CS-ADR-DSN ISSUE 3 — CHANGE INFORMATION

EASA publishes issues to certification specifications as consolidated documents. These documents are used for establishing the certification basis for applications made after the date of entry into force of the amendment.

Consequently, except for a note '[Issue: ADR-DSN/3]' under the amended paragraph, the consolidated text of CS-ADR-DSN does not allow readers to see the detailed changes introduced by the new amendment. To allow readers to also see these detailed changes, this document has been created. The same format as for the publication of Notices of Proposed Amendments (NPAs) has been used to show the changes:

— deleted text is ~~struck through~~;

— new or amended text is highlighted in grey;

— an ellipsis '[…]' indicates that the rest of the text is unchanged.

A Preamble has been created and inserted in CS-ADR-DSN.

BOOK 1 –CERTIFICATION SPECIFICATIONS FOR AERODROMES

Amend CS ADR-DSN.002 as follows:

CS ADR-DSN.A.002 Definitions

(...)

~~'Aerodrome identification sign' means a sign placed on an aerodrome to aid in identifying the aerodrome from the air.~~

'Aerodrome operator' means any legal or natural person, operating or proposing to operate one or more aerodromes.

~~'Aerodrome reference point' means the designated geographical location of an aerodrome.~~

'Aerodrome traffic density' means the number of movements in the mean busy hour and is the arithmetic mean over the year of the number of movements in the daily busiest hour. Movement is either a take-off or a landing:

(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.

(...)

'Apron service road' means a road located on or adjacent to an apron, intended for the exclusive use of vehicles.

(...)

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

(...)

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

(...)

2. 'Precision approach runway, ~~c~~Category I': an instrument runway served by non-visual aids and visual aids, intended for operations 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 (RVR) not less than 550 m.

3. 'Precision approach runway, ~~c~~Category II': an instrument runway served by non-visual aids and visual aids intended for operations with a decision height (DH) lower than 60 m (200 ft) but not lower than 30 m (100 ft) and a runway visual range (RVR) not less than 300 m.

4. 'Precision approach runway, ~~c~~Category III': an instrument~~-~~ runway served by non-visual aids and visual aids to and along the surface of the runway and:

   A — intended for operations with a decision height (DH) lower than 30 m (100 ft), or no decision height and a runway visual range (RVR) not less than 175 m; or

   B — intended for operations with a decision height (DH) lower than 15 m (50 ft), or no decision height and a runway visual range (RVR) less than 175 m but not less than 50 m; ~~and~~ or

   C — intended for operations with no decision height (DH) and no runway visual range (RVR) limitations.

'Intermediate holding position' means a designated position intended for traffic control at which taxiing aircraft and vehicles should stop and hold until further cleared to proceed when so instructed by the appropriate air traffic control unit~~aerodrome control tower~~.

(...)

'Sensitive ~~A~~area~~'~~ means an area extending beyond the Critical Area where the parking and/or movement of aircraft or vehicles will affect the guidance signal to the extent that it may be rendered unacceptable to aircraft using the signal.

Amend CS ADR-DSN.A.005 as follows:

CS ADR-DSN.A.005 Aerodrome reference code

(...)

(c) The code number for element 1 should be determined from Table A-1, 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. 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.

(d) The code letter for element 2 should be determined from Table A-1, column (3), by selecting the code letter which corresponds to the greatest wingspan, or the greatest outer main gear wheel span whichever gives the more demanding code letter of the aeroplanes for which the facility is intended.

Amend CS ADR-DSN.A.010 as follows:

CS ADR-DSN.A.010

~~i~~Intentionally left blank

Amend CS ADR-DSN.B.020 as follows:

CS ADR-DSN.B.020 Choice of maximum permissible crosswind components

~~i~~Intentionally left blank

Amend CS ADR-DSN.B.025 as follows:

CS ADR-DSN.B.025 Data to be used

~~i~~Intentionally left blank

Amend CS ADR-DSN.B.035 as follows:

CS ADR-DSN.B.035 ~~Actual i~~Length of runway and declared distances

(...)

Amend CS ADR-DSN.B.055 as follows:

CS ADR-DSN.B.055 Minimum distance between parallel instrument runways

(...)

(b) Apart from provided in (a) above, for segregated parallel operations the specified minimum distance:

(1) may ~~should~~ 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) should be increased by 30 m for each 150 m that the arrival runway is staggered away from the arriving aircraft.

(...)

Amend CS ADR-DSN.B.060 as follows:

CS ADR-DSN.B.060 Longitudinal slopes of runways

(...)

(c) Along no portion of a runway should the longitudinal slope exceed:

(1) 1.25 % where the code number is 4, except that for the first and last quarter of the length of the runway where the longitudinal slope should not exceed 0.8 %;

(2) 1.5 % where the code number is 3, except that for the first and last quarter of the length of a precision approach runway ~~c~~Category II or III where the longitudinal slope should not exceed 0.8 %; and

(3) 2 % where the code number is 1 or 2.

Amend CS ADR-DSN.B.090 as follows:

CS ADR-DSN.B.090 Surface of runways

(a) The surface of a runway should be constructed without irregularities that would ~~result in loss in~~ impair the runway surface friction characteristics or otherwise adversely affect the take-off or landing of an aeroplane.

(b) ~~The surface of a~~A paved runway should be so constructed or resurfaced ~~so~~ as to provide ~~good~~ surface friction characteristics ~~when the runway is wet~~ at or above the minimum friction level.

(c) The average surface texture depth of a new surface should be not less than 1.0 mm.

(d) When ~~If~~ the surface is grooved or scored, the grooves or scorings should be either perpendicular to the runway centre line or parallel to non-perpendicular transverse joints where applicable.

Delete SECTION 1 as follows:

~~**SECTION 1 — RUNWAY TURN PADS**~~

Amend CS ADR-DSN.B.110 as follows:

CS ADR-DSN.B.110 Surface of runway turn pads

(...)

(b) The surface of a runway turn pad should be so constructed or resurfaced as to provide surface friction characteristics ~~compatible with the runway friction characteristics~~ at least equal to that of the adjoining runway.

Delete SECTION 2 as follows:

~~**SECTION 2 — RUNWAY SHOULDERS**~~

Amend CS ADR-DSN.B.135 as follows:

CS ADR-DSN.B.135 Width of runway shoulders

(a) The runway shoulders should extend symmetrically on each side of the runway so that the overall width of the runway and its shoulders is not less than:

(1)~~(a)~~ 60 m where the code letter is D or E; and

(2)~~(b)~~ 75 m where the code letter is F.

Amend CS ADR-DSN.B.155 as follows:

CS ADR-DSN.B.155 Length of runway strip

(a) A strip should extend before the threshold and beyond the end of the runway or stopway for a distance of at least:

(1) ~~(a)~~ 60 m where the code number is 2, 3, or 4;

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

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

Delete SECTION 3 as follows:

~~**SECTION 3 — RUNWAY STRIP**~~

Amend CS ADR-DSN.B.165 as follows:

CS ADR-DSN.B.165 Objects on runway strips

(a) An object situated on a runway strip which may endanger aeroplanes should be regarded as an obstacle and should, as far as practicable, be removed.

(b) 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 T, should be permitted on a runway strip:

(1) within 77.5 m of the runway centre line of a precision approach runway ~~c~~Category I, II or III where the code number is 4 and the code letter is F; or

(2) within 60 m of the runway centre line of a precision approach runway ~~c~~Category I, II or III where the code number is 3 or 4;or

(3) within 45 m of the runway centre line of a precision approach runway ~~c~~Category I where the code number is 1 or 2.

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

(c) To eliminate a buried vertical surface on objects situated on a graded portion of the runway strip, a slope should be provided to minimise hazards to aeroplanes running off the runway. ~~which extends from the top of the construction to not less than 0.3 m below ground level. The slope should be no greater than 1:10.~~

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

Amend CS ADR-DSN.B.170 as follows:

CS ADR-DSN.B.170

i~~I~~ntentionally left blank

Insert new CS ADR-DSN.B.191 as follows:

CS ADR-DSN.B.191 Drainage characteristics of the movement area and adjacent areas

The safety objective of the drainage systems of the movement area and adjacent areas is to minimise water depth on the surface by draining surface water off the runway in the shortest path practicable and particularly out of the area of the wheel path.

Delete SECTION 4 as follows:

~~**SECTION 4 — CLEARWAYS, STOPWAYS AND RADIO ALTIMETER OPERATING AREA**~~

Amend CS ADR-DSN.B.195 as follows:

CS ADR-DSN.B.195 Clearways

(a) The inclusion of detailed specifications for clearways below ~~in this section~~ is not intended to imply that a clearway has to be provided.

(...)

Amend CS ADR-DSN.B.200 as follows:

CS ADR-DSN.B.200 Stopways

(a) The inclusion of detailed specifications for stopways below ~~in this section~~ is not intended to imply that a stopway has to be provided.

(...)

(e) Surface of stopways:

The surface of a paved stopway should be so constructed ~~so~~or resurfaced as to provide ~~a good coefficient of friction~~ surface friction characteristics ~~to be compatible with that~~ at or above those of the associated runway ~~when the stopway is wet~~.

Amend CS ADR-DSN.B.205 as follows:

CS ADR-DSN.B.205 Radio altimeter operating area

(a) A radio altimeter operating area should be established in the pre-threshold area of a precision approach runway ~~c~~Category II and III, and where practicable, in the pre-threshold area of a precision approach runway ~~c~~Category I.

(...)

(c) Width of the area:

A radio altimeter operating area should 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 a~~n~~ safety assessment indicates that such reduction would not affect the safety of operations of aircraft.

CHAPTER C — RUNWAY END SAFETY AREA

Amend CS ADR-DSN.C.210 as follows:

CS ADR-DSN.C.210 Runway ~~E~~end ~~S~~safety ~~A~~areas (RESA)

(...)

(b) A runway end safety area should be provided at each end of a runway strip where:

(1) the code number is 3 or 4; and

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

(c) Where practicable, a runway end safety area should 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.

Amend CS ADR-DSN.C.215 as follows:

CS ADR-DSN.C.215 Dimensions of runway end safety areas

(a) Length of runway end safety area ~~RESA~~

(1) A runway end safety area should extend from the end of a runway strip to a distance of at least 90 m and, as far as practicable, extend to a distance of:

~~(1)~~(i) 240 m where the code number is 3 or 4 and

~~(2)~~(ii) 120 m where the code number is 1 or 2 and the runway is an instrument one; and

(2) A runway end safety area should extend from the end of a runway strip, as far as practicable, to a distance of 30 m where the code number is 1 or 2 and the runway is a non-instrument one.

(b) Notwithstanding the provisions in (a) above, the length of the runway end safety area may be reduced where an arresting system is installed, based on the design specifications of the system.

(c) Width of runway end safety area ~~RESA~~

The width of a runway end safety area should be at least twice that of the associated runway and, wherever practicable, be equal to that of the graded portion of the associated runway strip.

Amend CS ADR-DSN.C.235 as follows:

CS ADR-DSN.C.235 Strength of runway end safety areas

A runway end safety area should have a bearing strength sufficient to serve its primary purpose. ~~Intentionally blank~~

Amend CS ADR-DSN.D.290 as follows:

CS ADR-DSN.D.290 Surface of taxiways

(...)

(b) The surface of a paved taxiway should be so constructed or resurfaced ~~so~~ as to provide suitable surface friction characteristics.

Amend CS ADR-DSN.D.315 as follows:

CS ADR-DSN.D.315 Width of taxiway strips

(...)

(b) A taxiway strip should 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 D-1, column (11).

Amend CS ADR-DSN.D.335 as follows:

CS ADR-DSN.D.335 Holding bays, runway-holding positions, intermediate holding positions, and road-holding positions

(...)

(b) A runway-holding position or positions should be established:

(1) on the taxiway, if the location or alignment of the taxiway is such that a taxiing aircraft or vehicle can infringe an obstacle limitation surface or ILS/MLS critical/sensitive area or interfere with the operation of radio navigation aids;

(2) on the taxiway, at the intersection of a taxiway and a runway; and

(3) at an intersection of a runway with another runway when the former runway is part of a standard taxi-route.

(...)

Amend CS ADR-DSN.D.340 as follows:

CS ADR-DSN.D.340 Location of holding bays, runway-holding positions, intermediate holding positions, and road-holding positions

(...)

(c) The location of a runway-holding position established in accordance with CS ADR-DSN.D.335 should 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.

	Code number[d]			
Type of runway	1	2	3	4
Non-instrument	30 m	40 m	75 m	75 m
Non-precision approach	40 m	40 m	75 m	75 m
Precision approach ~~c~~Category I	60 m[b]	60 m[b]	90 m[a,b]	90 m[a,b,c]
Precision approach ~~c~~Categories II and III	—	—	90 m[a,b]	90 m[a,b,c]
Take-off runway	30 m	40 m	75 m	75 m

a. If a holding bay, runway-holding position, or road-holding position is at a lower elevation compared to the threshold, the distance may be decreased 5 m for every metre the bay or holding position is lower than the threshold, contingent upon not infringing the inner transitional surface.

b. This distance may need to be increased to avoid interference with radio navigation aids, particularly the glide path and localiser facilities (see CS ADR-DSN.D.340).

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.

c. Where the code letter is F, this distance should be 107.5 m.

Note:~~.~~ — The distance of 107.5 m for code number 4 where the code letter is F 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.

d. Elevation of taxiway should be taken into account for possible increase of the distances indicated in this table.

Table D-2. Minimum distance from the runway centre line to a holding bay, runway-holding position, or road-holding position

Amend CS ADR-DSN.D.350 as follows:

CS ADR-DSN.E.350 Size of aprons

i~~I~~ntentionally left blank

Amend CS ADR-DSN.E.360 as follows:

CS ADR-DSN.E.360 Slopes on aprons

(a) Slopes on an apron, including those on an aircraft stand taxilane, should be sufficient to prevent accumulation of water on the surface of the apron but should be kept to the minimum required to facilitate effective drainage.

(...)

Amend CS ADR-DSN.E.365 as follows:

CS ADR-DSN.E.365 Clearance distances on aircraft stands

(...)

(b) An aircraft stand should provide the following minimum clearances between an aircraft entering or exiting ~~using~~ the stand and any adjacent building, aircraft on another stand and other objects:

Code Letter	Clearance
A	3 m
B	3 m
C	4.5 m
D	7.5 m
E	7.5 m
F	7.5 m

Amend CS ADR-DSN.G.400 as follows:

CS ADR-DSN.G.400 Clearance distances on a de-icing/anti-icing pad

(...)

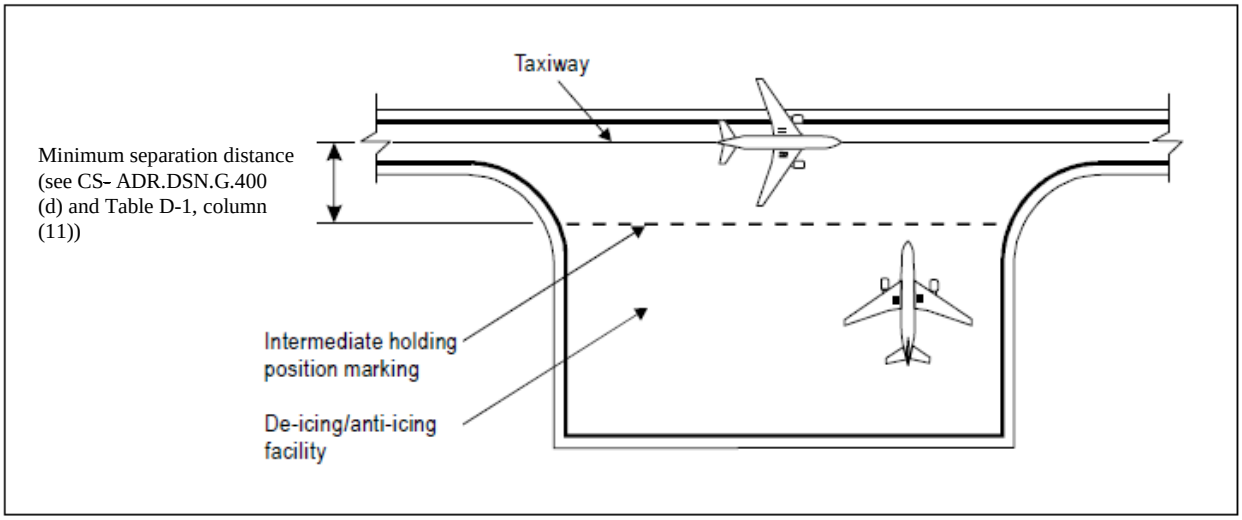


Figure G-1. Minimum separation distance on a de-icing/anti-icing facility

Amend CS ADR-DSN.H.410 as follows:

CS ADR-DSN.H.410 Outer horizontal surface

~~I~~Intentionally left blank

Amend CS ADR-DSN.H.420 as follows:

CS ADR-DSN.H.420 Inner horizontal surface

(...)

(c) Characteristics: The outer limits of the inner horizontal surface are defined by a circle ~~circular arcs~~ centred on the geometric centre of the runway, by a convex contour composed of circular arcs centred on the intersections of the extended RWY centre line with the end of the RWY strip, joined tangentially by straight lines parallel to the runway centre line, as shown in Figure H-1, or on other points established for such purpose ~~as in Figure H-1~~.

Amend CS ADR-DSN.H.440 as follows:

CS ADR-DSN.H.440 Slewed take-off climb surface

~~I~~Intentionally left blank

Amend CS ADR-DSN.H.445 as follows:

CS ADR-DSN.H.445 Obstacle ~~F~~free ~~Z~~zone (OFZ)

(a) An OFZ is intended to protect aeroplanes from fixed and mobile obstacles during Category ~~I,~~ II~~, or~~ and III operations when approaches are continued below decision height, and during any subsequent missed approach or balked landing with all engines operating normally. It is not intended to supplant the requirement of other surfaces or areas where these are more demanding.

