AZƏRBAYCAN RESPUBLİKASININ
RƏQƏMSAL İNKİŞAF VƏ NƏQLİYYAT NAZİRLİYİ
DÖVLƏT MÜLKİ AVİASİYA AGENTLİYİ

ƏMR

№ 3-27-102/3-2-53/2024

Bakı şəhəri "2" dekabr 2024 il

"Azərbaycan Aviasiya Qaydaları-Aerodrom Standartları" sənədinin 8-ci nəşrinin qüvvəyə minməsi barədə

Beynəlxalq Mülki Aviasiya Təşkilatının "Beynəlxalq Mülki Aviasiya haqqında" 1944-cü il 7 dekabr tarixli Konvensiyaya Əlavə 14-ün birinci hissəsinə edilmiş dəyişikliyin tətbiq edilməsi məqsədilə Azərbaycan Respublikası Prezidentinin 2018-ci il 22 may tarixli 90 nömrəli Fərmanı ilə təsdiq edilmiş "Azərbaycan Respublikasının Rəqəmsal İnkişaf və Nəqliyyat Nazirliyi yanında Dövlət Mülki Aviasiya Agentliyi haqqında Əsasnamə"nin 5.6.6-cı yarımbəndini rəhbər tutaraq,

əmr edirəm:

1. "Azərbaycan Aviasiya Qaydaları-Aerodrom Standartları" sənədinin 8-ci nəşri qüvvəyə minsin.
2. Dövlət Mülki Aviasiya Agentliyinin (DMAA) və onun tabeliyində "Mülki Aviasiyada Uçuşların Təhlükəsizliyi üzrə Dövlət Müfəttişliyi" publik hüquqi şəxsin, həmçinin mülki aviasiya subyektlərinin aidiyyəti mütəxəssislərinin sözügedən sənədlə tanış edilməsi və icrası təmin edilsin.
3. Sənədin yenilənmiş nəşri DMAA-nın rəsmi internet saytında yerləşdirilsin.
4. Əmr bütün şəxsi heyətə çatdırılsın.
5. Əmrin icrasına nəzarət direktorun müavini Bəhruz Məlikova həvalə edilsin.

Direktor **Arif Məmmədov**

APPROVED
by SCAA Director Order № 3-27-102/3-2-53/2024 dd. 02 December 2024

AZERBAIJAN AVIATION RULES – AERODROME STANDARDS

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0.3 DISTRIBUTION CONTROL

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0.4 RECORD OF AMENDMENTS AND REVISIONS

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Ed.02/Rev.01	20.NOV.2019	Dir.Order № 62 dd.15.11.2019	Improvement
Ed.02/Rev.02	03.MAR.2020	Dir.Order № 08 dd.28.02.2020	Improvement
Edition № 03	17.JUN.2020	Dir.Order № 27 dd.12.06.2020	
Ed.03/Rev.01	02.NOV.2020	Dir.Order № 52 dd.28.10.2020	Implemetation of ICAO AN14(I)/AM16
Ed.03 Rev.02	19.MAR.2021	Dir.Order № 19 dd.15.03.2021	Implemetation of SMS requirements
Edition № 04	15.DEC.2021	Dir.Order № 75 dd.09.12.2021	Implemetation of GRF
Edition № 05	12.MAY.2022	Dir.Order № 41 dd.10.05.2022	Improvement
Edition № 06	01. MAY.2023	Dir.Order № 21 dd.18.04.2023	Improvement
Edition № 07	30.MAY.2024	Dir.Order № 3-27-102/3-2-26/2024 dd. 30.05.2024	Aviation Law
Edition № 08	02.DEC.2024	Dir.Order № 3-27-102/3-2-53/2024 dd. 02.12.2024	Implemetation of PCR

***Edition**: - Release of a document having incorporated all previous revisions until the current version. New edition of a document will not show revised text in blue color. Current edition of a document shown on each page in footer.*

***Revision**: - A change made to a part of document, where it is reflected with blue text or accompanied with a vertical line on right side of a document. Basic information on revisions (number and date) given in the List of effective Pages and indicated in header of affected page and in context itself.*

0.5 TERMS AND DEFINITIONS

Definition	Meaning
Accident	An occurrence associated with the operation of an aircraft which takes place between the time any person boards the aircraft with the intention of flight until such time as all such persons have disembarked, in which a) a person is fatally or seriously injured as a result of: – being in the aircraft, or – direct contact with any part of the aircraft, including parts which have become detached from the aircraft, or – direct exposure to jet blast, except when the injury are from natural causes, self-inflicted, or inflicted by other persons, or when the injuries are to stowaways hiding outside the areas normally available to the passengers and crew or; b) the aircraft sustains damage or structural failure which: – adversely affects the structural strength, performance or flight characteristics of the aircraft, and – would normally require major repair or replacement of the affected component except for engine failure or damage, when the damage is limited to the engine, its c) cowlings or accessories; or for damage limited to propellers, wing tips, antennas, tires, brakes, fairings, small dents or puncture holes in the aircraft skin; or d) the aircraft is missing or is completely inaccessible.
Data accuracy	A degree of conformance between the estimated or measured value and the true value.
Aerodrome	A defined area on land or water (including any buildings, installation and equipment) intended to be used, either wholly or in part for the arrival, departure and surface movement of aircraft.
Aerodrome beacon	Aeronautical beacon used to indicate the location of an aerodrome from the air.
Aerodrome Certificate	Means a certificate granted by the Director SCAA pursuant to Article 10, chapter 10.2 of the Law of the Republic of Azerbaijan on Aviation to an aerodrome operator to operate an aerodrome, subsequent to the acceptance of the aerodrome operator's Aerodrome Manual.
Aerodrome elevation	The elevation of the highest point of the landing area.
Aerodrome facilities and equipment	Means any facility or equipment, inside or outside the boundaries of an aerodrome, that is constructed, or installed, and maintained for the arrival, departure and surface movement of aircraft.
Aerodrome identification sign	A sign placed on an aerodrome to aid in identifying the aerodrome from the air.
Aerodrome mapping data (AMD).	Data collected for the purpose of compiling aerodrome mapping information for aeronautical uses. ***Note:*** *Aerodrome mapping data are collected for purposes that include the improvement of the user's situational awareness, surface navigation operations, training, charting and planning.*
Aerodrome mapping Database (AMDB)	A collection of aerodrome mapping data organized and arranged as a structured data set.

Definition	Meaning
Aerodrome Manual	Means the manual forming part of the application for an Aerodrome Certificate under the AAR-AS.
Aerodrome operator	In relation to a certified aerodrome, means the holder of an Aerodrome Certificate.
Aerodrome reference point	The designated geographical location of an aerodrome
Aerodrome traffic density	a) Light. 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. 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. c) Heavy. 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. ***Note 1*** *– The number of movements in the mean busy hour is the arithmetic mean over the year of the number of movements in the daily busiest hour.* ***Note 2*** *– Either a take-off or landing constitutes a movement.*
Aeronautical beacon	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	Any light specially provided as an aid to air navigation, other than a light displayed on an aircraft.
Aeronautical Information Publication	Means a publication issued by and with the authority of the Aeronautical Information Services and containing aeronautical information of a lasting character essential to air navigation.
Aeronautical Information Services	Means the services established within the defined area of coverage responsible for the provision of aeronautical information and data necessary for the safety, regularity and efficiency of air navigation and, where appropriate, includes the personnel and facilities employed to provide information pertaining to the availability of air navigation services and their associated procedures necessary for the safety, regularity and efficiency of air navigation.
Aeroplane reference field length	The minimum field length required for takeoff 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 certificating 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. ***Note:*** *Attachment A, Section 2 of the ICAO Annex 14 provides information on the concept of balanced field length and the ICAO Airworthiness Manual (Doc 9760) contains detailed guidance on matters related to take-off distance.*
AIP amendment	Means permanent changes to the information contained in the Aeronautical Information Publication.
AIP supplement	Means temporary changes, published by means of special pages, to the information contained in the Aeronautical Information Publication.

Definition	Meaning
Aircraft Classification Number	A number expressing the relative effect of an aircraft on a pavement for a specified standard subgrade category. ***Note:*** *The aircraft classification number is calculated with respect to the centre of gravity (CG) position which yields the critical loading on the critical gear. Normally the aftmost CG position appropriate to the maximum gross apron (ramp) mass is used to calculate the ACN.* *In exceptional cases the forward most CG position may result in the nose gear loading being more critical.*
Aircraft classification rating	A number expressing the relative effect of an aircraft on a pavement for a specified standard subgrade category.
Aircraft stand	A designated area on an apron intended to be used for parking an aircraft.
Apron	A defined area, on a land aerodrome, intended to accommodate aircraft for purposes of loading or unloading passengers, mail or cargo, fuelling, parking or aintenance.
Apron management service	A service provided to regulate the activities and the movement of aircraft and vehicles on an apron.
Arresting system	A system designed to decelerate an aeroplane overrunning the runway.
Autonomous runway incursion warning system (ARIWS)	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 a vehicle operator.
Balked Landing	A landing manoeuvre that is unexpectedly discontinued at any point below the obstacle clearance altitude/height (OCA/H).
Barrette	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.
Bird incident	Means an incident where: a) there Is a collision between an aircraft and one or more birds; b) where one or more birds pass sufficiently close to an aircraft in flight to cause alarm to the pilot.
Calendar	Discrete temporal reference system that provides the basis for defining temporal position to a resolution of one day (ISO 19108*).
Capacitor discharge lights	A lamp in which high-intensity flashes of extremely short duration are produced by the discharge of electricity at high voltage through a gas enclosed in a tube.
Certified aerodrome	Means an aerodrome whose operator has been granted an Aerodrome Certificate.
Clearway	A defined rectangular area on the ground or water under the control of the aerodrome operator selected or prepared as a suitable area over which an aeroplane may make a portion of its initial climb to a specified height.
Controlled aerodrome	An aerodrome provided with air traffic control services.
Cyclic redundancy check (CRC)	A mathematical algorithm applied to the digital expression of data that provides a level of assurance against loss or alteration of data.

Definition	Meaning
Data quality	A degree or level of confidence that the data provided meet the requirements of the data user in terms of accuracy, resolution, integrity (or equivalent assurance level), traceability, timeliness, completeness and format.
Data integrity (assurance level)	A degree of assurance that an aeronautical data and its value has not been lost or altered since the origination or authorized amendment.
Datum	Any quantity or set of quantities that may serve as a reference or basis for the calculation of other quantities (ISO 19104*).
De-icing/anti-icing facility	A facility where frost, ice or snow is removed (de-icing) from the aeroplane to provide clean surfaces, and/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. ***Note:*** *Further guidance is given in the Regulation of Aircraft Ground De-icing/Anti-icing Operations (Doc 9640).*
De-icing/anti-icing pad	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 maneuvering of two or more mobile de-icing/anti-icing equipment.
Declared distances.	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	Simultaneous approaches to parallel or near-parallel instrument runways where radar separation minima between aircraft on adjacent extended runway centre lines are prescribed.
Director of Civil Aviation	Means the Director of the Civil Aviation Authority of Azerbaijan, who is also referred to as the Chief Executive of the Civil Aviation Authority of Azerbaijan under the Aviation Law of Azerbaijan Republic and includes any person acting on that capacity.
Displaced threshold	A threshold not located at the extremity of a runway.
Effective intensity	The effective intensity of 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)	The height related to the reference ellipsoid, measured along the ellipsoid outer normal through the point in question.
Fatal injury	Means any injury which results in death within 30 days of the accident.
Facility malfunction incident	Means an incident that involves an unserviceability of a visual/non-visual aid, electrical system, aeronautical telecommunications facility and/or other equipment needed for aircraft operation.
Fixed light	A light having constant luminous intensity when observed from a fixed point.
Foreign object debris (FOD)	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.

Definition	Meaning
Frangible object	An object of low mass designed to break, distort or yield on impact so as to present the minimum hazard to aircraft. ***Note**: Guidance on design for frangibility is contained in the G-AGA-013*
Geodetic datum	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	The equipotential surface in the gravity field of the Earth which coincides with the undisturbed mean sea level (MSL) extended continuously through the continents. ***Note**: The geoid is irregular in shape because of local gravitational disturbances (wind tides, salinity, current, etc.) and the direction of gravity is perpendicular to the geoid at every point.*
Geoid undulation	The distance of the geoid above (positive) or below (negative) the mathematical reference ellipsoid. ***Note**: In respect to the World Geodetic System – 1984 (WGS-84) defined ellipsoid, the difference between the WGS-84 ellipsoidal height and orthometric height represents WGS-84 geoid undulation.*
Gregorian calendar	Calendar in general use; first introduced in 1582 to define a year that more closely approximates the tropical year than the Julian calendar (ISO 19108*). ***Note**: In the Gregorian calendar, common years have 365 days and leap years 366 days divided into 12 sequential months.*
Hazard beacon	An aeronautical beacon used to designate a danger to air navigation.
Heliport	An aerodrome or a defined area on a structure intended to be used wholly or in part for the arrival, departure and surface movement of helicopters.
Holding bay	A defined area where aircraft can be held, or bypassed, to facilitate efficient surface movement of aircraft.
Holdover time	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	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 Principle	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	Human capabilities and limitations which have an impact on the safety and efficiency of aeronautical operations.
Identification beacon	An aeronautical beacon emitting a coded signal by means of which a particular point of reference can be identified.
Incident	An occurrence, other than an accident, associated with the operation of an aircraft which affects or could affect the safety of operation.
Independent parallel approaches	Simultaneous approaches to parallel or near-parallel instrument runways where radar separation minima between aircraft on adjacent extended runway centre lines are not prescribed.

Definition	Meaning
Independent parallel departures	Simultaneous departures from parallel or nearparallel instrument runways.
Instrument runway	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 1 000 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 (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 (200 ft) but not lower than 30 m (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 lower than 30m (100ft), or no decision height and a runway visual range less than 300m or no runway visual range limitations. ***Note 1*** *– Visual aids need not necessarily be matched to the scale of non-visual aids provided. The criterion for the selection of visual aids is the conditions in which operations are intended to be conducted.* ***Note 2 –*** *Refer to Annex 6 for instrument approach operation types.*
Integrity classification (aeronautical data)	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	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.
Investigation	A process conducted for the purpose of accident prevention which includes the gathering and analysis of information, the drawing of conclusions, including the determination of causes and, when appropriate, the making of safety recommendations.
Landing area	That part of a movement area intended for the landing or take-off of aircraft.
Landing direction indicator	A device to indicate visually the direction currently designated for landing and take-off.

Definition	Meaning
Laser-beam free flight zone (LFFZ)	Airspace in the immediate proximity to the aerodrome where the irradiance is restricted to a level unlikely to cause any visual disruption.
Laser-beam critical flight zone (LCFZ)	Airspace in the immediate proximity to the aerodrome but beyond the LFFZ where the irradiance is restricted to a level unlikely to cause glare effects.
Laser-beam sensitive flight zone (LSFZ)	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	The probability that the complete installation operates within the specified tolerances and that the system is operationally usable.
Manoeuvring area	That part of an aerodrome to be used for the take-off, landing and taxiing of aircraft, excluding aprons.
Marker	An object displayed above ground level in order to indicate an obstacle or delineate a boundary.
Marking	A symbol or group of symbols displayed on the surface of the movement area in order to convey aeronautical information.
Movement area	That part of an aerodrome to be used for the take-off, landing and taxiing of aircraft, consisting of the manoeuvring area and the aprons.
Near-parallel runways	Non-intersecting runways whose extended centre lines have an angle of convergence/divergence of 15 degrees or less.
Non-instrument runway	A runway intended for the operation of aircraft using visual approach procedures. ***Note**: Visual meteorological conditions (VMC) are described in Chapter 3 of Annex 2.*
Normal flight zone (NFZ)	Airspace not defined as LFFZ, LCFZ, or LSFZ, but which must be protected from laser radiation capable of causing biological damage to the eye.
NOTAM or Notice to Airmen	Means a notice distributed by means of telecommunication containing information concerning the establishment, condition or change in any aeronautical facility, service or procedure or hazard, the timely knowledge of which is essential to personnel concerned with flight operations.
Obstacle	Any fixed (whether temporary or permanent) or mobile object or parts thereof, that: a) are located on an area intended for the surface movement of aircraft; or b) extend above a defined surface intended to protect aircraft in flight; o c) stand outside those defined surfaces and that have been assessed as being a hazard to air navigation.
Obstacle free zone	The airspace above the inner approach surface, inner transitional surface, 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	Means a series of surfaces that define the volume of airspace at and around an aerodrome to be kept free of obstacles in order to permit the intended aircraft operations to be conducted safely and to prevent the

Definition	Meaning
	aerodrome from becoming unusable by the growth of obstacles around the aerodrome.
Occurrence	Means an accident or incident.
Outer main gear wheel span	The distance between the outside edges of the main gear wheels.
Orthometric height	Height of a point related to the geoid, generally presented as an MSL elevation.
Pavement Classification rating	A number expressing the bearing strength of a pavement.
Precision approach runway	See 'Instrument runway'.
Pre-flight information bulletin	Means a presentation of current NOTAM information of operational significance, prepared prior to flight.
Primary runway(s)	Runway(s) used in preference to others whenever conditions permit.
Promulgated information incident	Means an incident that involves significantly incorrect, inadequate, or misleading information promulgated in any aeronautical information publication, map or chart.
Protected flight zones	Airspace specifically designated to mitigate the hazardous effects of laser radiation.
Road	An established surface route on the movement area meant for the exclusive use of vehicles.
Road-holding position	A designated position at which vehicles may be required to hold.
Runway	A defined rectangular area on a land aerodrome prepared for the landing and take-off of aircraft.
Runway condition assessment matrix (RCAM).	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)	A number describing the runway surface condition to be used in the runway condition report. ***Note:*** *The purpose of the runway condition code is to permit an operational aeroplane performance calculation by the flight crew. Procedures for the determination of the runway condition code are described in the G-AGA-026.*
Runway condition report (RCR)	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)	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	A light system intended to caution pilots or vehicle drivers that they are about to enter an active runway.
Runway-holding position	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.

Definition	Meaning
	Note: *In radiotelephony phraseologies, the expression "holding point" is used to designate the runway-holding position.*
Runway strip	A defined area, including the runway and stopway if provided, that is intended: a) to reduce the risk of damage to aircraft running off a runway; and b) to protect aircraft flying over the area during take-off or landing operations.
Runway surface condition(s)	A description of the condition(s) 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. ***Note 1:*** *The runway surface conditions used in the runway condition report establish the performance requirements between the aerodrome operator, aeroplane manufacturer and aeroplane operator.* ***Note 2:*** *Aircraft de-icing chemicals and other contaminants are also reported but are not included in the list of runway surface condition descriptors because their effect on runway surface friction characteristics and the runway condition code cannot be evaluated in a standardized manner.* ***Note 3:*** *Procedures on determining runway surface conditions are available in the G-AGA-026.* 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*. The runway surface 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*. A wet runway where the surface friction characteristics of a significant portion of the runway have been determined to be degraded. d) *Contaminated runway*. 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. ***Note:*** *Procedures on determination of contaminant coverage on runway are available in the G-AGA-026.* e) Runway surface condition descriptors. One of the following elements on the surface of the runway: ***Note:*** *The descriptions for e) i) to viii) are used solely in the context of the runway condition report and are not intended to supersede or replace any existing WMO definitions.* i) *Compacted snow*. 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*. Snow from which a snowball cannot readily be made.

Definition	Meaning
	iii) *Frost*. Frost consists of ice crystals formed from airborne moisture on a surface whose temperature is below freezing. Frost differs from ice in that the frost crystals grow independently and therefore have a more granular texture. ***Note 1:*** *Below freezing refers to air temperature equal to or less than the freezing point of water (0 degree Celsius).* ***Note 2:*** *Under certain conditions frost can cause the surface to become very slippery and it is then reported appropriately as reduced braking action.* iv) Ice. Water that has frozen or compacted snow that has transitioned into ice, in cold and dry conditions. v) Slush. 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. Water of depth greater than 3 mm. ***Note:*** *Running water of depth greater than 3 mm is reported as standing water by convention.* vii) Wet ice. Ice with water on top of it or ice that is melting. ***Note:*** *Freezing precipitation can lead to runway conditions associated with wet ice from an aeroplane performance point of view. Wet ice can cause the surface to become very slippery. It is then reported appropriately as reduced braking action in line with procedures in the G-AGA-026.* viii) Wet snow. 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	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)	The range over which the pilot of an aircraft on the center line of a runway can see the runway surface markings or the lights delineating the runway or identifying its centre line.
Safety Management System (SMS)	A systematic approach to managing of safety including the necessary organisational structure, accountabilities, policies and procedures.
Security incident	Means an incident that involves unlawful interference.
Segregated parallel operations	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.
Serious incident	Means an incident involving circumstances indicating that an accident nearly occurred.
Serious injury	Means any injury that is sustained by a person in an accident and that a) requires hospitalization for more than 48 hours, ommencing within seven days from the date the injury was received; or b) results in a fracture of any bone, except simple fractures of fingers, toes or nose; or c) involves lacerations which cause severe haemorrhage, nerve, muscle, or tendon damage; or

Definition	Meaning
	d) involves any injury to any internal organ; or e) involves second or third degree burns, or any burns affecting more than 5% of the body surface; or f) involves verified exposure to infectious substances or injurious radiation.
Shoulder	An area adjacent to the edge of a pavement so prepared as to provide a transition between the pavement and the adjacent surface.
Sign	a) Fixed message sign. A sign presenting only one message. b) Variable message sign. A sign capable of presenting several pre-determined messages or no message, as applicable.
Signal area	An area on an aerodrome used for the display of ground signals.
Slush	Water-saturated snow which with a heel-and-toe slap-down motion against the ground will be displaced with a splatter; specific gravity: 0.5 up to 0.8. ***Note:*** *Combinations of ice, snow and/or standing water may, especially when rain, rain and snow, or snow is falling, produce substances with specific gravities in excess of 0.8. These substances, due to their high water/ice content, will have a transparent rather than a cloudy appearance and, at the higher specific gravities, will be readily distinguishable from slush.*
Snow (on the ground)	a) Dry snow. Snow which can be blown if loose or, if compacted by hand, will fall apart again upon release; specific gravity: up to but not including 0.35. b) Wet snow. Snow which, if compacted by hand, will stick together and tend to or form a snowball; specific gravity: 0.35 up to but not including 0.5. c) Compacted snow. Snow which has been compressed into a solid mass that resists further compression and will hold together or break up into lumps if picked up; specific gravity: 0.5 and over.
Station declination	An alignment variation between the zero degree radial of a VOR and true north, determined at the time the VOR is calibrated.
Stopway	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)	The time required for the actual intensity of a light measured in a given direction to fall from 50 % and recover to 50 % during a power supply change-over, when the light is being operated at intensities of 25 % or above.
Take-off runway	A runway intended for take-off only.
Taxiway	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

Definition	Meaning
	speeds than are achieved on other exit taxiways thereby minimizing runway occupancy times.
Taxiway intersection	A junction of two or more taxiways.
Taxiway strip	An area including a taxiway intended to protect an aircraft operating on the taxiway and to reduce the risk of damage to an aircraft accidentally running off the taxiway.
Threshold	The beginning of that portion of the runway usable for landing.
Touchdown zone	The portion of a runway, beyond the threshold, where it is intended landing aeroplanes first contact the runway.
Usability factor	The percentage of time during which the use of a runway or system of runways is not restricted because of the cross-wind component. ***Note:*** *Cross wind component means the surface wind component at right angles to the runway centre line.*
Unserviceable area	A part of the movement area that is unfit and unavailable for use by aircraft.
Work area	A part of an aerodrome in which maintenance or construction works are in progress.

Note: *Terms and definitions that are shown in singular above shall also take on the same meaning when they are expressed in plural form in this Regulation and vice versa.*

** ISO Standard 19104, Geographic Information – Terminology*

** ISO Standard 19108, Geographic Information – Temporal schema*

0.6 ABBREVIATION

AIG	Accident Investigation Group of the SCAA
ACN	Aircraft Classification Number
ACR	Aircraft Classification Rating
AGL	Aerodrome Ground Lighting
AIP	Aeronautical Information Publication
APAPI	Abbreviated precision approach path indicator
AIS	Aeronautical Information Services
ANA	Air Navigation Act
Aprx.	Approximately
ASDA	Accelerate-stop distance available
ATC	Air Traffic Control
ATS	Air Traffic Services
cd	Candela
cm	Centimetre
C	Degree Celsius
SCAA	The State Civil Aviation Agency under the Ministry of Digital Development and Transport of the Republic of Azerbaijan
AGA	Aerodrome Operators Oversight and Ground Management Department
Cat.	Category
CBR	California Bearing Ratio
CIE	Commission Internationale de Eclairage
DME	Distance Measuring Equipment
E	Modulus of elasticity
ft	Foot
ICAO	International Civil Aviation Organisation
ILS	Instrument Landing System
IMC	Instrument Meteorological Conditions
kg	Kilogram
km	Kilometre
km/h	Kilometre per Hour
kt	Knot
K	Degree Kelvin
L	Litre
LDA	Landing Distance Available
m	Metre

max	Maximum
mm	Millimetre
mnm	Minimum
MLS	Microwave Landing System
MN	Mega Newton
MOT	Ministry of Transport
MPa	Mega Pascal
NM	Nautical Mile
OCA/H	Obstacle Clearance Altitude/Height
OFZ	Obstacle Free Zone
OLS	Obstacle Limitation Surface
OMGWS	Outer main gear wheel span
PAPI	Precision Approach Path Indicator
PCN	Pavement Classification Number
PCR	Pavement Classification Rating
RESA	Runway End Safety Area
RFF	Rescue and Fire Fighting
RFFS	Rescue and Fire Fighting Services
RST	Runway Safety Team
RVR	Runway Visual Range
SARPS	ICAO Standards and Recommended Practices
SMGCS	Surface Movement Guidance and Control System
SMR	Surface Movement Radar
SMS	Safety Management System
TODA	Take-Off Distance Available
TORA	Take-Off Run Available
VMC	Visual Meteorological Conditions
Vol.	Volume
VOR	Very High Frequency Omni-directional Radio Range
WHMP	Wildlife hazard management programme
WIP	Work in progress

0.7 SYMBOLS

◦	Degree
=	Equals
'	Minute of Arc
μ	Friction Coefficient
>	Greater than
<	Less than
%	Percentage
±	Plus or Minus
“	Second of Arc

0.8 FOREWORD

The SCAA is responsible for the aerodrome certification process and for promulgating appropriate and clear Aerodrome Standards to be complied with by aerodrome operators. These Aerodrome Standards are based on the standards and recommended practices stipulated in Volume I of Annex 14 (entitled “Aerodromes – Aerodrome Design and Operations”) to the Chicago Convention on International Civil Aviation (as in force and amended from time to time by the Council of the International Civil Aviation Organisation), and with such adaptations as may be determined by the Director SCAA to be applicable in Azerbaijan.

This Regulation contains:

a) the procedures for the certification of aerodromes; and

b) aerodrome standards, recommended practices and guidance materials pertaining to the planning, operation and maintenance of aerodrome services, facilities and equipment.

Aerodrome operators or applicants for an aerodrome certificate shall refer to the applicable sections of the Aviation Law of Azerbaijan Republic, together with this Regulation, to ascertain the requirements of, and the obligations imposed by or under, Azerbaijan Civil Aviation Legislation.

From time to time, the SCAA may wish to supplement the aerodrome standards and requirements stipulated in this Regulation in the form of Aerodrome Safety Publications.

Where appropriate, such directives will be incorporated into this Regulation by amendment.

Amendments to this Regulation of Aerodrome Standards are the responsibility of the Director SCAA. Readers shall forward advice of errors, inconsistencies or suggestions for improvement to this email address: hq@caa.gov.az.

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1. INTRODUCTION

1.1 GENERAL

1.1.1 BACKGROUND AND SCOPE

1.1.1.1 Aerodrome safety is a vital link in aviation safety. Aerodrome safety is achieved by providing appropriate aerodrome services, facilities and equipment and maintaining them and the aerodrome environment to be safe for aircraft operations. By complying with the prescribed standards and procedures, and by taking a pro-active safety management approach in the operation of their aerodromes, aerodrome operators can demonstrate that they have discharged their safety obligations to the traveling public.

1.1.1.2 This Regulation of Aerodrome Standards, as referred to under paragraph 10.2 of Aviation Law of Azerbaijan Republic and as defined therein, contains:

(a) the procedures for the certification of aerodromes; and

(b) aerodrome standards, recommended practices and guidance materials pertaining to the planning, operation and maintenance of aerodrome services, facilities and equipment to be complied with by aerodrome operators.

1.1.1.3 The scope of this Regulation is confined to the safety, regularity and efficiency aspects of aerodrome facilities, equipment and operational procedures. It does not cover such aspects as those related to aeronautical meteorology, the administration of aerodrome finances and the servicing of passengers and cargo. It also excludes air traffic services and aeronautical information services, although their coordination with the aerodrome operator, which forms an integral part of an aerodrome's operations, has been incorporated.

1.1.2 AERODROME REGULATORY FUNCTIONS AERODROME SAFETY REGULATION

1.1.2.1 Paragraph 1.4.1 of ICAO Annex 14 Vol. I states as a standard that States shall certify aerodromes used for international operations in accordance with the specifications contained in the Annex 14 as well as other relevant ICAO specifications through an appropriate regulatory framework. Paragraph 1.4.3 of Annex 14 stipulates, as a standard, that the regulatory framework shall include the establishment of criteria and procedures for the certification of aerodromes.

1.1.2.2 Azerbaijan Republic stipulates that no person shall operate an aerodrome in Azerbaijan for the take-off and landing of aircraft engaged in flights for the purpose of the public transport or instruction in flying unless he is the holder of an Aerodrome Certificate granted under this Regulation.

1.1.2.3 The same paragraph 10.2 makes provision for the Director SCAA to grant an Aerodrome Certificate to an applicant if the Director SCAA is satisfied that:

(a) the applicant is competent to operate and maintain his aerodrome properly, having regard to his previous conduct and experience, facility and equipment, organisation, staffing, maintenance and other arrangements;

(b) the Aerodrome Manual prepared for the applicant's aerodrome and submitted with his application for Aerodrome Certificate contains accurate information and complies with the requirements specified in this document;

(c) the applicant's aerodrome facilities, equipment and services comply with the standards specified in this document;

(d) the applicant's aerodrome operating procedures make satisfactory provision for the safety of aircraft; and

(e) an acceptable safety management system is in place at the applicant's aerodrome.

1.1.2.4 Aerodrome security regulation

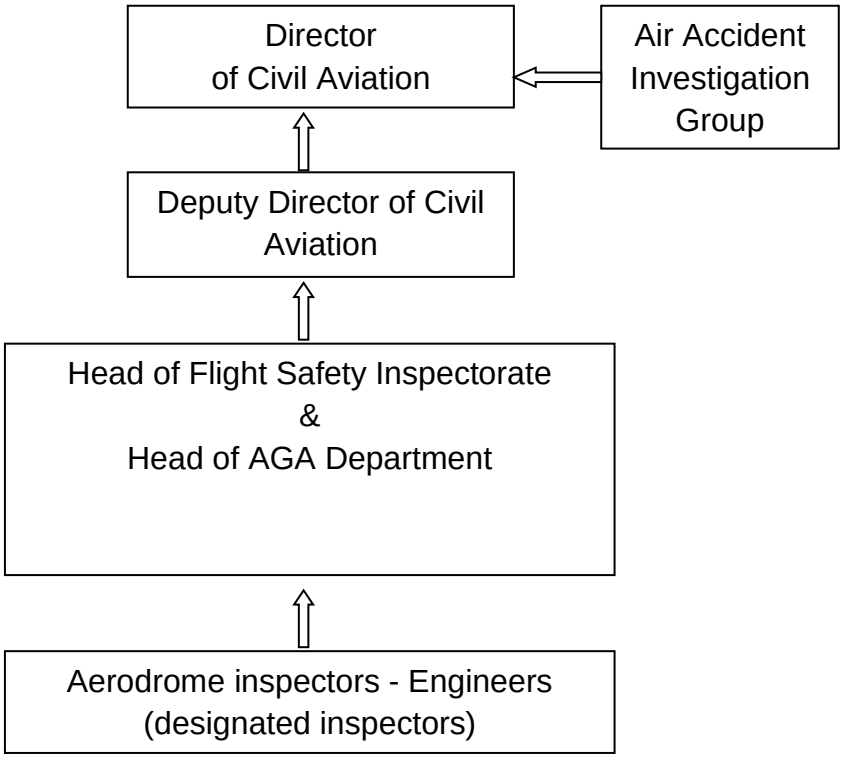
The authority for setting policies and regulations on aerodrome, airport and aviation security rests with "Azerbaijan Hava Yollari" CJSC Security Department. These policies and regulations are outside the scope of this Regulation except those areas for preventing unlawful interference in civil aviation at the aerodrome and for preventing unauthorized entry of persons, vehicles, equipment, animals and other things into the movement area.

1.1.2.5 Air accident investigation

The responsibility for investigation of air accidents and incidents in Azerbaijan lies with the Air Accident Investigation Group of the SCAA. In parallel, AGA may also conduct investigations to determine if any aerodrome safety regulations and requirements have been breached.

1.1.2.6 A chart showing the elements of the above-mentioned regulatory setup is shown below.

Figure 1-1 – Organisation of Aerodrome Regulatory and Operational Functions



1.1.3 RESPONSIBILITIES

1.1.3.1 The roles and responsibilities of the AGA include:

(a) ensuring that aerodromes in Azerbaijan offer a safe operational environment in accordance with the Convention on International Civil Aviation;

(b) reviewing ICAO State letters on the subject of aerodromes, preparing response thereto and taking action thereon;

(c) notifying ICAO of differences between Azerbaijan's national aerodrome safety regulations and practices vis-a-vis the SARPs contained in ICAO Annex 14 Vol. I;

(d) carrying out aerodrome certification in accordance with the Aviation Law of Azerbaijan Republic and under provisions of this Regulation;

(e) developing and continue to review national safety standards and recommended practices relating to aerodromes;

(f) monitoring and ensuring adherence to these standards and recommended practices through regular safety audits, providing measures for enforcing compliance and taking enforcement actions, when required;

(g) conducting regular reviews of aerodrome regulations and practices, and developing and issuing Aerodrome Safety Directives and/or Aerodrome Safety Publications containing guidance material relating to aerodrome

standards and recommended practices to promote the improvement of aerodrome safety;

(h) reviewing aerodrome-related accident and incident investigation reports produced by the AIG and performing investigations, where necessary, to determine if there is any violation of safety regulations and requirements by aerodrome operators and take enforcement actions, when required;

(i) notifying the Aeronautical Information Services regarding the certified status and particulars of aerodromes for promulgation in the Aeronautical Information Publications;

(j) maintaining a technical library containing files for each certified aerodrome, national aerodrome standards, recommended practices, guidance materials for aerodrome inspectors and where necessary, other relevant reference materials; and

(k) providing the Director SCAA with such information and advice as the Director SCAA may from time to time require.

1.1.3.2 Notwithstanding that the AGA sets and maintains aerodrome standards and recommended practices, certifies aerodrome operators and conducts aerodrome safety oversight audits, the responsibility for the safety of aerodrome operations rests with the certified aerodrome operators. A certified aerodrome operator with a Safety Management System in place is required to maintain its own safety audit and inspection program with the AGA taking an interest in what the internal safety audit program is achieving and how the aerodrome operator organisation is performing from a safety perspective.

1.1.3.3 AGA monitors the safety performance through conducting regular safety audits, reviewing the findings, identifying preventive and corrective actions needed, examining safety occurrences at the aerodromes and evaluating concerns expressed by the public or other industry participants.

1.1.4 RELEVANT LEGISLATION AND DOCUMENT

1.1.4.1 The relevant legislation and document hierarchy relating to the certification of aerodromes in Azerbaijan consists of:

(a) Article 10.2 of the Law of the Republic of Azerbaijan “On Aviation”, sub-items 3.0.20, 3.0.24 of the Statute of the State Civil Aviation Agency under the Ministry of Transport, Communications and High Technologies approved by the Decree of the President of the Republic of Azerbaijan №. 90 dd. May 22, 2018 and Azerbaijan Aviation Rules (AAR) approved by the Director of the State Civil Aviation Agency;

(b) This Regulation of Aerodrome Standards (with references to relevant sections of ICAO Annex 14 Vol. I and related guidance material);

(c) Aerodrome Safety Directives, as and when published, by the Director SCAA; and

(d) Aerodrome Safety Publications, as and when published, by the SCAA.

1.1.4.2 These regulatory documents establish, for aerodrome operators and aerodrome operators to be, a comprehensive description of safety conformance requirements and guidelines.

1.1.4.3 The Aviation Law and SCAA Statute establish the legislative framework (i.e. Regulations) and regulatory regime within which all aerodrome operators must operate.

1.1.4.4 The Regulation of Aerodrome Standards contains the standards published by the Director SCAA. These requirements are based on the SARPs contained in ICAO Annex 14 Vol. I and other related ICAO guidance material. The Director SCAA may also adopt suitable standards and/or recommended practices from other States into this Regulation. Aerodrome operators shall document their internal actions in their Aerodrome Manuals to demonstrate their continued compliance with requirements in this Regulation.

1.1.4.5 Aerodrome Safety Directives and/or Aerodrome Safety Publications, where published, are intended to supplement the standards and recommended practices contained in the Regulation of Aerodrome Standards, or to provide recommended practices and additional materials for education. These documents illustrate a means, but not necessarily the only means, of complying with the Regulations. These Directives or Publications may explain certain regulatory requirements by providing interpretive and explanatory materials. It is expected that aerodrome operators will provide adequate practices and/or document internal actions in their own Aerodrome Manuals to address the subject matter contained in these Directives or Publications.

1.1.4.6 In addition to the document mentioned above, to provide systematic and clear working procedures and guidelines for the function of the AGA, an Aerodrome Inspector Handbook is also produced by the AGA for the aerodrome inspectors to refer to and comply with in carrying out their tasks.

1.1.5 CROSS-REFERENCES WITH ICAO AND ADOPTED STANDARDS AND RECOMMENDED PRACTICES

1.1.5.1 To facilitate cross-referencing of the standards and recommended practices prescribed in this Regulation with those contained in ICAO Annex 14 Vol. I, other relevant ICAO documents, and standards and/or recommended practices adopted from other States a list of corresponding clauses between these documents showing the sources of reference documents from which the standards and recommended practices of this Regulation are derived is shown in Appendix A attached.

1.1.5.2 Notwithstanding the above, where there is a difference between a Standard and/or Recommended Practice stated in ICAO Annex 14 Vol. I or the standard and/or recommended practice of the originating State and one prescribed in this Regulation, the standard or recommended practice stipulated in this Regulation shall prevail.

1.1.6 PUBLICATION OF DIFFERENCES IN AIP

1.1.6.1 Differences between the Standards prescribed in this Regulation and those contained in ICAO Annex 14 Vol. I, if any, are promulgated by the SCAA through section Gen 1.7 of the Azerbaijan Aeronautical Information Publication (AIP) and also notified to ICAO.

1.1.6.2 Exemptions granted by the Director SCAA are promulgated through the AIP.

1.1.7 DOCUMENT CHANGE MANAGEMENT

1.1.7.1 The power to issue and amend this Regulation rests with the Director SCAA

1.1.7.2 Requests for any change in content of this Regulation may be directed to Director SCAA

1.1.7.3 The need to amend this Regulation may be generated by a number of causes, including but not be limited to the following:

(a) promotion of safety;

(b) response to changed SCAA or legislative requirements;

(c) response to ICAO prescription; or

(d) accommodation of new initiatives or technologies.

1.1.8 RELATED REFERENCE DOCUMENTS

1.1.8.1 This Regulation shall be read in conjunction with the list of reference documents shown in Appendix B.

1.2 APPLICABILITY

1.2.1.1 The specifications, unless otherwise indicated in a particular context, shall apply to all aerodromes open to public use in accordance with the requirements of Article 15 of the Convention. The specifications of AAR-AGA-001, Chapter 7, shall apply only to land aerodromes.

1.2.1.2 The specifications in this document shall apply, where appropriate, to heliports but shall not apply to stolports.

Note.— *Guidance material on stolports is given in the Stolport Manual (Doc 9150).*

1.3 COMMON REFERENCE SYSTEMS

1.3.1 HORIZONTAL REFERENCE SYSTEM

1.3.1.1 World Geodetic System – 1984 (WGS-84) shall be used as the horizontal (geodetic) reference system. Reported aeronautical geographical coordinates (indicating latitude and longitude) shall be expressed in terms of the WGS-84 geodetic reference datum.

Note*: Comprehensive guidance material concerning WGS-84 is contained in the World Geodetic System – 1984 (WGS-84) Manual (Doc 9674).*

1.3.2 VERTICAL REFERENCE SYSTEM

1.3.2.1 Mean sea level (MSL) datum, which gives the relationship of gravityrelated height (elevation) to a surface known as the geoid, shall be used as the vertical reference system.

Note 1: *The geoid globally most closely approximates MSL. It is defined as the equipotential surface in the gravity field of the Earth which coincides with the undisturbed MSL extended continuously through the continents.*

Note 2: *Gravity-related heights (elevations) are also referred to as orthometric heights while distances of points above the ellipsoid are referred to as ellipsoidal heights.*

1.3.3 TEMPORAL REFERENCE SYSTEM

1.3.3.1 The Gregorian calendar and Coordinated Universal Time (UTC) shall be used as the temporal reference system.

1.3.3.2 When a different temporal reference system is used, this shall be indicated in GEN 2.1.2 of the Aeronautical Information Publication (AIP).

Note: *See Aeronautical Information Management Manual (M-ANS-001), Appendix 2.*

1.4 AERODROME CERTIFICATION PROCESS AND AERODROME MANUAL REQUIREMENTS

(See Chapter 3)

1.5 USE OF ICAO AERODROME REFERENCE CODE

(See Section 2.2)

1.6 AIRPORT DESIGN AND MASTER PLAN

Introductory Note: *A master plan for the long-term development of an aerodrome displays the ultimate development in a phased manner and reports the data and logic upon which the plan is based. Master plans are prepared to support modernization of existing aerodromes and creation of new aerodromes, regardless of size, complexity, and role. It is important to note that a master plan does not constitute a confirmed implementation programme. It provides information on the types of improvements to be undertaken in a phased manner. Guidance on all aspects of the planning of aerodromes is contained in the Airport Planning Manual (Doc 9184), Part 1.*

1.6.1 A master plan containing detailed plans for the development of aerodrome infrastructure shall be established.

Note 1: *A master plan represents the development plan of a specific aerodrome. It is developed by the aerodrome operator based on economic feasibility, traffic forecasts, current and future requirements provided by, among others, aircraft operators (see 1.6.3).*

Note 2: *A master plan may be required when the lack of capacity at an airport, due to conditions such as, but not limited to expected traffic growth, changing weather and climatic conditions or major works to address safety or environmental concerns, would put the connectivity of a geographical area at risk or cause severe disruption to the air transport network.*

1.6.2 The master plan shall:

(a) contain a schedule of priorities including a phased implementation plan; and

(b) be reviewed periodically to take into account current and future aerodrome traffic.

1.6.3 Aerodrome stakeholders, particularly aircraft operators, shall be consulted in order to facilitate the master planning process using a consultative and collaborative approach.

Note 1: *Provision of advanced planning data to facilitate the planning process include future aircraft types, characteristics and numbers of aircraft expected to be used, the anticipated growth of aircraft movements, number of passengers and amount of cargo projected to be handled.*

Note 2: *See ICAO Annex 9, Chapter 6 on the need for aircraft operators to inform aerodrome operators concerning the former's service, schedule and fleet plans to enable rational planning of facilities and services in relation to the traffic anticipated.*

Note 3: *See ICAO's Policies on Charges for Airports and Air Navigation Services Doc 9082), Section 1, regarding consultation with users concerning provision of advance planning data and protection of commercially sensitive data.*

1.6.4 Architectural and infrastructure-related requirements for the optimum implementation of international civil aviation security measures shall be integrated into the design and construction of new facilities and alterations to existing facilities at an aerodrome.

1.6.5 The design of aerodromes shall take into account land-use and environmental control measures.

Note: *Guidance on land-use planning and environmental control measures is contained in the Airport Planning Manual (Doc 9184), Part 2.*

1.7 SPECIFIC PROCEDURES FOR AERODROME OPERATIONS

Introductory Note: *This section introduces G-AGA-026 for use by an aerodrome undertaking an assessment of its compatibility with the type of traffic or operation it is intending to accommodate. The material in the G-AGA-026 addresses operational issues faced by existing aerodromes and provides the necessary procedures to ensure the continued safety of operations. Where alternative measures, operational procedures and operating restrictions have been developed, these are detailed in the aerodrome manual and reviewed periodically to assess their continued validity. G-AGA-026 does not substitute nor circumvent the provisions contained in this Regulation. It is expected that infrastructure on an existing aerodrome or a new aerodrome will fully comply with the requirements in this regulation. See AAR-ANS-005, 5.2.2.1 c) on a SCAA's responsibilities for the listing of its differences to the related ICAO Procedures in its Aeronautical Information Publication.*

1.7.1 When the aerodrome accommodates an aeroplane that exceeds the certificated characteristics of the aerodrome, the compatibility between the operation of the aeroplane and aerodrome infrastructure and operations shall be assessed and appropriate measures developed and implemented in order to maintain an acceptable level of safety during operations.

Note: *Procedures to assess the compatibility of the operation of a new aeroplane with an existing aerodrome can be found in the G-AGA-026.*

1.7.2 Information concerning alternative measures, operational procedures and operating restrictions implemented at an aerodrome arising from 1.7.1 shall be promulgated.

Note 1: *See M-ANS-001, Appendix 2, AD 2.20, on the provision of a detailed description of local traffic regulations.*

Note 2: *See G-AGA-026, Chapter 2, section 3.6, on promulgation of safety information.*

2. APPLICATION OF STANDARDS AND RECOMMENDED PRACTICES TO AERODROMES

2.1 GENERAL

2.1.1 LEGISLATIVE BACKGROUND AND APPLICABILITY

2.1.1.1 Paragraph 10 of the Aviation Law stipulates that the Director SCAA may grant an Aerodrome Certificate to an applicant if he is satisfied that the applicant's aerodrome facilities, equipment and services comply with the standards specified in the Regulation of Aerodrome Standards. Aerodrome operator shall comply with the applicable standards set out in the Regulation of Aerodrome Standards and shall not at any time contravene, or cause or permit the contravention of, any condition of the aerodrome certificate.

2.1.2 STANDARDS AND RECOMMENDED PRACTICES

2.1.2.1 Standards and Recommended Practices in the context of this Regulation of Aerodrome Standards are defined as follows:

***Standard*.** Any specification for physical characteristics, configuration, material, performance, personnel or procedure, the uniform application of which is recognized as necessary for the safety or regularity of international air navigation and to which aerodrome operators shall conform in accordance with the provisions of this Regulation and Aerodrome Safety Directives. In the event of non-compliance with any standard, an application for exemption and justification (through appropriate risk assessment and/ or aeronautical studies) to the SCAA is compulsory.

Recommended Practices. Any specification for physical characteristics, configuration, material, performance, personnel or procedure, the uniform application of which is recognized as desirable in the interest of safety, regularity or efficiency of international air navigation and to which aerodrome operators shall endeavor to conform in accordance with the provisions of this Regulation and Aerodrome Safety Directives and/or Aerodrome Safety Publications. In the event of non-compliance with any recommended practice, notification to the SCAA is compulsory.

2.1.2.2 In this Regulation of Aerodrome Standards and in the Aerodrome Safety Directives and/or Aerodrome Safety Publications, standards are identified by the words 'must' or 'shall'. Figures, appendices and tables associated with these standards form part of the main document and have the same status as the primary text. This Regulation of Aerodrome Standards may also require standards from other documents to be followed. In such cases, the referred standards become part of this Regulation.Recommended practices are identified by the words 'should' or 'may'.

2.1.2.3 Aerodrome operators shall endeavour to comply with recommended practices. Figures, appendices and tables associated with these recommended practices form part of the main document and have the same status as the primary text.

2.1.3 CHANGES TO AERODROME STANDARDS AND GUIDANCE MATERIAL AND THEIR EFFECTS ON EXISTING AERODROMES

2.1.3.1 Aerodrome operators shall nominate a focal point for receiving notifications from SCAA on changes or new editions of Regulations and other guidance material issued by SCAA and published on official website. Aerodrome operators shall advise SCAA,

in particular Head of Aerodrome Operators Oversight Department on contact details of a nominated focal point and update information, if there is a change in their contacts (email, phone).

2.1.3.2 Aerodrome operators shall make sure that recieved from SCAA updated information distributed by focal point in accordance with current list of responsible personnel (email, phone), who shall receive relevant information on new edition/changes of Regulations and other guidance material.

2.1.3.3 Standards and guidance material are subject to change from time to time. In general, existing aerodrome facilities may not need to be immediately modified in accordance with new standards and/or guidance that arise, unless advance notice has been given for the aerodrome operator to comply. The SCAA will determine and promulgate an appropriate time frame, depending on the critical nature of the requirement and other aerodrome operational considerations, for such revisions in standards and guidance to be applicable, so that they can be complied with by the aerodrome operators concerned.

2.1.3.4 Pursuant to paragraph 2.1.3.3 above, in the interim and unless otherwise directed by the SCAA, an aerodrome operator's existing facility that does not meet the new standards specified in this Regulation must continue to comply with the standards that were applicable to it under the conditions of the issuance of its Aerodrome Certificate.

2.1.3.5 At a certified aerodrome, an existing aerodrome facility that does not comply with this Regulation of Aerodrome Standards must be identified and recorded in the Aerodrome Manual described in Chapter 3. It must include the date or period when that facility was first introduced or last upgraded and an indication from the aerodrome operator of a plan or timescale to bring the facility in compliance with this Regulation. As part of the site safety audits conducted by the SCAA, evidence to demonstrate efforts to implement the abovementioned plan or timescale may be required.

2.1.3.6 Other than existing aerodrome facilities and equipment that are allowed to continue to be in use, or exemptions granted to the aerodrome operator for specific cases of consideration, an aerodrome operator is expected to comply with the standards and recommended practices contained in this Regulation of Aerodrome Standards when introducing a new aerodrome facility or equipment, or when carrying out replacement or improvement works on an existing facility or equipment, unless the replacement or improvement works is limited to those of very minor nature.

2.1.4 AERONAUTICAL STUDIES

2.1.4.1 Where an aerodrome operator is not able to comply with any standard stipulated in this Regulation, appropriate risk assessment and/ or aeronautical studies shall be conducted to assess the impact of deviations from the standards. The purpose of such studies is to present alternative means of ensuring the safety of aircraft operations, to estimate the effectiveness of each alternative and to recommend procedures to compensate for the deviation.

2.1.4.2 An aeronautical study is mostly frequently undertaken during the planning of a new airport or new airport facility, or during the certification of an existing aerodrome. It may also be carried out when aerodrome standards cannot be met as a result of development.

2.1.4.3 An aeronautical study is a study of an aeronautical problem carried out by an aerodrome operator to identify possible solutions and select a solution that is

acceptable without degrading safety. The SCAA will review these studies on a case-by-case basis and determine their acceptability.

2.1.4.4 Technical analysis will provide justification for a deviation on the grounds that an equivalent level of safety can be attained by other means. It is generally applicable on situations where the cost of correcting a problem that violates a standard is excessive but where the unsafe effects of the problem can be overcome by some procedural or other means which offer both practical and reasonable solutions.

2.1.4.5 In conducting a technical analysis, an aerodrome operator shall draw upon their practical experience and specialized knowledge. The aerodrome operator may also consult other specialists in relevant areas. When considering alternative procedures in the deviation approval process, it is essential to bear in mind the safety objective of the aerodrome certification regulations and the applicable standards so that the intent of the regulations is not circumvented.

2.1.4.6 In some instances, the only reasonable means of providing an equivalent level of safety is to adopt suitable procedures and to require, as a condition of certification, that cautionary advice be published in the appropriate AIS publications.

2.1.4.7 The determination to require caution will be primarily dependent on two considerations:

(i) a pilot's need to be made aware of potentially hazardous conditions; and

(ii) the responsibility of the SCAA to publish deviations from standards that would otherwise be assumed under the certificate status.

2.1.5 EXEMPTIONS FROM AERODROME STANDARDS

2.1.5.1 When an aerodrome is not able to comply with any standard specified in the Regulation of Aerodrome Standards, the aerodrome operator shall apply for an exemption from the relevant standard. The form for *Request for Grant of Exemption* can be found in Appendix J of this Regulation. Applications must be supported, in writing, by cogent reasons including any aeronautical study conducted and their associated results, and where appropriate, an indication of when compliance with the current standards can be expected

2.1.5.2 Under paragraph 10.6 of the Aviation Law, the SCAA may, after taking into account all safety-related aspects and operating circumstances, exempt, by notice in writing, any aerodrome operator from any provision of paragraph 10.2.

2.1.5.3 As stated in paragraph 10.6 of the Aviation Law, any exemption granted by the SCAA shall be subject to any condition or procedure specified by the SCAA in the relevant Aerodrome Certificate as being necessary in the interest of safety.

2.1.5.4 Under paragraph 10.6 of the Aviation Law, when an aerodrome does not comply with any standard specified in the Regulation of Aerodrome Standards, the Director SCAA may determine, after taking into consideration such aeronautical or other studies as he deems fit, any condition or procedure necessary to ensure that the aerodrome attains a level of safety equivalent to that established by the standard. The aerodrome operator shall ensure that his aerodrome complies with any condition or procedure determined by the Director SCAA.

2.1.5.5 Paragraph 10.6 of the Aviation Law stipulates that any deviation of an aerodrome from any standard shall be set out in an endorsement to the relevant Aerodrome Certificate.

2.1.5.6 Exemptions granted to an aerodrome operator must also be recorded in the Aerodrome Manual. The Aerodrome Manual must contain details of the exemption, reason that the exemption was requested for, any resultant limitations, conditions or procedures imposed, and other related safety information.

2.1.5.7 An exemption granted in respect of an existing facility shall continue to apply until its expiry date.

2.1.6 CONFLICT WITH OTHER STANDARDS AND RECOMMENDED PRACTICES

2.1.6.1 Compliance with the standards and recommended practices specified in this Regulation of Aerodrome Standards does not absolve an aerodrome operator from obligations in respect of requirements prescribed by other government or statutory authorities. Where another statutory requirement conflicts with the provisions of this Regulation, the matter must be referred to the SCAA for resolution.

2.1.7 OTHER TERMS USED WITH STANDARDS AND RECOMMENDED PRACTICES

2.1.7.1 The status of other terms used jointly with standards and recommended practices in this Regulation is explained as follows:

(a) *Appendices*

Appendices contain materials grouped separately for convenience but forming part of the standards and recommended practices.

(b*) Definitions*

Definitions do not have independent status but is an essential part of each standard and recommended practice in which the term is used, since a change in the meaning of the term would affect the specifications.

(c) Tables and Figures

Tables and Figures add to or illustrate a standard or recommended practice and which are referred to herein, form part of the associated standard or recommended practice and have the same status.

(d) Forewords

Forewords contain historical and explanatory material based on the action of the SCAA or ICAO.

(e) Introductions

Introductions comprise explanatory material introduced at the beginning of parts, chapters, or sections of this Regulation to assist in the understanding of the application of the text.

(f) Notes

Notes are included in the text, where appropriate, to give factual information or references bearing on the standards and recommended practices in question, but do not constitute part of the standards or recommended practices.

(g) Attachments

Attachments comprise material supplementary to the standards and recommended practices, or are included as a guide to their application.

2.2 USE OF ICAO AERODROME REFERENCE CODE

2.2.1 USE OF ICAO AERODROME REFERENCE CODE TO SPECIFY AERODROME STANDARDS AND RECOMMENDED PRACTICES

2.2.1.1 ICAO has devised a reference code to provide a simple method for interrelating the numerous specifications concerning the characteristics of aerodromes so as to provide a series of aerodrome facilities that are suitable for aeroplanes that are intended to operate at the aerodrome.

The code is not intended to be used for determining runway length or pavement strength requirements. The code is composed of two elements which are related to the aeroplane performance characteristics and dimensions. Element 1 is a number based on the aeroplane reference field length and element 2 is a letter based on the aeroplane wing span and outer main gear wheel span. A particular specification is related to the more appropriate of the two elements of the code or to an appropriate combination of the two code elements. The code letter or number within an element selected for design purposes is related to the critical aeroplane characteristics for which the facility is provided.

2.2.1.2 This Regulation of Aerodrome Standards adopts ICAO's method of applying the aerodrome reference code to determine the characteristics required of aerodromes and aerodrome facilities.

2.2.2 AERODROME REFERENCE CODE AND AEROPLANE CHARACTERISTICS

2.2.2.1 When applying the standards and recommended practices prescribed in this Regulation, first identify the aeroplanes which the aerodrome is intended to serve and then determine the two elements of the code.

2.2.2.2 An aerodrome reference code – code number and letter – which is selected for aerodrome planning purposes shall be determined in accordance with the characteristics of the aeroplane for which an aerodrome facility is intended.

2.2.2.3 The aerodrome reference code numbers and letters shall have the meanings assigned to them in Table 2-1 of this Regulation.

2.2.2.4 The code number for element 1 shall be determined from Table 2-1 of this Regulation, column 1, selecting the code number corresponding to the highest value of the aeroplane reference field lengths of the aeroplanes for which the runway is intended.

Note 1: *The determination of the aeroplane reference field length is solely for the selection of a code number and is not intended to influence the actual runway length provided.*

Note 2: *Guidance on determining the runway length is given in the G-AGA-017.*

2.2.2.5 The code letter for element 2 shall be determined from this Regulation by selecting the code letter which corresponds to the greatest wing span of the aeroplanes for which the facility is intended.

Note: *Guidance on determining the aerodrome reference code is given in the documents G-AGA-017 and G-AGA-020.*

Table 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

Note 1: *Guidance on planning for aeroplanes with wingspans greater than 80 m is given in the documents G-AGA-017 and G-AGA-020.*

Note 2: *Procedures on conducting aerodrome compatibility study to accommodate aeroplanes with folding wing tips spanning two code letters are given in the G-AGA-026. Further guidance can be found in the manufacturer's aircraft characteristics for airport planning manual.*

2.2.3 PROVISIONS FOR FUTURE LARGER AEROPLANES

2.2.3.1 Nothing in this Regulation of Aerodrome Standards is intended to inhibit the planning or provision of aerodrome facilities for larger aeroplanes that may be accommodated by the aerodrome at a later date. Appropriate additional safeguards may be taken into account to cater for more demanding aircraft that may be introduced at a later date. These relate mainly to minimum clearance requirements and guidance is given in G-AGA-017 and G-AGA-020. However, where movement area facilities are built for future larger aeroplanes, the aerodrome operator must liaise with the SCAA to determine the interim notification of aeroplane reference code and maintenance arrangements.

2.2.3.2 It is the prerogative of aerodrome operators to select the appropriate aeroplane and aeroplane characteristics for master planning of their aeroplanes. This Regulation of Aerodrome Standards has included ICAO Code F specifications for aerodrome facilities intended for aeroplanes larger than B747 wide body jets.

3. AERODROME CERTIFICATION PROCESS AND AERODROME MANUAL

3.1 GENERAL

3.1.1 INTRODUCTION

3.1.1.1 This chapter describes the requirement for aerodromes to operate with an Aerodrome Certificate and the process of certification by the SCAA.

3.1.1.2 The aerodrome certification process only addresses the aviation safety aspect of the aerodrome. It is the responsibility of the applicant to ensure that the use of the site as an aerodrome is in compliance with other State and local statutory requirements such as land-use or environment regulations. The Aerodrome Certificate does not absolve the applicant from observing such requirements.

3.1.2 REQUIREMENT TO HOLD AN AERODROME CERTIFICATE

3.1.2.1 Aerodrome Certificate is granted to holder after certification complete according to requirements of paragraph 10.2.

3.1.3 APPLYING FOR AN AERODROME CERTIFICATE

3.1.3.1 An applicant for an Aerodrome Certificate shall submit:

(a) an application in the form prescribed in this Regulation of Aerodrome Standards; and

(b) an Aerodrome Manual for the aerodrome for which the application is made; and

(c) an application fee.

3.1.3.2 The applicant must be the owner of the aerodrome site, or have obtained permission from the owner to use the site as an aerodrome.

3.1.3.3 Approvals from other government authorities as required by other local statutory requirements shall be obtained by the applicant and submitted together with the application.

3.1.3.4 The example of the *Form for Application of An Aerodrome Certificate* can be found in Appendix C of these Rules. *Form for Application of An Aerodrome Certificate* (F-AGA-001) is allocated at official web-site of the State Civil Aviation Agency.

3.1.3.5 The Aerodrome Manual to be submitted with the application must contain the information and instructions relating to the matters specified and contain such other information and instructions as may be necessary to enable the aerodrome operating staff to perform their duties. The detailed requirements of the Aerodrome Manual are explained in section 3.2 of this chapter.

Note: *Guidance on Aerodrome/Helidrom certification is given G-AGA-002.*

3.1.4 AERODROME CERTIFICATE PROCESSING FEE

3.1.4.1 An aerodrome certificate shall remain in force for a period of 3 years from the date of certification indicated on the aerodrome certificate, subject to the payment of a fee as specified in paragraph 29 and 29.1 of the Azerbaijan Republic Law N223 “About fees”.

Note: The period specified in 3.1.4.1 (3 years) may be reduced based on the results of audits and inspections.

3.1.5 PROCESSING AN AERODROME CERTIFICATE APPLICATION

3.1.5.1 Applications shall be submitted for initial certification ninety days, for removal sixty days to allow for detailed consideration and inspection of the aerodrome before the intended or desired date of grant of the Aerodrome Certificate.

3.1.5.2 Engineering and survey reports of the physical characteristics of the movement area, pavement strength and surface, obstacle limitation surfaces, etc., as required by the SCAA, shall be provided as part of the submission.

3.1.5.3 As part of the certification process, the SCAA may carry out inspection or testing of any aspect of the aerodrome or require substantiation of any information provided by the applicant.

However, it shall be clearly understood that the SCAA’s sample checking process does not absolve the applicant from the responsibility to provide accurate information.

3.1.5.4 Special assessment may be necessary if there are aerodrome facilities that are not in full compliance with the applicable standards contained in this Regulation. This may involve more time and resources and may result in restrictions being imposed on aircraft operations.

3.1.5.5 On receipt of the application, the AGA will carry out a detailed examination of the Aerodrome Manual submitted to check for completeness of coverage and compliance with the requirements stipulated under the Aviation Law with the Regulation of Aerodrome Standards, including the data to be published by the Aeronautical Information Services. Request for amendments and/or supplementary information to the Aerodrome Manual shall be prepared by the applicant and submitted to the SCAA. All aspects of the aerodrome operation, including the management structure, adequacy and competency of operation and maintenance staff, arrangements and provisions for their training, aerodrome site, facility, equipment, related services and operating procedures, etc. will be assessed in relation to the scale, scope and circumstances of the applicant’s proposed operations. Relevant documents submitted by the aerodrome operator will be retained by the SCAA during the currency of the Aerodrome Certificate.

3.1.5.6 A flight operations assessment may be required by SCAA to ensure that the operation of the aerodrome at the location specified in the application will not endanger the safety of aircraft operations.

3.1.5.7 The SCAA will also conduct a visit to the applicant’s aerodrome for on-site verification of aerodrome data; inspection of aerodrome services, facilities and equipment; interview of aerodrome operating staff; examination of operating procedures and training methods; checking the availability and adequacy of related services needed

3.1.5.8 to support aerodrome operations; assessment of the aerodrome's safety management system; review of aerodrome operator's safety documents and records; as well as survey for any presence of obstacles in obstacle limitation surfaces at and in the vicinity of the aerodrome.

3.1.5.9 For the purpose of paragraph 3.1.5.7 above, the applicant shall allow the Director SCAA or any other authorised person access to any part of the aerodrome or any aerodrome facility, equipment, records and operator personnel. The applicant shall also co-operate in facilitating the activities relating to the site audit.

3.1.5.10 Subject to any considerations that the SCAA may decide, any deficiencies found during the on-site audit mentioned above shall be addressed and rectified by the applicant within the time frame given by the SCAA. Where necessary, changes to the Aerodrome Manual shall be made accordingly and the revised Aerodrome Manual shall be submitted to the SCAA for acceptance before the issuance of an Aerodrome Certificate can be considered.

3.1.5.11 Once the Aerodrome Manual is approved by the SCAA, the applicant shall make copies of the Aerodrome Manual and distribute it to its stakeholders and other relevant parties

3.1.6 GRANTING OF AN AERODROME CERTIFICATE

3.1.6.1 Under paragraph 10.2 of the Aviation Law, the Director SCAA may grant an Aerodrome, Heliport and Helideck Certificates (See samples in Appendix D) to an applicant if he is satisfied that:

(a) the applicant is competent to operate and maintain his aerodrome properly, having regard to his previous conduct and experience, equipment, organisation, staffing, maintenance and other arrangements;

(b) the Aerodrome Manual prepared for the applicant's aerodrome and submitted with his application contains accurate information to SCAA,

(c) the applicant's aerodrome facilities, equipment and services comply with the standards specified in the Regulation of Aerodrome Standards;

(d) the applicant's aerodrome operating procedures make satisfactory provision for the safety of aircraft; and

(e) an acceptable safety management system is in place at the applicant's aerodrome.

3.1.6.2 The holder of an Aerodrome Certificate or an applicant for an Aerodrome Certificate shall be required to establish and implement an operating safety management system that complies with the standards specified in this Regulation of Aerodrome Standards for each aerodrome.

3.1.6.3 Aerodrome Certificates are granted on the condition that the aerodrome operator will, at all times, be in compliance with the applicable regulations and mandatory requirements.

3.1.6.4 Once granted, an Aerodrome Certificate will remain in force until it is amended, suspended or cancelled.

3.2 AERODROME MANUAL

3.2.1 REQUIREMENT TO SUBMIT AN AERODROME MANUAL

3.2.1.1 Paragraph 1.4.4 of Annex 14 requires an applicant for an Aerodrome Certificate to submit an Aerodrome Manual containing

(a) Information and instructions relating to the matters specified in this Regulation, and

(b) all such other information and instructions as may be necessary to enable the aerodrome operating staff to perform their duties.

3.2.2 PURPOSE AND SCOPE OF AERODROME MANUAL

3.2.2.1 The Aerodrome Manual is a fundamental requirement of the aerodrome certification process. It contains all the pertinent information concerning the aerodrome site, facilities, equipment, services, operating procedures, emergency planning, organisation and management, including the safety management system.

3.2.2.2 The information presented in the Aerodrome Manual shall demonstrate that the aerodrome conforms to the aerodrome standards stipulated in this Regulation of Aerodrome Standards and that there are no apparent shortcomings which would adversely affect the safety of aircraft movements. Non-conformance with any standard stipulated in this Regulation of Aerodrome Standards shall be highlighted in the Aerodrome Manual.

3.2.2.3 The Aerodrome Manual serves as a reference document agreed between the aerodrome operator and the SCAA with respect to the standards, conditions and the level of service to be maintained at the aerodrome.

3.2.2.4 The Aerodrome Manual provides a checklist of aerodrome standards, recommended practices and operating procedures to be maintained and the level of services to be provided at the aerodrome. Information provided in the Aerodrome Manual will enable the SCAA to assess the suitability of the aerodrome for the aircraft operations proposed and to judge an applicant's fitness to hold an Aerodrome Certificate. It is also the basic reference guide for conducting site inspections for granting an

3.2.2.5 Aerodrome Certificate, and for subsequent safety surveillance inspections to be carried out by the SCAA at regular intervals.

3.2.2.6 The purpose of the Aerodrome Manual is also to provide all such information and instructions as may be necessary to enable the aerodrome operating staff to effectively perform their duties in ensuring that the aerodrome is safe for use by aircraft. To achieve this aim, the Aerodrome Manual shall contain instructions for operating procedures from the aerodrome operator to his operational staff, including contractors and agents working for the aerodrome operator, as well as details of organisation structure such as key operational personnel and their areas of responsibility.

3.2.3 FORMAT OF AN AERODROME MANUAL

3.2.3.1 An Aerodrome Manual may contain a main Aerodrome Manual covering all areas that need to be addressed, as well as relevant supporting documents and manuals for aerodrome operations that are referred to in the main Aerodrome Manual. The main Aerodrome Manual may be supplemented by other documents and manuals, airport circulars, notices and instructions issued by the aerodrome operator to his staff and contractors or agents on airport operational matters from time to time. The contents of these supplementary materials shall be incorporated into the main Aerodrome Manual once they become permanent in nature.

3.2.3.2 The Aerodrome Manual is a living manual subject to frequent amendment and as such it shall be contained in a loose-leaf binder to facilitate easy amendment. The page and paragraph numbering system shall also be designed to allow for easy addition and deletion. An amendment record page shall be included in each copy of the Aerodrome Manual.

3.2.3.3 As a working and reference document for aerodrome operational staff, the Aerodrome Manual must be user-friendly. The information and instructions contained therein must be clear, concise and unambiguous.

3.2.4 MAINTENANCE AND CONTROL OF AERODROME MANUAL

3.2.4.1 According to the requirements of Annex 14 an aerodrome operator have to:

(a) produce an Aerodrome Manual for his aerodrome and provide the Director SCAA with a copy thereof which is kept complete and current;

(b) keep at least one complete and current copy of the Aerodrome Manual at the aerodrome and, if the aerodrome is not his principal place of business, keep another such copy of the Aerodrome Manual at his principal place of business;

(c) make the copy of the Aerodrome Manual available for inspection by the SCAA;

(d) maintain the Aerodrome Manual and make such amendments as may be necessary to maintain the accuracy of the information in the Aerodrome Manual and to keep its contents up to date;

(e) notify the SCAA, as soon as practicable, of any amendment made to the Aerodrome Manual.

(f) make such amendment or addition to the Aerodrome Manual as the SCAA may require for

(i) maintaining the accuracy of the Aerodrome Manual;

(ii) ensuring the safe and efficient operation of aircraft at the aerodrome; or

(iii) ensuring the safety of air navigation.

3.2.5 DISTRIBUTION AND AMENDMENT OF AERODROME MANUAL

3.2.5.1 The Aerodrome Manual is an important document and must be issued under the authority of the aerodrome operator and signed by a senior executive of the organisation. Any amendments to the Aerodrome Manual shall be approved by person(s) authorised by the aerodrome operator to do so.

3.2.5.2 Copies of relevant sections of the Aerodrome Manual shall be made available to each supervisory member of the aerodrome operating staff including those employed by the operator's contractors or agents, where relevant, so that the aerodrome operating staff

(a) is aware of the contents of every part of the aerodrome manual relevant to his duties; and

(b) undertakes his duties in conformity with the relevant provisions of the Aerodrome Manual.

3.2.5.3 For this purpose, aerodrome operating staff shall mean all persons, whether employed by the aerodrome operator, who in the course of their duties are,

(a) concerned with ensuring that the aerodrome is safe for use by aircraft;

or

(b) required to have access to the aerodrome maneuvering area or apron.

3.2.5.4 In addition, sufficient copies of the Aerodrome Manual shall be placed at the aerodrome operator's library and at the workplace of other relevant operating staff concerned.

3.2.5.5 Apart from submission of the Aerodrome Manual to the SCAA and internal distribution of copies to relevant operating staff, copies of the Aerodrome Manual shall also be made available to other external parties with a part to play in the aerodrome's safety process.

3.2.5.6 The Aerodrome Manual shall be a controlled document. An aerodrome operator shall appoint a document controller to be responsible for updating and distributing its Aerodrome Manual. Each copy of the Aerodrome Manual shall be numbered and a list of their holders maintained by the document controller. Amendments shall be recorded on the amendment page in front of each copy.

3.2.5.7 Each holder of the Aerodrome Manual shall be responsible for ensuring that his copy is kept up to date. For copies intended for common use, a person shall be designated to look after their amendment.

3.2.5.8 Manuscript amendments to the Aerodrome Manual are not acceptable. Changes or additions shall be subject of an additional or replacement page suitably dated. If the amendment affects the action of external parties, an acknowledgement slip shall be requested from each external party concerned when amendments are circulated so

3.2.5.9 as to document that each party concerned has received and taken notice of the amendment.

3.2.5.10 The aerodrome operator shall make prompt amendments to the Aerodrome Manual when there are updates to any part of the contents of the Aerodrome Manual or, when required by the SCAA upon review of the Aerodrome Manual or any proposed updates or amendments. Such amendments required by the SCAA shall be binding on the aerodrome operator.

3.2.5.11 The aerodrome operator shall send the amended pages, together with an amendment list to SCAA for acceptance.

3.2.6 INFORMATION TO BE INCLUDED IN THE AERODROME MANUAL

3.2.6.1 The details of the particulars to be covered in the Aerodrome Manual are explained in Appendix F found in this Regulation of Aerodrome Standards.

3.2.6.2 Applicants for Aerodrome Certificate and aerodrome operators shall ensure that the Aerodrome Manuals prepared for their aerodromes address the required contents comprehensively and clearly. The SCAA reserves the right to reject the Aerodrome Manual and/or to request for supplementary information to be provided with the Aerodrome Manual if the manual, or any part of it, is found to be unacceptable, incomplete or inadequate.

3.3 AIP AND NOTAM ACTION

3.3.1 INITIATING AIP AND NOTAM TO PROMULGATE A CERTIFIED AERODROME

3.3.1.1 Aerodrome operator shall be ensure that, in respect of his aerodrome and amongst other services related to safety to be provided, Aeronautical Information Services are available. Upon granting of an Aerodrome Certificate, the aerodrome operator shall prepare and submit to the Aeronautical Information Services a Notice to Airmen (NOTAM) and/or Aeronautical Information Publication (AIP) Amendment setting out all the aerodrome information which will be permanently included in AIP Azerbaijan, including the effective dates for which the aerodrome is certified and for which it will commence operations.

3.3.2 ROUTINE NOTIFICATION AND REPORTING

3.3.2.1 An aerodrome operator shall review every AIP, AIP Supplement, AIP Amendment, NOTAM, Pre-flight Information Bulletin and Aeronautical Information Circular issued by the Aeronautical Information Services provider on receipt thereof and shall, immediately after such review, notify the Aeronautical Information Services provider of any inaccurate information contained therein that pertains to his aerodrome.

3.3.2.2 An aerodrome operator shall, in writing, notify the Aeronautical Information Services of any change to any aerodrome facility or equipment or the level of service at the aerodrome

(a) which has been planned in advance; and

(b) which is likely to affect the accuracy of the information contained in any publication by the Aeronautical Information Services before effecting the change.

3.3.2.3 For the purpose of paragraph 3.3.2.2 above, the aerodrome operator shall consult and coordinate work closely with the Aeronautical Information Services to determine the required lead time with which to notify the Aeronautical Information Services of different types of planned changes.

3.3.2.4 Aerodrome operator shall give the Aeronautical Information Services provider and the air traffic control unit immediate notice detailing any of the following circumstances of which the aerodrome operator has knowledge:

(a) in respect of obstacles, obstructions and hazards —

(i) any projections by an object through an obstacle limitation surface relating to the aerodrome; and

(ii) the existence of any obstruction or hazardous condition affecting aviation safety at or near the aerodrome;

(b) any change in the level of service at the aerodrome as set out in any publication by the Aeronautical Information Services provider referred to in paragraph 3.3.2.1 above or any variation (that has been accepted by the Director SCAA) from this Regulation of Aerodrome Standards;

(c) closure of any part of the movement area of the aerodrome;

(d) any significant changes in any aerodrome facility or the physical layout of the aerodrome; and

(e) any other condition that could affect aviation safety at the aerodrome and against which precautions are warranted.

3.3.2.5 When it is not feasible for an aerodrome operator to arrange for the air traffic control unit to receive notice of any circumstance referred to in paragraph 3.3.2.4 above, the aerodrome operator shall give immediate notice directly to the pilots who may be affected by that circumstance.

3.4 CHANGES TO AERODROME CERTIFICATE

3.4.1 APPLICATION FOR CHANGES TO AERODROME CERTIFICATE

3.4.1.1 If an aerodrome operator wishes to apply for an amendment to its Aerodrome Certificate, e.g., a change of the Special Conditions under which the Aerodrome Certificate is initially subjected to, he shall write to the SCAA giving full details of the proposed variation and justification. The minimum notice required is 30 days.

3.5 ROUTINE LIAISON AND INSPECTIONS AT A CERTIFIED AERODROME

3.5.1 PROVISION OF ACCESS FOR INSPECTION AND SITE SAFETY AUDITS

3.5.1.1 Paragraph 10.4 of Air Law makes provisions for the Director SCAA or any authorized person, before an Aerodrome Certificate is granted and subsequently at any other time, for the purpose of ensuring safety at an aerodrome, to

(a) inspect and carry out tests on the aerodrome facilities, equipment or services;

(b) inspect the aerodrome operator's documents and records; or

(c) verify the aerodrome's safety management system.

3.5.1.2 For the purposes mentioned in paragraph 3.5.1.1 above, an aerodrome operator shall, at the request of the Director SCAA or any authorized person, allow access to any part of the aerodrome or any aerodrome facility, including equipment, records and operator personnel.

3.5.1.3 An aerodrome operator shall co-operate in facilitating the activities referred to in paragraph 3.5.1.1 above.

3.5.1.4 Inspections and site safety audits may be conducted as required to assess the continuing suitability of an aerodrome operator's organisation, facilities and equipment, the aerodrome operator's overall standard of operation and maintenance as well as level of compliance with statutory and Aerodrome Manual requirements.

3.6 REFUSAL/CANCELLATION/SUSPENSION/ TRANSFER OF AERODROME CERTIFICATE

3.6.1 REFUSAL OF AERODROME CERTIFICATE

3.6.1.1 If, for whatsoever reasons, the SCAA refuses to grant an Aerodrome Certificate to an applicant, the SCAA will, within 14 days of the refusal, give the applicant a written notice of the refusal, stating the reasons for the refusal.

3.6.2 CANCELLATION OF AERODROME CERTIFICATE

3.6.2.1 If an aerodrome operator wishes to cancel its aerodrome Certificate, e.g., due to closing down of his aerodrome, or as part of a process to transfer the aerodrome operator role to a new operator, he shall write to the SCAA giving full details of the proposed cancellation date and date of cessation of aerodrome operations. The minimum notice required for canceling an Aerodrome Certificate is 30 days.

3.6.2.2 SCAA may make changes to the proposed cancellation date of the Aerodrome Certificate and/or date of cessation of aerodrome operations after taking into account public interests and other aviation considerations and the aerodrome operator shall abide by such changes.

3.6.3 SUSPENSION/REVOCATION OF AERODROME CERTIFICATE

3.6.3.1 A suspension or cancellation of an Aerodrome Certificate shall take effect from the date specified in the notice of suspension or cancellation.

3.6.3.2 Once issued, an Aerodrome Certificate shall remain in force until the date of its suspension or cancellation.

3.6.3.3 Paragraph 10.5 and 10.7 of Air Law makes provisions for the Director SCAA to suspend or cancel an Aerodrome Certificate if there are reasonable grounds for believing that

(a) a condition to which the Aerodrome Certificate is subject has been breached; or

(b) the aerodrome facilities, equipment, operations or maintenance are not of the standard necessary in the interests of the safety of air navigation.

3.6.3.4 Before suspending or cancelling an Aerodrome Certificate, the Director SCAA is authorised to:

(a) give the aerodrome operator holding the Aerodrome Certificate a notice which

(i) sets out the facts and circumstances that, in the opinion of the Director SCAA, justify the suspension or cancellation of that certificate; and

(ii) invites the aerodrome operator to show cause, in writing, within a reasonable period stated in the notice, as to why that certificate shall not be suspended or cancelled; and

(b) take into account any reason that the aerodrome operator may give under sub-paragraph (a)(ii) of this clause.

3.6.3.5 An Aerodrome Certificate that has been suspended or cancelled must be returned immediately to the SCAA.

3.6.4 TRANSFER OF AERODROME CERTIFICATE

3.6.4.1 An Aerodrome Certificate shall not be transferable to any person without the prior consent in writing of the Director SCAA, and any purported transfer of an Aerodrome Certificate shall be void and of no effect.

4. AERODROME OPERATOR ORGANISATION AND DOCUMENT MANAGEMENT

4.1 AERODROME OPERATOR ORGANISATION

4.1.1 AERODROME ORGANISATION MANAGEMENT AND OPERATIONAL STRUCTURE

4.1.1.1 An effective management structure is essential for the operation of aerodromes. Duties and responsibilities of managers and senior executives must be clearly defined in writing, and chains of command systematically established.

4.1.1.2 The number and nature of the appointments at an aerodrome will vary with the size and complexity of the aerodrome and organisation. An excess of managers can lead to fragmentation of responsibility and control, and to as much difficulty and inefficiency as too few. In general, the appointment of deputies for managerial posts shall be kept to a minimum and particular care shall be taken in defining their functions and responsibilities. The aerodrome operator shall ensure that the management organisation is adequate and properly matched to the operating environment and commitments.

4.1.1.3 It is important that the operational management has proper status in the organisation and that it is in suitably experienced and competent hands. The positions held by key operations and maintenance personnel shall be listed in the Aerodrome Manual. It is a condition under the issuance of the Aerodrome Certificate that the SCAA shall be given notice of any intended change in the appointments or functions of these key personnel.

4.1.1.4 Where maintenance activities or aircraft ground handling services are performed by external contractors or agencies and not directly by the aerodrome operator, a senior post shall be established to coordinate arrangements and to provide continuous liaison with the maintenance contractors or handling agencies. It is responsibility of the aerodrome operator to ensure that his contractors and/or agencies are competent to perform their duties having regard to their experience, equipment, organisation, staffing, training and other arrangements.

4.1.1.5 Attention is drawn to paragraph 10 of the Law on Aviation, which requires the aerodrome operator to ensure proper and efficient maintenance of the aerodrome facilities and equipment. Aerodrome operator shall, in respect of his aerodrome, ensure that

(a) appropriate air traffic services are available to ensure the safety of aircraft in the airspace associated with the aerodrome; and

(b) aeronautical information services, meteorological services and provision of security and other services related to safety are available.

4.1.2 AERODROME OPERATIONAL STAFF AND COMPETENCY

4.1.2.1 Under paragraph 10.11 of the Air Law, an aerodrome operator shall employ an adequate number of qualified and skilled personnel to perform all critical activities for the operation and maintenance of his aerodrome.

4.1.2.2 Paragraph 9.4 of the Air Law stipulates that if the Director SCAA requires the competency of personnel to be certified, the aerodrome operator shall, employ only persons possessing such certification.

4.1.2.3 An aerodrome operator shall implement programmes to upgrade the competency of the personnel referred to in sub-paragraph 9.3.

4.1.2.4 Aerodrome operational staff here refers to staff engaged in the day to day operation of the aerodrome whose duties have a bearing on aircraft safety. They include apron control staff, rescue and fire fighting personnel, bird control staff, airfield lighting and aircraft pavement maintenance personnel, aircraft movement area inspection staff, etc., who in the course of their duties are concerned with ensuring that the aerodrome is safe for use by aircraft, or are required to have access to the aerodrome manoeuvring areas or apron.

