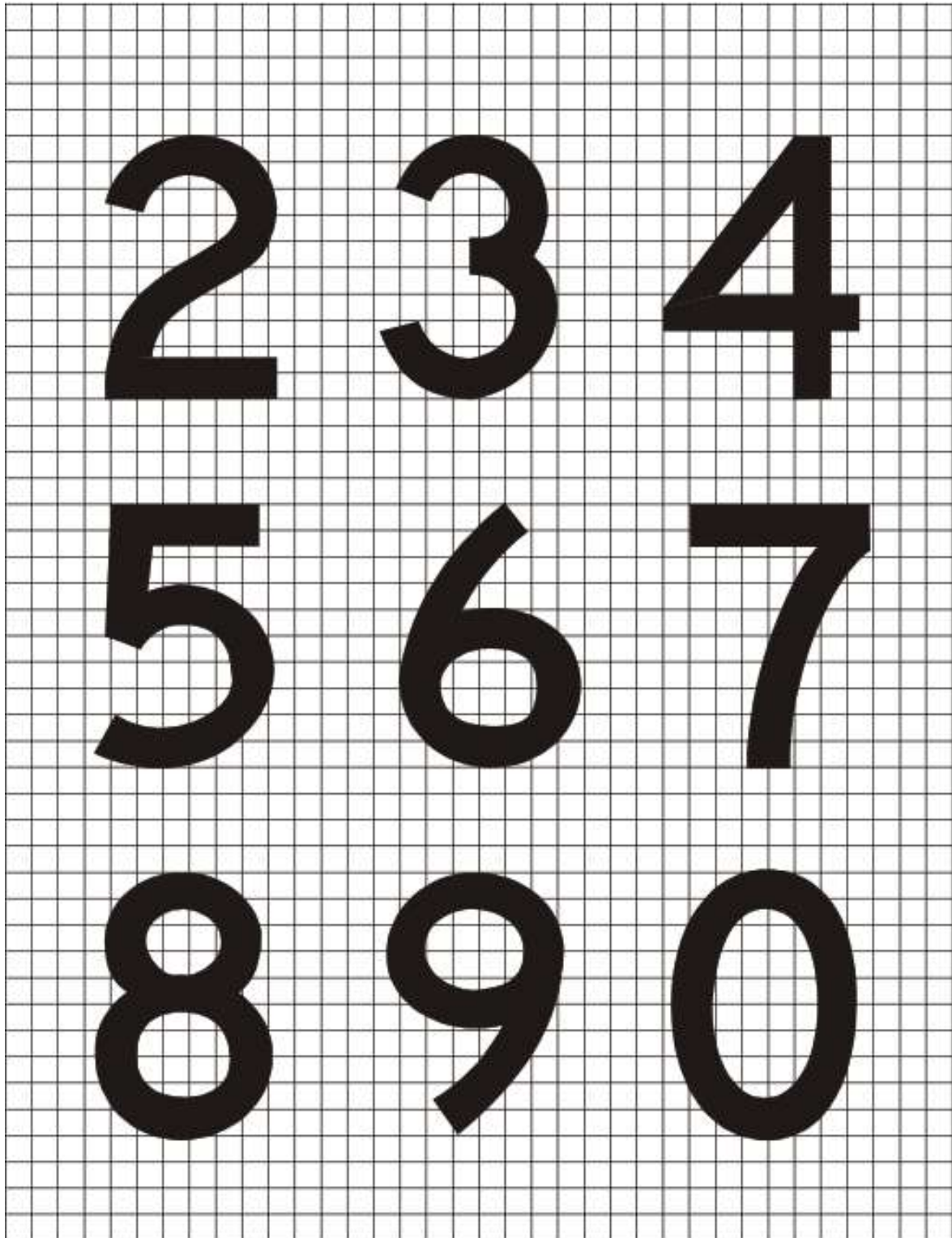
Note 3. Where one unit includes two types of signs, a separate grid shall be established for each type.