(...)

Amend CS ADR-DSN.J.470 as follows:

CS ADR-DSN.J.470 Non-instrument runways

(...)

(d) New objects or extensions of existing objects should not be permitted above the conical surface or inner horizontal surface except when the object would be shielded by an existing immovable object, or if after a safety assessment, it is determined that the object would not adversely affect the safety or significantly affect the regularity of operations of aeroplanes.

(e) Existing objects above any of the conical surface, inner horizontal surface, approach surface and transitional surfaces should, as far as practicable, be removed except when the object is shielded by an

existing immovable object, or if after a safety assessment, it is determined that the object would not adversely affect the safety or significantly affect the regularity of operations of aeroplanes.

(...)

Amend CS ADR-DSN.J.475 as follows:

CS ADR-DSN.J.475 Non-precision approach runways

(...)

(f) Existing objects above any of the surfaces required by paragraph (a) should as far as practicable be removed except when the object would be shielded by an existing immovable object, or if after a safety assessment, it is determined that the object would not adversely affect the safety or significantly affect the regularity of operations of aeroplanes.

Amend CS ADR-DSN.J.480 as follows:

CS ADR-DSN.J.480 Precision approach runways

(a) The following obstacle limitation surfaces should be established for a precision approach runway ~~c~~Category I:

(1) conical surface;

(2) inner horizontal surface;

(3) approach surface; and

(4) transitional surfaces.

(b) The following obstacle limitation surfaces should be established for a precision approach runway ~~c~~Category II or III:

(1) conical surface;

(2) inner horizontal surface;

(3) approach surface and inner approach surface;

(4) transitional surfaces and inner transitional surfaces; and

(5) balked landing surface.

(...)

(g) New objects or extensions of existing objects should 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 if after a safety assessment , it is determined that the object would not adversely affect the safety or significantly affect the regularity of operations of aeroplanes.

(h) Existing objects above an approach surface, a transitional surface, the conical surface and inner horizontal surface should, as far as practicable, be removed except when an object would be shielded by an existing immovable object, or if after a safety assessment, it is determined that the object would not adversely affect the safety or significantly affect the regularity of operations of aeroplanes.

Amend CS ADR-DSN.J.485 as follows:

CS ADR-DSN.J.485 Runways meant for take-off

(...)

(e) Existing objects that extend above a take-off climb surface should as far as practicable be removed except when an object is shielded by an existing immovable object, or if after a safety assessment, it is determined that the object would not adversely affect the safety or significantly affect the regularity of operations of aeroplanes.

RUNWAYS MEANT FOR TAKE-OFF			
	Code number		
Surface and dimensions[a]	1	2	3 or 4
(1)	(2)	(3)	(4)
TAKE-OFF CLIMB			
Length of inner edge	60[e] m	80[e] m	180 m
Distance from runway end[b]	30 m	60 m	60 m
Divergence (each side)	10 %	10 %	12.5 %
Final width	380 m	580 m	1 200 m 1 800 m[c]
Length	1 600 m	2 500 m	15 000 m
Slope	5 %	4 %	2 %[d]

a All dimensions are measured horizontally unless specified otherwise.
b The take-off climb surface starts at the end of the clearway if the clearway length exceeds the specified distance.
c 1 800 m when the intended track includes changes of heading greater than 15° for operations conducted in IMC, VMC by night.
d See GM1~~CS~~ ADR-DSN.J.485 (a~~c~~) and (e).
e Where clearway is provided the length of the inner edge should be 150 m.

Table J-2. Dimensions and slopes of obstacle limitation surfaces — Runways meant for take-off

Amend CS ADR-DSN.J.490 as follows:

CS ADR-DSN.J.48690 Other objects

(...)

(b) Anything which may, after a safety assessment, endanger aeroplanes on the movement area or in the air within the limits of the inner horizontal and conical surfaces should be regarded as an obstacle and should be removed in so far as practicable.

Insert new CS ADR-DSN.J.487 as follows:

CS ADR-DSN.J.487 Objects outside the obstacle limitation surfaces

(a) Applicability: The specifications in paragraph (b) below apply only to the area under control of the aerodrome operator.

(b) 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 should be regarded as obstacles, unless a safety assessment indicates that they do not constitute a hazard to aeroplanes.

Amend CS ADR-DSN.K.505 as follows:

CS ADR-DSN.K.505 Signal panels and signal area

iIntentionally left blank

Amend CS ADR-DSN.K.510 as follows:

CS ADR-DSN.K.510 Location of signal panels and signal area

iIntentionally left blank

Amend CS ADR-DSN.K.515 as follows:

CS ADR-DSN.K.515 Characteristics of signal panels and signal area

iIntentionally left blank

Amend CS ADR-DSN.L.525 as follows:

CS ADR-DSN.L.525 Runway designation marking

(...)

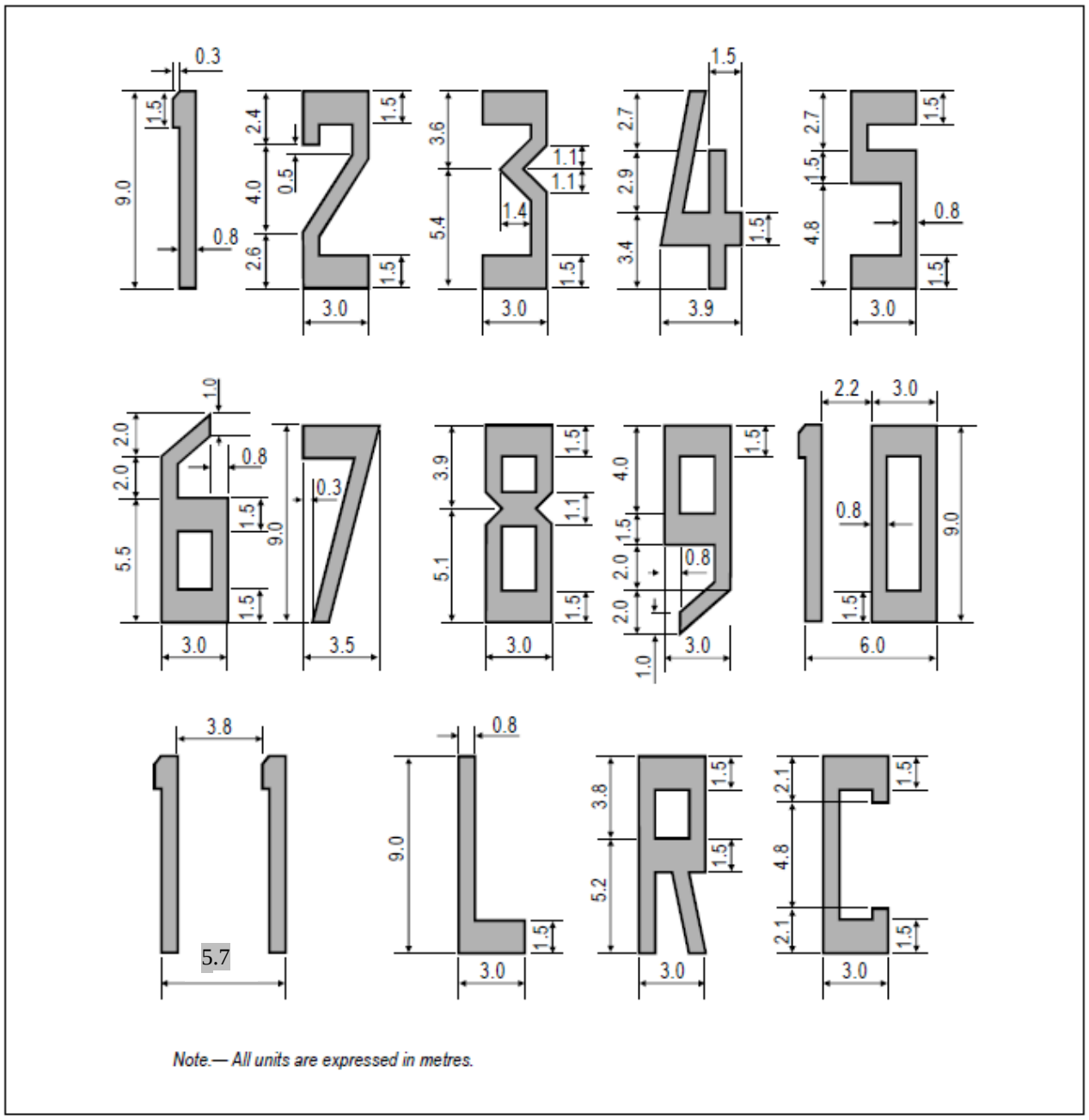


Figure L-2. Form and proportions of numbers and letters for runway designation markings

Amend CS ADR-DSN.L.530 as follows:

CS ADR-DSN.L.530 Runway centre line marking

(...)

(c) Characteristics:

(...)

(2) The width of the stripes should be not less than:

(i) 0.90 m on precision approach ~~c~~Category II and III runways;

(ii) 0.45 m on non-precision approach runways where the code number is 3 or 4, and precision approach ~~c~~Category I runways; and

(iii) 0.30 m on non-precision approach runways where the code number is 1 or 2, and on non-instrument runways.

Amend CS ADR-DSN.L.535 as follows:

CS ADR-DSN.L.535 Threshold marking

(1) Applicability ~~and location~~: A threshold marking should be provided at the threshold of a runway.

(...)

Amend CS ADR-DSN.L.545 as follows:

CS ADR-DSN.L.545 Touchdown zone marking

(...)

(c) Characteristics:

(...)

(2) The lateral spacing between the inner sides of the rectangles should 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 should correspond to the lateral spacing specified for the aiming point marking in Table L-1 (columns (2), (3), (4), or (5), as appropriate). The pairs of markings should be provided at longitudinal spacings of 150 m beginning from the threshold, except that ~~where~~ pairs of touchdown zone markings ~~are~~ coincident with or located within 50 m of an aiming point~~,~~ marking should be deleted from the pattern.

(...)

Amend CS ADR-DSN.L.555 as follows:

CS ADR-DSN.L.555 Taxiway centre line marking

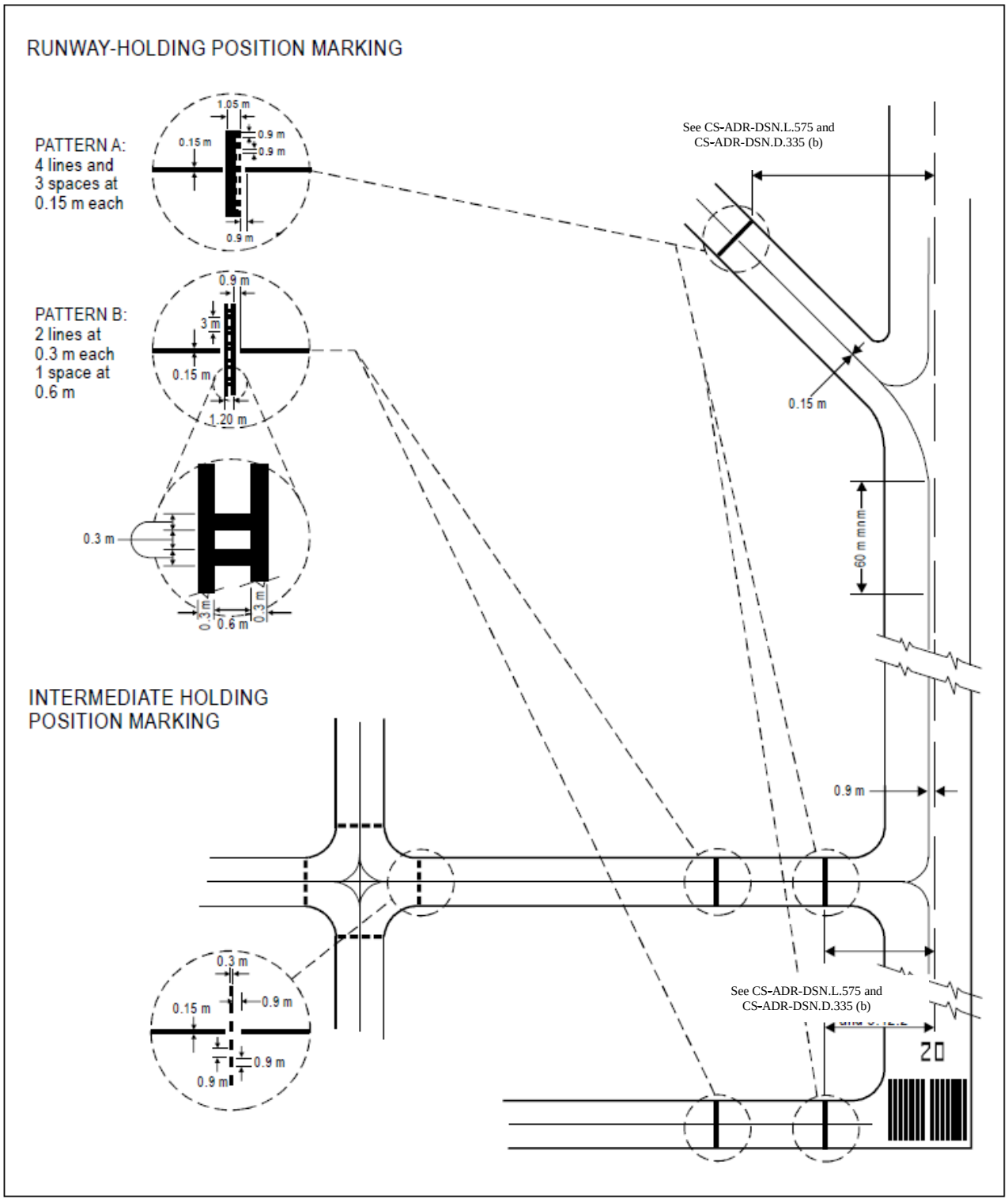


Figure L-5. Taxiway markings (shown with basic runway markings)

Amend CS ADR-DSN.L.570 as follows:

CS ADR-DSN.L.570 Enhanced taxiway centre line marking

(a) ~~Applicability:~~ Where provided, ~~A~~an enhanced taxiway centre line marking should be installed at each taxiway/runway intersection where it is necessary to denote the proximity of a runway-holding position. ~~extend from the runway holding position Pattern A (as defined in Figure L-5. Taxiway markings) to a distance of up to 47 m (a minimum of three (3) dashed lines) in the direction of travel away from the runway or to the next runway holding position if within 47 m distance.~~

(b) Characteristics:

(1) Enhanced taxiway centre line marking should be as shown in Figure L-6. An enhanced taxiway centre line marking should extend from the runway-holding position Pattern A (as defined in Figure L-5) to a distance of up to 47 m in the direction of travel away from the runway (see Figure L-6(a)).

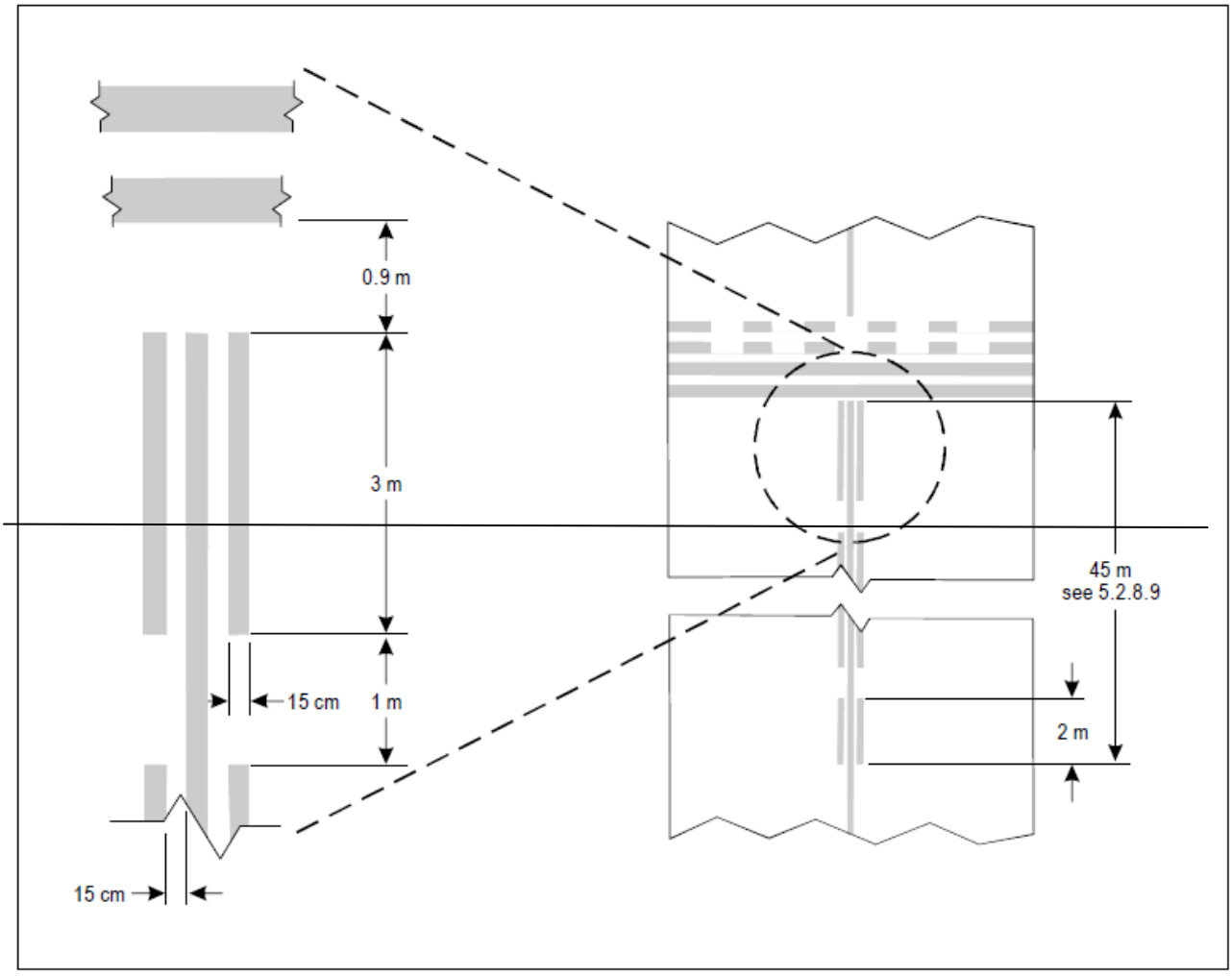
(2) If the enhanced taxiway centre line marking intersects another runway-holding position marking, such as for a precision approach Category II or III runway, that is located within 47 m of the first runway-holding position marking, the enhanced taxiway centre line marking should be interrupted 0.9 m prior to and after the intersected runway-holding position marking. The enhanced taxiway centre line marking should 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 L-6(b)).