4.1.2.5 As mentioned in paragraphs 4.1.2.1 to 4.1.2.3 above, an aerodrome operator shall satisfy the Director SCAA that he has an adequate number of operational staff for the proposed aerodrome operations. This requirement will not be assessed against a set formula, as there will clearly be a wide variation according to particular circumstances. All operational staff shall be employed full- time. The employment of part time staff will be acceptable only in exceptional circumstances.

4.1.2.6 Arrangements for the supervision of operational staff must be sensibly related to the size of the organisation and the nature of the operation, and must be in the hands of persons having the experience and qualities necessary to ensure that the maintenance are of high professional standards. The duties and responsibilities of these supervisory personnel and their supporting staff shall be well-defined.

4.1.2.7 All operational personnel shall be properly trained to perform their duties in an efficient and effective manner. Apart from initial training, refresher training shall also be provided at regular intervals to ensure that a high standard is maintained. Training provisions including any competency test required of staff shall be detailed in the Aerodrome Manual. A record of all such training and tests shall be kept up to date.

4.1.2.8 The aerodrome personnel shall be provided with the tools and equipment required to carry out the operation in accordance with the job specifications.

4.1.3 AERODROME OPERATIONS LIBRARY

4.1.3.1 An aerodrome operator shall maintain an adequate library of maps, charts, guidance material, operations manuals and other documents needed for reference, planning and the effective operation of an airport. The library shall be kept in an orderly fashion and responsibility for its maintenance clearly defined.

4.1.3.2 Arrangements shall be made for the amendment of manuals, documents and guidance material, and for bringing the amendments to the notice of staff concerned. A record of the amendments shall be kept and a system derived to ensure the effective promulgation of information to staff concerned.

4.1.3.3 The minimum list of the documents and publications that must be kept and made available for access by staff is shown in Appendix G of this Regulation of Aerodrome Standards.

4.1.4 INSTRUCTIONS TO AERODROME OPERATIONAL STAFF

4.1.4.1 The Aerodrome Manual shall include a systematic procedure for bringing urgent or temporary information to the notice of aerodrome operations and maintenance staff.

4.2 DOCUMENT AND RECORD MANAGEMENT

4.2.1 FORMS, DOCUMENTS AND RECORDS

4.2.1.1 An aerodrome operator shall to provide various official forms and records for use by his operational staff. Unless the use of such forms is self explanatory, instructions for their completion shall be included in the Aerodrome Manual. Copies and records of the safety related forms such as forms for the inspection of runway, taxiway, apron, equipment, marking, lighting etc., the recording of bird strike occurrence and reporting of accidents and incidents shall be made available to all relevant staff who need to use them.

4.2.1.2 An aerodrome operator shall maintain a quality control system to ensure a systematic means of safekeeping safety records that would enable effective preservation of these records and allow ease of retrieval. A minimum list of the safety records to be kept together with the minimum period required for record preservation is shown in Appendix H of this Regulation of Aerodrome Standards.

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5. AERODROME WORK SAFETY, SAFETY MANAGEMENT SYSTEM AND ACCIDENT / INCIDENT REPORTING AND INVESTIGATION PROCEDURES

5.1 AERODROME WORK SAFETY

5.1.1 INTRODUCTION

5.1.1.1 An aerodrome operator shall plan and implement works to be carried out at an aerodrome so as not to create any hazard to aircraft operations or confusion to pilots. The Aerodrome Manual submitted by an aerodrome operator shall include details of the procedures for planning and safe carrying out of such work activities at the aerodrome.

5.1.1.2 An aerodrome operator shall, in his Aerodrome Manual, address how aerodrome works are to be carried out so that:

(a) where the works are of a nature that they will disrupt operations, these works shall be carried out with proper planning in advance; and

(b) where the works are of a minor/maintenance nature, these works may be carried out as time-limited works where normal aircraft operations are not disrupted and the movement area can be restored to normal safety standards and any obstacle created by those works removed in not more than 10 minutes. Depending on the nature and extent of each activity, time-limited works may include minor maintenance of markings and lights, grass mowing, sweeping of aircraft pavements, surveys and inspections, etc.

***Note**: At a controlled aerodrome, the air traffic control unit may, at the request of the aerodrome operator, vary the time limits set put in paragraph 5.1.1.2 (b) above for restoring normal safety standards or resuming aerodrome works. A variation under this paragraph is subject to such conditions as the air traffic control unit may impose.*

5.1.2 AERODROME WORK PLANS

5.1.2.1 Unless an aerodrome is closed during works in progress, or the work is of an emergency nature, an aerodrome operator shall not carry out aerodrome works, other than time-limited works, without proper planning in advance.

5.1.2.2 A plan shall be established, setting out the arrangements for carrying out those aerodrome works in coordination with all other operational, maintenance and development activities at the aerodrome. Work Safety Plan shall be approved by the SCAA.

5.1.2.3 When preparing a work plan, an aerodrome operator shall consult:

(a) commercial air transport operators using the aerodrome;

(b) the aerodrome's air traffic control unit; and

(c) if the work plan may affect its operations, the Rescue and Fire Fighting Service unit at the aerodrome so that the scope and impact of work is understood by related aerodrome users and service providers and to ensure the safety of aircraft operations at the aerodrome.

5.1.2.4 The aerodrome operator shall ensure that clear and ample prior notification is provided to the Aeronautical Information Services, the aerodrome air traffic control unit, aircraft operators and other users or service providers of the aerodrome. Such notification shall include timely and accurate promulgation of AIP Supplements or NOTAMs, with clear details of the extent and period of works.

5.1.2.5 An aerodrome operator shall be required to provide an explanation of his work plan, and any alterations or updates thereof, to the SCAA upon request.

5.1.2.6 Aerodrome works, for which a work plan is required, shall be carried out in accordance with the arrangements set out in the work plan and any subsequent alterations or updates.

5.1.2.7 The work plan shall address details of any special requirements or restrictions arising during or on completion of the works.

5.1.2.8 The work plan shall outline details, if any, of special arrangements to be made during works if emergencies or adverse weather conditions occur.

5.1.2.9 A work plan may not be required if the aerodrome operator closes the aerodrome to aircraft operations while aerodrome works are being carried out. The SCAA, commercial air transport operators and all organisations and persons likely to be affected by the closure shall be given reasonable notice of intention to close the aerodrome.

5.1.2.10 An aerodrome operator shall not close the aerodrome to aircraft operations due to aerodrome works unless an AIP Supplement or a NOTAM giving notice of the closure has been issued not less than 14 days before the closure takes place.

5.1.2.11 A work plan is not required for emergency aerodrome works carried out to repair damage to part of the maneuvering area, or to remove an obstacle, or if the works do not require any restrictions to aircraft operations. Where practicable, a NOTAM giving the nature and time and date of the commencement of the urgent repair works shall be issued, as early as possible, before the commencement of the works.

5.1.3 MANAGEMENT AND CONTROL OF AERODROME WORKS

5.1.3.1 An aerodrome operator shall ensure that aerodrome works are carried out in accordance with the requirements of this Regulation.

5.1.3.2 An aerodrome operator shall appoint a person responsible for the safe and proper execution of each item of aerodrome works. This person shall be required to:

(a) ensure the safety of aircraft operations is not affected by the aerodrome work plan;

(b) ensure that, where applicable, the aerodrome works are notified by the issue of an AIP Supplement or a NOTAM and that the text of each AIP Supplement or NOTAM pertaining to such notification conveys the information on operational restrictions accurately and clearly to aerodrome users and service providers;

(c) supply the air traffic control unit with whatever information necessary to ensure the safety of aircraft operations;

(d) discuss with the work organisations involved, on a regular basis, any matters necessary to ensure the safety of aircraft operations;

(e) ensure that unserviceable portions of the movement area, temporary obstructions and limits of the work areas are correctly marked and lit in accordance with the required standards and the work plan;

(f) ensure that vehicles, plant and equipment carrying out aerodrome works are properly marked and lit or are properly supervised;

(g) ensure that all requirements under the work plan pertaining to vehicles, plant and equipment and materials are complied with;

(h) ensure that access routes to work areas are in accordance with that designated in the work plan and are clearly identified and that access is restricted to these routes;

(i) ensure that excavation is carried out in accordance with the work plan and relevant requirements, and in particular, that sufficient precautions are taken so as to avoid damage or loss of calibration to any underground power or control cable, utilities or other services associated with a precision approach and landing system, any navigational aid or facility or equipment essential for the safety of aerodrome operations;

(j) report immediately to the aerodrome air traffic control unit and the aerodrome operator any incident, or damage to facilities, likely to affect air traffic control services or the safety of aircraft;

(k) provide adequate supervisors duty at the work areas while major works are in progress and the aerodrome is open to aircraft operations;

(l) ensure that the aerodrome air traffic control unit is kept informed of the radio call signs of vehicles used by the work organisations that are operating in the aircraft movement areas;

(m) remove vehicles, plant and personnel from the movement area immediately, where necessary, to ensure the safety of aircraft operations;

(n) ensure that the movement area is safe for normal aircraft operations following the removal of vehicles, plant and equipment and personnel from the work areas;

(o) in the case of time-limited works, ensure that the work areas are restored to normal safety standards not less than 5 minutes before the time scheduled for opening the work areas to aircraft operations; and

(p) ensure that floodlighting or any other lighting required for carrying out aerodrome works is shielded so as not to present a hazard to aircraft operations.

5.1.3.3 The person responsible for the aerodrome works shall be satisfied that the work plan is adequately prepared and that sufficient safety measures are put in place on the work site at all times during the execution of the aerodrome works when the aerodrome is open to aircraft operations.

5.1.3.4 An aerodrome operator shall take all reasonable measures to ensure that aerodrome works are well-organized and that all work personnel carries out aerodrome works in a manner that will ensure the safety of aircraft operations.

5.1.3.5 Persons, vehicles, plant and equipment required for carrying out aerodrome works shall not be permitted to enter the movement area or remain on it except for the purpose of carrying out those works.

5.1.3.6 Procedures for entering the work areas shall be addressed in the work plan.

5.1.4 MARKERS, MARKINGS AND LIGHTS

5.1.4.1 Aerodrome markers, markings, signs and lights required for, or affected by, aerodrome works shall be adjusted or installed in accordance with the appropriate aerodrome standards.

5.1.4.2 Parts of the movement area that are unserviceable as a result of the aerodrome works being carried out shall be marked and lit in accordance with the appropriate aerodrome standards.

5.1.4.3 All obstacles created as a result of aerodrome works being carried out shall be marked and lit in accordance with the appropriate aerodrome standards.

5.1.4.4 Vehicles and plant used in carrying out aerodrome works shall be marked and lit, where necessary, in accordance with the appropriate aerodrome standards.

5.1.5 COMMUNICATIONS EQUIPMENT

5.1.5.1 At a controlled aerodrome, a vehicle used by work parties carrying out aerodrome works on the movement area shall be equipped with a radio for two-way communications with the aerodrome air traffic control unit.

5.1.5.2 For the purpose of communication with the air traffic control unit, each vehicle used for carrying out aerodrome works on the movement area shall be given a callsign.

5.1.5.3 Any vehicle or plant that is not:

(a) marked or lit in accordance with section 5.1.4 above; or

(b) if applicable, equipped with a two-way radio;

shall only be used in carrying out aerodrome works if it is:

(i) used under the direct supervision of another vehicle that is equipped with a two-way radio set and which is responsible for escorting the vehicle or plant without radio when carrying out aerodrome works; or

(ii) used only within the limits of appropriately marked and lit work areas.

5.1.5.4 The drivers of vehicles equipped with a radio for two-way communications with the aerodrome air traffic control unit shall be properly trained and be responsible for checking that their radio sets are switched on and serviceable at all times when working on the movement area.

5.1.6 WORKS NEAR AIRCRAFT MOVEMENT AREAS

5.1.6.1 The aerodrome operator shall refer to chapters 7 and 8 of this Regulation of Aerodrome Standards and G-AGA-016 – Guidance for Control of Obstacles to determine the extent of work allowed near aircraft movement areas.

5.1.6.2 Works on or near aircraft movement areas or runway strips shall be carried out as quickly as practicable to minimize any potential risks arising out of changes associated with the works in progress.

5.1.6.3 Where works are to be undertaken in the vicinity of navigational or landing aids located within the runway strips, considerations shall be taken to ensure that neither the works nor vehicles or plant associated with the works may affect the performance of the aids.

5.1.7 COMPLETION

5.1.7.1 On the completion of aerodrome works and restoration of normal safety standards to the movement area, the aerodrome operator shall cancel any AIP Supplement or NOTAM issued to advise of those works.

5.1.7.2 Aerodrome operator shall to inspect his aerodrome, as circumstances require, to ensure aviation safety during and immediately after any period of construction or repair of an aerodrome facility or equipment that is critical to the safety of aircraft operations, and at any other time when there are conditions at the aerodrome that could affect aviation safety.

5.2 SAFETY MANAGEMENT SYSTEM

5.2.1.1 A Safety Management System (SMS) shall be established by the aerodrome operators for operations and maintenance of its aerodrome.

5.2.1.2 In order to maintain and further improve safety in civil aviation SCAA promotes the principles of safety management to address safety risks proactively; and stresses the concept of overall safety performance in all domains. Safety Management principles revolve around the implementation of the State Safety Programme (SSP) and Safety Management System in aviation. All Operators/SPs shall refer to SCAA's Order to "SMS organization rule", apply them in practice and sustain compliant during re-certification.

5.3 AERODROME ACCIDENT/INCIDENT REPORTING AND INVESTIGATION PROCEDURES

5.3.1 AERODROME OCCURRENCE REPORTING

5.3.1.1 This section prescribes the requirements for reporting the occurrence or detection of defects, failures or malfunctions at an aerodrome, its components or equipment, which could jeopardize the safe operation of the aerodrome or cause it to become a danger to persons or property.

5.3.1.2 The objectives of the Aerodrome Occurrence Report as follows:

(a) To ensure that knowledge of these occurrences is disseminated so that other persons and organisations may learn from them.

(b) To enable an assessment to be made by those concerned (whether internal or external to the aerodrome operator) of the safety implications of each occurrence, both in itself and in relation to previous similar occurrences, so that they may take or initiate any necessary action.

5.3.2 REPORTABLE OCCURRENCES AND REPORTING PROCEDURES

5.3.2.1 An aerodrome operator shall report to the SCAA of any aircraft accident, serious incident or serious injury occurring at his aerodrome within 24 hours of the occurrence.

5.3.2.2 An aerodrome operator shall report to the SCAA of any aircraft incident occurring at his aerodrome as soon as reasonably practicable but not more than 48 hours of the occurrence.

5.3.2.3 The definitions for aircraft accident, serious incident, incident and serious injury are as follows:

(a) Accident – See definition under section 0.6 of this Regulation

(b) Serious incident – See definition under section 0.6 of this Regulation

Examples are:

- A near collision requiring an avoidance maneuver to avoid a collision or an unsafe situation or where an avoidance action would have been appropriate.
- A controlled flight into terrain only marginally avoided.
- An aborted take-off on a closed or engaged runway.
- A take-off from a closed or engaged runway with marginal separation from an obstacle.
- A landing or attempted landing on a closed or engaged runway.
- A take-off or landing incident such as undershooting, overrunning or running off the side of runways.
- A major failure of any navigation aid when a runway is in use.

(c) Incident - See definition under section 0.6 of this Regulation

(d) Serious injury – See definition under section 0.6 of this Regulation

5.3.2.4 Information to be provided in the reporting and notification of an aircraft accident, serious incident, incident or serious injury shall at least include, as far as possible, the following:

(a) the date and local time of occurrence;

(b) the exact location of the occurrence with reference to some easily defined geographical point;

(c) detailed particulars of the parties involved, including the owner, operator, manufacturer, nationality, registration marks, serial numbers, assigned identities of aircraft and equipment;

(d) a detailed description of the sequence of events leading up to the incident;

(e) the physical characteristics, environment or circumstances of the area in which the incident occurred and an indication of the access difficulties or special requirements to reach the site;

(f) in the case of an aircraft accident, the number of crew members, passengers or other persons respectively killed or seriously injured as a result of the accident; and

(g) a description of the follow-up action being taken after the incident has occurred.

5.3.3 AERODROME OCCURRENCE RECORDS

5.3.3.1 An aerodrome operator shall establish and maintain Aerodrome Occurrence Reports for any accident, serious incident, incident, serious injury or any occurrence or event that has a bearing on the safety of aerodrome operations.

5.3.3.2 Aerodrome Occurrence Reports shall be used by an aerodrome operator to monitor and improve the level of operational safety, including reviews of safety standards required.

5.3.3.3 The aerodrome operator shall report to the SCAA produce and provide information contained in the Aerodrome Occurrence Report relating to any safety occurrence or event.

5.3.4 AERODROME ACCIDENT / INCIDENT INVESTIGATIONS

5.3.4.1 In the event of an accident or serious incident, an aerodrome operator shall carry out its own investigations.

5.3.4.2 In the event of an incident, an aerodrome operator shall carry out its own investigations.

5.3.4.3 The investigator, or team of investigators, shall be technically competent and shall either possess or have access to the background information, so that the facts and events are interpreted accurately. The investigations shall be a search to understand how the mishap happened, why it occurred, including organisational contributing factors, and to recommend action to prevent a recurrence, and shall not be intended to apportion blame.

5.3.4.4 The lesson learnt derived from an aerodrome incident/accident investigation shall be disseminated to staff to provide feedback for safety improvement.

5.3.4.5 The aerodrome operator shall report to the SCAA produce and provide information contained in the aerodrome accident/incident investigation report relating to any such event.

5.3.4.6 An aerodrome operator shall inspect his aerodrome, as circumstances require, to ensure safety as soon as practicable after any aircraft accident or incident.

5.4 RUNWAY SAFETY

5.4.1.1 Aerodrome operator shall maintain runway incursions, excursions and confusion prevention through different strategies that include effective identification of hazards related to runway safety, risk mitigation, coordination and cooperation between different stakeholders, establishment of runway safety action plans and runway safety teams (RSTs), and the collection, sharing and exchange of safety information.

5.4.1.2 The runway safety team (RST) shall be established at the aerodrome and included in the aerodrome manual.

Note: Activities to be included in the terms of reference as well as the proposed composition of an RST are included in the documents G-AGA-026 and G-AGA-005.

6. AERODROME DATA

6.1 GENERAL

6.1.1 INTRODUCTION

6.1.1.1 This chapter contains specifications relating to the provision of aerodrome data to the Aeronautical Information Service (AIS) for publication in accordance with Azerbaijan Aviation Rules – Aeronautical Information Services (AAR-ANS-005) to the Convention on International Civil Aviation.

6.1.1.2 The Aeronautical Information Services or AIS is an unit of the Civil Aviation Agency of Azerbaijan responsible for collecting, collating, editing and publishing aeronautical information. Aeronautical information is published by the AIS as an Integrated Aeronautical Information Package consisting of the following elements:

(a) **Aeronautical Information Publication (AIP)** – A publication issued by and with the authority of the AIS and containing aeronautical information of a lasting character essential to air navigation.

(b) **AIP Amendment** – Permanent changes to the information contained in the AIP.

(c) **AIP Supplement** – Temporary changes to the information contained in the AIP which are published by means of special pages.

(d) **NOTAM** – A notice distributed by means of telecommunication containing information concerning the establishment, condition or change in any aeronautical facility, service, procedure or hazard, the timely knowledge of which is essential to personnel concerned with flight operations.

(e) **Pre-flight information bulletin (PIB)** – A presentation of current NOTAM information of operational significance, prepared prior to flight.

(f) **Aeronautical Information Circular (AIC)** – a notice containing information which relates to flight safety, air navigation, technical, administrative or legislative matters.

6.2 INFORMATION TO BE REPORTED TO THE AIS

6.2.1 AERONAUTICAL DATA

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

Note.– Specifications concerning the accuracy and integrity classification related to aerodrome-related aeronautical data are contained in *M-ANS-001, Appendix 1.*

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

Note 1.— Aerodrome mapping databases related provisions are contained in AAR-ANS-005, Chapter 5 and Aeronautical Information Management Manual (M-ANS-001), Chapter 5.

Note 2.– Guidance material concerning the application of aerodrome mapping databases is provided in ICAO Annex 14, Attachment A, Section 22.

6.2.1.3 Where made available in accordance with 6.2.1.2, the selection of the aerodrome mapping data features to be collected shall be made with consideration of the intended applications.

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

Note 2: *Aerodrome mapping databases can be provided at one of two levels of quality - fine or medium. These levels and the corresponding numerical requirements are defined in RTCA Document DO-272B and European Organisation for Civil Aviation Equipment (EUROCAE) Document ED-99C — User Requirements for Aerodrome Mapping Information.*

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

Note: *Detailed specifications concerning digital data error detection techniques are contained in Aeronautical Information Management Manual (M-ANS-001).*

6.2.2 AERODROME REFERENCE POINT

6.2.2.1 An aerodrome reference point shall be established for an aerodrome.

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

6.2.2.3 The position of the aerodrome reference point shall be measured and reported to the Aeronautical Information Services in degrees, minutes and seconds.

6.2.3 AERODROME AND RUNWAY ELEVATIONS

6.2.3.1 The aerodrome elevation and geoid undulation at the aerodrome elevation position shall be measured to the accuracy of one-half meter and reported to the Aeronautical Information Services.

6.2.3.2 For an aerodrome used by international civil aviation for non-precision approaches, the elevation and geoid undulation of each threshold, the elevation of the runway end and any significant high and low intermediate points along the runway shall be measured to the accuracy of one-half meter and reported to the Aeronautical Information Services.

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

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

6.2.4 AERODROME REFERENCE TEMPERATURE

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

6.2.4.2 The aerodrome reference temperature shall be the monthly mean of the daily maximum temperatures for the hottest month of the year (the hottest month being that

which has the highest monthly mean temperature). This temperature shall be averaged over a period of years.

6.2.5 AERODROME DIMENSIONS AND RELATED INFORMATION

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

(a) runway – true bearing to one-hundredth of a degree, designation number, length, width, displaced threshold location to the nearest 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, stopway – length, width to the nearest metre, surface type;

(c) taxiway – designation, width, surface type;

(d) apron – surface type, aircraft stands;

(e) the boundaries of the air traffic control service;

(f) clearway – length to the nearest metre, ground profile;

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

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

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

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

6.2.5.2 The geographical coordinates of each threshold shall be measured and reported to the AIS in degrees, minutes, seconds and hundredths of seconds.

6.2.5.3 The geographical coordinates of appropriate taxiway centre line points shall be measured and reported to the AIS in degrees, minutes, seconds and hundredths of seconds.

6.2.5.4 The geographical coordinates of each aircraft stand shall be measured and reported to the AIS in degrees, minutes, seconds and hundredths of seconds.

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

Note 1: *See for graphical illustrations of obstacle data collection surfaces and criteria used to identify obstacles in Areas 2 and 3 as below:*

1. Obstacle data shall be collected and recorded in accordance with the Area 2 numerical requirements specified in Table A8-2:

(a) Area 2a: a rectangular area around a runway that comprises the runway strip plus any clearway that exists. The Area 2a obstacle collection surface shall have height of 3 m above the nearest runway elevation measured along the runway centre line, and for those portions related to a clearway, if one exists, at the elevation of the nearest runway end;

(b) Area 2b: an area extending from the ends of Area 2a in the direction of departure, with a length of 10 km and a splay of 15% to each side. The Area 2b obstacle collection surface has a 1.2% slope extending from the ends of Area 2a at the elevation of the runway end in the direction of departure, with a length of 10 km and a splay of 15% to each side. Obstacles less than 3 m in height above ground need not be collected;

(c) Area 2c: an area extending outside Area 2a and Area 2b at a distance of not more than 10 km from the boundary of Area 2a. The Area 2c obstacle collection surface has a 1.2% slope extending outside Area 2a and Area 2b at a distance of not more than 10 km from the boundary of Area 2a. The initial elevation of Area 2c shall be the elevation of the point of Area 2a at which it commences. Obstacles less than 15 m in height above ground need not be collected; and

(d) Area 2d: an area outside the Areas 2a, 2b and 2c up to a distance of 45 km from the aerodrome reference point, or to an existing TMA boundary, whichever is nearest. The Area 2d obstacle collection surface has a height of 100 m above ground.

2. In those portions of Area 2 where flight operations are prohibited due to very high terrain or other local restrictions and/or regulations, obstacle data shall be collected and recorded in accordance with the Area 1 requirements.

3. Data on every obstacle within Area 1 whose height above the ground is 100 m or higher shall be collected and recorded in the database in accordance with the Area 1 numerical requirements specified in Table A8-2.

***Note 2:** ICAO Annex 14 Vol. I Appendix 5 provides requirements for obstacle data determination in Areas 2 and 3. See para.6.2.1.1 of this Regulation.*

***Note 3:** Implementation of AAR-ANS-005 concerning the availability, as of 18 November 2010, of obstacle data according to Area 2 and Area 3 specifications would be facilitated by appropriate advanced planning for the collection and processing of such data.*

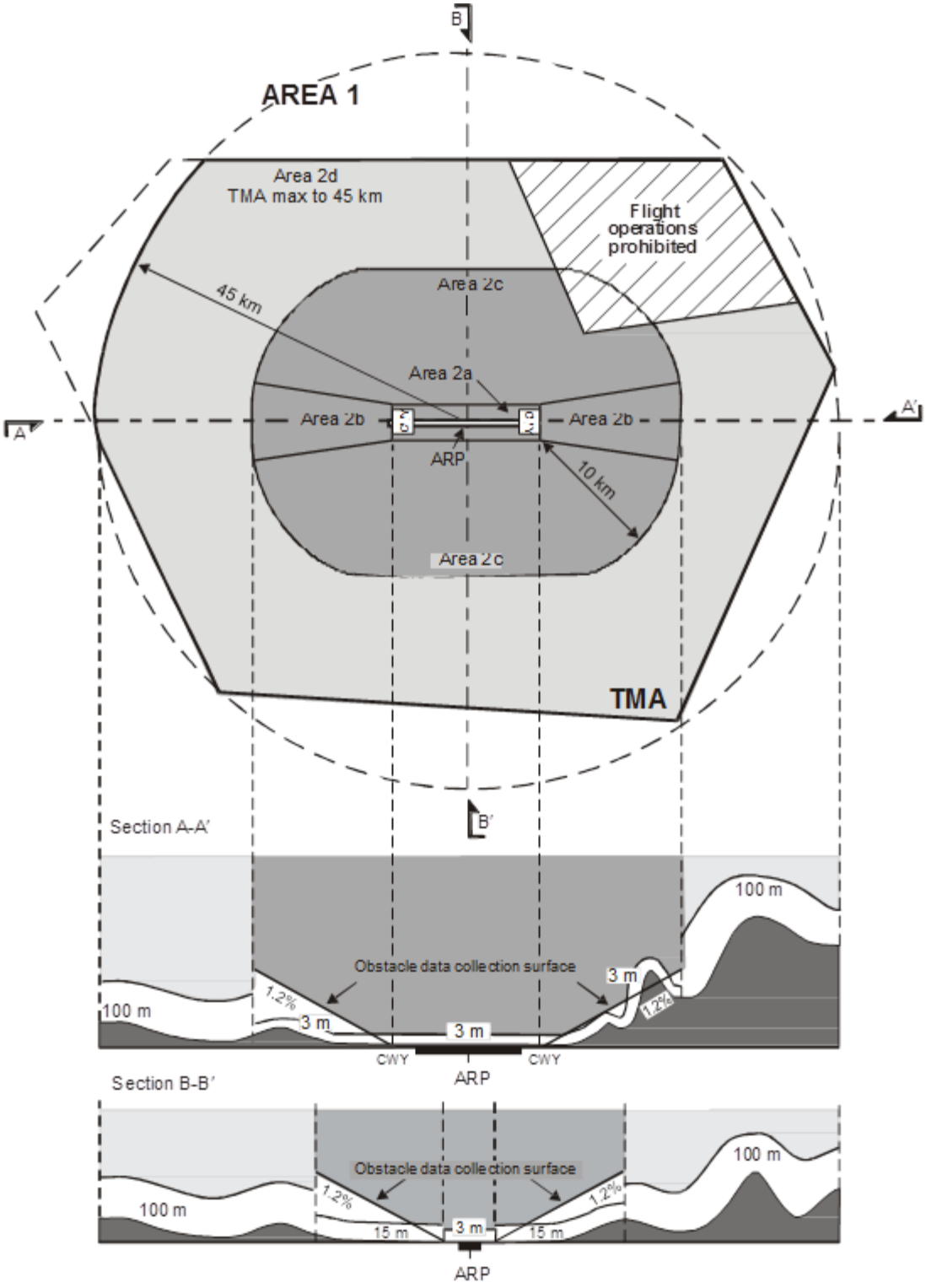


Figure A8-2. Obstacle data collection surface – Area 1 and Area 2

6.2.6 STRENGTH OF PAVEMENTS

6.2.6.1 The bearing strength of a pavement shall be determined.

6.2.6.2 The bearing strength of a pavement intended for aircraft of apron (ramp) mass greater than 5 700 kg shall be made available using the aircraft classification rating – pavement classification rating (ACR-PCR) method by reporting all of the following information:

a) the pavement classification rating (PCR) and numerical value;

b) pavement type for ACR-PCR determination;

c) subgrade strength category;

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

e) evaluation method.

Note: *Guidance on reporting and publishing of PCRs is contained in the Aerodrome Design Manual (Doc 9157, Part 3).*

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

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

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

Note: *The standard procedures for determining the ACR of an aircraft are given in the Aerodrome Design Manual (Doc 9157), Part 3. For convenience, dedicated software is available on the ICAO website, for computing any aircraft ACRs at any mass on rigid and flexible pavements for the four standard subgrade strength categories detailed in 6.2.6.6 b) below.*

6.2.6.5 For the purpose of determining the ACR, the behaviour of a pavement shall be classified as equivalent to a rigid or flexible construction.

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

(a) Pavement type for ACR-PCR determination:

	Code
Rigid pavement	R
Flexible pavement	F

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

(b) Subgrade strength category:

	Code
High strength: characterized by E=200 MPa, and representing all E values equal to or above 150 MPa for rigid and flexible pavements.	A
Medium strength: 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
Low strength: 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
Ultra-low strength: characterized by E=50 MPa and representing all E values strictly less than 60 MPa, for rigid and flexible pavements.	D

(c) Maximum allowable tire pressure category:

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

Note: *See Note 5 to 14.2.2.1 where the pavement is used by aircraft with tire pressures in the upper categories.*

(d) Evaluation method:

	Code
Technical evaluation: representing a specific study of the pavement characteristics and the types of aircraft which the pavement is intended to serve.	T
Using aircraft experience: representing a knowledge of the specific type and mass of aircraft satisfactorily being supported under regular use.	U

Note: *The following examples illustrate how pavement strength data are reported under ACR-PCR method. Further guidance on this topic is contained in the Aerodrome Design Manual (Doc 9157), Part 3 - Pavements.*

Example 1.— If the bearing strength of a rigid pavement, resting on a medium strength subgrade, has been assessed by technical evaluation to be PCR 760 and there is no tire pressure limitation, then the reported information would be:

PCR 760 / R / B / W / T

Example 2.— If the bearing strength of a composite pavement, behaving like a flexible pavement and resting on a high strength subgrade, has been assessed by using aircraft experience to be PCR 550 and the maximum tire pressure allowable is 1.25 MPa, then the reported information would be:

PCR 550 / F / A / Y / U

Note: *Composite construction.*

6.2.6.7 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 2.6.2 and 2.6.3.

Note: *ICAO Annex 14, vol I, Attachment A, Section 19, details a simple method for regulating overload operations while the Aerodrome Design Manual, (Doc 9157), Part 3, includes the descriptions of more detailed procedures for evaluation of pavements and their suitability for restricted overload operations.*

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

(a) maximum allowable aircraft mass; and

(b) maximum allowable tire pressure.

6.2.7 PRE-FLIGHT ALTIMETER CHECK LOCATION

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

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

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

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

6.2.7.3 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 of the average elevation for that location.

6.2.8 DECLARED DISTANCES

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

(a) take-off run available (TORA);

(b) take-off distance available (TODA);

(c) accelerate-stop distance available (ASDA); and

(d) landing distance available (LDA).

(e) clearway (CWY)

(f) runway end safety areas (RESA)

(g) stopway (SWY)

Takeoff Run Available *(TORA)* The length of runway declared available and suitable for the ground run of an aeroplane taking off.

Take Off Distance Available *(TODA)* The length of the take off run available (TORA) plus the length of the clearway, where provided.

Accelerate Stop Distance Available *(ASDA)* The length of the takeoff run plus the length of the (Stopway) where provided.

Landing Distance Available *(LDA)* The length of runway which is declared available and suitable for the ground run of an aeroplane landing.

Clearway *(CWY)* is an area beyond the paved runway, free of obstructions and under the control of the airport authorities. The length of the clearway may be included in the length of the takeoff distance available (TODA). For example, if a paved runway is 2000 m long and there are 400 m of clearway beyond the end of the runway, the takeoff distance available is 2400 m long.

Runway End Safety Areas *(RESA)* 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"

Stopway *(SWY)* 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.

6.2.8.2 Where a runway is not provided with a stopway or clearway and the threshold is located at the extremity of the runway, the four declared distances shall normally be equal to the length of the runway.

6.2.8.3 Where a runway is provided with a clearway (CWY), then TODA shall include the length of clearway.

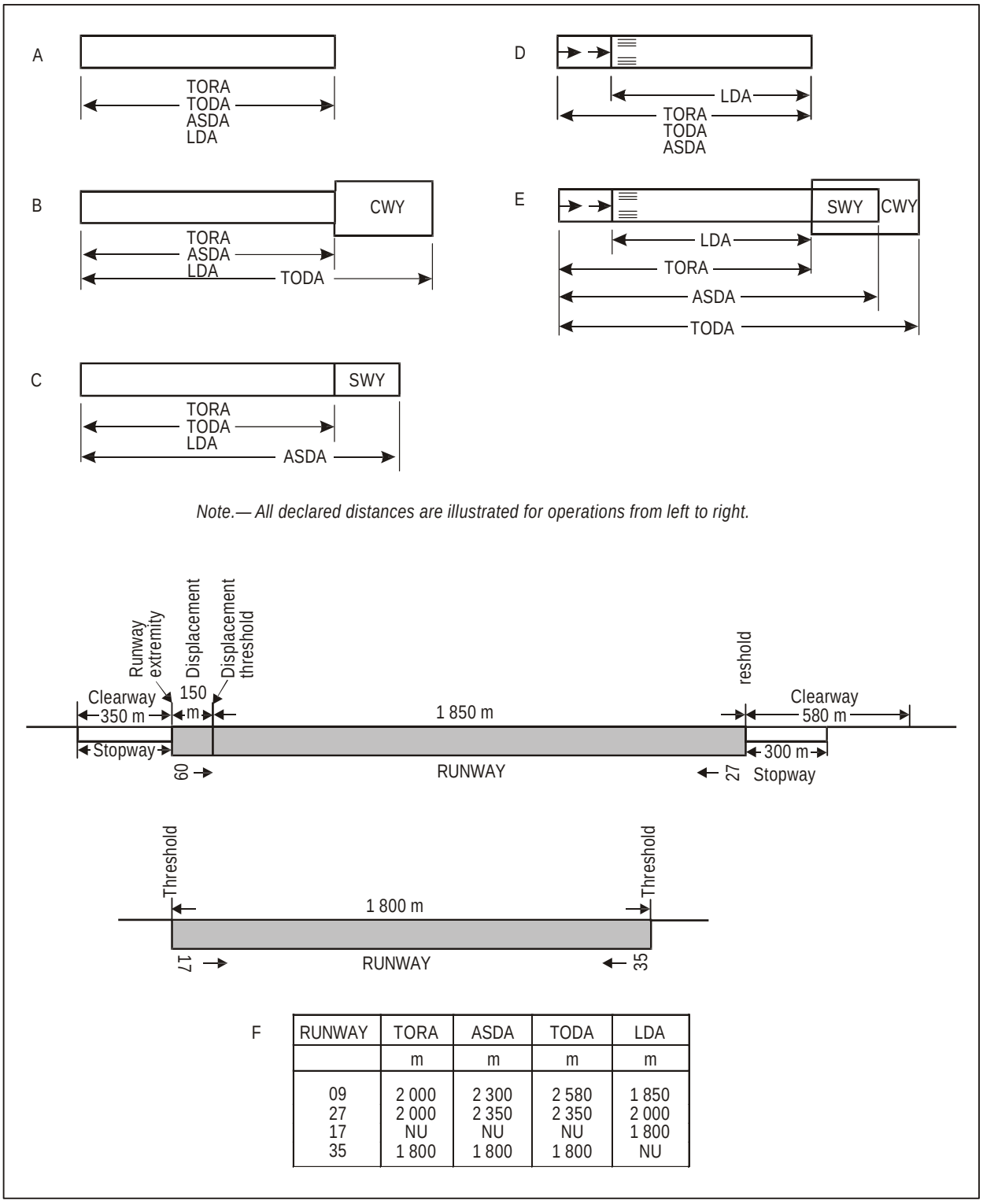
6.2.8.4 Where a runway is provided with a stopway (SWY), then ASDA shall include the length of stopway.

6.2.8.5 Where a runway has a displaced threshold, then the LDA shall be reduced by the distance the threshold is displaced. A displaced threshold affects only the LDA for approach made to that threshold; all declared distances for operations in the reciprocal direction are unaffected.

6.2.8.6 Where more than one of the features (a runway provided with a clearway or a stopway or having a displaced threshold) exist, then more than one of the declared distances shall be modified – but the modification shall follow the same principle.

6.2.8.7 If a runway direction cannot be used for take-off or landing, or both, because it is operationally forbidden, then this shall be declared and the words "not usable" or the abbreviation "NU" entered.

Note: *Figure A-1 contains illustration on declared distances as below.*



Note.— All declared distances are illustrated for operations from left to right.

F

RUNWAY	TORA	ASDA	TODA	LDA
	m	m	m	m
09	2 000	2 300	2 580	1 850
27	2 000	2 350	2 350	2 000
17	NU	NU	NU	1 800
35	1 800	1 800	1 800	NU

Figure A-1. Illustration of declared distances

6.2.9 CONDITION OF THE MOVEMENT AREA AND RELATED FACILITIES

6.2.9.1 Information on the condition of the movement area and the operational status of related facilities shall be provided to the Aeronautical Information Services, and similar information of operational significance to the air traffic service 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.

Note: *The nature, format and conditions of the information to be provided are specified in Aeronautical Information Management Manual (M-ANS-001) and the PANS-ATM (Doc 4444). Specific procedures pertaining to works in progress on the movement area and to the reporting of such works are specified in the G-AGA-026.*

6.2.9.2 The condition of the movement area and the operational status of related facilities shall be monitored and reports on matters of operational significance affecting aircraft and aerodrome operations shall be provided in order to take appropriate action, particularly in respect of the following:

(a) construction or maintenance work;

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

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

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

(e) anti-icing or de-icing liquid chemicals or other contaminants on 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.

Note 1: *Other contaminants may include mud, dust, sand, volcanic ash, oil and rubber. Procedures for monitoring and reporting the conditions of the movement area are included in the G-AGA-026.*

Note 2: *The Aeroplane Performance Manual (Doc 10064) provides guidance on aircraft performance calculation requirements regarding the description of runway surface conditions in 6.2.9.2 c), e) and f).*

Note 3: *Origin and evolution of data, assessment process and the procedures are prescribed in the G-AGA-026. These procedures are intended to fulfil the requirements to achieve the desired level of safety for aeroplane operations prescribed by ICAO Annex 6 and Annex 8 and to provide the information fulfilling the syntax requirements for dissemination specified in AAR-ANS-005 and the PANS-ATM (Doc 4444).*

6.2.9.3 To facilitate compliance with 6.2.9.1 and 6.2.9.2, the following inspections shall be carried out each day:

(a) for the movement area, at least once where the aerodrome reference code number is 1 or 2 and at least twice where the aerodrome reference code number is 3 or 4; and

(b) for the runway(s), inspections in addition to a) whenever the runway surface conditions may have changed significantly due to meteorological conditions.

6.2.9.4 Personnel assessing and reporting runway surface conditions required in 6.2.9.2 and 6.2.9.5 shall be trained and competent to perform their duties.

Note 1: *Guidance on training of personnel is given in Appendix M.*

Note 2: *Information on training for personnel assessing and reporting runway surface conditions is available in the G-AGA-026.*

Runway surface condition(s) for use in the runway condition report

Introductory Note: *The philosophy of the runway condition report is that the aerodrome operator assesses the runway surface conditions whenever water, snow, slush, ice or frost are present on an operational runway. From this assessment, a runway condition code (RWYCC) and a description of the runway surface are reported which can be used by the flight crew for aeroplane performance calculations. This report, based on the type, depth and coverage of contaminants, is the best assessment of the runway surface condition by the aerodrome operator; however, all other pertinent information may be taken into consideration. See Appendix M for further details. G-AGA-026 contains procedures on the use of the runway condition report and assignment of the RWYCC in accordance with the runway condition assessment matrix (RCAM).*

6.2.9.5 The runway surface condition shall be assessed and reported through a runway condition code (RWYCC) and a description using the following terms:

COMPACTED SNOW
DRY
DRY SNOW
DRY SNOW ON TOP OF COMPACTED SNOW
DRY SNOW ON TOP OF ICE
FROST
ICE
SLUSH
STANDING WATER
WATER ON TOP OF COMPACTED SNOW
WET
WET ICE
WET SNOW
WET SNOW ON TOP OF COMPACTED SNOW
WET SNOW ON TOP OF ICE
CHEMICALLY TREATED
LOOSE SAND

Note 1: *The runway surface conditions are those conditions for which, by means of the methods described in the G-AGA-026, the flight crew can derive appropriate aeroplane performance.*

Note 2: *The conditions, either singly or in combination with other observations, are criteria for which the effect on aeroplane performance is sufficiently deterministic to allow assignment of a specific runway condition code.*

Note 3: *The terms CHEMICALLY TREATED and LOOSE SAND do not appear in the aeroplane performance section but are used in the situational awareness section of the runway condition report.*

6.2.9.6 Whenever an operational runway is contaminated, an assessment of the contaminant depth and coverage over each third of the runway shall be made and reported.

Note: *Procedures on depth and coverage reporting are found in the G-AGA-026.*

6.2.9.7 When friction measurements are used as part of the overall runway surface assessment on compacted snow- or ice-covered surfaces, the friction measuring device shall meet the standard set or agreed by the SCAA.

6.2.9.8 Friction measurements made on runway surface conditions with contaminants other than compacted snow and ice shall not be reported.

Note: *Friction measurements on loose contaminants such as snow and slush, in particular, are unreliable due to drag effects on the measurement wheel.*

6.2.9.9 Information that a runway or portion thereof is slippery wet shall be made available.

Note 1: *The surface friction characteristics of a runway or a portion thereof can be degraded due to rubber deposits, surface polishing, poor drainage or other factors. The determination that a runway or portion thereof is slippery wet stems from various methods used solely or in combination. These methods may be functional friction measurements, using a continuous friction measuring device, that fall below a minimum standard as defined by the State, observations by aerodrome maintenance personnel, repeated reports by pilots and aircraft operators based on flight crew experience, or through analysis of aeroplane stopping performance that indicates a substandard surface. Supplementary tools to undertake this assessment are described in the G-AGA-026.*

Note 2: *See 6.2.9.1 and 6.2.13 concerning the provision of information to, and coordination between, appropriate authorities.*

6.2.9.10 Notification shall be given to relevant aerodrome users when the friction level of a paved runway or portion thereof is less than the minimum friction level specified by the SCAA in accordance with 14.2.2.3.

Note 1: *Guidance on determining and expressing the minimum friction level is provided in Assessment, Measurement and Reporting of Runway Surface Conditions (Cir 329).*

Note 2: *Procedures on conducting a runway surface friction characteristics evaluation programme are provided in the G-AGA-026.*

Note 3: *Information to be promulgated in a NOTAM includes specifying which portion of the runway is below the minimum friction level and its location on the runway.*

6.2.10 Disabled Aircraft Removal

Note: *See section 13.2.3 of this Regulation for information on disabled aircraft removal services.*

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

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

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

6.2.11 Rescue and Fire Fighting

Note: *See section 13.2 of this Regulation for information on rescue and fire fighting services.*

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

6.2.11.2 The level of protection normally available at the aerodrome shall be expressed in terms of the category of the rescue and fire fighting services as described in section 13.2 of this Regulation and in accordance with the types and amounts of extinguishing agents normally available at the aerodrome.

6.2.11.3 Changes in the level of protection normally available at an aerodrome for rescue and fire fighting shall be notified to the air traffic services unit and the Aeronautical Information Services to enable these units to provide the necessary information to arriving and departing aircraft. When such a change has been corrected, the above units shall be advised accordingly.

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

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

6.2.12 VISUAL APPROACH SLOPE INDICATOR SYSTEMS

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

(a) associated runway designation number;

(b) type of system according to paragraph 9.4.5.2 of this Regulation. For a PAPI or APAPI installation, the side of the runway on which the lights are installed, ie. left or right, shall be given;

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

(d) nominal approach slope angle(s). For a PAPI and an APAPI this shall be angle (B+C)/2 and (A+B)/2, respectively as in Figure 9-19; and

(e) minimum edge height(s) over the threshold of the on-slope signal(s).

For a PAPI, this shall be the setting angle of the third unit from the runway minus 2', i.e. angle B minus 2', and for an APAPI this shall be the setting angle of the unit farther from the runway minus 2', i.e. angle A minus 2'.

6.2.13 COORDINATION BETWEEN THE AERODROME OPERATOR AND THE AERONAUTICAL INFORMATION SERVICES

6.2.13.1 To ensure that the Aeronautical Information Services obtain information to enable them to provide up-to-date pre-flight information and to meet the need for in-flight information, the aerodrome operator shall establish arrangements with the Aeronautical Information Services to report, with a minimum of delay:

(a) information on the status of certification of aerodromes and aerodrome conditions (reference sections 3.1, 6.2.9, 6.2.10, 6.2.11, 6.2.12 above);

(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.

6.2.13.2 Before introducing changes to the air navigation system, due account shall be taken by the aerodrome operator of the time needed by the Aeronautical Information Services for the preparation, production and issue of relevant material for promulgation. To ensure timely provision of information to the Aeronautical Information Services, close coordination between those services concerned is therefore required.

6.2.13.3 Of a particular importance are changes to aeronautical information that affects charts and/or computer-based navigation systems which qualify to be notified by the aeronautical information regulation and control (AIRAC) system, as specified in AAR-ANS-005, Chapter 6. The predetermined internationally agreed AIRAC effective dates shall be observed by the responsible aerodrome operator when submitting the raw information/data to the Aeronautical Information Services.

Note: *Detailed specifications concerning the AIRAC system are contained in Aeronautical Information Management Manual (M-ANS-001), Chapter 6.*

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

Note 1: *Specifications concerning the accuracy and integrity classification of aerodrome-related aeronautical data are contained in Aeronautical Information Management Manual (M-ANS-001), Appendix 1.*

Note 2: *Specifications for the issue of a NOTAM and SNOWTAM are contained in AAR-ANS-005, Chapter 6 and Aeronautical Information Management Manual (M-ANS-001), Appendix 3 and 4 respectively.*

Note 3: *AIRAC information is distributed by the AIS at least 42 days in advance of the AIRAC effective dates with the objective of reaching recipients at least 28 days in advance of the effective date.*

Note 4: *The schedule of the predetermined internationally agreed AIRAC common effective dates at intervals of 28 days, including 6 November 1997 and guidance for the AIRAC use are contained in the ICAO Aeronautical Information Services Manual (ICAO Doc 8126, Chapter 2).*

7. PHYSICAL CHARACTERISTICS

7.1 GENERAL

7.1.1 INTRODUCTION

7.1.1.1 This chapter contains specifications related to the physical characteristics required of aerodrome runway, taxiway, apron and related facilities.

7.2 PHYSICAL REQUIREMENTS OF AERODROME FACILITIES

7.2.1 RUNWAYS

Number and orientation of runways

Introductory Note: *Many factors affect the determination of the orientation, siting and number of runways.*

One important factor is the usability factor, as determined by the wind distribution, which is specified hereunder. Another important factor is the alignment of the runway to facilitate the provision of approaches conforming to the approach surface specifications of Chapter 8 of this Regulation. In ICAO Annex 14 Vol. I, Attachment A, Section 1, information is given concerning these and other factors.

When a new instrument runway is being located, particular attention needs to be given to areas over which aeroplanes will be required to fly when following instrument approach and missed approach procedures, so as to ensure that obstacles in these areas or other factors will not restrict the operation of the aeroplanes for which the runway is intended.

7.2.1.1 The number and orientation of runways at an aerodrome shall be such that the usability factor of the aerodrome is not less than 95 % for the aeroplanes that the aerodrome is intended to serve.

7.2.1.2 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.

Note: *Guidance on how to address noise problems is provided in the ICAO Airport Planning Manual (Doc 9184) Part 2 and in the ICAO Guidance on the Balanced Approach to Aircraft Noise Management (Doc 9829).*

7.2.1.3 Choice of maximum permissible cross-wind components

In the application of paragraph 7.2.1.1 above, it shall be assumed that landing or take-off of aeroplanes is, in normal circumstances, precluded when the cross-wind component exceeds:

— 37 km/h (20 kt) in the case of aeroplanes whose reference field length is 1 500 m or over, except that when poor runway braking action owing to an insufficient longitudinal coefficient of friction is experienced with some frequency, a cross-wind component not exceeding 24 km/h (13 kt) shall be assumed;

— 24 km/h (13 kt) in the case of aeroplanes whose reference field length is 1 200 m or up to but not including 1 500 m; and

— 19 km/h (10 kt) in the case of aeroplanes whose reference field length is less than 1 200 m.

Note: *In ICAO Annex 14 Vol. I, Attachment A, Section 1, guidance is given on factors affecting the calculation of the estimate of the usability factor and allowances which may have to be made to take account of the effect of unusual circumstances.*

7.2.1.4 **Data to be used.**

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 five years. The observations used shall be made at least eight times daily and spaced at equal intervals of time.

Note: *These winds are mean winds. Reference to the need for some allowance for gusty conditions is made in ICAO Annex 14 Vol. I, Attachment A, Section 1.*

Location of threshold

7.2.1.5 A threshold shall normally be located at the extremity of a runway unless operational considerations justify the choice of another location.

Note: *Guidance on the siting of the threshold is given in ICAO Annex 14 Vol. I, Attachment A, Section 10.*

7.2.1.6 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. Where this displacement is due to an unserviceable runway condition, a cleared and graded area of at least 60 m in length shall be available between the unserviceable area and the displaced threshold. Additional distance shall also be provided to meet the requirements of the runway end safety area as appropriate.

Note: *Guidance on factors which may be considered in the determination of the location of a displaced threshold is given in ICAO Annex 14 Vol. I, Attachment A, Section 10.*

Actual length of runways

7.2.1.7 **Primary runway**

Except as provided in paragraph 7.2.1.9 of this Regulation, 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 and shall be not less than the longest length determined by applying the corrections for local conditions to the operations and performance characteristics of the relevant aeroplanes.

Note 1: *This specification does not necessarily mean providing for operations by the critical aeroplane at its maximum mass.*

Note 2: *Both take-off and landing requirements need to be considered when determining the length of runway to be provided and the need for operations to be conducted in both directions of the runway.*

Note 3: *Local conditions that may need to be considered include elevation, temperature, runway slope, humidity and the runway surface characteristics.*

Note 4: *When performance data on aeroplanes for which the runway is intended are not known, guidance on the determination of the actual length of a primary runway by application of general correction factors is given in the G-AGA-017.*

7.2.1.8 **Secondary runway**

The length of a secondary runway shall be determined similarly to primary runways except that it needs 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 %.

7.2.1.9 Runways with stopways or clearways

Where a runway is associated with a stopway or clearway, an actual runway length less than that resulting from application of paragraphs 7.2.1.7 or 7.2.1.8, as appropriate, may be considered satisfactory, but in such a case 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.

Note: *Guidance on use of stopways and clearways is given in ICAO Annex 14 Vol. I, Attachment A, Section 2.*

Width of runways

7.2.1.10 The width of a runway shall not be less than the appropriate dimension specified in the following tabulation:

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	30m	45 m
4	-	-	45 m	45 m

a. The width of a precision approach runway shall be not less than 30 m where the code number is 1 or 2.

Note 1: *The combinations of code numbers and OMGWS for which widths are specified have been developed for typical aeroplane characteristics.*

Note 2: *Factors affecting runway width are given in the G-AGA-017.*

Note 3: *See 7.2.2 concerning the provision of runway shoulders, in particular for Code aeroplanes with four (or more) engines.*

7.2.1.11 Minimum distance between parallel runways

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

— 210 m where the higher code number is 3 or 4;

— 150 m where the higher code number is 2; and

— 120 m where the higher code number is 1.

Note: *Procedures for wake turbulence categorization of aircraft and wake turbulence separation minima are contained in the Procedures for Air Navigation Services — Air Traffic Management (PANS-ATM), Doc 4444, Chapter 4, 4.9 and Chapter 5, 5.8, respectively.*

7.2.1.12 Where parallel instrument runways are intended for simultaneous use subject to conditions specified in the PANS-ATM (Doc 4444) and the PANS-OPS (Doc 8168), Volume I, the minimum distance between their centre lines shall be:

— 1 035 m for independent parallel approaches;

— 915 m for dependent parallel approaches;

— 760 m for independent parallel departures;

— 760 m for segregated parallel operations;

except that:

(a) for segregated parallel operations the specified minimum distance:

1) may be decreased by 30 m for each 150 m that the arrival runway is staggered toward the arriving aircraft, to a minimum of 300 m; and

2) shall be increased by 30 m for each 150 m that the arrival runway is staggered away from the arriving aircraft;

(b) for independent parallel approaches, combinations of minimum distances and associated conditions other than those specified in the PANS-ATM (Doc 4444) may be applied when it is determined that such combinations would not adversely affect the safety of aircraft operations.

Note: *Procedures and facilities requirements for simultaneous operations on parallel or near-parallel instrument runways are contained in the PANS-ATM (Doc 4444), Chapter 6 and the PANS-OPS (Doc 8168), Volume I, Part VII and Volume II, Parts II and III and relevant guidance is contained in the ICAO Manual of Simultaneous Operations on Parallel or Near-Parallel Instrument Runways (Doc 9643).*

Slopes on runways

7.2.1.13 Longitudinal slopes

The slope computed by dividing the difference between the maximum and minimum elevation along the runway centre line by the runway length shall not exceed:

— 1 % where the code number is 3 or 4; and

— 2 % where the code number is 1 or 2.

7.2.1.14 Along no portion of a runway shall the longitudinal slope exceed:

— 1.25 % where the code number is 4, except that for the first and last quarter of the length of the runway the longitudinal slope shall not exceed 0.8 %;

— 1.5 % where the code number is 3, except that for the first and last quarter of the length of a precision approach runway category II or III the longitudinal slope shall not exceed 0.8 %; and

— 2 % where the code number is 1 or 2.

7.2.1.15 Longitudinal slope changes

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

— 1.5 % where the code number is 3 or 4; and

— 2 % where the code number is 1 or 2.

Note: *Guidance on slope changes before a runway is given in ICAO Annex 14 Vol. I, Attachment A, Section 4.*

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

— 0.1 % per 30 m (minimum radius of curvature of 30 000 m) where the code number is 4;

— 0.2 % per 30 m (minimum radius of curvature of 15 000 m) where the code number is 3; and

— 0.4 % per 30 m (minimum radius of curvature of 7 500 m) where the code number is 1 or 2.

7.2.1.17 Sight distance

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

— any point 3 m above a runway to all other points 3 m 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.

— any point 2 m above a runway to all other points 2 m above the runway within a distance of at least half the length of the runway where the code letter is B; and

— any point 1.5 m above a runway to all other points 1.5 m above the runway within a distance of at least half the length of the runway where the code letter is A.

Note: *Consideration will have to be given to providing an unobstructed line of sight over the entire length of a single runway where a full-length parallel taxiway is not available. Where an aerodrome has intersecting runways, additional criteria on the line of sight of the intersection area would need to be considered for operational safety. See the G-AGA-017.*

7.2.1.18 Distance between slope changes

Undulations or appreciable changes in slopes located close together along a runway shall be avoided. The distance between the points of intersection of two successive curves shall not be less than:

a) the sum of the absolute numerical values of the corresponding slope changes multiplied by the appropriate value as follows:

— 30 000 m where the code number is 4;

— 15 000 m where the code number is 3; and

— 5 000 m where the code number is 1 or 2; or

b) 45 m;

whichever is greater.

Note: *Guidance on implementing this specification is given in ICAO Annex 14 Vol. I, Attachment A, Section 4.*

7.2.1.19 Transverse slopes

To promote the most rapid drainage of water, the runway surface shall, if practicable, be cambered except where a single cross fall from high to low in the direction of the wind most frequently associated with rain would ensure rapid drainage. The transverse slope shall ideally be:

— 1.5 % when the code letter is C, D, E or F; and

— 2 % when the code letter is A or B;

but in any event shall not exceed 1.5 % or 2 %, as applicable, nor be less than 1 % except at runway or taxiway intersections where flatter slopes may be necessary.

For a cambered surface the transverse slope on each side of the centre line shall be symmetrical.

Note: *On wet runways with cross-wind conditions the problem of aquaplaning from poor drainage is apt to be accentuated. In ICAO Annex 14 Vol. I, Attachment A, Section 7, information is given concerning this problem and other relevant factors.*

7.2.1.20 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 shall be provided taking account of the need for adequate drainage.

Note: *Guidance on transverse slope is given in the ICAO Aerodrome Design Manual, Part 3.*

Strength of runways

7.2.1.21 A runway shall be capable of withstanding the traffic of aeroplanes the runway is intended to serve.

Surface of runways

7.2.1.22 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.

Note 1: *Surface irregularities may adversely affect the take-off or landing of an aeroplane by causing excessive bouncing, pitching, vibration, or other difficulties in the control of an aeroplane.*

Note 2: *Guidance on design tolerances and other information is given in ICAO Annex 14 Vol. I, Attachment A, Section 5. Additional guidance is included in the ICAO Aerodrome Design Manual, Part 3.*

7.2.1.23 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 SCAA.

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

Note: *Guidance on surface friction characteristics of a new or resurfaced runway is given in Attachment A, Section 7. Additional guidance is included in the G-AGA-012 and Chapter 14 para.14.2.2.4 Runway friction measurement of this Regulation.*

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

Note: *Guidance on surface friction characteristics of new runway surfaces is given in Attachment A, Section 7 and Chapter 14 para.14.2.2.4 Runway friction measurement of this Regulation. Additional guidance is included in the G-AGA-012.*

7.2.1.26 The average surface texture depth of a new surface shall be not less than 1.0 mm.

Note 1: *Macrotexture and microtexture are taken into consideration in order to provide the required surface friction characteristics. Guidance on surface design is given in Attachment A, Section 8.*

Note 2: *Guidance on methods used to measure surface texture is given in the G-AGA-012.*

Note 3: *Guidance on design and methods for improving surface texture is given in the Aerodrome Design Manual (Doc 9157), Part 3.*

7.2.1.27 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.

Note: *Guidance on methods for improving the runway surface texture is given in the ICAO Aerodrome Design Manual, Part 3.*

7.2.2 RUNWAY SHOULDERS

General

Note: *Guidance on characteristics and treatment of runway shoulders is given in ICAO Annex 14 Vol. I, Attachment A, Section 9, and in the G-AGA-017.*

7.2.2.1 Runway shoulders shall be provided for a runway where the code letter is D, E or F.

Width of runway shoulders

7.2.2.2 For aeroplanes with OMGWS from 9 m up to but not including 15 m, 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:

— 60 m where the code letter is D or E;

--- 60 m where the code letter is F with two- or three-engined aeroplanes; and

— 75 m where the code letter is F with four (or more)-engined aeroplanes.

Slopes on runway shoulders

7.2.2.3 The surface of the shoulder that abuts the runway shall be flush with the surface of the runway and its transverse slope shall not exceed 2.5 %

Strength of runway shoulders

7.2.2.4 The portion of a runway shoulder between the runway edge and a distance of 30 m from the runway centre line shall be prepared or constructed so as 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.

Note: *Guidance on strength of runway shoulders is given in the G-AGA-017.*

Surface of runway shoulders

7.2.2.5 A runway shoulder shall be prepared or constructed so as to resist erosion and the ingestion of the surface material by aeroplane engines.

7.2.2.6 Runway shoulders for code letter F aeroplanes shall be paved to a minimum overall width of runway and shoulder of not less than 60 m.

Note: Guidance on surface of runway shoulders is given in the G-AGA-017.

7.2.3 RUNWAY TURN PADS

General

7.2.3.1 Where the end of a runway is not served by a taxiway or a taxiway turnaround and where the code is D, E or F, a runway turn pad shall be provided to facilitate a 180-degree turn for aeroplanes (See Figure 7-1)

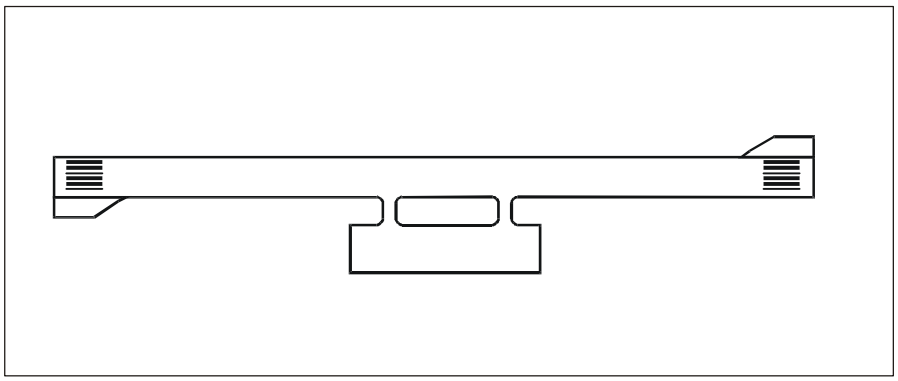


Figure 7-1. Typical turn pad layout

7.2.3.2 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-degree turn of aeroplanes.

Note 1: *Such areas may also be useful if provided along a runway to reduce taxiing time and distance for aeroplanes which may not require the full length of the runway.*

Note 2: *Guidance on the design of the runway turn pads is available in G-AGA-017. Guidance on taxiway turnaround as an alternative facility is available in the G-AGA-020.*

7.2.3.3 The runway turn pad may 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.**

Note: *The initiation of the turn would be facilitated by locating the turn pad on the left side of the runway, since the left seat is the normal position for the pilot-in-command.*

7.2.3.4 The intersection angle of the runway turn pad with the runway shall not exceed 30 degrees.

7.2.3.5 The nose wheel steering angle to be used in the design of the runway turn pad shall not exceed 45 degrees.

7.2.3.6 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 by the following tabulations:

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.*

Slopes on runway turn pads

7.2.3.7 The 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. The slopes shall be the same as those on the adjacent runway pavement surface.

Strength of runway turn pads

7.2.3.8 The strength of a runway turn pad shall 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.

Note: *Where a runway turn pad is provided with flexible pavement, the surface would need to be capable of withstanding the horizontal shear forces exerted by the main landing gear tires during turning manoeuvres.*

Surface of runway turn pads

7.2.3.9 The surface of a runway turn pad shall not have surface irregularities that may cause damage to an aeroplane using the turn pad.

7.2.3.10 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.

Shoulders for runway turn pads

7.2.3.11 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.

Note: *As a minimum, the width of the shoulders would need to cover the outer engine of the most demanding aeroplane and thus may be wider than the associated runway shoulders.*

7.2.3.12 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.

7.2.4 RUNWAY STRIPS

General

7.2.4.1 A runway and any associated stopways shall be included in a strip.

Length of runway strips

7.2.4.2 A strip shall extend before the threshold and beyond the end of the runway or stopway for a distance of at least:

— 60 m where the code number is 2, 3 or 4;

— 60 m where the code number is 1 and the runway is an instrument one; and

— 30 m where the code number is 1 and the runway is a non-instrument one.

Width of runway strips

7.2.4.3 A strip including a precision approach runway shall extend laterally to a distance of at least:

— 140 m where the code number is 3 or 4; and

— 70 m where the code number is 1 or 2;

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

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

— 140 m where the code number is 3 or 4; and

— 70 m where the code number is 1 or 2;

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

7.2.4.5 A strip including a non-instrument runway shall 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:

— 75 m where the code number is 3 or 4;

— 40 m where the code number is 2; and

— 30 m where the code number is 1.

Objects on runway strips

Note: *See paragraph 13.9 of this Regulation for information regarding siting of equipment and installations on runway strips.*

7.2.4.6 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.

Note 1: *Consideration will have to be given to the location and design of drains on a runway strip to prevent damage to an aeroplane accidentally running off a runway. Suitably designed drain covers may be required. For further guidance, see the G-AGA-017.*

Note 2: *Where open-air or covered storm water conveyances are installed, consideration will have to be given to ensure that their structure does not extend above the surrounding ground so as not to be considered an obstacle. See also Note 1 to 7.2.4.16.*

Note 3: *Particular attention needs to be given to the design and maintenance of an open-air storm water conveyance in order to prevent wildlife attraction, notably birds. If needed, it can be covered by a net. Procedures on wildlife management are specified in the G-AGA-026. Further guidance can be found in the G-AGA-001.*

7.2.4.7 No fixed object, other than visual aids required for air navigation or those required for aircraft safety purposes and which must be sited on the runway strip, and satisfying the relevant frangibility requirement in Chapter 9 of this Regulation, 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.

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

Note: *See Chapter 8, section 8.2.1 for characteristics of inner transitional surface.*

Grading of runway strips

7.2.4.8 That portion of a strip of an instrument runway within a distance of at least:

— 75 m where the code number is 3 or 4; and

— 40 m where the code number is 1 or 2;

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.

Note: *Guidance on grading of a greater area of a strip including a precision approach runway where the code number is 3 or 4 is given in ICAO Annex 14 Vol. I, Attachment A, Section 8.*

7.2.4.9 That portion of a strip of a non-instrument runway within a distance of at least:

— 75 m where the code number is 3 or 4;

— 40 m where the code number is 2; and

— 30 m where the code number is 1;

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.

7.2.4.10 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.

7.2.4.11 That portion of a strip to at least 30 m before a threshold shall be prepared against blast erosion in order to protect a landing aeroplane from the danger of an exposed edge.

7.2.4.12 Where the areas above paved surfaces, they shall be able to withstand the occasional passage of the critical aeroplane for runway pavement design.

Note: *The area adjacent to the end of a runway may be referred to as a blast pad.*

Slopes on runway strips

7.2.4.13 Longitudinal slopes

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

— 1.5 % where the code number is 4;

— 1.75 % where the code number is 3; and

— 2 % where the code number is 1 or 2.

7.2.4.14 Longitudinal slope changes

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.

7.2.4.15 Transverse slopes

Transverse slopes on that portion of a strip to be graded shall be adequate to prevent the accumulation of water on the surface but shall not exceed:

— 2.5 % where the code number is 3 or 4; and

— 3 % where the code number is 1 or 2;

except that to facilitate drainage the slope for the first 3 m outward from the runway, shoulder or stopway edge shall be negative as measured in the direction away from the runway and may be as great as 5 %.

7.2.4.16 The transverse slopes of any portion of a strip beyond that to be graded shall not exceed an upward slope of 5 % as measured in the direction away from the runway.

Note 1: *Where deemed necessary for proper drainage, an open-air storm water conveyance may be allowed in the non-graded portion of a runway strip and would be placed as far as practicable from the runway.*

Note 2: *The aerodrome rescue and firefighting (RFF) procedure would need to take into account the location of openair water conveyances within the non-graded portion of a runway strip.*

Strength of runway strips

7.2.4.17 That portion of a strip of an instrument runway within a distance of at least:

— 75 m where the code number is 3 or 4; and

— 40 m where the code number is 1 or 2;

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.

Note: *Guidance on preparation of runway strips is given in the G-AGA-017.*

7.2.4.18 That portion of a strip containing a non-instrument runway within a distance of at least:

— 75 m where the code number is 3 or 4;

— 40 m where the code number is 2; and

— 30 m where the code number is 1;

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.

7.2.5 RUNWAY END SAFETY AREAS

General

7.2.5.1 A runway end safety area shall be provided at each end of a runway strip where:

— the code number is 3 or 4; and

— the code number is 1 or 2 and the runway is an instrument one.

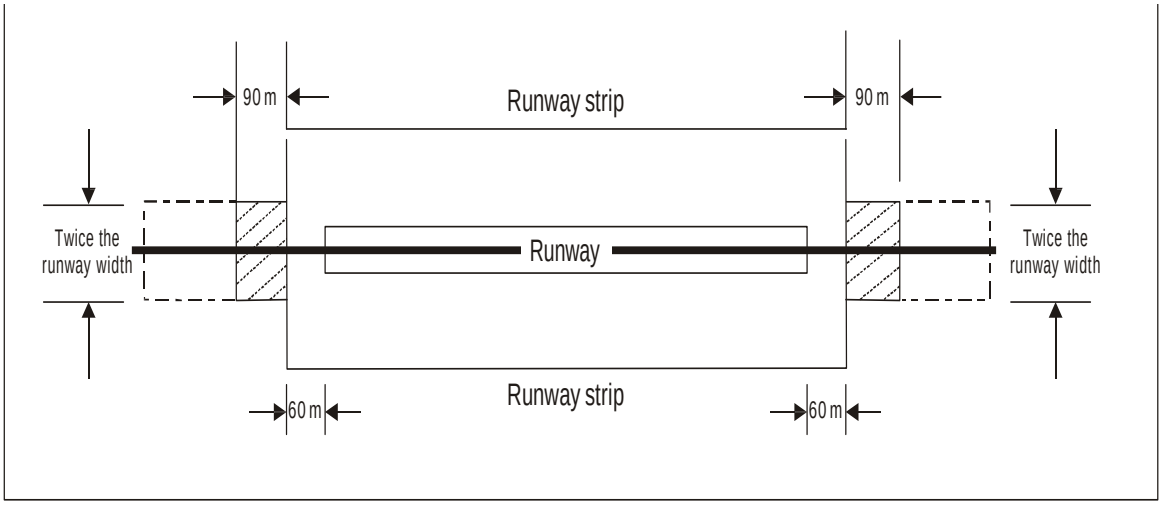


Figure A-5. Runway end safety area for a runway where the code number is 3 or 4

— Where a runway end safety area is provided in accordance with this chapter, consideration shall be given to providing an area long enough to contain overruns and undershoots resulting from a reasonably probable combination of adverse operational factors. On a precision approach runway, the ILS

localizer is normally the first upstanding obstacle, and the runway end safety area shall extend up to this facility. In other circumstances, the first upstanding obstacle may be a road, a railroad or other constructed or natural feature. The provision of a runway end safety area shall take such obstacles into consideration.

— Where provision of a runway end safety area would be particularly prohibitive to implement, consideration would have to be given to reducing some of the declared distances of the runway for the provision of a runway end safety area and installation of an arresting system.

— research programmes, as well as evaluation of actual aircraft overruns into arresting systems, have demonstrated that the performance of some arresting systems can be predictable and effective in arresting aircraft overruns.

— Demonstrated performance of an arresting system can be achieved by a validated design method, which can predict the performance of the system. The design and performance shall be based on the type of aircraft anticipated to use the associated runway that imposes the greatest demand upon the arresting system.

— The design of an arresting system must consider multiple aircraft parameters, including but not limited to, allowable aircraft gear loads, gear configuration, tire contact pressure, aircraft centre of gravity and aircraft speed. Accommodating undershoots must also be addressed. Additionally, the design must allow the safe operation of fully loaded rescue and fire fighting vehicles, including their ingress and egress.

— The information relating to the provision of a runway end safety area and the presence of an arresting system shall be published in the AIP.

7.2.5.2 A runway end safety area shall be provided at each end of a runway strip where the code number is 1 or 2 and the runway is a non-instrument one.

Dimensions of runway end safety areas

7.2.5.3 A runway end safety area shall extend from the end of a runway strip to a distance of at least 90 m where:

- the code number is 3 or 4; and

- the code number is 1 or 2 and the runway is an instrument one.

If an arresting system is installed, the above length may be reduced, based on the design specification of the system, subject to acceptance by the SCAA.

Note: *Guidance on arresting systems is given in Attachment A, Section 10 and para.7.2.5.1 of this Regulation.*

7.2.5.4 A runway end safety area shall extend from the end of a runway strip to a distance of at least 30 m where the code number is 1 or 2 and the runway is a non-instrument one.

7.2.5.5 The width of a runway end safety area shall be at least twice that of the associated runway.

7.2.5.6 Not in use.

Objects on runway end safety areas

Note: *See section 13.9 for information regarding siting of equipment and installations on runway end safety areas.*

7.2.5.7 An object situated on a runway end safety area which may endanger aeroplanes shall be regarded as an obstacle and shall be removed.

Clearing and grading of runway end safety areas

7.2.5.8 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.

Note: *The surface of the ground in the runway end safety area does not need to be prepared to the same quality as the runway strip. See, however, paragraph 7.2.5.12 of this Regulation.*

Slopes on runway end safety areas

7.2.5.9 **General**

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.

7.2.5.10 **Longitudinal slopes**

The longitudinal slopes of a runway end safety area shall not exceed a downward slope of 5 %. Longitudinal slope changes shall be as gradual as practicable and abrupt changes or sudden reversals of slopes avoided.

7.2.5.11 **Transverse slopes**

The transverse slopes of a runway end safety area shall not exceed an upward or downward slope of 5 %. Transitions between differing slopes shall be as gradual as practicable.

Strength of runway end safety areas

7.2.5.12 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, enhance aeroplane deceleration and facilitate the movement of rescue and fire fighting vehicles as required in paragraphs 13.2.26 to 13.2.28 of this Regulatiom.

Note: *Guidance on strength of a runway end safety area is given in the G-AGA-017.*

7.2.6 CLEARWAYS

Note: *The inclusion of detailed specifications for clearways in this section is not intended to imply that a clearway has to be provided. ICAO Annex 14 Vol. I, Attachment A, Section 2 provides information on the use of clearways.*

Location of clearways

7.2.6.1 The origin of a clearway shall be at the end of the take-off run available.

Length of clearways

7.2.6.2 The length of a clearway shall not exceed half the length of the take-off run available.

Width of clearways

7.2.6.3 A clearway shall extend laterally on each side of the extended centre line of the runway, to a distance of at least:

(a) 75 m for instrument runways; and

(b) half of the width of the runway strip for non-instrument runways.

Slopes on clearways

7.2.6.4 The ground in a clearway shall not project above a plane having an upward slope of 1.25 %, the lower limit of this plane being a horizontal line which:

(a) is perpendicular to the vertical plane containing the runway centre line; and

(b) passes through a point located on the runway centre line at the end of the take-off run available.

Note: *Because of transverse or longitudinal slopes on a runway, shoulder or strip, in certain cases the lower limit of the clearway plane specified above may be below the corresponding elevation of the runway, shoulder or strip. It is not intended that these surfaces be graded to conform with the lower limit of the clearway plane nor is it intended that terrain or objects which are above the clearway plane beyond the end of the strip but below the level of the strip be removed unless it is considered they may endanger aeroplanes.*

7.2.6.5 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. In such situations, in that portion of the clearway within a distance of 22.5 m 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.

Objects on clearways

Note: *See paragraph 13.9 of this Regulation for information regarding siting of equipment and installations on clearways.*

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

7.2.7 STOPWAYS

Note: *The inclusion of detailed specifications for stopways in this section is not intended to imply that a stopway has to be provided. ICAO Annex 14 Vol. I, Attachment A, Section 2 provides information on the use of stopways.*

Width of stopways

7.2.7.1 A stopway shall have the same width as the runway with which it is associated.

Slopes on stopways

7.2.7.2 Slopes and changes in slope on a stopway, and the transition from a runway to a stopway, shall comply with the specifications of paragraphs 7.2.1.13 to 7.2.1.19 of this Regulation for the runway with which the stopway is associated except that:

(a) the limitation in paragraph 7.2.1.14 of this Regulation of a 0.8 % slope for the first and last quarter of the length of a runway need not be applied to the stopway; and

(b) at the junction of the stopway and runway and along the stopway the maximum rate of slope change may be 0.3 % per 30 m (minimum radius of curvature of 10 000 m) for a runway where the code number is 3 or 4.

Strength of stopways

7.2.7.3 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.

Note: *ICAO Annex 14 Vol. I, Attachment A, Section 2 presents guidance relative to the support capability of a stopway.*

Surface of stopways

7.2.7.4 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.

7.2.8 RADIO ALTIMETER OPERATING AREA

General

7.2.8.1 A radio altimeter operating area shall be established in the pre-threshold area of a precision approach runway.

Length of the area

7.2.8.2 A radio altimeter operating area shall extend before the threshold for a distance of at least 300 m.

Width of the area

7.2.8.3 A radio altimeter operating area shall extend laterally, on each side of the extended centre line of the runway, to a distance of 60 m, except that, when special circumstances so warrant, the distance may be reduced to no less than 30 m if an aeronautical study indicates that such reduction would not affect the safety of operations of aircraft

Longitudinal slope changes

7.2.8.4 On a radio altimeter operating area, slope changes shall be avoided or kept to a minimum. Where slope changes cannot be avoided, the slope changes shall be as gradual as practicable and abrupt changes or sudden reversals of slopes avoided. The rate of change between two consecutive slopes shall not exceed 2 % per 30 m.

Note: *Guidance on radio altimeter operating area is given in ICAO Annex 14 Vol. I, Attachment A, Section 4.3 and in the ICAO Manual of All-Weather Operations, (Doc 9365), Section 5.2.*

Guidance on the use of radio altimeter is given in the PANS-OPS, Volume II, Part III, Chapter 21.

7.2.9 TAXIWAYS

Note 1: *Unless otherwise indicated the requirements in this section are applicable to all types of taxiways.*

Note 2: *See section 9.3.18 for a standardized scheme for the nomenclature of taxiways which may be used to improve situational awareness and as a part of an effective runway incursion prevention measure.*

General

7.2.9.1 Taxiways shall be provided to permit the safe and expeditious surface movement of aircraft.

Note: *Guidance on layout and standardized nomenclature of taxiways is given in the G-AGA-020.*

7.2.9.2 Sufficient entrance and exit taxiways for a runway shall be provided to expedite the movement of aeroplanes to and from the runway and provision of rapid exit taxiways considered when traffic volumes are high.

7.2.9.3 The design of the 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 by the following tabulation:

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.*

Wheel base means the distance from the nose gear to the geometric centre of the main gear.

Width of taxiways

7.2.9.4 A straight portion of a taxiway shall have a width of not less than that given by the following tabulation:

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

Note: *Guidance on width of taxiways is given in the G-AGA-020.*

Taxiway curves

7.2.9.5 Changes in direction of taxiways shall be as few and small as possible. The radii of the curves shall be compatible with the manoeuvring capability and normal taxiing speeds of the aeroplanes for which the taxiway is intended. 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 7.2.9.3.

Note 1: *An example of widening taxiways to achieve the wheel clearance specified is illustrated in Figure 7-2. Guidance on the values of suitable dimensions is given in the G-AGA-020.*

Note 2: *The location of taxiway centre line markings and lights is specified in paragraphs 9.3.8.4 and 9.4.16.11 of this Regulation.*

Note 3: *Compound curves may reduce or eliminate the need for extra taxiway width.*

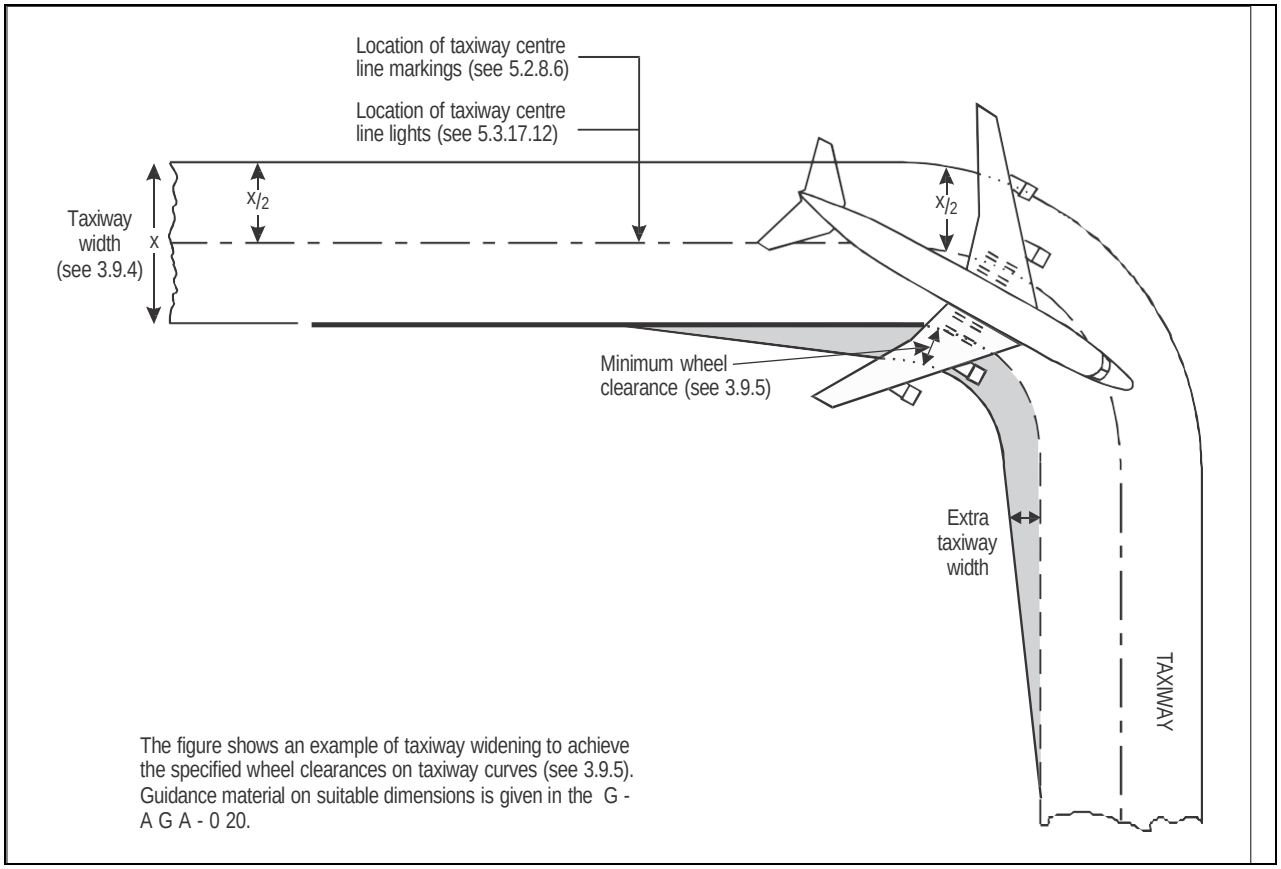


Figure 7-2. Taxiway curve

Junctions and intersections

7.2.9.6 To facilitate the movement of aeroplanes, fillets shall be provided at junctions and intersections of taxiways with runways, aprons and other taxiways. The design of the fillets shall ensure that the minimum wheel clearances specified in 7.2.9.3 are maintained when aeroplanes are manoeuvring through the junctions or intersections.