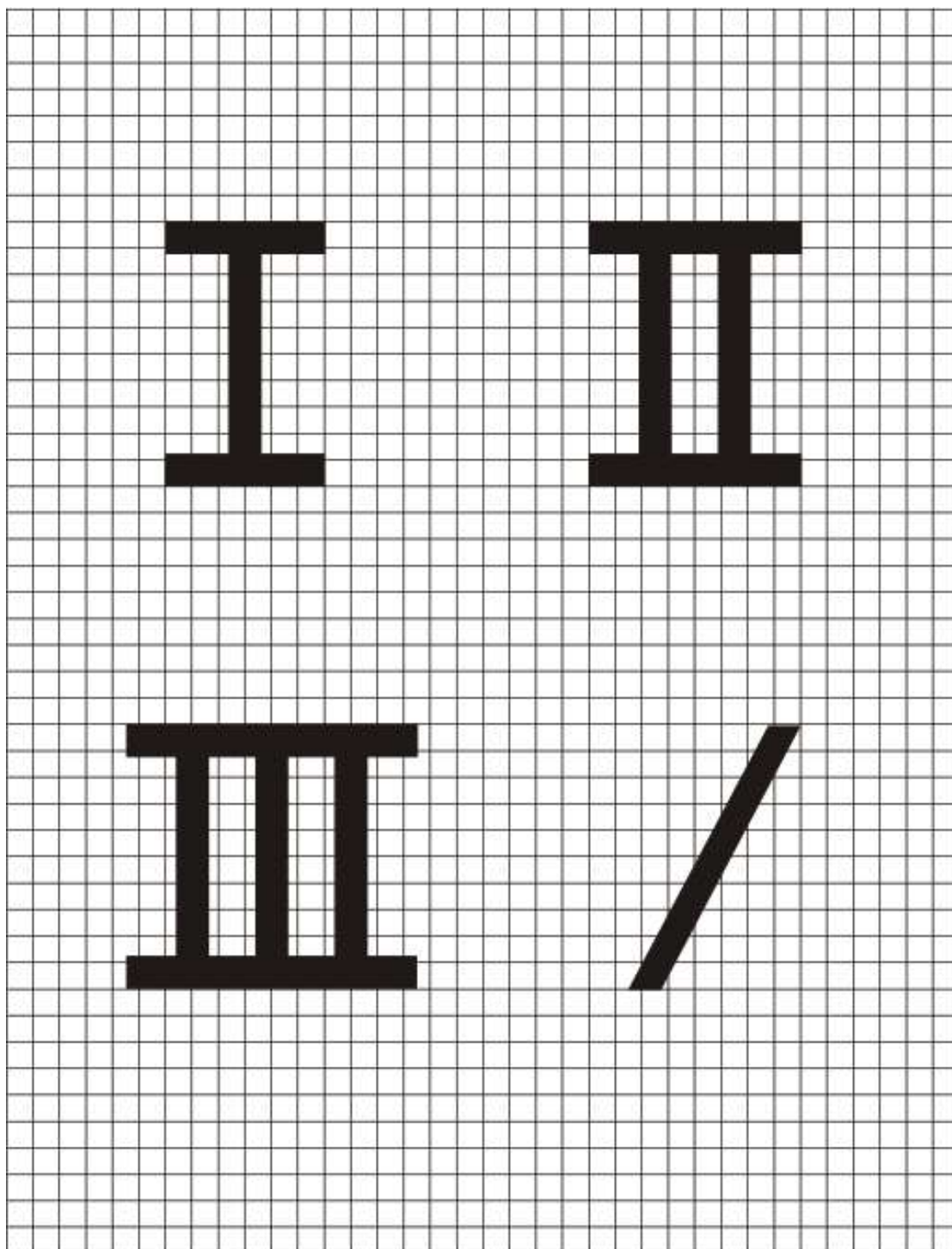
Figure A4-2. Forms of characters

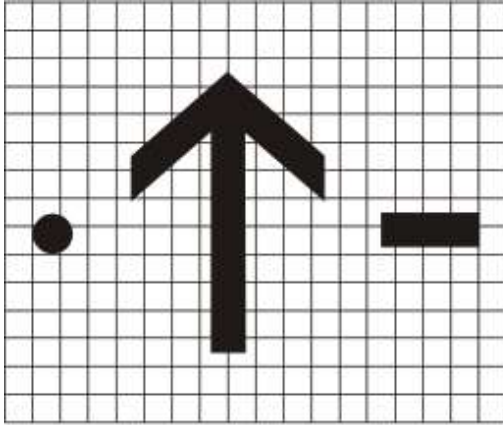










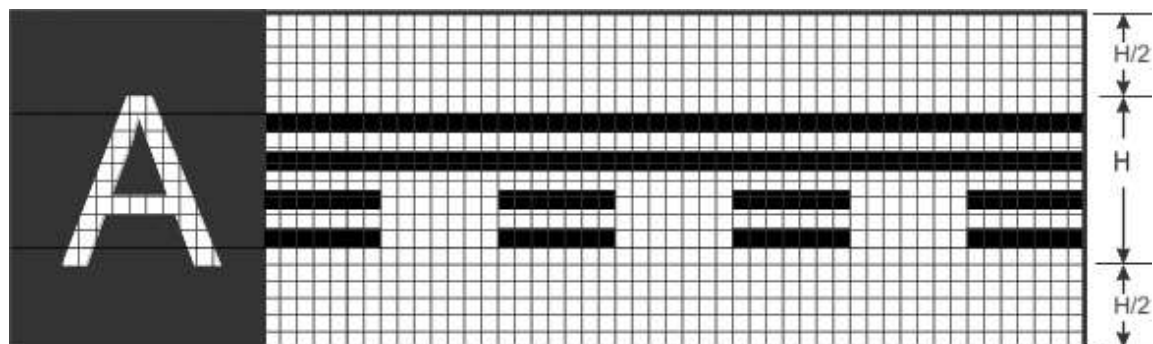


Arrow, dot and dash

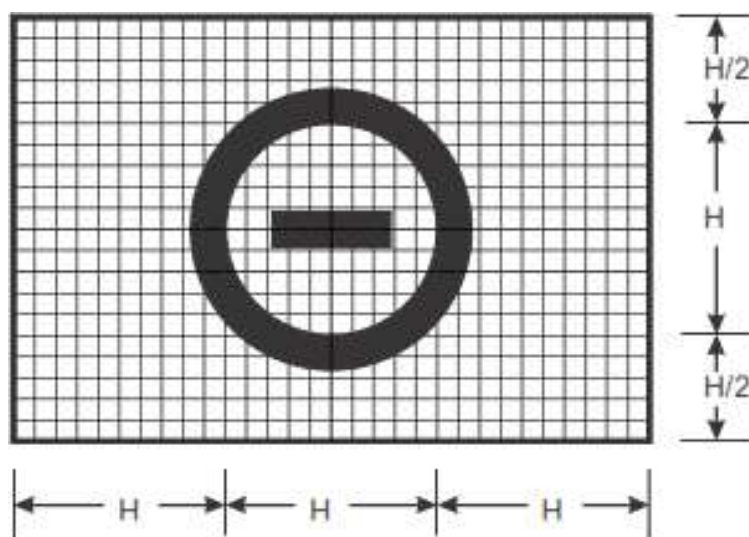
Note 1.—The arrow stroke width, diameter of the dot, and both width and length of the dash shall be proportioned to the character stroke widths.

Note 2.— The dimensions of the arrow shall remain constant for a particular sign size, regardless of orientation.