(3) 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 should 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 should 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 L-6(c)).

(4) Where two taxiway centre lines converge at or before the runway-holding position marking, the inner dashed line should not be less than 3 m in length (see Figure L-6(d)).

(5) 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 should extend over this entire distance. The enhanced taxiway centre line markings should not extend beyond either runway-holding position marking (see Figure L-6(e)).

[Editorial Note: Remove exiting Figure L-6]



[Editorial Note: Insert new Figure L-6]

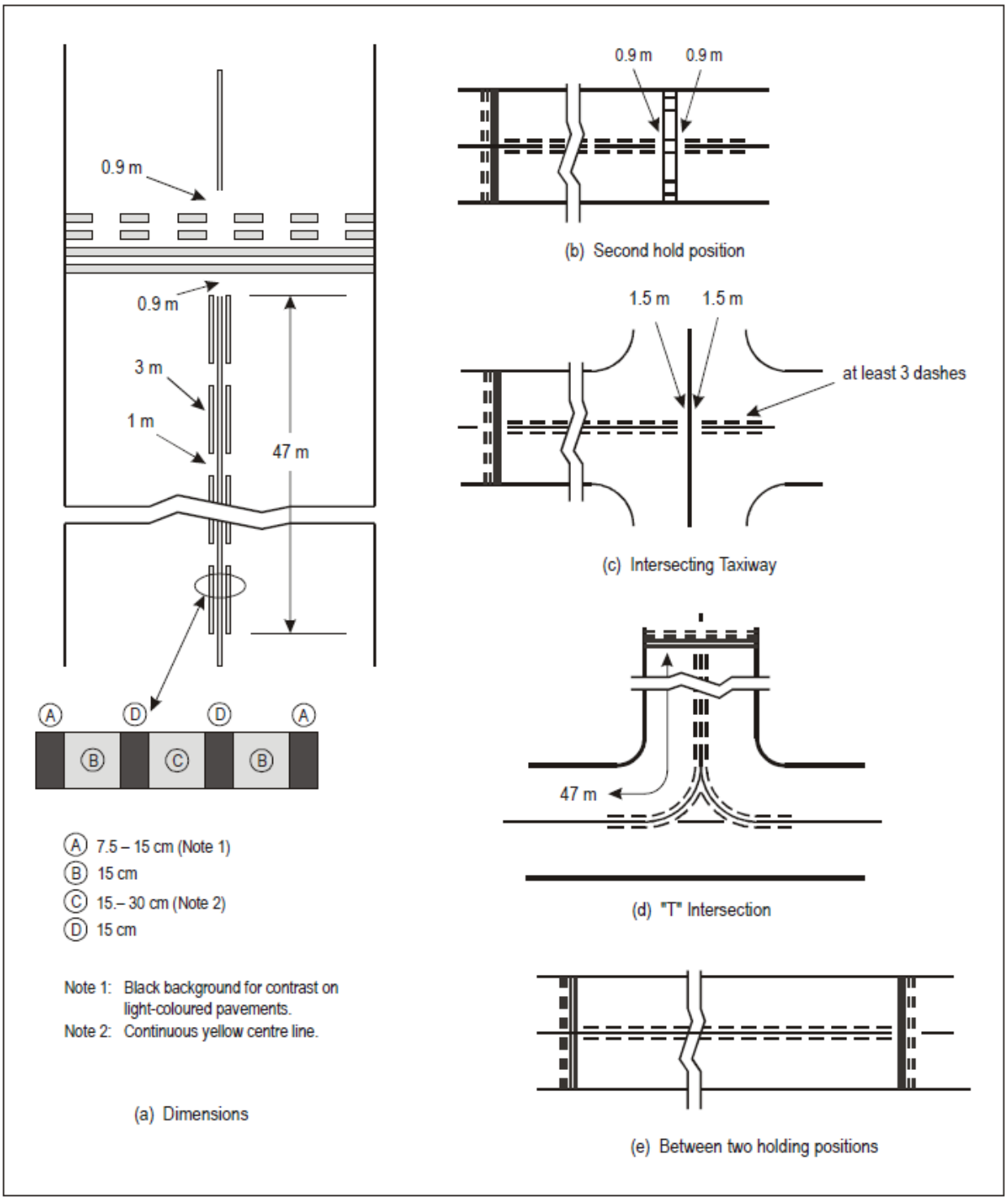


Figure L-6. Enhanced taxiway centre line marking

Amend CS ADR-DSN.L.575 as follows:

CS ADR-DSN.L.575 Runway-holding position marking

A runway-holding position marking should be displayed along a runway-holding position.

(a) Characteristics:

(...)

(2) Where a single runway-holding position is provided at an intersection of a taxiway and a precision approach ~~c~~Category I, II or III runway, the runway-holding position marking should be as shown in Figure L-5, pattern A.

(...)

(6) Where a pattern B runway-holding position marking is located on an area where it would exceed 60 m in length, a mandatory instruction marking containing the term 'CAT II' or 'CAT III' as appropriate should 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 should be not less than 1.8 m high and should be placed not more than 0.9 m on the holding side of ~~beyond~~ the runway holding-position marking.

(...)

Amend CS ADR-DSN.L.580 as follows:

CS ADR-DSN.L.580 Intermediate holding position marking

(...)

(b) Location:

(...)

(2) 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 should not be less than the dimension specified in the table below.

Code letter	**Distance (metres)**
A	15.5 ~~16.25~~
B	20 ~~21.5~~
C	26
D	37 ~~40.5~~
E	43.5 ~~47.5~~
F	51 ~~57.5~~

(...)

Amend CS ADR-DSN.L.585 as follows:

CS ADR-DSN.L.585 VOR aerodrome checkpoint marking

(a) Applicability: When a VOR aerodrome check-point is established, it should be indicated by a VOR aerodrome check-point marking and sign.

(...)

Insert new CS ADR-DSN.L.597 as follows:

CS ADR-DSN.L.597 Apron service road marking

(a) Applicability: The limits of an apron service road, should be defined by apron service road markings.

(b) Location: Apron service road markings should define the areas intended for use by ground vehicles and other aircraft servicing equipment to provide safe separation from aircraft.

(c) Characteristics:

(1) Apron service road markings should be white.

(2) Apron service road markings should be continuous in length on the edges, continuous or broken in the middle, as appropriate, and at least 10 cm in width.

(3) When an apron service road crosses a taxiway or aircraft stand taxilane, the apron service road edge marking should be laterally dashed along the crossing. The stripes should be 1.0 m in length, and their width should be equal to the width of the continuous part of the marking.

(d) Apron service road markings should be discontinued when they intersect with other markings on an apron. The discontinuation should be not more than 1 m on each side from the edge of the interested marking.

Amend CS ADR-DSN.L.600 as follows:

CS ADR-DSN.L.600 Road-holding position marking

(a) Applicability: A road-holding position marking should be provided at all road entrances or intersections to a runway or a taxiway.

(...)

(c) Characteristics:

(1) The road-holding position marking should be in accordance with the local road traffic regulations.

(2) The road-holding position marking at the intersection of a road with a taxiway should be in accordance with the local ~~road~~ traffic regulations for a yield right-of-way or mandatory stop.

Amend CS ADR-DSN.L.605 as follows:

CS ADR-DSN.L.605 Mandatory instruction marking

(...)

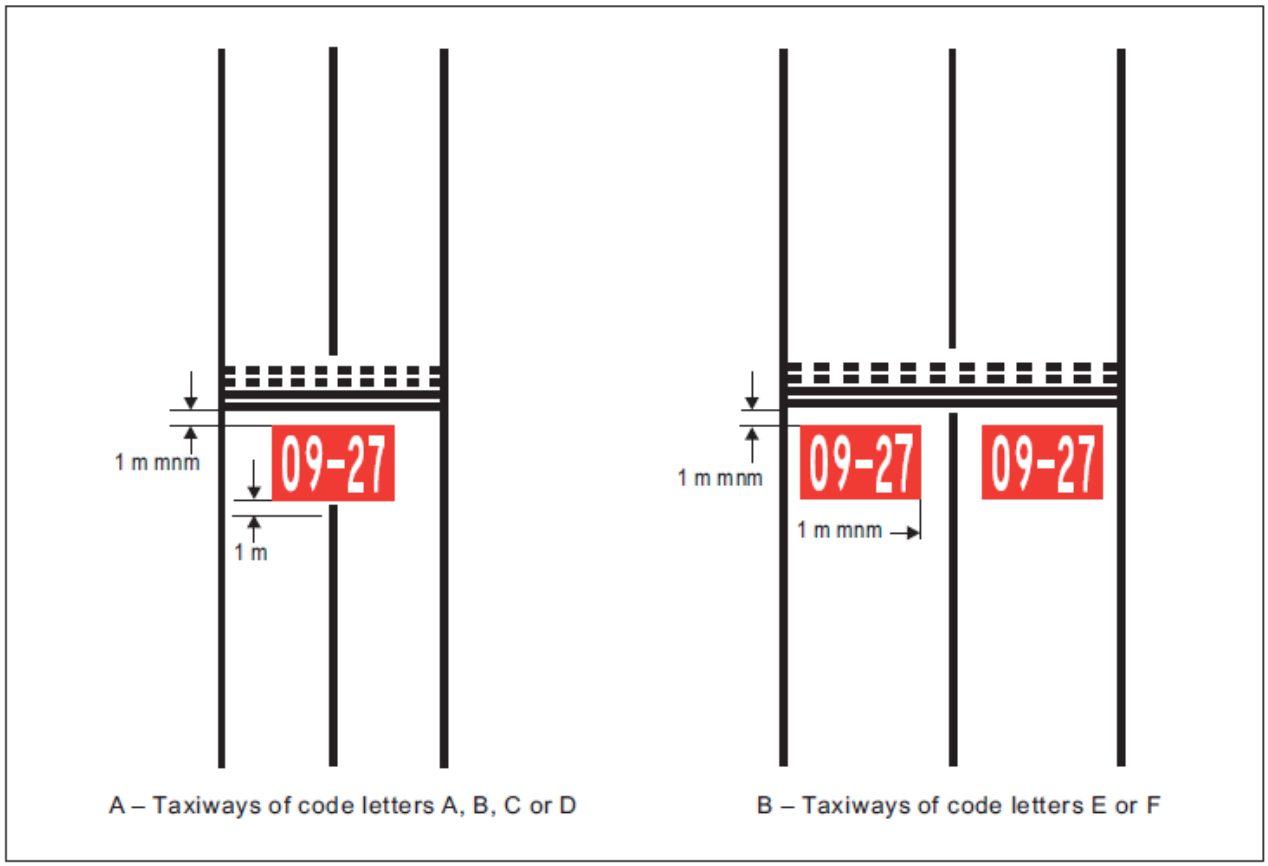
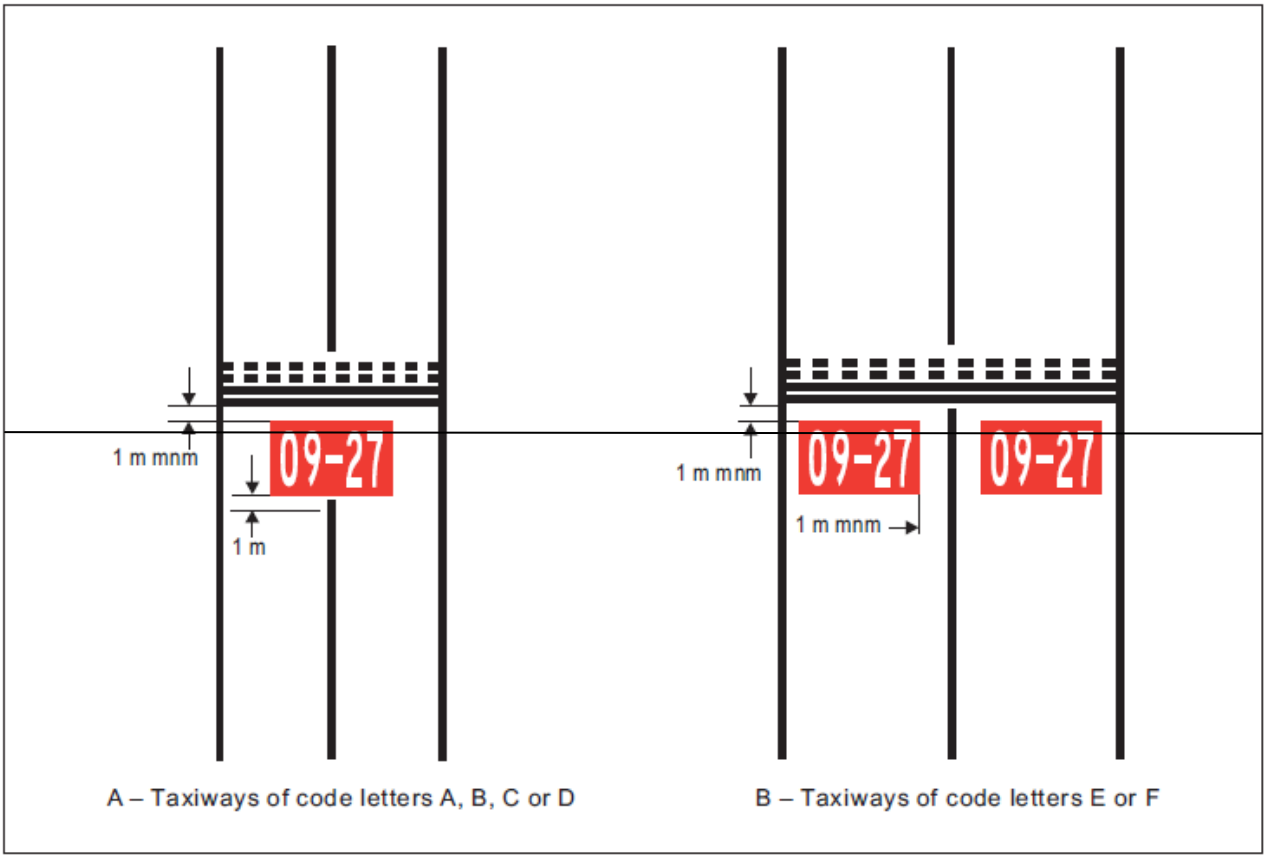


Figure L-9. Mandatory instruction marking

Amend CS ADR-DSN.L.610 as follows:

CS ADR-DSN.L.610 Information marking

(...)



~~Figure L 9. Mandatory instruction marking~~

Delete SECTION 1 as follows:

~~**SECTION 1 – APPROACH LIGHTING SYSTEM**~~

Amend CS ADR-DSN.M.625 as follows:

CS ADR-DSN.M.625 Approach lighting systems~~, general and applicability~~

(a) The safety objective of the approach lighting system is to provide ~~visual guidance for~~ alignment and roll guidance, and limited distance-to-go information to enable safe approach to a runway.

(b) Non-instrument runway

Applicability: Where physically practicable, a simple approach lighting system as specified in CS ADR-DSN.M.626 should be provided to serve a non-instrument 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.

(c) Non-precision approach runway

Applicability: Where physically practicable, a simple approach lighting system specified in CS ADR-DSN.M.626 should 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.

(d) Precision approach runway ~~c~~Category I

Applicability: Where physically practicable, a precision approach ~~c~~Category I lighting system as specified in CS ADR-DSN.M.630 should be provided to serve a precision approach runway ~~c~~Category I.

(e) Precision approach runway ~~c~~Categories II and III

Applicability: A precision approach ~~c~~Category II and III lighting system as specified in CS ADR-DSN.M.635 should be provided to serve a precision approach runway ~~c~~Category II or III.

Amend CS ADR-DSN.M.626 as follows:

CS ADR-DSN.M.626 Simple approach lighting systems

(a) Location and composition:

(i) A simple approach lighting system should 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 (see Figure M-1).

(ii) The certification specifications, as prescribed in Book 1 provide for the basic characteristics for simple approach lighting systems. For certain aspects of these systems, some latitude is permitted, for example, in the spacing between centre line lights and crossbar~~s~~.

(...)

Amend CS ADR-DSN.M.630 as follows:

CS ADR-DSN.M.630 Precision approach ~~c~~Category I lighting system

(a) The safety objective of the approach lighting system is to provide ~~visual guidance for~~ alignment and roll guidance, and limited distance-to-go information to enable safe approach to a runway.