Note: *Consideration will have to be given to the aeroplane datum length when designing fillets. Guidance on the design of fillets and the definition of the term aeroplane datum length are given in the G-AGA-020.*

Taxiway minimum separation distances

7.2.9.7 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 Table 7-1 (See next page), 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.

Note 1: *Guidance on factors which may be considered in the aeronautical study is given in the G-AGA-020.*

Note 2: *ILS and MLS installations may also influence the location of taxiways due to interferences to ILS and MLS signals by a taxiing or stopped aircraft. Information on critical and sensitive areas surrounding ILS and MLS installations is contained in ICAO Annex 10, Volume I, Attachments C and G (respectively).*

Note 3: *The separation distances of Table 7-1, column 10, do not necessarily provide the capability of making a normal turn from one taxiway to another parallel taxiway. Guidance for this condition is given in the G-AGA-020.*

Note 4: *The separation distance between the centre line of an aircraft stand taxilane and an object shown in Table 7-1, column 12, may need to be increased when jet exhaust wake velocity may cause hazardous conditions for ground servicing.*

Table 7-1 – 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 Code number				Non-instrument runways 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 G-AGA-020.*

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 G-AGA-020.

Slopes on taxiways

7.2.9.8 Longitudinal slopes

The longitudinal slope of a taxiway shall not exceed:

— 1.5 % where the code letter is C, D, E or F; and

— 3 % where the code letter is A or B.

7.2.9.9 Longitudinal slope changes

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:

— 1 % per 30 m (minimum radius of curvature of 3 000 m) where the code letter is C, D, E or F; and

— 1 % per 25 m (minimum radius of curvature of 2 500 m) where the code letter is A or B.

7.2.9.10 Sight distance

Where a change in slope on a taxiway cannot be avoided, the change shall be such that, from any point:

— 3 m above the taxiway, it will be possible to see the whole surface of the taxiway for a distance of at least 300 m from that point, where the code letter is C, D, E or F;

— 2 m above the taxiway, it will be possible to see the whole surface of the taxiway for a distance of at least 200 m from that point, where the code letter is B; and

— 1.5 m above the taxiway, it will be possible to see the whole surface of the taxiway for a distance of at least 150 m from that point, where the code letter is A.

7.2.9.11 Transverse slopes

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:

— 1.5 % where the code letter is C, D, E or F; and

— 2 % where the code letter is A or B.

Note: *See paragraph 7.2.13.4 of this Regulation regarding transverse slopes on an aircraft stand taxilane.*

Strength of taxiways

7.2.9.12 The strength of a taxiway shall be at least equal to that of the runway it serves, due consideration being given 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.

Note: *Guidance on the relation of the strength of taxiways to the strength of runways is given in the ICAO Aerodrome Design Manual, Part 3.*

Surface of taxiways

7.2.9.13 The surface of a taxiway shall not have irregularities that cause damage to aeroplane structures.

7.2.9.14 The surface of a paved taxiway shall be so constructed or resurfaced as to provide suitable surface friction characteristics.

Note: *Suitable surface friction characteristics are those surface properties required on taxiways that assure safe operation of aeroplanes.*

Rapid exit taxiways

Note: *The following specifications detail requirements particular to rapid exit taxiways. See Figure 7-3. General requirements for taxiways also apply to this type of taxiway. Guidance on the provision, location and design of rapid exit taxiways is included in the G-AGA-020.*

7.2.9.15 A rapid exit taxiway shall be designed with a radius of turn-off curve of at least:

— 550 m where the code number is 3 or 4; and

— 275 m where the code number is 1 or 2;

to enable exit speeds under wet conditions of:

— 93 km/h where the code number is 3 or 4; and

— 65 km/h where the code number is 1 or 2.

Note: *The locations of rapid exit taxiways along a runway are based on several criteria described in the G-AGA-020, in addition to different speed criteria.*

7.2.9.16 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.

7.2.9.17 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.

7.2.9.18 The intersection angle of a rapid exit taxiway with the runway shall not be greater than 45° nor less than 25° and preferably shall be 30°.

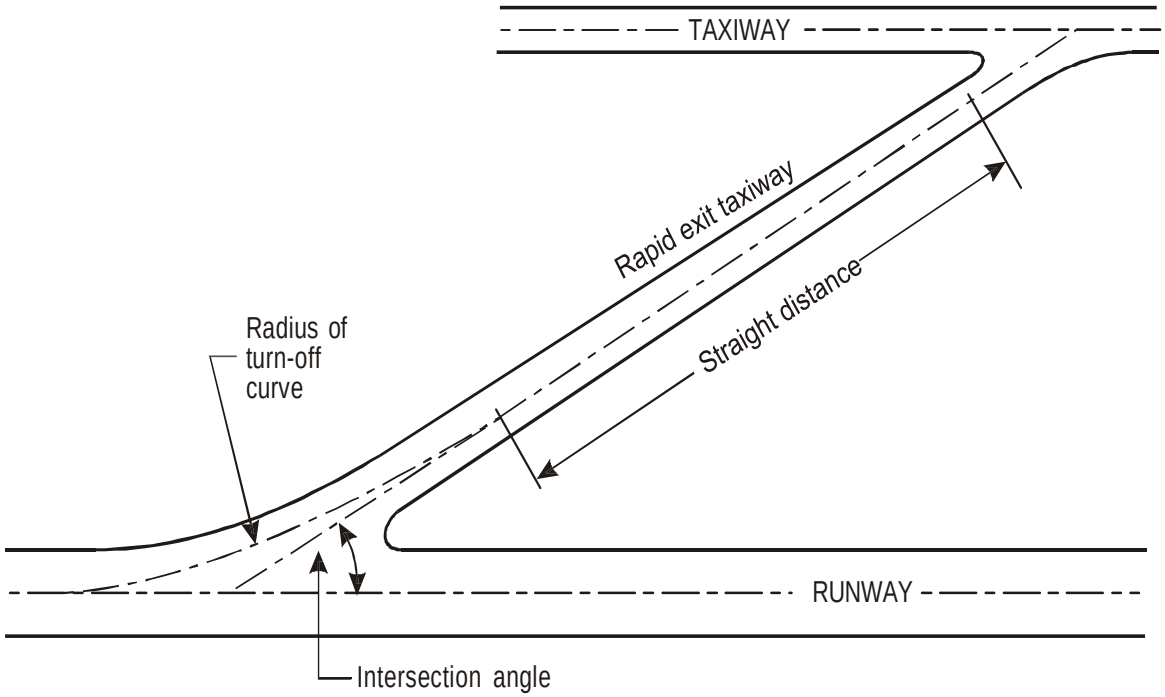


Figure 7-3. Rapid exit taxiway

Taxiways on bridges

7.2.9.19 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.

7.2.9.20 Access shall be provided to allow rescue and fire fighting vehicles to intervene in both directions within the specified response time to the largest aeroplane for which the taxiway bridge is intended.

Note: *If aeroplane engines overhang the bridge structure, protection of adjacent areas below the bridge from engine blast may be required.*

7.2.9.21 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.

7.2.10 TAXIWAY SHOULDERS

Note: *Guidance on characteristics of taxiway shoulders and on shoulder treatment is given in the G-AGA-020.*

7.2.10.1 Straight portions of a taxiway where the code letter is C, D, E or F shall be 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:

— 44 m where the code letter is F;

— 38 m where the code letter is E;

— 34 m where the code letter is D; and

— 25 m where the code letter is C.

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

7.2.10.2 When a taxiway is intended to be used by turbine-engined aeroplanes, the surface of the taxiway shoulder shall be so prepared as to resist erosion and the ingestion of the surface material by aeroplane engines.

7.2.11 TAXIWAY STRIPS

Note: *Guidance on characteristics of taxiway strips is given in the G-AGA-020.*

General

7.2.11.1 A taxiway, other than an aircraft stand taxilane, shall be included in a strip.

Width of taxiway strips

7.2.11.2 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 Table 7-1, column 11 of this Regulation.

Objects on taxiway strips

Note: *See paragraph 13.9 of this Regulation for information regarding siting of equipment and installations on taxiway strips.*

7.2.11.3 The taxiway strip shall provide an area clear of objects which may endanger taxiing aeroplanes.

Note: *Consideration will have to be given to the location and design of drains on a taxiway strip to prevent damage to an aeroplane accidentally running off a taxiway. Suitably designed drain covers may be required.*

Grading of taxiway strips

7.2.11.4 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:

— 10.25 m where the OMGWS is up to but not including 4.5 m;

— 11 m where the OMGWS is 4.5 m up to but not including 6 m;

— 12.50 m where the OMGWS is 6 m up to but not including 9 m;

— 18.50 m where the OMGWS is 9 m up to but not including 15 m, where the code letter is D;

— 19 m where the OMGWS is 9 m up to but not including 15 m where the code letter is E.

— 22 m where the OMGWS is 9 m up to but not including 15 m where the code letter is F.

Note: *Guidance on width of the graded portion of a taxiway is given in the G-AGA-020.*

Slopes on taxiway strips

7.2.11.5 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:

— 2.5 % for strips where the code letter is C, D, E or F; and

— 3 % for strips of taxiways where the code letter is A or B;

the upward slope being measured with reference to the transverse slope of the adjacent taxiway surface and not the horizontal. The downward transverse slope shall not exceed 5 % measured with reference to the horizontal.

7.2.11.6 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 % as measured in the direction away from the taxiway.

7.2.12 HOLDING BAYS, RUNWAY-HOLDING POSITIONS, INTERMEDIATE HOLDING POSITIONS AND ROAD-HOLDING POSITIONS

General

7.2.12.1 Holding bay(s) shall be provided when the traffic density is medium or heavy.

7.2.12.2 A runway-holding position or positions shall be established:

(a) on the taxiway, at the intersection of a taxiway and a runway; and

(b) at an intersection of a runway with another runway when the former runway is part of a standard taxi-route.

7.2.12.3 A runway-holding position shall be 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.

7.2.12.4 An intermediate holding position shall be established on a taxiway at any point other than a runway-holding position where it is desirable to define a specific holding limit.

7.2.12.5 A road-holding position shall be established at an intersection of a road with a runway.

Location

7.2.12.6 The distance between a holding bay, runway-holding position established at a taxiway/runway intersection or road-holding position and the centre line of a runway shall be in accordance with Table 7-2 of this Regulatin and, 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 or penetrate the inner transitional surface.

Note: *Guidance for the positioning of runway-holding positions is given in the G-AGA-020 .*

Table 7-2 – Minimum distance from the runway centre line to a holding bay, runway-holding position or road-holding position

	Code number			
Type of runway	1	2	3	4
Non-instrument	30m	40m	75m	75m
Non-precision approach	40m	40m	75m	75m
Precision approach category I	60m(b)	60m(b)	90m(a,b)	90m(a,b,c)
Precision approach categories II and III	-	-	90m(a,b)	90m(a,b,c)
Take-off runway	30m	40m	75m	75m

(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 ICAO Annex 10, Volume I, Attachments C and G, respectively (See also paragraph 7.2.12.6 of this Regulation).

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 52.7 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.*

7.2.12.7 At elevations greater than 700 m (2 300 ft) the distance of 90 m specified in Table 7-2 for a precision approach runway code number 4 shall be increased as follows:

a) up to an elevation of 2 000 m (6 600 ft); 1 m for every 100 m (330 ft) in excess of 700 m (2 300 ft);

b) elevation in excess of 2 000 m (6 600 ft) and up to 4 000 m (13 320 ft); 13 m plus 1.5 m for every 100 m (330 ft) in excess of 2 000 m (6 600 ft); and

c) elevation in excess of 4 000 m (13 320 ft) and up to 5 000 m (16 650 ft); 43 m plus 2 m for every 100 m (330 ft) in excess of 4 000 m (13 320 ft).

7.2.12.8 If a holding bay, runway-holding position or road-holding position for a precision approach runway code number 4 is at a greater elevation compared to the threshold, the distance specified in Table 7-2 of this Regulation shall be further increased 5 m for every metre the bay or position is higher than the threshold.

7.2.12.9 The location of a runway-holding position established in accordance with paragraph 7.2.12.3 of this Regulation shall be such that a holding aircraft or vehicle will not infringe the obstacle free zone, approach surface, take-off climb surface or ILS/MLS critical/ sensitive area or interfere with the operation of radio navigation aids.

7.2.13 APRONS

General

7.2.13.1 Aprons shall be provided where necessary to permit the on- and offloading of passengers, cargo or mail as well as the servicing of aircraft without interfering with the aerodrome traffic.

Size of aprons

7.2.13.2 The total apron area shall be adequate to permit expeditious handling of the aerodrome traffic at its maximum anticipated density.

Strenght of aprons

7.2.13.3 Each part of an apron shall be capable of withstanding the traffic of the aircraft it is intended to serve, due consideration being given 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.

Slopes of aprons

7.2.13.4 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 level as drainage requirements permit.

7.2.13.5 On an aircraft stand the maximum slope shall not exceed 1 % .

Clearance distances on aircraft stands

7.2.13.6 An aircraft stand shall provide the following minimum clearances between an aircraft entering or exiting the stand and any adjacent building, aircraft on another stand and other objects:

Code letter	Clearance
A	3m
B	3m
C	4.5m
D	7.5m
E	7.5m
F	7.5m

When special circumstances so warrant, these clearances 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.

Note: *On aprons, consideration also has to be given to the provision of service roads and to manoeuvring and storage area for ground equipment (See the document G-AGA-020 for guidance on storage of ground equipment).*

7.2.14 ISOLATED AIRCRAFT PARKING POSITION

7.2.14.1 An isolated aircraft parking position shall be designated or 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

7.2.14.2 The isolated aircraft parking position shall be located at the maximum distance practicable and in any case never less than 100 m from other parking positions, buildings or public areas, etc. The position shall not be located over underground utilities such as gas and aviation fuel and, to the extent feasible, electrical or communication cables.

7.2.15 DE-ICING/ANTI-ICING FACILITIES

Note: *Safe and efficient aeroplane operations are of primary importance in the development of an aeroplane de-icing/ anti-icing facility. For further guidance, see the Manual on Aircraft Ground De-icing/Anti-icing Operations (Doc 9640).*

General

7.2.15.1 Aeroplane de-icing/anti-icing facilities shall be provided at an aerodrome where icing conditions are expected to occur.

Location

7.2.15.2 De-icing/anti-icing facilities shall be provided either at aircraft stands or at specified remote areas along the taxiway leading to the runway meant for take-off, provided that adequate drainage arrangements for the collection and safe disposal of excess de-icing/anti-icing fluids are available to prevent ground water contamination. The effect of volume of traffic and departure flow rates shall also be considered.

Note 1: *One of the primary factors influencing the location of a de-icing/anti-icing facility is to ensure that the holdover time of the anti-icing treatment is still in effect at the end of taxiing and when take-off clearance of the treated aeroplane is given.*

Note 2: *Remote facilities compensate for changing weather conditions when icing conditions or blowing snow are expected to occur along the taxi-route taken by the aeroplane to the runway meant for take-off.*

7.2.15.3 The remote de-icing/anti-icing facility shall be located to be clear of the obstacle limitation surfaces specified in Chapter 8, not cause interference to the radio

navigation aids and be clearly visible from the air traffic control tower for clearing the treated aeroplane.

7.2.15.4 The remote de-icing/anti-icing facility shall be so located as to provide for an expeditious traffic flow, perhaps with a bypass configuration, and not require unusual taxiing maneuver into and out of the pads.

Note: *The jet blast effects caused by a moving aeroplane on other aeroplanes receiving the anti-icing treatment or taxiing behind will have to be taken into account to prevent degradation of the treatment.*

Size and number of de-icing/anti-icing pads

Note: *An aeroplane de-icing/anti-icing pad consists of:*
a) an inner area for parking of an aeroplane to be treated, and
b) an outer area for movement of two or more mobile de-icing/anti-icing equipment.

7.2.15.5 The size of a de-icing/anti-icing pad shall be equal to the parking area required by the most demanding aeroplane in a given category with at least 3.8 m clear paved area all round the aeroplane for the movement of the de-icing/anti-icing vehicles.

Note: *Where more than one de-icing/anti-icing pad is provided, consideration will have to be given to providing deicing/anti-icing vehicle movement areas of adjacent pads that do not overlap, but are exclusive for each pad. Consideration will also need to be given to bypassing of the area by other aeroplanes with the clearances specified in 7.2.15.9 and 7.2.15.10.*

7.2.15.6 The number of de-icing/anti-icing pads required shall be determined based on the meteorological conditions, the type of aeroplanes to be treated, the method of application of de-icing/anti-icing fluid, the type and capacity of the dispensing equipment used, and the departure flow rates.

Note: *See the G-AGA-020.*

Slopes on de-icing/anti-icing pads

7.2.15.7 The de-icing/anti-icing pads shall be provided with suitable slopes to ensure satisfactory drainage of the area and to permit collection of all excess de-icing/anti-icing fluid running off an aeroplane. The maximum longitudinal slope shall be as little as practicable and the transverse slope shall not exceed 1 %.

Strength of de-icing/anti-icing pads

7.2.15.8 The de-icing/anti-icing pad shall be capable of withstanding the traffic of the aircraft it is intended to serve, due consideration being given to the fact that the de-icing/anti-icing pad (like an 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

Clearance distances on a de-icing/anti-icing pad

7.2.15.9 A de-icing/anti-icing pad shall provide the minimum clearances specified in 7.2.13.6 for aircraft stands. If the pad layout is such as to include bypass configuration, the minimum separation distances specified in Table 7-1, column 12, shall be provided.

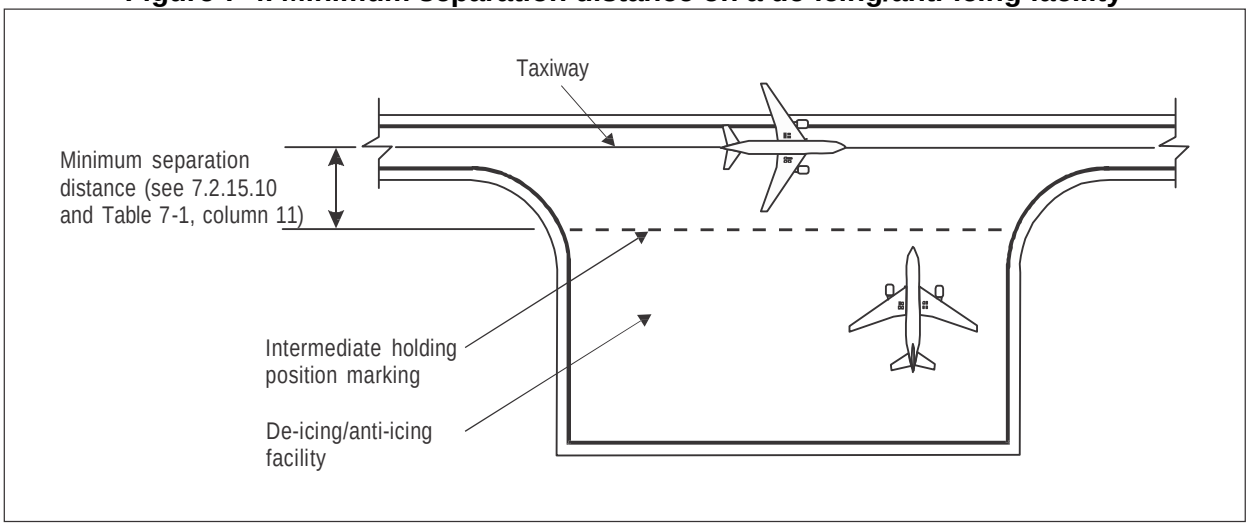
7.2.15.10 Where the de-icing/anti-icing facility is located adjoining a regular taxiway, the taxiway minimum separation distance specified in Table 7-1, column 11, shall be provided. (See Figure 7-4.)

Environmental considerations

Note: *The excess de-icing/anti-icing fluid running off an aeroplane poses the risk of contamination of ground water in addition to affecting the pavement surface friction characteristics.*

7.2.15.11 Where de-icing/anti-icing activities are carried out, the surface drainage shall be planned to collect the run-off separately, preventing its mixing with the normal surface run-off so that it does not pollute the ground water.

Figure 7-4. Minimum separation distance on a de-icing/anti-icing facility



8. OBSTACLE RESTRICTION AND REMOVAL

8.1 GENERAL

8.1.1 INTRODUCTION

8.1.1.1 This chapter describes obstacle limitation surfaces around an aerodrome that are to be maintained free from obstacles.

8.1.1.2 The shielding principles to be used for assessing whether an existing obstacles shields another one or a new one is explained in section 8.3.

8.1.1.3 An aerodrome operator shall establish a systematic means of surveying and monitoring any object that penetrates these surfaces within the aerodrome itself and a radius around the aerodrome and report any penetration immediately to the SCAA and appropriate air traffic services unit and to promulgate them through the Aeronautical Information Services and air traffic services unit so that aeroplane operations can be conducted safely at all times.

Note: *Beyond the radius around the aerodrome, the relevant government authorities (See G-AGA-016 Obstacles Control Manual) will survey and monitor any object that penetrates these surfaces and report any penetration immediately to the SCAA and to promulgate them through the Aeronautical Information Services and air traffic services unit so that aeroplane operations can be conducted safely at all times.*

8.1.1.4 The ultimate responsibility for limitation and control of obstacles rests with the airport operator. This includes the responsibility for controlling obstacles on airport property and for arranging the removal or lowering of existing obstacles outside the airport boundaries. Arranging the removal or lowering of existing obstacles outside the airport boundaries can be met by negotiations leading to purchase or condemnation (where authorized) of air easements or title to the property. As part of this, the airport operator shall:

a) To establish an obstacle control commission.

b) The commission shall develop an obstacle control program to be responsible for the ongoing process of ensuring that obstacle limitation surfaces remain free of obstacles that could compromise the safety of flights.

c) The airport operator shall work closely with government agencies at all levels to ensure that all possible steps have been taken to prevent the erection of obstacles on which obstacle limitation surfaces are based.

d) The commission shall make a visual inspection of all obstacle lights and markings on and around the airport according to obstacle control program, and take steps to have inoperative lights repaired, in some cases, principally at commercial or industrial sites, the property owner must provide for the maintenance, repair, and replacement of lights.

e) All records on this matter shall be kept.

8.1.1.5 An aerodrome operator shall agree with the SCAA, to plan and determine the allowable height limits for new developments within the aerodrome and the type of instrument or visual flight operations that may be permitted.

Note: *Beyond the aerodrome boundary, all new developments will be referred to the SCAA, to determine the allowable heights limits that may be permitted.*

8.2 OBSTACLE LIMITATION

Note 1: *The objectives of the specifications in this chapter are to define the airspace around aerodromes to be maintained free from obstacles so as to permit the intended aeroplane operations at the aerodromes to be conducted safely and to prevent the aerodromes from becoming unusable by the growth of obstacles around the aerodromes. This is achieved by establishing a series of obstacle limitation surfaces that define the limits to which objects may project into the airspace.*

Note 2: *Objects which penetrate the obstacle limitation surfaces contained in this chapter may in certain circumstances cause an increase in the obstacle clearance altitude/height for an instrument approach procedure or any associated visual circling procedure or have other operational impact on flight procedure design. Criteria for flight procedure design, are contained in Procedures for Air Navigation Services – Aircraft Operations (PANS-OPS) (Doc 8168).*

Note 3: *The establishment of, and requirements for, an obstacle protection surface for visual approach slope indicator systems are specified in paragraphs 9.4.5.24 to 9.4.5.28 of this Regulation.*

8.2.1 OBSTACLE LIMITATION SURFACES

Note: *See Figure 8-1 and para.8.1.2.12 of this Regulation below.*

Outer horizontal surface

Note: *Guidance on the need to provide an outer horizontal surface and its characteristics is contained in the G-AGA-016.*

Conical surface

8.2.1.1 Description – Conical surface. A surface sloping upwards and outwards from the periphery of the inner horizontal surface.

8.2.1.2 Characteristics – 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.

8.2.1.3 The slope of the conical surface shall be measured in a vertical plane perpendicular to the periphery of the inner horizontal surface.

Inner horizontal surface

8.2.1.4 Description – Inner horizontal surface. A surface located in a horizontal plane above an aerodrome and its environs.

8.2.1.5 Characteristics – The radius or outer limits of the inner horizontal surface shall be measured from a reference point or points established for such purpose.

Note: *The shape of the inner horizontal surface need not necessarily be circular. Guidance on determining the extent of the inner horizontal surface is contained in the G-AGA-016.*

8.2.1.6 The height of the inner horizontal surface shall be measured above an elevation datum established for such purpose. Note: Guidance on determining the elevation datum is contained in the G-AGA-016.

Approach surface

8.2.1.7 Description – Approach surface. An inclined plane or combination of planes preceding the threshold.

8.2.1.8 Characteristics – 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; and

(c) an outer edge parallel to the inner edge.

8.2.1.9 The elevation of the inner edge shall be equal to the elevation of the mid-point of the threshold.

8.2.1.10 The slope(s) of the approach surface shall be measured in the vertical plane containing the centre line of the runway.

Inner approach surface

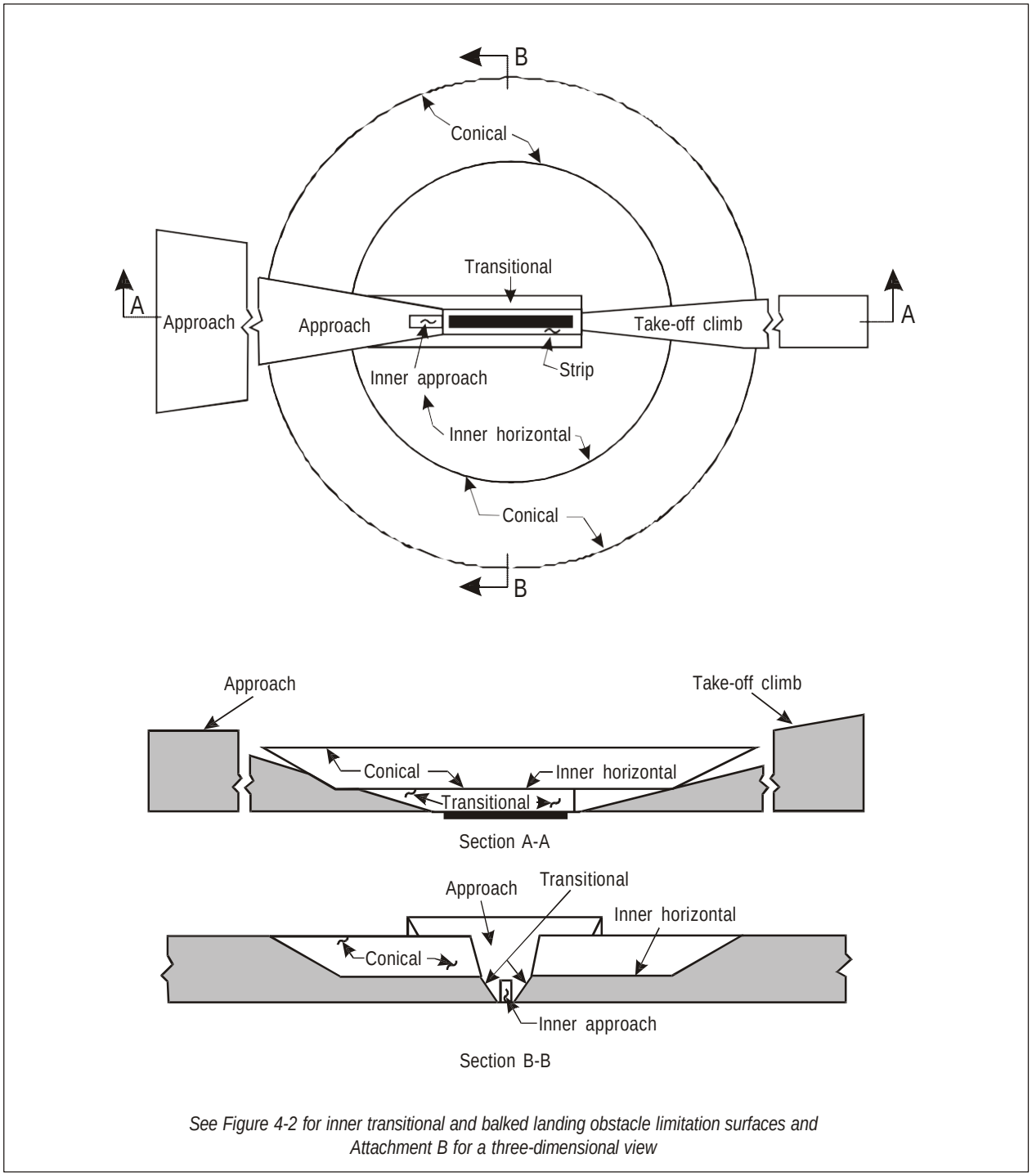
8.2.1.11 Description – Inner approach surface. A rectangular portion of the approach surface immediately preceding the threshold.

8.2.1.12 Characteristics – 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.



See Figure 4-2 for inner transitional and balked landing obstacle limitation surfaces and Attachment B for a three-dimensional view

Figure 8-1. Obstacle limitation surfaces

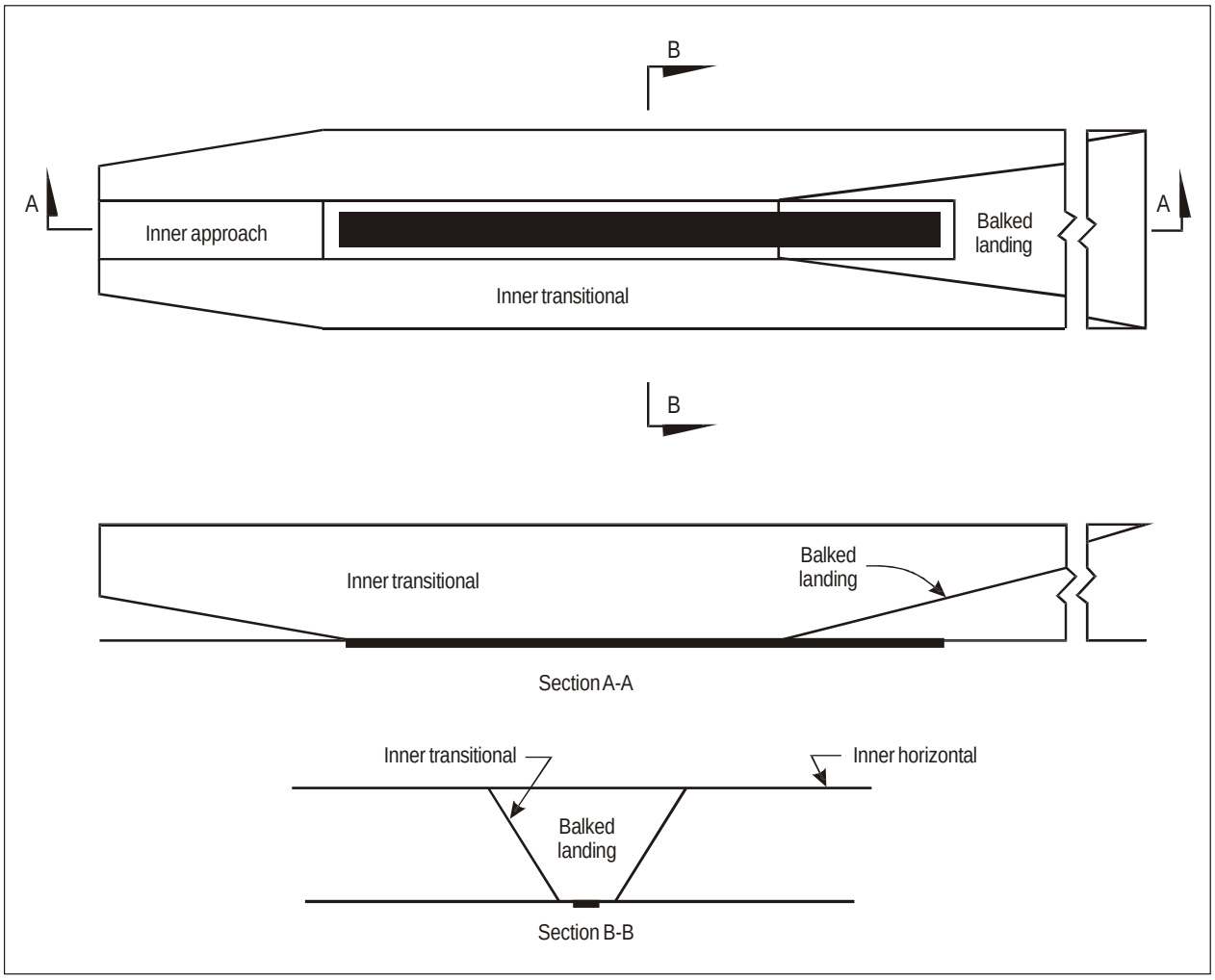


Figure 8-2. Inner approach, inner transitional and balked landing obstacle limitation surfaces

Transitional surface

8.2.1.13 Description – Transitional surface. 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.

8.2.1.14 Characteristics – The limits of the 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 in the inner horizontal surface.

8.2.1.15 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.

Note: *As a result of b) the transitional surface along the strip will be curved if the runway profile is curved, or a plane if the runway profile is a straight line. The intersection of the transitional surface with the inner horizontal surface will also be a curved or a straight line depending on the runway profile.*

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

Inner transitional surface

Note: *It is intended that the inner transitional surface be the controlling obstacle limitation surface for navigation aids, aircraft and other vehicles that must be near the runway and which is not be penetrated except for frangible objects. The transitional surface described in paragraph 8.2.1.13 of this Regulation is intended to remain as the controlling obstacle limitation surface for buildings, etc.*

8.2.1.17 Description – Inner transitional surface. A surface similar to the transitional surface but closer to the runway.

8.2.1.18 Characteristics – 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.

8.2.1.19 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.

Note: *As a result of b) the inner transitional surface along the strip will be curved if the runway profile is curved or a plane if the runway profile is a straight line. The intersection of the inner transitional surface with the inner horizontal surface will also be a curved or a straight line depending on the runway profile.*

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

Balked landing surface

8.2.1.21 Description – Balked landing surface. An inclined plane located at a specified distance after the threshold, extending between the inner transitional surface.

8.2.1.22 Characteristics – 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.

8.2.1.23 The elevation of the inner edge shall be equal to the elevation of the runway centre line at the location of the inner edge.

8.2.1.24 The slope of the balked landing surface shall be measured in the vertical plane containing the centre line of the runway.

Take-off climb surface

8.2.1.25 Description – Take-off climb surface. An inclined plane or other specified surface beyond the end of a runway or clearway.

8.2.1.26 Characteristics – 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 takeoff track.

8.2.1.27 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.

8.2.1.28 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.

8.2.1.29 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.

8.2.2 OBSTACLE LIMITATION REQUIREMENTS

Note: *The requirements for obstacle limitation surfaces are specified on the basis of the intended use of a runway, i.e. take-off or landing and type of approach, and are intended to be applied when such use is made of the runway. In case where operations are conducted to or from both directions of a runway; then the function of certain surfaces may be nullified because of more stringent requirements of another lower surface*

Non-instrument runways

8.2.2.1 The following obstacle limitation surfaces shall be established for a noninstrument runway.

— conical surface;

— inner horizontal surface;

— approach surface; and

— transitional surfaces.

8.2.2.2 The heights and slopes of the surfaces shall not be greater than and their other dimensions not less than, those specified in Table 8-1 of this Regulation.

8.2.2.3 New objects or extensions of existing objects shall not be permitted above an approach or transitional surface except when the new object or extension would be shielded by an existing immovable object.

Note: *Circumstances in which the shielding principle may reasonably be applied are described in the G-AGA-016.*

8.2.2.4 New objects or extensions of existing objects shall not be permitted above the conical surface or inner horizontal surface except when the object would be shielded by an existing immovable object, or after aeronautical study it is determined that the object would not adversely affect the safety or significantly affect the regularity of operations of aeroplanes.

Table 8-1 – Dimensions and slopes of obstacle limitation surfaces – Approach runways

APPROACH RUNWAYS

RUNWAY CLASSIFICATION								Precision approach category		
Surface and dimentions	Non-instrument Code number				Non-precision approach Code number			I Code number		II or III Code number
	1	2	3	4	1,2	3	4	1,2	3,4	3,4
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(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	2000 m	2500 m	4000 m	4000 m	3500 m	4000 m	4000 m	3500 m	4000 m	4000 m
INNER APPROACH										
Width	-	-	-	-	-	-	-	90 m	120 m[e]	120 m[e]
Distance from threhold	-	-	-	-	-	-	-	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 threhold	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	1600 m	2500 m	3000 m	3000 m	2500 m	3000 m	3000 m	3000 m	3000 m	3000 m
Slope	5%	4%	3.33%	2.5%	3.33%	2%	2%	2.5%	2%	2%
Second section										
Length	-	-	-	-	-	3600 m[b]	3600 m[b]	12000 m	3600 m[b]	3600 m[b]
Slope	-	-	-	-	-	2.5%	2.5%	3%	2.5%	2.5%
Horizontal section										
Length	-	-	-	-	-	8400 m[b]	8400 m[b]	-	8400 m[b]	8400 m[b]
Total length	-	-	-	-	-	15000 m	15000 m	15000 m	15000 m	15000 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[e]	120 m[e]
Distance from threshold								c	1800 md	1800 md
Divergence (each side)								10%	10%	10%
Slope								4%	3.33%	3.33%

(a) All dimentions are measured horizontally unless specified otherwise
(b) Variable length (see 8.2.2.9 or 8.2.2.17)
(c) Distance to the end of strip
(d) Or end of runway whichever is less
(e) Where the code letter is F(Table 2-1), the width is increased to 140 m except for those aerodromes that accommodate a code letter F aeroplanes equipped with digital avionics that provide steering commands to maintain an established track during the go-around manoevre.

Note: See Circulars 301,345 and Chapter 4 of the G-AGA-026 for futher information.

8.2.2.5 Existing objects above any of the surfaces required by paragraph 8.2.2.1 of this Regulation shall as far as practicable be removed except when, in the opinion of the SCAA, 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 or significantly affect the regularity of operations of aeroplanes.

Note: *Because of transverse or longitudinal slopes on a strip, in certain cases the inner edge or portions of the inner edge of the approach surface may be below the corresponding elevation of the strip. It is not intended that the strip be graded to conform with the inner edge of the approach surface, nor is it intended that terrain or objects which are above the approach surface beyond the end of the strip, but below the level of the strip, be removed unless it is considered they may endanger aeroplanes.*

8.2.2.6 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.

Non-precision approach runways

8.2.2.7 The following obstacle limitation surfaces shall be established for a nonprecision approach runway:

— conical surface;

— inner horizontal surface;

— approach surface; and

— transitional surfaces.

8.2.2.8 The heights and slopes of the surfaces shall not be greater than, and their other dimensions not less than, those specified in Table 8-1 of this Regulation, except in the case of the horizontal section of the approach surface (See paragraph 8.2.2.9 of this Regulation).

8.2.2.9 The approach surface shall be horizontal beyond the point at which the 2.5 % slope intersects:

(a) a horizontal plane 150m above the threshold elevation; or

(b) the horizontal plane passing through the top of any object that governs the obstacle clearance altitude/height (OCA/H); whichever is the higher.

8.2.2.10 New objects or extensions of existing objects shall not be permitted above an approach surface within 3,000 m of the inner edge or above a transitional surface except when the new object or extension would be shielded by an existing immovable object.

Note: *Circumstances in which the shielding principle may reasonably be applied are described in the G-AGA-016.*

8.2.2.11 New objects or extensions of existing objects shall not be permitted above the approach surface beyond 3 000 m from the inner edge, the conical surface or inner

horizontal surface except when the object would be shielded by an existing immovable object, or after aeronautical study it is determined that the object would not adversely affect the safety or significantly affect the regularity operations of aeroplanes.

8.2.2.12 Existing objects above any of the surfaces required by paragraph 8.2.2.7 shall as far as practicable be removed except when, in the opinion of the SCAA, 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 or significantly affect the regularity of operations of aeroplanes.

Note: *Because of the transverse or longitudinal slopes on a strip, in certain cases the inner edge or portions of the inner edge of the approach surface may be below the corresponding elevation of the strip. It is not intended that the strip be graded to conform with the inner edge of the approach surface, nor is it intended that terrain or objects which are above the approach surface beyond the end of the strip, but below the level of the strip, be removed unless it is considered they may endanger aeroplanes.*

Precision approach runways

8.2.2.13 The following obstacle limitation surfaces shall be established for a precision approach runway category I, II and III:

– conical surface;

– inner horizontal surface;

– approach surface and inner approach surface;

– transitional surfaces;

– inner transitional surfaces; and

– balked landing surface

8.2.2.14 Reserved

8.2.2.15 Reserved

8.2.2.16 The heights and slopes of the surfaces shall not be greater than, and their other dimensions not less than, those specified in Table 8-1 of this Regulation, except in the case of the horizontal section of the approach surface (See paragraph 8.2.2.17 of this Regulation).

8.2.2.17 The approach surface shall be horizontal beyond the point at which the 2.5 % slope intersects:

(a) a horizontal plane 150 m above the threshold elevation; or

(b) the horizontal plane passing through the top of any object that governs the obstacle clearance limit; whichever is the higher.

8.2.2.18 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. Mobile objects shall not be permitted above these surfaces during the use of the runway for landing.

8.2.2.19 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 SCAA, the new object or extension would be shielded by an existing immovable object.

Note: *Circumstances in which the shielding principle may reasonably be applied are described in the G-AGA-016.*

8.2.2.20 New objects or extensions of existing objects shall not be permitted above the conical surface and the inner horizontal surface except when an object would be shielded by an existing immovable object, or after aeronautical study it is determined that the object would not adversely affect the safety or significantly affect the regularity operations of aeroplanes.

8.2.2.21 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 an object is shielded by an existing immovable object, or after aeronautical study it is determined that the object would not adversely affect the safety or significantly affect the regularity operations of aeroplanes.

Note: *Because of transverse or longitudinal slopes on a strip, in certain cases the inner edge or portions of the inner edge of the approach surface may be below the corresponding elevation of the strip. It is not intended that the strip be graded to conform with the inner edge of the approach surface, nor is it intended that terrain or objects which are above the approach surface beyond the end of the strip, but below the level of the strip, be removed unless it is considered that may endanger aeroplanes.*

Runways meant for take-off

8.2.2.22 The following obstacle limitation surface shall be established for a runway meant for take-off:

– take-off climb surface.

8.2.2.23 The dimension of the surface shall be not less than the dimensions specified in Table 8-2 of this Regulation, except that a lesser length may be adopted or the take-off climb surface where such lesser length would be consistent with procedural measures adopted to govern the outward flight of aeroplanes.

8.2.2.24 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 Table 8-2 of this Regulation when critical operating conditions are to be catered to. If the specified slope is reduced, corresponding adjustment in the length of take-off climb surface shall be made so as to provide protection to a height of 300m.

Note: *When local conditions differ widely from sea level standard atmospheric conditions, it may be advisable for the slope specified in Table 8-2 of this Regu to be reduced. The degree of this reduction 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.*

Table 8-2 – Dimensions and slopes of obstacle limitation surfaces

RUNWAYS MEANT FOR TAKE-OFF

Surface and dimensions (a)	Code number		
	1	2	3 or 4
(1)	(2)	(3)	(4)
TAKE-OFF CLIMB			
Length of inner edge	60m	80m	180m
Distance from runway end (b)	30m	60m	60m
Divergence (each side)	10%	10%	12.5%
Final width	380m	580m	1200m 1800m(c)
Length	1600m	2500m	15000m
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 intended track includes changes of heading greater than 15° for operations conducted in IMC, VMC by night.			
d. See paragraphs 8.2.2.24 and 8.2.2.26 of this Regulation.			

8.2.2.25 New objects or extensions of existing objects shall not be permitted above a take-off climb surface except when, in the opinion of the SCAA, the new object or extension would be shielded by an existing immovable object.

Note: *Circumstances in which the shielding principle may reasonably be applied are described in the G-AGA-016.*

8.2.2.26 If no object reaches the 2 % (1:50) take-off climb surface, new objects shall be limited to preserve the existing obstacle free surface or a surface down to a slope of 1.6 % (1:62.5).

8.2.2.27 Existing objects that extend above a take-off climb surface shall as far as practicable be removed except when an object is shielded by an existing immovable object, or after aeronautical study it is determined that the object would not adversely affect the safety or significantly affect the regularity of operations of aeroplanes.

Note: *Because of transverse slopes on a strip or clearway, in certain cases portions of the inner edge of the take-off climb surface may be below the corresponding elevation of the strip or clearway. It is not intended that the strip or clearway be graded to conform with the inner edge of the take-off climb surface, nor it is intended that terrain or objects which are above the take-off*

climb surface beyond the end of the strip or clearway, but below the level of the strip or clearway, be removed unless it is considered that may endanger aeroplanes. Similar considerations apply at the junction of a clearway and strip where differences in transverse slopes exist.

8.2.3 OBJECTS OUTSIDE THE OBSTACLE LIMITATION SURFACES

8.2.3.1 Arrangements shall be made to enable the SCAA to be consulted concerning proposed construction beyond the limits of the obstacle limitation surfaces that extend above a height established by SCAA, in order to permit an aeronautical study of the effect of such construction on the operation of aeroplanes.

8.2.3.2 In areas beyond the limits of the obstacle limitation surfaces, at least those objects which extend to a height of 150 m 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.

Note: *This study may have regard to the nature of operations concerned and may distinguish between day and night operations.*

8.2.4 OTHER OBJECTS

8.2.4.1 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 shall, as far as practicable, be removed.

8.2.4.2 Anything which may, in the opinion of the SCAA after aeronautical study, endanger aeroplanes on the movement area or in the air within the limits of the inner horizontal and conical surfaces shall be regarded as an obstacle and shall be removed in so far as practicable.

Note: *In certain circumstances, objects that do not project above any of the surfaces enumerated in paragraph 8.2.1 may constitute a hazard to aeroplanes as, for example, where there are one or more isolated objects in the vicinity of an aerodrome.*

8.3 PRINCIPLES OF SHIELDING

8.3.1 GENERAL

8.3.1.1 A new obstacle located in the vicinity of an existing obstacle and assessed as not being a hazard to aircraft is deemed to be shielded.

8.3.1.2 Unless specifically directed by the SCAA, a shielded obstacle does not require removal, lowering, marking or lighting and shall not impose any additional restrictions to aircraft operations.

8.3.1.3 The SCAA will assess and determine whether an obstacle is shielded. An aerodrome operator shall notify the SCAA of the presence of all obstacles and their detailed characteristics through the submission of its Aerodrome Manual.

8.3.1.4 Only existing permanent obstacles may be considered in assessing shielding of new obstacles.

8.3.2 SHIELDING PRINCIPLES

8.3.2.1 In assessing whether an existing obstacle shields an obstacle, the SCAA will be guided by the principles of shielding detailed below.

Obstacle penetrating the approach and take-off climb surfaces

8.3.2.2

(a) An existing obstacle within the approach and take-off climb area is called the critical obstacle. Where a number of obstacles exist closely together, the critical obstacle is the one which subtends the greatest vertical angle measured from the appropriate inner edge.

(b) As illustrated in Figure 8-3, a new obstacle may be assessed as not imposing additional restrictions if:

(i) when located between the inner edge end and the critical obstacle, the new obstacle is below a plane sloping downwards at 10% from the top of the critical obstacle toward the inner edge;

(ii) when located beyond the critical obstacle from the inner edge end, the new obstacle is not higher than the height of the permanent obstacle; and

(iii) where there is more than one critical obstacle within the approach and take-off climb area, and the new obstacle is located between two critical obstacles, the height of the new obstacle is not above a plane sloping downwards at 10% from the top of the next critical obstacle.

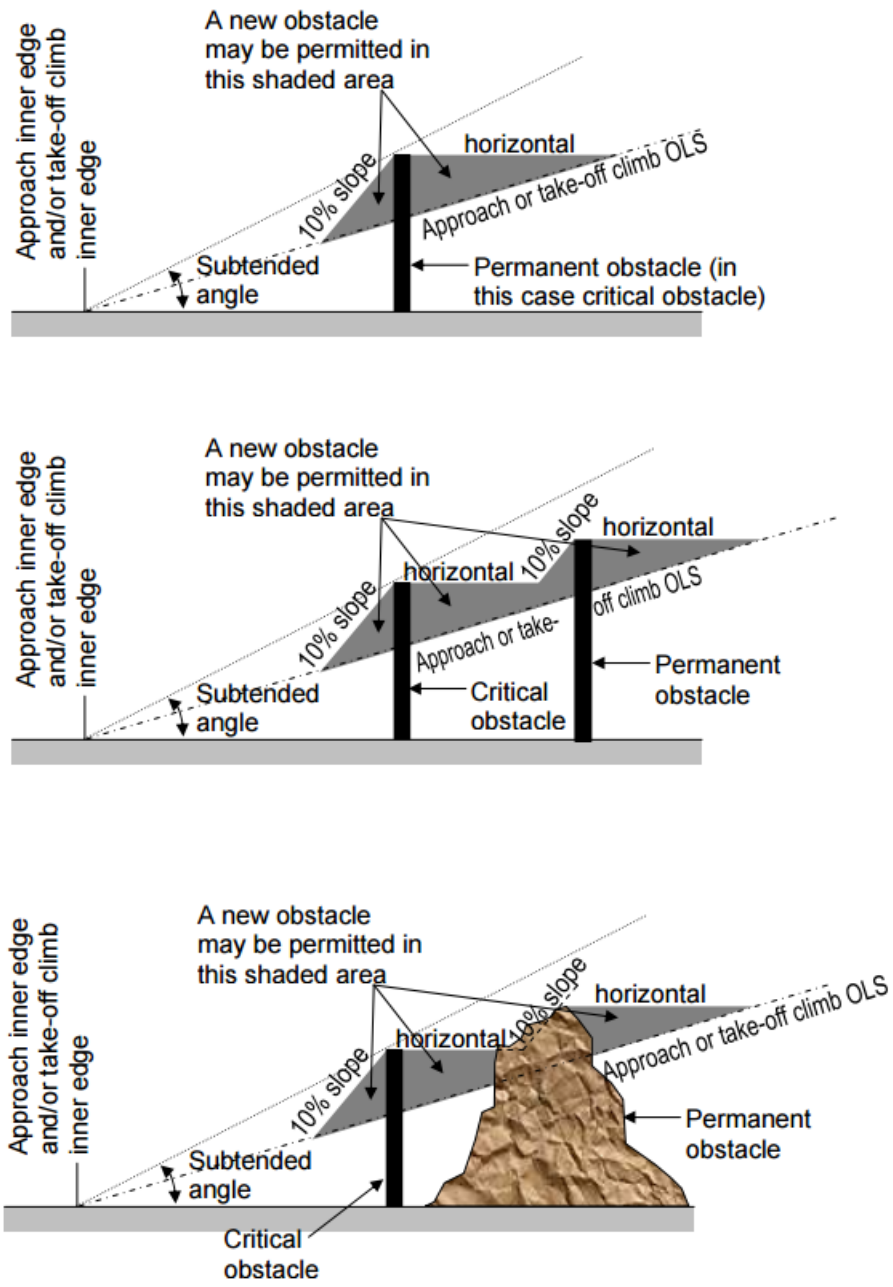


Figure 8-3 – Shielding of obstacles penetrating the approach and take-off climb surfaces

Obstacle penetrating the inner and outer horizontal and conical surfaces

8.3.2.3 A new obstacle may be accepted if it is in the vicinity of an existing obstacle, and does not penetrate a 10% downward sloping conical shaped surface from the top of the existing obstacle, i.e., the new obstacle is shielded radially by the existing obstacle.

Obstacle penetrating the transitional surfaces

8.3.2.4 A new obstacle may be assessed as not imposing additional restrictions if it does not exceed the height of an existing obstacle which is closer to the runway strip and the new obstacle is located perpendicularly behind the existing obstacle relative to the runway centre line.

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9. VISUAL AIDS FOR NAVIGATION

9.1 GENERAL

9.1.1 INTRODUCTION

9.1.1.1 This chapter details the specifications for aerodrome indicators and signaling devices, markings, lights, signs and markers to be provided at an aerodrome.

9.2 INDICATORS AND SIGNALLING DEVICES

9.2.1 WIND DIRECTION INDICATORS

Application

9.2.1.1 An aerodrome shall be equipped with at least one wind direction indicator.

Location

9.2.1.2 A wind direction indicator 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.

Characteristics

9.2.1.3 The wind direction indicator shall be in the form of a truncated cone made of fabric and shall have a length of not less than 3.6 m and a diameter, at the larger end, of not less than 0.9 m. It 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.

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 300 m, having regard to background. Where practicable, a single colour, preferably white or orange, shall be used. Where a combination of 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 five alternate bands, the first and last bands being the darker colour.

9.2.1.4 The location of at least one wind direction indicator shall be marked by a circular band 15 m in diameter and 1.2 m wide. The band shall be centred about the wind direction indicator support and shall be in a colour chosen to give adequate conspicuity, preferably white.

9.2.1.5 Provision shall be made for illuminating at least one wind indicator at an aerodrome intended for use at night.

9.2.2 LANDING DIRECTION INDICATOR

Location

9.2.2.1 Where provided, a landing direction indicator shall be located in a conspicuous place on the aerodrome.

Characteristics

9.2.2.2 The landing direction indicator shall be in the form of a “T”.

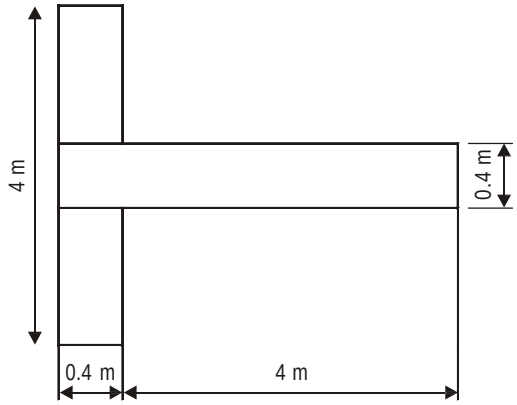

Figure 9-1. Landing direction indicator

9.2.2.3 The shape and minimum dimensions of a landing "T" shall be as shown in Figure 9-1. The colour of the landing "T" shall 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. Where required for use at night, the landing "T" shall either be illuminated or outlined by white lights.

9.2.3 SIGNALLING LAMP

Application

9.2.3.1 A signalling lamp shall be provided at a controlled aerodrome in the aerodrome control tower.

Characteristics

9.2.3.2 A signalling lamp shall be capable of producing red, green and white signals, and of:

(a) being aimed manually at any target as required;

(b) giving a signal in any one colour followed by a signal in either of the two other colours; and

(c) transmitting a message in any one of the three colours by Morse Code up to a speed of at least four words per minute.

When selecting the green light, use shall be made of the restricted boundary of green as specified below: (ICAO Annex 14 Vol. I, Appendix 1, 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 shall be within the following boundaries:

Yellow boundary $y = 0.726 – 0.726x$

White boundary $x = 0.650y$

Blue boundary $y = 0.390 – 0.171x$

9.2.3.3 The beam spread shall be not less than 1° nor greater than 3°, with negligible light beyond 3°. When the signalling lamp is intended for use in the daytime the intensity of the coloured light shall be not less than 6 000 cd.

9.2.4 SIGNAL PANELS AND SIGNAL AREA

Note: *The inclusion of detailed specifications for a signal area in this section is not intended to imply that one has to be provided. ICAO Annex 14 Vol. I, Attachment A, Section 16 provides guidance on the need to provide ground signals. ICAO Annex 2, Appendix 1 specifies the shape, colour and use of visual ground signals. The document G-AGA-014 provides guidance on their design.*

Location of signal area

9.2.4.1 The signal area shall be located so as to be visible for all angles of azimuth above an angle of 10° above the horizontal when viewed from a height of 300 m.

Characteristics of signal area

9.2.4.2 The signal area shall be an even horizontal surface at least 9 m square.

9.2.4.3 The colour of the signal area shall be chosen to contrast with the colours of the signal panels used, and it shall be surrounded by a white border not less than 0.3 m wide.

9.3 MARKINGS

9.3.1 GENERAL

Interruption of runway markings

9.3.1.1 At an intersection of 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 runway(s) shall be interrupted. The runway side stripe marking of the more important runway may be either continued across the intersection or interrupted.

9.3.1.2 The order of importance of runways for the display of runway markings shall be as follows:

1st — precision approach runway;

2nd — non-precision approach runway; and

3rd — non-instrument runway.

9.3.1.3 At an intersection of a runway and taxiway the markings of the runway shall be displayed and the markings of the taxiway interrupted.

Note: *See paragraph 9.3.8.5 of this Regulation regarding the manner of connecting runway and taxiway centre line markings.*

Colour and conspicuity

9.3.1.4 Runway markings shall be white.

Note 1: *It has been found that, on runway surfaces of light colour, the conspicuity of white markings can be improved by outlining them in black.*

Note 2: *It is preferable that the risk of uneven friction characteristics on markings be reduced in so far as practicable by the use of a suitable kind of paint.*

Note 3: *Markings may consist of solid areas or a series of longitudinal stripes providing an effect equivalent to the solid areas.*

9.3.1.5 Taxiway markings, runway turn pad markings and aircraft stand markings shall be yellow.

9.3.1.6 Apron safety lines shall be of a conspicuous colour which shall contrast with that used for aircraft stand markings.

9.3.1.7 At aerodromes where operations take place at night, pavement markings shall be made with reflective materials designed to enhance the visibility of the markings.

Note: *Guidance on reflective materials is given in the G-AGA-014.*

Unpaved taxiways

9.3.1.8 An unpaved taxiway shall be provided, so far as practicable, with the markings prescribed for paved taxiways.

9.3.2 RUNWAY DESIGNATION MARKING

Application

9.3.2.1 A runway designation marking shall be provided at the thresholds of a paved runway.

9.3.2.2 A runway designation marking shall be provided, so far as practicable, at the thresholds of an unpaved runway.

Location

9.3.2.3 A runway designation marking shall be located at a threshold as shown below.

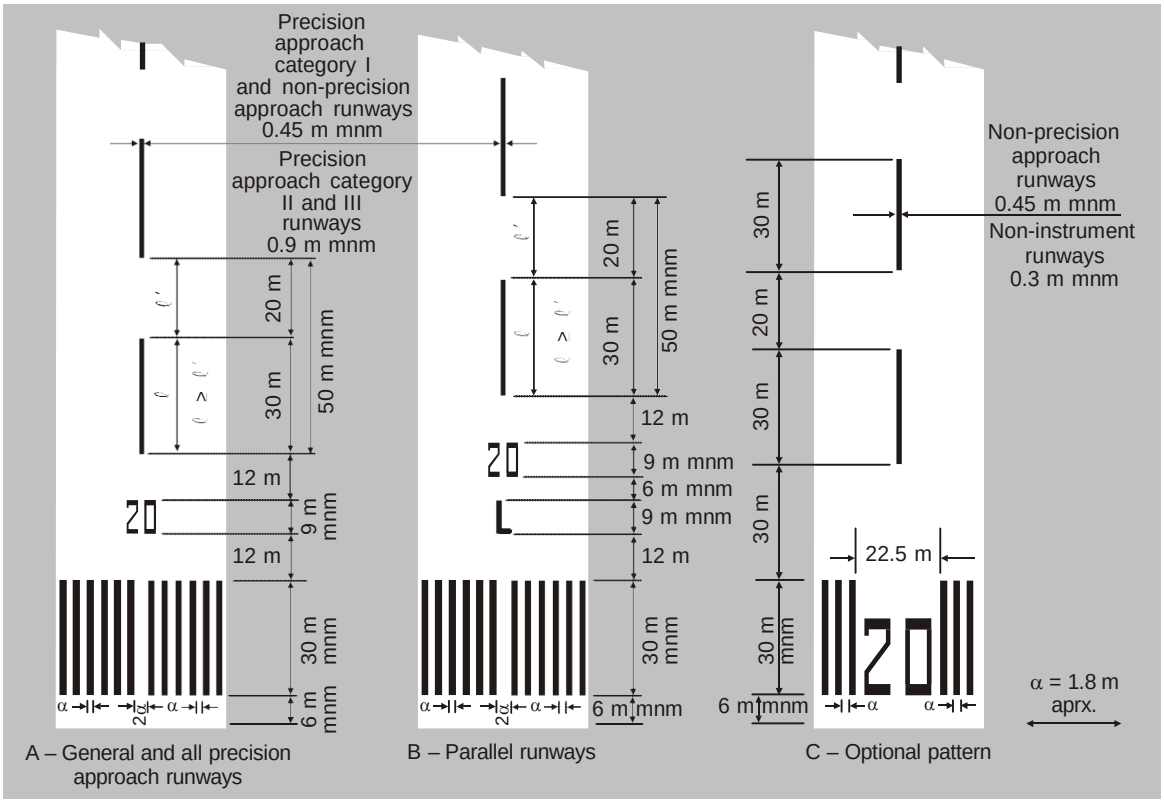

Figure 9-2. Runway designation, centre line and threshold markings

Note: *If the runway threshold is displaced from the extremity of the runway, a sign showing the designation of the runway may be provided for aeroplanes taking off.*

Characteristics

9.3.2.4 A runway designation marking shall consist of a two-digit number and on parallel runways shall be supplemented with a letter. 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. On 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. When the above rule would give a single digit number, it shall be preceded by a zero.

9.3.2.5 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:

— for two parallel runways: “L” “R”;

— for three parallel runways: “L” “C” “R”;

— for four parallel runways: “L” “R” “L” “R”;

— for five parallel runways: “L” “C” “R” “L” “R” or “L” “R” “L” “C” “R”; and

— for six parallel runways: “L” “C” “R” “L” “C” “R”.

9.3.2.6 The numbers and letters shall be in the form and proportion shown below (Figure 9-3). The dimensions shall be not less than those shown below, 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.

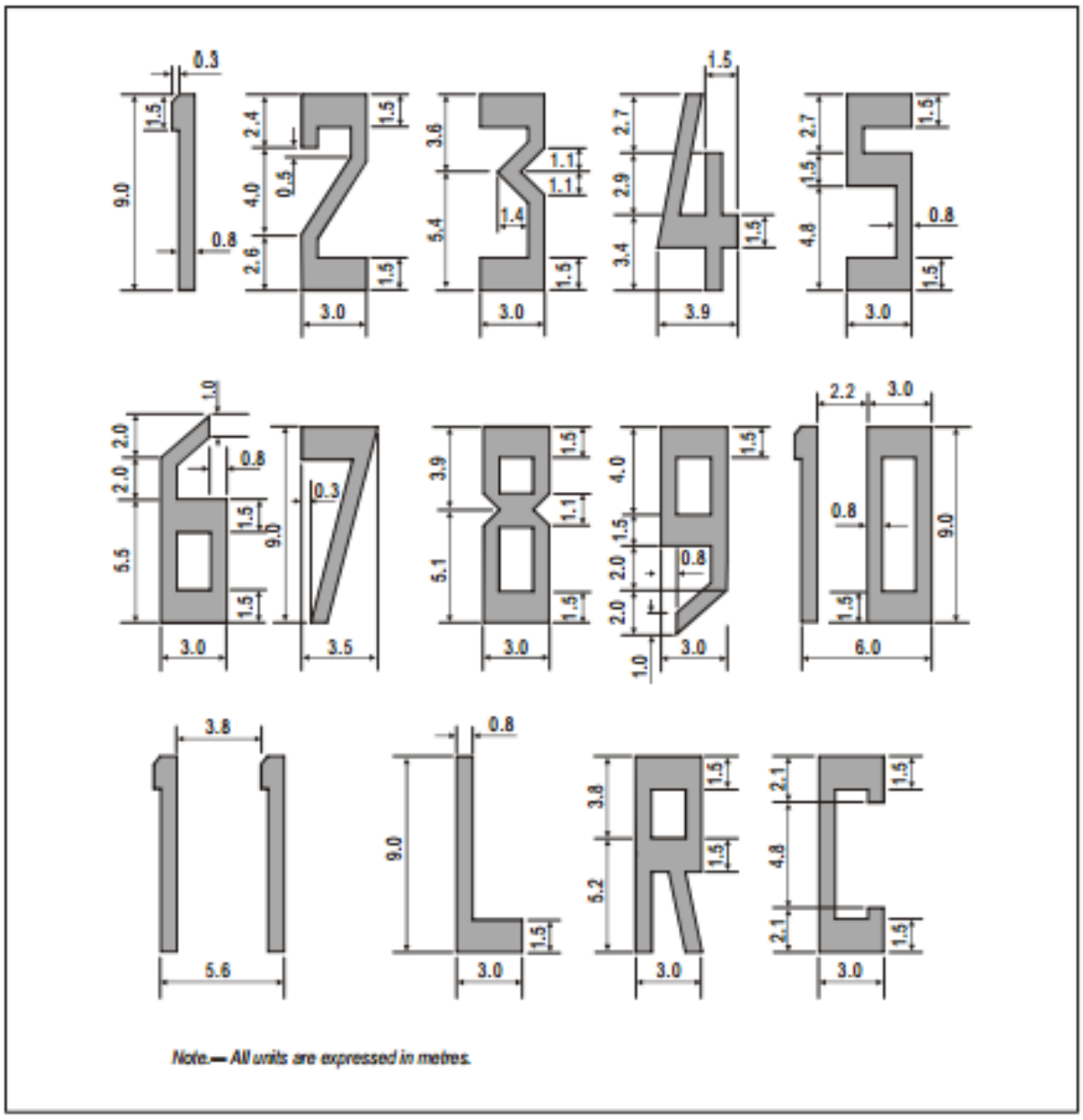

Figure 9-3. Form and proportions of numbers and letters for runway designation markings

9.3.3 RUNWAY CENTRE LINE MARKING

Application

9.3.3.1 A runway centre line marking shall be provided on a paved runway.

Location

9.3.3.2 A runway centre line marking shall be located along the centre line of the runway between the runway designation markings as shown in paragraph 9.3.2.3, except when interrupted in compliance with paragraph 9.3.1.1 of this Regulation.

Characteristics

9.3.3.3 A runway centre line marking shall consist of a line of uniformly spaced stripes and gaps. The length of a stripe plus a gap shall be not less than 50 m or more than 75 m. The length of each stripe shall be at least equal to the length of the gap or 30 m, whichever is greater.

9.3.3.4 The width of the stripes shall be not less than:

— 0.90 m on precision approach category II and III runways;

— 0.45 m on non-precision approach runways where the code number is 3 or 4, and precision approach category I runways; and

— 0.30 m on non-precision approach runways where the code number is 1 or 2, and on non-instrument runways.

9.3.4 THRESHOLD MARKING

Application

9.3.4.1 A threshold marking shall be provided at the threshold of a paved instrument runway, and of a paved non-instrument runway where the code number is 3 or 4 and the runway is intended for use by international commercial air transport.

9.3.4.2 A threshold marking shall be provided at the threshold of a paved non-instrument runway where the code number is 3 or 4 and the runway is intended for use by other than international commercial air transport.

9.3.4.3 A threshold marking shall be provided, so far as practicable, at the thresholds of an unpaved runway.

Note: *The document G-AGA-014, shows a form of marking which has been found satisfactory for the marking of downward slopes immediately before the threshold.*

Location

9.3.4.4 The stripes of the threshold marking shall commence 6 m from the threshold.

Characteristics

9.3.4.5 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 paragraph 9.3.2.3 (Figure 9-2 (A) and (B)) for a runway width of 45 m. The number of stripes shall be in accordance with the runway width as follows:

Runway width	Number of stripes
18m	4
23m	6
30m	8
45m	12
60m	16

except that on non-precision approach and non-instrument runways 45 m or greater in width, they may be as shown in paragraph 9.3.2.3, Figure 9-2 (C).

9.3.4.6 The stripes shall extend laterally to within 3 m of the edge of a runway or to a distance of 27 m on either side of a runway centre line, whichever results in the smaller lateral distance. Where a runway designation marking is placed within a threshold marking there shall be a minimum of three stripes on each side of the centre line of the runway. Where a runway designation marking is placed above a threshold marking, the stripes shall be continued across the runway. The stripes shall be at least 30 m long and approximately 1.80 m wide with spacings of approximately 1.80 m 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, and in the case where the designation marking is included within the threshold marking this spacing shall be 22.5 m.

Transverse stripe

9.3.4.7 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 as shown in Figure 9-4 (B) shall be added to the threshold marking.

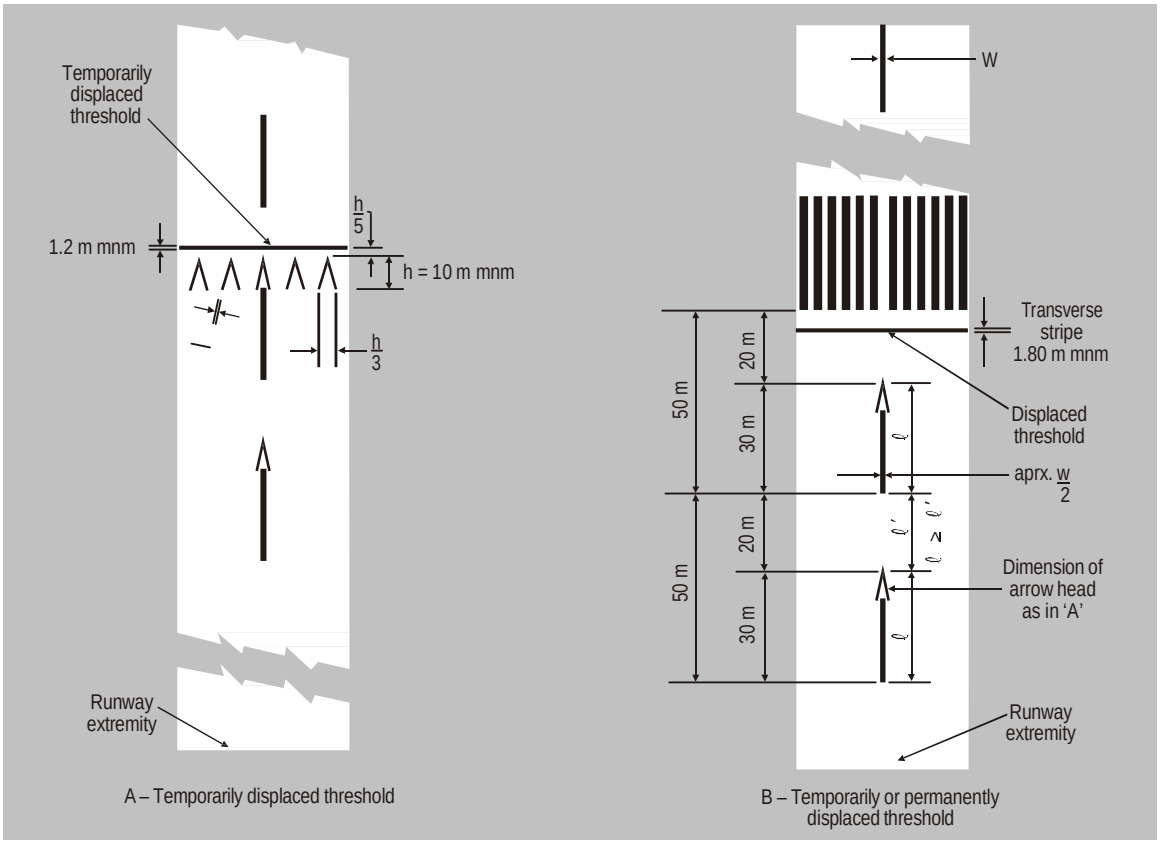

Figure 9-4. Displaced threshold markings

9.3.4.8 A transverse stripe shall be not less than 1.80 m wide.

Arrows

9.3.4.9 Where a runway threshold is permanently displaced, arrows conforming to Figure 9-4 (B) shall be provided on the portion of the runway before the displaced threshold.

9.3.4.10 When a runway threshold is temporarily displaced from the normal position, it shall be marked as shown in Figure 9-4 (A) or 5-4 (B) and all markings prior to the displaced threshold shall be obscured except the runway centre line marking, which shall be converted to arrows.

Note 1: *In the case where a threshold is temporarily displaced for only a short period of time, it has been found satisfactory to use markers in the form and colour of a displaced threshold marking rather than attempting to paint this marking on the runway.*

Note 2: *When the runway before a displaced threshold is unfit for the surface movement of aircraft, closed markings, as described in paragraph 11.2.1.4 of this Regulation, are required to be provided.*

9.3.5 AIMING POINT MARKING

Application

9.3.5.1 An aiming point marking shall be provided at each approach end of a paved instrument runway where the code number is 2, 3 or 4.

9.3.5.2 An aiming point marking shall be provided at each approach end of: a) a paved non-instrument runway where the code number is 3 or 4, b) a paved instrument runway where the code number is 1, when additional conspicuity of the aiming point is desirable.

Location

9.3.5.3 The aiming point marking shall commence no closer to the threshold than the distance indicated in the appropriate column of Table 9-1 of this Regulation, 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.

9.3.5.4 An aiming point marking shall consist of two conspicuous stripes. 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 Table 9-1 of this Regulation. Where a touchdown zone marking is provided, the lateral spacing between the markings shall be the same as that of the touch-down zone marking.

Table 9-1 – Location and dimensions of aiming point marking

Location and dimensions	Landing distance available			
	Less than 800 m	**800 m up to but not including 1 200 m**	**1 200 m up to but not including 2 400 m**	**2 400 m and above**
(1)	(2)	(3)	(4)	(5)
Distance from threshold to beginning of marking	150m	250m	300m	400m
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)	6-10m (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 space which is element 2 of the aerodrome reference code at Chapter 2, Table 2-1.				

9.3.6 TOUCHDOWN ZONE MARKING

Application

9.3.6.1 A touchdown zone marking shall be provided in the touchdown zone of a paved precision approach runway where the code number is 2, 3 or 4.

9.3.6.2 A touchdown zone marking shall be provided in the touchdown zone of a paved non-precision approach or non-instrument runway where the code number is 3 or 4 and additional conspicuity of the touchdown zone is desirable.

Location and characteristics

9.3.6.3 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 and, where the marking is to be displayed at both the approach directions of a runway, the distance between the thresholds, as follows:

Landing distance available or the distance between thresholds	Pair(s) of markings
Less than 900 m	1
900m up to but not including 1 200 m	2
1 200m up to but not including 1 500 m	3
1 500m up to but not including 2 400 m	4
2 400m or more	6

9.3.6.4 A touchdown zone marking shall conform to either of the two patterns shown in Figure 9-5. For the pattern shown in Figure 9-5 (A), the markings shall be not less than 22.5 m long and 3 m wide. For the pattern shown in Figure 9-5 (B), each stripe of each marking shall be not less than 22.5 m long and 1.8 m wide with a spacing of 1.5 m between adjacent stripes. The lateral spacing between the inner sides of the rectangles shall be equal to that of the aiming point marking where provided. 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 Table 9-1 of this Regulation (columns 2, 3, 4 or 5, as appropriate). The pairs of markings shall be provided at longitudinal spacings of 150 m beginning from the threshold except that pairs of touchdown zone markings coincident with or located within 50 m of an aiming point marking shall be deleted from the pattern.

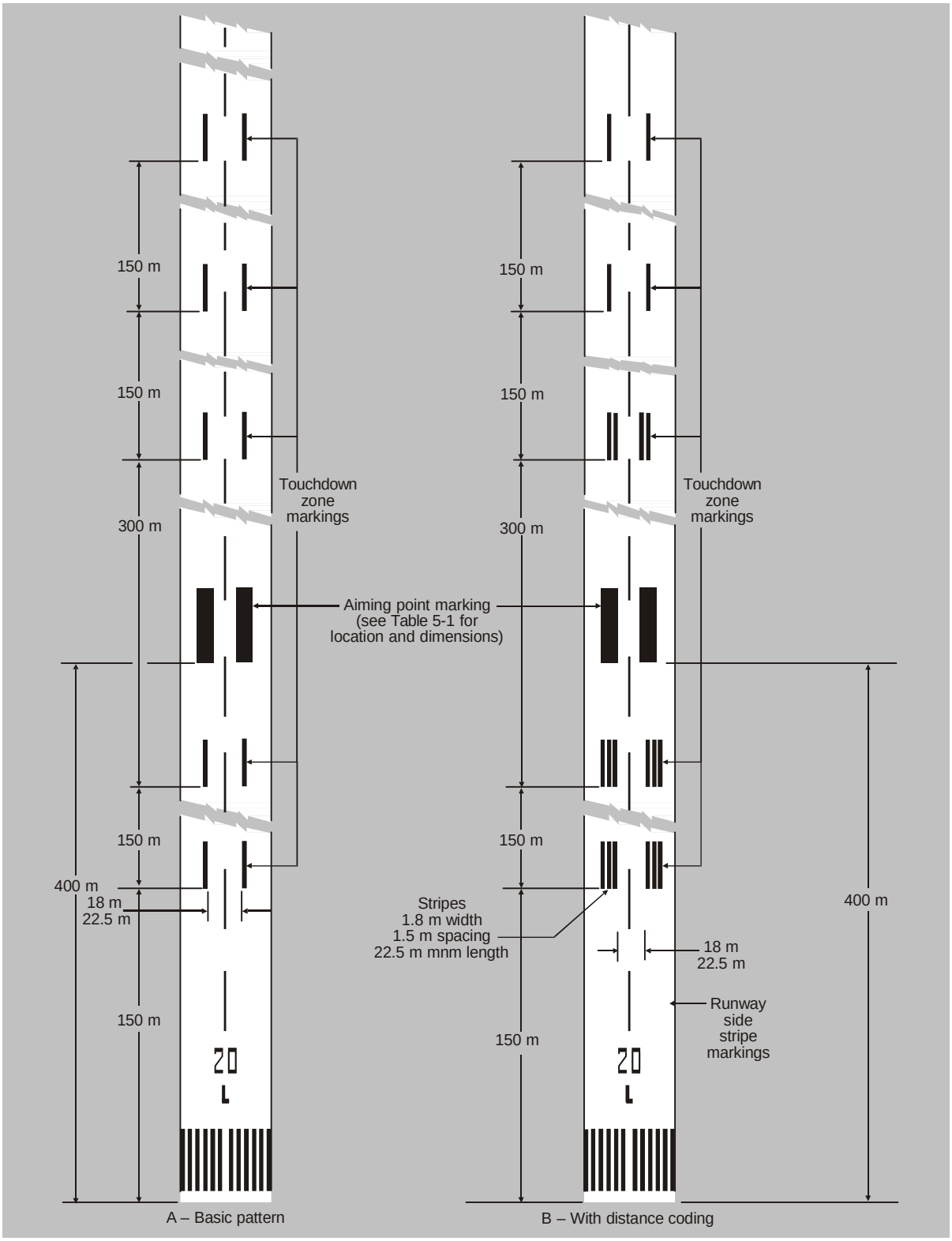

Figure 9-5. Aiming point and touchdown zone markings
(illustrated for a runway with a length of 2 400 m or more)

9.3.6.5 On a non-precision approach runway where the code number is 2, an additional pair of touchdown zone marking stripes shall be provided 150 m beyond the beginning of the aiming point marking.

9.3.7 RUNWAY SIDE STRIPE MARKING

Application

9.3.7.1 A runway side stripe marking shall be provided between the thresholds of a paved runway where there is a lack of contrast between the runway edges and the shoulders or the surrounding terrain.

9.3.7.2 A runway side stripe marking shall be provided on a precision approach runway irrespective of the contrast between the runway edges and the shoulders or the surrounding terrain.

Location

9.3.7.3 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, except that, where the runway is greater than 60 m in width, the stripes shall be located 30 m from the runway centre line.

9.3.7.4 Where a runway turn pad is provided, the runway side stripe marking shall be continued between the runway and the runway turn pad.

Characteristics

9.3.7.5 A runway side stripe shall have an overall width of at least 0.9 m on runways 30 m or more in width and at least 0.45 m on narrower runways.

9.3.8 TAXIWAY CENTRE LINE MARKING

Application

9.3.8.1 Taxiway centre line marking shall be provided on a paved taxiway and apron where the code number is 3 or 4 in such a way as to provide continuous guidance between the runway centre line and aircraft stands.

9.3.8.2 Taxiway centre line marking shall be provided on a paved taxiway and apron where the code number is 1 or 2 in such a way as to provide continuous guidance between the runway centre line and aircraft stands.

9.3.8.3 Taxiway centre line marking shall be provided on a paved runway 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.

9.3.8.4 Where it is necessary to denote the proximity of a runway-holding position, enhanced taxiway centre line marking shall be provided.

Note: *The provision of enhanced taxiway centre line marking may form part of runway incursion prevention measures.*

9.3.8.5 Where provided, enhanced taxiway centre line marking shall be installed at each taxiway/runway intersections.

Location

9.3.8.6 On a straight section of a taxiway the taxiway centre line marking shall be located along the taxiway centre line. 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.

***Note**: See paragraph 7.2.9.6 and Figure 7- 2.*

9.3.8.7 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 below (Figures 9-6 and 9-26). The taxiway centre line marking shall be extended parallel to the runway centre line marking for a distance of at least 60 m beyond the point of tangency where the code number is 3 or 4, and for a distance of at least 30 m where the code number is 1 or 2.