Figure A4-3. Runway vacated and NO ENTRY sign

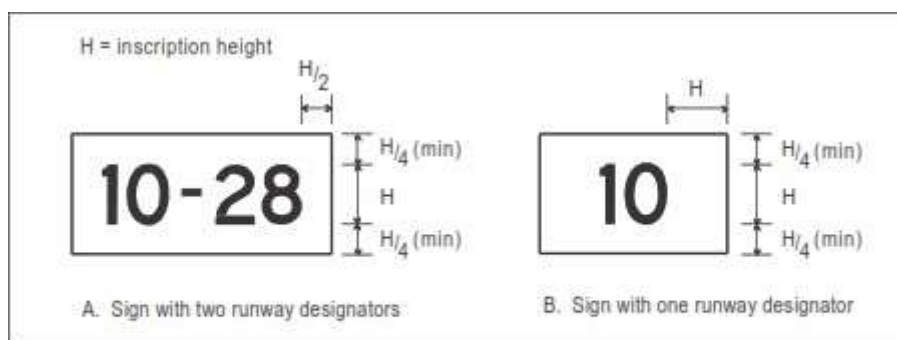


Runway vacated sign (with typical location sign)



NO ENTRY sign

Figure A4-4. Sign Dimension



Explanatory Note to Figure A4-4: "H" stands for the inscription height.

Table A4-1. Letter and numeral widths and space between letters or numerals

a) Letter to letter code number				
Preceding Letter	Following Letter			Code number
	B, D, E, F, H, I, K, L, M, N, P, R, U	C, G, O, Q, S, X, Z	A, J, T, V, W, Y	
A	2	2	4	
B	1	2	2	
C	2	2	3	
D	1	2	2	
E	2	2	3	
F	2	2	3	
G	1	2	2	
H	1	1	2	
I	1	1	2	
J	1	1	2	
K	2	2	3	
L	2	2	4	
M	1	1	2	
N	1	1	2	
O	1	2	2	
P	1	2	2	
Q	1	2	2	
R	1	2	2	
S	1	2	2	
T	2	2	4	
U	1	1	2	
V	2	2	4	
W	2	2	4	
X	2	2	3	
Y	2	2	4	
Z	2	2	3	

b) Numeral to numeral code number				
Preceding Numeral	Following number			Code number
	1, 5	2, 3, 6, 8, 9, 0	4, 7	
1	1	1	2	
2	1	2	2	
3	1	2	2	
4	2	2	4	
5	1	2	2	
6	1	2	2	
7	2	2	4	
8	1	2	2	
9	1	2	2	
0	1	2	2	

c) Space between characters				
Code No.	Character height (mm)			Space (mm)
	200	300	400	
1	48	71	96	
2	38	57	76	
3	25	38	50	
4	13	19	25	

d) Width of letter				
Letter	Letter height (mm)			Width (mm)
	200	300	400	
A	170	255	340	
B	137	205	274	
C	137	205	274	
D	137	205	274	
E	124	185	248	
F	124	185	248	
G	137	205	274	
H	137	205	274	
I	32	48	64	
J	127	190	254	
K	140	210	280	
L	124	185	248	
M	157	235	314	
N	137	205	274	
O	143	214	286	
P	137	205	274	
Q	143	214	286	
R	137	205	274	
S	137	205	274	
T	124	185	248	
U	137	205	274	
V	152	229	304	
W	178	267	356	
X	137	205	274	
Y	171	257	342	
Z	137	205	274	

e) Width of numeral				
Numeral	Numeral height (mm)			Width (mm)
	200	300	400	
1	50	74	98	
2	137	205	274	
3	137	205	274	
4	143	214	286	
5	137	205	274	
6	137	205	274	
7	137	205	274	
8	137	205	274	
9	137	205	274	
0	143	214	286	

INSTRUCTIONS

- To determine the proper SPACE between letters or numerals, obtain the code number from table a) or b) and enter table c) for that code number to the desired letter or numeral height.
- The space between words or groups of characters forming an abbreviation or symbol should be equal to 0.5 to 0.75 of the height of the characters used except that where an arrow is located with a single character such as 'A →', the space may be reduced to not less than one quarter of the height of the character in order to provide a good visual balance.
- Where the numeral follows a letter or vice versa use Code 1.
- Where a hyphen, dot, or diagonal stroke follows a character or vice versa use Code 1.
- For the intersection take-off sign, the height of the lower case 'm' is 0.75 of the height of the preceding '0' (zero) and spaced from the preceding '0' at code 1 for the character height of the numerals.

MADE this 12th DAY of MARCH

James Jay
 DIRECTOR GENERAL