(b) Location and composition

(1) General: A precision approach ~~c~~Category I lighting system should 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 (see Figure M-2).

(...)

(c) Characteristics:

(1) The centre line and crossbar lights of a precision approach ~~c~~Category I lighting system should be fixed lights showing variable white. Each centre line light position should consist of either:

(...)

(3) If the centre line consists of lights as described in paragraph ~~M.630~~(c)(1)(i) or ~~M.630~~(c)(2)(i) above, additional crossbars of lights to the crossbar provided at 300 m from the threshold should be provided at 150 m, 450 m, 600 m and 750 m from the threshold. The lights forming each

crossbar should 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 should be spaced so as to produce a linear effect, except that gaps may be left on each side of the centre line. These gaps should be kept to a minimum to meet local requirements and each should not exceed 6 m.

(...)

(5) The ~~chromaticity and~~ characteristics of lights should be in accordance with the specifications in ~~CS ADR-DSN.U.930 and~~ CS ADR-DSN.U.940, Figure U-5. The chromaticity of lights should be in accordance with the specifications in CS ADR-DSN.U.930 and Figure U-1.

(6) If the centre line consists of barrettes as described in paragraph ~~M.630~~(c)(1)(ii) or ~~M.630~~(c)(2)(ii) above, each barrette should 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.

(7) Each capacitor discharge light as described in paragraph ~~M.630~~(c)(6) should 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 should be such that these lights can be operated independently of the other lights of the approach lighting system.

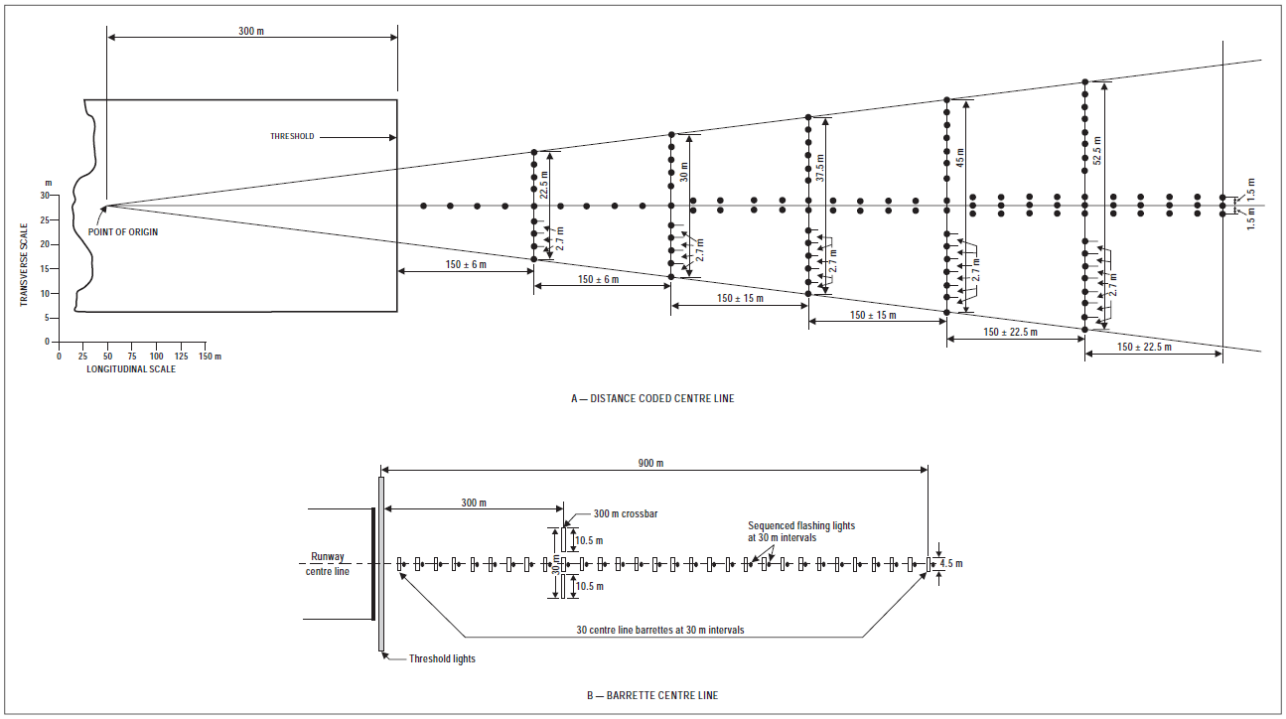


Figure M-2. Precision approach ~~c~~Category I lighting systems

Amend CS ADR-DSN.M.635 as follows:

CS ADR-DSN.M.635 Precision approach ~~c~~Category II and III lighting system

(a) Location and composition:

(...)

(6) If the centre line beyond a distance of 300 m from the threshold consists of lights as described in paragraphs ~~M.635~~(b)(2)(ii) and ~~M.635~~(b)(3~~2~~)(ii) below, additional crossbars of lights should be provided at 450 m, 600 m and 750 m from the threshold. Where such additional crossbars are incorporated in the system, the outer ends of these crossbars should 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.

(...)

(b) Characteristics:

(1) The centre line of a precision approach ~~c~~Category II and III lighting system for the first 300 m from the threshold should 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 in CS ADR.DSN.S.895 can be demonstrated, the centre line of a precision approach ~~c~~Category II and III lighting system for the first 300 m from the threshold may consist of:

(i) barrettes where the centre line beyond 300 m from the threshold consists of barrettes as described in paragraph ~~M.635~~(b)(3)(i) below; or

(ii) 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 ~~M.635~~(b)(3)(ii) below, with the innermost single light source located 30 m and the innermost barrette located 60 m from the threshold; or

(iii) single light sources where the threshold is displaced 300 m or more;

all of which should show variable white.

(...)

(5) If the centre line beyond 300 m from the threshold consists of barrettes as described in paragraphs ~~M.635~~(b)(2)(i) and ~~M.635~~(b)(3)(i), each barrette beyond 300 m should 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.

(...)

(10) The characteristics of lights should be in accordance with the specifications in CS ADR-DSN.U.940, Figures U-5 ~~and~~ or U-6, as appropriate.

(11) The chromaticity of lights should be in accordance with the specifications in CS ADR-DSN.U.930 and Figure U-1.

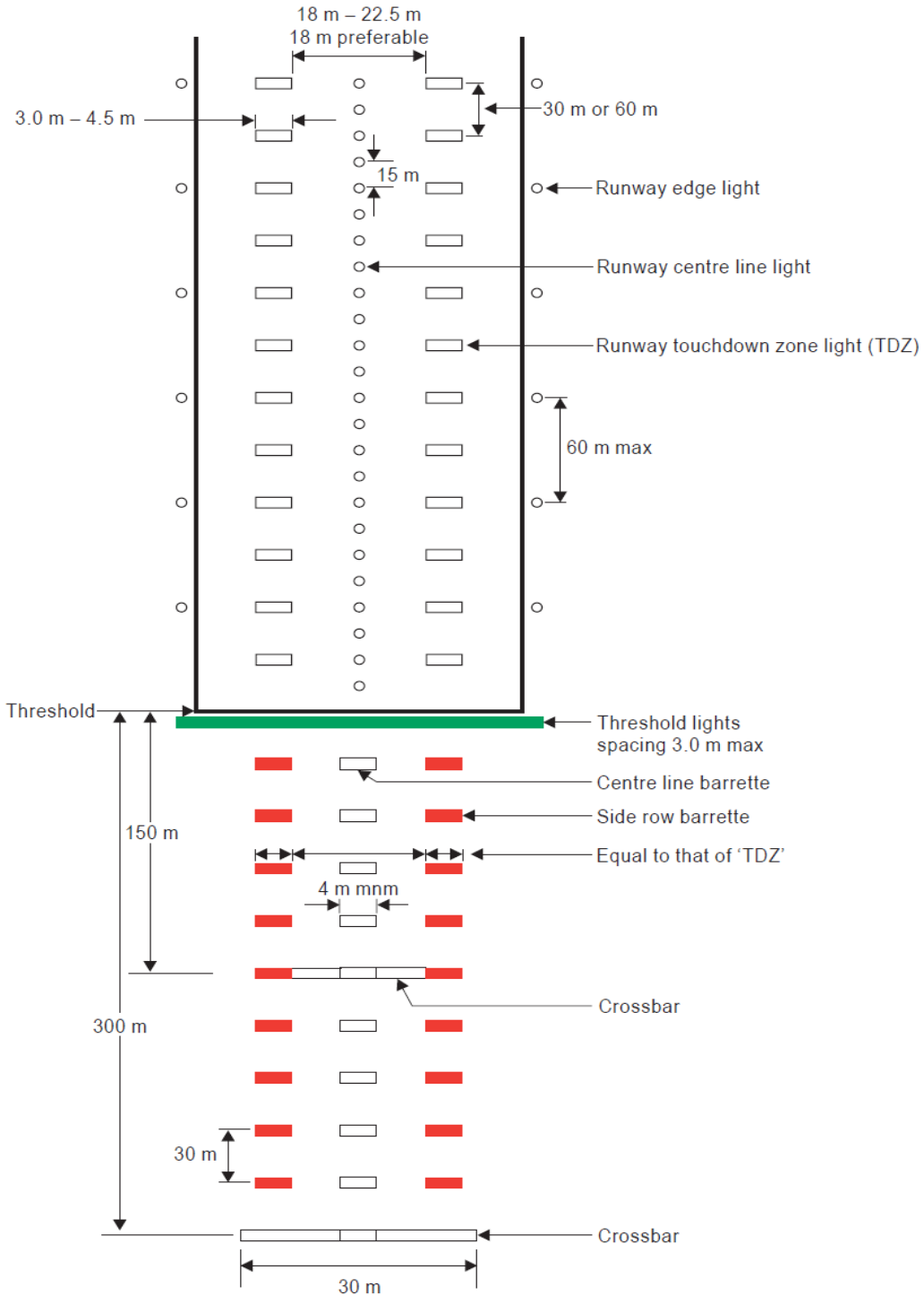


Figure M-3A. Inner 300 m approach and runway lighting for precision approach runways, ~~c~~Categories II and III

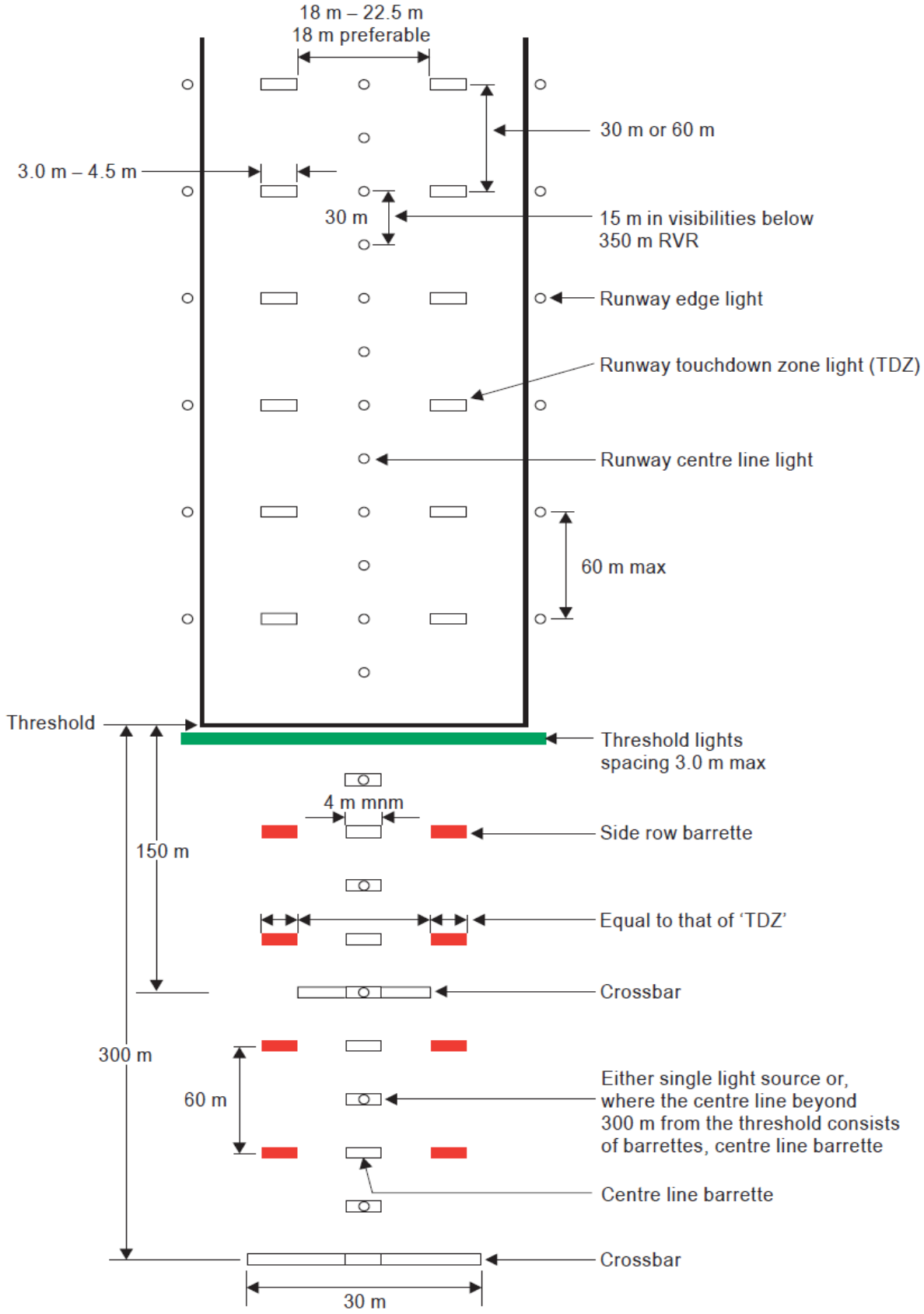


Figure M-3B. Inner 300 m approach and runway lighting for precision approach runways, ~~c~~Categories II and III where the serviceability levels of the lights specified as maintenance objectives in CS ADR-DSN.S.895 can be demonstrated

Delete SECTION 2 as follows:

~~**SECTION 2 – VISUAL APPROACH SLOPE INDICATOR SYSTEM**~~

Amend CS ADR-DSN.M.645 as follows:

CS ADR-DSN.M.645 Precision approach path indicator and Abbreviated precision approach path indicator (PAPI and APAPI)

(a) A PAPI or APAPI should be in accordance with the specifications provided ~~as prescribed~~ in paragraphs CS ADR-DSN.M.645 to CS ADR-DSN.M.655.~~M.645 — M.655.Section 2 — Visual approach slope indicator systems.~~

(b) Definition and positioning:

(1) The PAPI system should consist of a wing bar of four ~~4~~ sharp transition multi-lamp (or paired single lamp) units equally spaced. ~~and t~~The APAPI system should~~all~~ consist of a wing bar of two~~2~~ sharp transition multi-lamp (or paired single lamp) units. The PAPI and APAPI system should be located on the left side of the runway unless it is physically impracticable to do so. 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 for PAPI or APAPI.

~~(1) The APAPI system should consist of a wing bar of two2 sharp transition multi-lamp (or paired single lamp) units. The system should be located on the left side of the runway unless it is physically impracticable to do so.~~

(...)

(c) Characteristics:

(...)

(2) Colour:

(i) The colour transition from red to white in the vertical plane should be such as to appear to an observer, at a distance of not less than 300 m, to occur within a vertical angle of not more than 3´.

(ii) At full intensity, the chromaticity of lights units should be in accordance with the specifications in CS ADR-DSN.U.930 and Figure U-1, and the red light should have a Y coordinate not exceeding 0.320.

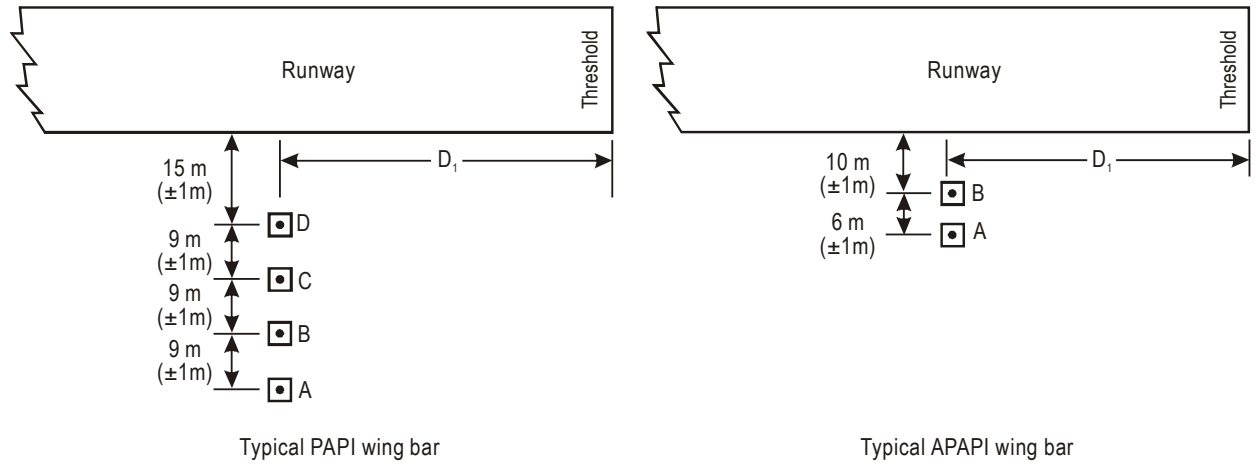
(3) Intensity:

(i) The light intensity distribution of the light units should be as shown in CS ADR-DSN.U.940, Figure U-26.