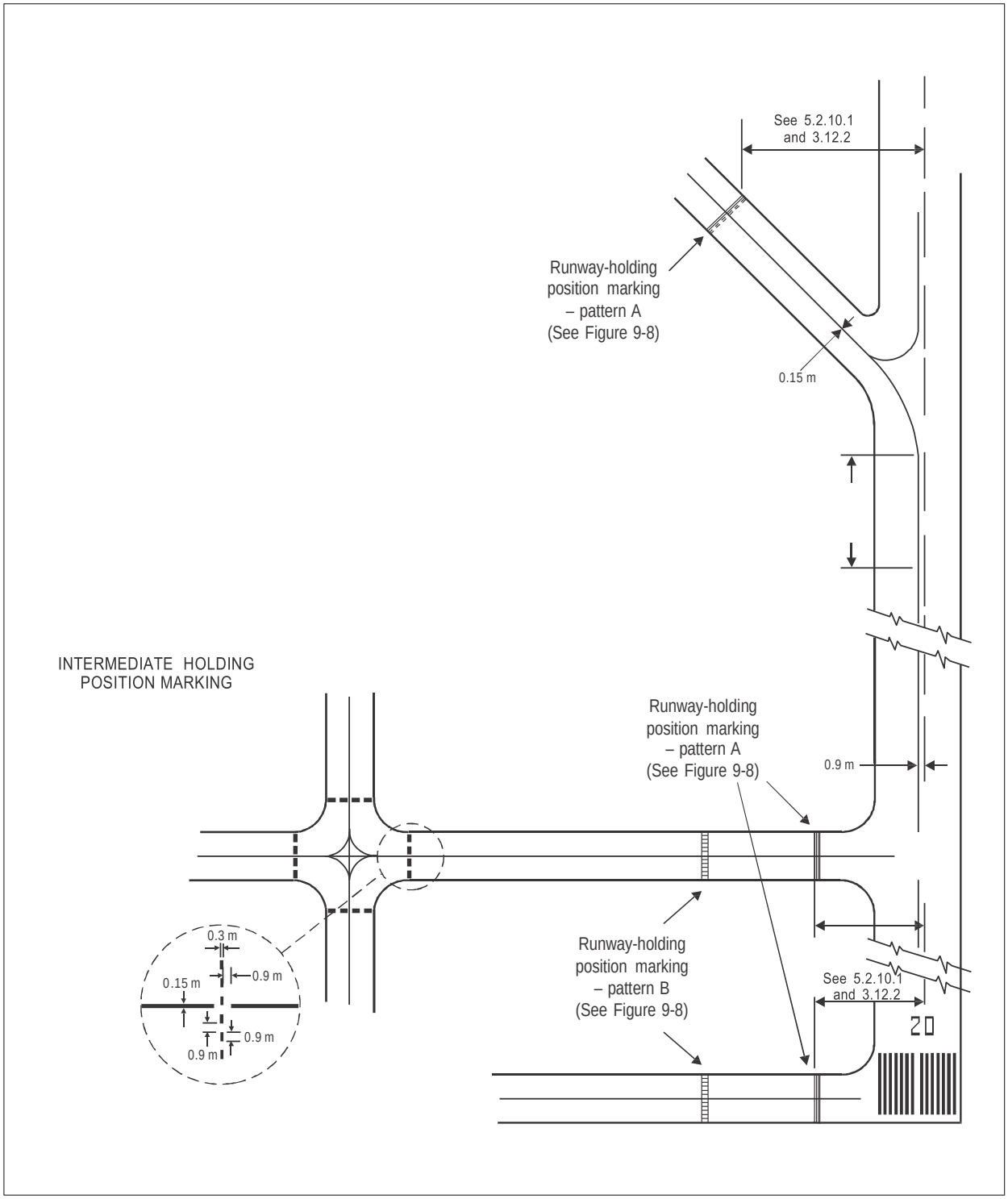

Figure 9-6. Taxiway markings
(shown with basic runway markings)

9.3.8.8 Where taxiway centre line marking is provided on a runway in accordance with paragraph 9.3.8.3 of this Regulation, the marking shall be located on the centre line of the designated taxiway.

9.3.8.9 Where provided:

(a) An enhanced taxiway centre line marking shall extend from the runway-holding position Pattern A (as defined in Figure 9-6, Taxiway markings) to a distance of up to 47 m in the direction of travel away from the runway. See Figure 9-7 (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 47 m of the first runway-holding position marking, the enhanced taxiway centre line marking shall be interrupted 0.9 m 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 47 m from start to finish, whichever is greater. See Figure 9-7 (b).

(c) If the enhanced taxiway centre line marking continues through a taxiway/taxiway intersection that is located within 47 m of the runway-holding position marking, the enhanced taxiway centre line marking shall be interrupted 1.5 m prior to and after the point where the intersected taxiway centre line crosses the enhanced taxiway centre line. The enhanced taxiway centre line marking shall continue beyond the taxiway/taxiway intersection for at least three dashed line segments or 47 m from start to finish, whichever is greater. See Figure 9-7 (c).

(d) Where two taxiway centre lines converge at or before the runway-holding position marking, the inner dashed line shall not be less than 3 m in length. See Figure 9-7 (d).

(e) Where there are two opposing runway-holding position markings and the distance between the markings is less than 94 m, the enhanced taxiway centre line markings shall extend over this entire distance. The enhanced taxiway centre line markings shall not extend beyond either runway-holding position marking. See Figure 9-7 (e).

Characteristics

9.3.8.10 A taxiway centre line marking shall be at least 15cm 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 paragraph 9.3.8.7 (Figure 9-6).

9.3.8.11 Enhanced taxiway centre line marking shall be as shown below. (Figure 9-7.)

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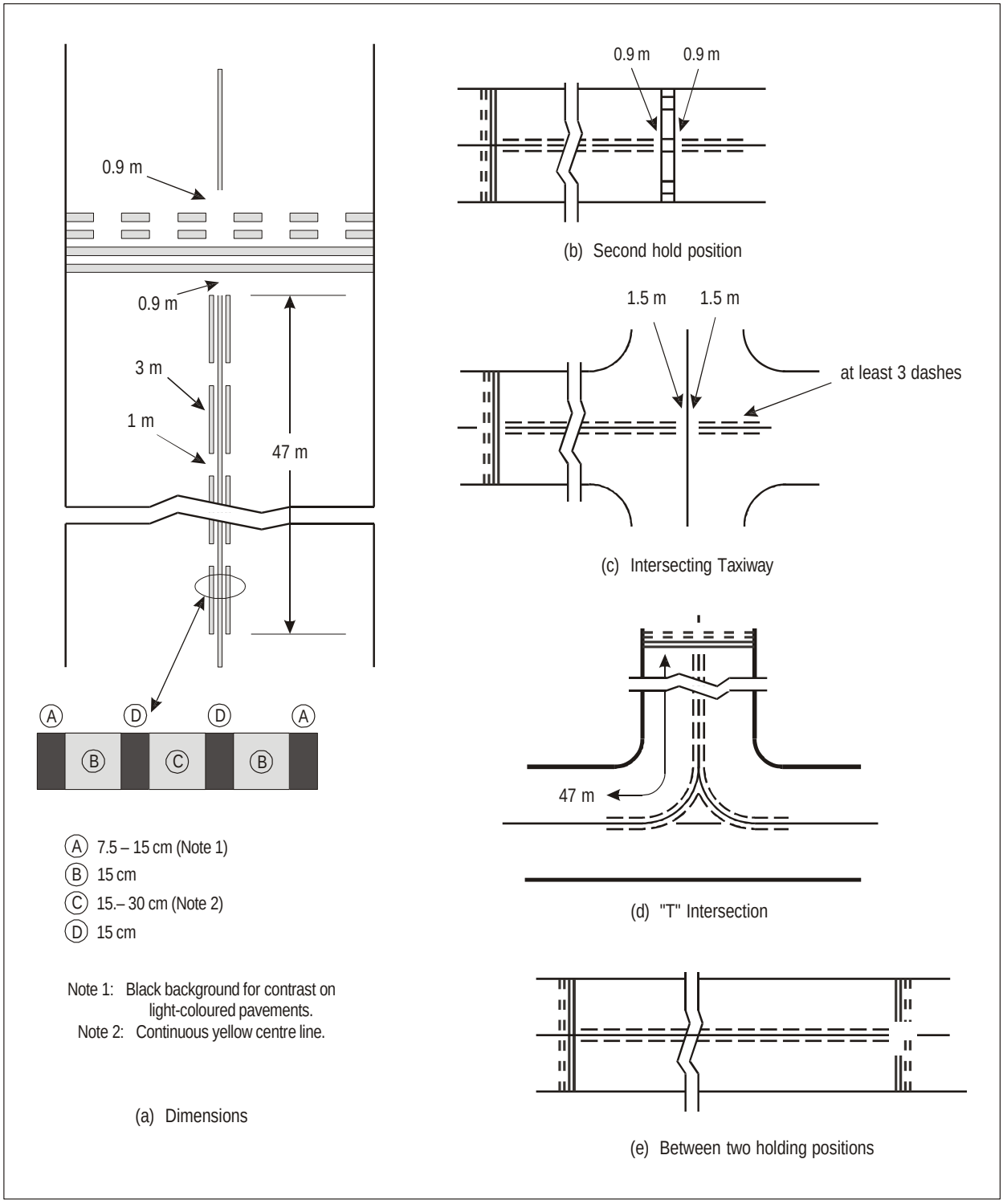


Figure 9-7. Enhanced taxiway centre line marking

9.3.9 RUNWAY TURN PAD MARKING

Application

9.3.9.1 Where a runway turn pad is provided, a runway turn pad marking shall be provided for continuous guidance to enable an aeroplane to complete a 180-degree turn and align with the runway centre line.

Location

9.3.9.2 The runway turn pad markings shall be curved from the runway centre line into the turn pad. The radius of the curve shall be compatible with the manoeuvring capability and normal taxiing speeds of the aeroplanes for which the runway turn pad is intended. The intersection angle of the runway turn pad marking with the runway centre line shall not be greater than 30 degrees.

9.3.9.3 The runway turn pad markings shall be extended parallel to the runway centre line marking or a distance of at least 60 m beyond the point of tangency where the code number is 3 or 4, and for a distance of at least 30 m where the code number is 1 or 2.

9.3.9.4 The 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-degree turn is to be made. The straight portion of the runway turn pad marking shall be parallel to the outer edge of the runway turn pad.

9.3.9.5 The design of the curve allowing the aeroplane to negotiate a 180-degree turn shall be based on a nose wheel steering angle not exceeding 45 degrees.

9.3.9.6 The design of the turn pad marking shall be such that, when the cockpit of the aeroplane 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 that those specified in 7.2.3.6.

Note: *For ease of manoeuvring, consideration may be given to providing a larger wheel-to-edge clearance for codes E and F aeroplanes. See 7.2.3.7.*

Characteristics

9.3.9.7 A runway turn pad marking shall be at least 15cm in width and continuous in length.

9.3.10 RUNWAY-HOLDING POSITION MARKING

Application and location

9.3.10.1 A runway-holding position marking shall be displayed along a runway-holding position.

Note: *See 9.5.2 concerning the provision of signs at runwayholding positions.*

Characteristics

9.3.10.2 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 paragraph 9.3.8.7 (Figure 9-6, pattern A.)

9.3.10.3 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 Figure 9-6, pattern A. Where two or three runway-holding positions are provided at such an intersection, the runway-holding position marking closer (closest) to the runway shall be as shown in Figure 9-6, pattern A and the markings farther from the runway shall be as shown in Figure 9-6, pattern B.

9.3.10.4 The runway-holding position marking displayed at a runway-holding position established in accordance with paragraph 7.2.12.3 of this Regulation shall be as shown in Figure 9-6, pattern A.

9.3.10.5 Until 26 November 2026, the dimensions of runway-holding position markings shall be as shown in Figure 9-8, pattern A1 (or A2) or pattern B1 (or B2), as appropriate.

9.3.10.6 As of 26 November 2026, the dimensions of runway-holding position markings shall be as shown in Figure 9-8, pattern A2 or pattern B2, as appropriate.

9.3.10.7 Where increased conspicuity of the runway holding position is required, the dimensions of runway-holding position marking shall be as shown in Figure 9-8, pattern A2 or pattern B2, as appropriate.

Note: *An increased conspicuity of the runway-holding position can be required, notably to avoid incursion risks.*

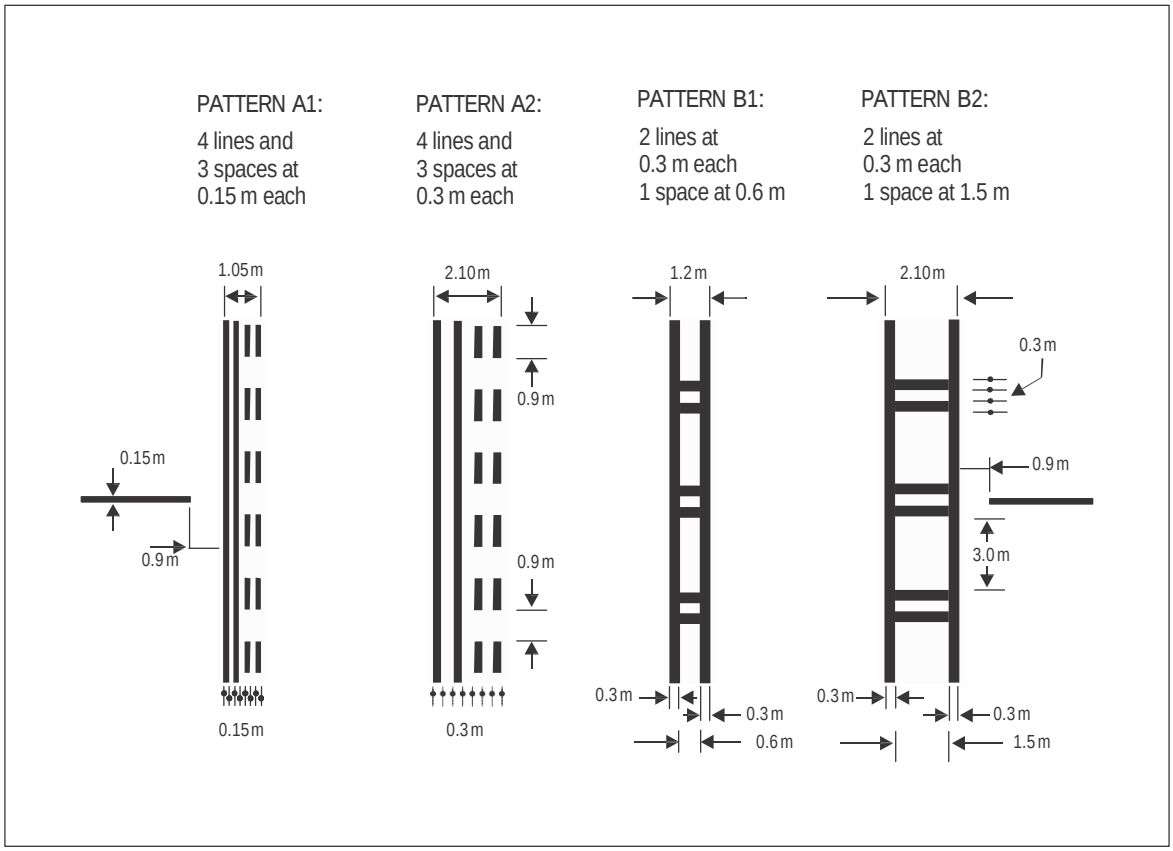


Figure 9-8. Runway-holding position markings

9.3.10.8 Where a pattern B runway-holding position marking is located on an area where it would exceed 60 m 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 45 m maximum between successive marks. The letters shall be not

less than 1.8 m high and shall be placed not more than 0.9 m beyond the holding position marking.

9.3.10.9 The runway-holding position marking displayed at a runway/runway intersection shall be perpendicular to the centre line of the runway forming part of the standard taxi-route. The pattern of the marking shall be as shown in Figure 9-8, pattern A2.

9.3.11 INTERMEDIATE HOLDING POSITION MARKING

Application and location

9.3.11.1 An intermediate holding position marking shall be displayed along an holding position.

9.3.11.2 An intermediate holding position marking shall be displayed at the exit boundary of a remote de-icing/anti-icing facility adjoining a taxiway.

9.3.11.3 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. It shall be coincident with a stop bar or intermediate holding position lights, where provided.

9.3.11.4 The distance between an intermediate holding position marking at the exit boundary of a remote de-icing/ anti-icing facility and the centre line of the adjoining taxiway shall not be less than the dimension specified in para.7.2.9.8 Table 7-1, column 11 of this Regulation.

Characteristics

9.3.11.5 An intermediate holding position marking shall consist of a single broken line as shown in para. 9.3.8.7 (Figure 9-6.)

9.3.12 VOR AERODROME CHECK-POINT MARKING

Application

9.3.12.1 When a VOR aerodrome check-point is established, it shall be indicated by a VOR aerodrome check-point marking and sign.

Note: *See 9.5.4 for VOR aerodrome check-point sign.*

9.3.12.2 Site selection

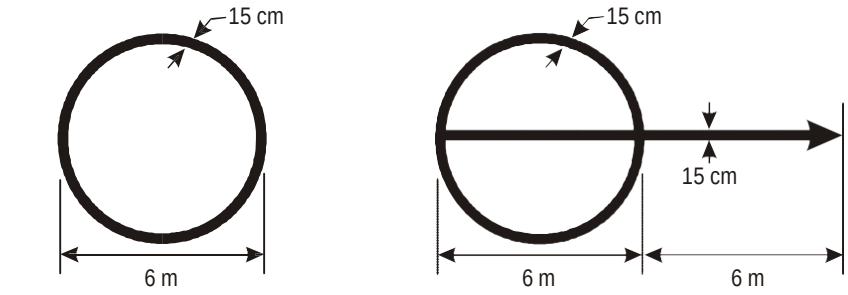
Note: *Guidance on the selection of sites for VOR aerodrome check-points is given in ICAO Annex 10, Volume I, Attachment E.*

Location

9.3.12.3 A VOR aerodrome check-point marking shall be centred on the spot at which an aircraft is to be parked to receive the correct VOR signal.

Characteristics

9.3.12.4 A VOR aerodrome check-point marking shall consist of a circle 6 m in diameter and have a line width of 15 cm. See below : Figure 9-9 (A)



Note.— A direction line need only be provided when an aircraft must be aligned in a specific direction.

Figure 9-9. VOR aerodrome checkpoint marking

9.3.12.5 When it is preferable for an aircraft to be aligned in a specific direction, a line shall be provided that passes through the centre of the circle on the desired azimuth. The line shall extend 6 m outside the circle in the desired direction of heading and terminate in an arrowhead. The width of the line shall be 15 cm (see Figure 9-9 (B)).

9.3.12.6 A VOR aerodrome check-point marking shall preferably be white in colour but shall differ from the colour used for the taxiway markings.

Note: *To provide contrast, markings may be bordered with black.*

9.3.13 AIRCRAFT STAND MARKINGS

Note: *Guidance on the layout of aircraft stand markings is contained in the G-AGA-014 and G-AGA-007 Apron markings and signs Guidance.*

Application

9.3.13.1 Aircraft stand markings shall be provided for designated parking positions on a paved apron.

Location

9.3.13.2 Aircraft stand markings on a paved apron shall be located so as to provide the clearances specified in paragraph 7.2.13.6 of this Regulation, when the nose wheel follows the stand marking.

Characteristics

9.3.13.3 Aircraft stand markings shall include such elements as stand identification, lead-in line, turn bar, turning line, alignment bar, stop line and lead-out line, as are required by the parking configuration and to complement other parking aids.

9.3.13.4 An aircraft stand identification (letter and/or number) shall be included in the lead-in line a short distance after the beginning of the lead-in line. The height of the identification shall be adequate to be readable from the cockpit of aircraft using the stand.

9.3.13.5 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.

Note: *Example: 2A-B747, 2B-F28.*

9.3.13.6 Lead-in, turning and lead-out lines shall normally be continuous in length and have a width of not less than 15 cm. Where one or more sets of stand markings are superimposed on a stand marking, the lines shall be continuous for the most demanding aircraft and broken for other aircraft.

9.3.13.7 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.

9.3.13.8 Where it is intended that an aircraft proceed in one direction only, arrows pointing in the direction to be followed shall be added as part of the lead-in and lead-out lines.

9.3.13.9 A turn bar 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. It shall have a length and width of not less than 6 m and 15 cm, respectively, and include an arrowhead to indicate the direction of turn.

Note: *The distances to be maintained between the turn bar and the lead-in line may vary according to different aircraft types, taking into account the pilot's field of view.*

9.3.13.10 If more than one turn bar and/or stop line is required, they shall be coded.

9.3.13.11 An alignment bar 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. It shall have a width of not less than 15 cm.

9.3.13.12 A stop line shall be located at right angles to the alignment bar, abeam the left pilot position at the intended point of stop. It shall have a length and width of not less than 6 m and 15 cm, respectively.

Note: *The distances to be maintained between the stop line and the lead-in line may vary according to different aircraft types, taking into account the pilot's field of view.*

9.3.14 APRON SAFETY LINES

Note: *Guidance on apron safety lines is contained in the G-AGA-014 and G-AGA-007 Apron markings and signs Guidance.*

Application

9.3.14.1 Apron safety lines shall be provided on a paved apron as required by the parking configurations and ground facilities.

Location

9.3.14.2 Apron safety lines shall be located so as to define the areas intended for use by ground vehicles and other aircraft servicing equipment, etc., to provide safe separation from aircraft.

Characteristics

9.3.14.3 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.

9.3.14.4 An apron safety line shall be continuous in length and at least 10 cm in width.

9.3.15 ROAD-HOLDING POSITION MARKING

Application

9.3.15.1 A road-holding position marking shall be provided at all road entrances to a runway.

Location

9.3.15.2 The road-holding position marking shall be located across the road at the holding position.

Characteristics

9.3.15.3 The road-holding position marking shall be in accordance with the local road traffic regulations.

9.3.16 APRON SERVICE ROAD MARKING

Applicability

9.3.16.1 The limits of an apron service road, shall be defined by apron service road markings.

Location

9.3.16.2 Apron service road markings shall define the areas intended for use by ground vehicles and other aircraft servicing equipment to provide safe separation from aircraft.

Characteristics

9.3.16.3 Apron service road markings shall be white.

9.3.16.4 Apron service road markings shall be continuous in length on the edges, continuous or broken in the middle, as appropriate, and at least 10 cm in width.

9.3.16.5 When an apron service road crosses a taxiway or aircraft stand taxilane, the apron service road edge marking shall be laterally dashed along the crossing. The stripes

shall be 1.0 m in length, and their width shall be equal to the width of the continuous part of the marking.

Note: *Guidance on the apron service road is given in G-AGA-007, Section 3.13.*

9.3.16.6 Apron service road markings shall be discontinued when they intersect with other markings on an apron. The interrupted gap shall be not more than 1 m on each side from the edge of the interested marking.

9.3.17 MANDATORY INSTRUCTION MARKING

Note: *Guidance on mandatory instruction marking is given in the G-AGA-014.*

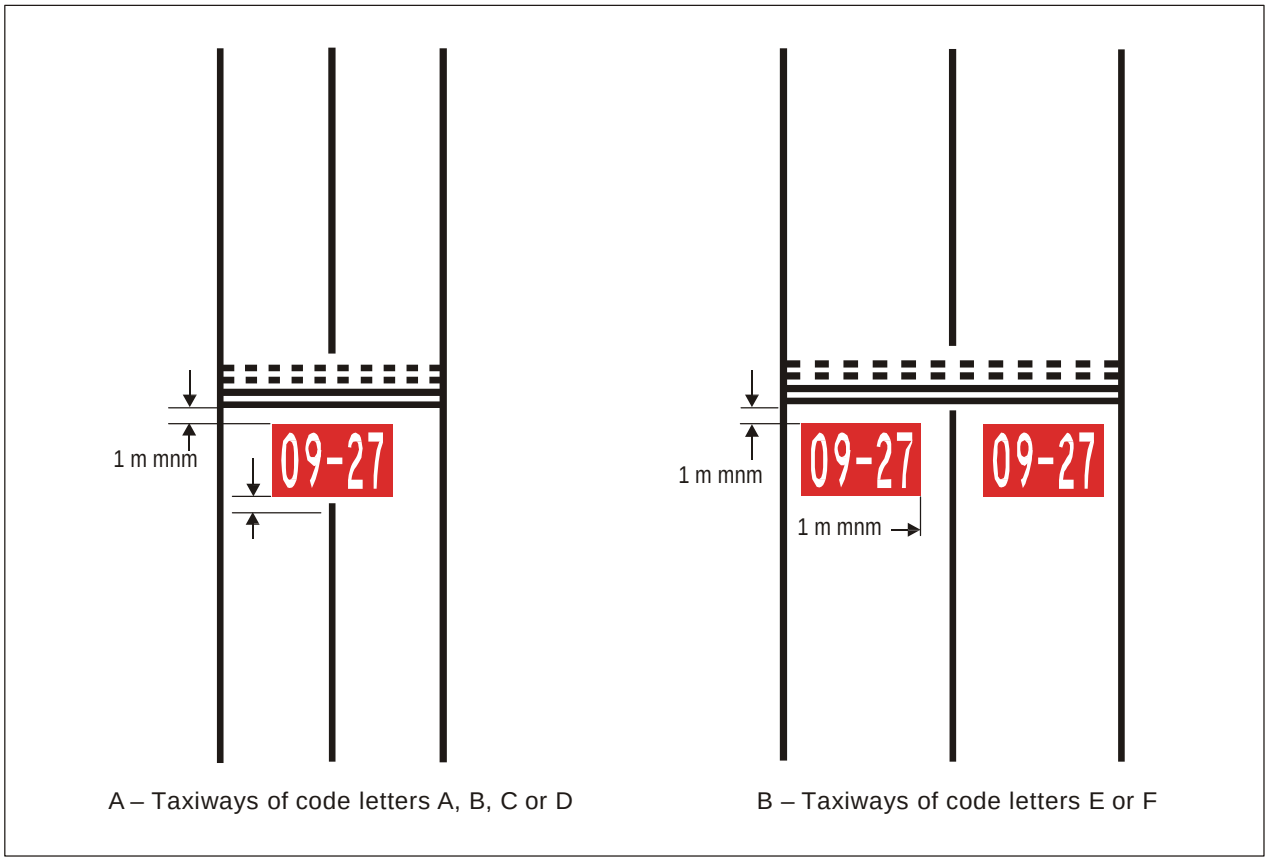
Application

9.3.17.1 Where it is impracticable to install a mandatory instruction sign in accordance with paragraph 9.5.2.1 of this Regulation, a mandatory instruction marking shall be provided on the surface of the pavement.

9.3.17.2 Where operationally required, such as on taxiways exceeding 60 m in width, or to assist in the prevention of a runway incursion, a mandatory instruction sign shall be supplemented by a mandatory instruction marking.

Location

9.3.17.3 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 centerline and on the holding side of the runway-holding position marking as shown below. (Figure 9-10 (a)).



A – Taxiways of code letters A, B, C or D

B – Taxiways of code letters E or F

Figure 9-10. Mandatory instruction marking

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

9.3.17.4 The mandatory instruction marking on taxiways, where the code letter 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 Figure 9-10 (b). The distance between the nearest edge of the marking and the runwayholding position marking or the taxiway centre line marking shall be not less than 1 m.

9.3.17.5 Except where operationally required, a mandatory instruction marking shall not be located on a runway.

Characteristics

9.3.17.6 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.

9.3.17.7 A NO ENTRY marking shall consist of an inscription in white reading NO ENTRY on a red background.

9.3.17.8 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.

9.3.17.9 The character height shall be 4 m for inscriptions where the code letter is C, D, E or F, and 2 m where the code letter is A or B. The inscriptions shall be in the form and proportions shown in G-AGA-007.

9.3.17.10 The background shall be rectangular and extend a minimum of 0.5 m laterally and vertically beyond the extremities of the inscription.

9.3.18 INFORMATION MARKING

Note: *Guidance on information marking is contained in the G-AGA-014 and G-AGA-007 Apron markings and signs Guidance.*

Application

9.3.18.1 Where an information sign would normally be installed and is impractical to install, as determined by the aerodrome operator, an information marking shall be displayed on the surface of the pavement.

9.3.18.2 Where operationally required an information sign shall be supplemented by an information marking.

9.3.18.3 An information (location/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.

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

Location

9.3.18.5 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.

Characteristics

9.3.18.6 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.

9.3.18.7 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.

9.3.18.8 The character height shall be 4 m. The inscriptions shall be in the form and proportions shown in G-AGA-007.

9.4 LIGHTS

9.4.1 GENERAL

Lights which may endanger the safety of aircraft

9.4.1.1 A non-aeronautical ground light near an aerodrome which might endanger the safety of aircraft shall be extinguished, screened or otherwise modified so as to eliminate the source of danger.

Laser emissions which may endanger the safety of aircraft

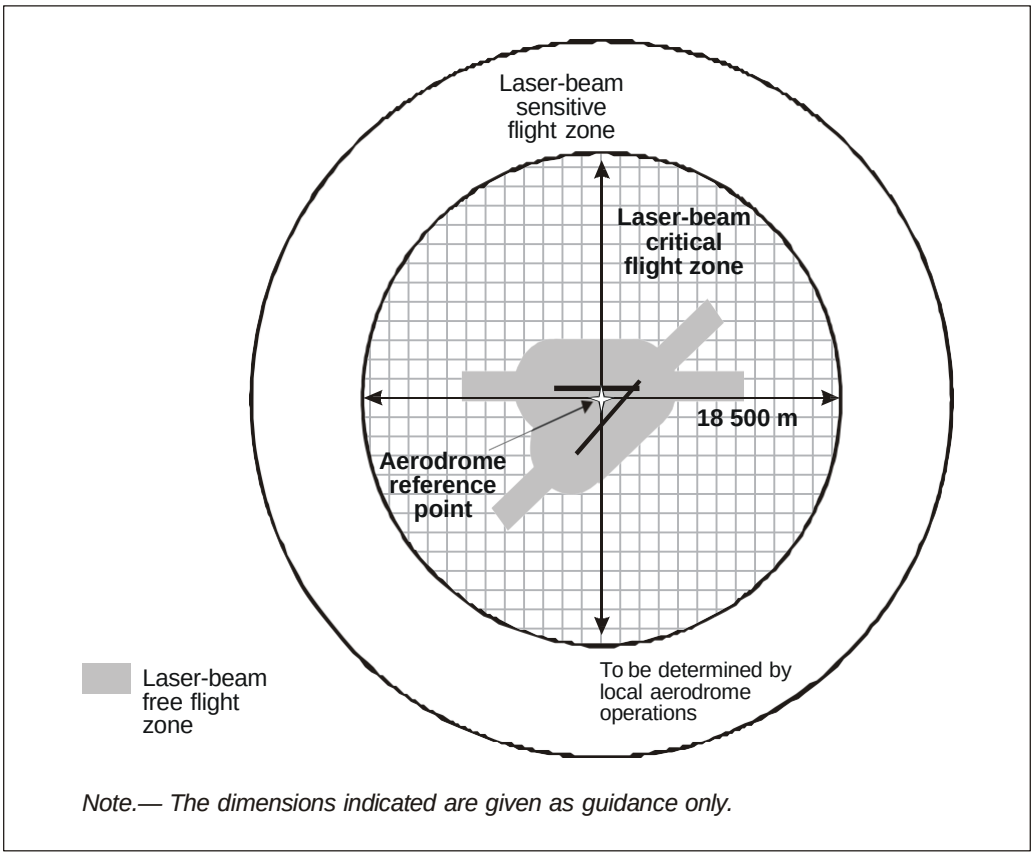
9.4.1.2 To protect the safety of aircraft against the hazardous effects of laser emitters, the following protected zones shall be established around aerodromes:

— a laser-beam free flight zone (LFFZ),

— a laser-beam critical flight zone (LCFZ), and

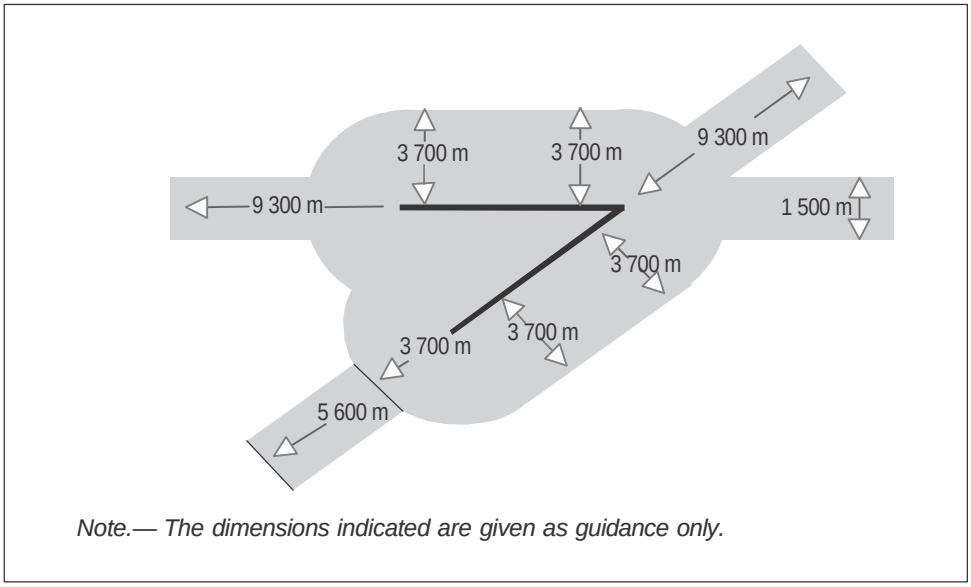
— a laser-beam sensitive flight zone (LSFZ).

Note 1: *Figures 9-11, 9-12 and 9-13 may be used to determine the exposure levels and distances that adequately protect flights operations.*



Note.— The dimensions indicated are given as guidance only.

Figure 9-11. Protected flight zones



Note.— The dimensions indicated are given as guidance only.

Figure 9-12. Multiple runway laser-beam free flight zone

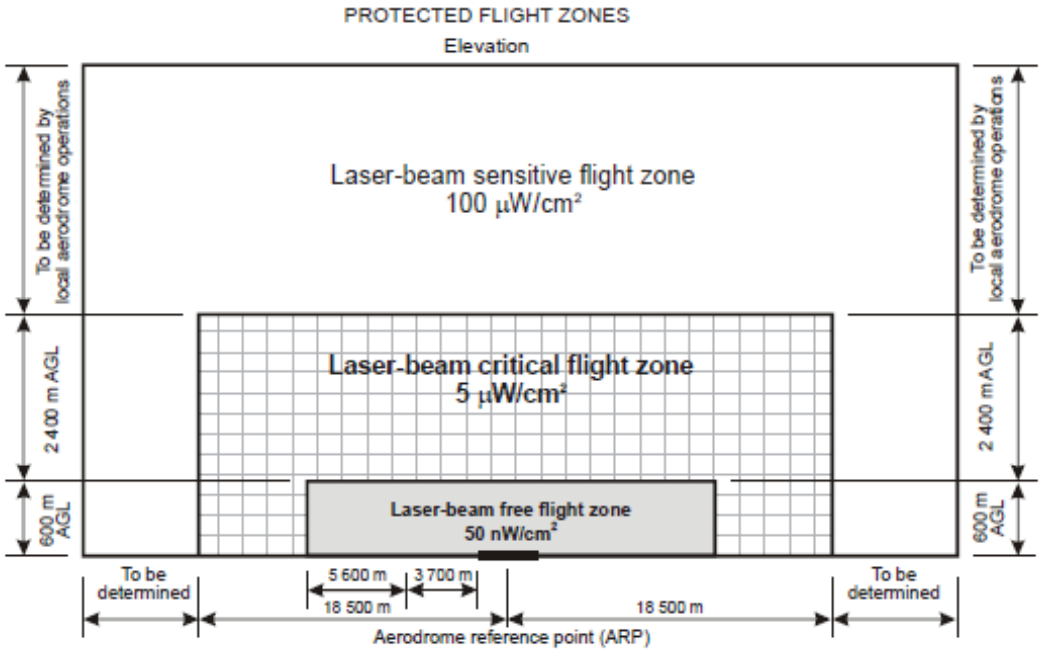


Figure 9-13. Protected flight zones with indication of maximum irradiance levels for visible laser beams

Note 2: *The restrictions on the use of laser beams in the three protected flight zones, LFFZ, LCFZ and LSFZ, refer to visible laser beams only. Laser emitters operated by the authorities in a manner compatible with flight safety are excluded. In all navigable air space, the irradiance level of any laser beam, visible or invisible, is expected to be less than or equal to the maximum permissible exposure (MPE) unless such emission has been notified to the Civil Aviation Authority and permission obtained.*

Note 3: *The protected flight zones are established in order to mitigate the risks of operating laser emitters in the vicinity of aerodromes.*

Note 4: *Further guidance on how to protect flight operations from the hazardous effects of laser emitters is contained in the ICAO Manual on Laser Emitters and Flights Safety (Doc 9815).*

Note 5: *See also ICAO Annex 11 – Air Traffic Services, Chapter 2.*

Note 6: *The establishment of the protected zones in Azerbaijan is the responsibility of the SCAA.*

Lights which may cause confusion

9.4.1.3 A non-aeronautical ground light which, by reason of its intensity, configuration or colour, might prevent, or cause confusion in, the clear interpretation of aeronautical ground lights shall be extinguished, screened or otherwise modified so as to eliminate such a possibility. In particular, 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:

within the areas before the threshold and beyond the end of the runway extending at least 4 500 m in length from the threshold and runway end and 750 m either side of the extended runway centre line in width.

(b) Instrument runway — code number 2 or 3:

as in a), except that the length shall be at least 3 000 m.

(c) Instrument runway — code number 1;

and non-instrument runway:

within the approach area.

Aeronautical ground lights which may cause confusion to mariners

Note: *In the case of aeronautical ground lights near navigable waters, consideration needs to be given to ensuring that the lights do not cause confusion to mariners.*

Light fixtures and supporting structures

Note: *See 13.9 for information regarding siting of equipment and installations on operational areas, and the document G-AGA-013 for guidance on frangibility of light fixtures and supporting structures.*

Elevated approach lights

9.4.1.4 Elevated approach lights and their supporting structures shall be frangible except that, in that portion of the approach lighting system beyond 300 m from the threshold:

(a) where the height of a supporting structure exceeds 12 m, the frangibility requirement shall apply to the top 12 m 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.

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

Elevated lights

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

Surface lights

9.4.1.7 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.

9.4.1.8 The temperature produced by conduction or radiation at the interface between an installed inset light and an aircraft tire shall not exceed 160°C during a 10-minute period of exposure.

Note: *Guidance on measuring the temperature of inset lights is given in the G-AGA-014.*

Light intensity and control

Note: *In dusk or poor visibility conditions by day, lighting can be more effective than marking. For lights to be effective in such conditions or in poor visibility by night, they must be of adequate intensity. To obtain the required intensity, it will usually be necessary to make the light directional, in which case the arcs over which the light shows will have to be adequate and so orientated as to meet the operational requirements. The runway lighting system will have to be considered as a whole, to ensure that the relative light intensities are suitably matched to the same end. (See ICAO Annex 14 Vol. I, Attachment A, Section 14, and the document G-AGA-014)*

9.4.1.9 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.

Note: *While the lights of an approach lighting system may be of higher intensity than the runway lighting, it is good practice to avoid abrupt changes in intensity as these could give a pilot a false impression that the visibility is changing during approach.*

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

— approach lighting system;

— runway edge lights;

— runway threshold lights;

— runway end lights;

— runway centre line lights;

— runway touchdown zone lights; and

— taxiway centre line lights.

9.4.1.11 On the perimeter of and within the ellipse defining the main beam in Figures A9-1 to A9-10, the maximum light intensity value shall not be greater than three times the minimum light intensity value measured in accordance with collective notes for Figures A9-1 to A9-11, Note 2.

9.4.1.12 On the perimeter of and within the rectangle defining the main beam in Figures A9-12 to A9-20, the maximum light intensity value shall not be greater than three times the minimum light intensity value measured in accordance with collective notes for Figures A9-12 to A9-21 and A9-26, Note 2.

9.4.2 EMERGENCY LIGHTING

Application

9.4.2.1 At an aerodrome provided with runway lighting and without a secondary power supply, sufficient emergency lights shall be conveniently available for installation on at least the primary runway in the event of failure of the normal lighting system.

Note: *Emergency lighting may also be useful to mark obstacles or delineate taxiways and apron areas.*

Location

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

Characteristics

9.4.2.3 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.

9.4.3 AERONAUTICAL BEACONS

Application

9.4.3.1 Where operationally necessary an aerodrome beacon or an identification beacon shall be provided at each aerodrome intended for use at night.

9.4.3.2 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.

Aerodrome beacon

9.4.3.3 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.

Location

9.4.3.4 The aerodrome beacon shall be located on or adjacent to the aerodrome in an area of low ambient background lighting.

9.4.3.5 The location of the beacon shall be such that the beacon is not shielded by objects in significant directions and does not dazzle a pilot approaching to land.

Characteristics

9.4.3.6 The aerodrome beacon shall show either coloured flashes alternating with white flashes, or white flashes only. The frequency of total flashes shall be from 20 to 30 per minute. 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. 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.

9.4.3.7 The light from the beacon shall show at all angles of azimuth. The vertical light distribution shall extend upwards from an elevation of not more than 1° to an elevation determined by the SCAA to be sufficient to provide guidance at the maximum

elevation at which the beacon is intended to be used and the effective intensity of the flash shall be not less than 2 000 cd.

Note: *At locations where a high ambient background lighting level cannot be avoided, the effective intensity of the flash may be required to be increased by a factor up to a value of 10.*

Identification beacon

Application

9.4.3.8 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.

Location

9.4.3.9 The identification beacon shall be located on the aerodrome in an area of low ambient background lighting.

9.4.3.10 The location of the beacon shall be such that the beacon is not shielded by objects in significant directions and does not dazzle a pilot approaching to land.

Characteristics

9.4.3.11 An identification beacon at a land aerodrome shall show at all angles of azimuth. The vertical light distribution shall extend upwards from an elevation of not more than 1° to an elevation determined by the SCAA to be sufficient to provide guidance at the maximum elevation at which the beacon is intended to be used and the effective intensity of the flash shall be not less than 2 000 cd.

Note: *At locations where a high ambient background lighting level cannot be avoided, the effective intensity of the flash may be required to be increased by a factor up to a value of 10.*

9.4.3.12 An identification beacon shall show flashing-green at a land aerodrome and flashing-yellow at a water aerodrome.

9.4.3.13 The identification characters shall be transmitted in the International Morse Code.

9.4.3.14 The speed of transmission shall be between six and eight words per minute, the corresponding range of duration of the Morse dots being from 0.15 to 0.2 seconds per dot.

9.4.4 APPROACH LIGHTING SYSTEMS

Application

9.4.4.1 Application

A — Non-instrument runway

Where physically practicable, a simple approach lighting system as specified in paragraphs 9.4.4.2 to 9.4.4.9 of this Regulation shall be provided to serve a noninstrument runway where the code number is 3 or 4 and intended for use at night, except when the runway is used only in conditions of good visibility, and sufficient guidance is provided by other visual aids.

Note: *A simple approach lighting system can also provide visual guidance by day.*

B — Non-precision approach runway

Where physically practicable, a simple approach lighting system as specified in paragraphs 9.4.4.2 to 9.4.4.9 of this Regulation shall be provided to serve a non-precision approach runway, except when the runway is used only in conditions of good visibility or sufficient guidance is provided by other visual aids.

Note: *It is advisable to give consideration to the installation of a precision approach category I lighting system or to the addition of a runway lead-in lighting system.*

C — Precision approach runway category I

Where physically practicable, a precision approach category I lighting system as specified in paragraphs 9.4.4.10 to 9.4.4.21 of this Regulation shall be provided to serve a precision approach runway category I.

D — Precision approach runway categories II and III

A precision approach category II and III lighting system as specified in paragraphs 9.4.4.22 to 9.4.4.39 of this Regulation shall be provided to serve a precision approach runway category II or III.

Simple approach lighting system

Location

9.4.4.2 A simple approach lighting system shall consist of a row of lights on the extended centre line of the runway extending, whenever possible, over a distance of not less than 420 m from the threshold with a row of lights forming a crossbar 18 m or 30 m in length at a distance of 300 m from the threshold.

9.4.4.3 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. The lights of the crossbar shall be spaced so as to produce a linear effect, except that, when a crossbar of 30 m is used, gaps may be left on each side of the centre line. These gaps shall be kept to a minimum to meet local requirements and each shall not exceed 6 m.

Note 1: *Spacings for the crossbar lights between 1 m and 4 m are in use. Gaps on each side of the centre line may improve directional guidance when approaches are made with a lateral error, and facilitate the movement of rescue and fire fighting vehicles.*

Note 2: *See ICAO Annex 14 Vol. I, Attachment A, Section 12 for guidance on installation tolerances.*

9.4.4.4 The lights forming the centre line shall be placed at longitudinal intervals of 60 m, except that, when it is desired to improve the guidance, an interval of 30 m may be used. The innermost light shall be located either 60 m or 30 m from the threshold, depending on the longitudinal interval selected for the centre line lights.

9.4.4.5 If it is not physically possible to provide a centre line extending for a distance of 420 m from the threshold, it shall be extended to 300 m so as to include the crossbar. If this is not possible, the centre line lights shall be extended as far as practicable, and each centre line light shall then consist of a barrette at least 3 m in length. Subject to the approach system having a crossbar at 300 m from the threshold, an additional crossbar may be provided at 150 m from the threshold.

9.4.4.6 The system shall lie as nearly as practicable in the horizontal plane passing through the threshold, provided that:

(a) no object other than an ILS or MLS azimuth antenna shall protrude through the plane of the approach lights within a distance of 60 m from the centre line of the system; and

(b) b) no light other than a light located within the central part of a crossbar or a centre line barrette (not their extremities) shall be screened from an approaching aircraft.

Any ILS or MLS azimuth antenna protruding through the plane of the lights shall be treated as an obstacle and marked and lighted accordingly.

Characteristics

9.4.4.7 The lights of a simple approach lighting system shall be fixed lights and the colour of the lights shall be such as to ensure that the system is readily distinguishable from other aeronautical ground lights, and from extraneous lighting if present. Each centre line light shall consist of either:

(a) a single source; or

(b) a barrette at least 3 m in length.

Note 1: *When the barrette as in b) is composed of lights approximating to point sources, a spacing of 1.5 m between adjacent lights in the barrette has been found satisfactory.*

Note 2: *It may be advisable to use barrettes 4 m in length if it is anticipated that the simple approach lighting system will be developed into a precision approach lighting system.*

Note 3: *At locations where identification of the simple approach lighting system is difficult at night due to surrounding lights, sequence flashing lights installed in the outer portion of the system may resolve this problem.*

9.4.4.8 Where provided for a non-instrument runway, the lights shall show at all angles in azimuth necessary to a pilot on base leg and final approach. The intensity of the lights shall be adequate for all conditions of visibility and ambient light for which the system has been provided.

9.4.4.9 Where provided for a non-precision approach runway, the lights shall 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. 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 shall remain usable.

<u>Precision approach category I lighting system</u>

Location

9.4.4.10 A precision approach category I lighting system shall consist of a row of lights on the extended centre line of the runway extending, wherever possible, over a distance of 900 m from the runway threshold with a row of lights forming a crossbar 30 m in length at a distance of 300 m from the runway threshold.

Note: *The installation of an approach lighting system of less than 900 m in length may result in operational limitations on the use of the runway. See ICAO Annex 14 Vol. I, Attachment A, Section 12.*

9.4.4.11 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. 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. These gaps shall be kept to a minimum to meet local requirements and each shall not exceed 6 m.

Note 1: *Spacings for the crossbar lights between 1 m and 4 m are in use. Gaps on each side of the centre line may improve directional guidance when approaches are made with a lateral error, and facilitate the movement of rescue and fire fighting vehicles.*

Note 2: *See ICAO Annex 14 Vol. I, Attachment A, Section 11 for guidance on installation tolerances.*

9.4.4.12 The lights forming the centre line shall be placed at longitudinal intervals of 30 m with the innermost light located 30 m from the threshold.

9.4.4.13 The system shall lie as nearly as practicable in the horizontal plane passing through the threshold, provided that:

(a) no object other than an ILS or MLS azimuth antenna shall protrude through the plane of the approach lights within a distance of 60 m from the centre line of the system; and

(b) no light other than a light located within the central part of a crossbar or a centre line barrette (not their extremities) shall be screened from an approaching aircraft.

Any ILS or MLS azimuth antenna protruding through the plane of the lights shall be treated as an obstacle and marked and lighted accordingly.

Characteristics

9.4.4.14 The centre line and crossbar lights of a precision approach category I lighting system shall be fixed lights showing variable white. Each centre line light position shall consist of either:

(a) a single light source in the innermost 300 m of the centre line, two light sources in the central 300 m of the centre line and three light sources in the outer 300 m of the centre line to provide distance information; or

(b) a barrette.

9.4.4.15 Where the serviceability level of the approach lights specified as a maintenance objective in 14.2.5.10 can be demonstrated, each centre line light position may consist of either:

(a) a single light source; or

(b) a barrette.

9.4.4.16 The barrettes shall be at least 4 m in length. When barrettes are composed of lights approximating to point sources, the lights shall be uniformly spaced at intervals of not more than 1.5 m.

9.4.4.17 If the centre line consists of barrettes as described in paragraph 9.4.4.14 b) or 9.4.4.15 b) of this Regulation, each barrette shall be supplemented by a capacitor discharge light, except where such lighting is considered unnecessary taking into account the characteristics of the system and the nature of the meteorological conditions.

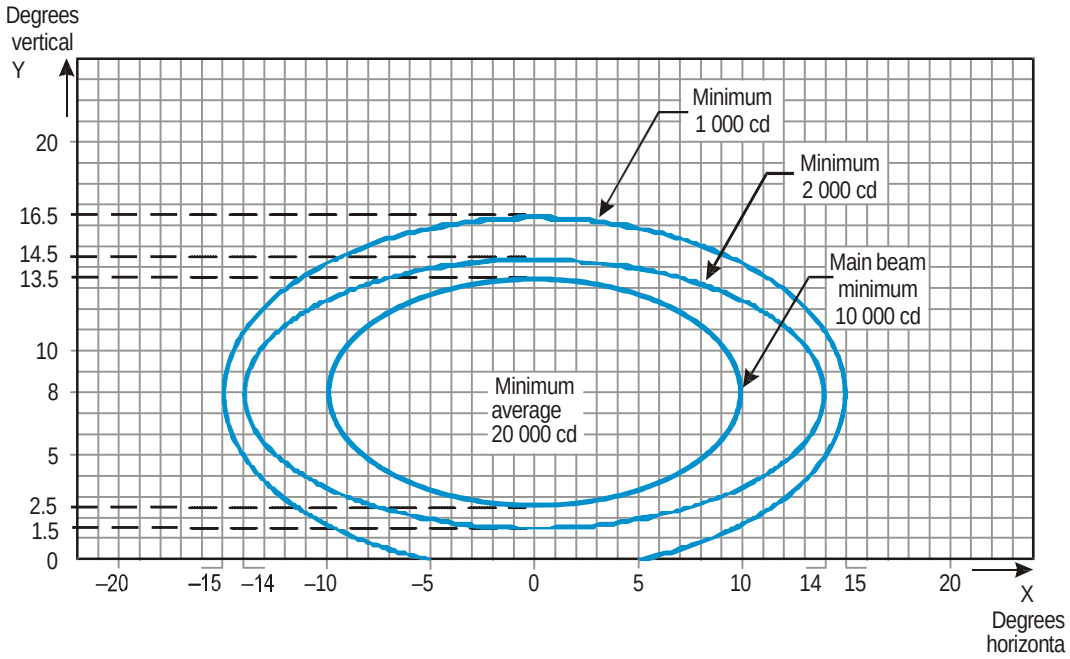
9.4.4.18 Each capacitor discharge light as described in paragraph 9.4.4.17 of this Regulation shall be flashed twice a second in sequence, beginning with the outermost light and progressing toward the threshold to the innermost light of the system. The design of the electrical circuit shall be such that these lights can be operated independently of the other lights of the approach lighting system.

9.4.4.19 If the centre line consists of lights as described in paragraph 9.4.4.14 a) or 9.4.4.15 a) of this Regulation, additional crossbars of lights to the crossbar provided at 300 m from the threshold shall be provided at 150 m, 450 m, 600 m and 750 m from the threshold. 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. 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. These gaps shall be kept to a minimum to meet local requirements and each shall not exceed 6 m.

Note: *See ICAO Annex 14 Vol. I, Attachment A, Section 11 for detailed configuration.*

9.4.4.20 Where the additional crossbars described in paragraph 9.4.4.19 of this Regulation are incorporated in the system, the outer ends of the crossbars shall 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 300 m from threshold.

9.4.4.21 The lights shall be in accordance with the specifications of Figure A9-1.



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 A9-1 to A9-11 and A9-26.

Figure A9-1. Isocandela diagram for approach centre line light and crossbars (white light)

Note: *The flight path envelopes used in the design of these lights are given in Figure A-6.*

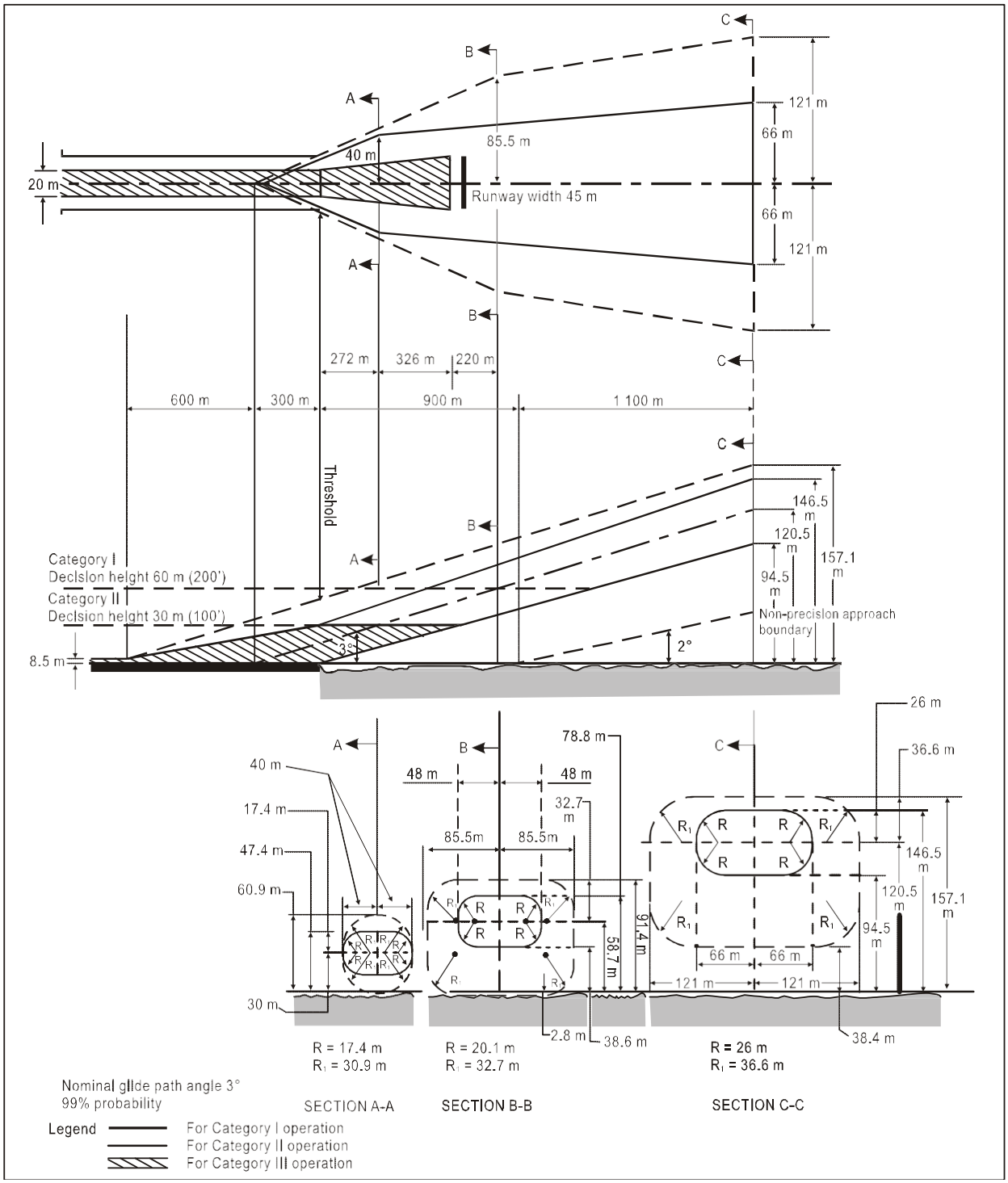


Figure A-6. Flight path envelopes to be used for lighting design for category I, II and III operations

Precision approach category II and III lighting system

Location

9.4.4.22 The approach lighting system shall consist of a row of lights on the extended centre line of the runway, extending, wherever possible, over a distance of 900 m from the runway threshold. In addition, the system shall have two side rows of lights, extending 270 m from the threshold, and two crossbars, one at 150 m and one at 300 m from the threshold, all as shown in Figure 9-14.

Where the serviceability level of the approach lights specified as maintenance objectives in paragraph 14.2.5.7 of this Regulation can be demonstrated, the system may have two side rows of lights, extending 240 m from the threshold, and two crossbars, one at 150m and one at 300 m from the threshold, all as shown in Figure 9-15.

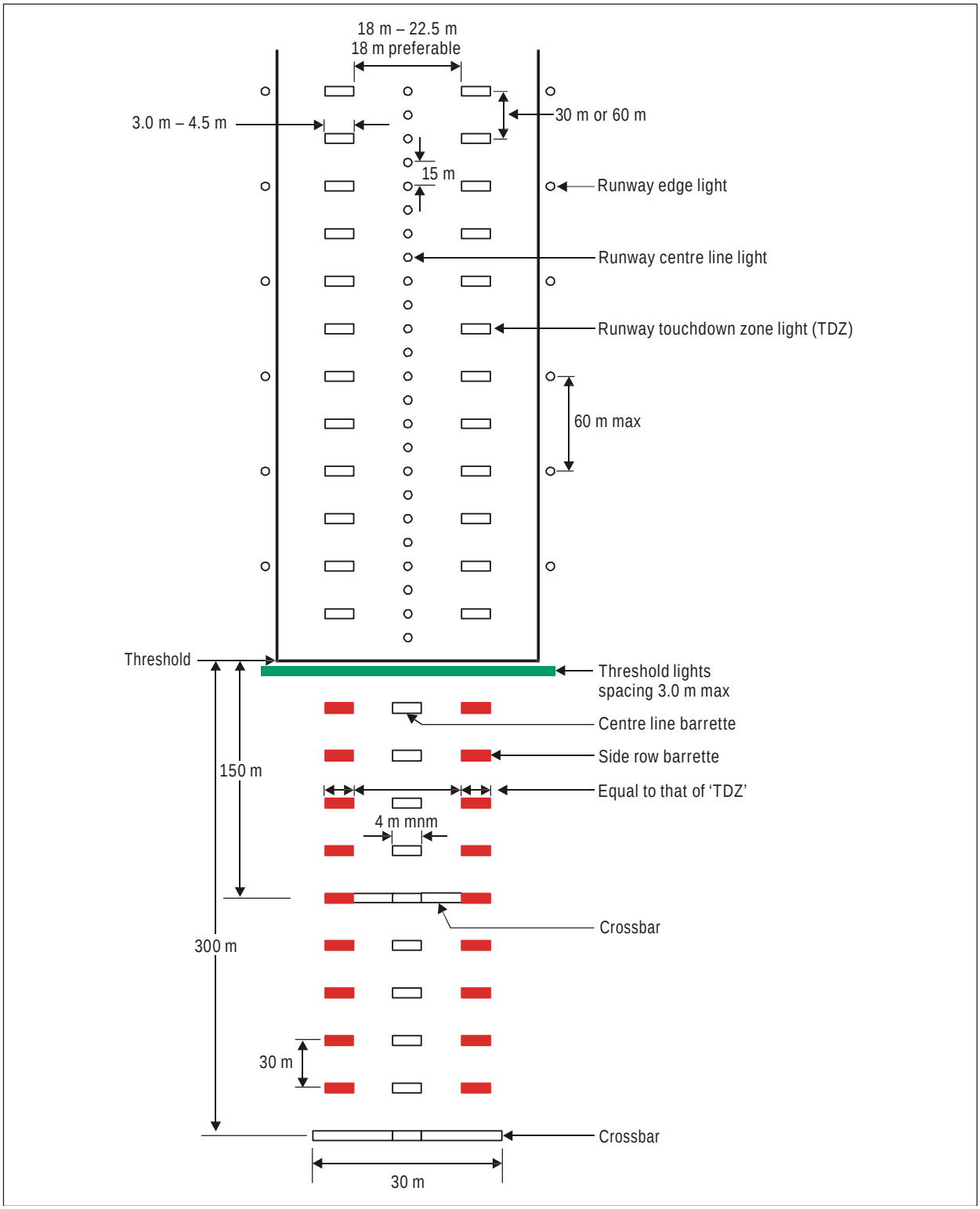


Figure 9-14. Inner 300 m approach and runway lighting for precision approach runways, categories II and III

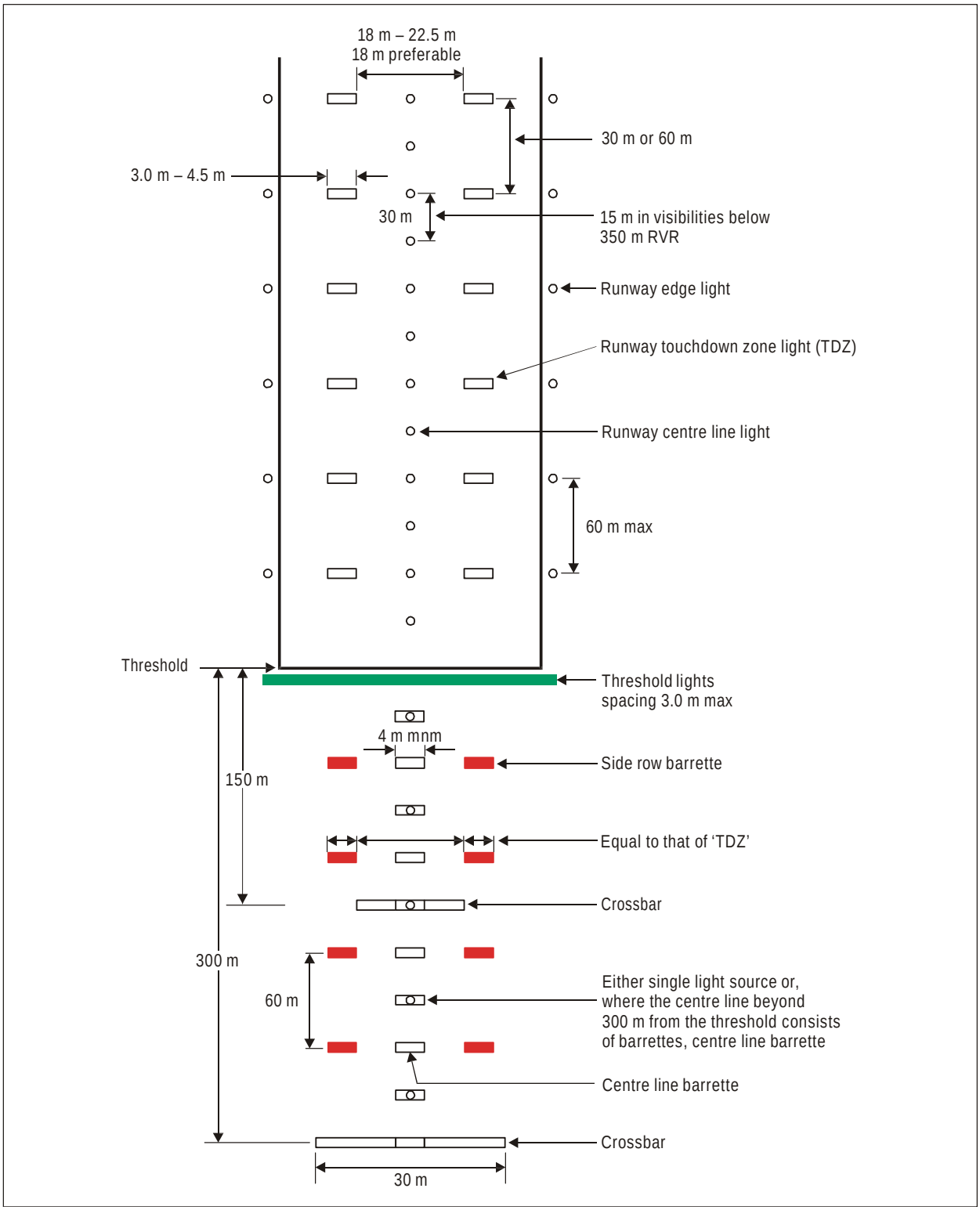


Figure 9-15. Inner 300 m approach and runway lighting for precision approach runways, categories II and III, where the serviceability levels of the lights specified as maintenance objectives in Chapter 14 can be demonstrated

Note: *The length of 900 m is based on providing guidance for operations under category I, II and III conditions. Reduced lengths may support category II and III operations but may impose limitations on category I operations. See Attachment A, Section 11.*

9.4.4.23 The lights forming the centre line shall be placed at longitudinal intervals of 30 m with the innermost lights located 30 m from the threshold.

9.4.4.24 The lights forming the side rows shall 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 30 m from the threshold. Where the serviceability level of the approach lights specified as maintenance objectives in paragraph 14.2.5.7 of this Regulation can be demonstrated, lights forming the side rows may be placed on each side of the centre line, at a longitudinal spacing of 60 m with the first light located 60 m from the threshold. The lateral spacing (or gauge) between the innermost lights of the side rows shall be not less than18 m nor more than 22.5 m, and preferably 18 m, but in any event shall be equal to that of the touchdown zone lights.

9.4.4.25 The crossbar provided at 150 m from the threshold shall fill in the gaps between the centre line and side row lights.

9.4.4.26 The crossbar provided at 300 m from the threshold shall extend on both sides of the centre line lights to a distance of 15 m from the centre line.

9.4.4.27 If the centre line beyond a distance of 300 m from the threshold consists of lights as described in paragraph 9.4.4.31 b) or 9.4.4.32 b) of this Regulation, additional crossbars of lights shall be provided at 450 m, 600 m and 750 m from the threshold.

9.4.4.28 Where the additional crossbars described in paragraph 9.4.4.27 of this Regulation are incorporated in the system, the outer ends of these crossbars shall lie on two straight lines that either are parallel to the centre line or converge to meet the runway centre line 300 m from the threshold.

9.4.4.29 The system shall lie as nearly as practicable in the horizontal plane passing through the threshold, provided that:

(a) no object other than an ILS or MLS azimuth antenna shall protrude through the plane of the approach lights within a distance of 60 m from the centre line of the system; and

(b) no light other than a light located within the central part of a crossbar or a centre line barrette (not their extremities) shall be screened from an approaching aircraft.

Any ILS or MLS azimuth antenna protruding through the plane of the lights shall be treated as an obstacle and marked and lighted accordingly.

Characteristics

9.4.4.30 The centre line of a precision approach category II and III lighting system for the first 300 m from the threshold shall consist of barrettes showing variable white, except that, where the threshold is displaced 300 m or more, the centre line may consist of single light sources showing variable white. Where the serviceability level of the approach lights specified as maintenance objectives in paragraph 14.2.5.7 of this Regulation can be demonstrated, the centre line of a precision approach category II and III lighting system for the first 300m from the threshold may consist of either:

(a) barrettes, where the centre line beyond 300 m from the threshold consists of barrettes as described in paragraph 9.4.4.32 a) of this Regulation; or

(b) alternate single light sources and barrettes, where the centre line beyond 300 m from the threshold consists of single light sources as described in paragraph 9.4.4.32 b) of this Regulation, with the innermost single light source located 30 m and the innermost barrette located 60 m from the threshold; or

(c) single light sources where the threshold is displaced 300 m or more;

all of which shall show variable white.

9.4.4.31 Beyond 300 m from the threshold each centre line light position shall consist of either:

(a) a barrette as used on the inner 300 m; or

(b) two light sources in the central 300 m of the centre line and three light sources in the outer 300 m of the centre line;

all of which shall show variable white.

9.4.4.32 Where the serviceability level of the approach lights specified as maintenance objectives in paragraph 14.2.5.7 of this Regulation can be demonstrated, beyond 300 m from the threshold each centre line light position may consist of either:

(a) a barrette; or

(b) a single light source;

all of which shall show variable white.

9.4.4.33 The barrettes shall be at least 4 m in length. When barrettes are composed of lights approximating to point sources, the lights shall be uniformly spaced at intervals of not more than 1.5 m.

9.4.4.34 If the centre line beyond 300 m from the threshold consists of barrettes as described in paragraph 9.4.4.31 a) or 9.4.4.32 a) of this Regulation, each barrette beyond 300 m shall be supplemented by a capacitor discharge light, except where such lighting is considered unnecessary taking into account the characteristics of the system and the nature of the meteorological conditions.

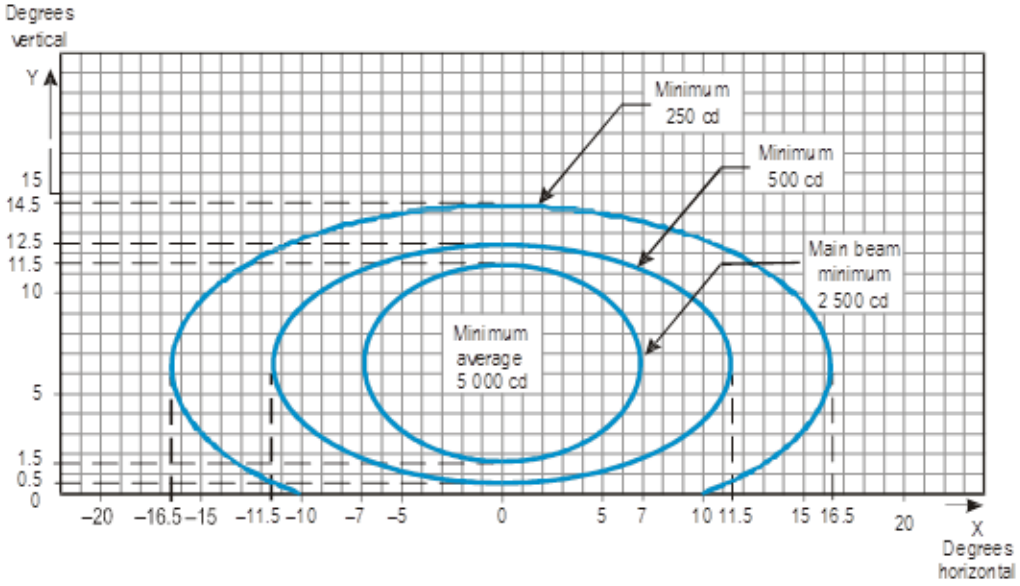
9.4.4.35 Each capacitor discharge light shall be flashed twice a second in sequence, beginning with the outermost light and progressing toward the threshold to the innermost light of the system. The design of the electrical circuit shall be such that these lights can be operated independently of the other lights of the approach lighting system.

9.4.4.36 The side row shall consist of barrettes showing red. The length of a side row barrette and the spacing of its lights shall be equal to those of the touchdown zone light barrettes.

9.4.4.37 The lights forming the crossbars shall be fixed lights showing variable white. The lights shall be uniformly spaced at intervals of not more than 2.7 m.

9.4.4.38 The intensity of the red lights shall be compatible with the intensity of the white lights.

9.4.4.39 The lights shall be in accordance with the specifications of Figures A9-1 (see para.9.4.4.21 of this Regulation) and A9-2.



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

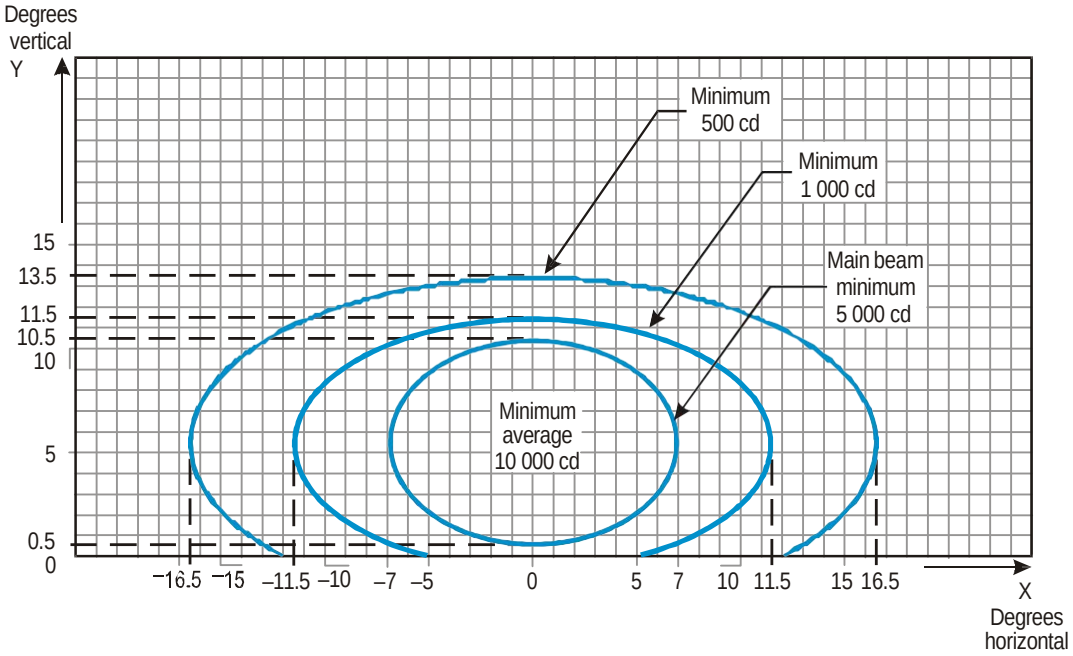
3. Vertical setting angles of the lights shall be such that the following vertical coverage of the main beam will be met:

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 A9-2. Isocandela diagram for approach side row light (red light)

Note: *The flight path envelopes used in the design of these lights are given in Figure A-4.*



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 A9-1 to A9-11 and A9-26.

Figure A9-4. Isocandela diagram for threshold wing bar light (green light)

9.4.5 VISUAL APPROACH SLOPE INDICATOR SYSTEMS

Application

9.4.5.1 A visual approach slope indicator system shall be provided to serve the approach to a runway whether or not the runway is served by ther 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 in the absence of sufficient extraneous lights in the approach area by night, or

(ii) 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.

Note: *Guidance on the priority of installation of visual approach slope indicator systems is contained in ICAO Annex 14 Vol. I, Attachment A, Section 11.*

9.4.5.2 The standard visual approach slope indicator systems shall consist of the following:

(a) PAPI and APAPI systems conforming to the specifications contained in 9.4.5.6 to 9.4.5.23 inclusive;

as shown in Figure 9-16.

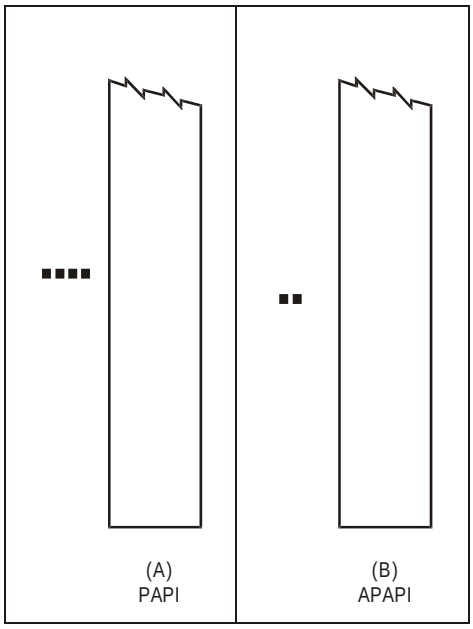


Figure 9-16. Visual approach slope indicator systems

9.4.5.3 PAPI shall be provided where the code number is 3 or 4 when one or more of the conditions specified in paragraph 9.4.5.1 of this Regulation exist.

9.4.5.4 PAPI or APAPI shall be provided where the code number is 1 or 2 when one or more of the conditions specified in paragraph 9.4.5.1 of this Regulation exist.

9.4.5.5 Where a runway threshold is temporarily displaced from the normal position and one or more of the conditions specified in paragraph 9.4.5.1 of this Regulation exist, a PAPI shall be provided except that where the code number is 1 or 2 an APAPI may be provided.

PAPI and APAPI

Description

9.4.5.6 The PAPI system shall consist of a wing bar of 4 sharp transition multi-lamp (or paired single lamp) units equally spaced. The system shall be located on the left side of the runway unless it is physically impracticable to do so.

Note: *Where a runway is used by aircraft requiring visual roll guidance which is not provided by other external means, then a second wing bar may be provided on the opposite side of the runway.*

9.4.5.7 The APAPI system shall consist of a wing bar of 2 sharp transition multi-lamp (or paired single lamp) units. The system shall be located on the left side of the runway unless it is physically impracticable to do so.

Note: *Where a runway is used by aircraft requiring visual roll guidance which is not provided by other external means, then a second wing bar may be provided on the opposite side of the runway.*

9.4.5.8 The 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 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 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.

9.4.5.9 The wing bar of an APAPI shall be constructed and arranged in such a manner that a pilot making an approach will:

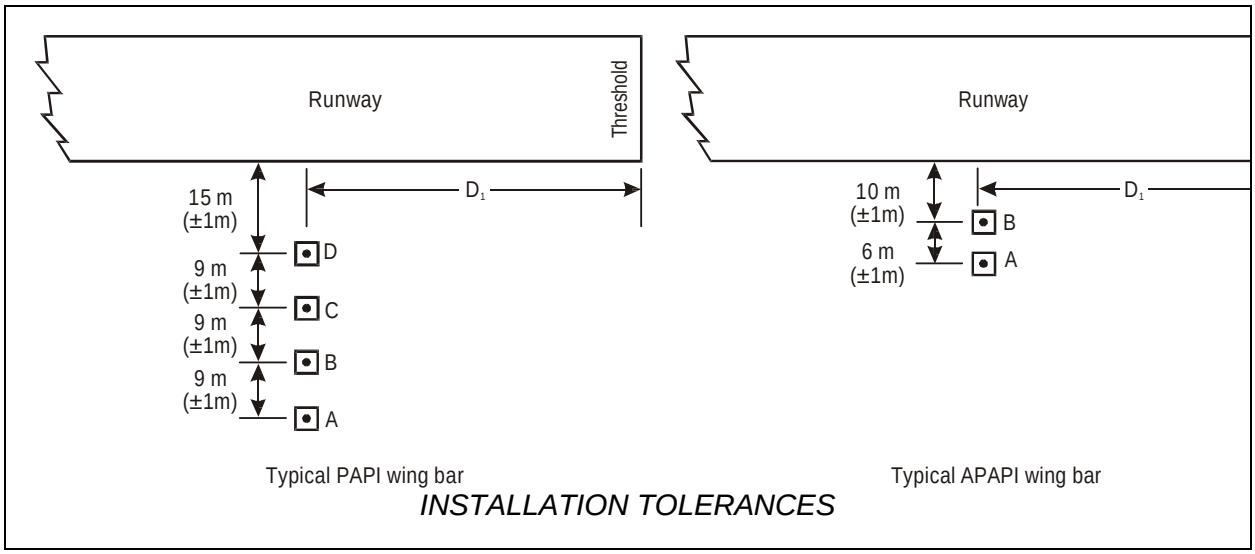
(a) when on or close to the approach slope, see the unit nearer the runway as red and the unit farther from the runway as white;

(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.

Siting

9.4.5.10 The light units shall be located as in the basic configuration illustrated in Figure 9-19, subject to the installation tolerances given therein. 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. The light units shall be mounted as low as possible and shall be frangible.



INSTALLATION TOLERANCES

a) Where a PAPI or APAPI is installed on a runway not equipped with an ILS or MLS, the distance D1 shall be calculated to ensure that the lowest height at which a pilot will see a correct approach path indication (Figure 9-20, angle B for a PAPI and angle A for an APAPI) provides the wheel clearance over the threshold specified in Table 9-2 for the most demanding amongst aeroplanes regularly using the runway.

b) Where a PAPI or APAPI is installed on a runway equipped with an ILS and/or MLS, the distance D1 shall be calculated to provide the optimum compatibility between the visual and non-visual aids for the range of eye-to-antenna heights of the aeroplanes regularly using the runway. The distance shall be equal to that between the threshold and the effective origin of the ILS glide path or MLS minimum glide path, as appropriate, plus a correction factor for the variation of eyeto- antenna heights of the aeroplanes concerned.

The correction factor is obtained by multiplying the average eyeto- antenna height of those aeroplanes by the cotangent of the approach angle. However, the distance shall be such that in no case will the wheel clearance over the threshold be lower than that specified in column (3) of Table 9-2.

***Note:** See Section 5.2.5 for specifications on aiming point marking. Guidance on the harmonization of PAPI, ILS and/or MLS signals is contained in the G-AGA-014.*

c) If a wheel clearance, greater than that specified in a) above is required for specific aircraft, this can be achieved by increasing D1.

d) Distance D1 shall be adjusted to compensate for differences in elevation between the lens centres of the light units and the threshold.

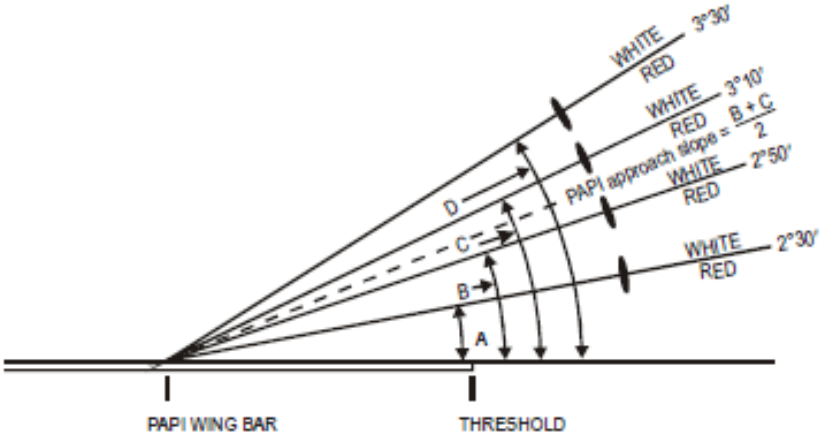
e) To ensure that units are mounted as low as possible and to allow for any transverse slope, small height adjustments of up to 5 cm between units are acceptable. A lateral gradient not greater than 1.25 % can be accepted provided it is uniformly applied across the units.

f) A spacing of 6 m (±1 m) between PAPI units shall be used on code numbers 1 and 2. In such an event, the inner PAPI unit shall be located not less than 10 m (±1 m) from the runway edge.

***Note:** Reducing the spacing between light units results in a reduction in usable range of the system.*

g) *The lateral spacing between APAPI units may be increased to 9 m (±1 m) if greater range is required or later conversion to a full PAPI is anticipated. In the latter case, the inner APAPI unit shall be located 15 m (±1 m) from the runway edge.*

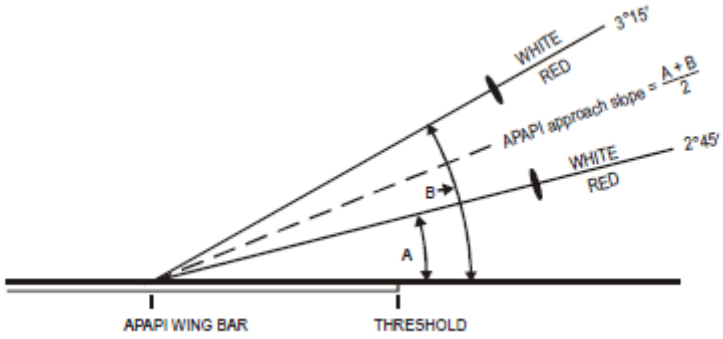
Figure 9-19. Siting of PAPI and APAPI



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

Figure 9-20. Light beams and angle of elevation setting of PAPI and APAPI

Table 9-2. Wheel clearance over threshold for PAPI and APAPI

Eye-to-wheel height of aeroplane in the approach configurationa	Desired wheel clearance (metres) b,c	Minimum wheel clearance (metres) d
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.