(ii) Suitable intensity control should be provided so as to allow adjustment to meet the prevailing conditions and to avoid dazzling the pilot during approach and landing.

(...)

[Editorial Note: Insert new Figure M-4]



INSTALLATION TOLERANCES

a) Where a PAPI or APAPI is installed on a runway not equipped with an ILS or MLS, the distance D_1 should be calculated to ensure that the lowest height at which a pilot will see a correct approach path indication (Figure M-5, angle B for a PAPI and angle A for an APAPI) provides the wheel clearance over the threshold specified in Table M-1 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 D_1 should 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 should 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 eye-to-antenna heights of the aeroplanes concerned. The correction factor is obtained by multiplying the average eye-to-antenna height of those aeroplanes by the cotangent of the approach angle. However, the distance should be such that in no case will the wheel clearance over the threshold be lower than that specified in column (3) of Table M-1.

Note: See CS ADR-DSN.L.540 for specifications on aiming point marking. Further guidance on the harmonisation of PAPI, ILS and/or MLS signals is contained in ICAO Doc 9157, Aerodrome Design Manual, Part 4, Visual Aids.

c) If a wheel clearance, greater than that specified in a) above is required for specific aircraft, this can be achieved by increasing D_1.

d) Distance D_1 should 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 per cent can be accepted provided it is uniformly applied across the units.

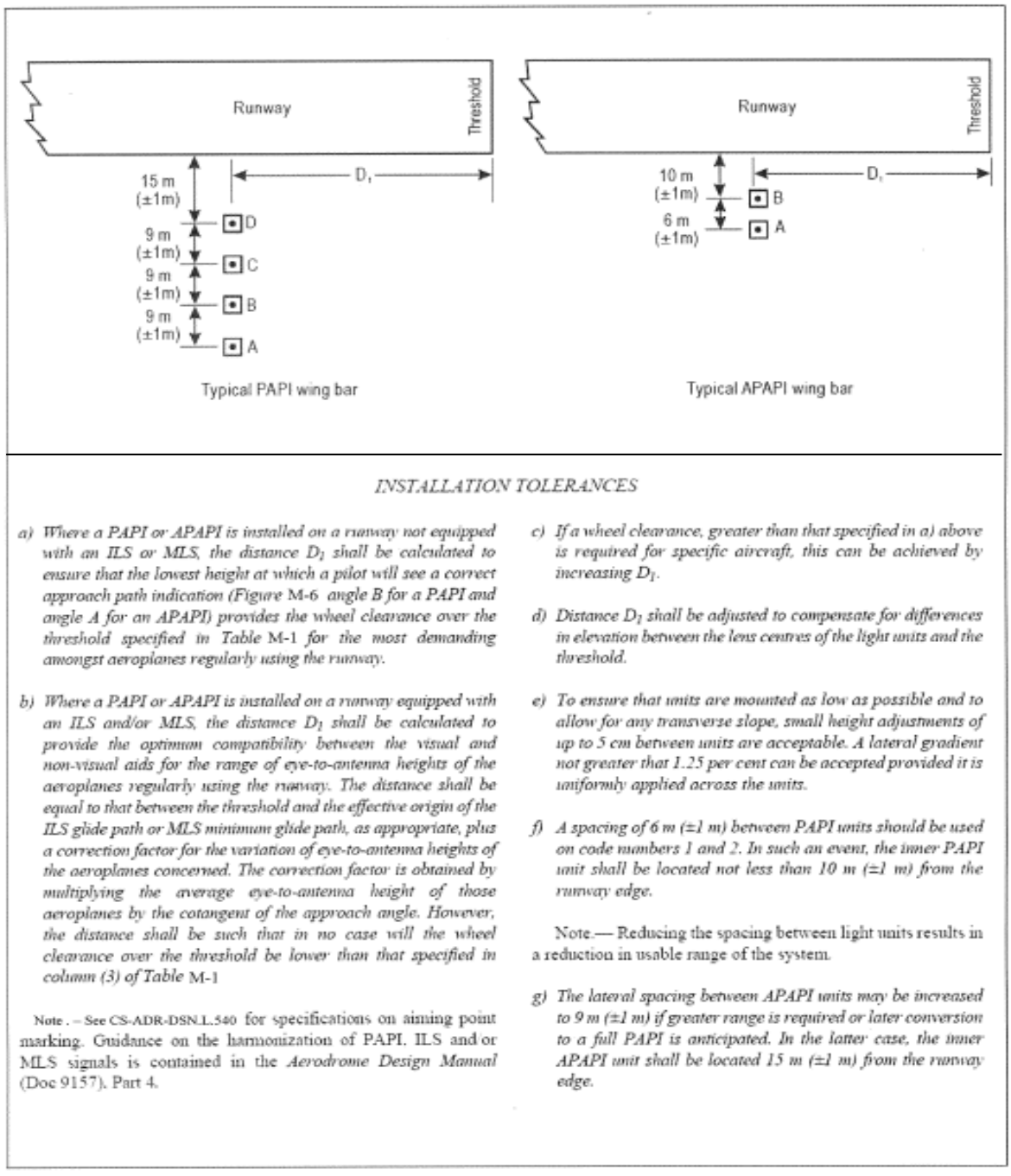
f) A spacing of 6 m (±1 m) between PAPI units should be used on code numbers 1 and 2. In such an event, the inner PAPI unit should be located not less than 10 m (±1 m) from the runway edge.

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 should be located 15 m (±1 m) from the runway edge.

Figure M-4. Siting of PAPI and APAPI

[Editorial Note: Remove existing Figure M-4]



INSTALLATION TOLERANCES

a) Where a PAPI or APAPI is installed on a runway not equipped with an ILS or MLS, the distance D_1 shall be calculated to ensure that the lowest height at which a pilot will see a correct approach path indication (Figure M-6 angle B for a PAPI and angle A for an APAPI) provides the wheel clearance over the threshold specified in Table M-1 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 D_1 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 eye-to-antenna heights of the aeroplanes concerned. The correction factor is obtained by multiplying the average eye-to-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 M-1

Note . – See CS-ADR-DSN.L.540 for specifications on aiming point marking. Guidance on the harmonization of PAPI. ILS and/or MLS signals is contained in the *Aerodrome Design Manual* (Doc 9157), Part 4.

c) If a wheel clearance, greater than that specified in a) above is required for specific aircraft, this can be achieved by increasing D_1.

d) Distance D_1 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 that 1.25 per cent can be accepted provided it is uniformly applied across the units.

f) A spacing of 6 m (±1 m) between PAPI units should 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 M-4. Siting of PAPI and APAPI~~

Amend CS ADR-DSN.M.650 as follows:

CS ADR-DSN.M.650 Approach slope and elevation setting of light units for PAPI and APAPI

(a) Approach slope:

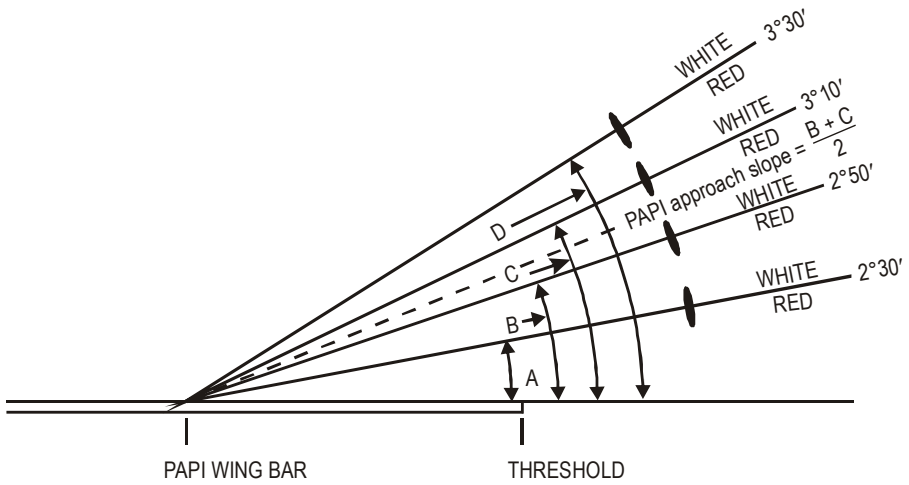
(1) The approach slope as defined in Figure M-5, should be so designed to be appropriate for used by the aeroplanes in the approach.

(2) When the runway is equipped with an ILS and/or MLS, the siting and the angle of elevation of the light units should 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.

(3) The azimuth spread of the light beam should 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 safety assessment indicates that the object could adversely affect the safety of operations. The extent of the restriction should be such that the object remains outside the confines of the light beam.

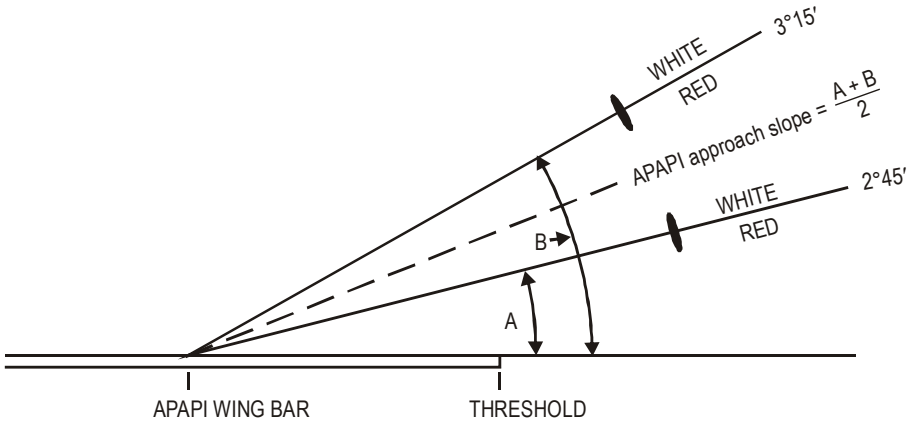
(...)

[Editorial Note: Insert new Figure M-5]



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′.

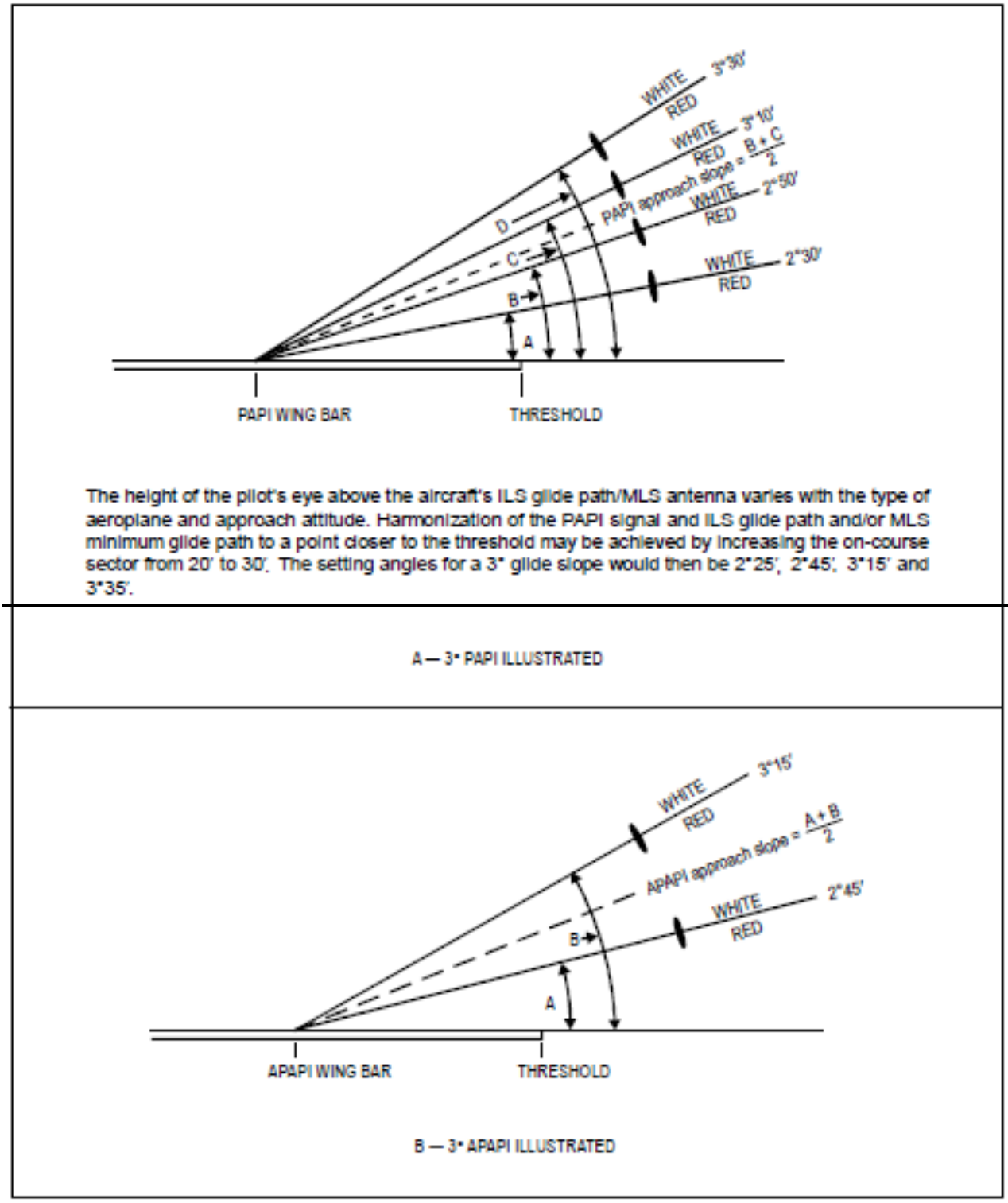
A — 3° PAPI ILLUSTRATED



B — 3° APAPI ILLUSTRATED

Figure M-5. Light beams and angle of elevation setting of PAPI and APAPI

[Editorial Note: Remove exiting Figure M-5]



~~Figure M-5. Light beams and angle of elevation setting of PAPI and APAPI~~

Amend CS ADR-DSN.M.655 as follows:

CS ADR-DSN.M.655 Obstacle protection surface for PAPI and APAPI

(...)

(c) New objects or extensions of existing objects should not be permitted above an obstacle protection surface except when the new object or extension would be shielded by an existing immovable object, or if after a safety assessment, it is determined that the object would not adversely affect the safety of operations of aeroplanes.

(d) Where ~~an~~ safety assessment 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 should be taken:

(...)

(...)

Amend CS ADR-DSN.M.660 as follows:

CS ADR-DSN.M.660 Circling guidance lights

(a) Applicability: Circling guidance lights should 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 ~~that are~~ intending to carry out circling approaches.

(...)

Delete SECTION 3 as follows:

~~**SECTION 3 – RUNWAY&TAXIWAY LIGHTS**~~

Amend CS ADR-DSN.M.675 as follows:

CS ADR-DSN.M.675 Runway edge lights

(...)

(d) In all angles of azimuth, as prescribed in paragraph (c)(2) above, runway edge lights should show at angles up to 15° above the horizontal with 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 should 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.

(e) Runway edge lights characteristics on a precision approach runway should be in accordance with the specifications in CS ADR-DSN.U.940, Figure U-13 or Figure U-14, as appropriate.

(f) The chromaticity of lights should be in accordance with the specifications in CS ADR-DSN.U.930 and in Figure U-1.

Amend CS ADR-DSN.M.680 as follows:

CS ADR-DSN.M.680 Runway threshold and wing bar lights

(...)

(b) Location and positioning of runway threshold:

(...)

(3) Threshold lighting should consist of:

(i) on a non-instrument or non-precision approach runway, at least six lights;

(ii) on a precision approach runway ~~c~~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

(iii) on a precision approach runway ~~c~~Category II or III, lights uniformly spaced between the rows of runway edge lights at intervals of not more than 3 m.

(4) The lights prescribed in paragraphs (b)(3)(i) and (b)(3)(ii) above should be either:

(i) equally spaced between the rows of runway edge lights, or

(ii) 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.

(...)

(e) Characteristics of runway threshold and wing bar lights:

(1) Runway threshold and wing bar lights should be fixed unidirectional lights showing green in the direction of approach to the runway. The intensity and beam spread of the lights should be adequate for the conditions of visibility and ambient light in which use of the runway is intended.

(2) Runway threshold lights on a precision approach runway should be in accordance with the specifications in CS ADR-DSN.U.940, Figure U-7.

(3) Threshold wing bar lights on a precision approach runway should be in accordance with the specifications in CS ADR-DSN.U.940, Figure U-8.

(4) The chromaticity of lights should be in accordance with the specifications in CS ADR-DSN.U.930 and Figure U-1.

Amend CS ADR-DSN.M.685 as follows:

CS ADR-DSN.M.685 Runway end lights

(...)

(b) Location and positioning:

(...)

(3) For a precision approach runway ~~c~~Category III, the spacing between runway end lights, except between the two innermost lights if a gap is used, should not exceed 6 m.

(c) Characteristics of runway end lights:

(1) Runway end lights should be fixed unidirectional lights showing red in the direction of the runway. The intensity and beam spread of the lights should be adequate for the conditions of visibility and ambient light in which use of the runway is intended.

(2) Runway end lights characteristics on a precision approach runway should be in accordance with the ~~chromaticity and characteristics~~ specifications in ~~CS ADR-DSN.U.930 and~~ CS ADR-DSN.U.940, Figure U-12.

(3) Runway end lights on a precision approach runway should be in accordance with the chromaticity specifications in CS ADR-DSN.U.930 and Figure U-1.

Amend CS ADR-DSN.M.690 as follows:

CS ADR-DSN.M.690 Runway centre line lights

(...)