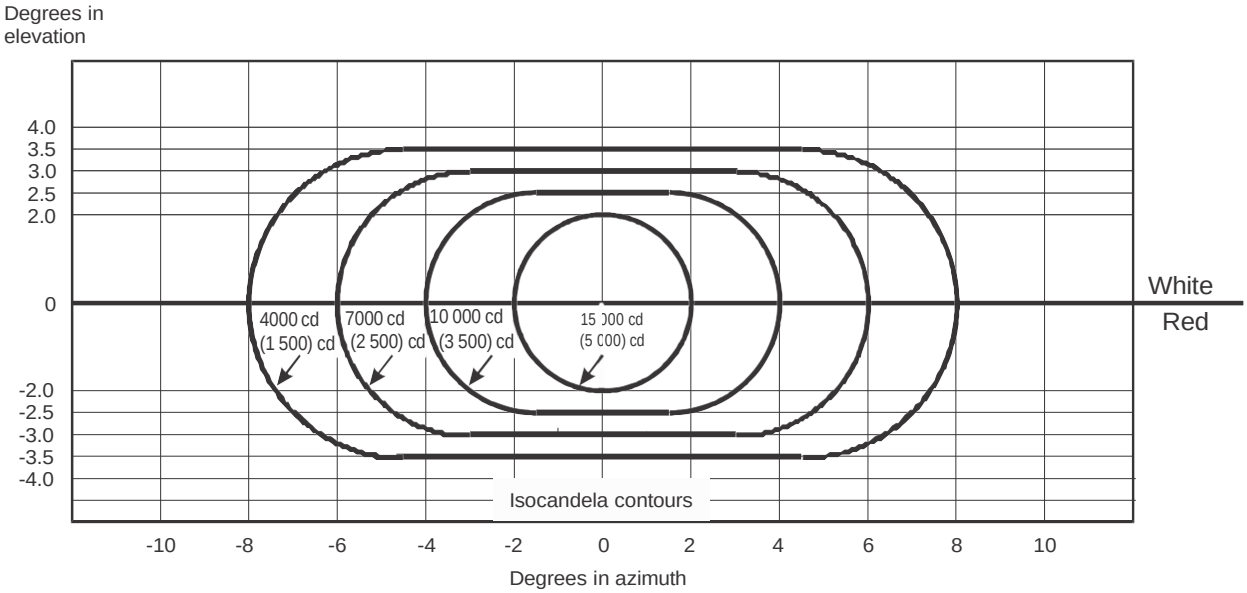
Characteristics of the light units

9.4.5.11 The system shall be suitable for both day and night operations.

9.4.5.12 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, to occur within a vertical angle of not more than 3'.

9.4.5.13 At full intensity the red light shall have a Y coordinate not exceeding 0.320.

9.4.5.14 The light intensity distribution of the light units shall be as shown in Figure A9-23.



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 A9-23. Light intensity distribution of PAPI and APAPI

Note: *See the document G-AGA-014 for additional guidance on the characteristics of light units.*

9.4.5.15 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.

9.4.5.16 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' and at least 4°30' above the horizontal.

9.4.5.17 The light units shall be so designed that deposits of condensation, dirt, etc., 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.

Approach slope and elevation setting of light units

9.4.5.18 The approach slope as defined in Figure 9-20 shall be appropriate for use by the aeroplanes using the approach.

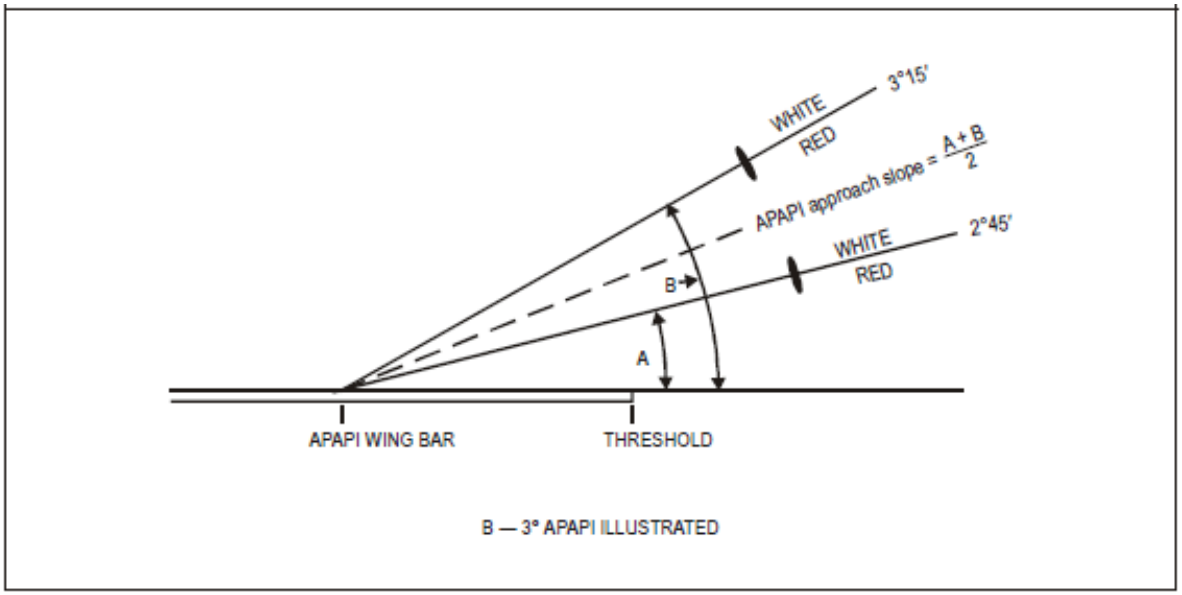


Figure 9-20. Light beams and angle of elevation setting of PAPI and APAPI

9.4.5.19 When the runway is equipped with an ILS and/or MLS, 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 and/or the minimum glide path of the MLS, as appropriate.

9.4.5.20 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 one white and three reds will clear all objects in the approach area by a safe margin.

9.4.5.21 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. one white and one red, will clear all objects in the approach area by a safe margin.

9.4.5.22 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. The extent of the restriction shall be such that the object remains outside the confines of the light beam.

Note: *See paragraphs 9.4.5.24 to 9.4.5.28 concerning the related obstacle protection surface.*

9.4.5.23 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.

Obstacle protection surface

Note: *The following specifications apply to PAPI and APAPI.*

9.4.5.24 An obstacle protection surface shall be established when it is intended to provide a visual approach slope indicator system.

9.4.5.25 The characteristics of the obstacle protection surface, i.e. origin, divergence, length and slope shall correspond to those specified in the relevant column of Table 9-3 and in Figure 9-21.

Table 9-3 – Dimensions and slopes of the obstacles protection surface

Surface dimen-sions	Runway type/code number							
	Non-instrument				Instrument			
	Code number				Code number			
	1	2	3	4	5	6	7	8
Length of inner edge	60 m	80 m	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
Divergen-ce (each side)	10%	10%	10%	10%	15%	15%	15%	15%
Total length	7 500 m	7 500 m	15 000 m	15 000 m	7 500 m	7 500 m	15 000 m	15 000 m
Slope								
a) PAPI[b]	-	A-0.57°	A-0.57°	A-0.57°	A-0.57°	A-0.57°	A-0.57°	A-0.57°
b) APAPI[b]	A-0.9°	A-0.9°	-	-	A-0.9°	A-0.9°	-	-

a. No slope has been specified if a system is unlikely to be used on runway type/code number indicated.

b. Angles as indicated in Figure 9-19.

c. 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 9-19). 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 9.4.5.28 e).

9.4.5.26 New objects or extensions of existing objects shall not be permitted above an obstacle protection surface except when, in the opinion of the SCAA, the new object or extension would be shielded by an existing immovable object.

Note: *Circumstances in which the shielding principle may reasonably be applied are described in the G-AGA-016.*

9.4.5.27 Existing objects above an obstacle protection surface shall be removed except when, in the opinion of the SCAA, 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.

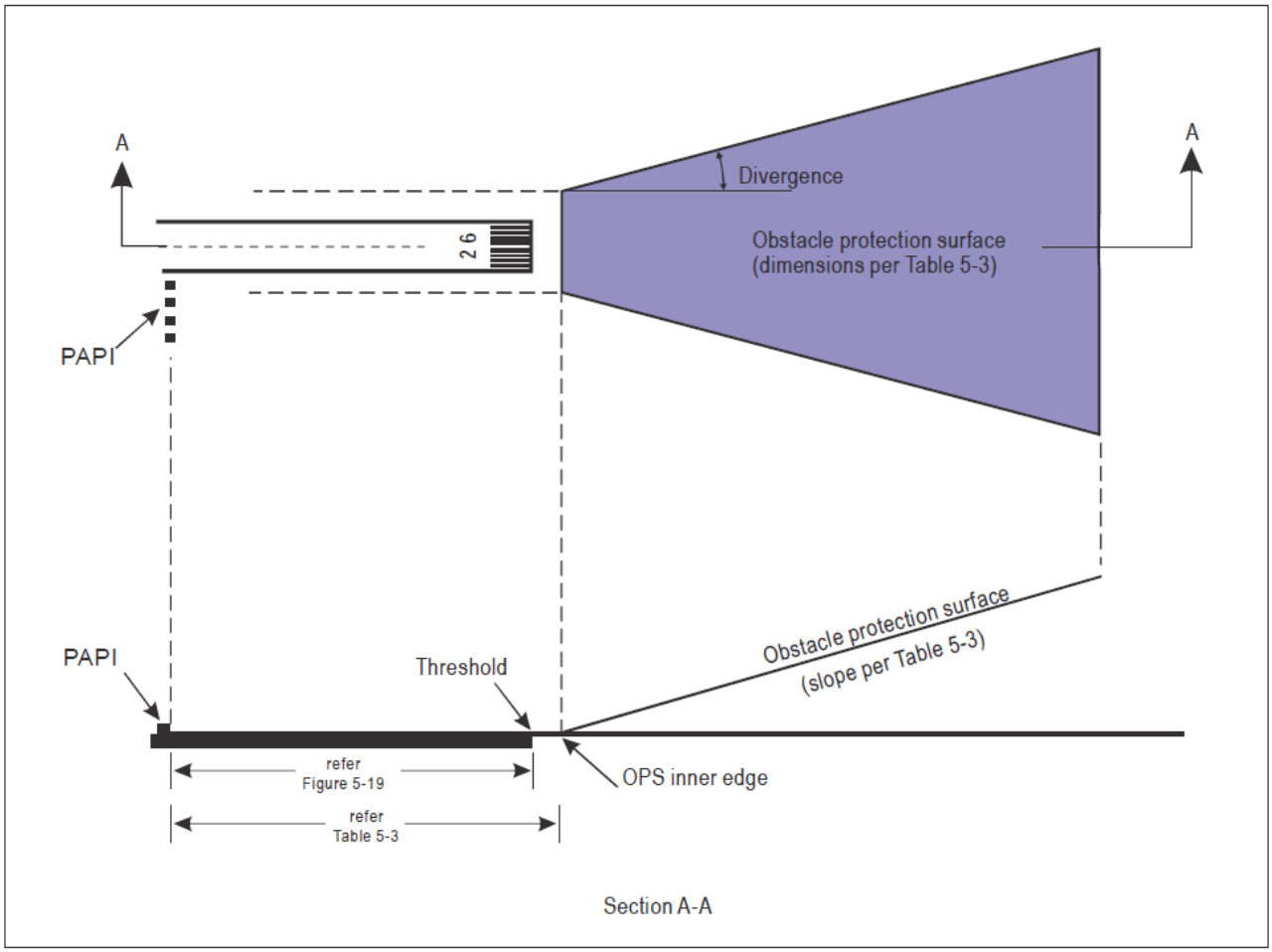


Figure 9-21. Obstacle protection surface for visual approach slope indicator systems

9.4.5.28 Where an aeronautical study indicates that an existing object extending above an obstacle protection surface could adversely affect the safety of operations of aeroplanes one or more of the following measures shall be taken:

(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°; and

(e) suitably displace the system upwind of the threshold such that the object no longer penetrates the OPS.

Note1: *Guidance on this issue is contained in the G-AGA-014.*

Note 2: *The displacement of the system upwind of the threshold reduces the operational landing distance.*

9.4.6 CIRCLING GUIDANCE LIGHTS

Application

9.4.6.1 Circling guidance lights shall be provided when existing approach and runway lighting systems do not satisfactorily permit identification of the runway and/or approach area to a circling aircraft in the conditions for which it is intended the runway be used for circling approaches.

Location

9.4.6.2 The location and number of circling guidance lights shall be 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 and/or other features 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.

9.4.6.3 Circling guidance lights shall consist of:

(a) lights indicating the extended centre line of the runway and/or parts of any approach lighting system; 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.

Note: *Guidance on installation of circling guidance lights is given in the G-AGA-014.*

Characteristics

9.4.6.4 Circling guidance lights shall 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. The flashing lights shall be white, and the steady lights either white or gaseous discharge lights.

9.4.6.5 The lights shall be designed and be installed in such a manner that they will not dazzle or confuse a pilot when approaching to land, taking off or taxiing.

9.4.7 RUNWAY LEAD-IN LIGHTING SYSTEMS

Application

9.4.7.1 A runway lead-in lighting system shall be provided 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.

Note: *Guidance on providing lead-in lighting systems is given in the G-AGA-014.*

Location

9.4.7.2 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. The interval between adjacent groups shall not exceed approximately 1 600 m.

Note: *Runway lead-in lighting systems may be curved, straight or a combination thereof.*

9.4.7.3 A runway lead-in lighting system shall extend from a point as determined by the SCAA, up to a point where the approach lighting system, if provided, or the runway or the runway lighting system is in view.

Characteristics

9.4.7.4 Each group of lights of a runway lead-in lighting system shall consist of at least three flashing lights in a linear or cluster configuration. The system may be augmented by steady burning lights where such lights would assist in identifying the system.

9.4.7.5 The flashing lights shall be white, and the steady burning lights gaseous discharge lights.

9.4.7.6 Where practicable, the flashing lights in each group shall flash in sequence towards the runway.

9.4.8 RUNWAY THRESHOLD IDENTIFICATION LIGHTS

Application

9.4.8.1 Runway threshold identification lights shall be installed:

(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.

Location

9.4.8.2 Runway threshold identification lights shall be located symmetrically about the runway centre line, in line with the threshold and approximately 10 m outside each line of runway edge lights.

Characteristics

9.4.8.3 Runway threshold identification lights shall be flashing white lights with a flash frequency between 60 and 120 per minute.

9.4.8.4 The lights shall be visible only in the direction of approach to the runway.

9.4.9 RUNWAY EDGE LIGHTS

Application

9.4.9.1 Runway edge lights shall be provided for a runway intended for use at night or for a precision approach runway intended for use by day or night.

9.4.9.2 Runway edge lights shall be provided on a runway intended for take-off with an operating minimum below an RVR of the order of 800 m by day.

Location

9.4.9.3 Runway edge lights shall be placed along the full length of the runway and shall be in two parallel rows equidistant from the centre line.

9.4.9.4 Runway edge lights shall be placed along the edges of the area declared for use as the runway or outside the edges of the area at a distance of not more than 3 m.

9.4.9.5 Where the width of the area which could be declared as runway exceeds 60 m, 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.

9.4.9.6 The lights shall be uniformly spaced in rows at intervals of not more than 60 m for an instrument runway, and at intervals of not more than 100 m for a non-instrument runway. The lights on opposite sides of the runway axis shall be on lines at right angles to that axis. At intersections of runways, lights may be spaced irregularly or omitted, provided that adequate guidance remains available to the pilot.

Characteristics

9.4.9.7 Runway edge lights shall be fixed lights showing variable white, except that:

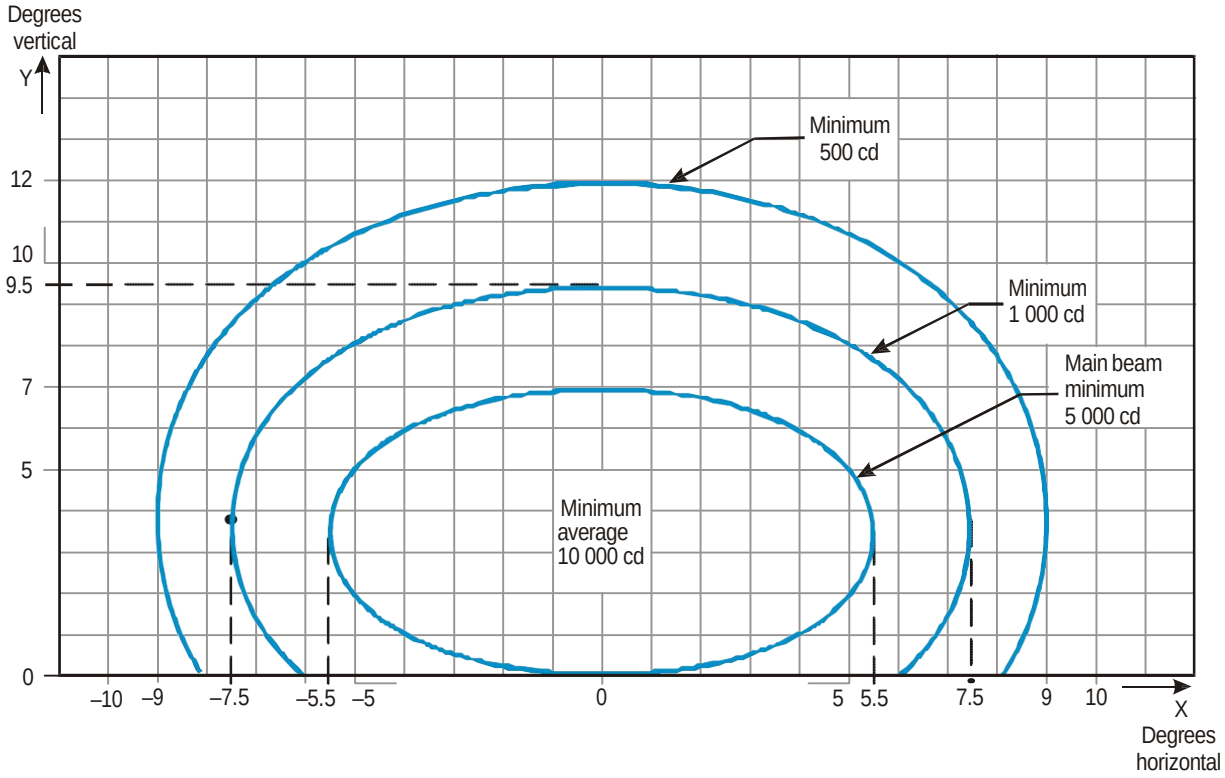
(a) in the case of a displaced threshold, the lights between the beginning of the runway and the displaced threshold shall show red in the approach direction; and

(b) a section of the lights 600 m 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.

9.4.9.8 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. When the runway edge lights are intended to provide circling guidance, they shall show at all angles in azimuth (See paragraph 9.4.6.1 of this Regulation).

9.4.9.9 In all angles of azimuth required in paragraph 9.4.9.8 of this Regulation, runway edge lights shall show at angles up to 15° 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. In any case, the intensity shall be at least 50 cd except that at an aerodrome without extraneous lighting the intensity of the lights may be reduced to not less than 25 cd to avoid dazzling the pilot.

9.4.9.10 Runway edge lights on a precision approach runway shall be in accordance with the specifications of Figure A9-9 or A9-10.



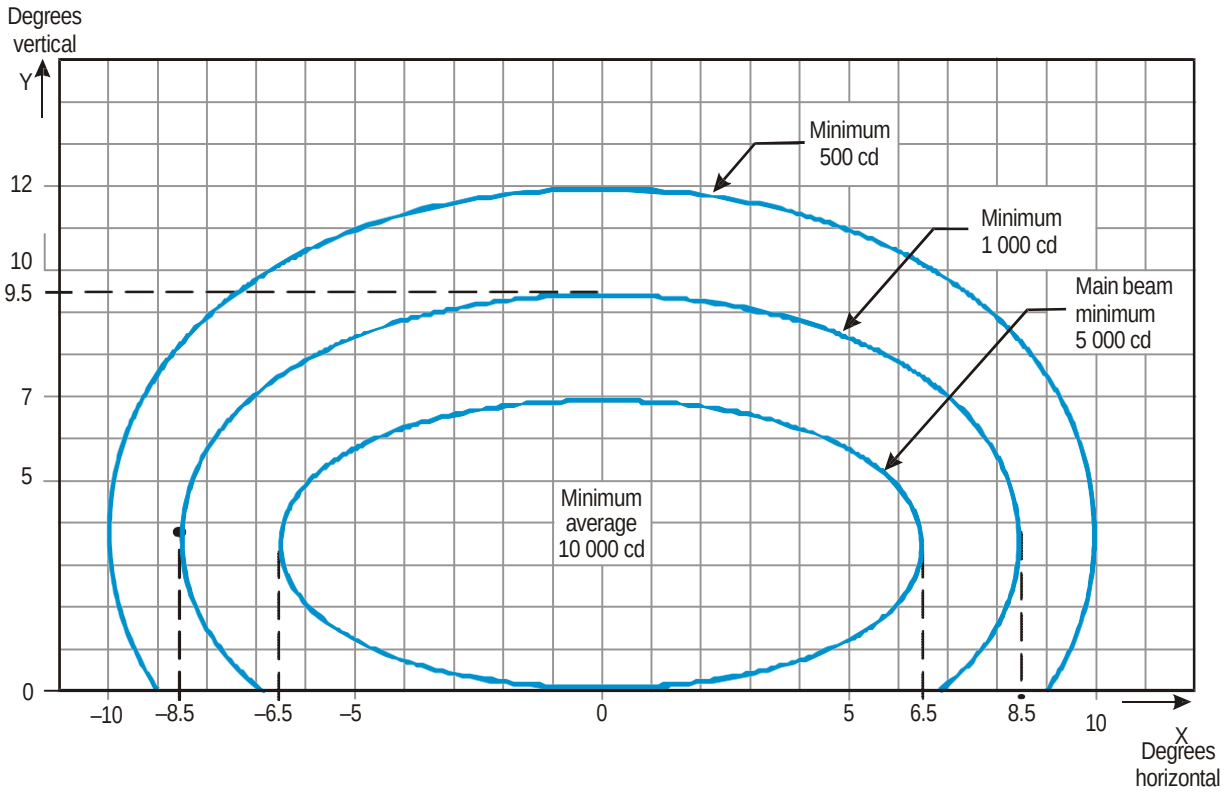
Notes:

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 A9-1 to A9-11 and A9-26.

Figure A9-9. 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	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 A9-1 to A9-11 and A9-26.

Figure A9-10. Isocandela diagram for runway edge light where width of runway is 60 m (white light)

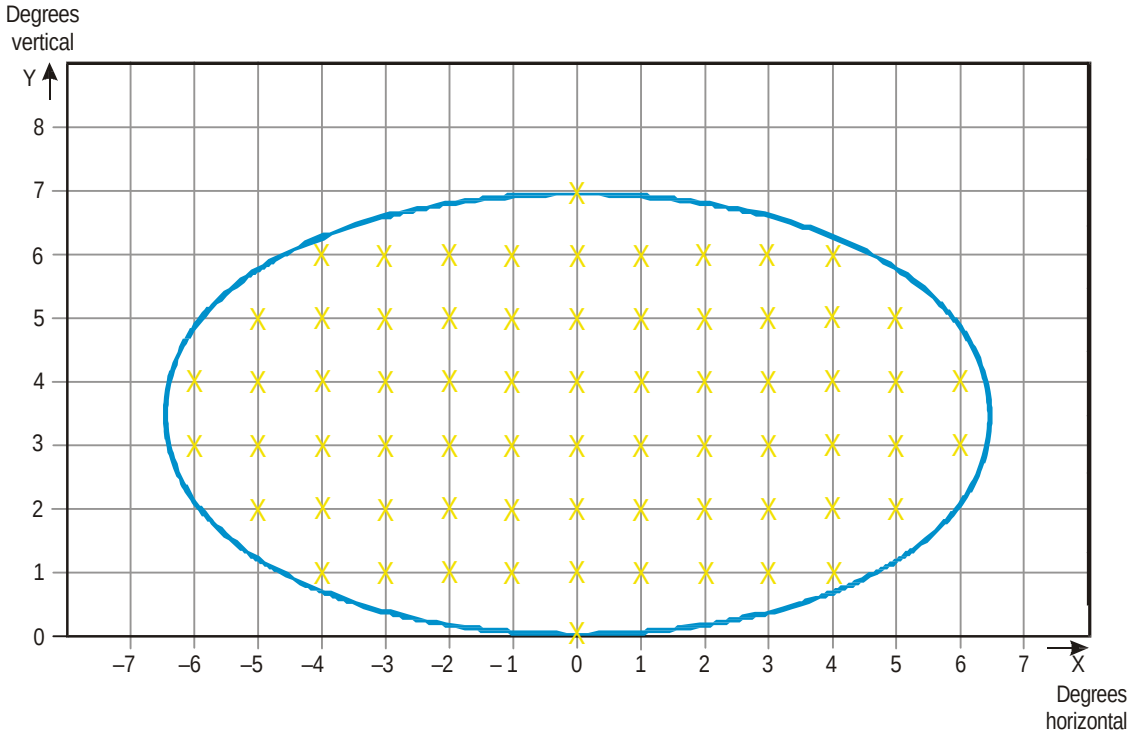


Figure A2-11. Grid points to be used for the calculation of average intensity of approach and runway lights

9.4.10 RUNWAY THRESHOLD AND WING BAR LIGHTS

(See below Figure 9-22)

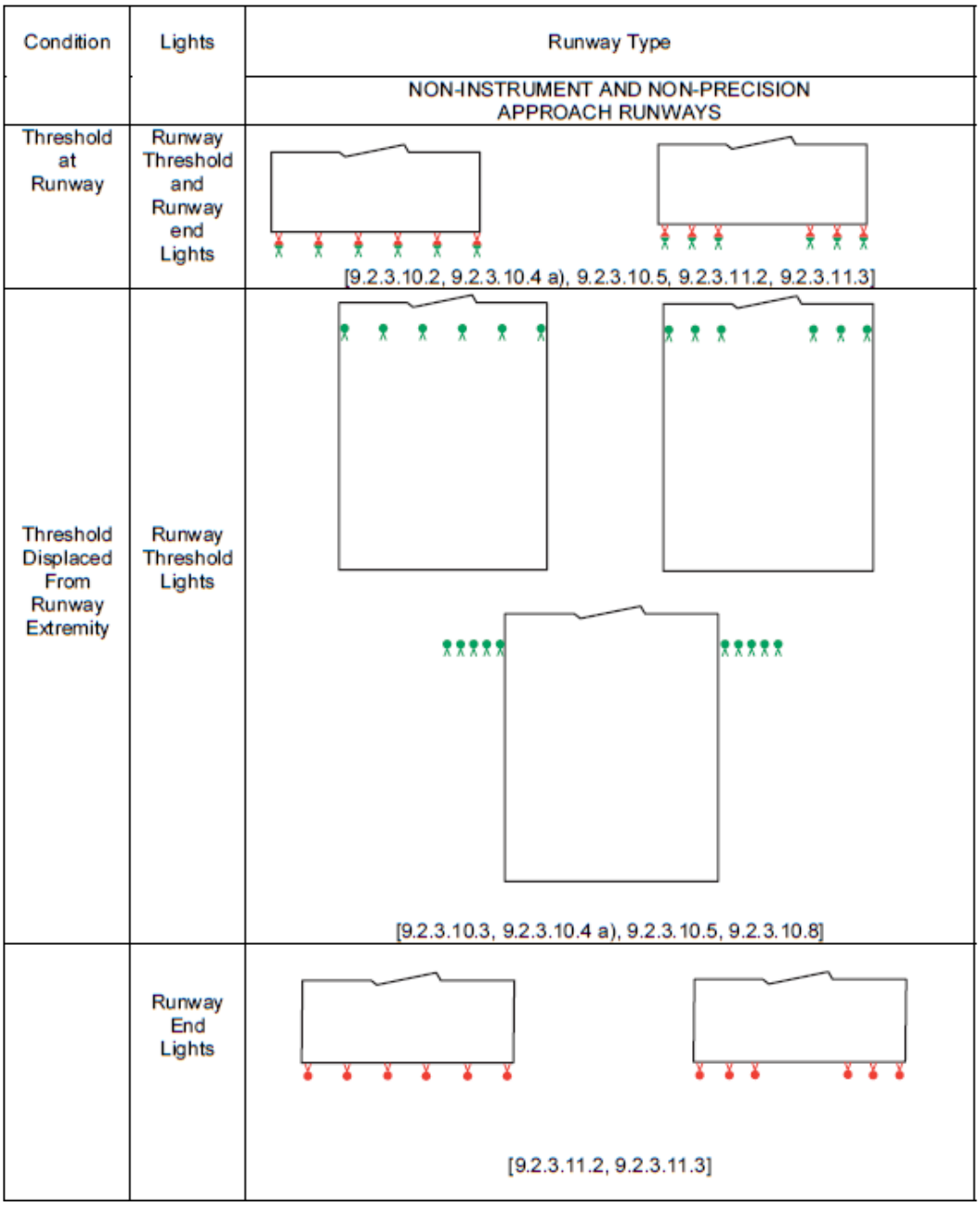


Figure 9-22. Arrangement of runway threshold and runway end lights

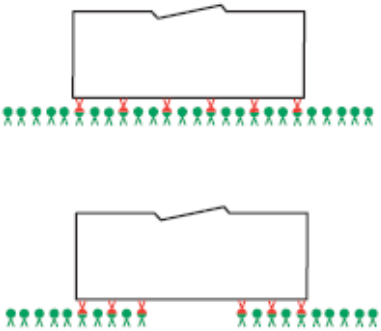
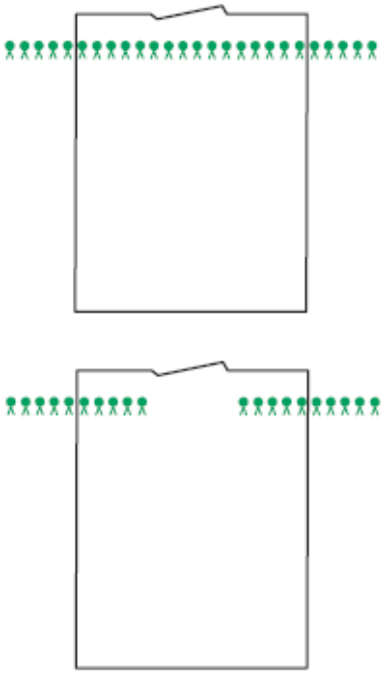
Condition	Lights	Runway Type
		PRECISION APPROACH RUNWAYS CATEGORY I
Threshold at Runway	Runway Threshold and Runway end Lights	 [9.2.3.10.2, 9.2.3.10.4 b), 9.2.3.10.5, 9.2.3.10.8, 9.2.3.11.2, 9.2.3.11.3]
Threshold Displaced From Runway Extremity	Runway Threshold Lights	 [9.2.3.10.3, 9.2.3.10.4 b), 9.2.3.10.5, 9.2.3.10.8]
	Runway End Lights	 [9.2.3.11.2, 9.2.3.11.3]

Figure 9-22. Arrangement of runway threshold and runway end lights

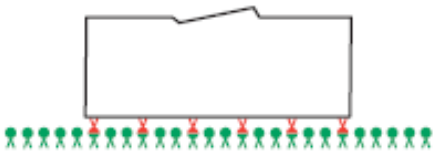
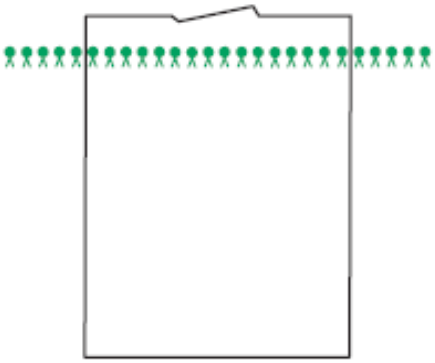
Condition	Lights	Runway Type
		PRECISION APPROACH RUNWAYS CATEGORY II
Threshold at Runway	Runway Threshold and Runway end Lights	 [9.2.3.10.2, 9.2.3.10.4 c), 9.2.3.10.8, 9.2.3.11.2, 9.2.3.11.3]
Threshold Displaced From Runway Extremity	Runway Threshold Lights	 [9.2.3.10.3, 9.2.3.10.4 c), 9.2.3.10.8]
	Runway End Lights	 [9.2.3.11.2, 9.2.3.11.3]

Figure 9-22. Arrangement of runway threshold and runway end lights

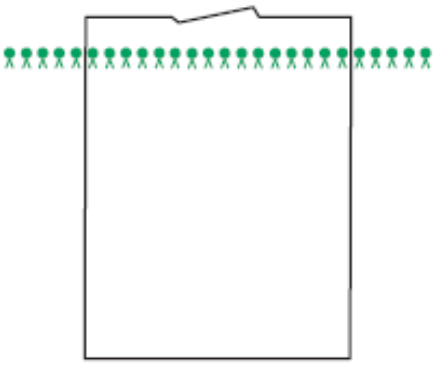
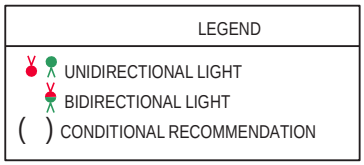
Condition	Lights	Runway Type PRECISION APPROACH RUNWAYS CATEGORY III
Threshold at Runway	Runway Threshold and Runway end Lights	 [9.2.3.10.2, 9.2.3.10.4 c), 9.2.3.10.8, 9.2.3.11.2, 9.2.3.11.3]
Threshold Displaced From Runway Extremity	Runway Threshold Lights	 [9.2.3.10.3, 9.2.3.10.4 c), 9.2.3.10.8]
	Runway End Lights	 [9.2.3.11.2, 9.2.3.11.3]

Figure 9-22. Arrangement of runway threshold and runway end lights



Note: *The minimum number of lights are shown for a runway 45 m wide with runway edge lights installed at the edge.*

Application of runway threshold lights

9.4.10.1 Runway threshold lights shall be provided 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.

Location of runway threshold lights

9.4.10.2 When a threshold is at the extremity of a runway, the threshold lights shall 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 3 m outside the extremity.

9.4.10.3 When a threshold is displaced from the extremity of a runway, threshold lights shall be placed in a row at right angles to the runway axis at the displaced threshold.

9.4.10.4 Threshold lighting shall consist of:

(a) on a non-instrument or non-precision approach runway, at least six lights;

(b) 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 3 m between the rows of runway edge lights; and

(c) 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 3 m.

9.4.10.5 The lights prescribed in paragraph 9.4.10.4 a) and b) of this Regulation 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 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.

Application of wing bar lights

9.4.10.6 Wing bar lights shall be provided on a precision approach runway when additional conspicuity is considered desirable.

9.4.10.7 Wing bar lights shall be provided on a non-instrument or non precision approach runway where the threshold is displaced and runway threshold lights are required, but are not provided.

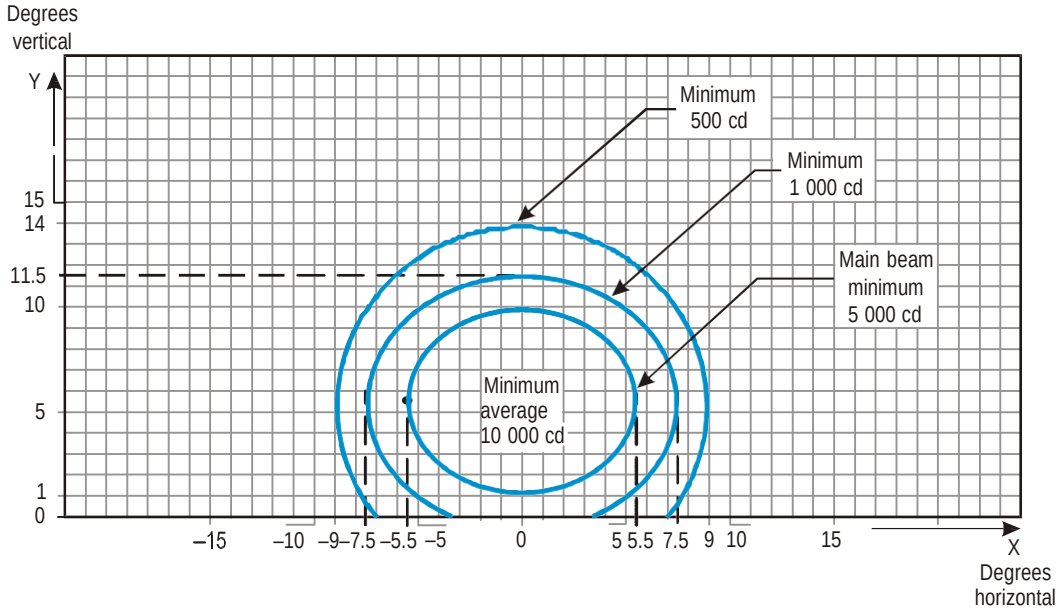
Location of wing bar lights

9.4.10.8 Wing bar lights shall be symmetrically disposed about the runway centre line at the threshold in two groups, i.e. wing bars. Each wing bar shall be formed by at least five lights extending at least 10 m 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.

Characteristics of runway threshold and wing bar lights

9.4.10.9 Runway threshold and wing bar lights shall be fixed unidirectional lights showing green in the direction of approach to the runway. 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.

9.4.10.10 Runway threshold lights on a precision approach runway shall be in accordance with the specifications of Figure A9-3.



Notes:

1. Curves calculated on formula $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$

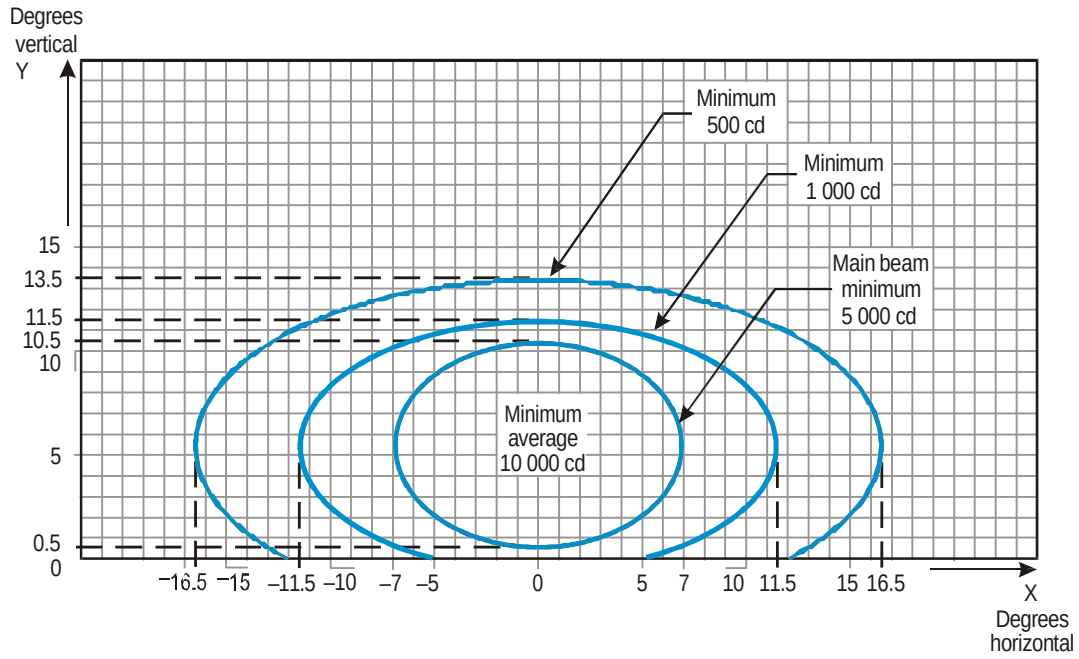
a	5.5	7.5	9.0
b	4.5	6.0	8.5

2. Toe-in 3.5 degrees

3. See collective notes for Figures A9-1 to A9-11 and A9-26.

Figure A9-3. Isocandela diagram for threshold light (green light)

9.4.10.11 Threshold wing bar lights on a precision approach runway shall be in accordance with the specifications of Figure A9-4.



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 A9-1 to A9-11 and A9-26.

Figure A9-4. Isocandela diagram for threshold wing bar light (green light)

9.4.11 RUNWAY END LIGHTS

(See Figure 9-22)

Application

9.4.11.1 Runway end lights shall be provided for a run-way equipped with runway edge lights.

Note: *When the threshold is at the runway extremity, fittings serving as threshold lights may be used as runway end lights.*

Location

9.4.11.2 Runway end 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 3 m outside the end.

9.4.11.3 Runway end lighting shall consist of at least six lights. The lights shall be either:

(a) equally spaced between the rows of runway edge lights, or

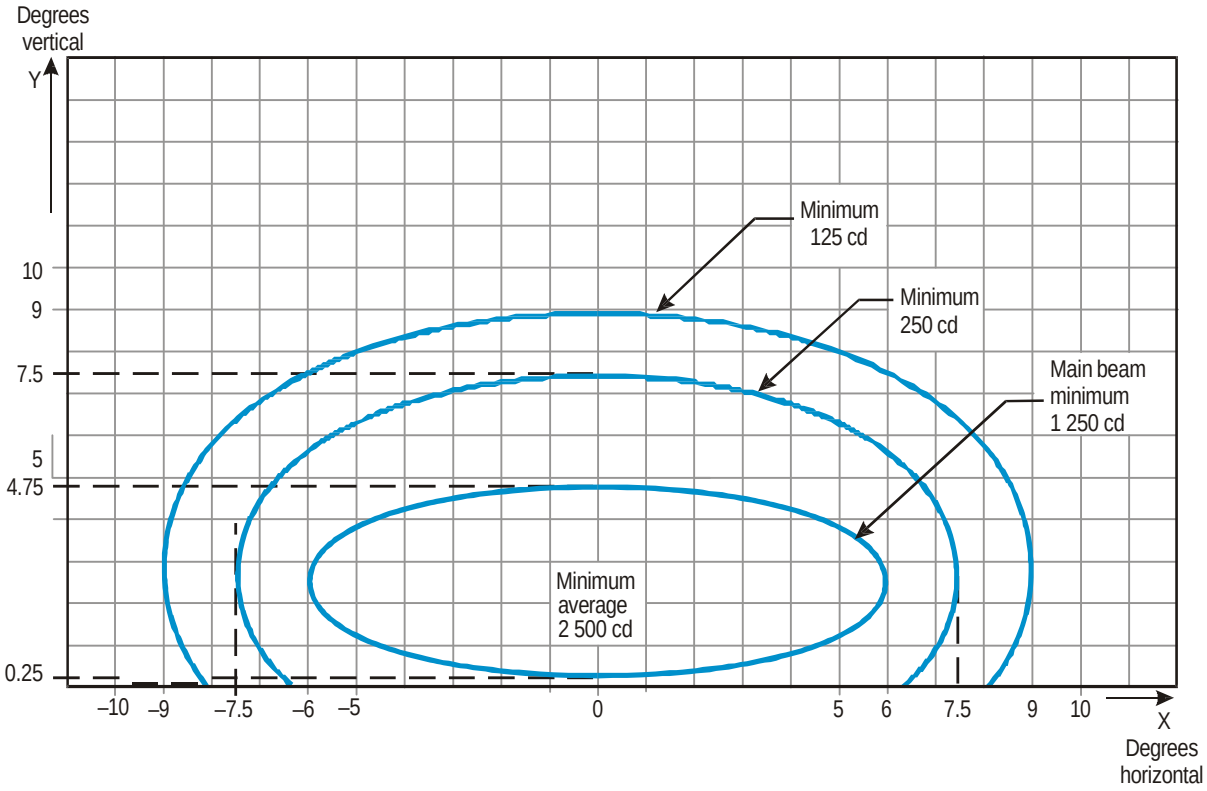
(b) symmetrically disposed about the runway centre line in two groups with the lights uniformly spaced in each group and with a gap between the groups of not more than half the distance between the rows of runway edge lights.

For a precision approach runway category III, the spacing between runway end lights, except between the two innermost lights if a gap is used, shall not exceed 6 m.

Characteristics

9.4.11.4 Runway end lights shall be fixed unidirectional lights showing red in the direction of the runway. 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.

9.4.11.5 Runway end lights on a precision approach run-way shall be in accordance with the specifications of Figure A9-8.



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 A9-1 to A9-11 and A9-26.

Figure A9-8. Isocandela diagram for runway end light (red light)

9.4.12 RUNWAY CENTRE LINE LIGHTS

Application

9.4.12.1 Runway centre line lights shall be provided on a precision approach runway category II or III.

9.4.12.2 Runway centre line lights shall be provided on a precision approach runway category I, when the runway is used by aircraft with high landing speeds or where the width between the runway edge lights is greater than 50 m.

9.4.12.3 Runway centre line lights shall be provided on a runway intended to be used for take-off with an operating minimum below an RVR of the order of 400 m.

9.4.12.4 Runway centre line lights shall be provided on a runway intended to be used for take-off with an operating minimum of an RVR of the order of 400 m 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 50 m.

Location

9.4.12.5 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 60 cm where it is not practicable to locate them along the centre line. The lights shall be located from the threshold to the end at longitudinal spacing of approximately 15 m. Where the serviceability level of the runway centre line lights specified as maintenance objectives in paragraph 14.2.5.7 or 14.2.5.11 of this Regulation, as appropriate, can be demonstrated and the runway is intended for use in runway visual range conditions of 350 m or greater, the longitudinal spacing may be approximately 30 m.

Note: *Existing centre line lighting where lights are spaced at 7.5 m need not be replaced.*

9.4.12.6 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 3 m length and spaced at uniform intervals of 30m, as shown in Figure 9-23 (see below), 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.

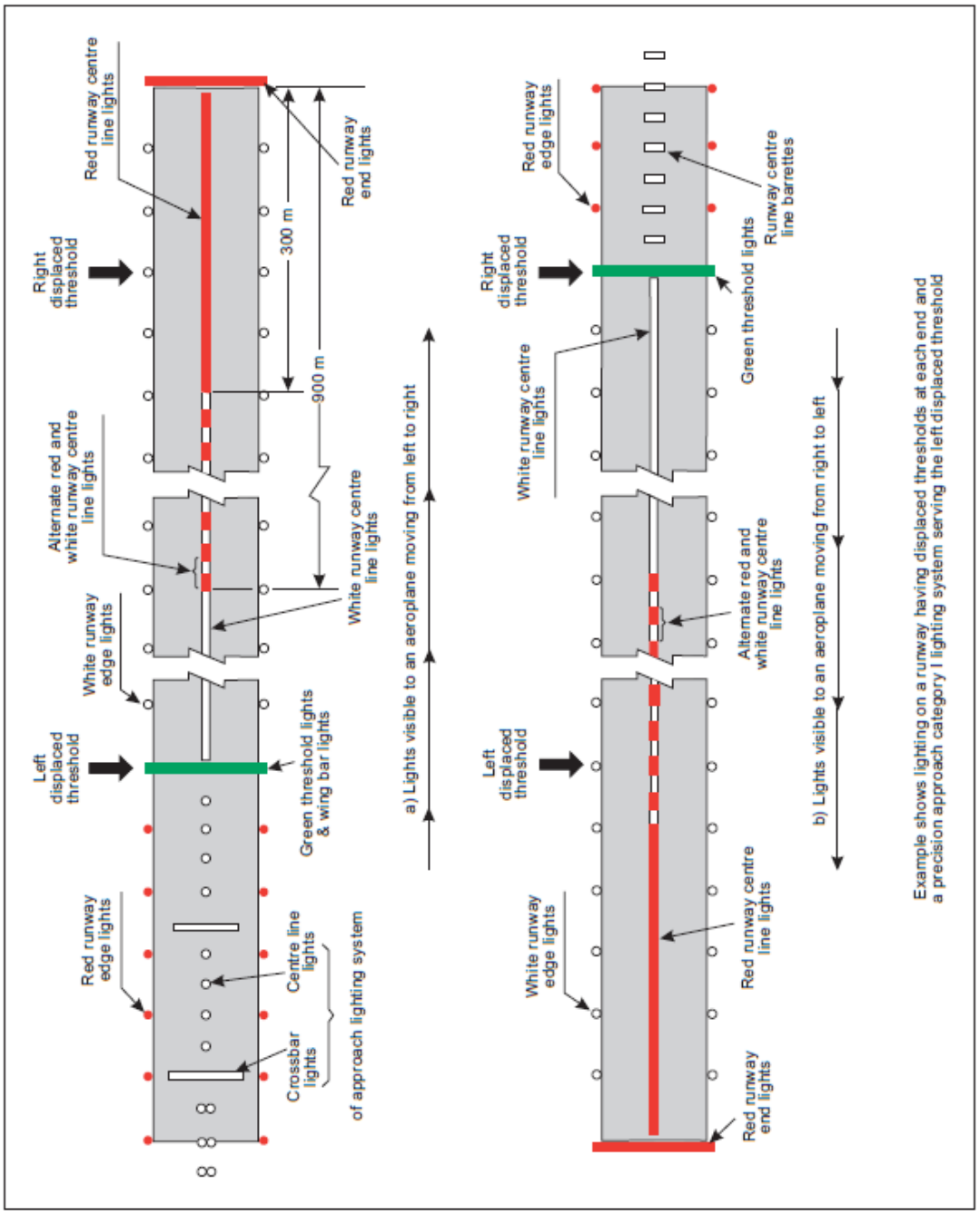


Figure 9-23. Example of approach and runway lighting for runway with displaced thresholds

Where necessary, provision shall be made to extinguish those centre line lights specified in b) or reset the intensity of the approach lighting system or barrettes when the runway is being used for landing. In no case shall 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.

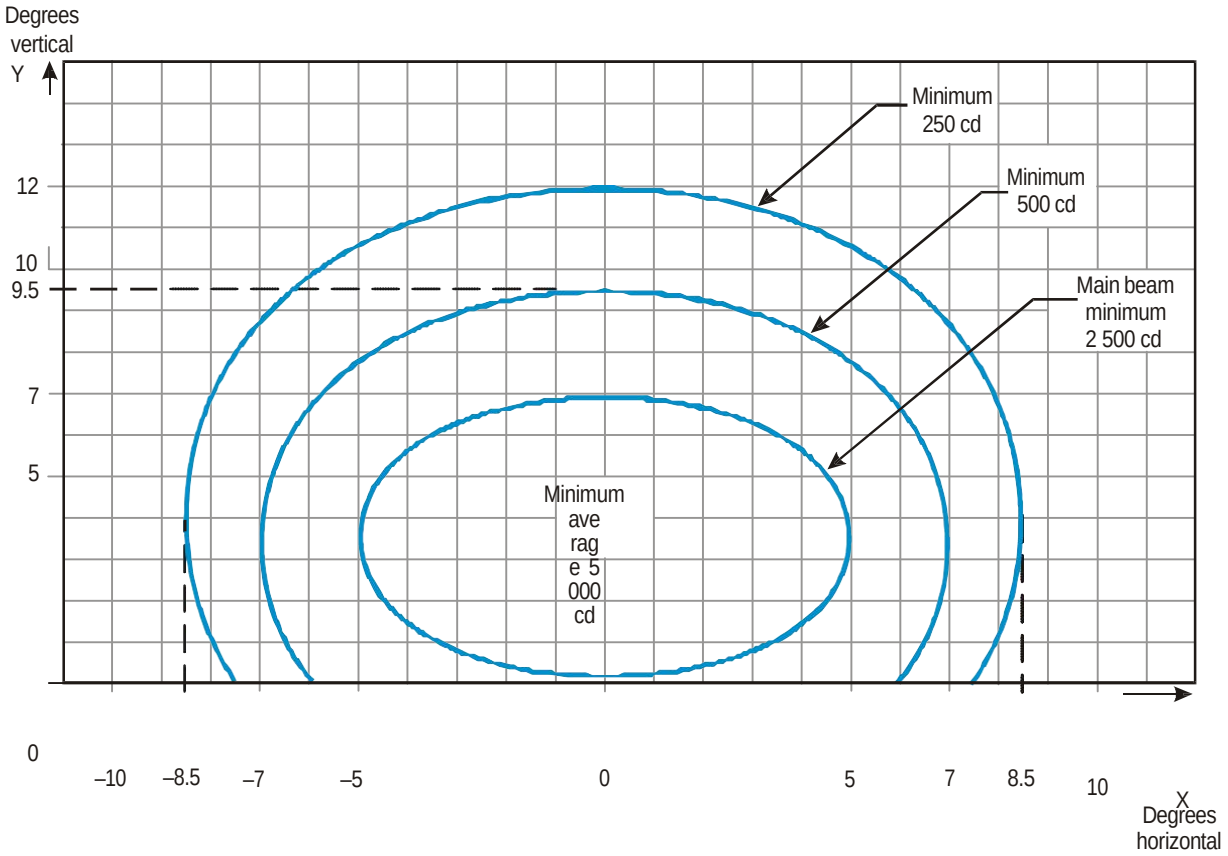
Characteristics

9.4.12.7 Runway centre line lights shall be fixed lights showing variable white from the threshold to the point 900 m from the runway end; alternate red and variable white from 900 m to 300 m from the runway end;

and red from 300 m to the runway end, except that for runways less than 1 800 m in length, the alternate red and variable white lights shall extend from the mid-point of the runway usable for landing to 300 m from the runway end.

Note: *Care is required in the design of the electrical system to ensure that failure of part of the electrical system will not result in a false indication of the runway distance remaining.*

9.4.12.8 Runway centre line lights shall be in accordance with the specifications of Figure A9-6 or A9-7.



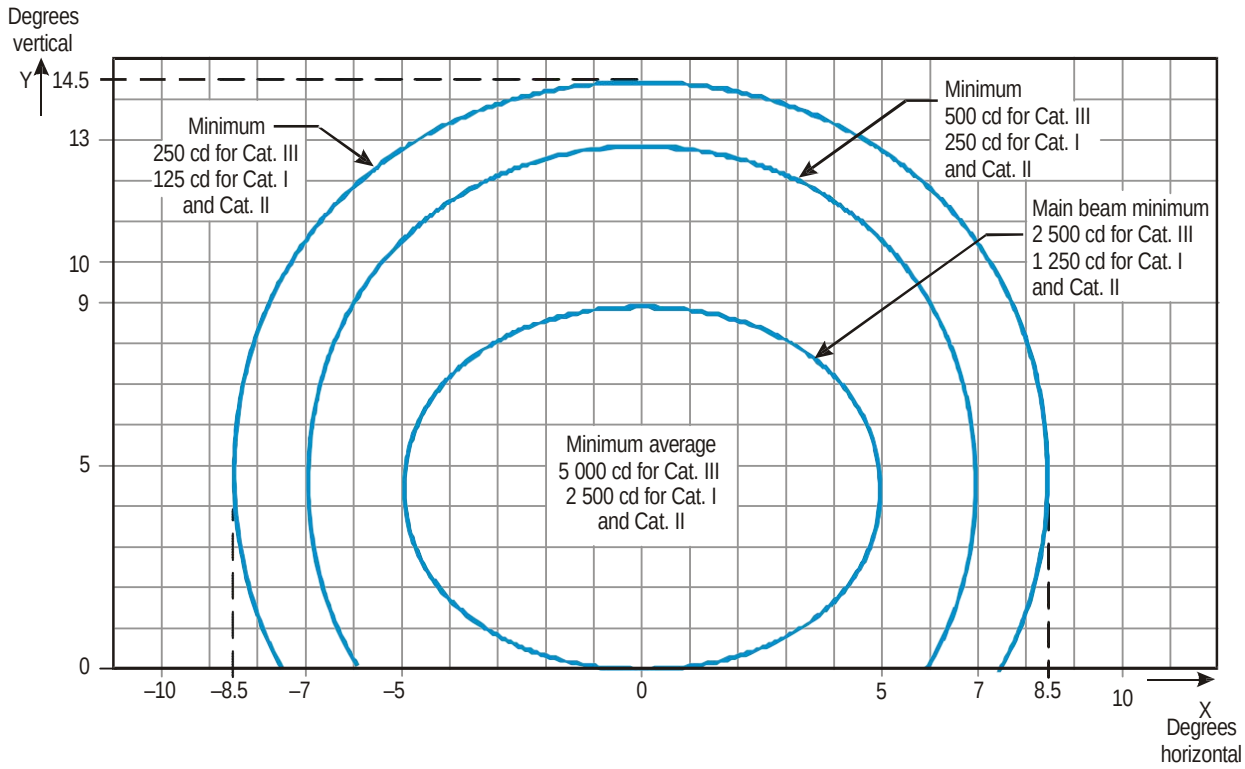
Notes:

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 A9-1 to A9-11 and A9-26.

Figure A9-6. 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	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 A9-1 to A9-11 and A9-26.

Figure A9-7. Isocandela diagram for runway centre line light with 15 m longitudinal spacing (white light) and rapid exit taxiway indicator light (yellow light)

9.4.13 RUNWAY TOUCHDOWN ZONE LIGHTS

Application

9.4.13.1 Touchdown zone lights shall be provided in the touchdown zone of a precision approach runway category II or III.

Location

9.4.13.2 Touchdown zone lights shall extend from the threshold for a longitudinal distance of 900 m, except that, on runways less than 1 800 m in length, the system shall be shortened so that it does not extend beyond the midpoint of the runway. The pattern shall be formed by pairs of barrettes symmetrically located about the runway centre

line. 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. The longitudinal spacing between pairs of barrettes shall be either 30 m or 60 m.

Note: *To allow for operations at lower visibility minima, it may be advisable to use a 30 m longitudinal spacing between barrettes.*

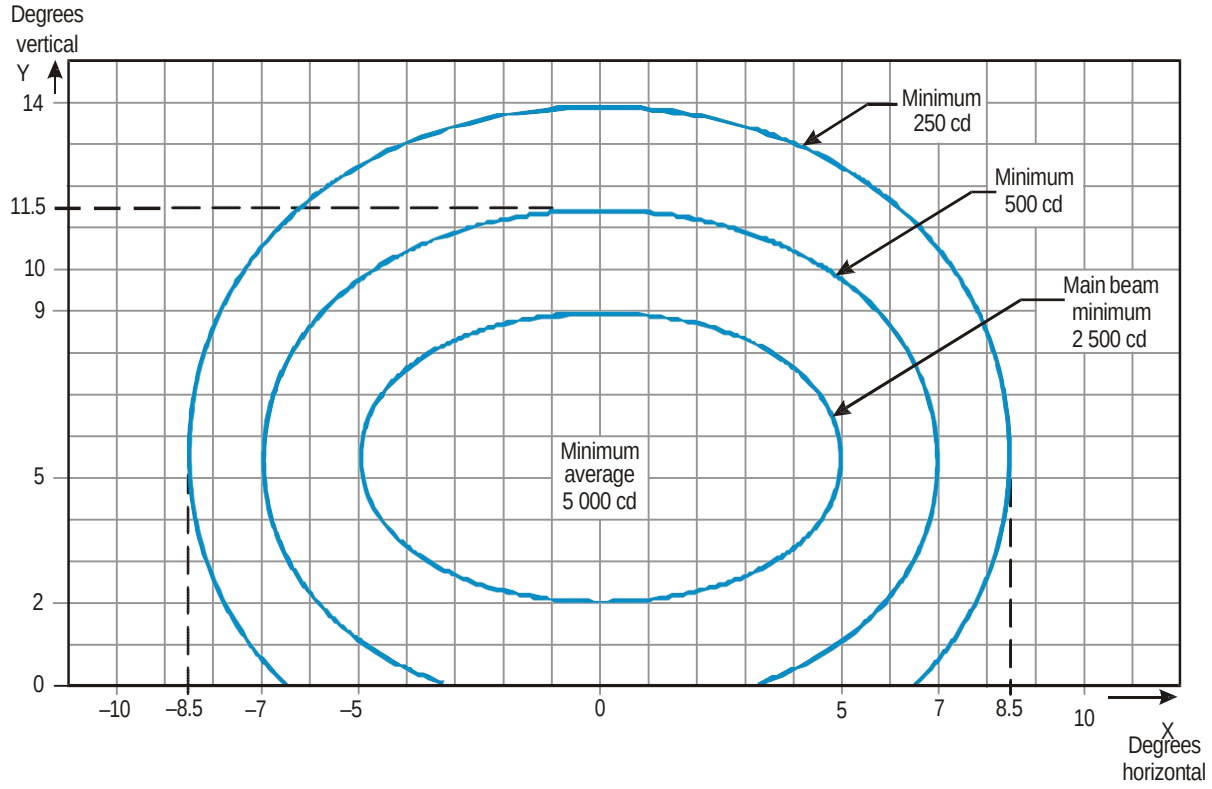
Characteristics

9.4.13.3 A barrette shall be composed of at least three lights with a spacing between the lights of not more than 1.5m.

9.4.13.4 A barrette shall be not less than 3 m nor more than 4.5 m in length.

9.4.13.5 Touchdown zone lights shall be fixed unidirectional lights showing variable white.

9.4.13.6 Touchdown zone lights shall be in accordance with the specifications of Figure A9-5.



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 A9-1 to A9-11 and A9-26.

Figure A9-5. Isocandela diagram for touchdown zone light (white light)

9.4.13.7 Simple touchdown zone lights

Note: *The purpose of simple touchdown zone lights is to provide pilots with enhanced situational awareness in all visibility conditions and to help enable pilots to decide whether to commence a go-around if the aircraft has not landed by a certain point on the runway. It is essential that pilots operating at aerodromes with simple touchdown zone lights be familiar with the purpose of these lights.*

Application

9.4.13.8 Except where TDZ lights are provided in accordance with paragraph 9.4.13 of this Regulation, at an aerodrome where the approach angle is greater than 3.5 degrees and/or the Landing Distance Available combined with other factors increases the risk of an overrun, simple touchdown zone lights shall be provided.

Location

9.4.13.9 Simple touchdown zone lights shall be a pair of lights located on each side of the runway centreline 0.3 m beyond the upwind edge of the final touchdown zone marking. 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. The spacing between the lights of the same pair shall not be more than 1.5 m or half the width of the touchdown zone marking, whichever is greater. (See Figure 9-24 below)

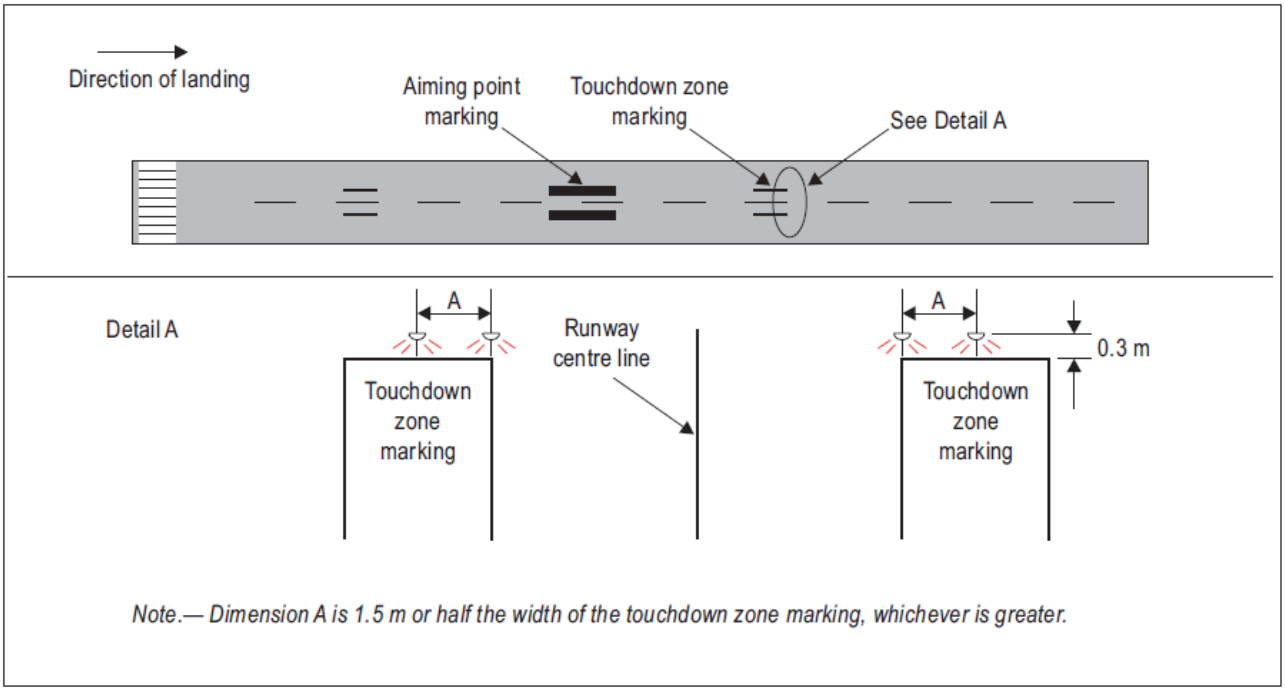


Figure 9-24. Simple touchdown zone lighting

9.4.13.10 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.

Characteristics

9.4.13.11 Simple touchdown zone lights shall 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.

9.4.13.12 Simple touchdown zone lights shall be in accordance with the specifications in Appendix 2 and para.9.4.13.6 of this Regulation Figure A9-5.

Note: *As a good operating practice, simple touchdown zone lights are supplied with power on a separate circuit to other runway lighting so that they may be used when other lighting is switched off.*

9.4.14 RAPID EXIT TAXIWAY INDICATOR LIGHTS

Note: *The purpose of rapid exit taxiway indicator lights (RETILs) is to provide pilots with distance-to-go information to the nearest rapid exit taxiway on the runway, to enhance situational awareness in low visibility conditions and enable pilots to apply braking action for more efficient roll-out and runway exit speeds. It is essential that pilots operating at aerodromes with runway(s) displaying rapid exit taxiway indicator lights be familiar with the purpose of these lights.*

Application

9.4.14.1 Rapid exit taxiway indicator lights shall be provided on a runway intended for use in runway visual range conditions less than a value of 350 m and/or where the traffic density is heavy.

Note: *See below as on ICAO Annex 14, Vol. I, Attachment A, Section 14:*

- *rapid exit taxiway indicator lights (RETILs) comprise a set of yellow unidirectional lights installed in the runway adjacent to the centre line. The lights are positioned in a 3-2-1 sequence at 100 m intervals prior to the point of tangency of the rapid exit taxiway centre line. They are intended to give an indication to pilots of the location of the next available rapid exit taxiway.*

- *in low visibility conditions, RETILs provide useful situational awareness cues while allowing the pilot to concentrate on keeping the aircraft on the runway centre line.*

- *following a landing, runway occupancy time has a significant effect on achievable runway capacity. RETILs allow pilots to maintain a good roll-out speed until it is necessary to decelerate to an appropriate speed for the turn into a rapid exit turn-off. A roll-out speed of 60 knots until the first RETIL (three-light barrette) is reached is seen as the optimum.*

9.4.14.2 Rapid exit taxiway indicator lights shall not be displayed in the event of any lamp failure or other failure that prevents the display of the light pattern depicted in Figure 9-25, in full.

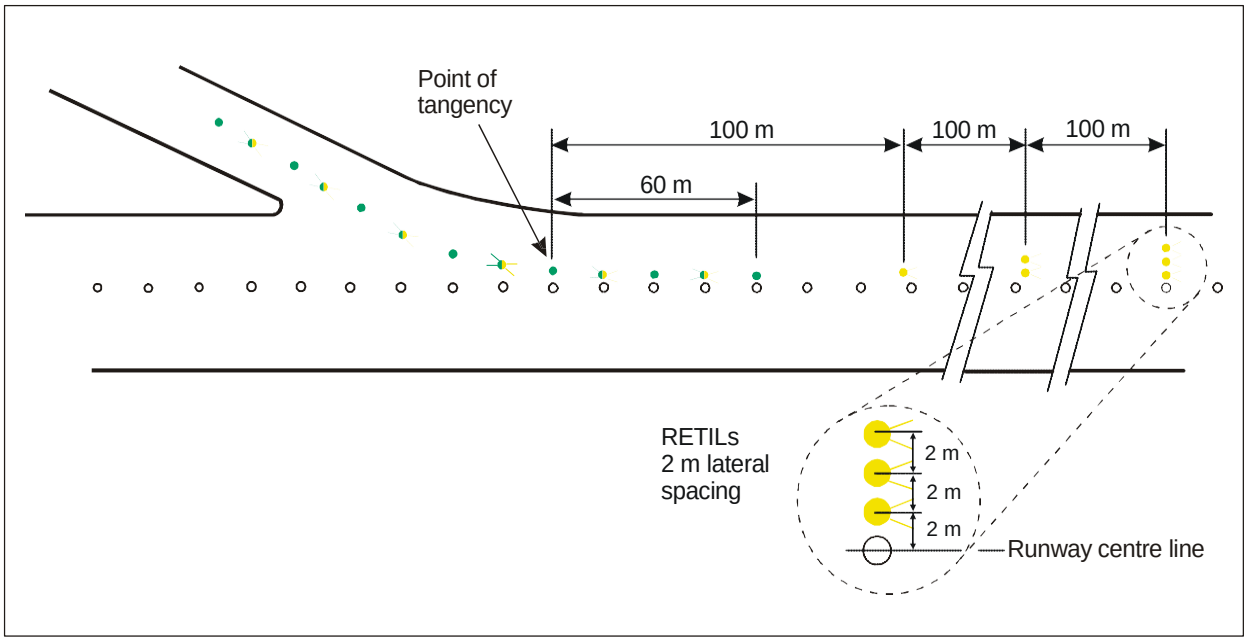


Figure 9-25. Rapid exit taxiway indicator lights (RETILS)

Location

9.4.14.3 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 Figure 9-25. In each set, the lights shall be located 2 m apart and the light nearest to the runway centre line shall be displaced 2 m from the runway centre line.

9.4.14.4 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.

Characteristics

9.4.14.5 Rapid exit taxiway indicator lights shall be 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.

9.4.14.6 Rapid exit taxiway indicator lights shall be in accordance with the specifications in Figure A9-6 or Figure A9-7, as appropriate. (See para. 9.4.12.8 of this Regulation)

9.4.14.7 Rapid exit taxiway indicator lights shall be supplied with power on a separate circuit to other runway lighting so that they may be used when other lighting is switched off.

9.4.15 STOPWAY LIGHTS

Application

9.4.15.1 Stopway lights shall be provided for a stopway intended for use at night.

Location

9.4.15.2 Stopway lights 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. 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 3 m outside the end.

Characteristics

9.4.15.3 Stopway lights shall be fixed unidirectional lights showing red in the direction of the runway.

9.4.16 TAXIWAY CENTRE LINE LIGHTS

Application

9.4.16.1 Taxiway centre line lights shall be provided on an exit taxiway, taxiway and apron intended for use in runway visual range conditions less than a value of 350 m 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.

9.4.16.2 Taxiway centre line lights shall be provided on a taxiway intended for use at night in runway visual range conditions of 350 m 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.

Note: *Where there may be a need to delineate the edges of a taxiway, e.g. on a rapid exit taxiway or narrow taxiway, this may be done with taxiway edge lights or markers.*

9.4.16.3 Taxiway centre line lights shall be provided on an exit taxiway, taxiway, de-icing/anti-icing facility 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.

9.4.16.4 Taxiway centre line lights shall be provided on a runway forming part of a standard taxi-route and intended for taxiing in runway visual range conditions less than a value of 350 m, 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.

Note: *See paragraph 12.2.2.3 of this Regulation for provisions concerning the interlocking of runway and taxiway lighting systems.*

9.4.16.5 Taxiway centre line lights shall be provided 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.

Characteristics

9.4.16.6 Except as provided for in 9.4.16.7.1, 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.

9.4.16.7 Taxiway centre line lights on an exit taxiway shall be fixed lights. Alternate taxiway centre line lights shall show green and yellow from their beginning near the runway centre line to the perimeter of the ILS/MLS critical/sensitive area or the lower edge of the inner transitional surface, whichever is farthest from the runway; and thereafter all lights shall show green (figure 9-26). The first light in the exit centre line shall always show green, and the light nearest to the perimeter shall always show yellow.

***Note 1**: Care is necessary to limit the light distribution of green lights on or near a runway so as to avoid possible confusion with threshold lights.*

***Note 2**: For yellow filter characteristics see ICAO Annex 14 Vol. I, Appendix 1, 2.2.*

***Note 3**: The size of the ILS/MLS critical/sensitive area depends on the characteristics of the associated ILS/MLS and other factors. Guidance is provided in ICAO Annex 10, Volume I, Attachments C and G.*

***Note 4**: See paragraph 9.4.3 for specifications on runway vacated signs.*

(See Figure 9-26 as below)

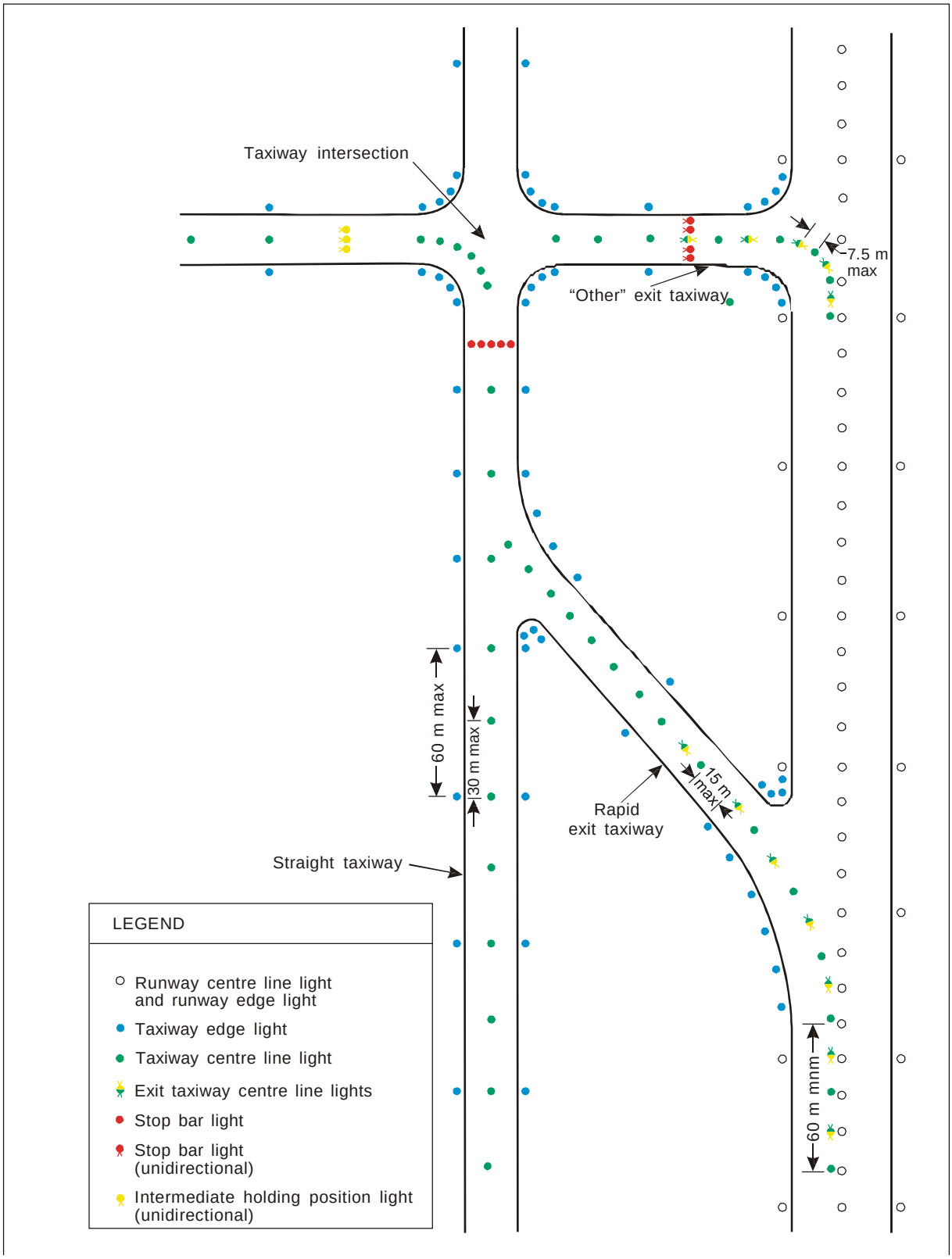


Figure 9-26. Taxiway lighting

9.4.16.7.1 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/MLS critical/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/MLS critical/sensitive area or the lower edge of the inner transitional surface, whichever is farthest from the runway.

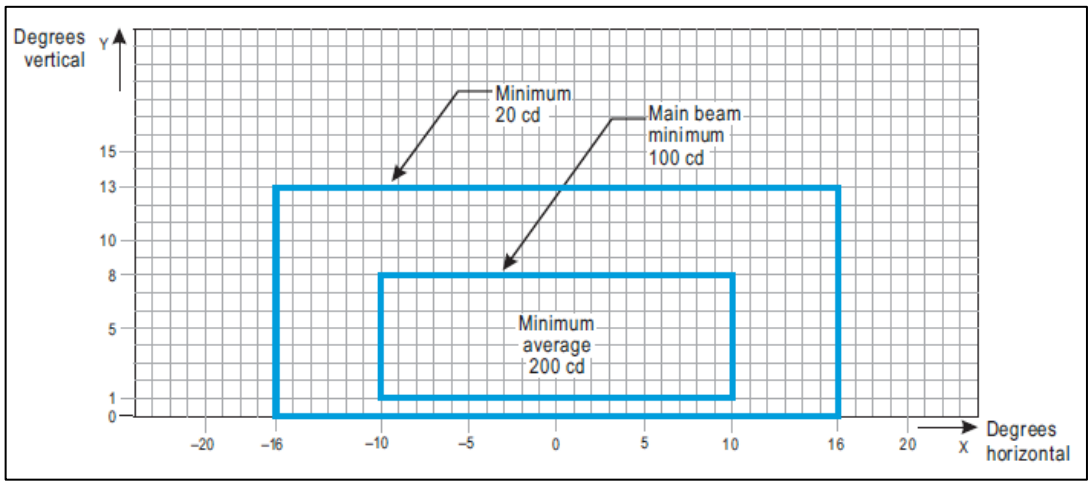
Note 1: *Care is necessary to limit the light distribution of green lights on or near a runway so as to avoid possible confusion with threshold lights.*

Note 2: *The provisions of 9.4.16.7.1 can form part of effective runway incursion prevention measures.*

9.4.16.8 Taxiway centre line lights shall be in accordance with the specifications of:

(a) Figure A9-12, A9-13, or A9-14 for taxiways intended for use in runway visual range conditions of less than a value of 350 m; and

(b) Figure A9-15 or A9-16 for other taxiways.



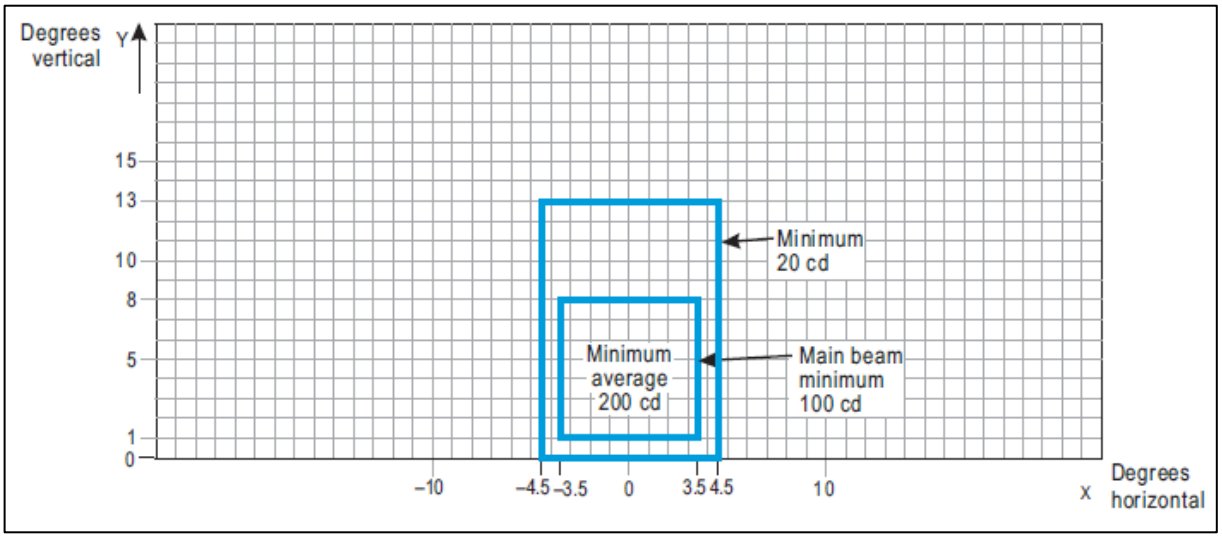
Notes:

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 A9-12 to A9-21.*

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 A9-12. 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 where large offsets can occur and for low-intensity runway guard lights, Configuration B

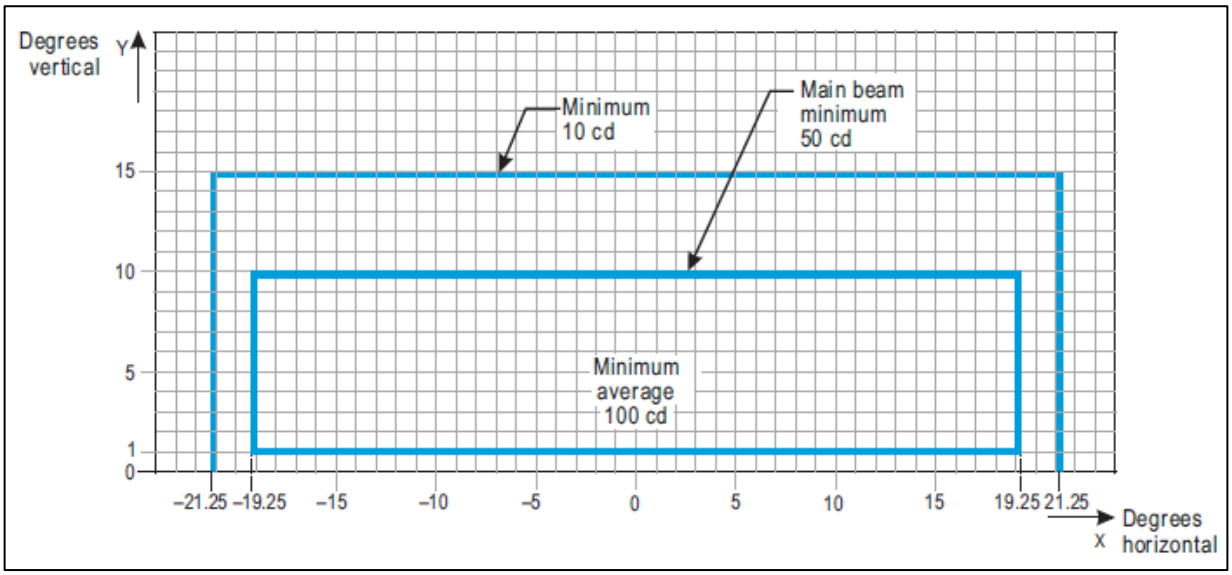


Notes:

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 A9-12 to A9-21.*

Figure A9-13. 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



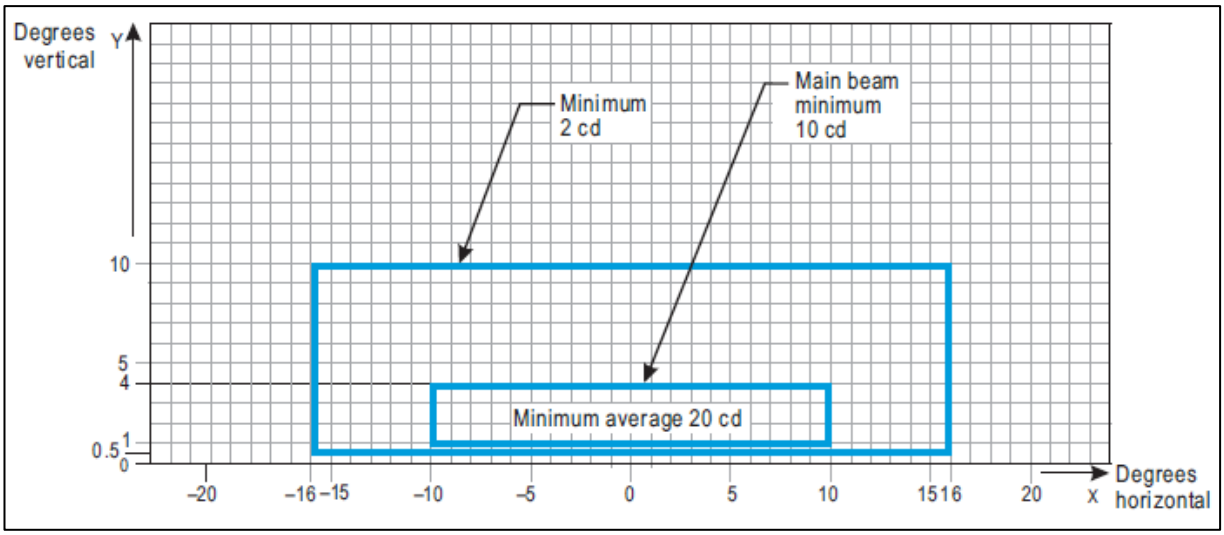
Notes:

1. *Lights on curves to be toed-in 15.75 degrees with respect to the tangent of the curve.*

2. *See collective notes for Figures A9-12 to A9-21.*

Figure A9-14. Isocandela diagram for taxiway centre line (7.5 m spacing), 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 m.

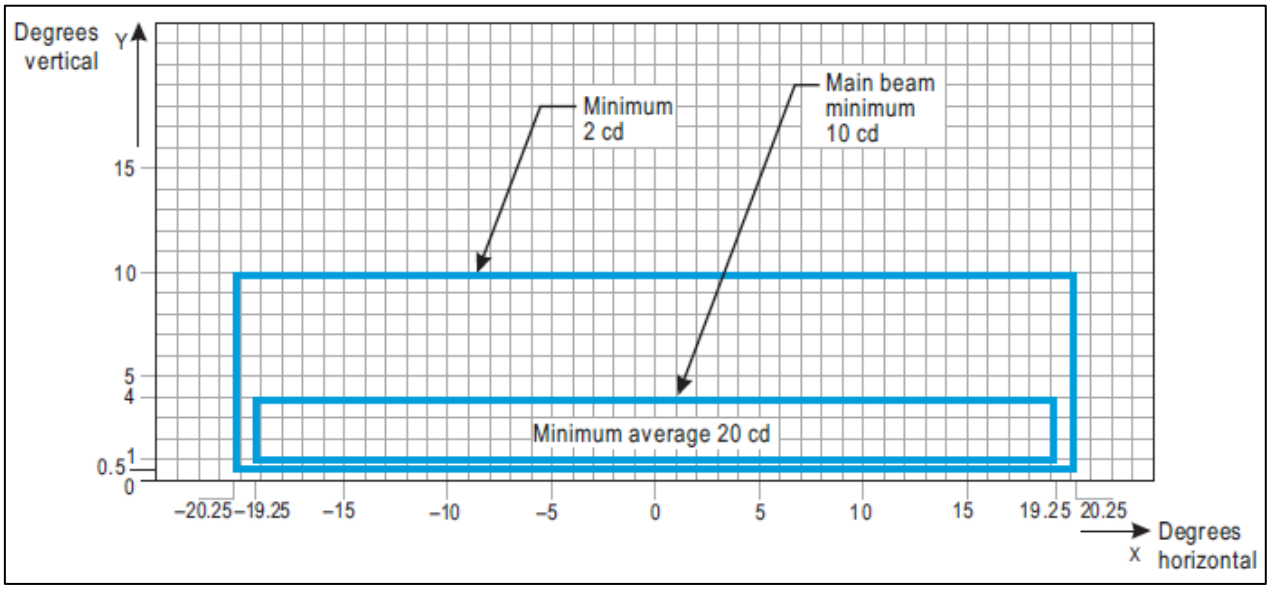
(c) Figure A9-15 or A9-16 for other taxiways.



Notes:

1. *At locations where high background luminance is usual and where*
2. *deterioration of light output resulting from dust, snow and local contamination is a significant factor, the cdvalues shall be multiplied by 2.5.*
3. *Where omnidirectional lights are used they shall comply with the vertical beam requirements in this figure.*
4. *See collective notes for Figures A9-12 to A9-21.*

Figure A9-15. 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:

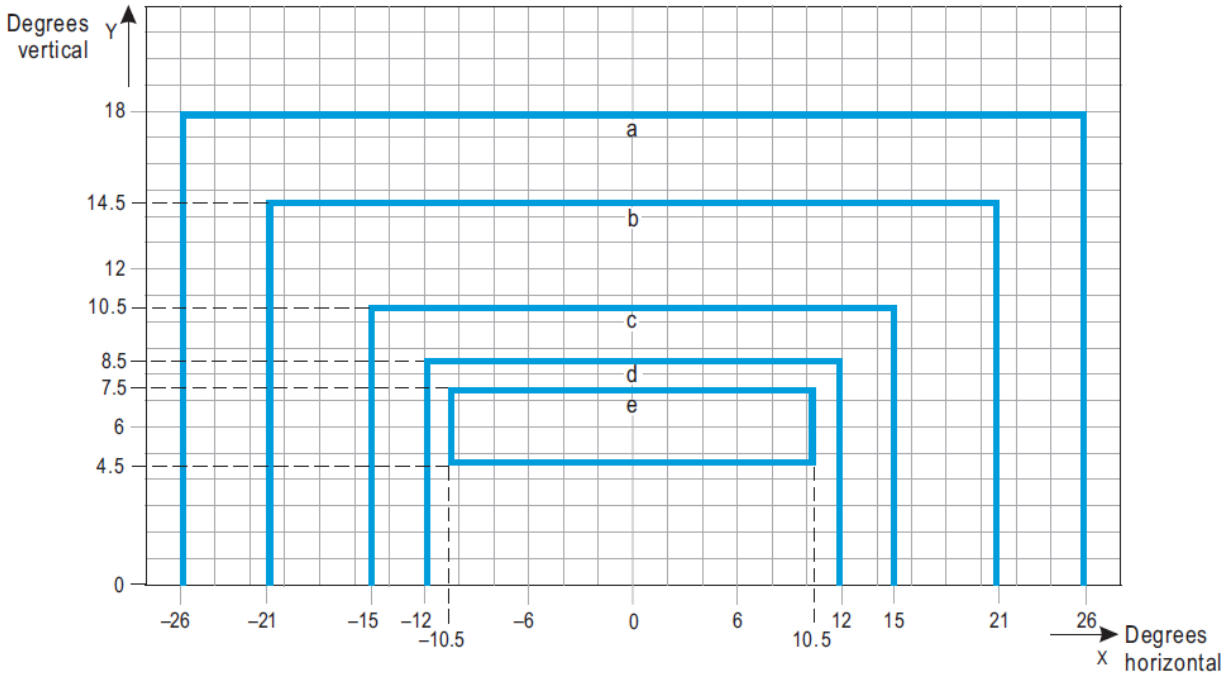
1. *Lights on curves to be toed-in 15.75 degrees with respect to the tangent of the curve.*
2. *At locations where high background luminance is usual and where deterioration of light output resulting from dust, snow and local contamination is a significant factor, the cdvalues shall be multiplied by 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 A9-12 to A9-21.*

Figure A9-16. 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

9.4.16.9 Where higher intensities are required, from an operational point of view, taxiway centre line lights on rapid taxiways intended for use in runway visual range conditions less than a value of 350 m shall be in accordance with the specifications of Figure A9-12 (see para.9.4.16.9 of this Regulation). The number of levels of brilliancy settings for these lights shall be the same as that for the runway centre line lights.

9.4.16.10 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 Figure A9-17, A9-18 or A9-19.

Note: *High-intensity centre line lights shall only be used in case of an absolute necessity and following a specific study.*



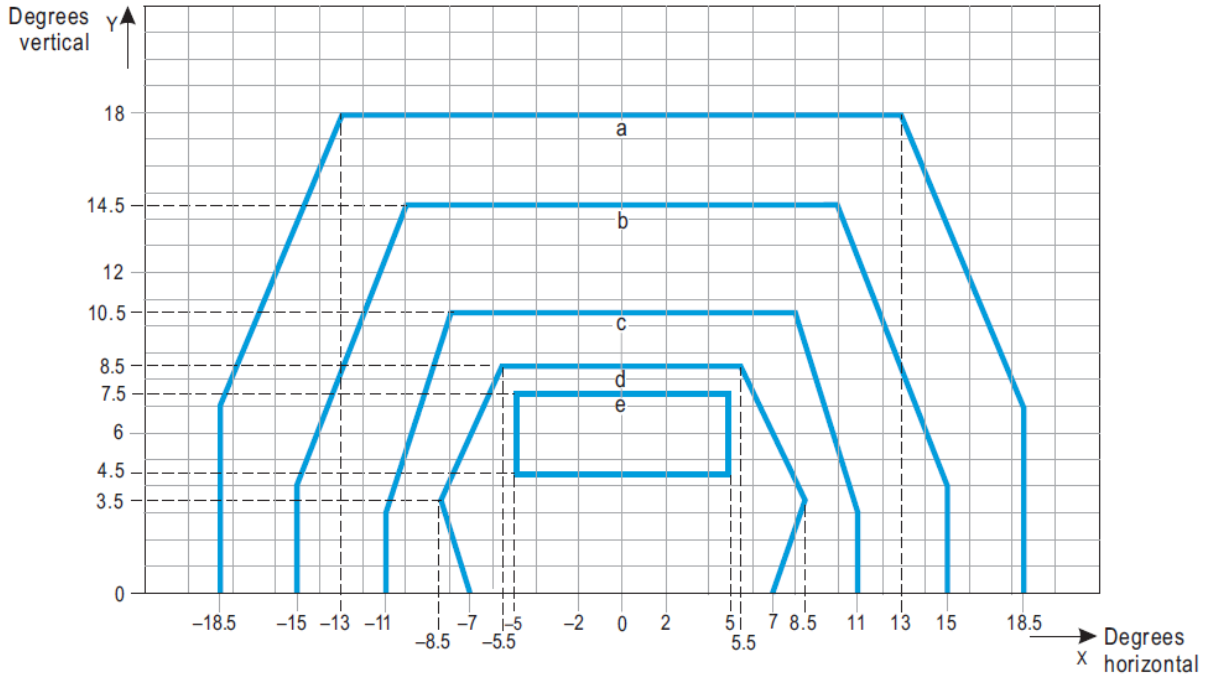
Curve	a	b	c	d	e
Intensity (cd)	8	20	100	450	1800

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 A9-12 to A9-21.*

Figure A9-17. 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.



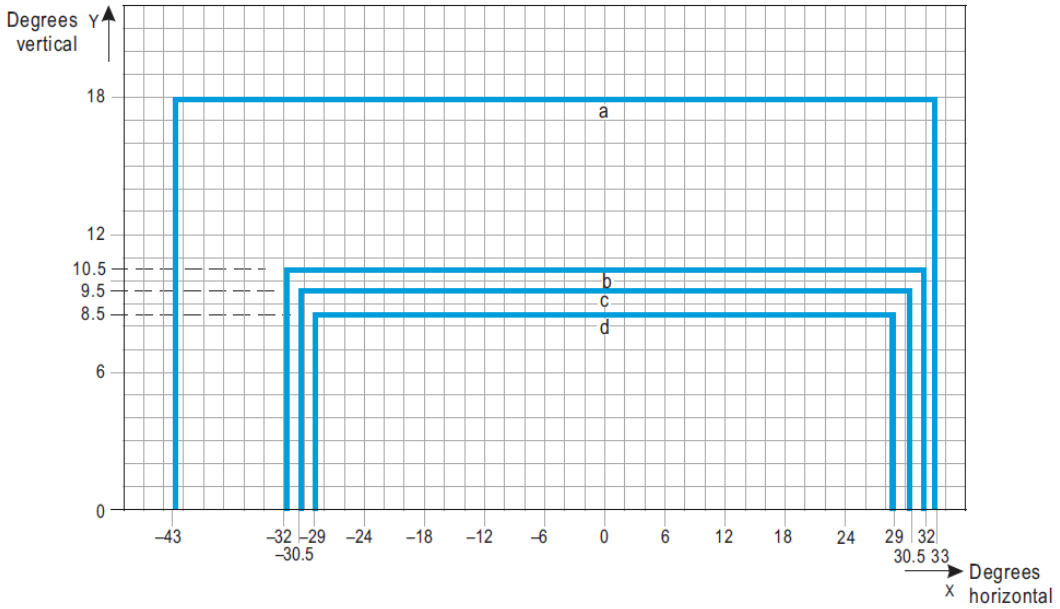
Curve	a	b	c	d	e
Intensity (cd)	8	20	100	450	1800

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 A9-12 to A9-21.*

Figure A9-18. 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.

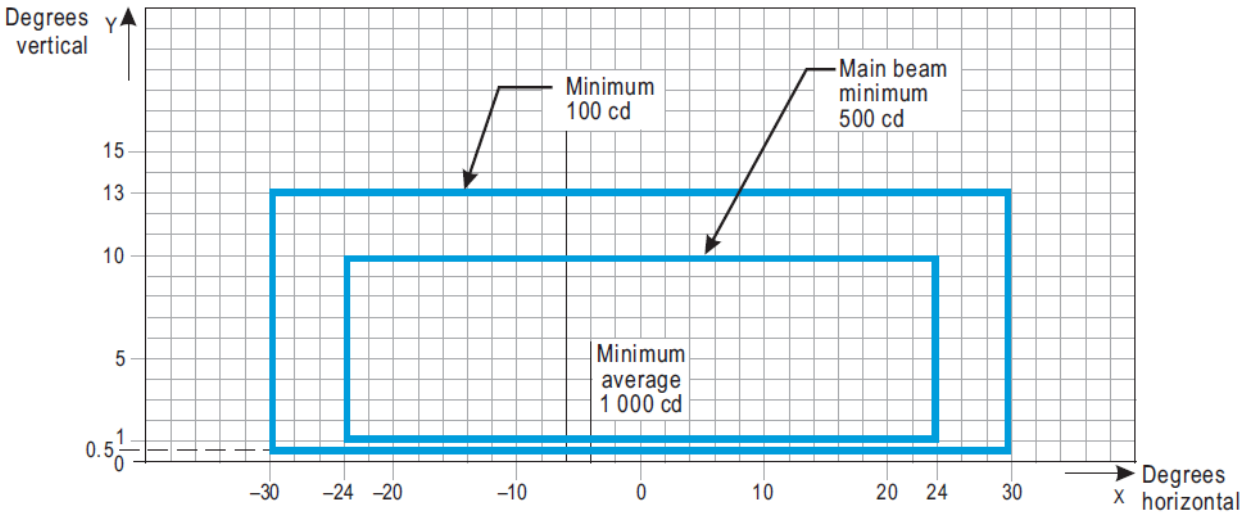


Curve	a	b	c	d	e
Intensity (cd)	8	100	200	400	8

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 A9-12 to A9-21.*

Figure A9-19. 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.



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 A9-12 to A9-21.*

Figure A9-20. Isocandela diagram for high-intensity runway guard lights, Configuration B.

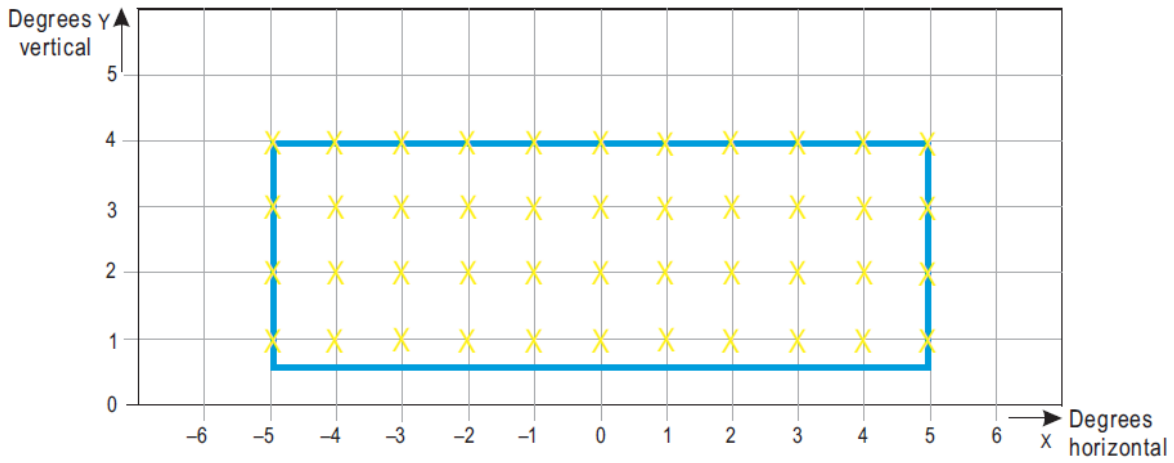


Figure A9-21. Grid points to be used for calculation of average intensity of taxiway centre line and stop bar lights

Collective notes to Figures A9-12 to A9-21

1. *The intensities specified in Figures A9-12 to A9-20 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 A9-12 to A9-20 shows the minimum allowable light intensities. The average intensity of the main beam is calculated by establishing grid points as shown in Figure A9-21 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, shall never fall to a value less than 50 % of the value shown in the figures, and it shall 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.*

Location

9.4.16.11 Taxiway centre line lights shall normally be located on the taxiway centre line marking, except that they may be offset by not more than 30 cm where it is not practicable to locate them on the marking.

Taxiway centre line lights on taxiways

Location

9.4.16.12 Taxiway centre line lights on a straight section of a taxiway shall be spaced at longitudinal intervals of not more than 30 m, except that:

(a) larger intervals not exceeding 60 m may be used where, because of the prevailing meteorological conditions, adequate guidance is provided by such spacing;

(b) intervals less than 30 m shall be provided on short straight sections; and

(c) on a taxiway intended for use in RVR conditions of less than a value of 350 m, the longitudinal spacing shall not exceed 15m.

9.4.16.13 Taxiway centre line lights on a taxiway curve shall continue from the straight portion of the taxiway at a constant distance from the outside edge of the taxiway curve. The lights shall be spaced at intervals such that a clear indication of the curve is provided.

9.4.16.14 On a taxiway intended for use in RVR conditions of less than a value of 350 m, the lights on a curve shall not exceed a spacing of 15 m and on a curve of less than 400 m radius the lights shall be spaced at intervals of not greater than 7.5 m.

This spacing shall extend for 60 m before and after the curve.

Note 1: *Spacings on curves that have been found suitable for a taxiway intended for use in RVR conditions of 350 m or greater are:*

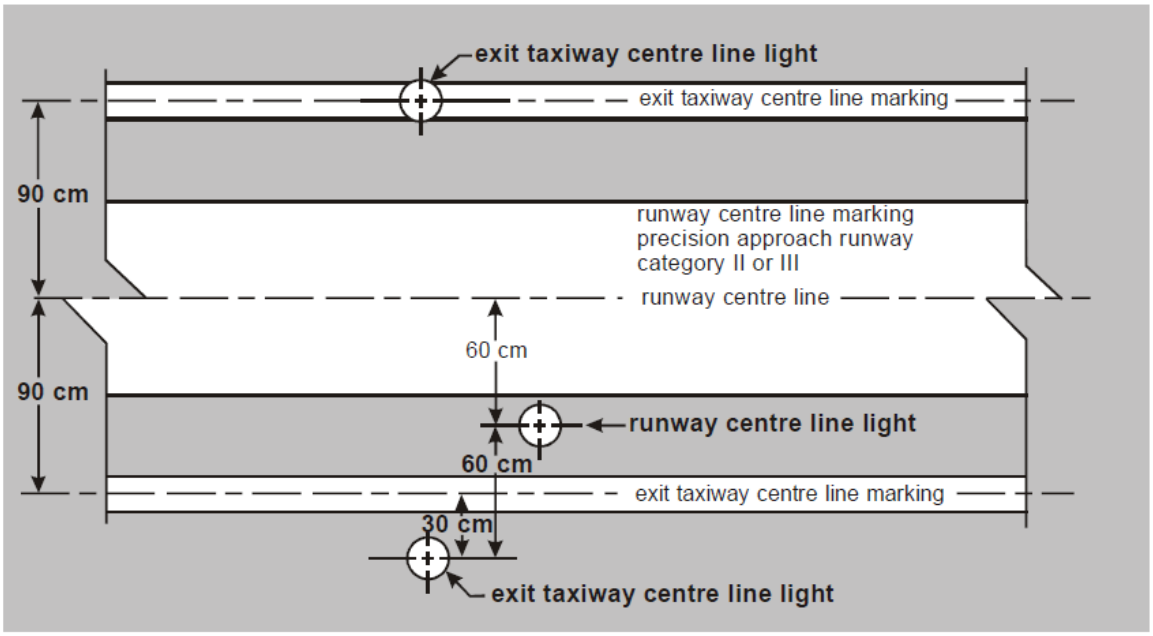
Curve radius	*Light spacing*
up to 400 m	*7.5 m*
401 m to 899 m	*15 m*
900 m or greater	*30 m*

Note 2: *See paragraph 7.2.9.6 of this Regulation and Figure 7-2.*

Taxiway centre line lights on rapid exit taxiways

Location

9.4.16.15 Taxiway centre line lights on a rapid exit taxiway shall commence at a point at least 60 m 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. The lights on that portion parallel to the runway centre line shall always be at least 60 cm from any row of runway centre line lights, as shown below.



Tolerances for offset runway centre line lights and taxiway centre line lights to maintain 60 cm separation.

Figure 9-27. Offset runway and taxiway centre line lights

9.4.16.16 The lights shall be spaced at longitudinal intervals of not more than 15 m, except that, where runway centre line lights are not provided, a greater interval not exceeding 30 m may be used.

Taxiway centre line lights on other exit taxiways

Location

9.4.16.17 Taxiway centre line lights 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. The first light shall be at least 60 cm from any row of runway centre line lights, as shown in Figure 9-26 and para. 9.4.16.7 of this Regulation.

9.4.16.18 The lights shall be spaced at longitudinal intervals of not more than 7.5 m.

Taxiway centre line lights on runways

Location

9.4.16.19 Taxiway centre line lights on a runway forming part of a standard taxi-route and intended for taxiing in runway visual range conditions less than a value of 350 m shall be spaced at longitudinal intervals not exceeding 15 m.

9.4.17 TAXIWAY EDGE LIGHTS

Application

9.4.17.1 Taxiway edge lights shall be provided at the edges of a runway turn pad, holding bay, apron, etc. 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.

Note: *See paragraph 9.6.5 of this Regulation for taxiway edge markers.*

9.4.17.2 Taxiway edge lights shall be provided 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.

Note: *See paragraph 12.2.2.3 of this Regulation for provisions concerning the inter-locking of runway and taxiway lighting systems.*

Location

9.4.17.3 Taxiway edge lights on a straight section of a taxiway and on a runway forming part of a standard taxi-route shall be spaced at uniform longitudinal intervals of not more than 60 m. The lights on a curve shall be spaced at intervals less than 60 m so that a clear indication of the curve is provided.

Note: *Guidance on the spacing of taxiway edge lights on curves is given in the G-AGA-014.*

9.4.17.4 Taxiway edge lights on a holding bay, de-icing/anti-icing facility, apron, etc., shall be spaced at uniform longitudinal intervals of not more than 60 m.

9.4.17.5 Taxiway edge lights on a runway turn pad shall be spaced at uniform longitudinal intervals of not more than 30m.

9.4.17.6 The lights shall be located as near as practicable to the edges of the taxiway, runway turn pad, holding bay, apron or runway, etc. or outside the edges at a distance of not more than 3 m.

Characteristics

9.4.17.7 Taxiway edge lights shall be fixed lights showing blue. The lights shall show up to at least 75° above the horizontal and at all angles in azimuth necessary to provide guidance to a pilot taxiing in either direction. At an intersection, exit or curve the lights shall 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.

9.4.17.8 The intensity of taxiway edge lights shall be at least 2 cd from 0° to 6° vertical, and 0.2 cd at any vertical angles between 6° and 75°.

9.4.18 RUNWAY TURN PAD LIGHTS

Application

9.4.18.1 Runway turn pad lights shall be provided for continuous guidance on a runway turn pad intended for use in runway visual range conditions less than a value of 350 m, to enable an aeroplane to complete a 180-degree turn and align with the runway centre line.

9.4.18.2 Runway turn pad lights shall be provided on a runway turn pad intended for use at night.

Location

9.4.18.3 Runway turn pad lights shall normally be located on the runway turn pad marking, except that they may be offset by not more than 30 cm where it is not practicable to locate them on the marking.

9.4.18.4 Runway turn pad lights on a straight section of the runway turn pad marking shall be spaced at longitudinal intervals of not more than 15 m.

9.4.18.5 Runway turn pad lights on a curved section of the runway turn pad marking shall not exceed a spacing of 7.5 m.

Characteristics

9.4.18.6 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.

9.4.18.7 Runway turn pad lights shall be in accordance with the specifications of Figure A9-13, A9-14 or A9-15 and para. 9.4.16.8 of this Regulation, as appropriate.

9.4.19 STOP BARS

Application

Note 1: *A stop bar is intended to be controlled either manually or automatically by air traffic services.*

Note 2: *Runway incursions may take place in all visibility or weather conditions. The provision of stop bars at runway holding positions and their use at night in visibility conditions greater than 550 m runway visual range can form part of effective runway incursion prevention measures.*

9.4.19.1 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 350 m, 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 550 m, 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.

9.4.19.2 Where there is more than one stop bar associated with a taxiway/runway intersection, only one shall be illuminated at any given time.

9.4.19.3 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.

Location

9.4.19.4 Stop bars shall be located across the taxiway at the point where it is desired that traffic stop. Where the additional lights specified in paragraph 9.4.19.6 of this Regulation are provided, these lights shall be located not less than 3 m from the taxiway edge.

Characteristics

9.4.19.5 Stop bars shall consist of lights spaced at uniform intervals of no more than 3 m across the taxiway, showing red in the intended direction(s) of approach to the intersection or runway-holding position.

Note: *Where necessary to enhance conspicuity of an existing stop bar, extra lights are installed uniformly.*

9.4.19.6 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.

9.4.19.7 Stop bars installed at a runway-holding position shall be unidirectional and shall show red in the direction of approach to the runway.

9.4.19.8 Where the additional lights specified in paragraph 9.4.19.6 of this Regulation 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.

9.4.19.9 The intensity in red light and beam spreads of stop bar lights shall be in accordance with the specifications in Figures A9-12 through A9-16, as appropriate.

9.4.19.10 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 Figure A9-17, A9-18 or A9-19.

Note: *High-intensity stop bars shall only be used in case of an absolute necessity and following a specific study.*

9.4.19.11 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 Figure A9-17 or A9-19.

9.4.19.12 The lighting circuit shall be designed so that:

(a) stop bars located across entrance taxiways are selectively switchable;

(b) stop bars located across taxiways intended to be used only as exit taxiways are switchable selectively or in groups;

(c) 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 90 m; and

(d) 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.

Note: *Care is required in the design of the electrical system to ensure that all of the lights of a stop bar will not fail at the same time.*

Guidance on this issue is given in the G-AGA-015.

9.4.20 INTERMEDIATE HOLDING POSITION LIGHTS

Note: *See paragraph 9.3.11 of this Regulation for specifications on intermediate holding position marking.*

Application

9.4.20.1 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 350 m.

9.4.20.2 Intermediate holding position lights shall be provided at an intermediate holding position where there is no need for stop-and-go signals as provided by a stop bar.

Location

9.4.20.3 Intermediate holding position lights shall be located along the intermediate holding position marking at a distance of 0.3 m prior to the marking.

Characteristics

9.4.20.4 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. The lights shall be disposed symmetrically about and at right angle to the taxiway centre line, with individual lights spaced 1.5 m apart.

9.4.21 DE-ICING/ANTI-ICING FACILITY EXIT LIGHTS

Application

9.4.21.1 De-icing/anti-icing facility exit lights shall be provided at the exit boundary of a remote de-icing/anti-icing facility adjoining a taxiway.

Location

9.4.21.2 De-icing/anti-icing facility exit lights shall be located 0.3 m inward of the intermediate holding position marking displayed at the exit boundary of a remote de-icing/anti-icing facility.

Characteristics

9.4.21.3 De-icing/anti-icing facility exit lights shall consist of in-pavement fixed unidirectional lights spaced at intervals of 6 m showing yellow in the direction of the approach to the exit boundary with a light distribution similar to taxiway centre line lights (see Figure 9-28).

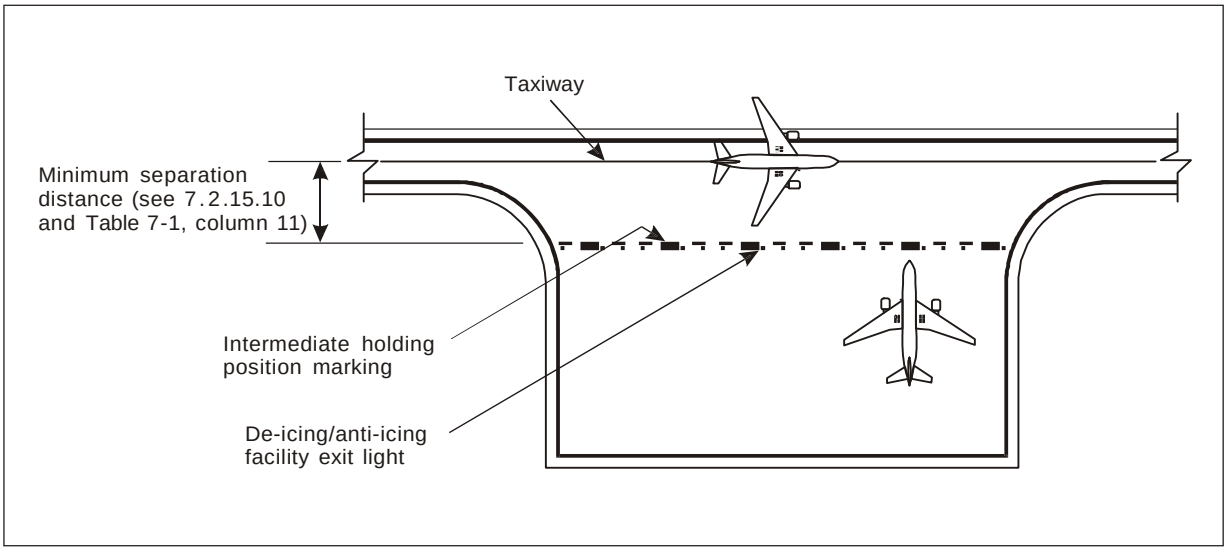


Figure 9-28. Typical remote de-icing/anti-icing facility

9.4.22 RUNWAY GUARD LIGHTS

Note: *Runway incursions may take place in all visibility or weather conditions. The use of runway guard lights at runway-holding positions can form part of effective runway incursion prevention measures. Runway guard lights warn pilots- and drivers of vehicles- when operating on taxiways- that they are about to enter a runway. There are two standard configurations of runway guard lights as illustrated in Figure 9-29.*

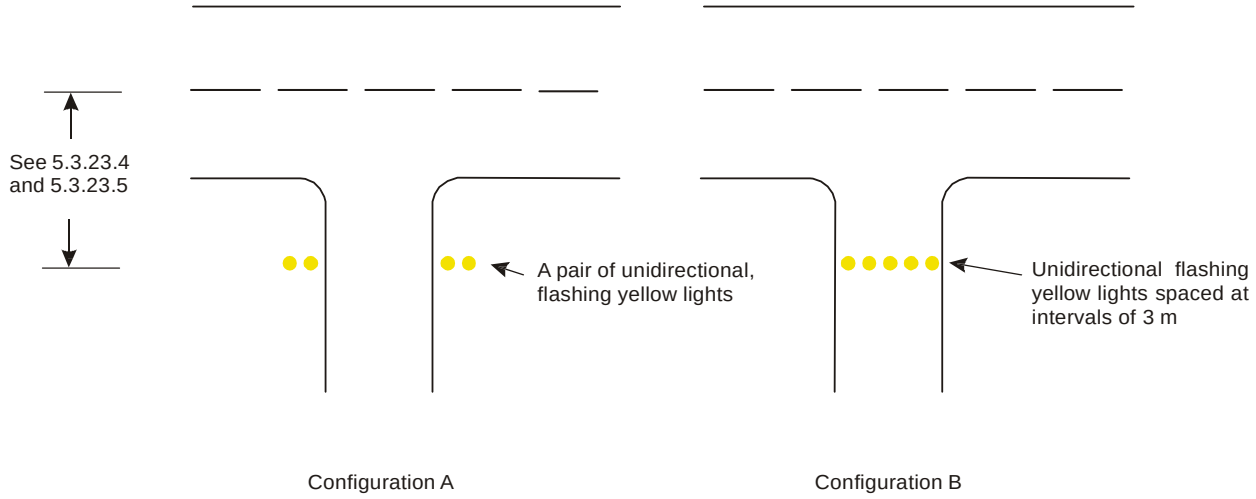


Figure 9-29. Runway guard lights

Application

9.4.22.1 Runway guard lights, Configuration A, shall be provided at each taxiway/runway intersection associated with a runway intended for use in:

(a) runway visual range conditions less than a value of 550 m where a stop bar is not installed; and

(b) runway visual range conditions of values between 550m and 1200m where the traffic density is heavy.

Note 1: *Runway guard lights, Configuration B may supplement Configuration A when deemed necessary.*

Note 2: *Guidance on the design, operation and the location of runway guard lights Configuration B is given in the document G-AGA-014.*

9.4.22.2 As part of runway incursion prevention measures, runway guard lights, Configuration A or B, shall be provided at each taxiway/runway intersection where runway incursion hot spots have been identified, and used under all weather conditions during day and night.

9.4.22.3 Configuration B runway guard lights shall not be collocated with a stop bar.

9.4.22.4 Where more than one runway-holding positions exist at a runway/taxiway intersection, only the set of runway guard lights associated with the operational runway-holding position shall be illuminated.

Location

9.4.22.5 Runway guard lights, Configuration A, shall be located at each side of the taxiway on the holding side of the runway-holding position marking.

9.4.22.6 Runway guard lights, Configuration B, shall be located across the taxiway on the holding side of the runway-holding position marking.

Characteristics

9.4.22.7 Runway guard lights, Configuration A, shall consist of two pairs of yellow lights.

9.4.22.8 Where there is a need to enhance the contrast between the on and off state of runway guard lights, Configuration A, 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.

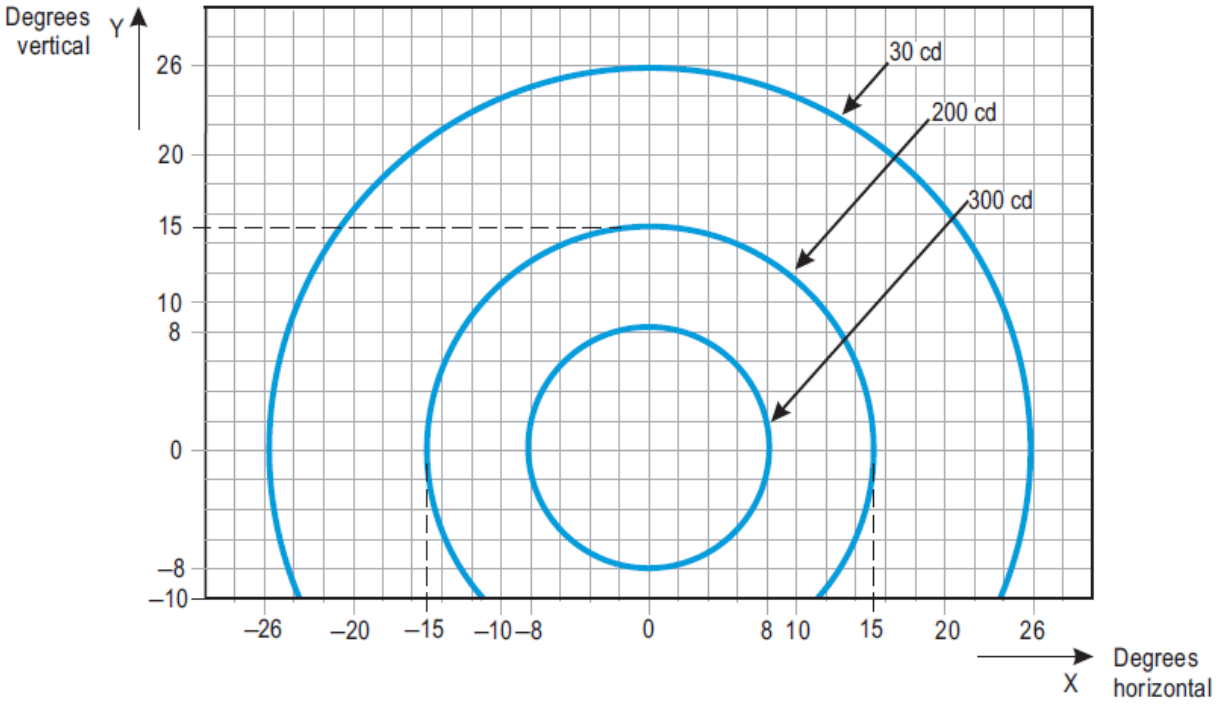
Note: *Some other device or design, e.g. specially designed optics, may be used in lieu of the visor.*

9.4.22.9 Runway guard lights, Configuration B, shall consist of yellow lights spaced at intervals of 3 m across the taxiway.

9.4.22.10 The light beam shall be unidirectional and shall show yellow in the direction of approach to the runway-holding position.

Note: *For guidance on orientation and aiming of runway guard lights, see the document G-AGA-014.*

9.4.22.11 The intensity in yellow light and beam spreads of lights of Configuration A shall be in accordance with the specifications in Figure A9-24.

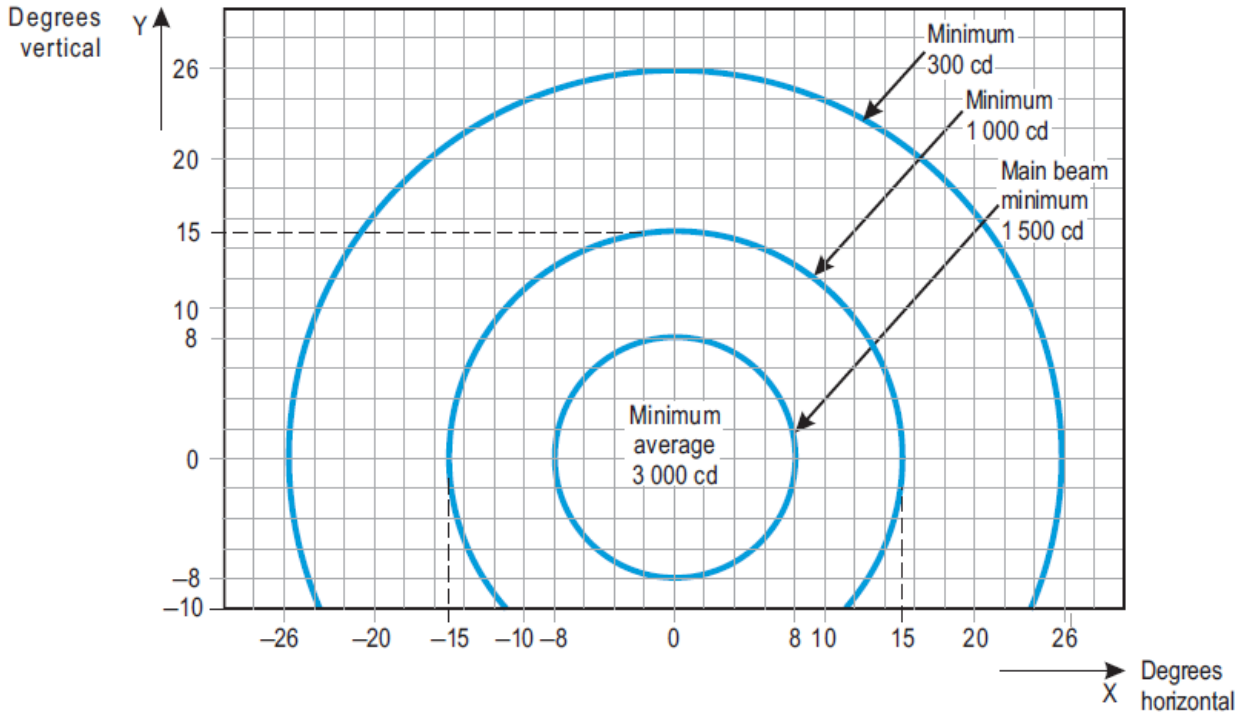


Notes:

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 A9-24. Isocandela diagram for each light in low-intensity runway guard lights, Configuration A

9.4.22.12 Where runway guard lights are intended for use during the day, the intensity in yellow light and beam spreads of lights of Configuration A shall be in accordance with the specifications in Figure A9-25 as below.



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 A9-25. Isocandela diagram for each light in high-intensity runway guard lights, Configuration A

9.4.22.13 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 of Configuration A shall be in accordance with the specifications in Figure A9-25 as above.

Note: *Higher light intensities may be required to maintain ground movement at a certain speed in low visibilities.*

9.4.22.14 The intensity in yellow light and beam spreads of lights of Configuration B shall be in accordance with the specifications in Figure A9-12 and para. 9.4.16.8 of this Regulation.

9.4.22.15 Where runway guard lights are intended for use during the day, the intensity in yellow light and beam spreads of lights of Configuration B shall be in accordance with the specifications in Figure A9-20 and para. 9.4.16.10 of this Regulation

9.4.22.16 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 of Configuration B shall be in accordance with the specifications in Figure A9-20 and para. 9.4.16.10 of this Regulation.

9.4.22.17 The lights in each unit of Configuration A shall be illuminated alternately.

9.4.22.18 For Configuration B, adjacent lights shall be alternately illuminated and alternative lights shall be illuminated in unison.

9.4.22.19 The lights shall be illuminated between 30 and 60 cycles per minute and the light suppression and illumination periods shall be equal and opposite in each light.

Note: *The optimum flash rate is dependent on the rise and fall times of the lamps used. Runway guard lights, Configuration A, installed on 6.6 ampere series circuits have been found to look best when operated at 45 to 50 flashes per minute per lamp. Runway guard lights, Configuration B, installed on 6.6 ampere series circuits have been found to look best when operated at 30 to 32 flashes per minute per lamp.*

9.4.23 APRON FLOODLIGHTING

(See also paragraphs 9.4.16.1 and 9.4.17.1 of this Regulation)

Application

9.4.23.1 Apron floodlighting shall be provided on an apron and on a designated isolated aircraft parking position intended to be used at night.

Note 1: *Where a de-icing/anti-icing facility is located in close proximity to the runway and permanent floodlighting could be confusing to pilots, other means of illumination of the facility may be required.*

Note 2: *The designation of an isolated aircraft parking position is specified in 7.2.14.*

Note 3: *Guidance on apron floodlighting is given in the G-AGA-014.*

Location

9.4.23.2 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. The arrangement and aiming of floodlights shall be such that an aircraft stand receives light from two or more directions to minimize shadows.

Characteristics

9.4.23.3 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.

9.4.23.4 The average illuminance shall be at least the following:

Aircraft stand:

— horizontal illuminance — 20 lux with a uniformity ratio (average to minimum) of not more than 4 to 1; and

— vertical illuminance — 20 lux at a height of 2 m above the apron inrelevant directions.

Other apron areas:

— horizontal illuminance — 50 % of the average illuminance on the aircraft stands with a uniformity ratio (average to minimum) of not more than 4 to 1.

9.4.24 VISUAL DOCKING GUIDANCE SYSTEM

Application

9.4.24.1 A visual docking guidance system shall be provided 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.

Note: *The factors to be considered in evaluating the need for a visual docking guidance system are in particular: the number and type(s) of aircraft using the aircraft stand, weather conditions, space available on the apron and the precision required for manoeuvring into the parking position due to aircraft servicing installation, passenger loading bridges, etc. See the G-AGA-014 — Visual Aids for guidance on the selection of suitable systems.*

Characteristics

9.4.24.2 The system shall provide both azimuth and stopping guidance.

9.4.24.3 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.

Note: *Care is required in both the design and on-site installation of the system to ensure that reflection of sunlight, or other light in the vicinity, does not degrade the clarity and conspicuity of the visual cues provided by the system.*

9.4.24.4 The azimuth guidance unit and the stopping position indicator shall be of a design such that:

(a) a clear indication of malfunction of either or both is available to the pilot and

(b) they can be turned off.

9.4.24.5 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.

9.4.24.6 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.

9.4.24.7 The system shall be usable by all types of aircraft for which the aircraft stand is intended, preferably without selective operation.

9.4.24.8 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.

Azimuth guidance unit

Location

9.4.24.9 The azimuth guidance unit shall 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 at least by the pilot occupying the left seat.

9.4.24.10 The azimuth guidance unit shall be aligned for use by the pilots occupying both the left and right seats.

Characteristics

9.4.24.11 The azimuth guidance unit shall provide unambiguous left/right guidance which enables the pilot to acquire and maintain the lead-in line without over controlling.

9.4.24.12 When azimuth guidance is indicated by colour change, green shall be used to identify the centre line and red for deviations from the centre line.

Stopping position indicator

Location

9.4.24.13 The stopping position indicator shall 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.

9.4.24.14 The stopping position indicator shall be usable at least by the pilot occupying the left seat.

9.4.24.15 The stopping position indicator shall be usable by the pilots occupying both the left and right seats.

Characteristics

9.4.24.16 The stopping position information provided by the indicator for a particular aircraft type shall account for the anticipated range of variations in pilot eye height and/or viewing angle.

9.4.24.17 The stopping position indicator shall 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.

9.4.24.18 The stopping position indicator shall provide closing rate information over a distance of at least 10 m.

9.4.24.19 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.

9.4.25 ADVANCED VISUAL DOCKING GUIDANCE SYSTEM

Application

Note 1: *Advanced visual docking guidance systems (A-VDGS) include those systems that, in addition to basic and passive azimuth and stop position information, provide pilots with active (usually sensor-based) guidance information, such as aircraft type indication (in accordance with ICAO Document 8643), distance-to-go information and closing speed. Docking guidance information is usually provided on a single display unit.*

Note 2: *An A-VDGS may provide docking guidance information in three stages: the acquisition of the aircraft by the system, the azimuth alignment of the aircraft, and the stopping position information.*

9.4.25.1 An A-VDGS shall be provided where it is operationally desirable to confirm the correct aircraft type for which guidance is being provided, and/or to indicate the stand centre line in use, where more than one is provided for.

9.4.25.2 The A-VDGS shall be suitable for use by all types of aircraft for which the aircraft stand is intended.

9.4.25.3 The A-VDGS shall only be used in conditions in which its operational performance is specified.

Note 1: *The use of the A-VDGS in conditions such as weather, visibility, and background lighting both by day and night would need to be specified.*

Note 2: *Care is required in both the design and on-site installation of the system to ensure that glare, reflection of sunlight, or other light in the vicinity, does not degrade the clarity and conspicuity of the visual cues provided by the system.*

9.4.25.4 The docking guidance information provided by an A-VDGS shall 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. A method of indicating that the A-VDGS is not in operational use or unserviceable, shall be provided.

Location

9.4.25.5 The 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.

Note: *Usually the pilot-in-command is responsible for the docking of the aircraft. However, in some circumstances, another person could be responsible and this person may be the driver of a vehicle that is towing the aircraft.*

Characteristics

9.4.25.6 The A-VDGS shall provide, at minimum, the following guidance information at the appropriate stage of the docking manoeuvre:

(a) an emergency stop indication;

(b) the aircraft type and model for which the guidance is provided;

(c) an indication of the lateral displacement of the aircraft relative to the stand centre line;

(d) the direction of azimuth correction needed to correct a displacement from the stand centre line;

(e) an indication of the distance to the stop position;

(f) an indication when the aircraft has reached the correct stopping position; and

(g) a warning indication if the aircraft goes beyond the appropriate stop position.

9.4.25.7 The A-VDGS shall be capable of providing docking guidance information for all aircraft taxi speeds encountered during the docking manoeuvre.

Note: *See the G-AGA-014, for an indication of the maximum aircraft speeds relative to distance to the stopping position.*

9.4.25.8 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 centreline greater than 1 m.

9.4.25.9 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 Table 9.4.

Table 9.4 Recommended displacement accuracy

Guidance information	max. deviation at stop position (stop area)	max. deviation at 9 m from stop position	max. deviation at 15 m from stop position	max. deviation at 25 m from stop position
Azimuth	±250 mm	±340 mm	±400 mm	±500 mm
Distance	±500 mm	±1000 mm	±1300 mm	Not specified

9.4.25.10 Symbols and graphics used to depict guidance information shall be intuitively representative of the type of information provided.

Note: *The use of colour would need to be appropriate and need to follow signal convention, i.e. red, yellow and green mean hazard, caution and normal/correct conditions, respectively. The effects of colour contrasts would also need to be considered.*

9.4.25.11 Information on the lateral displacement of the aircraft relative to the stand centre line shall be provided at least 25m prior to the stop position.

Note: *The indication of the distance of the aircraft from the stop position may be colour-coded and presented at a rate and distance proportional to the actual closure rate and distance of the aircraft approaching the stop point.*

9.4.25.12 Continuous closure distance and closure rate shall be provided from at least 15 m prior to the stop position.

9.4.25.13 Where provided, closure distance displayed in numerals shall be provided in metre integers to the stop position and displayed to 1 decimal place at least 3 m prior to the stop position.

9.4.25.14 Throughout the docking manoeuvre, an appropriate means shall be provided on the AVDGS 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.

9.4.25.15 Provision to initiate an immediate halt to the docking procedure shall be made available to personnel responsible for the operational safety of the stand.

9.4.25.16 The word “STOP” in red characters shall be displayed when an immediate cessation of the docking manoeuvre is required.

9.4.26 AIRCRAFT STAND MANOEUVRING GUIDANCE LIGHTS

Application

9.4.26.1 Aircraft stand manoeuvring guidance lights shall be provided 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.

Location

9.4.26.2 Aircraft stand manoeuvring guidance lights shall be collocated with the aircraft stand markings.

Characteristics

9.4.26.3 Aircraft stand manoeuvring guidance lights, other than those indicating a stop position, shall be fixed yellow lights, visible throughout the segments within which they are intended to provide guidance.

9.4.26.4 The lights used to delineate lead-in, turning and lead-out lines shall be spaced at intervals of not more than 7.5 m on curves and 15 m on straight sections.

9.4.26.5 The lights indicating a stop position shall be fixed, unidirectional lights, showing red.

9.4.26.6 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.

9.4.26.7 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.

9.4.27 ROAD-HOLDING POSITION LIGHT

Application

9.4.27.1 A road-holding position light shall be provided 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 350 m.

9.4.27.2 A road-holding position light shall be provided at each road-holding position serving a runway when it is intended that the runway will be used in runway visual range conditions of values between 350 m and 550 m.

Location

9.4.27.3 A road-holding position light shall be located adjacent to the holding position marking 1.5 m (± 0.5 m) from one edge of the road, i.e. left or right as appropriate to the local traffic regulations.

Note: *See paragraph 13.9 of this Regulation for the mass and height limitations and frangibility requirements of navigation aids located on runway strips.*

Characteristics

9.4.27.4 The road-holding position light shall comprise:

(a) a controllable red (stop)/green (go) traffic light; or

(b) a flashing-red light.

Note: *It is intended that the lights specified in sub-paragraph a) be controlled by the air traffic services.*

9.4.27.5 The road-holding position light beam shall be unidirectional and aligned so as to be visible to the driver of a vehicle approaching the holding position.

9.4.27.6 The intensity of the light beam shall be 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.

Note: *The commonly used traffic lights are likely to meet the requirements in paragraphs 9.4.26.5 and 9.4.26.6.*

9.4.27.7 The flash frequency of the flashing-red light shall be between 30 and 60 flashes per minute.

9.4.28 NO-ENTRY BAR

Note: *Runway incursions may take place in all visibility or weather conditions. The use of no-entry bars can form part of effective runway incursion prevention measures.*

Application

9.4.28.1 A no-entry bar shall be provided 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.

Location

9.4.28.2 A no-entry bar 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.

9.4.28.3 A no-entry bar shall be co-located with a no-entry sign and/or a no-entry marking.

Characteristics

9.4.28.4 A no-entry bar shall consist of unidirectional lights spaced at uniform intervals of no more than 3 m showing red in the intended direction(s) of approach to the runway.

Note: *Where necessary to enhance conspicuity, extra lights are installed uniformly.*

9.4.28.5 A pair of elevated lights shall be added to each end of the no-entry bar where the inpavement no entry 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.

9.4.28.6 The intensity in red light and beam spreads of no-entry bar lights shall be in accordance with the specifications in Figures A9-12 through A9-16, as appropriate.

9.4.28.7 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 Figure A9-17, A9-18 or A9-19.

Note: *High-intensity no-entry bars are typically used only in case of an absolute necessity and following a specificstudy.*

9.4.28.8 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 Figure A9-17 or A9-19.

9.4.28.9 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.

9.4.29 RUNWAY STATUS LIGHTS

Introductory Note: *Runway status lights (RWSL) is a type of autonomous runway incursion warning system (ARIWS). The two basic visual components of RWSL are runway entrance lights (RELs) and take-off hold lights (THLs). Either component may be installed by itself, but the two components are designed to be complementary to each other.*

Location

9.4.29.1 Where provided, RELs shall be offset 0.6 m from the taxiway centre line on the opposite side to the taxiway centre line lights and begin 0.6 m before the runway-holding position extending to the edge of the runway. An additional single light shall be placed on the runway 0.6 m from the runway centre line and aligned with the last two taxiway RELs.

Note: *Where two or more runway-holding positions are provided, the runway-holding position referred is that closest to the runway.*

9.4.29.2 RELs shall consist of at least five light units and shall be spaced at a minimum of 3.8 m and a maximum of 15.2 m longitudinally, depending upon the taxiway length involved, except for a single light installed near the runway centre line.

9.4.29.3 Where provided, THLs shall be offset 1.8 m on each side of the runway centre line lights and extend, in pairs, starting at a point 115 m from the beginning of the runway and, thereafter, every 30 m for at least 450 m.

Note: *Additional THLs may be similarly provided at the starting point of the take-off roll.*

Characteristics

9.4.29.4 Where provided, RELs shall consist of a single line of fixed in pavement lights showing red in the direction of aircraft approaching the runway.

9.4.29.5 RELs shall illuminate as an array at each taxiway/runway intersection where they are installed less than two seconds after the system determines a warning is needed.

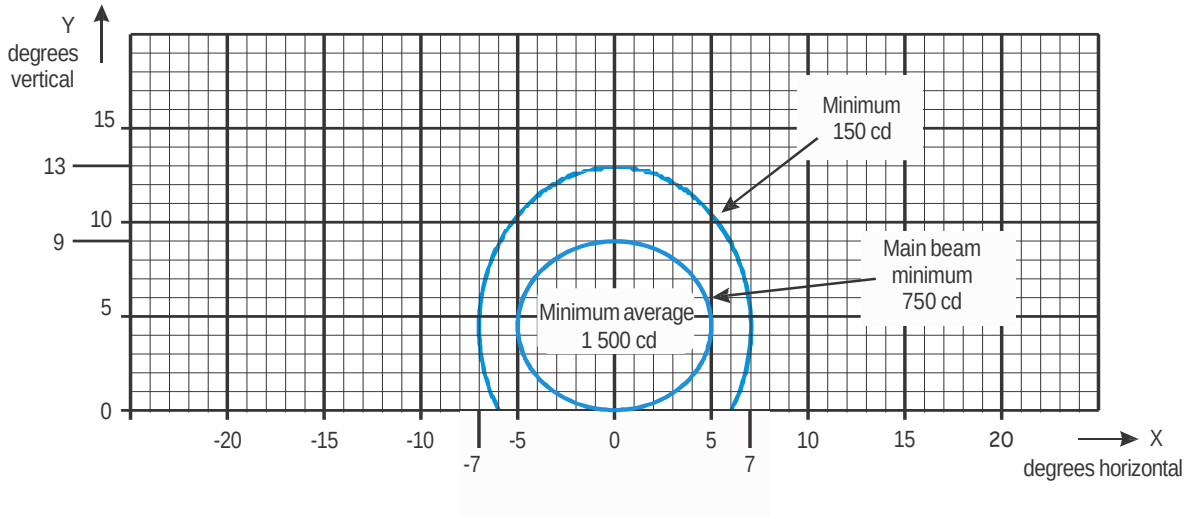
9.4.29.6 Intensity and beam spread of RELs shall be in accordance with the specifications of Figures A9-12 and A9-14.

Note: *Consideration for reduced beam width may be required for some REL lights at acute angled runway/taxiway intersections to ensure the RELs are not visible to aircraft on the runway.*

9.4.29.7 Where provided, THLs shall consist of two rows of fixed in pavement lights showing red facing the aircraft taking off.

9.4.29.8 THLs shall illuminate as an array on the runway less than two seconds after the system determines a warning is needed.

9.4.29.9 Intensity and beam spread of THLs shall be in accordance with the specifications of Figure A9-26 as below.



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 A9-1 to A9-11 and A9-26.

Figure A9-26. Isocandela diagram for take-off and hold lights (THL) (red light)

9.4.29.10 RELs and THLs shall be automated to the extent that the only control over each system will be to disable one or both systems.

9.5 SIGNS

9.5.1 GENERAL

Note: *Signs shall be either fixed message signs or variable message signs. Guidance on signs is contained in the G-AGA-014 and G-AGA-007 Apron markings and signs Guidance.*

Application

9.5.1.1 Signs shall be provided 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 paragraph 13.8.1 of this Regulation.

Note: *See paragraph 9.3.18 of this Regulation for specifications on information marking.*

9.5.1.2 A variable message sign shall be provided where:

(a) the instruction or information displayed on the sign is relevant only during a certain period of time; and/or

(b) there is a need for variable pre-determined information to be displayed on the sign to meet the requirements of paragraph 13.8.1 of this Regulation.

Characteristics

9.5.1.3 Signs shall be frangible. Those located near a runway or taxiway shall be sufficiently low to preserve clearance for propellers and the engine pods of jet aircraft. The installed height of the sign shall not exceed the dimension shown in the appropriate column of Table 9-5.

9.5.1.4 Signs shall be rectangular, as shown in Figures 9-30 and 9-31 with the longer side horizontal.

9.5.1.5 The only signs on the movement area utilizing red shall be mandatory instruction signs.

9.5.1.6 The inscriptions on a sign shall be in accordance with the provisions of Appendix N.

9.5.1.7 Signs shall be illuminated in accordance with the provisions of Appendix N when intended for use:

(a) in runway visual range conditions less than a value of 800 m; or

(b) at night in association with instrument runways; or

(c) at night in association with non-instrument runways where the code number is 3 or 4.

Table 9-5 – Location distances for taxiing guidance signs including runway exit signs

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
Code number	Legend	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	1100	11-21 m	8-15 m

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)

Figure 9-30. Mandatory instruction signs

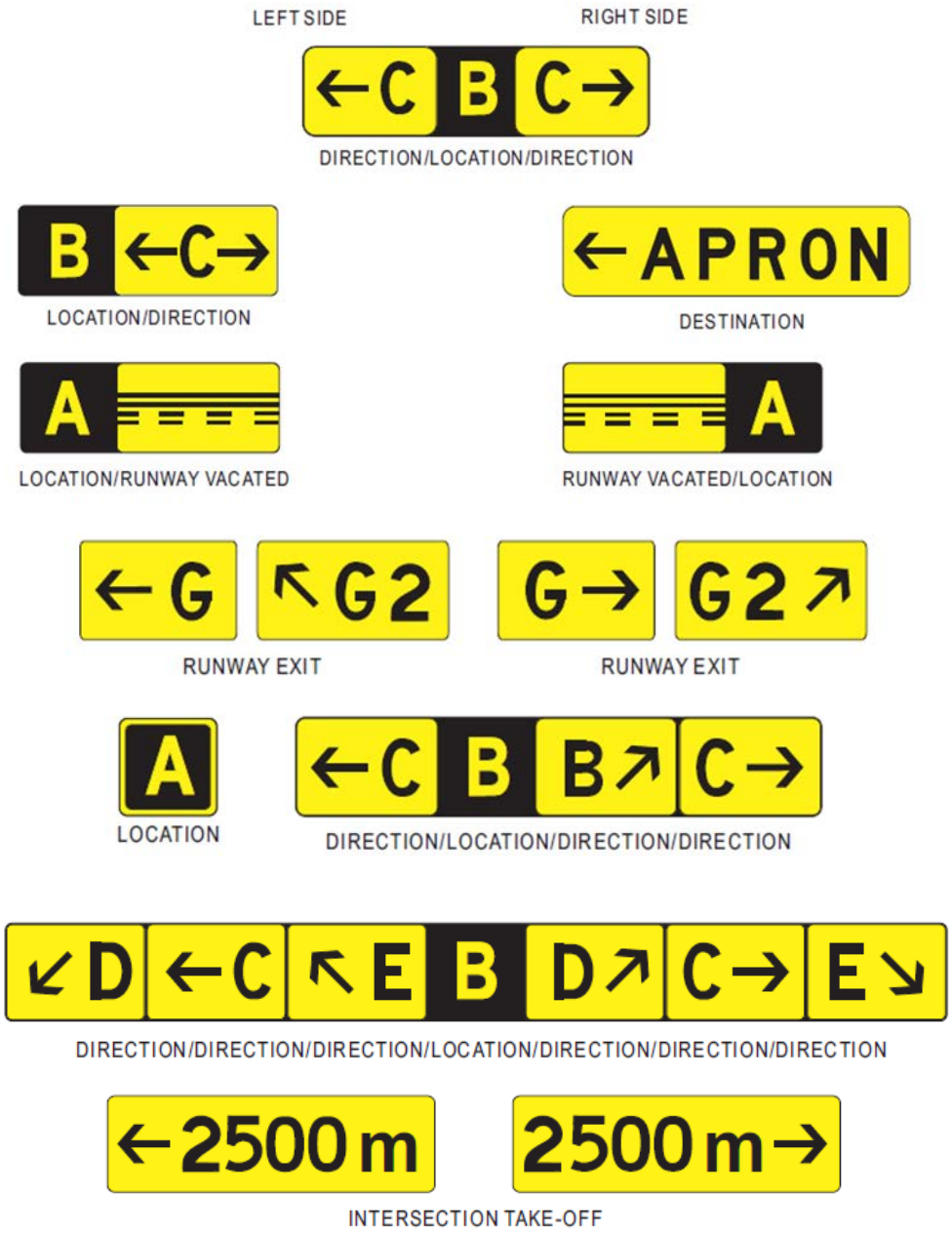


Figure 9-31. Information signs

9.5.1.8 Signs shall be retroreflective and/or illuminated in accordance with the provisions of Appendix N when intended for use at night in association with non-instrument runways where the code number is 1 or 2.

9.5.1.9 A variable message sign shall show a blank face when not in use.

9.5.1.10 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.

9.5.1.11 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 seconds.

9.5.2 MANDATORY INSTRUCTION SIGNS

Note: *See Figure 9-30 for pictorial representation of mandatory instruction signs and Figure 9-32 for examples of locating signs at taxiway/runway intersections.*

Application

9.5.2.1 A mandatory instruction sign shall be provided to identify a location beyond which an aircraft taxiing or vehicle shall not proceed unless authorized by the aerodrome control tower.

9.5.2.2 Mandatory instruction signs 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.

Note: *See paragraph 9.5.7 of this Regulation for specifications on road-holding position signs.*

9.5.2.3 A pattern “A” runway-holding position marking shall be supplemented at a taxiway/runway intersection or a runway/runway intersection with a runway designation sign.

9.5.2.4 A pattern “B” runway-holding position marking shall be supplemented with a category I, II or III holding position sign.

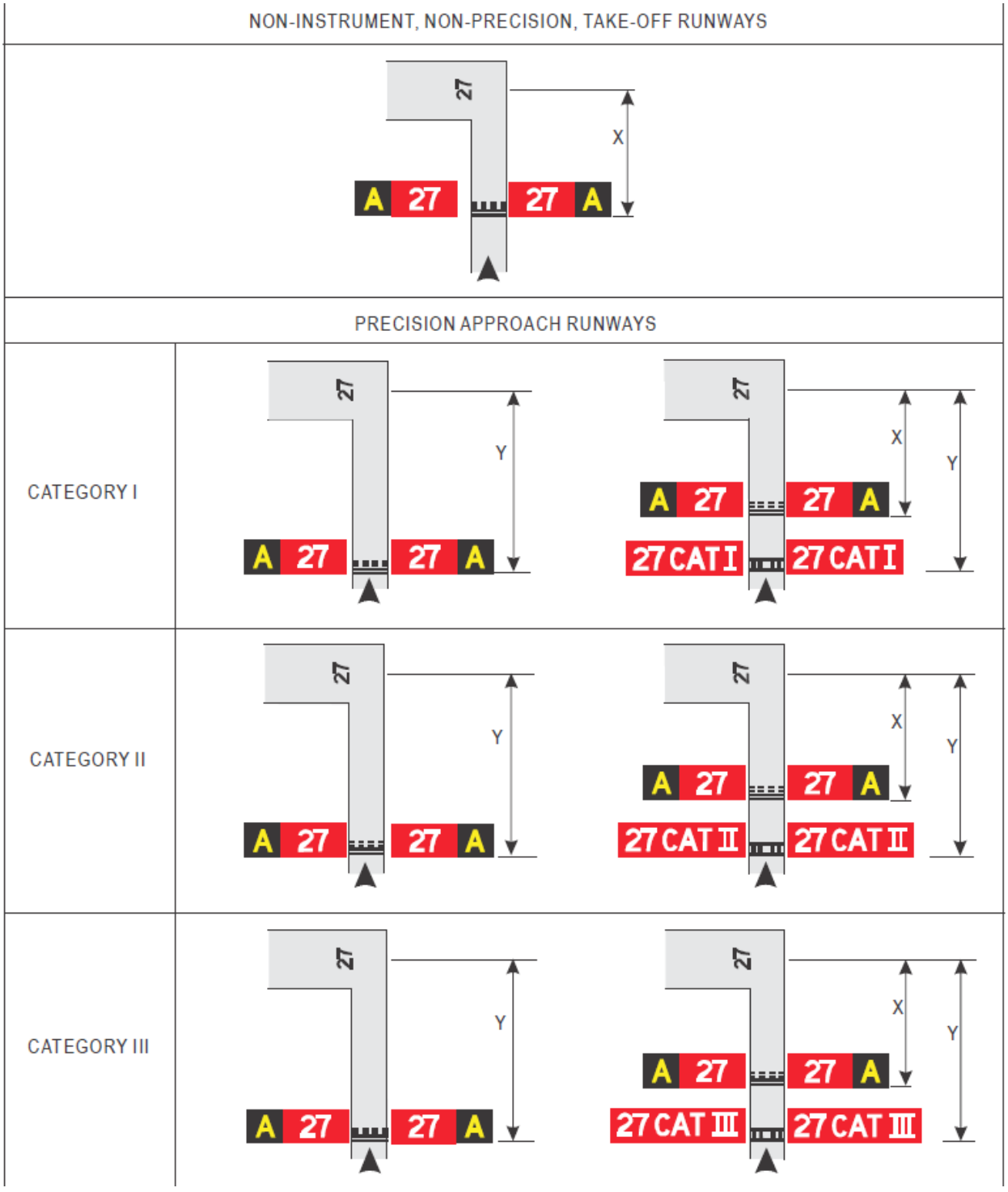
9.5.2.5 A pattern “A” runway-holding position marking at a runway-holding position established in accordance with paragraph 7.2.12.3 of this Regulation shall be supplemented with a runway-holding position sign.

Note: *See paragraph 9.3.10 of this Regulation for specifications on runway-holding position marking.*

9.5.2.6 A runway designation sign at a taxiway/runway intersection shall be supplemented with a location sign in the outboard (farthest from the taxiway) position, as appropriate.

Note: *See paragraph 9.5.3 of this Regulation for characteristics of location signs.*

9.5.2.7 A NO ENTRY sign shall be provided when entry into an area is prohibited.



Note: Distance X is established in accordance with Table 3-2. Distance Y is established at the edge of the ILS/MLS critical/sensitive area.

Figure 9-32. Examples of sign positions at taxiway/runway intersections

Location

9.5.2.8 A runway designation sign at a taxiway/runway intersection or a runway/runway intersection shall be located on each side of the runway-holding position marking facing the direction of approach to the runway.

9.5.2.9 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.

9.5.2.10 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.

9.5.2.11 A runway-holding position sign shall be located on each side of the runway-holding position established in accordance with paragraph 7.2.12.3 of this Regulation, facing the approach to the obstacle limitation surface or ILS/MLS critical/sensitive area, as appropriate.

Characteristics

9.5.2.12 A mandatory instruction sign shall consist of an inscription in white on a red background.

9.5.2.13 Where, owing to environmental or other factors, the conspicuity of the inscription on a mandatory instruction sign needs to be enhanced, the outside edge of the white inscription shall be supplemented by a black outline measuring 10 mm in width for runway code numbers 1 and 2, and 20 mm in width for runway code numbers 3 and 4.

9.5.2.14 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.

9.5.2.15 The inscription on a category I, II, III or joint II/III holding position sign shall consist of the runway designator followed by CAT I, CAT II, CAT III or CAT II/III, as appropriate.

9.5.2.16 The inscription on a NO ENTRY sign shall be in accordance with Figure 9-30.

9.5.2.17 The inscription on a runway-holding position sign at a runway holding position established in accordance with paragraph 7.2.12.3 of this Regulation shall consist of the taxiway designation and a number.

9.5.2.18 Where installed, the inscriptions/ symbol of Figure 9-30 shall be used.

9.5.3 INFORMATION SIGNS

Note: *See Figure 9-31 for pictorial representations of information signs.*

Application

9.5.3.1 An information sign shall be provided where there is an operational need to identify by a sign, a specific location, or routing (direction or destination) information.

9.5.3.2 Information signs shall include: direction signs, location signs, destination signs, runway exit signs, runway vacated signs and intersection take-off signs.

9.5.3.3 A runway exit sign shall be provided where there is an operational need to identify a runway exit.

9.5.3.4 A runway vacated sign shall be provided 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/sensitive area or the lower edge of the inner transitional surface whichever is farther from the runway centre line.

Note: *See paragraph 9.4.16 of this Regulation for specifications on colour coding taxiway centre line lights.*

9.5.3.5 An intersection take-off sign shall be provided when there is an operational need to indicate the remaining take-off run available (TORA) for intersection take-offs.

9.5.3.6 Where necessary, a destination sign shall be provided to indicate the direction to a specific destination on the aerodrome, such as cargo area, general aviation, etc.

9.5.3.7 A combined location and direction sign shall be provided when it is intended to indicate routing information prior to a taxiway intersection.

9.5.3.8 A direction sign shall be provided when there is an operational need to identify the designation and direction of taxiways at an intersection.

9.5.3.9 A location sign shall be provided at an intermediate holding position.

9.5.3.10 A location sign shall be provided in conjunction with a runway designation sign except at a runway/runway intersection.

9.5.3.11 A location sign shall be provided in conjunction with a direction sign, except that it may be omitted where an aeronautical study indicates that it is not needed.

9.5.3.12 Where necessary, a location sign shall be provided to identify taxiways exiting an apron or taxiways beyond an intersection.

9.5.3.13 Where a taxiway ends at an intersection such as a ‘‘T’’ and it is necessary to identify this, a barricade, direction sign and/or other appropriate visual aid shall be used.

Location

9.5.3.14 Except as specified in paragraphs 9.5.3.16 and 9.5.3.24 of this Regulation information signs shall, wherever practicable, be located on the left-hand side of the taxiway in accordance with Table 9-5.

9.5.3.15 At a taxiway intersection, information signs shall be located prior to the intersection and in line with the intermediate holding position marking. Where there is no intermediate holding position marking, the signs shall be installed at least 60m from

the centre line of the intersecting taxiway where the code number is 3 or 4 and at least 40 m where the code number is 1 or 2.

9.5.3.16 A runway exit sign shall be located on the same side of the runway as the exit is located (i.e. left or right) and positioned in accordance with Table 9-5.

9.5.3.17 A runway exit sign shall be located prior to the runway exit point in line with a position at least 60 m prior to the point of tangency where the code number is 3 or 4, and at least 30 m where the code number is 1 or 2.

9.5.3.18 A runway vacated sign shall be located at least on one side of the taxiway. 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/MLS critical/sensitive area; or

(b) the distance between the centre line of the runway and the lower edge of the inner transitional surface.

9.5.3.19 Where provided in conjunction with a runway vacated sign, the taxiway location sign shall be positioned outboard of the runway vacated sign.

9.5.3.20 An intersection take-off sign shall be located at the left-hand side of the entry taxiway. The distance between the sign and the centre line of the runway shall be not less than 60 m where the code number is 3 or 4 and not less than 45 m where the code number is 1 or 2.

9.5.3.21 A taxiway location sign installed in conjunction with a runway designation sign shall be positioned outboard of the runway designation sign.

9.5.3.22 A destination sign shall not normally be collocated with a location or direction sign.

9.5.3.23 An information sign other than a location sign shall not be collocated with a mandatory instruction sign.

9.5.3.24 A direction sign, barricade and/or other appropriate visual aid used to identify a ‘‘T’’ intersection shall be located on the opposite side of the intersection facing the taxiway.

Characteristics

9.5.3.25 An information sign other than a location sign shall consist of an inscription in black on a yellow background.

9.5.3.26 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.

9.5.3.27 The inscription on a runway exit sign shall consist of the designator of the exit taxiway and an arrow indicating the direction to follow.

9.5.3.28 The inscription on a runway vacated sign shall depict the pattern A runway-holding position marking as shown in Figure 9-31.

9.5.3.29 The inscription on an intersection take-off sign shall consist of a numerical message indicating the remaining take-off run available in metres plus an arrow, appropriately located and oriented, indicating the direction of the take-off as shown in Figure 9-31.

9.5.3.30 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 Figure 9-31.

9.5.3.31 The inscription on a direction sign shall comprise an alpha or alphanumerical message identifying the taxiway(s) plus an arrow or arrows appropriately oriented as shown in Figure 9-31.

9.5.3.32 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.

9.5.3.33 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.

9.5.3.34 Where a location sign and direction signs are used in combination:

(a) all direction signs related to left turns shall be placed on the left side of the location sign and all direction signs related to right turns shall be placed on the right side of the location sign, except that where the junction consists of one intersecting taxiway, the location sign may alternatively be placed on the left hand side;

(b) 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;

(c) 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

(d) adjacent direction signs shall be delineated by a vertical black line as shown in Figure 9-31.

9.5.3.35 A taxiway shall be identified by a designator that is used only once on an aerodrome comprising a single letter, two letters or a combination of a letter or letters followed by a number.

9.5.3.36 When designating taxiways, the use of words such as inner and outer shall be avoided wherever possible.

9.5.3.37 When designating taxiways, the use of the letters I, O or X shall not be used to avoid confusion with the numerals 1, 0 and closed marking.

9.5.3.38 The use of numbers alone on the manoeuvring area shall be reserved for the designation of runways.

9.5.3.39 Apron stand designators shall not be the same as taxiway designators.

9.5.4 VOR AERODROME CHECK-POINT SIGN

Application

9.5.4.1 When a VOR aerodrome check-point is established, it shall be indicated by a VOR aerodrome check-point marking and sign.

Note: *See paragraph 9.3.12 for VOR aerodrome check-point marking.*

Location

9.5.4.2 A VOR aerodrome check-point sign shall be located as near as possible to the check-point and so that the inscriptions are visible from the cockpit of an aircraft properly positioned on the VOR aerodrome check-point marking.

Characteristics

9.5.4.3 A VOR aerodrome check-point sign shall consist of an inscription in black on a yellow background.

9.5.4.4 The inscriptions on a VOR check-point sign shall be in accordance with one of the alternatives shown in Figure 9-33 below in which:

(a) VOR is an abbreviation identifying this as a VOR check-point;

(b) 116.3 is an example of the radio frequency of the VOR concerned;

(c) 147° is an example of the VOR bearing, to the nearest degree, which shall be indicated at the VOR check-point; and

(d) 4.3 NM is an example of the distance in nautical miles to a DME collocated with the VOR concerned.

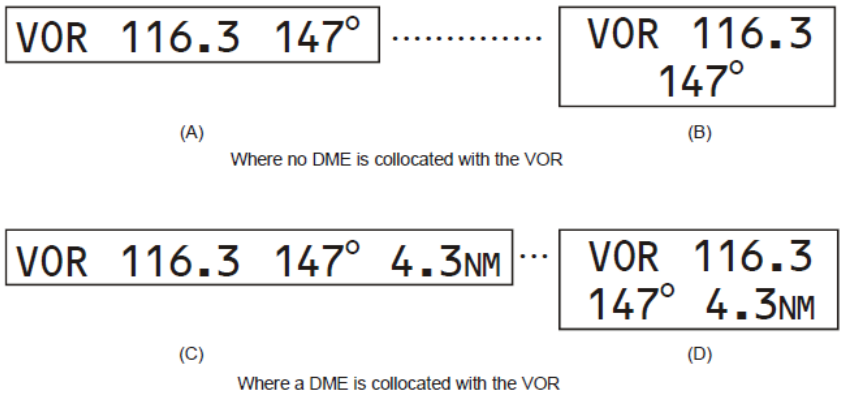


Figure 9-33. VOR aerodrome checkpoint sign

Note: *Tolerances for the bearing value shown on the sign are given in ICAO Annex 10, Volume I, Attachment E. It will be noted that a check-point can only be used operationally when periodic checks show it to be consistently within ± 2 degrees of the stated bearing.*

9.5.5 AERODROME IDENTIFICATION SIGN

Application

9.5.5.1 An aerodrome identification sign shall be provided at an aerodrome where there is insufficient alternative means of visual identification.

Location

9.5.5.2 The aerodrome identification sign shall be placed on the aerodrome so as to be legible, in so far as is practicable, at all angles above the horizontal.

Characteristics

9.5.5.3 The aerodrome identification sign shall consist of the name of the aerodrome.

9.5.5.4 The colour selected for the sign shall give adequate conspicuity when viewed against its background.

9.5.5.5 The characters shall have a height of not less than 3 m.

9.5.6 AIRCRAFT STAND IDENTIFICATION SIGNS

Application

9.5.6.1 An aircraft stand identification marking shall be supplemented with an aircraft stand identification sign where feasible.

Location

9.5.6.2 An aircraft stand identification sign shall be located so as to be clearly visible from the cockpit of an aircraft prior to entering the aircraft stand.

Characteristics

9.5.6.3 An aircraft stand identification sign shall consist of an inscription in black on a yellow background.

9.5.7 ROAD-HOLDING POSITION SIGN

9.5.7.1 A road-holding position sign shall be provided at all road entrances to a runway.

Location

9.5.7.2 The road-holding position sign shall be located 1.5 m from one edge of the road (left or right as appropriate to the local traffic regulations) at the holding position.

Characteristics

9.5.7.3 A road-holding position sign shall consist of an inscription in white on a red background.

9.5.7.4 The inscription on a road-holding position sign shall be in the national language, be in conform ity with the local traffic regulations and include the following:

(a) a requirement to stop; and

(b) where appropriate:

(i) a requirement to obtain ATC clearance; and

(ii) location designator.

Note: *Examples of road-holding position signs are contained in the G-AGA-014.*

9.5.7.5 A road-holding position sign intended for night use shall be retroreflective or illuminated.

9.6 MARKERS

9.6.1 GENERAL

Markers shall be frangible. Those located near a runway or taxiway shall be sufficiently low to preserve clearance for propellers and for the engine pods of jet aircraft.

Note 1: *Anchors or chains, to prevent markers which have broken from their mounting from blowing away, are sometimes used.*

Note 2: *Guidance on frangibility of markers is given in the G-AGA-013.*

9.6.2 UNPAVED RUNWAY EDGE MARKERS

Application

9.6.2.1 Markers shall be provided when the extent of an unpaved runway is not clearly indicated by the appearance of its surface compared with that of the surrounding ground.

Location

9.6.2.2 Where runway lights are provided, the markers shall be incorporated in the light fixtures. Where there are no lights, markers of flat rectangular or conical shape shall be placed so as to delimit the runway clearly.

Characteristics

9.6.2.3 The flat rectangular markers shall have a minimum size of 1 m by 3 m and shall be placed with their long dimension parallel to the runway centre line. The conical markers shall have a height not exceeding 50 cm.

9.6.3 STOPWAY EDGE MARKERS

Application

9.6.3.1 Stopway edge markers shall be provided when the extent of a stopway is not clearly indicated by its appearance compared with that of the surrounding ground.

Characteristics

9.6.3.2 The stopway edge markers shall be sufficiently different from any runway edge markers used to ensure that the two types of markers cannot be confused.

Note: *Markers consisting of small vertical boards camouflaged on the reverse side, as viewed from the runway, have proved operationally acceptable.*

9.6.4 EDGE MARKERS FOR SNOW-COVERED RUNWAYS

Application

9.6.4.1 Edge markers for snow-covered runways shall be used to indicate the usable limits of a snow-covered runway when the limits are not otherwise indicated.

Note: *Runway lights could be used to indicate the limits.*

Location

9.6.4.2 Edge markers for snow-covered runways shall be placed along the sides of the runway at intervals of not more than 100 m, and shall be located symmetrically about the runway centre line at such a distance from the centre line that there is adequate clearance for wing tips and powerplants. Sufficient markers shall be placed across the threshold and end of the runway.

Characteristics

9.6.4.3 Edge markers for snow-covered runways shall consist of conspicuous objects such as evergreen trees about 1.5 m high, or light-weight markers.

9.6.5 TAXIWAY EDGE MARKERS

Application

9.6.5.1 Taxiway edge markers shall be provided on a taxiway where the code number is 1 or 2 and taxiway centre line or edge lights or taxiway centre line markers are not provided.

Location

9.6.5.2 Taxiway edge markers shall be installed at least at the same locations as would the taxiway edge lights had they been used.

Characteristics

9.6.5.3 A taxiway edge marker shall be retroreflective blue.

9.6.5.4 The marked surface as viewed by the pilot shall be a rectangle and shall have a minimum viewing area of 150 cm^2.