(b) Applicability:

(1) Runway centre line lights should be provided on a precision approach runway ~~c~~Category II or III.

(2) Runway centre line lights should 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.

(...)

(d) Characteristics:

(1) Runway centre line lights should 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 should extend from the midpoint of the runway usable for landing to 300 m from the runway end.

(2) Runway centre line lights characteristics should be in accordance with the specifications in~~CS ADR-DSN.U.930 and~~ CS ADR-DSN.U.940, Figure U-10 or Figure U-11, as appropriate.

(3) Runway centre line lights chromaticity should be in accordance with the specifications in CS ADR-DSN.U.930 and Figure U-1.

(e) Centre line guidance for take-off from the beginning of a runway to a displaced threshold should be provided by:

(1) 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

(2) runway centre line lights; or

(3) barrettes of at least 3 m length, and spaced at uniform intervals of 30 m, as shown in Figure M-8, 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.

Where necessary, provision should be made to extinguish those centre line lights, as prescribed in paragraph (2) above or reset the intensity of the approach lighting system or barrettes when the runway is being used for landing. In no case should only the single source runway centre line lights show from the beginning of the runway to a displaced threshold when the runway is being used for landing.

Amend CS ADR-DSN.M.695 as follows:

CS ADR-DSN.M.695 Runway touchdown zone lights

(a) Applicability: Touchdown zone lights should be provided in the touchdown zone of a precision approach runway ~~c~~Category II or III.

(...)

(c) Characteristics:

(1) A barrette should be composed of at least three lights with spacing between the lights of not more than 1.5 m.

(2) A barrette should be not less than 3 m or more than 4.5 m in length.

(3) Touchdown zone lights should be fixed unidirectional lights showing variable white.

(4) Touchdown zone lights characteristics should be in accordance with the ~~chromaticity and characteristics~~ specifications in ~~in CS ADR-DSN.U.930 and~~ CS ADR-DSN.U.940, Figure U-9.

(5) Touchdown zone lights chromaticity should be in accordance with the specifications in CS ADR-DSN.U.930 and Figure U-1.

Insert new CS ADR-DSN.M.696 as follows:

CS ADR-DSN.M.696 Simple touchdown zone lights

(a) 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.

(b) Applicability: Except where touchdown zone lights are provided in accordance with CS ADR-DSN.M.695, at a runway 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 should be provided.

(c) Location and positioning:

(1) Simple touchdown zone lights should be a pair of lights located on each side of the runway centre line 0.3 metres beyond the upwind edge of the final touchdown zone marking.

(2) The lateral spacing between the inner lights of the two pairs of lights should be equal to the lateral spacing selected for the touchdown zone marking.

(3) The spacing between the lights of the same pair should not be more than 1.5 m or half the width of the touchdown zone marking, whichever is greater (see Figure M-8(C)).

(4) Where provided on a runway without touchdown zone markings, simple touchdown zone lights should be installed in such a position that provides the equivalent touchdown zone information.

(d) Characteristics:

(1) Simple touchdown zone lights should be fixed unidirectional lights showing variable white and aligned so as to be visible to the pilot of a landing aeroplane in the direction of approach to the runway.

(2) Simple touchdown zone lights characteristics should be in accordance with the specifications in CS ADR-DSN.U.940, Figure U-9.

(3) Simple touchdown zone lights chromaticity should be in accordance with the specifications in CS ADR-DSN.U.930 and Figure U-1.

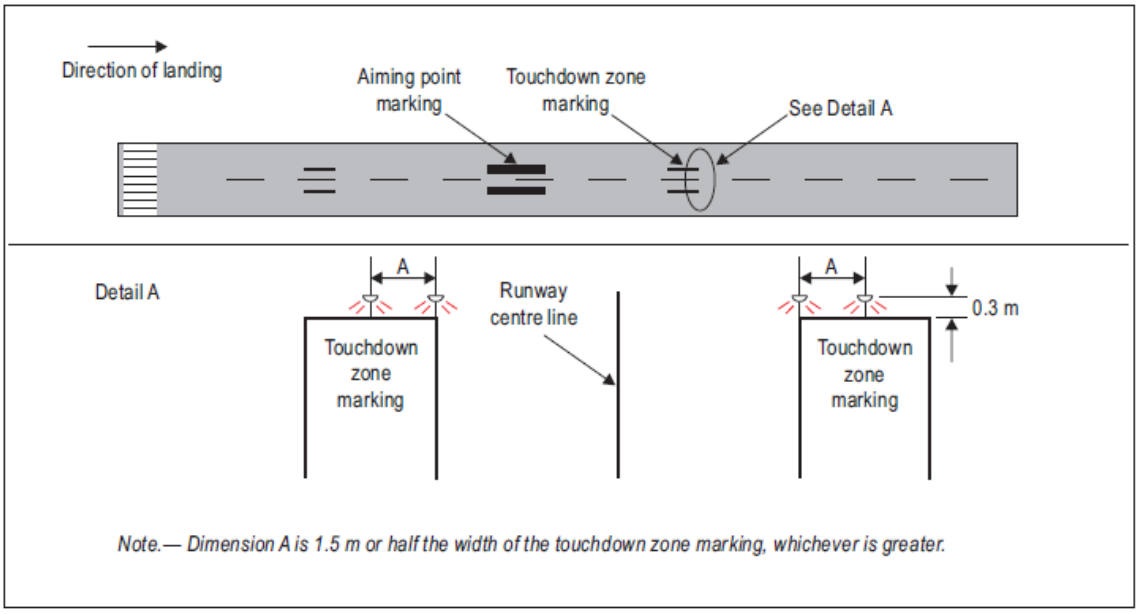


Figure M-8(C). Simple touchdown zone lighting

Amend CS ADR-DSN.M.700 as follows:

CS ADR-DSN.M.700 Rapid exit taxiway indicator lights

intentionally left blank

Amend CS ADR-DSN.M.705 as follows:

CS ADR-DSN.M.705 Stopway lights

(a) Applicability ~~and purpose~~: Stopway lights should be provided for a stopway intended for use at night.

(b) Location:

(1) Stopway lights should be placed along the full length of the stopway and should be in two parallel rows that are equidistant from the centre line and coincident with the rows of the runway edge lights. The spacing between the lights should be in accordance with CS ADR-DSN.M.675((b)(4). Stopway lights placed along the edge of the stopway should consist of at least one pair of lights.

(2) At least four uni-directional stopway lights equally spaced across the width of the ~~S~~stopway should ~~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.

(c) Characteristics:

(1) Stopway lights should be fixed unidirectional lights showing red in the direction of the runway.

(2) Stopway lights chromaticity should be in accordance with the specifications in CS ADR-DSN.U.93~~4~~0 and Figure U-1.

Amend CS ADR-DSN.M.710 as follows:

CS ADR-DSN.M.710 Taxiway centre line lights

(...)

(b) Applicability:

(1) Taxiway centre line lights should be provided on an exit taxiway, taxiway, de-icing/anti-icing facility, 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.

(2) Taxiway centre line lights should 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.

(3) Taxiway centre line lights should 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.

(4) Taxiway centre line lights should 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.

(...)

(c) Characteristics:

(1) Except as provided for in paragraph (c)(3) below, ~~T~~taxiway centre line lights on a taxiway other than an exit taxiway and on a runway forming part of a standard taxi-route should 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.

(2) Taxiway centre line lights on an exit taxiway should be fixed lights. Alternate taxiway centre line lights should 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 should show green, as shown in Figure M-10. The first light in the exit centre line should always show green and ~~T~~the light nearest to the perimeter should always show yellow.

~~Where aircraft follow the same centre line in both directions, the centre line lights should show green to aircraft approaching the runway.~~

(3) Where necessary to denote the proximity to a runway, taxiway centre line lights should 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:

(i) their end point near the runway centre line; or

(ii) 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.

(4) Taxiway centre line lights should be in accordance with the specifications in CS ADR-DSN.U.940, Figure U-16, U-17, or U-18, as appropriate, for taxiways intended for use in runway visual range conditions of less than a value of 350 m; Figure U-19 or Figure U-20, as appropriate, for other taxiways.

(5) Where higher intensities are required, from an operational point of view, taxiway centre line lights on rapid exit taxiways intended for use in runway visual range conditions less than a value of 350 m should be in accordance with the specifications in CS ADR-DSN.U.940, Figure U-16. The number of levels of brilliancy settings for these lights should be the same as that for the runway centre line lights.

(6) 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 should be in accordance with the specifications in CS ADR-DSN.U.940, Figure U-21, U-22, or U-23, as appropriate.

(7) High intensity centre line lights should only be used in case of an absolute necessity and following a specific study.

(8) Taxiway centre line lights chromaticity should be in accordance with the specifications in CS ADR-DSN.U.930 and Figure U1.

(...)

Amend CS ADR-DSN.M.715 as follows:

CS ADR-DSN.M.715 Taxiway centre line lights on taxiways, runways, rapid exit taxiways, or on other exit taxiways

(...)

(b) Taxiway centre line lights on taxiways:

(...)

(3) On a taxiway curve the spacing of taxiway centre line lights should be as specified in the Table M-3. ~~intended for use in RVR conditions of less than a value of 350 m, the lights on a curve should not exceed spacing of 15 m, and on a curve of less than 400 m radius the lights should be spaced at intervals of not greater than 7.5 m. This spacing should extend for 60 m before and after the curve.~~

RVR	Radius of taxiway curve	Taxiway centre line lights spacing on taxiway curves
< 350 m	< 400 m	Not greater than7.5 m. This spacing should extend for 60 m before and after the curve.
	≥ 400 m	Not greater than 15 m
≥ 350 m	< 400 m	Not greater than 7.5 m
	401 m to 899 m	Not greater than 15 m
	> 900 m	Not greater than 30 m

Table M-3. Taxiway centre line lights spacing on taxiway curves

(c) Taxiway centre line lights on other exit taxiways:

(1) Taxiway centre line lights on exit taxiways other than rapid exit taxiways should 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 should be at least 60 cm from any row of runway centre line lights, as shown in Figure M-9.~~Arrangement of runway threshold and runway end lights~~.

(...)

(f) Positioning of taxiway centre line lights on taxiway:

~~(i)~~ The spacing on a particular section of taxiway centre line lighting (straight or curved section) should be such that a clear indication of the taxiway centre line is provided, particularly on a curved section.

~~(ii) Where a taxiway is only intended for use in RVR conditions of 350 m or greater, the spacing of taxiway centre line lights on curves should not exceed the table below:~~

~~Curve radius Light spacing~~

~~up to 400 m 7.5 m~~

~~401 m to 899 m 15 m~~

~~900 m or greater 30 m~~

(...)

Amend CS ADR-DSN.M.720 as follows:

CS ADR-DSN.M.720 Taxiway edge lights

(...)

(c) Characteristics:

(...)

(4) Taxiway edge lights chromaticity should be in accordance with the specifications in CS ADR-DSN.U.930 and Figure U-1.

Amend CS ADR-DSN.M.725 as follows:

CS ADR-DSN.M.725 Runway turn pad lights

(a) The safety objective of runway turn pad lights is to provide additional guidance on a runway turn pad ~~intended for use in reduced visibility conditions and at night~~ to enable an aeroplane to complete a safe 180-degree turn, and align with the runway centre line.

(b) Applicability:

(1) Runway turn pad lights should 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.

(2) Runway turn pad lights should be provided on a runway turn pad intended for use at night, except that these lights need not be provided where taxiway edge lights and runway turn pad marking provide adequate guidance.

(...)

(d) Characteristics:

(1) Runway turn pad lights should 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.

(2) Runway turn pad lights should be in accordance with the specifications in CS ADR-DSN.U.940, Figure U-17 ~~and~~ or Figure U-18, as appropriate.

(3) Runway turn pad lights chromaticity should be in accordance with the specifications in CS ADR-DSN.U.930 and Figure U-1.

Amend CS ADR-DSN.M.730 as follows:

CS ADR-DSN.M.730 Stop bars ~~lights~~

(a) Applicability:

(1) A stop bar should be provided at every runway-holding position serving a runway when it is intended that the runway should be used in runway visual range conditions less than a value of 550 m, except where:

(i) appropriate aids and procedures are available to assist in preventing inadvertent incursions of ~~aircraft and vehicles~~ traffic onto the runway; or

(ii) operational procedures exist to limit, in runway visual range conditions less than a value of 550 m, the number of:

(A) aircraft on the manoeuvring area to one at a time; and

(B) vehicles on the manoeuvring area to the essential minimum.

(2) Where there is more than one stop bar associated with a taxiway/runway intersection, only one should be illuminated at any given time.

(3)~~(2)~~ A stop bar should be provided at an intermediate holding position when it is desired to supplement markings with lights, and to provide traffic control by visual means.

(...)

(c) Characteristics:

(1) Stop bars should consist of lights spaced at uniform intervals of not more than 3 m across the taxiway, showing red in the intended direction(s) of approach to the intersection or runway-holding position.

(2) Stop bars installed at a runway-holding position should be unidirectional, and should show red in the direction of approach to the runway.

~~(3) Selectively switchable stop bars should be installed in conjunction with at least three taxiway centre line lights (extending for a distance of at least 90 m from the stop bar) in the direction that it is intended for an aircraft to proceed from the stop bar.~~

(3) The intensity in red light and beam spreads of stop bar lights should be in accordance with the specifications in CS ADR-DSN.U.940, Figures U-16 to U-20, as appropriate.

(4) 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 should be in accordance with the specifications in CS ADR-DSN.U.940, Figures U-21, U-22 or U-23, as appropriate.

~~(6) High intensity stop bars should only be used in case of an absolute necessity and following a specific study.~~

(5) Where a wide beam fixture is required, the intensity in red light and beam spreads of stop bar lights should be in accordance with the specifications in CS ADR-DSN.U.940, Figure U-21 or Figure U-23, as appropriate.

(6) The lighting circuit should be designed so that:

(i) stop bars located across entrance taxiways are selectively switchable;

(ii) stop bars located across taxiways intended to be used only as exit taxiways are switchable selectively or in groups;

(iii) when a stop bar is illuminated, any taxiway centre line lights installed beyond the stop bar should be extinguished for a distance of at least 90 m; and

(iv) stop bars are ~~should be~~ 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.

(7) Stop bar lights chromaticity should be in accordance with the specifications in CS ADR-DSN.U.930 and Figure U-1.

Amend CS ADR-DSN.M.735 as follows:

CS ADR-DSN.M.735 Intermediate holding position lights

(...)

(c) Characteristics of intermediate holding position lights:

(1) Intermediate holding position lights should 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.

(2) The lights should be disposed symmetrically about and at right angle to the taxiway centre line, with individual lights spaced 1.5 m apart.

(3) Intermediate holding position lights chromaticity should be in accordance with the specifications in CS ADR-DSN.U.930 and in Figure U1.

Amend CS ADR-DSN.M.740 as follows:

CS ADR-DSN.M.740 De-icing/anti-icing facility exit lights

(...)

(c) Characteristics: Where provided, de-icing/anti-icing facility exit lights should 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 M-11~~G-1~~).

(d) De-icing/anti-icing facility exit lights chromaticity should be in accordance with the specifications in CS ADR-DSN.U.930 and Figure U1.

Amend CS ADR-DSN.M.745 as follows:

CS ADR-DSN.M.745 Runway guard lights

(a) The purpose of runway guard lights is to warn pilots and drivers of vehicles when they are operating on taxiways, that they are about to enter an active runway. There are two standard configurations of runway guard lights as illustrated in Figure M-12.

(b) Applicability:

(1) Runway guard lights, Configuration A, should be provided at each taxiway/runway intersection associated with a runway intended for use in:

(i) runway visual range conditions less than a value of 550 m where ~~regardless of whether or not~~ a stop bar is not installed; and

(ii) runway visual range conditions of values between 550 m and 1 200 m where the traffic density is heavy.

(2) As part of runway incursion prevention measures, ~~R~~runway guard lights, Configuration A or B, ~~Configuration B, or both,~~ should 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. ~~enhanced conspicuity of the taxiway/runway intersection is needed, such as on a wide-throat taxiway, except that~~

(3) Configuration B runway guard lights should not be collocated with a stop bar.

(...)

(d) Characteristics:

(...)

(13) Runway guard lights chromaticity should be in accordance with the specifications in CS ADR-DSN.U.930 and Figure U-1.

Delete SECTION 4 as follows:

~~**SECTION 4 — APRON LIGHTING**~~

Amend CS ADR-DSN.M.750 as follows:

CS ADR-DSN.M.750 Apron floodlighting

(a) The purpose of apron floodlighting is to facilitate safe operations on an apron, on a de-icing/anti-icing facility, and on a designated isolated aircraft parking position intended to be used ~~in reduced visibility conditions and~~ at night.

(...)

Amend CS ADR-DSN.M.760 as follows:

CS ADR-DSN.M.760 Advanced visual docking guidance system

(a) Application:

(1) Advanced visual docking guidance system (A-VDGS) should 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.

(...)

(b) Characteristics:

(...)

(4) The information on displacement of the aircraft relative to the stand centre line and distance to the stopping position, when displayed, should be provided with the accuracy specified in Table M-43. Symbols and graphics used to depict guidance information should be intuitively representative of the type of information provided.

(...)

Guidance information	Maximum deviation at stop position (stop area)	Maximum deviation at 9 m from stop position	Maximum deviation at 15 m from stop position	Maximum deviation at 25 m from stop position
Azimuth	±250 mm	±340 mm	±400 mm	±500 mm
Distance	±500 mm	±1 000 mm	±1 300 mm	Not specified

Table M-43. A-VDGS recommended displacement accuracy

Amend CS ADR-DSN.M.770 as follows:

CS ADR-DSN.M.770 Road-holding position light

(...)