9.6.5.5 Taxiway edge markers shall be frangible. Their height shall be sufficiently low to preserve clearance for propellers and for the engine pods of jet aircraft.

9.6.6 TAXIWAY CENTRE LINE MARKERS

Application

9.6.6.1 Taxiway centre line markers shall be provided on a taxiway where the code number is 1 or 2 and taxiway centre line or edge lights or taxiway edge markers are not provided.

9.6.6.2 Taxiway centre line markers shall be provided on a taxiway where the code number is 3 or 4 and taxiway centre line lights are not provided if there is a need to improve the guidance provided by the taxiway centre line marking.

Location

9.6.6.3 Taxiway centre line markers shall be installed at least at the same location as would taxiway centre line lights had they been used.

Note: *See paragraph 9.4.16.12 of this Regulation for the spacing of taxiway centre line lights.*

9.6.6.4 Taxiway centre line markers shall normally be located on the taxiway centre line marking except that they may be offset by not more than 30 cm where it is not practicable to locate them on the marking.

Characteristics

9.6.6.5 A taxiway centre line marker shall be retroreflective green.

9.6.6.6 The marked surface as viewed by the pilot shall be a rectangle and shall have a minimum viewing area of 20 cm^2.

9.6.6.7 Taxiway centre line markers 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 markers themselves.

9.6.7 UNPAVED TAXIWAY EDGE MARKERS

Application

9.6.7.1 Where the extent of an unpaved taxiway is not clearly indicated by its appearance compared with that of the surrounding ground, markers shall be provided.

Location

9.6.7.2 Where taxiway lights are provided, the markers shall be incorporated in the light fixtures. Where there are no lights, markers of conical shape shall be placed so as to delimit the taxiway clearly.

9.6.8 BOUNDARY MARKERS

Application

9.6.8.1 Boundary markers shall be provided at an aerodrome where the landing area has no runway.

Location

9.6.8.2 Boundary markers shall be spaced along the boundary of the landing area at intervals of not more than 200 m, if the type shown in Figure 9-34 is used, or approximately 90 m, if the conical type is used with a marker at any corner.

Characteristics

9.6.8.3 Boundary markers shall be of a form similar to that shown in Figure 9-34, or in the form of a cone not less than 50 cm high and not less than 75 cm in diameter at the base. The markers shall be coloured to contrast with the background against which they will be seen. A single colour, orange or red, or two contrasting colours, orange and white or alternatively red and white, shall be used, except where such colours merge with the background.

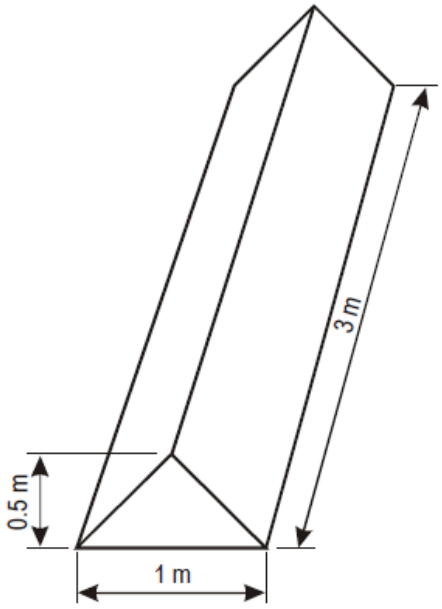


Figure 9-34. Boundary markers

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10. VISUAL AIDS FOR DENOTING OBSTACLES

10.1 GENERAL

10.1.1 INTRODUCTION

10.1.1.1 This chapter describes the visual aids required to be provided for objects located and/or operating at or around an aerodrome.

10.1.1.2 An aerodrome operator shall ensure that these visual aids are duly provided and properly maintained so that to ensure the safe operation of aircraft at and around its aerodrome.

10.2 OBJECTS TO BE MARKED AND/OR LIGHTED

Note1: *The marking and/or lighting of obstacles is intended to reduce hazards to aircraft by indicating the presence of the obstacles. It does not necessarily reduce operating limitations which may be imposed by an obstacle.*

Note 2: *An autonomous aircraft detection system may be installed on or near an obstacle (or group of obstacles such as wind farms), designed to operate the lighting only when the system detects an aircraft approaching the obstacle, in order to reduce light exposure to local residents. Guidance on the design and installation of an autonomous aircraft detection system is available in the G-AGA-014. The availability of such guidance is not intended to imply that such a system has to be provided.*

10.2.1 OBJECTS WITHIN THE LATERAL BOUNDARIES OF THE OBSTACLE LIMITATION SURFACES

10.2.1.1 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.

10.2.1.2 Elevated aeronautical ground lights within the movement area shall be marked so as to be conspicuous by day.

Obstacle lights shall not be installed on elevated ground lights or signs in the movement area.

10.2.1.3 All obstacles within the distance specified in Table 7-1, 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.

10.2.1.4 A fixed obstacle that extends above a take-off climb surface within 3 000 m of the inner edge of the take-off climb surface shall be marked and, if the runway is used at night, lighted, except that:

(a) such marking and lighting may be omitted when the obstacle is shielded by another fixed obstacle;

(b) 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 150 m;

(c) the marking may be omitted when the obstacle is lighted by high-intensity obstacle lights by day; and

(d) the lighting may be omitted where the obstacle is a lighthouse and an aeronautical study indicates the lighthouse light to be sufficient.

10.2.1.5 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:

(a) 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 150 m; or

(b) the object is lighted by high-intensity obstacle lights by day.

10.2.1.6 A fixed obstacle that extends above an approach surface within 3 000 m of the inner edge or above a transitional surface shall be marked and, if the runway is used at night, lighted, except that:

(a) such marking and lighting may be omitted when the obstacle is shielded by another fixed obstacle;

(b) 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 150 m;

(c) the marking may be omitted when the obstacle is lighted by high-intensity obstacle lights by day; and

(d) the lighting may be omitted where the obstacle is a lighthouse and an aeronautical study indicates the lighthouse light to be sufficient.

10.2.1.7 A fixed obstacle that extends above a horizontal surface shall be marked and, if the aerodrome is used at night, lighted, except that:

(a) 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;

(b) 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 150 m;

(c) the marking may be omitted when the obstacle is lighted by high-intensity obstacle lights by day; and

(d) the lighting may be omitted where the obstacle is a lighthouse and an aeronautical study indicates the lighthouse light to be sufficient.

10.2.1.8 A fixed object that extends above an obstacle protection surface shall be marked and, if the runway is used at night, lighted.

Note: *See paragraph 9.4.5 of this Regulation for information on the obstacle protection surface.*

10.2.1.9 Other objects inside the obstacle limitation surfaces shall be marked and/or lighted if an aeronautical study indicates that the object could constitute a hazard to aircraft (this includes objects adjacent to visual routes e.g. waterway or highway).

Anything which may, in the opinion of the appropriate authority after aeronautical study, endanger aeroplanes on the movement area or in the air within the limits of the inner horizontal and conical surfaces shall be regarded as an obstacle and shall be removed in so far as practicable.

Note: *In certain circumstances, objects that do not project above any of the surfaces enumerated in 4.1 may constitute a hazard to aeroplanes as, for example, where there are one or more isolated objects in the vicinity of an aerodrome.)*

10.2.1.10 Overhead wires, cables, etc., 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.

10.2.2 OBJECTS OUTSIDE THE LATERAL BOUNDARIES OF THE OBSTACLE LIMITATION SURFACES

10.2.2.1 Obstacles in accordance with below notes shall be marked and lighted, except that the marking may be omitted when the obstacle is lighted by high-intensity obstacle lights by day.

Note: *In areas beyond the limits of the obstacle limitation surfaces, at least those objects which extend to a height of 150 m 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.*

10.2.2.2 Other objects outside the obstacle limitation surfaces shall be marked and/or lighted if an aeronautical study indicates that the object could constitute a hazard to aircraft (this includes objects adjacent to visual routes e.g. waterway, highway).

10.2.2.3 Overhead wires, cables, etc., 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.

10.2.2.4 When it has been determined that an overhead wire, cable, etc., needs to be marked but it is not practicable to install markers on the wire, cable, etc., then high-intensity obstacle lights, Type B, shall be provided on their supporting towers.

10.2.3 MARKING AND/ OR LIGHTING OF OBJECTS

General

10.2.3.1 The presence of objects which must be lighted, as specified in 10.2. shall be indicated by low-, medium- or highintensity obstacle lights, or a combination of such lights.

10.2.3.2 Low-intensity obstacle lights, Types A B, C and D, 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 Table 10-1 and Appendix 1.

10.2.3.3 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. 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. If the shielded light does not contribute to the definition of the object to be lighted, it may be omitted.

10.2.4 MOBILE OBJECTS

Marking

10.2.4.1 All mobile objects to be marked shall be coloured or display flags.

Marking by colour

10.2.4.2 When mobile objects are marked by colour, a single conspicuous colour, preferably red or yellowish green for emergency vehicles and yellow for service vehicles, shall be used.

Marking by flags

10.2.4.3 Flags used to mark mobile objects shall be displayed around, on top of, or around the highest edge of the object. Flags shall not increase the hazard presented by the object they mark.

10.2.4.4 Flags used to mark mobile objects shall not be less than 0.9 m on each side and shall consist of a chequered pattern, each square having sides of not less than 0.3 m. The colours of the pattern shall contrast each with the other and with the background against which they will be seen. Orange and white or alternatively red and white shall be used, except where such colours merge with the background.

Table 10-1. Characteristics of obstacle lights

Light Type	Colour	Signal type/ (flash rate)	Peak intensity (cd) at given Background Luminance (b)			Light Distribution Table
			Day (Above 500 cd/m2)	Twilight (50-500 cd/m2)	Night (Below 50 cd/m2)	
Low-intensity, Type A (fixed obstacle)	Red	Fixed	N/A	N/A	10	Table 10-2
Low-intensity, Type B (fixed obstacle)	Red	Fixed	N/A	N/A	32	Table 10-2
Low-intensity, Type C (mobile obstacle)	Yellow/ Blue (a)	Flashing (60-90 fpm)	N/A	40	40	Table 10-2
Low-intensity, Type D (follow-me vehicle)	Yellow	Flashing (60–90 fpm)	N/A	200	200	Table 10-2
Medium-intensity, Type A	White	Flashing (20–60 fpm)	20 000	20 000	2 000	Table 10-3
Medium-intensity, Type B	Red	Flashing (20–60 fpm)	N/A	N/A	2 000	Table 10-3
Medium-intensity, Type C	Red	Fixed	N/A	N/A	2 000	Table 10-3
High-intensity, Type A	White	Flashing (40–60 fpm)	200 000	20 000	2 000	Table 10-3
High-intensity, Type B	White	Flashing (40–60 fpm)	100 000	20 000	2 000	Table 10-3

(a) See para.10.2.3.6

(b) For flashing lights, effective intensity as determined in accordance with the document G-AGA-014.

Table 10-2. Light distribution for low-intensity obstacle lights

	Minimum intensity (a)	Maximum intensity (a)	Vertical beam spread (f)	
			Minimum beam spread	Intensity
Type A	10 cd (b)	N/A	10°	5 cd
Type B	32 cd (b)	N/A	10°	16 cd
Type C	40 cd (b)	400 cd	12° (d)	20 cd
Type D	200 cd (c)	400 cd	N/A (e)	N/A

Note: *This table does not include recommended horizontal beam spreads. Para.10.2.2.3 of this Regulation requires 360° coverage around an obstacle. Therefore, the number of lights needed to meet this requirement will depend on the horizontal beam spreads of each light as well as the shape of the obstacle. Thus, with narrower beam spreads, more lights will be required.*

(a) 360° horizontal. For flashing lights, the intensity is read into effective intensity, as determined in accordance with the G-AGA-014.

(b) Between 2 and 10° vertical. Elevation vertical angles are referenced to the horizontal when the light is levelled.

(c) Between 2 and 20° vertical. Elevation vertical angles are referenced to the horizontal when the light is levelled.

(d) Peak intensity shall be located at approximately 2.5° vertical.

(e) Peak intensity shall be located at approximately 17° vertical.

(f) Beam spread is defined as the angle between the horizontal plane and the directions for which the intensity exceeds that mentioned in the "intensity" column.

Table 10-3. Light distribution for medium- and high-intensity obstacle lights according to benchmark intensities of Table 10-1

Benchmark intensity	Minimum requirements					Recommendations				
	Vertical elevation angle (b)			Vertical beam spread (c)		Vertical elevation angle (b)			Vertical beam spread (c)	
	0°		-1°			0°	-1°	-10°		
	Minimum average intensity (a)	Minimum intensity (a)	Minimum intensity (a)	Minimum beam spread	Intensity (a)	Maximum intensity (a)	Maximum intensity (a)	Maximum intensity (a)	Maximum beam spread	Intensity (a)
200000	200000	150000	75 000	3°	75 000	250000	112500	7 500	7°	75 000
100000	100000	75 000	37 500	3°	37 500	125000	56 250	3 750	7°	37 500
20 000	20 000	15 000	7 500	3°	7 500	25 000	11 250	750	N/A	N/A
2 000	2 000	1 500	750	3°	750	2 500	1 125	75	N/A	N/A

Note 1: *This table does not include recommended horizontal beam spreads. Para.10.2.2.3 of this Regulation requires 360° coverage around an obstacle. Therefore, the number of lights needed to meet this requirement will depend on the horizontal beam spreads of each light as well as the shape of the obstacle. Thus, with narrower beam spreads, more lights will be required.*

(a) 360° horizontal. All intensities are expressed in Candela. For flashing lights, the intensity is read into effective intensity, as determined in accordance with the G-AGA-014.
(b) Elevation vertical angles are referenced to the horizontal when the light unit is levelled.
(c) Beam spread is defined as the angle between the horizontal plane and the directions for which the intensity exceeds that mentioned in the “intensity” column.

Note 2: *An extended beam spread may be necessary under specific configuration and justified by an aeronautical study.*

Lighting

10.2.4.5 Low-intensity obstacle lights, Type C, shall be displayed on vehicles and other mobile objects excluding aircraft.

Note: *See ICAO Annex 2 for lights to be displayed by aircraft.*

10.2.4.6 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.

10.2.4.7 Low-intensity obstacle lights, Type D, shall be displayed on follow-me vehicles.

10.2.4.8 Low-intensity obstacle lights on objects with limited mobility such as aerobridges shall be fixed-red, and as a minimum be in accordance with the specifications for low-intensity obstacle lights, Type A, in Table 10-1. 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.

10.2.5 FIXED OBJECTS

Note: *The fixed objects of wind turbines are addressed separately in para.10.2.5 of this Regulation and the fixed objects of overhead wires, cables, etc., and supporting towers are addressed separately in para.10.2.6.*

Marking

10.2.5.1 All fixed objects to be marked shall, whenever practicable, be coloured, but if this 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.

Marking by colour

10.2.5.2 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 4.5 m in both dimensions. The pattern shall consist of rectangles of not less than 1.5 m and not more than 3 m on a side, the corners being of the darker colour. The colours of the pattern shall contrast each with the other and with the background against which they will be seen. Orange and white or alternatively red and white shall be used, except where such colours merge with the background. (See Figure 10-1. below)

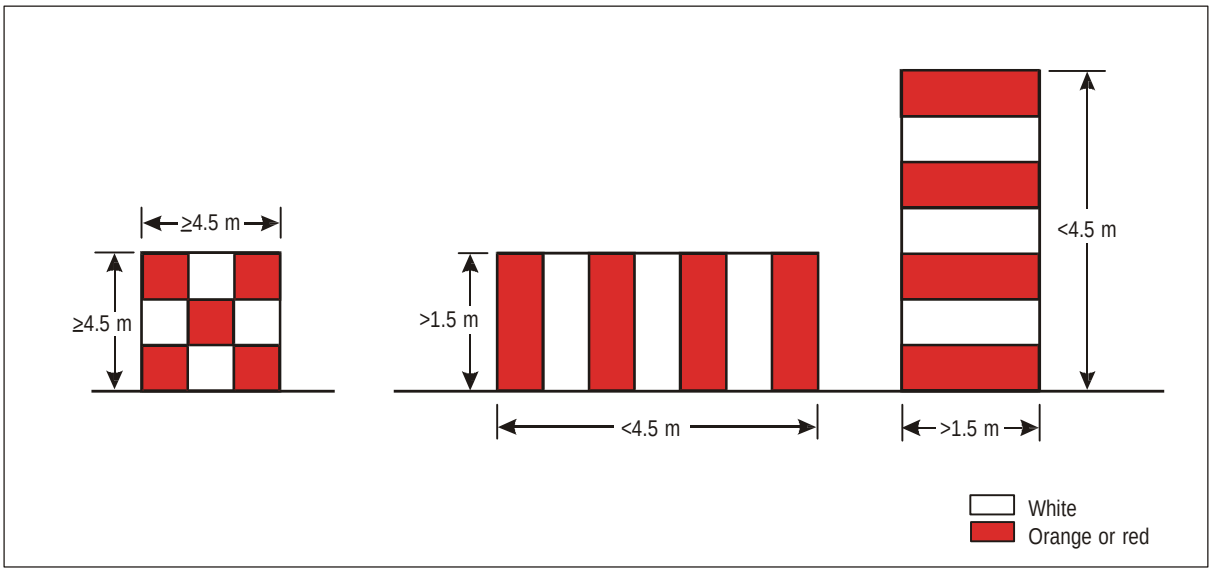
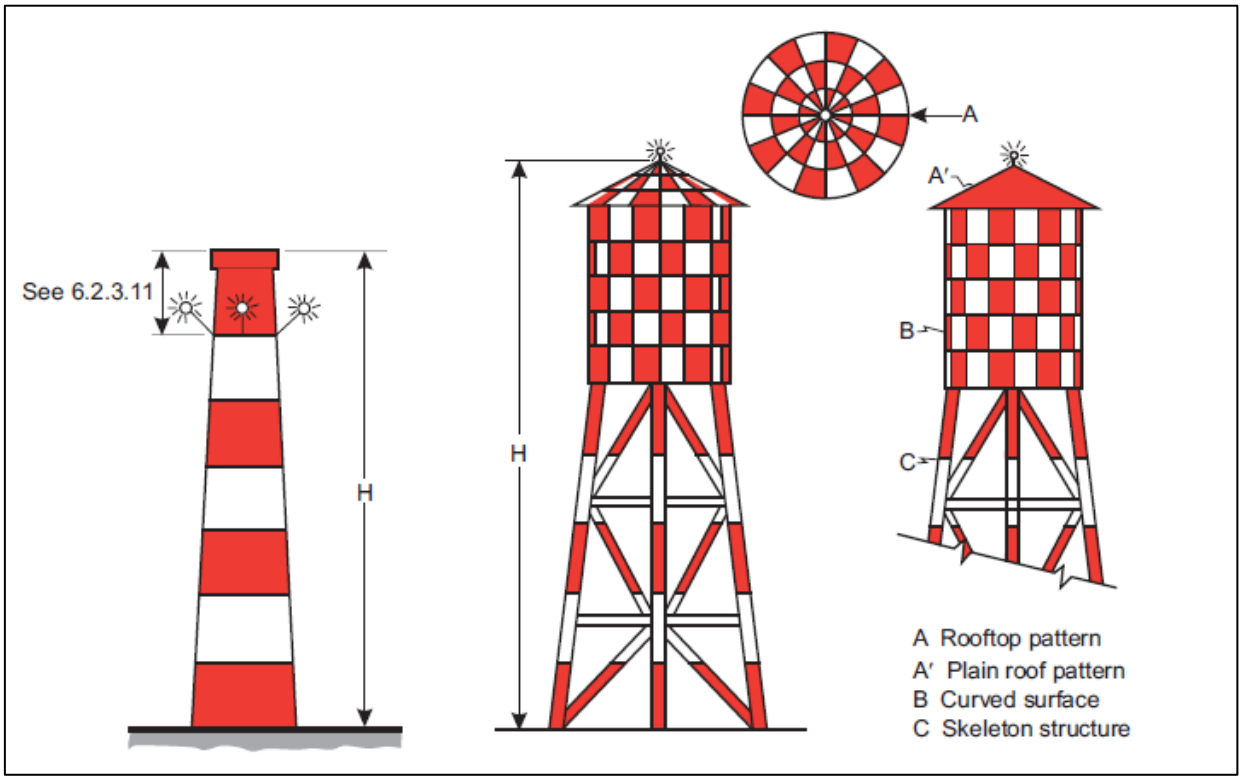


Figure 10-1. Basic marking patterns



Note: *H is less than 45 m for the examples shown above.*

For greater heights intermediate lights must be added as shown below.

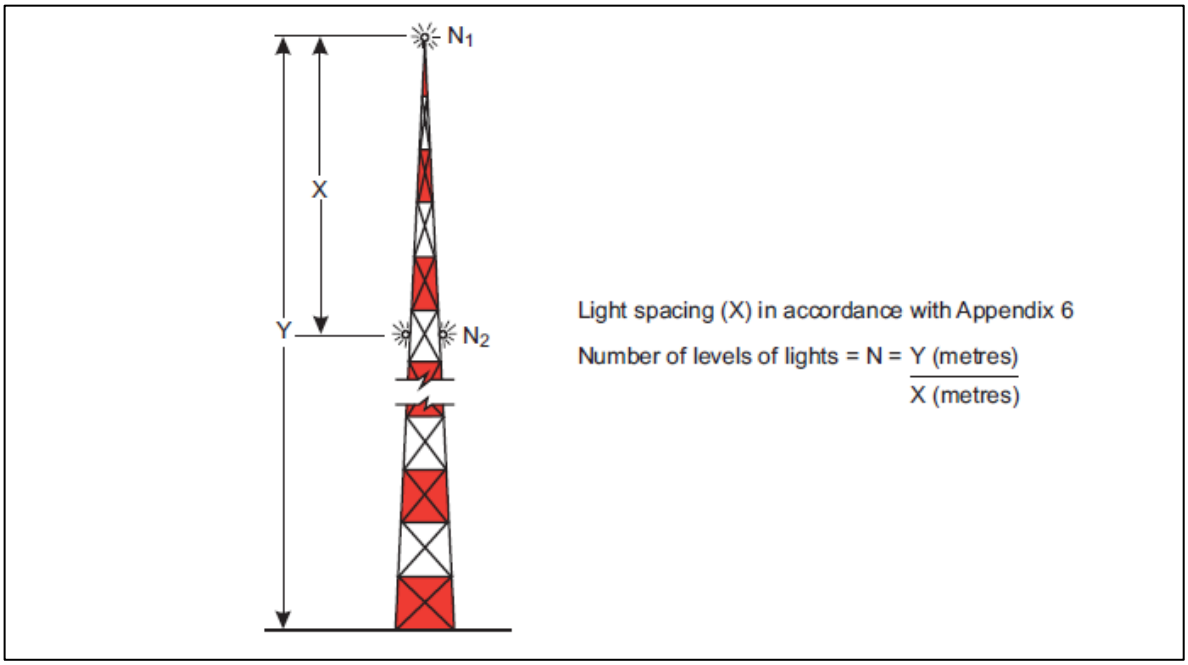


Figure 10-2. Examples of marking and lighting of tall structures

10.2.5.3 An object shall be coloured to show alternating contrasting bands if:

(a) it has essentially unbroken surfaces and has one dimension, horizontal or vertical, greater than 1.5 m, and the other dimension, horizontal or vertical, less than 4.5 m; or

(b) it is of skeletal type with either a vertical or a horizontal dimension greater than 1.5 m.

The bands shall be perpendicular to the longest dimension and have a width approximately 1/7 of the longest dimension or 30 m, whichever is less. The colours of the bands shall contrast with the background against which they will be seen.

Orange and white shall be used, except where such colours are not conspicuous when viewed against the background. The bands on the extremities of the object shall be of the darker colour. (See Figures 10-1 and 10-2. above)

Note: *Table 10-4 shows a formula for determining band widths and for having an odd number of bands, thus permitting both the top and bottom bands to be of the darker colour.*

Table 10-4. Marking band widths

Longest dimension		Band width
Greater than	Not exceeding	
1.5 m	210 m	1/7 of longest dimension
210 m	270 m	1/9 of longest dimension
270 m	330 m	1/11 of longest dimension
330 m	390 m	1/13 of longest dimension
390 m	450 m	1/15 of longest dimension
450 m	510 m	1/17 of longest dimension
510 m	570 m	1/19 of longest dimension
570 m	630 m	1/21 of longest dimension

10.2.5.4 An object shall be coloured in a single conspicuous colour if its projection on any vertical plane has both dimensions less than 1.5 m. Orange or red shall be used, except where such colours merge with the background.

Note: *Against some backgrounds it may be found necessary to use a different colour from orange or red to obtain sufficient contrast.*

Marking by flags

10.2.5.5 Flags used to mark fixed objects shall be displayed around, on top of, or around the highest edge of, the object.

When flags are used to mark extensive objects or groups of closely spaced objects, they shall be displayed at least every 15 m.

Flags shall not increase the hazard presented by the object they mark.

10.2.5.6 Flags used to mark fixed objects shall not be less than 0.6 m on each side.

10.2.5.7 Flags used to mark fixed objects shall 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 shall be used.

Marking by markers

10.2.5.8 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 1 000 m for an object to be viewed from the air and 300 m for an object to be viewed from the ground in all directions in which an aircraft is likely to approach the object. 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.

10.2.5.9 A marker shall be of one colour. When installed, white and red, or white and orange markers shall be displayed alternately. The colour selected shall contrast with the background against which it will be seen.

Lighting

10.2.5.10 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.

Note: *Recommendations on how a combination of low-, medium- and/or high-intensity lights on obstacles shall be displayed are given in Appendix 6.*

10.2.5.11 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, etc. (See Figure 10-2 above).

10.2.5.12 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 12 m 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.

10.2.5.13 In the case of an extensive object or of a group of closely spaced objects to be lighted that are:

(a) 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

(b) 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. If two or more edges are of the same height, the edge nearest the landing area shall be marked.

10.2.5.14 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.

10.2.5.15 Where lights are applied to display the general definition of an extensive object or a group of closely spaced objects, and

(a) low-intensity lights are used, they shall be spaced at longitudinal intervals not exceeding 45 m; and

(b) medium-intensity lights are used, they shall be spaced at longitudinal intervals not exceeding 900 m.

10.2.5.16 High-intensity obstacle lights, Type A, and medium-intensity obstacle lights, Types A and B, located on an object shall flash simultaneously.

10.2.5.17 The installation setting angles for high-intensity obstacle lights, Type A, shall be in accordance with Table 10-5 as below.

Table 10-5. Installation setting angles for high-intensity obstacle lights

Height of light unit above terrain	Angle of the peak of the beam above the horizontal
greater than 151 m AGL	0°
122 m to 151 m AGL	1°
92 m to 122 m AGL	2°
less than 92 m AGL	3°

Note: *High-intensity obstacle lights are intended for day use as well as night use. Care is needed to ensure that these lights do not create disconcerting dazzle. Guidance on the design, location and operation of high-intensity obstacle lights is given in the G-AGA-014.*

10.2.5.18 Where, in the opinion of the appropriate authority, 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 10 000 m radius) or cause significant environmental concerns, a dual obstacle lighting system shall be provided. This system 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.

Lighting of objects with a height less than 45 m above ground level

10.2.5.19 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 45 m.

10.2.5.20 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.

10.2.5.21 Low-intensity obstacle lights, Type B, shall be used either alone or in combination with medium-intensity obstacle lights, Type B, in accordance with 10.2.4.22.

10.2.5.22 Medium-intensity obstacle lights, Type A, B or C, shall be used where the object is an extensive one. 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.

Note: *A group of buildings is regarded as an extensive object.*

Lighting of objects with a height 45 m to a height less than 150 m above ground level

10.2.5.23 Medium-intensity obstacle lights, Type A, B or C, shall be used. 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.

10.2.5.24 Where an object is indicated by medium-intensity obstacle lights, Type A, and the top of the object is more than 105 m 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. These additional intermediate lights 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 105 m.

10.2.5.25 Where an object is indicated by medium-intensity obstacle lights, Type B, and the top of the object is more than 45 m 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. These additional intermediate lights 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 52 m.

10.2.5.26 Where an object is indicated by medium-intensity obstacle lights, Type C, and the top of the object is more than 45 m 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. These additional intermediate lights 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 52 m.

10.2.5.27 Where high-intensity obstacle lights, Type A, are used, they shall be spaced at uniform intervals not exceeding 105 m between the ground level and the top light(s) specified in para.10.2.4.10, except that 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.

Lighting of objects with a height 150 m or more above ground level

10.2.5.28 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 150 m and an aeronautical study indicates such lights to be essential for the recognition of the object by day.

10.2.5.29 Where high-intensity obstacle lights, Type A, are used, they shall be spaced at uniform intervals not exceeding 105 m between the ground level and the top light(s) specified in para.10.2.4.10, except that 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.

10.2.5.30 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 10 000 m radius) or cause significant environmental concerns, medium-intensity obstacle lights, Type C, shall be used alone, whereas mediumintensity obstacle lights, Type B, shall be used either alone or in combination with low-intensity obstacle lights, Type B.

10.2.5.31 Where an object is indicated by medium-intensity obstacle lights, Type A, additional lights shall be provided at intermediate levels. These additional intermediate lights 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 105 m.

10.2.5.32 Where an object is indicated by medium-intensity obstacle lights, Type B, additional lights shall be provided at intermediate levels. These additional intermediate lights 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 52 m.

10.2.5.33 Where an object is indicated by medium-intensity obstacle lights, Type C, additional lights shall be provided at intermediate levels. These additional intermediate lights 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 52 m.

10.2.6 WIND TURBINES

10.2.6.1 A wind turbine shall be marked and/or lighted if it is determined to be an obstacle.

Note: *see 8.2.3.1and 8.2.3.2 of this Regulation*

Markings

10.2.6.2 The rotor blades, nacelle and upper 2/3 of the supporting mast of wind turbines shall be painted white, unless otherwise indicated by an aeronautical study.

Lighting

10.2.6.3 When lighting is deemed necessary, medium intensity obstacle lights shall be used. In the case of a wind farm, i.e. a group of two or more wind turbines, it 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 with10.2.5.15, 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; and

(d) so that, within a wind farm, any wind turbines of significantly higher elevation are also identified wherever they are located.

(e) at locations prescribed in a), b) and d), respecting the following criteria:

(i) for wind turbines of less than 150 m in overall height (hub height plus vertical blade height), medium-intensity lighting on the nacelle shall be provided;

(ii) ii) for wind turbines from 150 m to 315 m in overall height, in addition to the medium-intensity light installed on the nacelle, a second light serving as an alternate shall be provided in case of failure of the operating light. The lights shall be installed to assure that the output of either light is not blocked by the other; and

(iii) iii) in addition, for wind turbines from 150 m to 315 m in overall height, an intermediate level at half the nacelle height of at least three low-intensity Type E lights, as specified in 10.2.3.3, shall be provided. If an aeronautical study shows that low-intensity Type E lights are not suitable, low-intensity Type A or B lights may be used.

Note.– The above 10.2.6.3 e) does not address wind turbines of more than 315 m of overall height. For such windturbines, additional marking and lighting may be required as determined by an aeronautical study.

10.2.6.4 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.

10.2.6.5 Where lighting is deemed necessary for a single wind turbine or short line of wind turbines, the installation shall be in accordance with 10.2.6.3 e) or as determined by an aeronautical study.

10.2.7 Overhead Wires, Cables, etc., and Supporting Towers

Marking

10.2.7.1 The wires, cables, etc., to be marked shall be equipped with markers; the supporting tower shall be coloured.

Marking by colours

10.2.7.2 The supporting towers of overhead wires, cables, etc., that require marking shall be marked in accordance with para.10.2.4.1 to 10.2.4.4, except that the marking of the supporting towers may be omitted when they are lighted by high-intensity obstacle lights by day.

Marking by markers

10.2.7.3 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 1 000 m for an object to be viewed from the air and 300 m for an object to be viewed from the ground in all directions in which an aircraft is likely to approach the object. 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.

10.2.7.4 A marker displayed on an overhead wire, cable, etc., shall be spherical and have a diameter of not less than 60 cm.

10.2.7.5 The spacing between two consecutive markers or between a marker and a supporting tower shall be appropriate to the diameter of the marker, but in no case shall the spacing exceed:

(a) 30 m where the marker diameter is 60 cm progressively increasing with the diameter of the marker to

(b) 35 m where the marker diameter is 80 cm and further progressively increasing to a maximum of

(c) 40 m where the marker diameter is of at least 130 cm.

Where multiple wires, cables, etc., are involved, a marker shall be located not lower than the level of the highest wire at the point marked.

10.2.7.6 A marker shall be of one colour. When installed, white and red, or white and orange markers shall be displayed alternately. The colour selected shall contrast with the background against which it will be seen.

10.2.7.7 When it has been determined that an overhead wire, cable, etc., needs to be marked but it is not practicable to install markers on the wire, cable, etc., then high-intensity obstacle lights, Type B, shall be provided on their supporting towers.

Lighting

10.2.7.8 High-intensity obstacle lights, Type B, shall be used to indicate the presence of a tower supporting overhead wires, cables, etc., where:

(a) an aeronautical study indicates such lights to be essential for the recognition of the presence of wires, cables, etc.;

or

(b) it has not been found practicable to install markers on the wires, cables, etc

10.2.7.9 Where high-intensity obstacle lights, Type B, are used, they shall be located at three levels:

— at the top of the tower;

— at the lowest level of the catenary of the wires or cables; and

— at approximately midway between these two levels.

Note: *In some cases, this may require locating the lights off the tower.*

10.2.7.10 High-intensity obstacle lights, Type B, indicating the presence of a tower supporting overhead wires, cables, etc., shall flash sequentially; first the middle light, second the top light and last, the bottom light.

The intervals between flashes of the lights shall approximate the following ratios:

Flash interval between	***Ratio of cycle time***
middle and top light	1/13
top and bottom light	2/13
bottom and middle light	10/13.

Note: *High intensity obstacle lights are intended for day use as well as night use. Care is needed to ensure that these lights do not create disconcerting dazzle. Guidance on the design, operation and the location of high-intensity obstacle lights is given in the G-AGA-014.*

10.2.7.11 Where, in the opinion of the appropriate authority, the use of high-intensity obstacle lights, Type B, at night may dazzle pilots in the vicinity of an aerodrome (within approximately 10 000 m radius) or cause significant environmental concerns, a dual obstacle lighting system shall be provided. This system shall be composed of high-intensity obstacle lights, Type B, for daytime and twilight use and medium-intensity obstacle lights, Type B, for nighttime use. Where medium-intensity lights are used they shall be installed at the same level as the high-intensity obstacle light Type B.

10.2.7.12 The installation setting angles for high-intensity obstacle lights, Type B, shall be in accordance with Table 10-5 para.10.2.5.17 of this Regulation.

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11. VISUAL AIDS FOR DENOTING RESTRICTED USE AREAS

11.1 GENERAL

11.1.1 INTRODUCTION

11.1.1.1 This chapter describes the visual aids required to mark restricted use areas at an aerodrome.

11.1.1.2 An aerodrome operator is required to adhere to these visual aids provisions so as to ensure that aircraft operations can be conducted safely on the aerodrome.

11.2 MARKING AND LIGHTING OF UNSERVICEABLE AREAS

11.2.1 CLOSED RUNWAYS AND TAXIWAYS, OR PARTS THEREOF

Application

Permanently closed runway or taxiway

11.2.1.1 A closed marking shall be displayed on a runway or taxiway, or portion thereof, which is permanently closed to the use of all aircraft.

Temporarily closed runway or taxiway

11.2.1.2 A closed marking shall be displayed on a temporarily closed runway or taxiway or portion thereof, except that such marking may be omitted when the closing is of short duration (less than 3 days) and adequate warning by air traffic services is provided.

Location

11.2.1.3 On a runway a closed marking shall 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 300 m. On a taxiway a closed marking shall be placed at least at each end of the taxiway or portion thereof closed.

Characteristics

11.2.1.4 The closed marking shall be of the form and proportions as detailed in Figure 11-1, Illustration a), when displayed on a runway, and shall be of the form and proportions as detailed in Figure 11-1, Illustration b), when displayed on a taxiway. The marking shall be white when displayed on a runway and shall be yellow when displayed on a taxiway.

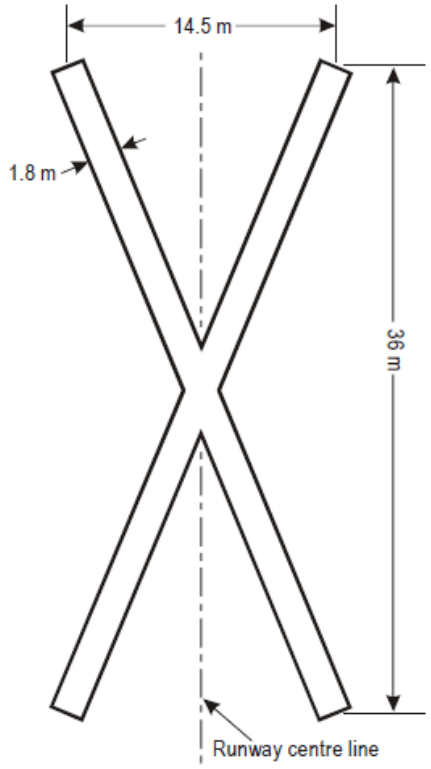

Illustration a) Closed runway marking

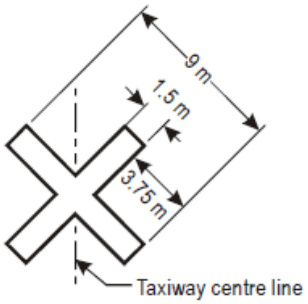

Illustration b) Closed taxiway marking

Figure 11-1. Closed runway and taxiway markings

Note1: *When 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.*

Note 2: *Procedures pertaining to the planning, coordination, monitoring and safety management of works in progress on the movement area are specified in the G-AGA-026.*

11.2.1.5 When a runway or taxiway or portion thereof is permanently closed, all normal runway and taxiway markings shall be obliterated.

11.2.1.6 Lighting on a closed runway or taxiway or portion thereof shall not be operated, except as required for maintenance purposes.

11.2.1.7 In addition to 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 3 m (See paragraph 11.2.4.4 of this Regulation).

11.2.2 NON-LOAD-BEARING SURFACES

Application

11.2.2.1 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 shall

have the boundary between such areas and the load-bearing surface marked by a taxi side stripe marking.

Note: *The marking of runway sides is specified in paragraph 9.3.7 of this Regulation.*

Location

11.2.2.2 A taxi side stripe marking shall be placed along the edge of the loadbearing pavement, with the outer edge of the marking approximately on the edge of the load-bearing pavement.

Characteristics

11.2.2.3 A taxi side stripe marking shall consist of a pair of solid lines, each 15cm wide and spaced 15cm apart and the same colour as the taxiway centre line marking.

Note: *Guidance on providing additional transverse stripes at an intersection or a small area on the apron is given in the G-AGA-014.*

11.2.3 PRE-THRESHOLD AREA

Application

11.2.3.1 When the surface before a threshold is paved and exceeds 60 m in length and is not suitable for normal use by aircraft, the entire length before the threshold shall be marked with a chevron marking.

Location

11.2.3.2 A chevron marking shall point in the direction of the runway and be placed as shown below in Figure 11-2.

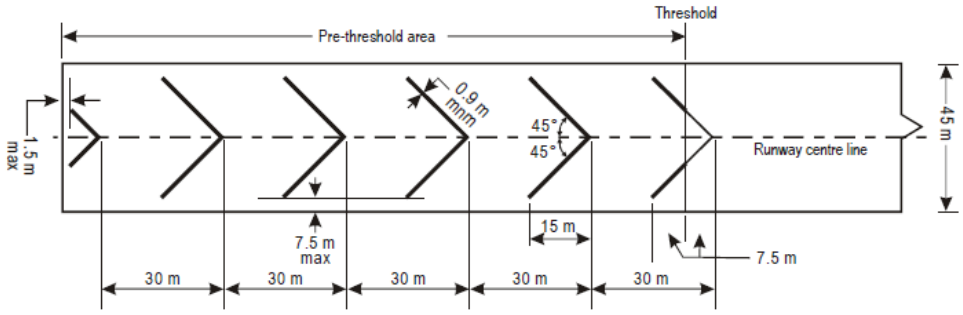

Figure 11-2. Pre-threshold marking

Characteristics

11.2.3.3 A chevron marking shall be of conspicuous colour and contrast with the colour used for the runway markings; it shall preferably be yellow. It shall have an over-all width of at least 0.9 m.

11.2.4 UNSERVICEABLE AREAS

Application

11.2.4.1 Unserviceability markers shall be 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. Unserviceability markers shall also be displayed at the entrances to a permanently or temporarily closed runway or taxiway, or part thereof. On a movement area used at night, unserviceability lights shall be used.

Note1: *Unserviceability markers and lights are used to guide aircraft to bypass a portion of a taxiway, apron or holding bay that is unfit for normal movement are intended for such purposes as warning pilots of a hole in a taxiway or apron pavement or outlining a portion of pavement, such as on an apron, that is under repair. They are not suitable for use when a portion of a runway becomes unserviceable, nor on a taxiway when a major portion of the width becomes unserviceable. In such instances, the runway or taxiway is normally closed.*

Note 2: *Procedures pertaining to the planning, coordination, monitoring and safety management of works in progress on the movement area are specified in the G-AGA-026.*

Location

11.2.4.2 Unserviceability markers and lights shall be placed at intervals sufficiently close so as to delineate the unserviceable area.

Note: *Guidance on the location of unserviceability lights is given as below:*

Where a temporarily unserviceable area exists, it may be marked with fixed-red lights. These lights shall mark the most potentially dangerous extremities of the area. A minimum of four such lights shall be used, except where the area is triangular in shape where a minimum of three lights may be employed. The number of lights shall be increased when the area is large or of unusual configuration. At least one light shall be installed for each 7.5 m of peripheral distance of the area. If the lights are directional, they shall be orientated so that as far as possible their beams are aligned in the direction from which aircraft or vehicles will approach. Where aircraft or vehicles will normally approach from several directions, consideration shall be given to adding extra lights or using omnidirectional lights to show the area from these directions.

Unserviceable area lights shall be frangible. Their height shall be sufficiently low to preserve clearance for propellers and for engine pods of jet aircraft.

Characteristics of unserviceability markers

11.2.4.3 Unserviceability markers shall consist of conspicuous upstanding devices such as flags, cones or marker boards.

Characteristics of unserviceability lights

11.2.4.4 An unserviceability light shall consist of a red fixed light. The light shall 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. In no case shall the intensity be less than 10 cd of red light.

Characteristics of unserviceability cones

11.2.4.5 An unserviceability cone shall be at least 0.5 m in height and red, orange or yellow or any one of these colours in combination with white.

Characteristics of unserviceability flags

11.2.4.6 An unserviceability flag shall be at least 0.5 m square and red, orange or yellow or any one of these colours in combination with white.

Characteristics of unserviceability marker boards

11.2.4.7 An unserviceability marker board shall be at least 0.5 m in height and 0.9 m in length, with alternate red and white or orange and white vertical stripes.

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12. ELECTRICAL SYSTEM

12.1 GENERAL

12.1.1 INTRODUCTION

12.1.1.1 This chapter describes specific requirements for aerodrome equipment and installations covering secondary power supply for visual aids, electrical systems, monitoring of serviceability of lighting systems, aerodrome security fencing and lighting, airport design (siting of equipment), aerodrome vehicle operations and surface movement guidance and control systems.

12.1.1.2 An aerodrome operator shall take note and comply with the requirements stipulated in this chapter.

12.2 ELECTRICAL SYSTEMS

12.2.1 ELECTRICAL POWER SUPPLY SYSTEMS FOR AIR NAVIGATION FACILITIES

***Introductory Note**: The safety of operations at aerodromes depends on the quality of the supplied power. The total electrical power supply system may include connections to one or more external sources of electric power supply, one or more local generating facilities and to a distribution network including transformers and switchgear. Many other aerodrome facilities supplied from the same system need to be taken into account while planning the electrical power system at aerodromes.*

12.2.1.1 Adequate primary power supply shall be available at aerodromes for the safe functioning of air navigation facilities.

12.2.1.2 The design and provision of electrical power systems for aerodrome visual and radio navigation aids shall be such that an equipment failure will not leave the pilot with inadequate visual and non-visual guidance or misleading information.

***Note:** The design and installation of the electrical systems need to take into consideration factors that can lead to malfunction, such as electromagnetic disturbances, line losses, power quality, etc. Additional guidance is given in the G-AGA-015.*

12.2.1.3 Electric power supply connections to those facilities for which secondary power is required shall be so arranged that the facilities are automatically connected to the secondary power supply on failure of the primary source of power.

12.2.1.4 The time interval between failure of the primary source of power and the complete restoration of the services required by paragraph 12.2.1.10 of this Regulation shall be as short as practicable, except that for visual aids associated with non-precision, precision approach or takeoff runways the requirements of Table 12-1 of this Regulation for maximum switch-over times shall apply.

***Note:** A definition of switch-over time is given in Chapter 1 of this Regulation.*

12.2.1.5 The provision of a definition of switch-over time shall not require the replacement of an existing secondary power supply before 1 January 2010. However, for a secondary power supply installed after 4 November 1999, 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 of Table 12-1 for maximum switch-over times as defined in Chapter 0.6 of this Regulation.

Table 12-1 - Secondary power supply requirements
(See Paragraph 12.2.1.4 of this Regulation)

Runway	Lighting aids requiring power	Maximum switch-over time
Non-instrumen	Visual approach slope indicators (a) Runway edge(b) Runway threshold(b) Runway end(b) Obstacle(a)	See 12.2.1.4 and 12.2.1.9
Non-precision approach	Approach lighting system Visual approach slope indicatorsa,(d) Runway edge(d) Runway threshold(d) Runway end Obstacle(a)	- 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 indicatorsa, (d). Runway threshold(d). Runway end. Essential taxiway(a). Obstacle(a).	- 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 taxiwaya Obstaclea	- 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 -9, 9.4.2 , 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.

Visual aids

Application

12.2.1.6 For a precision approach runway, a secondary power supply capable of meeting the requirements of Table 12-1 of this Regulation for the appropriate category of precision approach runway shall be provided.

Electric power supply connections to those facilities for which secondary power is required shall be so arranged that the facilities are automatically connected to the secondary power supply on failure of the primary source of power.

12.2.1.7 For a runway meant for take-off in runway visual range conditions less than a value of 800 m, a secondary power supply capable of meeting the relevant requirements of Table 12-1 of this Regulation shall be provided.

12.2.1.8 At an aerodrome where the primary runway is a non-precision approach runway, a secondary power supply capable of meeting the requirements of Table 12-1 of this Regulation shall be provided except that a secondary power supply for visual aids need not be provided for more than one non-precision approach runway.

12.2.1.9 At an aerodrome where the primary runway is a non-instrument runway, a secondary power supply capable of meeting the requirements of paragraph 12.2.1.4 of this Regulation 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 paragraph 9.4.2 of this Regulation is provided and capable of being deployed in 15 minutes.

12.2.1.10 The following aerodrome facilities shall be provided with secondary power supply capable of supplying power when there is a failure of primary power supply:

(a) the signalling lamp and the minimum lighting necessary to enable air traffic services personnel to carry out their duties;

Note: *The requirement for minimum lighting may be met by other than electrical means.*

(b) all obstacle lights which, in the opinion of the SCAA, are essential to ensure the safe operation of aircraft;

(c) approach, runway and taxiway lighting as specified in paragraphs 12.2.1.6 to 12.2.1.9 of this Regulation;

(d) meteorological equipment;

(e) essential security lighting, if provided in accordance with paragraph 13.11 of this Regulation;

(f) essential equipment and facilities for the aerodrome responding emergency agencies; and

(g) floodlighting on a designated isolated aircraft parking position if provided in accordance with paragraph 9.4.23.1 of this Regulation

and

(h) illumination of apron areas over which passengers may walk.

Note: *Specifications for secondary power supply for radio navigation aids and ground elements of communications systems are given in ICAO Annex 10, Volume I, Chapter 2.*

12.2.1.11 Requirements for a secondary power supply shall be met by either of the following:

— 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

— standby power unit(s), which are engine generators, batteries, etc., from which electric power can be obtained.

Note: *Guidance on secondary power supply is given in the G-AGA-015.*

12.2.2 SYSTEM DESIGN

12.2.2.1 For a runway meant for use in runway visual range conditions less than a value of 550 m, the electrical systems for the power supply, lighting and control of the lighting systems included in Table 12-1 of this Regulation shall be so designed that an equipment failure will not leave the pilot with inadequate visual guidance or misleading information.

Note: *Guidance on means of providing this protection is given in the G-AGA-015.*

12.2.2.2 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.

12.2.2.3 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.

12.2.3 MONITORING

Note: *Guidance on this subject is given in the G-AGA-015.*

12.2.3.1 A system of monitoring shall be employed to indicate the operational status of the lighting systems.

12.2.3.2 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. This information shall be automatically relayed to the air traffic services unit.

12.2.3.3 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.

12.2.3.4 For a runway meant for use in runway visual range conditions less than a value of 550 m, the lighting systems detailed in Table 12-1 of this Regulation 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 paragraphs 14.2.5.7 to 14.2.5.11 of this Regulation, as appropriate. This information shall be automatically relayed to the maintenance crew.

12.2.3.5 For a runway meant for use in runway visual range conditions less than a value of 550 m, the lighting systems detailed in Table 12-1 of this Regulation shall be monitored automatically to provide an indication when the serviceability level of any element falls below the minimum level below which operations shall not continue. This information shall be automatically relayed to the air traffic services unit and displayed in a prominent position.

Note: *Guidance on air traffic control interface and visual aids monitoring is included in the G-AGA-015.*

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13. AERODROME OPERATIONAL SERVICES, EQUIPMENT AND INSTALLATION

13.1 AERODROME EMERGENCY PLANNING

General

Aerodrome emergency planning is the process of preparing an aerodrome to cope with an emergency occurring at the aerodrome or in its vicinity. The objective of aerodrome emergency planning is to minimize the effects of an emergency, particularly in respect of saving lives and maintaining aircraft operations. The aerodrome emergency plan sets forth the procedures for coordinating the response of different aerodrome agencies (or services) and of those agencies in the surrounding community that could be of assistance in responding to the emergency. Guidance material to assist the aerodrome operator in establishing aerodrome emergency planning is given in the G-AGA-010.

13.1.1 An aerodrome emergency plan shall be established at an aerodrome, commensurate with the aircraft operations and other activities conducted at the aerodrome.

13.1.2 The aerodrome emergency plan shall provide for the coordination of the actions to be taken in an emergency occurring at an aerodrome or in its vicinity.

Note 1: *Examples of emergencies are: aircraft emergencies, sabotage including bomb threats, unlawfully seized aircraft, dangerous goods occurrences, building fires, and natural disaster and public health emergencies.*

Note 2: *Examples of public health emergencies are increased risk of travellers or cargo spreading a serious communicable disease internationally through air transport and severe outbreak of a communicable disease potentially affecting a large proportion of aerodrome staff.*

13.1.3 The plan shall coordinate the response or participation of all existing State agencies and service providers which, in the opinion of the aerodrome operator, could be of assistance in responding to an emergency.

Note 1: *Examples of agencies are:*

- *on the aerodrome: air traffic control units, rescue and fire fighting services, aerodrome administration, medical and ambulance services, aircraft operators, security services, and police;*

- *off the aerodrome: fire departments, police, health authorities (including medical, ambulance, hospital and public health services), military, and harbour patrol or coast guard.*

Note 2: *Public health services include planning to minimize adverse effects to the community from health related events and deal with population health issues rather than provision of health services to individuals.*

13.1.4 The plan shall provide for cooperation and coordination amongst the various organisations involved, including the rescue coordination centre, as necessary.

13.1.5 The aerodrome emergency plan document shall include at least the following:

(a) types of emergencies planned for;

(b) agencies involved in the plan;

(c) responsibility and role of each agency, the emergency operations centre and the command post, for each type of emergency;

(d) information on names and telephone numbers of offices or people to be contacted in the case of a particular emergency;

and

(e) a grid map of the aerodrome and its immediate vicinity.

13.1.6 The plan shall observe Human Factors principles to ensure optimum response by all existing State agencies and service providers participating in emergency operations.

Note1: *Guidance material on Human Factors principles can be found in the Human Factors Training Manual.*

Note 2: *General principles and procedures on the training of aerodrome personnel, including training programmes and competence checks, are specified in the G-AGA-026.*

Emergency operations centre and command post

13.1.7 A fixed crisis management centre and a mobile command post shall be available for use during an emergency.

13.1.8 The crisis management operations centre 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.

13.1.9 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.

13.1.10 A person shall be assigned to assume control of the crisis management centre and, another person the mobile command post.

Communication system

13.1.11 Adequate communication systems linking the command post and the crisis management centre with each other and with the participating agencies shall be provided in accordance with the plan and consistent with the particular requirements of the aerodrome.

Aerodrome emergency exercise

13.1.12 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.

Note: *The plan includes all participating agencies and associated equipment.*

13.1.13 The plan shall be tested by conducting:

(a) a full-scale aerodrome emergency exercise at intervals not exceeding two years 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;

(c) and reviewed thereafter, or after an actual emergency, so as to correct any deficiency found during such exercises or actual emergency.

Note 1: *The purpose of a full-scale exercise is to ensure the adequacy of the plan to cope with different types of emergencies. The purpose of a partial exercise is to ensure the adequacy of the response to individual participating agencies and components of the plan, such as the communications system. The purpose of modular tests is to enable concentrated effort on specific components of established emergency plans.*

Note 2: *Guidance material on airport emergency planning is available in the G-AGA-010.*

Emergencies in difficult environments

13.1.14 The 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 and/or swampy areas and where a significant portion of approach or departure operations takes place over these areas.

13.1.15 At those aerodromes located close to water and/or swampy areas, 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.

13.1.16 An assessment of the approach and departure areas within 1,000 m of the runway threshold shall be carried out to determine the options available for intervention.

Note: *Guidance material on assessing approach and departure areas within 1,000 m of runway thresholds can be found in Chapter 13 of the G-AGA-011.*

13.2 RESCUE AND FIRE FIGHTING

General

Introductory Note: *The principal objective of a rescue and fire fighting service is to save lives in the event of an aircraft accident or incident occurring at, or in the immediate vicinity of, an aerodrome. The rescue and fire fighting service is provided to create and maintain survivable conditions, to provide egress routes for occupants and to initiate the rescue of those occupants unable to make their escape without direct aid. The rescue may require the use of equipment and personnel other than those assessed primarily for rescue and fire fighting purposes.*

The most important factors bearing on effective rescue in a survivable aircraft accident are: the training received, the effectiveness of the equipment and the speed with which personnel and equipment designated for rescue and fire fighting purposes can be put into use.

Requirements to combat building and fuel farm fires are dealt with under separate emergency procedures.

Application

13.2.1 Rescue and fire fighting equipment and services shall be provided at an aerodrome when serving commercial air transport operations .

Note: *Public or private organisations, suitably located and equipped, may be designated to provide the rescue and fire fighting service. It is intended that the fire station housing these organisations be normally located on the aerodrome, although an off-aerodrome location is not precluded provided the response time can be met.*

13.2.2 Where an aerodrome is located close to water/swampy areas or difficult terrain, and where a significant portion of approach or departure operations takes place over these areas, specialist rescue services and fire fighting equipment appropriate to the hazard and risk shall be available.

Note 1: *Special fire fighting equipment need not be provided for water areas; this does not prevent the provision of such equipment if it would be of practical use, such as when the areas concerned include reefs or islands.*

Note 2: *The objective is to plan and deploy the necessary life-saving flotation equipment as expeditiously as possible in a number commensurate with the largest aeroplane normally using the aerodrome.*

Note 3: *Additional guidance is available in Chapter 13 of the G-AGA-011.*

Level of protection to be provided

13.2.3 The level of protection provided at an aerodrome for rescue and fire fighting shall be appropriate to the aerodrome category determined using the principles in paragraphs 13.2.5 and 13.2.6 of this Regulation, except that, where the number of movements of the aeroplanes in the highest category normally using the aerodrome is less than 700 in the busiest consecutive three months, the level of protection provided shall be not less than one category below the determined category.

Note: *Either a take-off or landing constitutes a movement.*

13.2.4 Reserved

13.2.5 The aerodrome category shall be determined from Table 13-1 of this Regulation and shall be based on the longest aeroplanes normally using the aerodrome and their fuselage width.

Note: *To categorize the aeroplanes using the aerodrome, first evaluate their overall length and second, their fuselage width.*

13.2.6 If, after selecting the category appropriate to the longest aeroplane's overall length, that aeroplane's fuselage width is greater than the maximum width in Table 13-1 of this Regulation, column 3 for that category, then the category for that aeroplane shall actually be one category higher.

Note 1: *See guidance in the G-AGA-011 for categorizing aerodromes, including those for all-cargo aircraft operations, for rescue and fire fighting purposes.*

Note 2: *Principles and procedures on training, including training programmes and competence checks, are specified in the G-AGA-026. Further guidance on the training of personnel, rescue equipment for difficult environment and other facilities and services for rescue and fire fighting is given in ICAO Annex 14, Vol.I, Attachment A, Section 17 and in the G-AGA-011.*

13.2.7 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.

Table 13-1 - Aerodrome category for rescue and fire fighting

Aerodrome Category	Aeroplane overall length	Maximum fuselage width
(1)	(2)	(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

Extinguishing agents

13.2.8 Both principal and complementary agents shall be provided at an aerodrome.

Note: *Descriptions of the agents may be found in the G-AGA-011.*

13.2.9 The principal extinguishing agent shall 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 to 3 shall preferably meet the minimum performance level B or C foam.

Note: *Information on the required physical properties and fire extinguishing performance criteria needed for a foam to achieve an acceptable performance level A,B or C rating is given in the G-AGA-011.*

13.2.10 The complementary extinguishing agent shall be a dry chemical powder suitable for extinguishing hydrocarbon fires.

Note 1: *When selecting dry chemical powders for use with foam, care must be exercised to ensure compatibility.*

Note 2: *Alternate complementary agents having equivalent fire fighting capability may be utilized. Additional information on extinguishing agents is given in the G-AGA-011.*

13.2.11 The amounts of water for foam production and the complementary agents to be provided on the rescue and fire fighting vehicles shall be in accordance with the aerodrome category determined under paragraphs 13.2.3, 13.2.4, 13.2.5, 13.2.6 and Table 13-2 of this Regulation, except for aerodrome categories 1 and 2, up to 100 % of the water may be substituted with complementary agent.

For the purpose of agent substitution, 1 kg of complementary agent shall be taken as equivalent to 1.0 L of water for production of a foam meeting performance level A.

Note 1: *The amounts of water specified for foam production are predicated on an application rate of 8.2 L/min/m2 for a foam meeting performance level A, 5.5 L/min/m2 for a foam meeting performance level B and 3.75 L/min/m2 for a foam meeting performance level C.*

Note 2: *When any other complementary agent is used, the substitution ratios need to be checked.*

13.2.12 At aerodromes where operation 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.

Note: *Guidance on the determination of quantities of water and discharge rates based on the largest theoretical aeroplane in a given category is available in Chapter 2 of the G-AGA-011.*

13.2.13 From 1 January 2015, at aerodromes 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.

Note: *Guidance on the determination of quantities of water and discharge rates based on the largest overall length of aeroplane in a given category is available in Chapter 2 of the G-AGA-011.*

13.2.14 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.

13.2.15 The amount of foam concentrate provided on a vehicle shall be sufficient to produce at least two loads of foam solution.

13.2.16 Supplementary water supplies, for the expeditious replenishment of rescue and fire fighting vehicles at the scene of an aircraft accident, shall be provided.

13.2.17 When a combination of different performance level foams are provided at an aerodrome, the total amount of water to be provided for foam production shall be calculated for each foam type and the distribution of these quantities shall be documented for each vehicle and applied to the overall rescue and fire fighting requirement.

13.2.18 The discharge rate of the foam solution shall not be less than the rates shown in Table 13-2 of this Regulation.

Table 13-2 - Minimum usable amounts of extinguishing agents

Aero-drome Category	Foam meeting performance level A		Foam meeting performance level B		Foam meeting performance level C		Complementary agents	
	Water (L)	Discharge rate foam solution/ minute (L)	Water (L)	Discharge rate foam solution/ minute (L)	Water (L)	Discharge rate foam solution/ minute (L)	Dry chemical powders (kg)	Dis-charge Rate (kg/second)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1	350	350	230	230	160	160	45	2.25
2	1000	800	670	550	460	360	90	2.25
3	1800	1300	1200	900	820	630	135	2.25
4	3600	2600	2400	1800	1700	1100	135	2.25
5	8100	4500	5400	3000	3900	2200	180	2.25
6	11800	6000	7900	4000	5800	2900	225	2.25
7	18200	7900	12100	5300	8800	3800	225	2.25
8	27300	10800	18200	7200	12800	5100	450	4.5
9	36400	13500	24300	9000	17100	6300	450	4.5
10	48200	16600	32300	11200	22800	7900	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.*

13.2.19 The complementary agents shall comply with the appropriate specifications of the International Organisation for Standardization (ISO).

13.2.20 The discharge rate of complementary agents shall be no less than the rates shown in Table 13-2 of this Regulation.

13.2.21 Dry chemcal powders shall only be substituted with an agent that has equivalent or better fire fighting capabilities, for all types of fires where complementary agent is expected to be used.

Note: *Guidance on the use of complementary agents can be found in the G-AGA-011.*

13.2.22 A reserve supply of foam concentrate, equivalent to 200 % of the quantities identified in Table 13-2, shall be maintained on the aerodrome for vehicle replenishment purposes.

Note 1: *Foam concentrate carried on fire vehicles in excess of the quantity identified in Table 13-2 can contribute to the reserve.*

Note 2: *See the G-AGA-011 for guidance on the conduct of a risk analysis to determine the quantities of reserve extinguishing agents.*

13.2.23 A reserve supply of complementary agent, equivalent to 100 % of the quantity identified in Table 13-2, shall be maintained on the aerodrome for vehicle replenishment purposes. Sufficient propellant gas shall be included to utilize this reserve complementary agent.

13.2.24 Category 1 and 2 aerodromes that have replaced up to 100 % of the water with complementary agent shall hold a reserve supply of complementary agent of 200 %.

13.2.25 Where a major delay in the replenishment of the supplies is anticipated, the amount of reserve supply in 13.2.22, 13.2.23 and 13.2.24 shall be increased as determined by a risk assessment.

Note: *See the G-AGA-011 for guidance on the conduct of a risk analysis to determine the quantities of reserve extinguishing agents.*

Rescue equipment

13.2.26 Rescue equipment commensurate with the level of aircraft operations shall be provided on the rescue and fire fighting vehicle(s).

Note: *Guidance on the rescue equipment to be provided at an aerodrome is given in the G-AGA-011.*

Response time

13.2.27 The operational objective of the rescue and fire fighting service shall be to achieve a response time not exceeding three minutes, to any point of each operational runway, in optimum visibility and surface conditions.

13.2.28 Reserved

13.2.29 The operational objective of the rescue and fire fighting service shall be to achieve a response time not exceeding three minutes to any other part of the movement area in optimum visibility and surface conditions.

Note 1: *Response time is considered to be the time between the initial call to the rescue and fire fighting service, and the time when the first responding vehicle(s) is (are) in position to apply foam at a rate of at least 50 % of the discharge rate specified in Table 13-2 of this Regulation.*

Note 2: *Optimum visibility and surface conditions are defined as daytime, good visibility, no precipitation with normal response route free of surface contamination e.g. water, ice or snow.*

13.2.30 To meet the operational objective as nearly as possible in less than optimum conditions of visibility, especially during low visibility operations, suitable guidance, equipment and/or procedures for rescue and fire fighting services shall be provided.

Note: *Additional guidance is available in the G-AGA-011.*

13.2.31 Any vehicles, other than the first responding vehicle(s), required to deliver the amounts of extinguishing agents specified in Table 13-2 of this Regulation shall ensure continuous agent application and shall arrive no more than four minutes from the initial call.

13.2.32 Reserved

13.2.33 A system of preventive maintenance of rescue and fire fighting vehicles shall be employed to ensure effectiveness of the equipment and compliance with the specified response time throughout the life of the vehicle.

Emergency access roads

13.2.34 Emergency access roads shall be provided on an aerodrome where terrain conditions permit their construction, so as to facilitate achieving minimum response times. Particular attention shall be given to the provision of ready access to approach areas up to 1 000 m from the threshold, or at least within the aerodrome boundary. Where a fence is provided, the need for convenient access to outside areas shall be taken into account.

Note: *Aerodrome service roads may serve as emergency access roads when they are suitably located and constructed.*

13.2.35 Emergency access roads shall be capable of supporting the heaviest vehicles which will use them, and be usable in all weather conditions. Roads within 90 m of a runway shall be surfaced to prevent surface erosion and the transfer of debris to the runway. Sufficient vertical clearance shall be provided from overhead obstructions for the largest vehicles.

13.2.36 When the surface of the road is indistinguishable from the surrounding area, edge markers shall be placed at intervals of about 10 m.

Fire stations

13.2.37 All rescue and fire fighting vehicles shall normally be housed in a fire station. Satellite fire stations shall be provided whenever the response time cannot be achieved from a single fire station.

13.2.38 The fire station shall be located so that the access for rescue and fire fighting vehicles into the runway area is direct and clear, requiring a minimum number of turns.

Communication and alerting systems

13.2.39 A discrete communication system shall be provided linking a fire station with the control tower, any other fire station on the aerodrome and the rescue and fire fighting vehicles.

13.2.40 An alerting system for rescue and fire fighting personnel, capable of being operated from that station, shall be provided at a fire station, any other fire station on the aerodrome and the aerodrome control tower.

Number of rescue and fire fighting vehicles

13.2.41 The minimum number of rescue and fire fighting vehicles provided at an aerodrome shall be in accordance with the following tabulation:

Aerodrome category	Rescue and fire fighting vehicles
1	1
2	1
3	1
4	1
5	1
6	2
7	2
8	3
9	3
10	3

Note: *Guidance on minimum characteristics of rescue and fire fighting vehicles is given in the G-AGA-011.*

Personnel

13.2.42 All rescue and fire fighting personnel shall be properly trained to perform their duties in an efficient manner and shall participate in live fire drills commensurate with the types of aircraft and type of rescue and fire fighting equipment in use at the aerodrome, including pressure-fed fuel fires.

Note 1: *Guidance to assist the aerodrome operator in providing proper training is given in ICAO Annex 14 Vol. I, Attachment A, Section 18.2 and G-AGA-011. See below:*

The training curriculum shall include initial and recurrent instruction in at least the following areas:

(a) airport familiarization;
(b) aircraft familiarization;
(c) rescue and fire fighting personnel safety;
(d) emergency communications systems on the aerodrome, including aircraft fire-related alarms;
(e) use of the fire hoses, nozzles, turrets and other appliances required for compliance with Chapter 13,13.2;
(f) application of the types of extinguishing agents required for compliance with Chapter 13, 13.2;
(g) emergency aircraft evacuation assistance;

(h) fire fighting operations;
(i) adaptation and use of structural rescue and fire fighting equipment for aircraft rescue and fire fighting;
(j) dangerous goods;
(k) familiarization with fire fighters' duties under the aerodrome emergency plan; and
(l) protective clothing and respiratory protection.

Note 2: *Fires associated with fuel discharged under very high pressure from a ruptured fuel tank are known as "pressure-fed fuel fires".*

13.2.43 The rescue and fire fighting personnel training programme shall include training in human performance, including team coordination.

Note: *Guidance material to design training programmes on human performance and team coordination can be found in the ICAO Human Factors Training Manual.*

13.2.44 During flight operations, sufficient trained and competent personnel shall be designated to be readily available to ride the rescue and fire fighting vehicles and to operate the equipment at maximum capacity. These personnel shall be 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. Consideration shall also be given for personnel to use hand lines, ladders and other rescue and fire fighting equipment normally associated with aircraft rescue and fire fighting operations.

13.2.45 In determining the minimum number of rescue and fire fighting personnel required a task resource analysis shall be completed and the level of staffing documented in the Aerodrome Manual.

Note: *Guidance on the use of a task resource analysis can be found in the G-AGA-011.*

13.2.46 All responding rescue and fire fighting personnel shall be provided with protective clothing and respiratory equipment to enable them to perform their duties in an effective manner.

Other special services

13.2.47 An aerodrome operator shall establish procedures to deal with fuel spillage, hot-works and other special services associated with fire risks.

Emergency hand signals

13.2.48 The signals shown in ICAO Annex 2, Appendix 1, Section 6 shall, when used, have the meaning indicated therein. They shall be used only for the purpose indicated and no other signals likely to be confused with them shall be used.

13.3 DISABLED AIRCRAFT REMOVAL

Note: *Guidance on removal of a disabled aircraft, including recovery equipment, is given in the G-AGA-009. See also ICAO Annex 13 concerning protection of evidence, custody and removal of aircraft.*

13.3.1 A plan for the removal of an aircraft disabled on, or adjacent to, the movement area shall be established for an aerodrome, and a coordinator designated to implement the plan, when necessary.

13.3.2 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.

13.4 WILDLIFE STRIKE HAZARD REDUCTION

Note: *The presence of wildlife (birds and other animals) on and in the airport vicinity poses a serious threat to aircraft operational safety.*

13.4.1 The wildlife strike hazard on, or in the vicinity of, an aerodrome shall be assessed through:

(a) the establishment of a procedure by the aerodrome operator for recording and reporting wildlife strikes to aircraft;

(b) the collection of information from aircraft operators, airport personnel and other sources on the presence of birds on or around the aerodrome constituting a potential hazard to aircraft operations; and

(c) an ongoing evaluation of the wildlife hazard by competent personnel.

Note: *See Azerbaijan Aviation Rules – Aeronautical Information Services (AAR-ANS-005), Chapter 5.*

13.4.2 Wildlife strike reports shall be collected and forwarded to ICAO for inclusion in the ICAO Bird Strike Information System (IBIS) database.

These reports shall include but not limited to the following information:

(a) date and local time of occurrence,

(b) aircraft type,

(c) runway,

(d) phase of flight,

(e) wildlife species,

(f) effect on flight, and

(g) whether pilots warned of wildlife activity.

13.4.2.1 Hardcopies/ softcopies of these reports shall be submitted monthly to the SCAA for inclusion in ICAO Bird Strike Information System (IBIS) database. A sample of the wildlife strike reporting form is shown in Appendix I of this Regulation.

Note: *The IBIS is designed to collect and disseminate information on wildlife strikes to aircraft. Information on the system is included in the Manual on the ICAO Bird Strike Information System (IBIS).*

13.4.3 The aerodrome operator shall take action to decrease the risk to aircraft operations by adopting measures to minimize the likelihood of collisions between wildlife and aircraft.

Note: *Procedures on the management of wildlife hazards on and within the vicinity of aerodromes, including the establishment of a wildlife hazard management programme (WHMP), wildlife risk assessment, land-use management and personnel training, are specified in the G-AGA-026, Part II, Chapters 1 and 6. Further guidance is given in the G-AGA-001 Airport Services Manual - Wildlife Control and Reduction.*

13.4.4 The aerodrome operator shall 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. Where the elimination of existing sites is not possible, the aerodrome operator shall ensure that any risk to aircraft posed by these sites is assessed and reduced to as low as reasonably practicable.

13.4.5 SCAA gives due consideration to aviation safety concerns related to land developments in the vicinity of the aerodrome that may attract wildlife.

13.5 APRON MANAGEMENT SERVICE

13.5.1 When warranted by the volume of traffic and operating conditions, an appropriate apron management service shall be provided on an apron by an aerodrome ATS unit, by the aerodrome operator, or by a cooperative combination of these, 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 regulation of other activities.

13.5.2 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.

Note: *Procedures on apron safety are specified in the G-AGA-026. Guidance on an apron management service is given in the G-AGA-018, G-AGA-008 and in the ICAO Manual of Surface Movement Guidance and Control Systems (SMGCS) (Doc 9476) and the Advanced Surface Movement Guidance and Control Systems (A-SMGCS) Manual (Doc 9830).*

13.5.3 An apron management service shall be provided with radiotelephony communications facilities.

13.5.4 Where low visibility procedures are in effect, persons and vehicles operating on an apron shall be restricted to the essential minimum.

Note: *Guidance on related special procedures is given in the G-AGA-008 and ICAO Manual of Surface Movement Guidance, Control Systems (SMGCS) (Doc 9476) and the Advanced Surface Movement Guidance and Control Systems (A-SMGCS) Manual (Doc 9830).*

13.5.5 An emergency vehicle responding to an emergency shall be given priority over all other surface movement traffic.

13.5.6 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 regulations.

13.5.7 An aircraft stand shall be visually monitored to ensure that the recommended clearance distances are provided to an aircraft using the stand.

Note: *Procedures on the training of operational personnel and on apron safety and operations, are specified in the G-AGA-026, Part II, Chapters 1 and 7.*

13.6 GROUND SERVICING OF AIRCRAFT

13.6.1 Fire extinguishing equipment suitable for at least initial intervention in the event of a fuel fire and personnel trained in its use shall be readily available during the ground servicing of an aircraft, and there shall be a means of quickly summoning the rescue and fire fighting service in the event of a fire or major fuel spill.

13.6.2 When aircraft refuelling operations take place 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 exits for expeditious evacuation; and

(b) a ready escape route from each of the exits to be used in an emergency.

13.7 AERODROME VEHICLE OPERATIONS

Note 1: *Procedures on the establishment of an airside driver permit (ADP) scheme and vehicle/equipment safety requirements, including detailed personnel training, are specified in the G-AGA-026, Part II, Chapter 9.*

Note 2: *Guidance on aerodrome vehicle operations is contained in G-AGA-008 and ICAO Annex 14 Vol. I, Attachment A, Section 18. On traffic rules and regulations for vehicles is contained in the ICAO Manual of Surface Movement Guidance and Control Systems (SMGCS) (Doc 9476) and the Advanced Surface Movement Guidance and Control Systems (ASMGCS) Manual (Doc 9830).*

Note 3: *It is intended that roads located on the movement area be restricted to the exclusive use of aerodrome personnel and other authorized persons, and that access to the public buildings by an unauthorized person will not require use of such roads.*

13.7.1 A vehicle shall be 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.

13.7.2 The driver of a vehicle on the movement area 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.

13.7.3 The driver of a vehicle on the movement area shall comply with all mandatory instructions conveyed by lights.

13.7.4 The driver of a vehicle on the movement area 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.

13.7.5 The 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. The driver shall maintain a continuous listening watch on the assigned frequency when on the movement area.

13.8 SURFACE MOVEMENT GUIDANCE AND CONTROL SYSTEMS

Application

13.8.1 A surface movement guidance and control system shall be provided at an aerodrome.

Note: *Guidance on surface movement guidance and control systems is contained in the ICAO Manual of Surface Movement Guidance and Control Systems (SMGCS) (Doc 9476). Guidance on advanced surface movement guidance and control systems is contained in the ICAO Manual of Advanced Surface Movement Guidance and Control Systems (A-SMGCS) (Doc 9830).*

Characteristics

13.8.2 The design of a surface movement guidance and control system 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.

13.8.3 The visual aid components of a surface movement guidance and control system, i.e. markings, lights and signs shall be designed to conform with the relevant specifications in sections 9.3, 9.4 and 9.5 of this Regulation, respectively.

13.8.4 A surface movement guidance and control system shall be designed to assist in the prevention of inadvertent incursions of aircraft and vehicles onto an active runway.

13.8.5 The system shall be designed to assist in the prevention of collisions between aircraft, and between aircraft and vehicles or objects, on any part of the movement area.

Note: *Guidance on control of stop bars through induction loops and on a visual taxiing guidance and control system is contained in the G-AGA-014.*

13.8.6 Where a surface movement guidance and control system is provided by selective switching of stop bars and taxiway centre line lights, the following requirements shall be met:

(a) taxiway routes which are indicated by illuminated taxiway centre line 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 centre line lights beyond it is suppressed; and

(c) the taxiway centre line lights are activated ahead of an aircraft when the stop bar is suppressed.

Note 1: *See sections 9.4.16 and 9.4.19 of this Regulation for specifications on taxiway centre line lights and stop bars, respectively.*

Note 2: *Guidance on installation of stop bars and taxiway centre line lights in surface movement guidance and control systems is given in the G-AGA-014 and the Advanced Surface Movement Guidance and Control Systems (A-SMGCS) Manual (Doc 9830).*

13.8.7 Surface movement radar for the manoeuvring area shall be provided at an aerodrome intended for use in runway visual range conditions less than a value of 350 m.

13.8.8 Surface movement radar for the manoeuvring area shall be provided at an aerodrome other than that in paragraph 13.8.7 of this Regulation when traffic density and operating conditions are such that regularity of traffic flow cannot be maintained by alternative procedures and facilities.

Note: *Guidance on the use of surface movement radar is given in the ICAO Manual of Surface Movement Guidance and Control Systems (SMGCS) and in the ICAO Air Traffic Services Planning Manual (Doc 9426).*

13.9 SITING OF EQUIPMENT AND INSTALLATIONS ON OPERATIONAL AREAS

Note 1: *Requirements for obstacle limitation surfaces are specified in section 8.2.2 of this Regulation.*

Note 2: *The design of light fixtures and their supporting structures, light units of visual approach slope indicators, signs, and markers, is specified in 9.4.1, 9.4.5, 9.5.1 and 9.6.1 of this Regulation, respectively. Guidance on the frangible design of visual and non-visual aids for navigation is given in the G-AGA-013.*

13.9.1 Unless its function requires it to be there for air navigation or for aircraft safety purposes, no equipment or installation shall be:

(a) on a runway strip, a runway end safety area, a taxiway strip or within the distances specified in Table 7-1 of this Regulation, column 11, if it would endanger an aircraft; or

(b) on a clearway if it would endanger an aircraft in the air.

13.9.2 Any equipment or installation required for air navigation or for aircraft safety purposes which must be located:

(a) on that portion of a runway strip within:

(i) 75 m of the runway centre line where the code number is 3 or 4; or

(ii) 45 m of the runway centre line where the code number is 1 or 2; or

(b) on a runway end safety area, a taxiway strip or within the distances specified in Table 7-1 of this Regulation; or

(c) on a clearway and which would endanger an aircraft in the air;

shall be frangible and mounted as low as possible.

Note: *Guidance on the siting of navigation aids is contained in the G-AGA-013.*

13.9.3 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 shall be regarded as an obstacle and shall be frangible and mounted as low as possible.

Note: Guidance on the sitting of navigation aids is given in the G-AGA-013.

13.9.4 Unless its function requires it to be there for air navigation or for aircraft safety purposes, no equipment or installation shall be located within 240 m from the end of the strip and within:

(a) 60 m of the extended centre line where the code number is 3 or 4;

or

(b) 45 m of the extended centre line where the code number is 1 or 2;

of a precision approach runway category, I, II or III.

13.9.5 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 within 240 m from the end of the strip and within:

(i) 60 m of the extended runway centre line where the code number is 3 or 4; or

(ii) 45 m of the extended runway centre line where the code number is 1 or 2; or

(b) penetrates the inner approach surface, the inner transitional surface or the balked landing surface;

shall be frangible and mounted as low as possible.

13.9.6 Any equipment or installation required for air navigation purposes which is an obstacle of operational significance in accordance with paragraphs 8.2.2.4, 8.2.2.11, 8.2.2.20 or 8.2.2.27 of this Regulation shall be frangible and mounted as low as possible.

13.10 FENCING

Application

13.10.1 A fence or other suitable barrier shall be provided on an aerodrome to prevent the entrance to the movement area of animals large enough to be a hazard to aircraft.

13.10.2 A fence or other suitable barrier shall be provided on an aerodrome to deter the inadvertent or premeditated access of an unauthorized person onto a non-public area of the aerodrome.

Note 1: *This is intended to include the barring of sewers, ducts tunnels etc., where necessary to prevent access.*

Note 2: *Special measures may be required to prevent the access of an unauthorized person to runways or taxiways which overpass public roads.*

13.10.3 Suitable means of protection shall be provided to deter the inadvertent or premeditated access of unauthorized persons into ground installations and facilities essential for the safety of civil aviation located off the aerodrome.

Note: The requirements for the fencing of the aerodrome are regulated by the "Rule for the organization of access and intra-facility regimes" approved by the Resolution of the Cabinet of Ministers of the Republic of Azerbaijan dated december 6, 2013 no. 337.

Location

13.10.4 The fence or barrier shall be 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.

13.10.5 When greater security is thought necessary, a cleared area shall be provided on both sides of the fence or barrier to facilitate the work of patrols and to make trespassing more difficult. Consideration shall be given to the provision of a perimeter road inside the aerodrome fencing for the use of both maintenance personnel and security patrols.

13.11 SECURITY LIGHTING

13.11.1 At an aerodrome where it is necessary for security reasons, a fence or other barrier provided for the protection of international civil aviation and its facilities shall be illuminated at a minimum essential level. Consideration shall be given to locating lights so that the ground area on both sides of the fence or barrier, particularly at access points, is illuminated.

13.12 AUTONOMOUS RUNWAY INCURSION WARNING SYSTEM

Note 1. *The inclusion of detailed specifications for an autonomous runway incursion warning system (ARIWS) in this section is not intended to imply that an ARIWS has to be provided at an aerodrome.*

Note 2. *The implementation of an ARIWS is a complex issue deserving careful consideration by aerodrome operators, air traffic services and States, and in coordination with the aircraft operators.*

Note 3. *Attachment A, Section 20, provides a description of an ARIWS and information on its use.*

Characteristics

13.12.1 Where an ARIWS is installed at an aerodrome:

(a) it shall provide 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;

(b) it shall function and be controlled independently of any other visual system on the aerodrome;

(c) its visual aid components, i.e., lights, shall be designed to conform with the relevant specifications in 5.3; and

(d) failure of part or all of it shall not interfere with normal aerodrome operations. To this end, provision shall be made to allow the ATC unit to partially or entirely shut down the system.

Note 1. *An ARIWS may be installed in conjunction with enhanced taxiway centre line markings, stop bars or runway guard lights.*

Note 2*. It is intended that the system(s) be operational under all weather conditions, including low visibility.*

Note 3. *An ARIWS may share common sensory components of an SMGCS or A-SMGCS, however, it operates independently of either system.*

13.12.2 Where an ARIWS is installed at an aerodrome, information on its characteristics and status shall be provided tonthe appropriate aeronautical information services for promulgation in the AIP with the description of the aerodrome surface movement guidance and control system and markings as specified in AAR-ANS-005.

Note: *Detailed specifications concerning the AIP are contained in Aeronautical Information Management Manual (M-ANS-001).*

14. AERODROME MAINTENANCE

14.1 GENERAL

14.1.1 INTRODUCTION

14.1.1.1 This chapter covers the maintenance of pavements, runway pavement overlays and visual aids.

14.1.1.2 An aerodrome operator shall take into account the requirement stipulated in this chapter and apply them, where relevant, to its aerodrome.

14.2 PROVISION OF AERODROME MAINTENANCE

14.2.1 MAINTENANCE

14.2.1.1 A maintenance programme, including preventive maintenance where appropriate, shall be established at an aerodrome to maintain facilities in a condition which does not impair the safety, regularity or efficiency of air navigation.