(c) Characteristics:

(1) The road-holding position light should comprise:

(i) a controllable red (stop)/green (go) traffic light; or

(ii) a flashing-red light

(2) Provisions for control of the lights in paragraph (1)(i) above should be installed in the positions for the air traffic services.

(...)

Insert new CS ADR-DSN.M.771 as follows:

CS ADR-DSN.M.771 No-entry bar

(a) Applicability: A no-entry bar should 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.

(b) Location: A no-entry bar should 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.

(c) Characteristics:

(1) A no-entry bar should 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.

(2) The lighting circuit should be so designed that:

(i) no-entry bars are switchable selectively or in groups;

(ii) when a no-entry bar is illuminated, any taxiway centre line lights installed beyond the no-entry bar, when viewed towards the runway, should be extinguished for a distance of at least 90 m; and

(iii) when a no-entry bar is illuminated, any stop bar installed between the no-entry bar and the runway should be extinguished.

(3) The intensity in red light and beam spreads of no-entry bar lights should be in accordance with the specifications in CS ADR-DSN.U.940, Figures U-16 to U-20, as appropriate.

(4) No-entry bar lights chromaticity should be in accordance with the specifications in CS ADR-DSN.U.930 and Figure U-1.

Amend CS ADR-DSN.N.775 as follows:

CS ADR-DSN.N.775 General

(...)

(b) Application:

(1) Signs should be provided to convey a mandatory instruction, information on a specific location, or destination on a movement area or to provide other information necessary for the implementation of surface movement guidance and control system (SMGCS) at an aerodrome.

(2) A variable message sign should be provided where:

(i) the instruction or information displayed on the sign is relevant only during a certain period of time; and/or

(ii) there is a need for variable predetermined information to be displayed on the sign to meet the requirements of the implementation of surface movement guidance and control system (SMGCS) at an aerodrome.

(a) Characteristics:

(...)

(10) Sign luminance should be as follows:

(i) Where operations are conducted in runway visual range conditions less than a value of 800 m, average sign luminance should be at least:

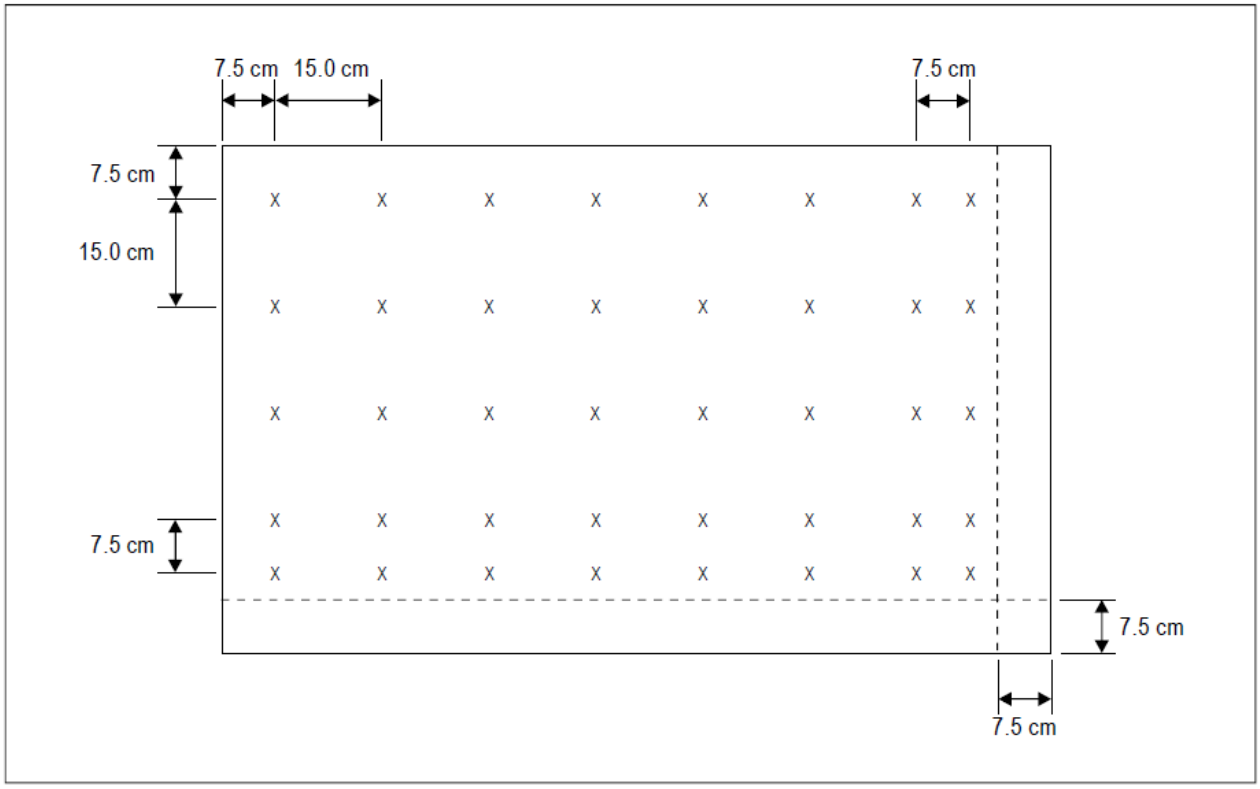
Red 30 cd/m^2
Yellow 150 cd/m^2
White 300 cd/m^2

(ii) Where operations are conducted in accordance with CS ADR-DSN.N.775(c)(5)(ii) and (c)(6), average sign luminance should be at least:

Red 10 cd/m^2
Yellow 50 cd/m^2
White 100 cd/m^2

Note: ~~(iii)~~In runway visual range conditions less than a value of 400 m, there will ~~should~~ be some degradation in the performance of signs.

(...)



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 should 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 should 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 should 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 should be established for each type.

Figure N-1. Grid points for calculating average luminance of a sign

Amend CS ADR-DSN.N.780 as follows:

CS ADR-DSN.N.780 Mandatory instruction signs

(a) Application:

(1) A mandatory instruction sign should be provided to identify a location beyond which an aircraft taxiing or vehicle should not proceed unless authorised by the aerodrome control tower.

(2) Mandatory instruction signs should include runway designation signs, ~~c~~Category I, II, or III holding position signs, runway-holding position signs, road-holding position signs, and NO ENTRY signs.

(3) A pattern 'A' runway-holding position marking should be supplemented at a taxiway/runway intersection or a runway/runway intersection with a runway designation sign.

(4) A pattern 'B' runway-holding position marking should be supplemented with a ~~c~~Category I, II, or III holding position sign.

(...)

(b) Location:

(...)

(2) A ~~c~~Category I, II, or III holding position sign should be located on each side of the runway-holding position marking facing the direction of the approach to the critical area.

(...)

(c) Characteristics:

(...)

(3) The inscription on a ~~c~~Category I, II, III, or joint II/III holding position sign should consist of the runway designator followed by CAT I, CAT II, CAT III, or CAT II/III as appropriate.

(...)

(d) Where appropriate, the following inscriptions/symbol should be used

Inscription/Symbol	Use
Runway designation of runway extremity	To indicate a runway-holding position at a runway extremity
Or	
Runway designation of both extremities of a runway	To indicate a runway-holding position located at other taxiway/runway intersections or runway/runway intersections
25 CAT I (Example)	To indicate a ~~c~~Category I runway-holding position at the threshold of runway 25
25 CAT II (Example)	To indicate a ~~c~~Category II runway-holding position at the threshold of runway 25
25 CAT III (Example)	To indicate a ~~c~~Category III runway-holding position at the threshold of runway 25
25 CAT II/III (Example)	To indicate a joint ~~c~~Category II/III runway-holding position at the threshold of runway 25
NO ENTRY symbol	To indicate that entry to an area is prohibited
B2 (Example)	To indicate a runway-holding position established in accordance with the requirements for physical characteristics

Amend CS ADR-DSN.N.785 as follows:

CS ADR-DSN.N.785 Information signs

(a) Application:

(...)

(11) A location sign should be provided in conjunction with a direction sign, except that it may be omitted where a~~n~~ safety assessment indicates that it is not needed.

(...)

(b) Location:

(1) Except as specified in paragraph (b)(3) below, information signs should wherever practicable, be located on the left-hand side of the taxiway in accordance with Table N-1.

(...)

(c) Characteristics:

(9) Where ~~it is~~ necessary to identify each of a series of intermediate holding positions on the same taxiway, the location sign should consist of the taxiway designation and a progressive number.

(...)

(13) The use of numbers alone on the manoeuvring area should be reserved for the designation of runways~~, or to indicate the location of aircraft stands~~.

Amend CS ADR-DSN.Q.840 as follows:

CS ADR-DSN.Q.840 Objects to be marked and/or lighted within the lateral boundaries of the obstacle limitation surfaces

(a) Applicability: The specifications for objects to be marked and/or lighted within the lateral boundaries of the obstacle limitation surfaces ~~below~~ apply only to the area under control of the aerodrome operator.

(b) Elevated aeronautical ground lights within the movement area should be marked so as to be conspicuous by day. Obstacle lights should not be installed on elevated ground lights or signs in the movement area.

(c) All obstacles within the distance specified in Table D-1, column (11), (12) or (13), from the centre line of a taxiway, an apron taxiway or aircraft stand taxilane should be marked and, if the taxiway, apron taxiway or aircraft stand taxilane is used at night, lighted.

(d)~~(b)~~ A fixed obstacle that extends above a take-off climb, approach or transitional surface within 3 000 m of the inner edge of the take-off climb or approach surface should be marked and if the runway is used at night, lighted, except that:

(1) such marking and lighting may be omitted when the obstacle is shielded by another fixed obstacle;

(2) 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;

(3) the marking may be omitted when the obstacle is lighted by high-intensity obstacle lights by day if medium intensity lights, Type A, are deemed insufficient; and

(4) the lighting may be omitted where the obstacle is a lighthouse and an safety assessment indicates the lighthouse light to be sufficient.

(e)~~(c)~~ A fixed object, other than an obstacle, adjacent to a take-off climb, approach or transitional surface should 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:

(1) 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

(2) the object is lighted by high-intensity obstacle lights by day if medium intensity lights, Type A, are deemed insufficient.

(f)~~(d)~~ A fixed obstacle that extends above a horizontal surface should be marked and if the aerodrome is used at night, lighted, except that:

(...)

(3) the marking may be omitted when the obstacle is lighted by high-intensity obstacle lights by day if medium intensity lights, Type A, are deemed insufficient; and

(4) the lighting may be omitted where the obstacle is a lighthouse and a safety assessment indicates the lighthouse light to be sufficient.

(g)~~(e)~~ A fixed object that extends above an obstacle protection surface should be marked and, if the runway is used at night, lighted, except that such marking and lighting may be omitted when the obstacle is shielded by another fixed obstacle.

~~(f) Elevated aeronautical ground lights within the movement area should be marked so as to be conspicuous by day. Obstacle lights should not be installed on elevated ground lights or signs in the movement area.~~

~~(g) All obstacles within the distance specified in Table D-1, from the centre line of a taxiway, an apron taxiway, or aircraft stand taxilane should be marked and if the taxiway, apron taxiway or aircraft stand taxilane is used at night, lighted.~~

Insert new CS ADR-DSN.Q.841 as follows:

CS ADR-DSN.Q.841 Objects to be marked and/or lighted outside the lateral boundaries of the obstacle limitation surfaces

(a) Applicability: The specifications for objects to be marked and/or lighted outside the lateral boundaries of the obstacle limitation surfaces apply only to the area under control of the aerodrome operator.

(b) Obstacles in accordance with CS ADR-DSN.J.487 should be marked and lighted, except that the marking may be omitted when the obstacle is lighted by high-intensity obstacle lights by day.

(c) When considered as an obstacle, other objects outside the obstacle limitation surfaces should be marked and/or lighted.

Amend CS ADR-DSN.Q.845 as follows:

CS ADR-DSN.Q.845 Marking of fixed objects

(a) General: All fixed objects to be marked should, whenever practicable, be coloured but if this is not practicable, markers or flags should be displayed on or above them, except those objects that are sufficiently conspicuous by their shape, size, or colour need not be otherwise marked.

(b) Marking by colour

(1) An object should 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 should 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 should contrast with each other and with the background against which they should be seen.

(2) An object should be coloured to show alternating contrasting bands if:

(i) 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

(ii) it is of skeletal type with either a vertical or a horizontal dimension greater than 1.5 m.

(3) The bands should 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 should contrast with the background against which they should be seen. Orange and white should be used,

except where such colours are not conspicuous when viewed against the background. The bands on the extremities of the object should be of the darker colour (see Figures Q-1 and Q-2). The dimensions of the marking band widths are shown in Table Q-4.

(4) An object should 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 should be used, except where such colours merge with the background.

(c) Marking by flags

(1) Flags used to mark fixed objects should 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 should be displayed at least every 15 m. Flags should not increase the hazard presented by the object they mark.

(2) Flags used to mark fixed objects should not be less than 0.6 m on each side.

(3) Flags used to mark fixed objects should 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 where such colours merge with the background, other conspicuous colours should be used.

(d) Marking by markers

(1) Markers displayed on or adjacent to objects should be located in conspicuous positions so as to retain the general definition of the object and should be recognisable 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 should be distinctive to the extent necessary to ensure that they are not mistaken for markers employed to convey other information, and they should be such that the hazard presented by the object they mark is not increased.

(2) A marker should be of one colour. When more than one markers are installed, white and red, or white and orange markers should be displayed alternately. The colour selected should contrast with the background against which it should be seen.

~~(a) The specifications below apply only to the area under control of the aerodrome operator.~~

~~(b) All fixed objects to be marked should whenever practicable, be coloured but if this is not practicable, markers or flags should be displayed on or above them, except that objects that are sufficiently conspicuous by their shape, size, or colour need not be otherwise marked.~~

~~(c) Use of colours~~

~~(1) An object should 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 should 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 should contrast with each other and with the background against which they should be seen.~~

~~(2) An object should be coloured to show alternating contrasting bands if:~~

~~(i) 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~~

~~(ii) it is of skeletal type with either a vertical or a horizontal dimension greater than 1.5 m.~~

(3) The bands should 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 should contrast with the background against which they should be seen. Orange and white should be used, except where such colours are not conspicuous when viewed against the background. The bands on the extremities of the object should be of the darker colour (see Figures Q-1 and Q-2). The dimensions of the marking band widths are shown in Table Q-3.

(4) An object should 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 should be used, except where such colours merge with the background.

(d) Use of markers:

(1) Markers displayed on or adjacent to objects should be located in conspicuous positions so as to retain the general definition of the object and should be recognisable 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 should be distinctive to the extent necessary to ensure that they are not mistaken for markers employed to convey other information, and they should be such that the hazard presented by the object they mark is not increased.

(2) Marker displayed on an overhead wire, cable, etc., should be spherical and have a diameter of not less than 60 cm.

(3) The spacing between two consecutive markers, or between a marker and a supporting tower should be appropriate to the diameter of the marker. The spacing should normally not exceed:

(i) 30 m where the marker diameter is 60 cm, increasing progressively with increase of the marker diameter to:

(A) 35 m where the marker diameter is 80 cm; and

(B) further progressive increases to a maximum of 40 m where the marker diameter is of at least 130 cm.

Where multiple wires, cables, etc., are involved, a marker should be located not lower than the level of the highest wire at the point marked.

(4) A marker should be of one colour. When installed, white and red, or white and orange markers should be displayed alternately. The colour selected should contrast with the background against which it should be seen.

(e) Use of flags

(1) Flags used to mark objects should 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 should be displayed at least every 15 m. Flags should not increase the hazard presented by the object they mark.

(2) Flags used to mark fixed objects should not be less than 0.6 m square.

(3) Flags used to mark fixed objects should be orange in colour or a combination of two triangular sections, one orange and the other white, or one red and the other white, except that where such colours merge with the background, other conspicuous colours should be used.