Note 1: *Preventive maintenance is programmed maintenance work done in order to prevent a failure or degradation of facilities.*

Note 2: *"Facilities" are intended to include such items as pavements, visual aids, fencing, drainage and electrical systems and buildings.*

14.2.1.2 The design and application of the maintenance programme shall observe Human Factors principles.

Note 1: *Guidance material on Human Factors principles can be found in the ICAO Human Factors Training Manual and in the G-AGA-018.*

Note 2: *General principles and procedures on the training of aerodrome personnel, including training programmes and competence checks, are specified in the G-AGA-026.*

14.2.2 PAVEMENTS

14.2.2.1 The surfaces of all movement areas including pavements (runways, taxiways, and aprons) and adjacent areas shall be inspected and their conditions monitored regularly as part of an aerodrome preventive and corrective maintenance programme with the objective of avoiding and eliminating any loose objects/debris that might cause damage to aircraft or impair the operation of aircraft systems.

Note 1: *See Paragraph 6.2.9.3 for inspections of movement areas.*

Note 2: *Guidance on carrying out daily inspections of the movement area is given in the G-AGA-018, Manual of Surface Movement Guidance and Control Systems (SMGCS) and the Advanced Surface Movement Guidance and Control Systems (ASMGCS) Manual.*

Note 3: *Additional guidance on sweeping/cleaning of surfaces is contained in the G-AGA-003.*

Note 4: *Guidance on precautions to be taken in regard to the surface of shoulders is given in ICAO Annex 14 Vol. I, Attachment A, Section 9, and the G-AGA-020.*

Note 5: *Where the pavement is used by large aircraft or aircraft with tire pressures in the upper categories referred to in 6.2.6.6 c), particular attention shall be given to the integrity of light fittings in the pavement and pavement joints.*

14.2.2.2 The surface of a runway shall be maintained in a condition such as to preclude formation of harmful irregularities:

1. In adopting tolerances for runway surface irregularities, the following standard of construction is achievable for short distances of 3 m and conforms to good engineering practice:

   Except across the crown of a camber or across drainage channels, the finished surface of the wearing course is to be of such regularity that, when tested with a 3m straight-edge placed anywhere in any direction on the surface, there is no deviation greater than 3 mm between the bottom of the straight-edge and the surface of the pavement anywhere along the straight-edge.

2. Caution shall also be exercised when inserting runway lights or drainage grilles in runway surfaces to ensure that adequate smoothness of the surface is maintained.

3. The operation of aircraft and differential settlement of surface foundations will eventually lead to increases in surface irregularities. Small deviations in the above tolerances will not seriously hamper aircraft operations. In general, isolated irregularities of the order of 2.5 cm to 3 cm over a 45 m distance are tolerable. Although maximum acceptable deviations vary with the type and speed of an aircraft, the limits of acceptable surface irregularities can be estimated to a reasonable extent. The following table describes maximum and temporarily acceptable limits. If the maximum limits are exceeded, corrective action shall be undertaken as soon as reasonably practicable to improve the ride quality. If the temporarily acceptable limits are exceeded, the portions of the runway that exhibit such roughness shall have corrective measures taken immediately if aircraft operations are to be continued.

Surface irregularity	**Length of irregularity (m)**								
	3	6	9	12	15	20	30	45	60
Acceptable surface irregularity height (cm)	2.9	3.8	4.5	5	5.4	5.9	6.5	8.5	10
Tolerable surface irregularity height (cm)	3.9	5.5	6.8	7.8	8.6	9.6	11	13.6	16
Excessive surface irregularity height (cm)	5.8	7.6	9.1	10	10.8	11.9	13.9	17	20

4. Note that “surface irregularity” is defined herein to mean isolated surface elevation deviations that do not lie along a uniform slope through any given section of a runway. For the purposes of this concern, a “section of a runway” is defined herein to mean a segment of a runway throughout which a continuing general uphill, downhill or flat slope is prevalent. The length of this section is generally between 30 and 60 metres, and can be greater, depending on the longitudinal profile and the condition of the pavement.

5. Deformation of the runway with time may also increase the possibility of the formation of water pools. Pools as shallow as approximately 3 mm in depth, particularly if they are located where they are likely to be encountered at high speed by landing aeroplanes, can induce aquaplaning, which can then be sustained on a wet runway by a much shallower depth of water. Improved guidance regarding the significant length and depth of pools relative to aquaplaning is the subject of further research. It is, of course, especially necessary to prevent pools from forming whenever there is a possibility that they might become frozen.

14.2.2.3 A paved runway shall be maintained in a condition so as to provide surface friction characteristics at or above the minimum friction level (MFL) as specified by the SCAA.

Note: *"ADVISORY PAMPHLET ON RUNWAY SURFACE CONDITION ASSESSMENT AND REPORTING PH-AGA-001" contains further information on this subject.*

14.2.2.4 Runway surface friction characteristics for maintenance purposes shall be periodically ***(see "SCAA Guidance on Assessment of Runway Surface Friction Characteristics G-AGA-006" and G-AGA-012)*** measured with a continuous friction measuring device using self-wetting features and documented. This frequency of these measurements is sufficient to determine the trend of the surface friction characteristics of the runway.

Note 1: *Additional guidance is included in the G-AGA-012.*

Note 2: *Guidance on evaluating the runway surface friction characteristics is provided in "ADVISORY PAMPHLET ON RUNWAY SURFACE CONDITION ASSESSMENT AND REPORTING PH-AGA-001".*

Note 3: *The objective of 14.2.2.3 to 14.2.2.7 and 14.2.2.8 is to ensure that the surface friction characteristics for the entire runway remain at or above a minimum friction level specified by the SCAA.*

14.2.2.5 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 SCAA.

14.2.2.6 Personnel measuring runway surface friction required in 14.2.2.5 shall be trained to fulfil their duties.

14.2.2.7 Corrective maintenance action shall be taken to prevent the runway surface friction characteristics for either the entire runway or a portion thereof from falling below a minimum friction level (MFL) specified by SCAA.

Note: *A portion of runway in the order of 100 m long may be considered significant for maintenance or reporting action.*

14.2.2.8 The runway surface shall be visually assessed, as necessary, under natural or simulated rain conditions for ponding or poor drainage and where required, corrective maintenance action taken.

14.2.2.9 When a taxiway is used by turbine-engined 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.

Note*: Guidance on this subject is given in the G-AGA-020.*

14.2.3 REMOVAL OF CONTAMINANTS

14.2.3.1 Snow, slush, ice, standing water, mud, dust, sand, oil, rubber deposits and other contaminants shall be removed from the surface of runways in use as rapidly and completely as possible to minimize accumulation.

Note: *The above requirement does not imply that winter operations on compacted snow and ice are prohibited. Information on snow removal and ice control and removal of other contaminants is given in the G-AGA-026.*

14.2.3.2 Taxiways shall be kept clear of snow, slush, ice, etc., to the extent necessary to enable aircraft to be taxied to and from an operational runway.

14.2.3.3 Aprons shall be kept clear of snow, slush, ice, etc., to the extent necessary to enable aircraft to manoeuvre safely or, where appropriate, to be towed or pushed.

14.2.3.4 Whenever the clearance of snow, slush, ice, etc., from the various parts of the movement area cannot be carried out simultaneously, the order of priority after the runway(s) in use shall be set in consultation with the affected parties such as rescue and fire fighting service and documented in a snow plan.

Note: *See Aeronautical Information Management Manual (M-ANS-001), Appendix 2, Part 3, AD 1.2.2 for information to be promulgated in an AIP concerning a snow plan. The Aeronautical Information Services Manual (Doc 8126), contains guidance on the description of a snow plan including general policy concerning operational priorities established for the clearance of movement areas.*

14.2.3.5 Chemicals to remove or to prevent the formation of ice and frost on aerodrome pavements shall be used when conditions indicate their use could be effective. Caution shall be exercised in the application of the chemicals so as not to create a more slippery condition.

Note: *Information on the use of chemicals for aerodrome pavements is given in the G-AGA-026.*

14.2.3.6 Chemicals which may have harmful effects on aircraft or pavements, or chemicals which may have toxic effects on the aerodrome environment shall not be used.

14.2.4 RUNWAY PAVEMENT OVERLAYS

Note: *The following specifications are intended for runway pavement overlay projects when the runway is to be returned temporarily to an operational status before resurfacing is complete. This may necessitate a temporary ramp between the new and old runway surfaces. Guidance on overlaying pavements and assessing their operational status is given in the Aerodrome Design Manual (Doc 9157), Part 3.*

14.2.4.1 The longitudinal slope of the temporary ramp, measured with reference to the existing runway surface or previous overlay course, shall be:

(a) 0.5 to 1.0 % for overlays up to and including 5 cm in thickness; and

(b) not more than 0.5 % for overlays more than 5 cm in thickness.

14.2.4.2 Overlaying shall proceed from one end of the runway toward the other end so that based on runway utilization most aircraft operations will experience a down ramp.

14.2.4.3 The entire width of the runway shall be overlaid during each work session.

14.2.4.4 Before a runway being overlaid is returned to a temporary operational status, a runway center line marking conforming to the specifications in Section 9.3.3 of this Regulation shall be provided. Additionally, the location of any temporary threshold shall be identified by a 3.6 m wide transverse stripe.

14.2.4.5 The overlay shall be constructed and maintained above the minimum friction level specified in 14.2.2.3.

14.2.5 VISUAL AIDS

Note 1: *These specifications are intended to define the maintenance performance level objectives. They are not intended to define whether the lighting system is operationally out of service.*

Note 2: *The energy savings of light emitting diodes (LEDs) are due in large part to the fact that they do not produce the infra-red heat signature of incandescent lamps. Aerodrome operators who have come to expect the melting of ice and snow by this heat signature may wish to evaluate whether or not a modified maintenance schedule is required during such conditions, or evaluate the possible operational value of installing LED fixtures with heating elements.*

Note 3: *Enhanced vision systems (EVS) technology relies on the infra-red heat signature provided by incandescent lighting. Azerbaijan Aviation Rules – Aeronautical Information Services (AAR-ANS-005) protocols provide an appropriate means of notifying aerodrome users of EVS when lighting systems are converted to LED.*

14.2.5.1 A light shall be deemed to be unserviceable when the main beam average intensity is less than 50 % of the value specified in the appropriate figure in ICAO Annex 14 Vol. I, Appendix 2. For light units where the designed main beam average intensity is above the value shown in ICAO Annex 14 Vol. I, Appendix 2, the 50 % value shall be related to that design value.

14.2.5.2 A system of preventive maintenance of visual aids shall be employed to ensure lighting and marking system reliability.

Note: *Guidance on preventive maintenance of visual aids is given in the G-AGA-003.*

14.2.5.3 The system of preventive maintenance employed for a precision approach runway category II or III shall 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 the air traffic control unit.

14.2.5.4 In-field 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 shall be undertaken by measuring all lights, as far as practicable, to ensure conformance with the applicable specification of ICAO Annex 14 Vol. I, Appendix 2.

14.2.5.5 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 shall be undertaken using a mobile measuring unit of sufficient accuracy to analyze the characteristics of the individual lights.

14.2.5.6 The frequency of measurement of lights for a precision approach runway category II or III shall be based on traffic density, the local pollution level, the reliability of the installed lighting equipment and the continuous assessment of the results of the in-field measurements but in any event shall not be less than twice a year for in-pavement lights and not less than once a year for other lights.

14.2.5.7 The system of preventive maintenance employed for a precision approach runway category II or III shall have as its objective 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 % of the lights are serviceable in each of the following particular significant elements:

(i) precision approach category II and III lighting system, the inner 450 m;

(ii) runway center line lights;

(iii) runway threshold lights; and

(iv) runway edge lights;

(b) 90 % of the lights are serviceable in the touchdown zone lights;

(c) 85 % of the lights are serviceable in the approach lighting system beyond 450 m; and

(d) 75 % of the lights are serviceable in the runway end lights.

In order to provide continuity of guidance, the allowable percentage of unserviceable lights shall not be permitted in such a way as to alter the basic pattern of the lighting system. Additionally, an unserviceable light shall not be permitted adjacent to another unserviceable light, except in a barrette or a crossbar where two adjacent unserviceable lights may be permitted.

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

— laterally: in the same barrette or crossbar; or

— longitudinally: in the same row of edge lights or barrettes.

14.2.5.8 The system of preventive maintenance employed for a stop bar provided at a runway-holding position used in conjunction with a runway intended for operations in runway visual range conditions less than a value of 350 m shall have 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.

14.2.5.9 The system of preventive maintenance employed for a taxiway intended for use in runway visual range conditions less than a value of 350 m shall have as its objective that no two adjacent taxiway centre line lights be unserviceable.

14.2.5.10 The system of preventive maintenance employed for a precision approach runway category I shall have as its objective that, during any period of category I operations, all approach and runway lights are serviceable and that, in any event, at least 85 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.

In order to provide continuity of guidance an unserviceable light shall not be permitted adjacent to another unserviceable light unless the light spacing is significantly less than that specified.

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

14.2.5.11 The system of preventive maintenance employed for a runway meant for take-off in runway visual range conditions less than a value of 550 m shall have as its objective that, during any period of operations, all runway lights are serviceable and that in any event:

(a) at least 95 % of the lights are serviceable in the runway centre line lights (where provided) and in the runway edge lights;

and

(b) at least 75 % of the lights are serviceable in the runway end lights.

In order to provide continuity of guidance, an unserviceable light shall not be permitted adjacent to another unserviceable light.

14.2.5.12 The system of preventive maintenance employed for a runway meant for take-off in runway visual range conditions of a value of 550 m or greater shall have as its objective that, during any period of operations, all runway lights are serviceable and that, in any event, at least 85 % of the lights are serviceable in the runway edge lights and runway end lights.

In order to provide continuity of guidance, an unserviceable light shall not be permitted adjacent to another unserviceable light.

14.2.5.13 During low visibility procedures the aerodrome operator shall restrict construction or maintenance activities in the proximity of aerodrome electrical systems.

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APPENDIX A – CROSS-REFERENCES BETWEEN THE STANDARDS AND RECOMMENDED PRACTICES OF THE REGULATION OF AERODROME STANDARDS AND THOSE OF ICAO ANNEX 14 VOL. I

Section in the Regulation of Aerodrome Standards	Corresponding section in the ICAO Annex 14 Vol. I	Remarks
Section 0.5	Section 1.1	Definitions
Section 3.1.2	Paragraphs 1.4.1, 1.4.2 and 1.4.3	Requirement for Aerodrome Certification
Section 3.2	Paragraph 1.4.4	Requirement for Aerodrome Manual
Section 5.2	Paragraph 1.4.4	Requirement for Safety Management System
Section 2.2	Section 1.6	Aerodrome Reference Code
Chapter 6	Chapter 2	Aerodrome Data
Chapter 7	Chapter 3	Physical Characteristics
Chapter 8	Chapter 4	Obstacle Restriction and Removal
Chapter 9	Chapter 5	Visual Aids for Navigation
Chapter 10	Chapter 6	Visual Aids for denoting Obstacles
Chapter 11	Chapter 7	Visual Aids for denoting Restricted Use Areas
Chapter 12	Chapter 8	Electrical Systems
Chapter 13	Chapter 9	Aerodrome Operational Services, Equipment and Installations
Chapter 14	Chapter 10	Aerodrome Maintenance

Table A-1 Cross-references between the standards and recommended practices of the Regulation of AS and those of ICAO Annex 14 Vol I.

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APPENDIX B – LIST OF RELATED REFERENCE DOCUMENTS

No.	Document
1	ICAO Annex 14 Vol. I
2	ICAO Aerodrome Design Manual (Doc 9157) Part 1 – Runways Part 2 – Taxiways, Aprons and Holding Bays Part 3 – Pavements Part 4 – Visuals Aids Part 5 – Electrical Systems Part 6 – Frangibility
3	ICAO Airport Planning Manual (Doc 9184) Part 1 – Master Planning Part 2 – Land Use and Environment Control Part 3 – Guidelines for Consultant/Construction Services
4	ICAO Airport Services Manual (Doc 9137) Part 1 – Rescue and Fire Fighting Part 2 – Pavement Surface Conditions Part 3 – Bird Control and Reduction Part 5 – Removal of Disabled Aircraft Part 6 – Control of Obstacles Part 7 – Airport Emergency Planning Part 8 – Airport Operational Services Part 9 – Airport Maintenance Practices
5	ICAO Manual on ICAO Bird Strike Information System (Doc 9332)
6	ICAO Manual of Surface Movement Guidance and Control Systems (Doc 9476)
7	ICAO Safety Management Manual (Doc 9859)

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APPENDIX C – FORM FOR APPLICATION OF AN AERODROME CERTIFICATE

APPLICATION FOR AN AERODROME CERTIFICATE

1. Particulars of the Applicant

Full Name: _____

_____

Address: _____

_____

_____ *Postal Code:* _____

Position: _____

Phone: _____ *Fax:* _____ *E-mail:* _____

2. Particulars of the Aerodrome Site

Aerodrome Name: _____

Real Property Description: _____

_____

_____

Geographical Coordinates of the Aerodrome Reference Point:

Latitude: ..... *Longitude:* .....

(in degrees, minutes and tenths of minutes and in WGS-84 format)

3. Is the Applicant the Owner of the Aerodrome Site?

Yes: ☐ *No:* ☐

If No, please provide:
(a) Details of rights held in relation to the site; and
(b) Name and address of the owner of the site and written evidence that permission has been obtained for the site to be used by the applicant as an aerodrome.

4. Details of Aerodrome

Intended commencement date of aerodrome operations: .....

Operating hours: .....

Largest type of aircraft expected to operate at aerodrome: .....

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APPLICATION FOR AN AERODROME CERTIFICATE

Intended aerodrome reference code[3]*:* .....

Intended type of runway: *Non-instrument:* ☐ *Non-precision:* ☐

Precision CAT I: ☐ *CAT II:* ☐ *CAT III:* ☐

Aerodrome traffic density: .....

Intended rescue & fire-fighting category[4]*:* .....

5. Is the aerodrome to be used for regular public transport operations?

Yes: ☐ No: ☐

6. Details to be shown on the Aerodrome Certificate

Aerodrome Name: .....

Aerodrome Operator: .....

Address: .....
.....

On behalf of the Aerodrome Operator shown above, I hereby apply for a certificate to operate the aerodrome.
My authority to act on behalf of the applicant is: .....
.....
.....

Signed: ..... Date: .....

Name of person making the declaration: .....

[3] Refer to AAR-AS Regulation of Aerodrome Standards Table 2-1.

[4] Refer to AAR-AS Regulation of Aerodrome Standards Table 13-1.

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APPENDIX D – SAMPLE CERTIFICATES

1. AERODROME CERTIFICATE

AZƏRBAYCAN RESPUBLİKASI / *REPUBLIC OF AZERBAIJAN*

RƏQƏMSAL İNKİŞAF VƏ NƏQLİYYAT NAZİRLİYİ
MİNİSTRY OF DİGİTAL DEVELOPMENT AND TRANSPORT

DÖVLƏT MÜLKİ AVİASİYA AGENTLİYİ
STATE CIVIL AVIATION AGENCY

UYĞUNLUQ SERTİFİKATI / *CERTIFICATE OF CONFORMITY*

№ AD-[XXX]

Aerodromun adı:
Name of Aerodrome:

Aerodromun yeri:
Location:

Aerodromun sahibi:
Aerodrome owner:

Sertifikatın sahibi:
Certificate holder:

Aerodromun istinad kodu:
Aerodrome reference code:

Bununla təsdiq edilir ki, ... aerodromu "Aviasiya haqqında" Azərbaycan Respublikası Qanununun və "Azərbaycan Aviasiya Qaydaları – Aerodrom Standartları" sənədinin tələblərinə uyğundur.
This is to confirm that ..... aerodrome meets the requirements of the Law of the Republic of Azerbaijan "On Aviation" and "Azerbaijan Aviation Rules – Aerodrome Standards".

..... aerodromu Azərbaycan Respublikasının Mülki aerodromlarının Dövlət Reyestrinə daxil edilib və .... kateqoriyalı hava gəmilərinin və .... növ helikopterlərin istismarına yararlıdır.
Hereby it is certified that the .... aerodrome has been entered into the State Register of Civil Aerodromes of the Republic of Azerbaijan and is suitable for operation of ... category aircraft and ... types of helicopters.

Bu sertifikata əlavə ediləcək İstismar Məhdudiyyətləri sənədin ayrılmaz tərkib hissəsini təşkil edir.
Operations Specifications attached to this certificate are an integral part hereof.

Bu sertifikat qüvvəsi dayandırılana və ya ləğv edilənə qədər üzərində qeyd edilən qüvvədən düşmə tarixinədək etibarlıdır.
This certificate shall remain valid until its expiry date unless the certificate has previously been suspended or revoked.

M.Y. / *S.P.*

_____
Səlahiyyətli şəxsin soyadı, adı, vəzifəsi və imzası

Verilmə tarixi / *Effective as of:*
Etibarlıdır / *Valid till:*

İSTİSMAR MƏHDUDİYYƏTLƏRİ / *OPERATIONS SPECIFICATIONS*

Uyğunluq sertifikatının nömrəsi:
Certificate of Conformity #:

Aerodromun adı:
Name of Aerodrome:

Tarix:
Date:

1. SÖUEZ-in ölçüsü və örtüyün tipi:
   Dimension of paved runway and type of surface:

2. Aerodromun istismara yararlı olduğu vaxt:
   Aerodrome is suitable for operations:

3. Aerodrom işıq enmə sistemləri ilə təchiz edilmişdir:
   Aerodrome is equipped with lighting systems:

4. Aerodrom üçün PCN ___ _/_/_/_/SÖUEZ ___° - ___° kursla enən hava gəmisinin maksimal çəkisi __ tondan artıq olmamalıdır.
   Aerodrome with magnetic approach course __° - ___°, Paved Runway PCN ___ _/_/_/_ is suitable for operation of aircraft with maximum weight not exceeding __ tonnes.

5. Aerodrom ICAO-nun ___ kateqoriyalı meteominimumu üzrə hava gəmilərinin qəbulu üçün yararlıdır.
   Aerodrome is certified for operations under ICAO weather minima:

6. Qəbul edilmiş azad olmalar:
   Accepted deviations:

7. Xüsusi şərtlər:
   Special conditions:

M.Y. / *S.P.*

_____
Səlahiyyətli şəxsin soyadı, adı, vəzifəsi və imzası

2. HELIPORT CERTIFICATE

AZƏRBAYCAN RESPUBLİKASI / *REPUBLIC OF AZERBAIJAN*

RƏQƏMSAL İNKİŞAF VƏ NƏQLİYYAT NAZİRLİYİ
MİNİSTRY OF DİGİTAL DEVELOPMENT AND TRANSPORT

DÖVLƏT MÜLKİ AVİASİYA AGENTLİYİ
STATE CIVIL AVIATION AGENCY

UYĞUNLUQ SERTİFİKATI / *CERTIFICATE OF CONFORMITY*

№ HD-[XXX]

Heliportun adı:
Name of Heliport:

Heliportun yeri:
Location:

Heliportun sahibi:
Heliport owner:

Sertifikatın sahibi:
Certificate holder:

Heliportun coğrafi koordinatları:
Geographical coordinates of the Heliport:

Bununla təsdiq edilir ki, ... aerodromu "Aviasiya haqqında" Azərbaycan Respublikası Qanununun, "Azərbaycan Aviasiya Qaydaları – Aerodrom Standartları" və "Azərbaycan Aviasiya Qaydaları – Heliport Standartları" sənədlərinin tələblərinə uyğundur.
This is to confirm that ..... aerodrome meets the requirements of the Law of the Republic of Azerbaijan "On Aviation" and "Azerbaijan Aviation Rules – Heliport Standards".

..... heliportu Azərbaycan Respublikasının Mülki aerodromlarının Dövlət Reyestrinə daxil edilib və .... kateqoriyalı hava gəmilərinin və .... növ helikopterlərin istismarına yararlıdır.
Hereby it is certified that the .... heliport has been entered into the State Register of Civil Aerodromes of the Republic of Azerbaijan and is suitable for operation of ... category aircraft and ... types of helicopters.

Bu Sertifikata əlavə ediləcək İstismar Məhdudiyyətləri sənədin ayrılmaz tərkib hissəsini təşkil edir.
Operations Specifications attached to this certificate are an integral part hereof.

Bu sertifikat qüvvəsi dayandırılana və ya ləğv edilənə qədər üzərində qeyd edilən qüvvədən düşmə tarixinədək etibarlıdır.
This certificate shall remain valid until its expiry date unless the certificate has previously been suspended or revoked.

M.Y. / *S.P.*

_____
Səlahiyyətli şəxsin soyadı, adı, vəzifəsi və imzası

Verilmə tarixi / *Effective as of:*
Etibarlıdır / *Valid till:*

İSTİSMAR MƏHDUDİYYƏTLƏRİ / *OPERATIONS SPECIFICATIONS*

Uyğunluq sertifikatının nömrəsi:
Certificate of Conformity #:

Heliportun adı:
Name of Heliport:

Tarix:
Date:

1. SÖUEZ-in ölçüsü və örtüyün tipi:
   Dimension of paved runway and type of surface:

2. Heliportun istismara yararlı olduğu vaxt:
   Heliport is suitable for operations:

3. Heliport işıq enmə sistemləri ilə təchiz edilmişdir:
   Heliport is equipped with lighting systems:

4. Heliport üçün PCN ___ _/_/_/_/SÖUEZ ___° - ___° kursla enən hava gəmisinin maksimal çəkisi __ tondan artıq olmamalıdır.
   Aerodrome with magnetic approach course __° - ___°, Paved Runway PCN ___ _/_/_/_ is suitable for operation of aircraft with maximum weight not exceeding __ tonnes.

M.Y. / *S.P.*

_____
Səlahiyyətli şəxsin soyadı, adı, vəzifəsi və imzası

3. HELIDECK CERTIFICATE

AZƏRBAYCAN RESPUBLİKASI / *REPUBLIC OF AZERBAIJAN*

RƏQƏMSAL İNKİŞAF VƏ NƏQLİYYAT NAZİRLİYİ
MİNİSTRY OF DİGİTAL DEVELOPMENT AND TRANSPORT

DÖVLƏT MÜLKİ AVİASİYA AGENTLİYİ
STATE CIVIL AVIATION AGENCY

UYĞUNLUQ SERTİFİKATI / *CERTIFICATE OF CONFORMITY*

№ HPD-[XXX]

Bununla təsdiq edilir ki, ... yerləşən helikopter meydançası "Aviasiya haqqında" Azərbaycan Respublikası Qanununun, "Azərbaycan Aviasiya Qaydaları – Aerodrom Standartları" və "Azərbaycan Aviasiya Qaydaları – Heliport Standartları" sənədlərinin tələblərinə uyğundur. Meydança aşağıdakı məhdudiyyətlərə riayət edilməklə helikopterlərin qəbulu və xidmətin göstərilməsi üçün yararlıdır:
This is to certify that helideck located on ..... meets the requirements of the Law of the Republic of Azerbaijan "On Aviation" and "Azerbaijan Aviation Rules – Heliport Standards". Helideck is capable to accept and provide services for helicopters in accordance with the limitations below:.

Helikopterin maksimal uçuş kütləsi (tonla):
Helicopter maximum take-off weight (MTOW) (t):

Helikopterin D-qiyməti (metrlə):
Helicopter D-value (m):

Küləyin sürəti (m/san):
Wind speed (m/s)

Bu sertifikat qüvvəsi dayandırılana və ya ləğv edilənə qədər üzərində qeyd edilən qüvvədən düşmə tarixinədək etibarlıdır.
This certificate shall remain valid until its expiry date unless the certificate has previously been suspended or revoked.

M.Y. / *S.P.*

_____
Səlahiyyətli şəxsin soyadı, adı, vəzifəsi və imzası

Verilmə tarixi / *Effective as of:*
Etibarlıdır / *Valid till:*

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APPENDIX E – RESERVED

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APPENDIX F – PARTICULARS TO BE INCLUDED IN AN AERODROME MANUAL

PART 1 – GENERAL

General information, including the following:

(a) purpose and scope of the Aerodrome Manual;

(b) the legal requirement for an Aerodrome Certificate and an Aerodrome Manual as prescribed in the national regulations;

(c) conditions for use of the aerodrome – a statement to indicate that the aerodrome shall at all times when it is available for the take-off and landing of aircraft, be so available to all persons on equal terms and conditions;

(d) the available aeronautical information services and procedures for timely and accurate effecting promulgation of AIP Amendment, AIP Supplement or NOTAM;

(e) the system for recording aircraft movements;

(f) obligations of the aerodrome operator; and

(g) a table presented in the format shown below to indicate the aerodrome and aerodrome operator's compliance status with EACH clause of this Regulation of Aerodrome Standards.

Table of Compliance with the clauses in the Regulation of Aerodrome Standards			
Clause No. in the Regulation of Aerodrome Standards	To indicate whether Standard or Recommended Practice	To indicate whether fully compliant, partially compliant, or non-compliant	To provide remarks or brief explanation when partially compliant or non-compliant

PART 2 – PARTICULARS OF THE AERODROME SITE

General information, including the following:

(a) a plan of the aerodrome showing the main aerodrome facilities for the operation of the aerodrome including, particularly, the location of each wind direction indicator;

(b) a plan of the aerodrome showing the aerodrome boundaries;

(c) 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

(d) 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.

PART 3 – PARTICULARS OF THE AERODROME REQUIRED TO BE REPORTED TO THE AERONAUTICAL INFORMATION SERVICE (AIS)

3.1 GENERAL INFORMATION

(a) the name of the aerodrome and ICAO airport code;

(b) the location of the aerodrome;

(c) the aerodrome reference code;

(d) the geographical coordinates of the aerodrome reference point code determined in terms of the World Geodetic System – 1984 (WGS-84) reference datum;

(e) the aerodrome elevation and geoid undulation;

(f) 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;

(g) the aerodrome reference temperature;

(h) details of the aerodrome beacon; and

(i) the name of the aerodrome operator and the address and telephone number at which the aerodrome operator may be contacted at all times.

3.2 AERODROME DIMENSIONS AND RELATED INFORMATION

General information, including the following:

(a) 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;

(b) length, width and surface type of strip, runway end safety areas, stopways;

(c) length, width and surface type of taxiways;

(d) apron surface type and aircraft stands;

(e) clearway length and ground profile;

(f) visual aids for approach procedures, visual approach lighting type and visual approach slope indicator system (PAPI and APAPI); marking and lighting of runways, taxiways, and aprons; 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; availability of standby power for lighting.

(g) the location and radio frequency of VOR aerodrome checkpoints;

(h) the location and designation of standard taxi routes;

(i) the geographical coordinates of each threshold;

(j) the geographical coordinates of appropriate taxiway centre line points;

(k) the geographical coordinates of each aircraft stand;

(l) 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. (This information may best be shown in the form of charts such as those required for the preparation of aeronautical information publications, as specified in Annexes 4 and 15 to the Convention);

(m) pavement surface type and bearing strength using the Aircraft Classification Rate – Pavement Classification Rate method;

(n) one or more pre-flight altimeter check locations established on and apron and their elevation;

(o) declared distances: take-off run available (TORA), take-off distance available (TODA), accelerate-stop distance available (ASDA), landing distance available (LDA);

(p) disabled aircraft removal plan: the telephone/telex/facsimile numbers and email address of the aerodrome coordinator 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

(q) rescue and fire-fighting: the level of protection provided, expressed in terms of the category of the rescue and fire-fighting services, which shall be in accordance with the longest aeroplane normally using the aerodrome and the type and amounts of extinguishing agents normally available at the aerodrome.

Note: *The accuracy of the information in Part 3 is critical to aircraft safety. Information requiring engineering survey and assessment shall be gathered or verified by qualified technical persons.*

3.3 INFORMATION ABOUT VISUAL AID SYSTEMS

(a) The type of runway lighting;

(b) The type of approach lighting;

(c) The visual approach slope indicator system;

(d) Portable lighting;

(e) The type of lighting for taxiways;

(f) The type of lighting for aprons;

(g) Other visual control and guidance aids for runways, taxiways and aprons (RWY holding position, intermediate holding position and stop bars);

(h) Details of the system of marking runway, taxiway and apron elements;

(i) Availability of standby power, switching arrangements and changeover times;

(j) A description of the visual docking guidance systems at any aprons used by aircraft conducting international operations, and the aircraft parking positions where the systems are installed;

PART 4 – PARTICULARS OF THE AERODROME OPERATING PROCEDURES AND SAFETY MEASURES

4.1 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:

(a) arrangement for reporting any changes to the SCAA and recording the reporting of changes during and outside the normal hours of aerodrome operations;

(b) the names and roles of persons responsible for notifying the changes, and their telephone numbers during and outside the normal hours of aerodrome operations; and

(c) the address and telephone numbers, as provided by the SCAA, of the place where changes are to be reported to the SCAA.

4.2 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:

(a) the role of the aerodrome operator, the aircraft operator, aerodrome fixed base operators, the aerodrome security entity, the SCAA and other government departments, as applicable; and

(b) the names and roles of the personnel responsible for controlling access to the aerodrome, and the telephone numbers for contacting them during and after working hours.

4.3 AERODROME EMERGENCY PLAN

Particulars of the aerodrome emergency plan, including the following:

(a) plans for dealing with emergencies occurring at the aerodrome or in its vicinity, including the malfunction of aircraft in flight; structural fires; sabotage, including bomb threats (aircraft or structure);

(b) unlawful seizure of aircraft; and incidents on the airport covering “during the emergency” and “after the emergency” considerations;

(c) details of test for aerodrome facilities and equipment to be used in emergencies, including the frequency of those tests;

(d) details of exercises to test emergency plans, including the frequency of those exercises;

(e) a list of organisations, agencies and persons of authority, both on- and off airport, for site roles; their telephone and facsimile numbers, e-mail and SITA addresses and the radio frequencies of their offices;

(f) the establishment of an aerodrome emergency committee to organize training and other preparations for dealing with emergencies; and

(g) the appointment of an on-scene commander for the overall emergency operation.

4.4 RESCUE AND FIRE-FIGHTING

Particulars of the facilities, equipment, personnel and procedures for meeting the rescue and fire-fighting requirements, including the names and roles of the persons responsible for dealing with the rescue and fire-fighting services at the aerodrome.

Note: *This subject shall also be covered in appropriate detail in the aerodrome emergency plan.*

4.5 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:

(a) 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;

(b) arrangement and means of communicating with the aerodrome air traffic control unit during an inspection;

(c) arrangements for keeping an inspection logbook, and the location of the logbook;

(d) details of inspection intervals and times;

(e) inspection checklist;

(f) farrangement for reporting the results of inspections and for taking prompt follow-up actions to ensure correction of unsafe conditions; and

(g) the names and roles of persons responsible for carrying out inspections, and their telephone number during and after working hours.

4.6 VISUAL AIDS AND AERODROME ELECTRICAL SYSTEMS

Particulars of the procedures for the inspection and maintenance of aeronautical lights (including obstacle lighting), signs, markers and aerodrome electrical systems, including the following:

(a) arrangement for carrying out inspections during and outside the normal hours of aerodrome operation, and the checklist for such inspection;

(b) arrangements for recording the results of inspections and for taking follow up action to correct deficiencies;

(c) arrangements for carrying out routine maintenance and emergency maintenance;

(d) arrangements for secondary power supplies, if any, and, if applicable, the particulars of any other method of dealing with partial or total system failure; and

(e) the names and roles of the persons responsible for the inspection and maintenance of the lighting, and the telephone numbers for contacting those persons during and after working hours.

4.7 MAINTENANCE OF THE MOVEMENT AREA

Particulars of the facilities and procedures for the maintenance of the movement area, including:

(a) arrangements for maintaining the paved areas;

(b) arrangements for maintaining the unpaved runways and taxiways;

(c) arrangements for maintaining the runway and taxiway strips; and

(d) arrangements for the maintenance of aerodrome drainage.

4.8 AERODROME WORK 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:

(a) arrangements for communicating with the aerodrome air traffic control unit during the progress of such work;

(b) the names, telephone numbers and roles of the persons and organisations responsible for planning and carrying out the work, and arrangements for contacting those persons and organisations at all times;

(c) the names and telephone numbers, 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.

(d) a distribution list for work plans, if required.

4.9 APRON MANAGEMENT

Particulars of the apron management procedures, including the following:

(a) arrangements between air traffic control and the apron management units;

(b) arrangements for allocating aircraft parking positions;

(c) arrangements for initiating engine start and ensuring clearance of aircraft push-back; and

(d) marshaling service.

4.10 APRON SAFETY MANAGEMENT

Procedures to ensure apron safety, including:

(a) protection from jet blasts;

(b) enforcement of safety precautions during aircraft re-fuelling operations;

(c) apron sweeping;

(d) apron cleaning;

(e) arrangements for reporting incidents and accidents on an apron; and

(f) arrangements for auditing the safety compliance of all personnel working on the apron.

4.11 AIRSIDE VEHICLE CONTROL

Particulars of the procedure for the control of surface vehicles on or in the vicinity of the movement area, including the following:

(a) details of the application traffic rules (including speed limits and the means of enforcing the rules); and

(b) the method of issuing driving permits for operating vehicles in the movement area.

4.12 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:

(a) arrangements for assessing wildlife hazards;

(b) arrangements for implementing wildlife control programmes; and

(c) the names and roles of the persons responsible for dealing with wildlife hazards, and their telephone numbers during and after working hours.

4.13 OBSTACLE CONTROL

Particulars setting out the procedures for:

(a) monitoring the obstacle limitation surfaces and Type A Chart for obstacle in the take-off surface;

(b) controlling obstacles within the authority of the operator;

(c) monitoring the height of buildings or structures within the boundaries of the obstacle limitation surfaces;

(d) controlling new developments in the vicinity of aerodromes; and

(e) notifying the SCAA 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.

4.14 REMOVAL OF DISABLED AIRCRAFT

Particulars of the procedures for removing a disabled aircraft on or adjacent to the movement area, including the following:

(a) the roles of the aerodrome operator and the holder of the aircraft certificate of registration;

(b) arrangements for notifying the holder of the certificate of registration;

(c) c) arrangements for liaising with the aerodrome air traffic control unit;

(d) d) arrangements for obtaining equipment and personnel to remove the disabled aircraft; and

(e) the names, role and telephone numbers of persons responsible for arranging for the removal of disabled aircraft.

4.15 HANDLING OF DANGEROUS GOODS

Particulars of the procedures for the safe handling and storage of dangerous goods on the aerodrome, including the following:

(a) arrangements for special areas on the aerodrome to be set up for the storage of inflammable liquids (including aviation fuels) and any other dangerous goods; and

(b) the method to be followed for the delivery, storage, dispensing and handling of dangerous goods.

***Note**: Dangerous goods include inflammable liquids and solid, corrosive liquids, compressed gases and magnetized or radioactive materials. Arrangements for dealing with the accidental spillage of dangerous goods shall be included in the aerodrome emergency plan.*

4.16 LOW-VISIBILITY OPERATIONS

Particulars of procedures to be introduced for low-visibility operations, including the measurement and reporting of runway visual range as and when required, and the names and telephone numbers, during and after working hours, of the persons responsible for measuring the runway visual range.

4.17 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:

(a) arrangements for the control of activities in the vicinity of radar and navaids installations;

(b) arrangements for ground maintenance in the vicinity of these installations;

and

(c) arrangements for the supply and installation of signs warning hazardous microwave radiation.

***Note 1:** In writing the procedures for each category, clear and precise information shall be included on:*

- when, or in what circumstances, an operating procedure is to be activated

- how an operating procedure is to be activated;

- actions to be taken;

- the persons who are to carry out the actions; and

- the equipment necessary for carrying out the actions, and access to such equipment.

***Note 2:** If any of the procedures specified above are not relevant or applicable, the reason shall be given.*

4.18 RUNWAY INCURSION PREVENTION

Particulars of the facilities, equipment and procedures in place to prevent runway incursion, including integration of markings, lights and signs as a whole into the runway incursion prevention plan, taking account of different traffic intensities and visibility conditions.

PART 5 – DETAILS OF THE AERODROME ADMINISTRATION AND SAFETY MANAGEMENT SYSTEM

Aerodrome administration

Particulars of the aerodrome administration, including the following:

(a) an aerodrome organisational chart showing the names and positions of key personnel, including their responsibilities;

(b) the name, position and telephone number of the person who has overall responsibility for aerodrome safety;

(c) airport committees; and

(d) particulars of staff training and competency, including the specifications of staff qualifications and experience, training and programme for upgrading of skills provided to staff on safety-related duties, and where necessary, the certification system for testing their competency.

SAFETY MANAGEMENT SYSTEM (SMS)

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:

(a) the safety policy, insofar as applicable, on the safety management process and its relation to the operational and maintenance process;

(b) the structure or organisation of the SMS, including staffing and the assignment of individual and group responsibilities for safety issues;

(c) SMS strategy and planning, such as setting safety performance target, 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

(d) SMS implementation, including facilities, methods and procedures for the effective communication of safety messages and the enforcement of safety requirements;

(e) a system for the implementation of, and action on, critical safety areas which require a higher level of safety management integrity (safety measures programmes);

(f) 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;

(g) the internal safety audit and review system detailing the systems and programmes for quality control of safety;

(h) the system for documenting all safety-related airport facilities as well as airport operational and maintenance records, including information on the design and construction of aircraft pavements and aerodrome lighting. The system shall enable easy retrieval of record including charts,

(i) ithe incorporation and enforcement of safety-related clauses in the contracts for construction work at the aerodrome.

APPENDIX G – DOCUMENTS AND PUBLICATIONS THAT MUST BE KEPT AND MADE AVAILABLE FOR REFERENCE BY AERODROME OPERATOR STAFF

Publishing Organisation	Name of Document	Reference
Aerodrome Operator	Aerodrome Manual	
	Airport Emergency Plan	
	Airport Security Programme	
AGA	AAR- Aerodrome Standards	
Civil Aviation Agency of the Republic of Azerbaijan	Aeronautical Information Publication, Republic of Azerbaijan	
SCAA of the Republic of Azerbaijan	Azerbaijan Aviation Regulation	
ICAO	Annex 9 – Facilitation	
	Annex 10 – Aeronautical Telecommunication Vol. I and II	
	Annex 13 – Aircraft Accident and Incident Investigation	
	Annex 14 – Aerodromes Vol. I and II	
	Annex 16 – Environmental Protection Vol. I and II	
	Annex 17 – Security	
	Location Indicators	Doc 7910
	ICAO Abbreviation and Codes	Doc 8400
	ICAO Designators for Aircraft Operating Agencies, Aeronautical Authorities and Services	Doc 8585
	Aircraft Type Designators	Doc 8643
	ICAO Airport Services Manual Part 1 – Rescue and Fire Fighting Part 2 – Pavement Surface Conditions Part 3 – Bird Control and Reduction Part 5 – Removal of Disabled Aircraft Part 6 – Control of Obstacles Part 7 – Airport Emergency Planning Part 8 – Airport Operational Services Part 9 – Airport Maintenance Practices	Doc 9137
	ICAO Aerodrome Design Manual Part 1 – Runways Part 2 – Taxiways, Aprons and Holding Bays Part 3 – Pavements Part 4 – Visuals Aids Part 5 – Electrical Systems Part 6 – Frangibility	Doc 9157
	ICAO Airport Planning Manual (Doc 9184) Part 1 – Master Planning Part 2 – Land Use and Environment Control Part 3 – Guidelines for Consultant/ Construction Services	Doc 9184

Publishing Organisation	Name of Document	Reference
	ICAO Manual on ICAO Bird Strike Information System	Doc 9332
	Accident Prevention Manual	Doc 9422
	ICAO Manual of Surface Movement Guidance and Control Systems	Doc 9476
	ICAO Safety Management Manual	Doc 9859

APPENDIX H – DOCUMENT AND RECORDS THAT MUST BE MAINTAINED BY THE AERODROME CERTIFICATE HOLDER

Item	Safety Records	Retention Period
1	Aircraft Ground Incident Records	Minimum retention periods for these documents and records shall be established by the aerodrome operator and accepted by the SCAA.
2	Aircraft Pavement Inspection Log and Maintenance Records	
3	Airfield Lighting Inspection Log and Maintenance Records	
4	Aerodrome Engineering Facilities (related to aircraft operations) Maintenance Records	
5	Apron Control Tower Log	
6	Wildlife Control Activities Records	
7	Safety Audit Records (in conjunction with the implementation of Safety Management System)	
8	Vehicular Accident Records	

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APPENDIX I – WILDLIFE STRIKE REPORTING FORM

WILDLIFE STRIKE REPORT

To be completed on discovering evidence that a birdstrike has occurred.
To be completed for all confirmed, unconfirmed, or 'near miss' birdstrike occurrences, in accordance with the guidance and information in Chapter 13 para.13.2.4 of AAR-AS.
Please note that Birdstrike Occurrences shall be submitted to the SCAA using e-mail: hq@caa.gov.az

Reporter Details	**Effect on flight**
Name.....Role.....	None ☐ Returned ☐
Employer	Aborted t/off ☐ Diverted ☐
Tel no .....Date.....	Loss or malfunction of any essential service ☐
Email.....	Other ☐
Birdstrike Details:	**Other Reports raised**
Confirmed ☐ Unconfirmed ☐ Near Miss ☐	Mandatory Occurrence Report (MOR) ☐
Aircraft Operator.....	Air Safety Report (ASR) ☐
Aircraft type & series.....	Other (specify) ☐
Aircraft reg.	**It is important to identify the species of bird whenever possible.**
Date (dd/mm/yy) ...../...../.....	**Bird Species/description** (e.g. Herring gull, Woodpigeon) .....
Time (local) .....: .....Hrs (24 hr)	**Any Remains Found** Yes ☐ No ☐
Dawn ☐ Day ☐ Dusk ☐ Night ☐	**Number of birds**
Precipitation:	seen struck *(enter actual number if known)*
None ☐ Fog ☐ Rain ☐ Sleet/Snow ☐	*1* ☐ ☐
Aerodrome	*2-10* ☐ ☐
Height (agl) ..... ft	*11-100* ☐ ☐
Speed (IAS) .....kt	*100+* ☐ ☐
Phase of Flight	
Taxi ☐ Descent ☐	**Pilot warned of birds** Yes ☐ No ☐
Take-off run ☐ Approach ☐	
Climb ☐ Landing roll ☐	
En Route ☐ Ground checks ☐	*Note 1: The reporter shall ensure, irrespective of this report having been filed, that details of this birdstrike occurrence are notified to the appropriate airline or aerodrome operator, as soon as practicable.*
Go Around ☐	

Part(s) of Aircraft	Struck	Damaged
Radome	☐	☐
Windshield	☐	☐
Nose (if not one of the above)	☐	☐
Engine nos: 1	☐	☐
2	☐	☐
3	☐	☐
4	☐	☐
Propelle	☐	☐
Wing/rotor (inc high lift devices)	☐	☐
Fuselage	☐	☐
Landing Gear	☐	☐
Tail	☐	☐
Lights	☐	☐
Other (specify in remarks field)	☐	☐

Remarks and other relevant information:

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APPENDIX J – REQUEST FOR GRANT OF EXEMPTION

APPLICATION FOR GRANTING EXEMPTION(s) (AERODROME)

Aerodrome Name:	Date:
Aerodrome Address:	
Geographical Coordinates of the Aerodrome Reference Point: Latitude: …… Longitude: …… *(in degrees, minutes and tenths of minutes and in WGS-84 format)*	
Reference clause(s) in AAR-AS: ……	
Reason(s) for exemption: ……	
Date for complying with the stated AAR-AS clause(s), if applicable: ……	
Comments:……	
A copy of appropriate risk assessment and/ or aeronautical studies attached with the request: Yes ☐ No ☐	
DECLARATION - I give my consent for the Az.SCAA to obtain and verify from or with any source, as Az.SCAA deem appropriate for the assessment of my request. - I declare that the particulars given by me in this application and the attached sheets are true to the best of my knowledge and understanding, and I have not willfully suppressed any material fact. I accept that if any of the information given by me in this application is any way false or incorrect, I shall be disqualified from exemption process.	
……/……/…… *Name of Applicant* *Signature* *Designation*	
Contact number/Fax:	E-mail:
For official use only:	
Verified by: ……/……/…… *Name of Aerodrome Inspector* *Signature* *Date*	
……/……/…… *Designation* *Contact number/Fax* *E-mail:*	
Comments: ……	
Supported by: ……/……/…… *Name of Supporting Officer* *Signature* *Date:*	
……/……/…… *Designation* *Contact number/Fax* *E-mail:*	
Comments:…… …… ……	

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APPENDIX K – SNOWTAM FORMAT

(COM heading)	(PRIORITY INDICATOR)	(ADDRESSES)		<≡
	(DATE AND TIME (OF FILING)	(ORIGINATOR'S INDICATOR)		<≡
(Abbreviated heading)	(SWAA* SERIAL NUMBER) S W * *	(LOCATION INDICATOR)	DATE/TIME OF ASSESSMENT	(OPTIONAL GROUP) <≡ (
SNOWTAM	(Serial number) <≡			

Aeroplane performance calculation section			
(AERODROME LOCATION INDICATOR)	M	A)	<≡
(DATE/TIME OF ASSESSMENT *(Time of completion of assessment in UTC)*)	M	B)	→
(LOWER RUNWAY DESIGNATION NUMBER)	M	C)	→
(RUNWAY CONDITION CODE (RWYCC) ON EACH RUNWAY THIRD) *(From Runway Condition Assessment Matrix (RCAM) 0, 1, 2, 3, 4, 5 or 6)*	M	D)	/ /
(PER CENT COVERAGE CONTAMINANT FOR EACH RUNWAY THIRD)	C	E)	/ /
(DEPTH *(mm)* OF LOOSE CONTAMINANT FOR EACH RUNWAY THIRD)	C	F)	/ /
(CONDITION DESCRIPTION OVER TOTAL RUNWAY LENGTH *(Observed on each runway third, starting from threshold having the lower runwaydesignation number)* COMPACTED SNOWDRY DRY SNOW DRY SNOW ON TOP OF COMPACTED SNOWDRY SNOW ON TOP OF ICE FROST ICE SLUSH STANDING WATER WATER ON TOP OF COMPACTED SNOWWET WET ICE WET SNOW WET SNOW ON TOP OF COMPACTED SNOWWET SNOW ON TOP OF ICE	M	G)	/ / →
(WIDTH OF RUNWAY TO WHICH THE RUNWAY CONDITION CODES APPLY,IF LESS THAN PUBLISHED WIDTH)	O	H)	<≡≡
Situational awareness section			
(REDUCED RUNWAY LENGTH, IF LESS THAN PUBLISHED LENGTH *(m)*)	O	I)	→
(DRIFTING SNOW ON THE RUNWAY)	O	J)	→

(LOOSE SAND ON THE RUNWAY)	O	K)	→
(CHEMICAL TREATMENT ON THE RUNWAY)	O	L)	→
(SNOWBANKS ON THE RUNWAY) *(If present, distance from runway centerline (m) followed by "L", "R" or "LR" as applicable)*	O	M)	→
(SNOWBANKS ON A TAXIWAY)	O	N)	→
(SNOWBANKS ADJACENT TO THE RUNWAY)	O	O)	→
(TAXIWAY CONDITIONS)	O	P)	→
(APRON CONDITIONS)	O	R)	→
(MEASURED FRICTION COEFFICIENT)	O	S)	
(PLAIN-LANGUAGE REMARKS)	O	T)	)

NOTES:

1. *Enter ICAO nationality letters as given in ICAO Doc 7910, Part 2 or otherwise applicable aerodrome identifier.

2. Information on other runways, repeat from B to H.

3. Information in the situational awareness section repeated for each runway, taxiway andapron. Repeat as applicable when reported.

4. Words in brackets ( ) not to be transmitted.

5. For letters A) to T), refer to the *Instructions for the completion of the SNOWTAMFormat*, paragraph 1, item b), in Appendix 4 of PANS-AIM (Doc 10066).

SIGNATURE OF ORIGINATOR *(not for transmission)*

APPENDIX L – RUNWAY FRICTION-MEASURIING DEVICES TEST REPORT FORM

RUNWAY FRICTION-MEASURING DEVICES TEST REPORT

Type of equipment		**Time**	…….	**Location**	*UBB…..*	**Programme No:**
Date of test	Weather	Wind		Direction/Speed		
…../…../…..	Condition prior to test					
Runway	…/….					
Surface description						

Surface texture tests	**Grease (mm)**	**Water (seconds)**
Position 1		
Position 2		
Position 3		
Tire wear test	**Rubber loss (grams)**	
Left		
Right		
Total		

Tests conducted by:	……../……	Towing vehicle (if applicable)	
Method of wetting		Depth of water	(mm)
Length covered by trace		Test speeds	
Starting at		Ending at:	……. *(UTC)*
Distance of run from centre line			

Friction results						
Speed km/h	32	65	95	130	145	160
1st third						
Middle third						
3rd third						
Recorder chart reference number and means of identification of individual run and speed:						
Speed km/h	32	65	95	130	145	160
Section of runway 45 m from centre line giving lowest coefficient of friction (excluding paint markings)						

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APPENDIX M – RUNWAY CONDITION REPORT FOR REPORTING RUNWAY SURFACE CONDITION

1. On a global level, movement areas are exposed to a multitude of climatic conditions and consequently a significant difference in the condition to be reported. The runway condition report (RCR) describes a basic methodology applicable for all these climatic variations.

2. The concept of the RCR is premised on:

   (a) an agreed set of criteria used in a consistent manner for runway surface condition assessment, aeroplane (performance) certification and operational performance calculation;

   (b) a unique runway condition code (RWYCC) linking the agreed set of criteria with the aircraft landing and takeoff performance table, and related to the braking action experienced and eventually reported by flight crews;

   (c) reporting of contaminant type and depth that is relevant to take-off performance;

   (d) a standardized common terminology and phraseology for the description of runway surface conditions that can be used by aerodrome operator inspection personnel, air traffic controllers, aircraft operators and flight crew;

   and

   (e) globally-harmonized procedures for the establishment of the RWYCC with a built-in flexibility to allow for local variations to match the specific weather, infrastructure and other particular conditions.

3. These harmonized procedures are reflected in a runway condition assessment matrix (RCAM) which correlates the RWYCC, the agreed set of criteria and the aircraft braking action which the flight crew shall expect for each value of the RWYCC.

4. Procedures which relate to the use of the RCAM are provided in the G-AGA-026.

5. It is recognized that information provided by the aerodrome's personnel assessing and reporting runway surface condition is crucial to the effectiveness of the runway condition report. A misreported runway condition alone shall not lead to an accident or incident. Operational margins shall cover for a reasonable error in the assessment, including unreported changes in the runway condition. But a misreported runway condition can mean that the margins are no longer available to cover for other operational variance (such as unexpected tailwind, high and fast approach above threshold or long flare).

6. This is further amplified by the need for providing the assessed information in the proper format for dissemination, which requires insight into the limitations set by the syntax for dissemination. This in turn restricts the wording of plain text remarks that can be provided.

7. It is important to follow standard procedures when providing assessed information on the runway surface conditions to ensure that safety is not compromised when aeroplanes use wet or contaminated runways. Personnel shall be trained in the relevant fields of competence and their competence verified in a manner required by the SCAA to ensure confidence in their assessments.

8. The training syllabus may include initial and periodic recurrent training in the following areas:

(a) aerodrome familiarization, including aerodrome markings, signs and lighting;

(b) aerodrome procedures as described in the aerodrome manual;

(c) aerodrome emergency plan;

(d) Notice to Airmen (NOTAM) initiation procedures;

(e) completion of/initiation procedures for RCR;

(f) aerodrome driving rules;

(g) air traffic control procedures on the movement area;

(h) radiotelephone operating procedures;

(i) phraseology used in aerodrome control, including the ICAO spelling alphabet;

(j) aerodrome inspection procedures and techniques;

(k) type of runway contaminants and reporting;

(l) assessment and reporting of runway surface friction characteristics;

(m) use of runway friction measurement device;

(n) calibration and maintenance of runway friction measurement device;

(o) awareness of uncertainties related to l) and m); and

(p) low visibility procedures

APPENDIX N – REQUIREMENTS CONCERNING DESIGN OF TAXIING GUIDANCE SIGNS

Note .— See Chapter 5, Section 5.4, for specifications on the application, location and characteristics of signs.

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 (see 5.4.3.22), the character size shall be that specified for mandatory instruction signs.

2. Arrow dimensions shall be as follows:

Legend height	*Stroke*
200 mm	32 mm
300 mm	48 mm
400 mm	64 mm

3. Stroke width for single letter shall be as follows:

Legend height	*Stroke*
200 mm	32 mm
300 mm	48 mm
400 mm	64 mm

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 in accordance with 5.4.1.7 b) and c) and 5.4.1.8, 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.

5. The luminance ratio between red and white elements of a mandatory sign shall be between 1:5 and 1:10.

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.

7. The average value is the arithmetic average of the luminance values measured at all considered grid points.

Note.— Guidance on measuring the average luminance of a sign is contained in the Aerodrome Design Manual (Doc 9157), Part 4.

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.

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.

10. The face height of signs shall be as follows:

Legend height	*Face height (min)*
200 mm	300 mm
300 mm	450 mm
400 mm	600 mm

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.

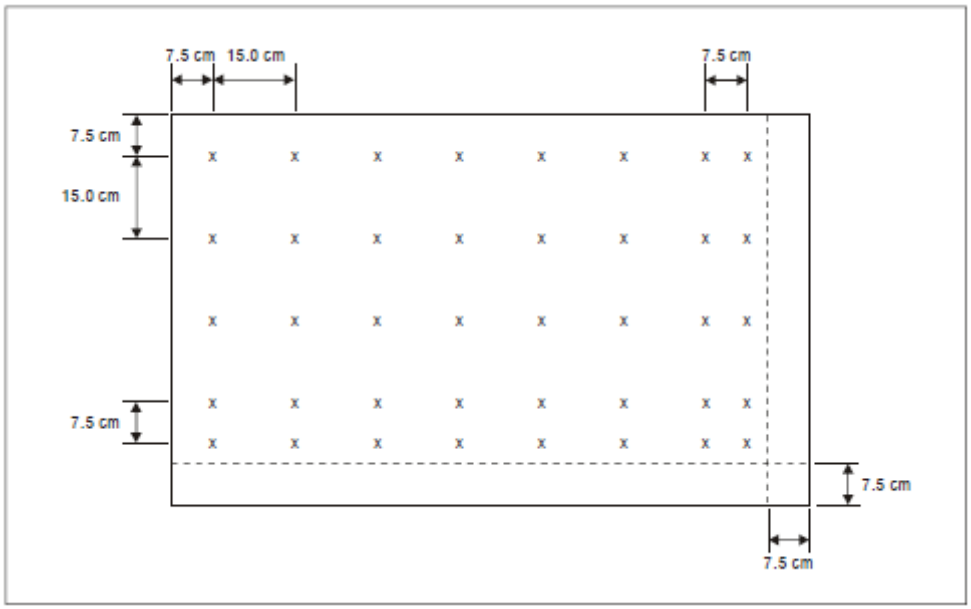
Note.— Additional guidance on determining the face width of a sign is contained in the Aerodrome Design Manual (Doc 9157), Part 4.

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.

13. The colours of signs shall be in accordance with the appropriate specifications in Appendix 1.



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:

a) 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.

b) 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.

c) 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.

d) 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 A4-1. Grid points for calculating average luminance of a sign

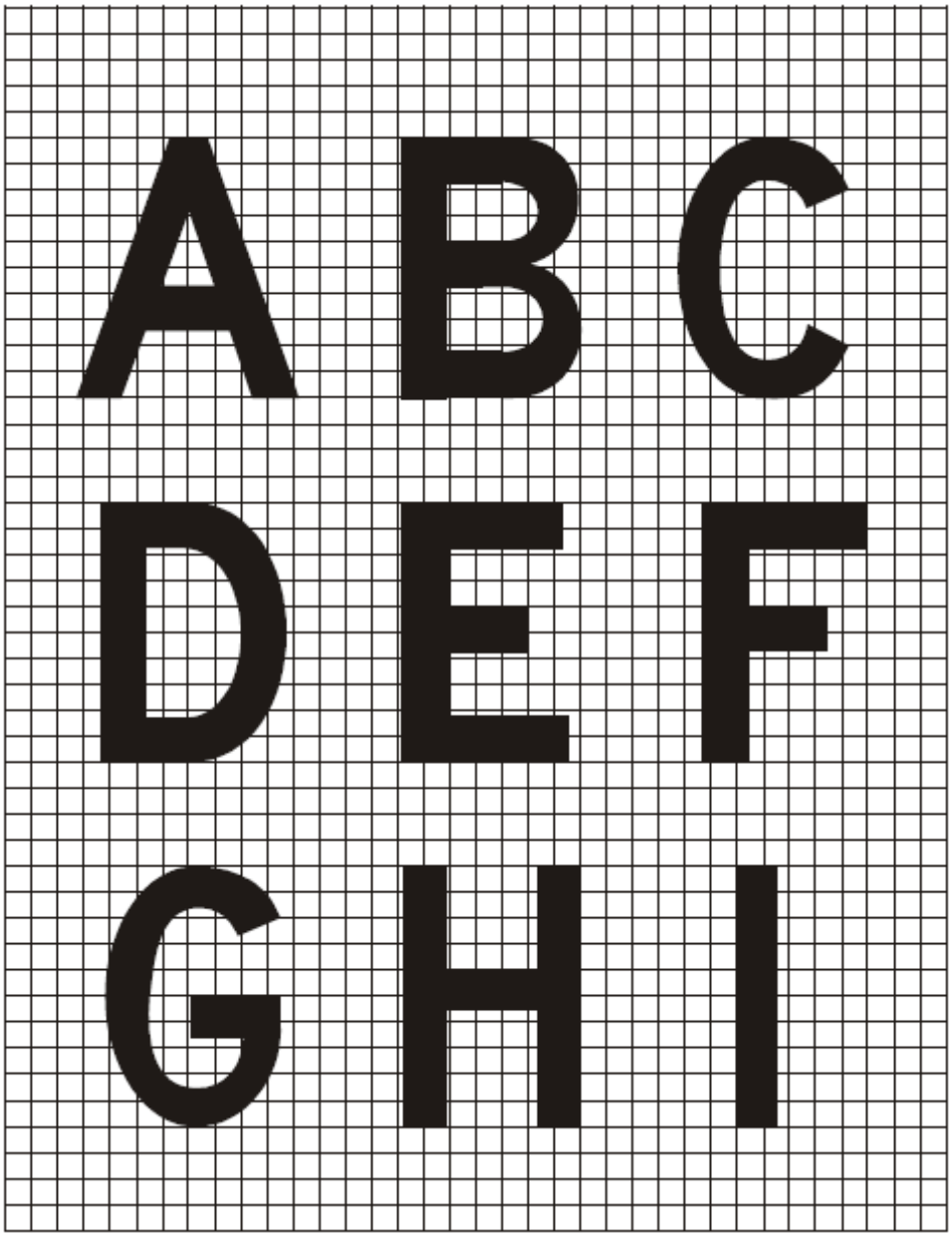


Figure A4-2. Forms of characters

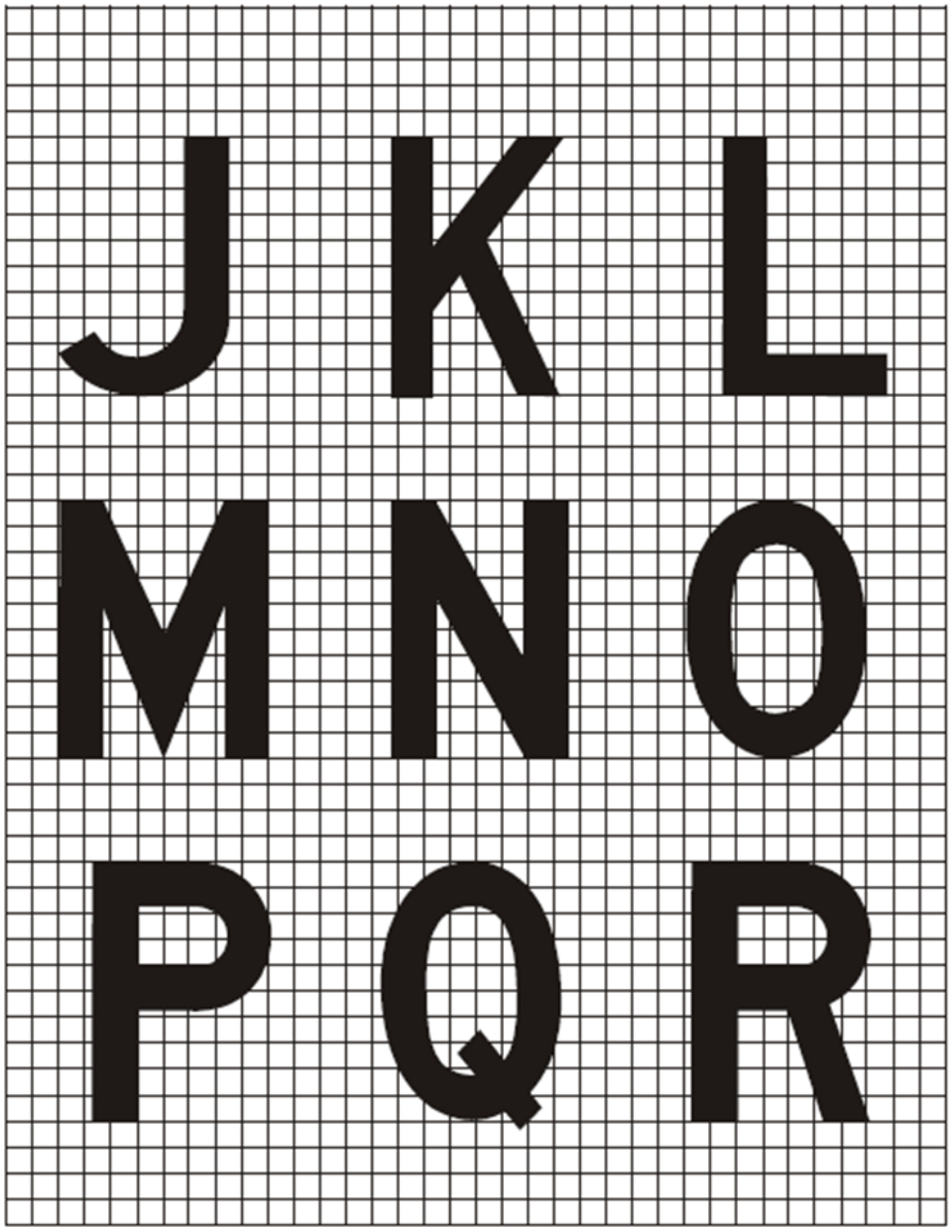


Figure A4-2. (cont.)

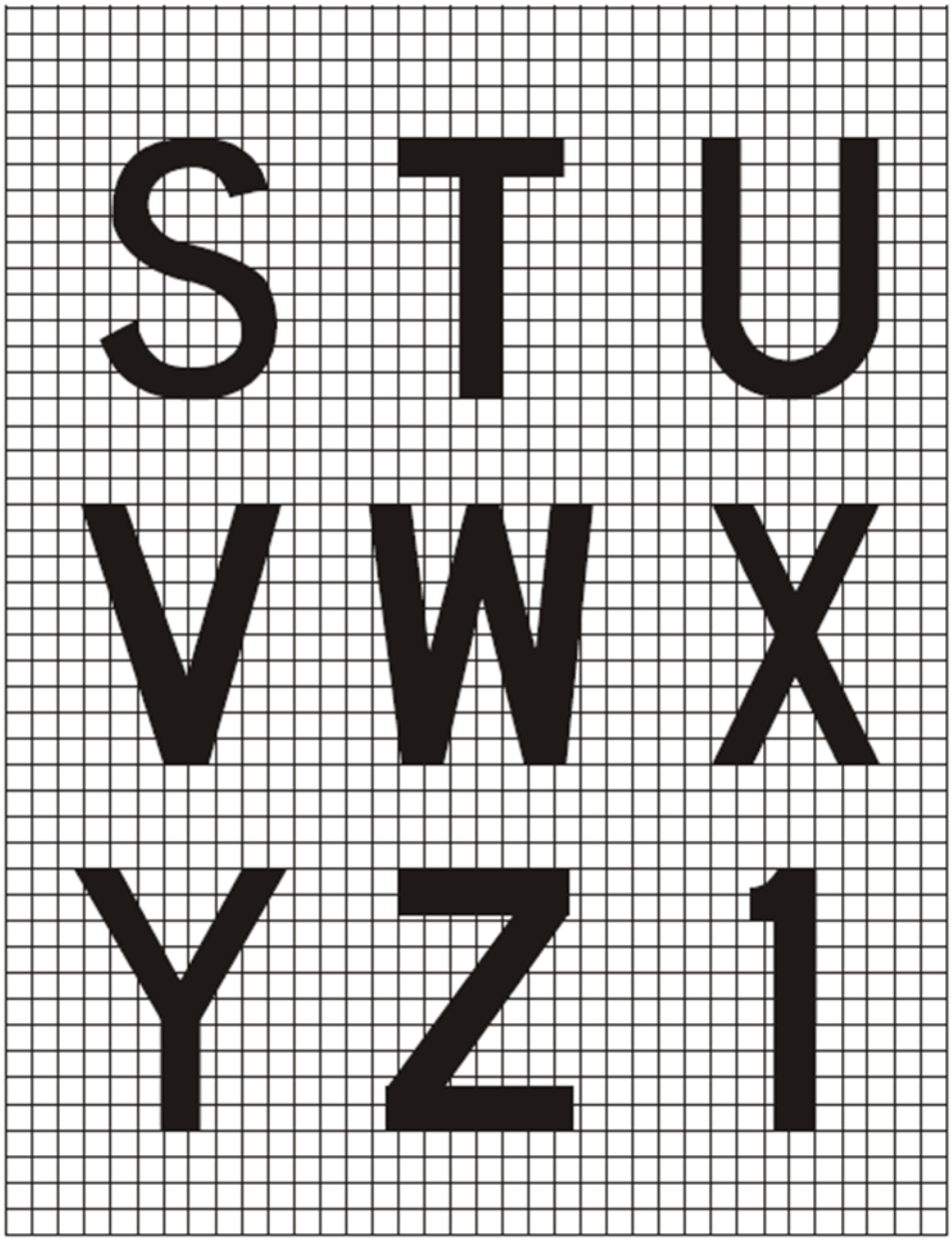


Figure A4-2. (cont.)

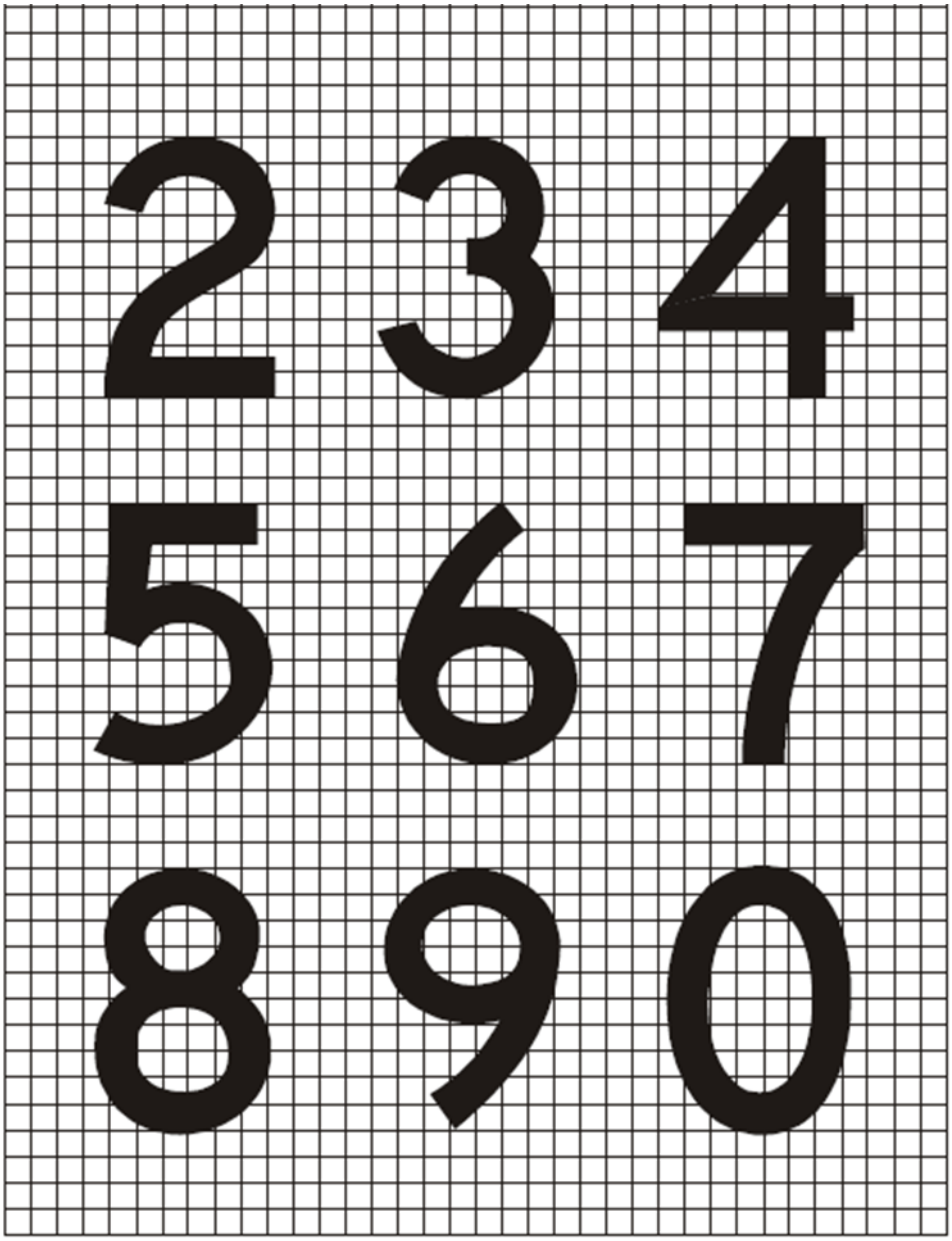


Figure A4-2. (cont.)

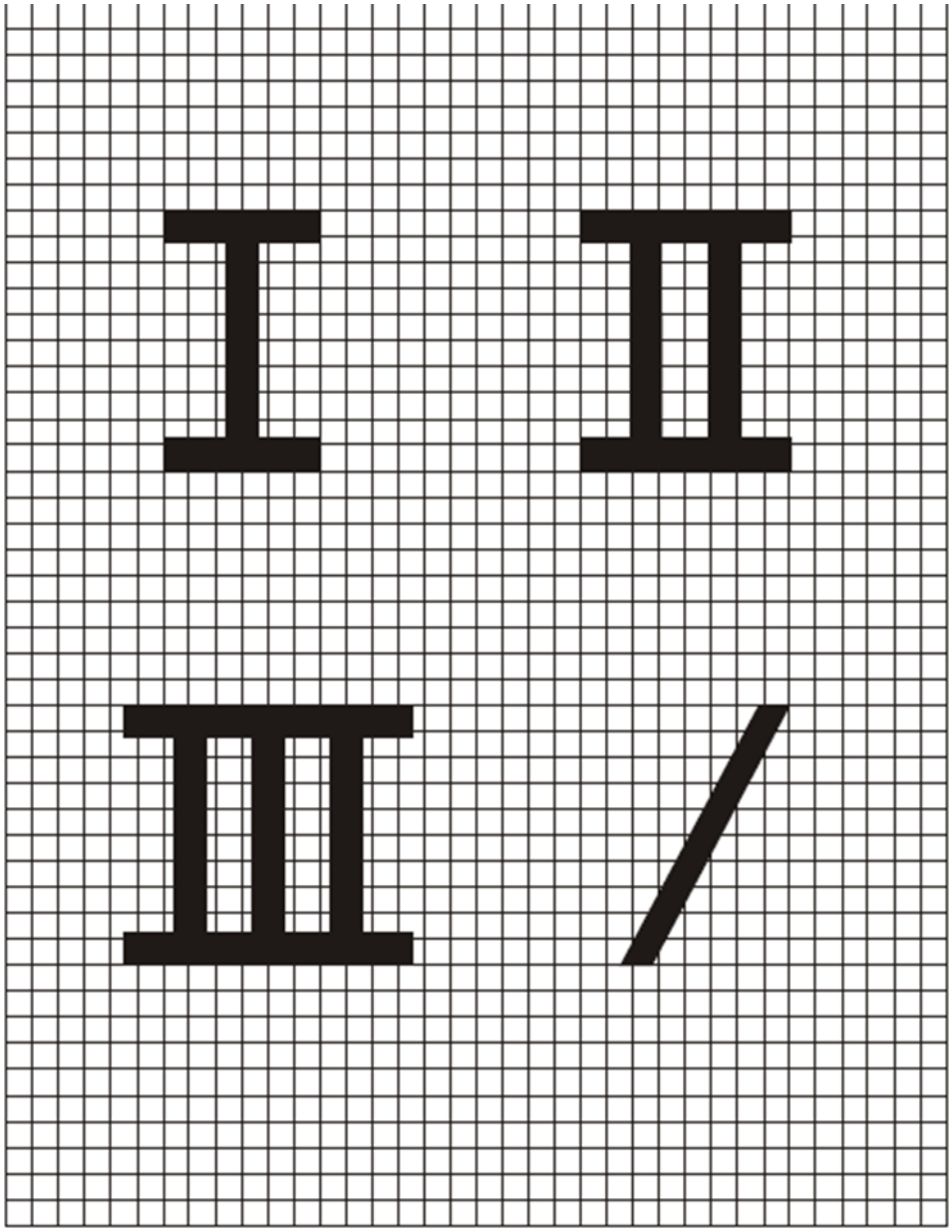
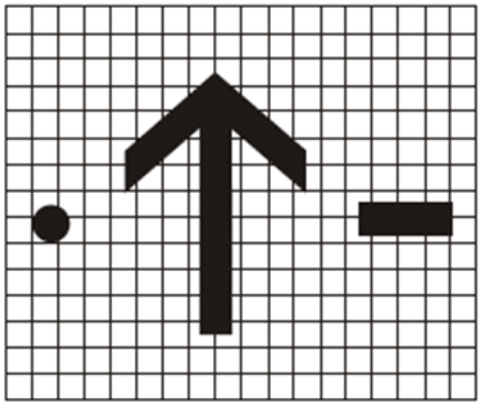


Figure A4-2. (cont.)

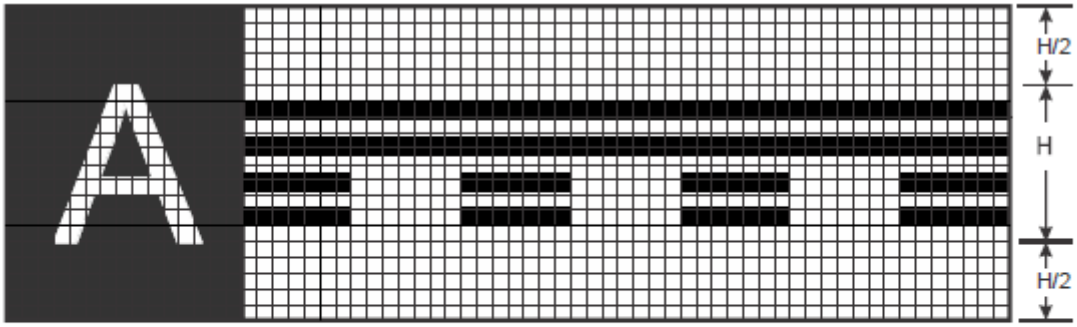


Note 1.—The arrow stroke width, diameter of the dot, and both width and length of the dash shall be proportioned to the character stroke widths.

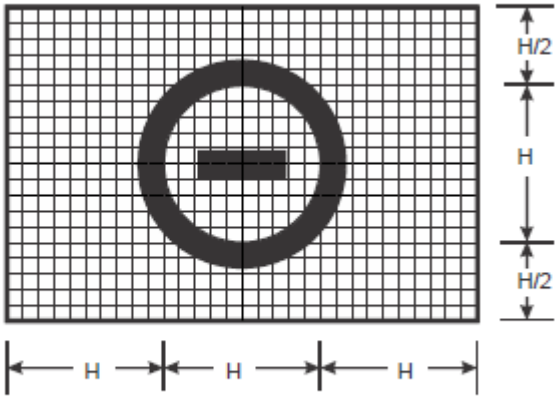
Note 2.— The dimensions of the arrow shall remain constant for a particular sign size, regardless of orientation.

Arrow, dot and dash

Figure A4-2.

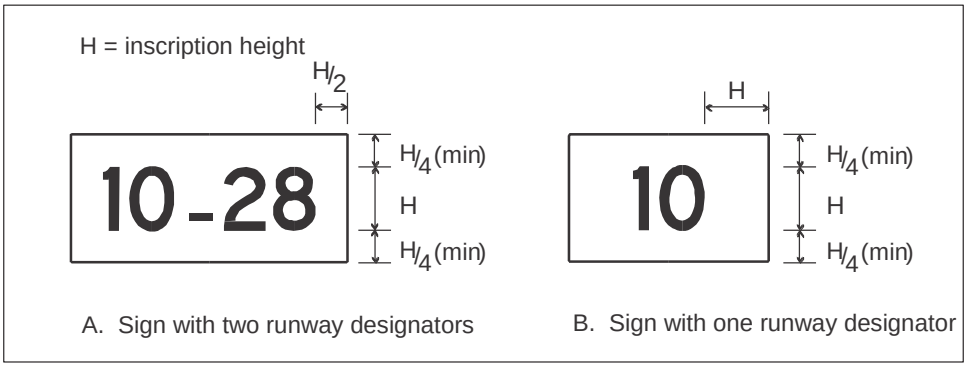


Runway vacated sign (with typical location sign)



NO ENTRY sign

Figure A4-3. Runway vacated and NO ENTRY signs



Explanatory Note to Figure A4-4: "H" stands for the inscription height.

Figure A4-4. Sign dimensions

Table A4-1. Letter and numeral widths and space between letters or numerals

a) Letter to letter code number			
Preceding Letter	Following Letter		
	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
	Code number		
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		
	1, 5	2, 3, 6, 8, 9, 0	4, 7
	Code number		
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)		
	200	300	400
	Space (mm)		
1	48	71	96
2	38	57	76
3	25	38	50
4	13	19	26

d) Width of letter			
Letter	Letter height (mm)		
	200	300	400
	Width (mm)		
A	170	255	340
B	137	205	274
C	137	205	274
D	137	205	274
E	124	186	248
F	124	186	248
G	137	205	274
H	137	205	274
I	32	48	64
J	127	190	254
K	140	210	280
L	124	186	248
M	157	236	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	186	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)		
	200	300	400
	Width (mm)		
1	50	74	98
2	137	205	274
3	137	205	274
4	149	224	298
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

1. 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.
2. 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.
3. Where the numeral follows a letter or vice versa use Code 1.
4. Where a hyphen, dot, or diagonal stroke follows a character or vice versa use Code 1.
5. 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.