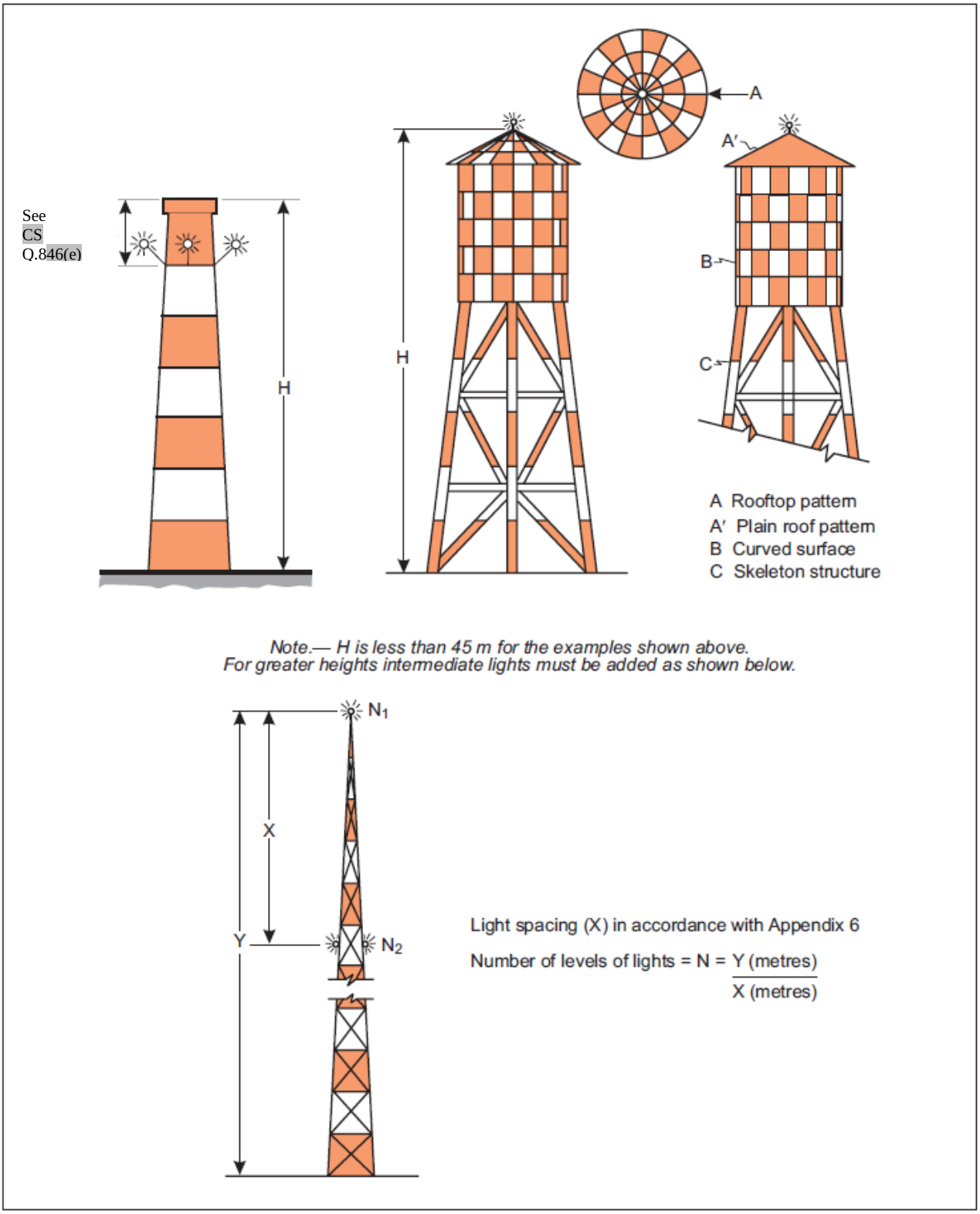


Figure Q-2. Examples of marking and lighting ~~and marking~~ of tall structures

Insert new CS ADR-DSN.Q.846 as follows:

CS ADR-DSN.Q.846 Lighting of fixed objects

(a) The presence of objects which should be lighted, as specified in CS ADR-DSN.Q.840 and CS ADR-DSN.Q.841 should be indicated by low-, medium- or high-intensity obstacle lights, or a combination of such lights.

(b) Low-intensity obstacle lights, Types A, B, C and D, medium-intensity obstacle lights, Types A, B and C and high-intensity obstacle lights Types A and B, should be in accordance with the specifications in Table Q-1, CS ADR-DSN.U.930 and Figure U-1.

(c) The number and arrangement of low-, medium- or high-intensity obstacle lights at each level to be marked should 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 should 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.

(d) In case of an object to be lighted one or more low-, medium- or high-intensity obstacle lights should be located as close as practicable to the top of the object.

(e) In the case of chimney or other structure of like function, the top lights should be placed sufficiently below the top so as to minimise contamination by smoke, etc. (see Figure Q-2).

(f) 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 should be located at the highest practicable point, and, if practicable, a medium-intensity obstacle light, Type A, mounted on the top.

(g) In the case of an extensive object or of a group of closely spaced objects to be lighted that are:

(1) Penetrating a horizontal obstacle limitation surface (OLS) or located outside an OLS, the top lights should be so arranged as to at least indicate the points or edges of the object highest in relation to OLS or above the ground, and so as to indicate the general definition and the extent of the objects; and

(2) Penetrating a sloping OLS, the top lights should 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 should be marked.

(h) When the obstacle limitation surface concerned is sloping and the highest point above the obstacle limitation surface is not the highest point of the object, additional obstacle lights should be placed on the highest point of the object.

(i) Where lights are applied to display the general definition of an extensive object or a group of closely spaced objects, and

(1) Low-intensity lights are used, they should be spaced at longitudinal intervals not exceeding 45 m.

(2) Medium-intensity lights are used, they should be spaced at longitudinal intervals not exceeding 900 m.

(j) High-intensity obstacle lights, Type A, and medium-intensity obstacle lights, Types A and B, located on an object should flash simultaneously.

(k) The installation setting angles for high-intensity obstacle lights, Type A, should be in accordance with Table Q-5.

Insert new CS ADR-DSN.Q.847 as follows:

CS ADR-DSN.Q.847 Lighting of fixed objects with a height less than 45 m above ground level

(a) Low-intensity obstacle lights, Type A or B, should be used where the object is a less extensive one and its height above the surrounding ground is less than 45 m.

(b) Where the use of low-intensity obstacle lights, Type A or B, would be inadequate, or an early special warning is required, then medium- or high-intensity obstacle lights should be used.

(c) Low-intensity obstacle lights, Type B, should be used either alone or in combination with medium-intensity obstacle lights, Type B, in accordance with subparagraph (d), below.

(d) Medium-intensity obstacle lights, Type A, B, or C, should be used where the object is an extensive one. Medium-intensity obstacle lights, Types A and C, should be used alone, whereas medium-intensity obstacle lights, Type B, should be used either alone or in combination with low-intensity obstacle lights, Type B.

Insert new CS ADR-DSN.Q.848 as follows:

CS ADR-DSN.Q.848 Lighting of fixed objects with a height 45 m to a height less than 150 m above ground level

(a) Medium-intensity obstacle lights, Type A, B, or C, should be used where the object is an extensive one. Medium-intensity obstacle lights, Types A and C, should be used alone, whereas medium-intensity obstacle lights, Type B, should be used either alone or in combination with low-intensity obstacle lights, Type B.

(b) 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 should be provided at intermediate levels. These additional intermediate lights should 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.

(c) 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 should be provided at intermediate levels. These additional intermediate lights should be alternately low-intensity obstacle lights, Type B, and medium-intensity obstacle lights, Type B, and should 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.

(d) 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 should be provided at intermediate levels. These additional intermediate lights should 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.

(e) Where high-intensity obstacle lights, Type A, are used, they should be spaced at uniform intervals not exceeding 105 m between the ground level and the top light(s) specified in paragraph CS ADR-DSN.Q.846(d), 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.

Insert new CS ADR-DSN.Q.849 as follows:

CS ADR-DSN.Q.849 Lighting of fixed objects with a height 150 m or more above ground level

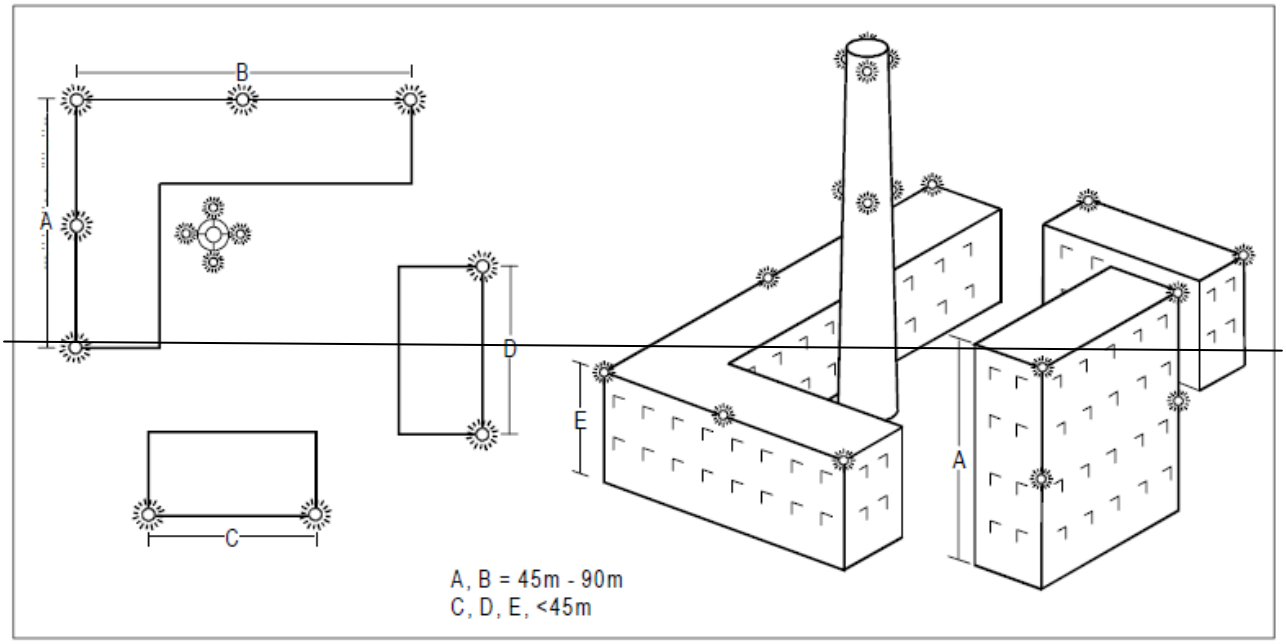
(a) High-intensity obstacle lights, Type A, should be used to indicate the presence of an object if its height above the level of the surrounding ground exceeds 150 m and a safety assessment indicates such lights to be essential for the recognition of the object by day.

(b) Where high-intensity obstacle lights, Type A, are used, they should be spaced at uniform intervals not exceeding 105 m between the ground level and the top light(s) specified in CS ADR-DSN.Q.846(d), except 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.

(c) Where an object is indicated by medium-intensity obstacle lights, Type A, additional lights should be provided at intermediate levels. These additional intermediate lights should 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.

(d) Where an object is indicated by medium-intensity obstacle lights, Type B, additional lights should be provided at intermediate levels. These additional intermediate lights should be alternately low-intensity obstacle lights, Type B, and medium-intensity obstacle lights, Type B, and should 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.

(e) Where an object is indicated by medium-intensity obstacle lights, Type C, additional lights should be provided at intermediate levels. These additional intermediate lights should 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.



~~Figure Q-3. Lighting of buildings~~

Amend CS ADR-DSN.Q.850 as follows:

CS ADR-DSN.Q.850 Lighting of other objects

(a) Low-intensity obstacle lights, Type C, should be displayed on vehicles and other mobile objects excluding aircraft.

(b)~~(3)~~ Low-intensity obstacle lights, Type C, displayed on vehicles associated with emergency or security ~~shall~~ should be flashing-blue and those displayed on other vehicles ~~shall~~ should be flashing-yellow.

(c)~~(4)~~ Low-intensity obstacle lights, Type D, ~~shall~~ should be displayed on follow-me vehicles.

(d)~~(6)~~ Low-intensity obstacle lights on objects with limited mobility such as aerobridges ~~shall~~ should be fixed-red, and, as a minimum, be in accordance with the specifications for low-intensity obstacle lights, Type A, in Table Q-1. The intensity of the lights ~~shall~~ should 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.

~~(a) The specifications below apply only to the area under control of the aerodrome operator.~~

~~(b) Use of obstacle lights:~~

~~(1) The presence of objects which should be lighted, should be indicated by low-, medium- or high-intensity obstacle lights, or a combination of such lights.~~

~~(2) Low-intensity obstacle lights, Type A or B, should be used where the object is a less extensive one and its height above the surrounding ground is less than 45 m.~~

~~(3) 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 should be used.~~

~~(4) Low-intensity obstacle lights, Type B, should be used either alone or in combination with medium-intensity obstacle lights, Type B, in accordance with subparagraph (d) below.~~

~~(5) Medium-intensity obstacle lights, Type A, B, or C, should be used where the object is an extensive oneor its height above the level of the surrounding ground is greater than 45 m. Medium-intensity obstacle lights, Types A and C, should be used alone, whereas medium-intensity obstacle lights, Type B, should be used either alone or in combination with low-intensity obstacle lights, Type B.~~

~~(6) High-intensity obstacle lights, Type A, should be used to indicate the presence of an object if its height above the level of the surrounding ground exceeds 150 m and an safety assessment indicates such lights to be essential for the recognition of the object by day.~~

~~(7) When a dual obstacle lighting system is provided, the system should be composed of high-intensity obstacle lights, Type A, or B, 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.~~

~~(c) Location of obstacle lights:~~

~~(1) One or more low-, medium- or high-intensity obstacle lights should be located as close as practicable to the top of the object. The top lights should be so arranged as to at least indicate the points or edges of the object highest in relation to the obstacle limitation surface.~~

~~(2) In the case of chimney or other structure of like function, the top lights should be placed sufficiently below the top so as to minimise contamination by smoke, etc. (see Figures Q-2 and Q-3).~~

~~(3) 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 should be located at the highest practicable point, and if practicable, a medium-intensity obstacle light, Type A, mounted on the top.~~

~~(4) In the case of an extensive object or of a group of closely spaced objects, top lights should be displayed at least on the points or edges of the objects highest in relation to the obstacle limitation surface 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 should be marked. Where low-intensity lights are used, they should be spaced at longitudinal intervals not exceeding 45 m. Where medium-intensity lights are used, they should be spaced at longitudinal intervals not exceeding 900 m.~~

~~(5) When the obstacle limitation surface concerned is sloping and the highest point above the obstacle limitation surface is not the highest point of the object, additional obstacle lights should be placed on the highest point of the object.~~

~~(6) 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 should be provided at intermediate levels. These additional intermediate lights should 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 (see subparagraph (b)(5) above).~~

~~(7) 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 should be provided at intermediate levels. These additional intermediate lights should be alternately low-intensity obstacle lights, Type B, and medium-intensity obstacle lights, Type B, and should 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.~~

~~(8) 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 should be provided at intermediate levels. These additional intermediate lights should 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.~~

~~(9) Where high-intensity obstacle lights, Type A, are used, they should be spaced at uniform intervals not exceeding 105 m between the ground level and the top light(s) specified in paragraph (c)(1) above, 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) Where high-intensity obstacle lights, Type B, are used, they should be located at three levels:

(i) at the top of the tower;

(ii) at the lowest level of the catenary of the wires or cables; and

(iii) at approximately midway between these two levels.

(11) The installation setting angles for high-intensity obstacle lights, Types A and B, should be in accordance with Table Q-1.

(12) The number and arrangement of low-, medium- or high-intensity obstacle lights at each level to be marked should 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 should be provided on that object 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.

(d) Low-intensity obstacle lights — Characteristics:

(1) Low-intensity obstacle lights on fixed objects, Types A and B, should be fixed red lights.

(2) Low-intensity obstacle lights, Types A and B, should be in accordance with the specifications in Table Q-2.

(3) (3) Low-intensity obstacle lights, Types C and D, should be in accordance with the specifications in Table Q-2.

(5) Low-intensity obstacle lights on objects with limited mobility should as a minimum be in accordance with the specifications for low-intensity obstacle lights, Type A, in Table Q-2.

(e) Medium-intensity obstacle lights — Characteristics:

(1) Medium-intensity obstacle lights, Type A, should be flashing white lights, Type B should be flashing red lights, and Type C should be fixed red lights.

(2) Medium-intensity obstacle lights, Types A, B and C, should be in accordance with the specifications in Table Q-2.

(3) Medium-intensity obstacle lights, Types A and B, located on an object should flash simultaneously.

(f) High-intensity obstacle lights — Characteristics:

(1) High-intensity obstacle lights, Types A and B, should be flashing white lights.

(2) High-intensity obstacle lights, Types A and B, should be in accordance with the specifications in Table Q-2.

(3) High-intensity obstacle lights, Type A, located on an object should flash simultaneously.

(4) High-intensity obstacle lights, Type B, indicating the presence of a tower supporting overhead wires, cables, etc., should flash sequentially; first the middle light, second the top light, and last the bottom light. The intervals between flashes of the lights should 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~~

Insert new CS ADR-DSN.Q.851 as follows:

CS ADR-DSN.Q.851 Marking and lighting of wind turbines

(a) Applicability: When considered as an obstacle a wind turbine should be marked and/or lighted.

(b) Marking: The rotor blades, nacelle and upper 2/3 of the supporting mast of wind turbines should be painted white, or if after a safety assessment, it is determined that other colour will improve safety.

(c) Lighting:

(1) Where lighting is deemed necessary for a single wind turbine or short line of wind turbines, the installation should be in accordance with paragraph (c)(2)(v) below, or as determined by a safety assessment.

(2) When lighting is deemed necessary in the case of a wind farm (i.e. a group of two or more wind turbines), the wind farm should be regarded as an extensive object and lights should be installed:

(i) to identify the perimeter of the wind farm;

(ii) respecting the maximum spacing, in accordance with CS ADR-DSN.Q.846(i), between the lights along the perimeter, or if after a safety assessment, it is determined that a greater spacing can be used;

(iii) so that, where flashing lights are used, they flash simultaneously throughout the wind farm;

(iv) so that, within a wind farm, any wind turbines of significantly higher elevation are also identified wherever they are located; and

(v) at locations prescribed in (i), (ii) and (iv):

(A) for wind turbines of less than 150 m in overall height (hub height plus vertical blade height), medium intensity lighting on the nacelle;

(B) 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 should be provided in case of failure of the operating light; the lights should be installed to assure that the output of either light is not blocked by the other;

(C) 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 CS ADR-DSN.Q.846(c), that are configured to flash at the same rate as the light on the nacelle; low-intensity Type A or B lights may be used if an safety assessment shows that low intensity Type E lights are not suitable.

(3) The obstacle lights should be installed on the nacelle in such a manner as to provide an unobstructed view for aircraft approaching from any direction.

Insert new CS ADR-DSN.Q.852 as follows:

CS ADR-DSN.Q.852 Marking and lighting of overhead wires, cables, supporting towers, etc.

(a) Marking: The wires, cables, etc. to be marked should be equipped with markers; the supporting tower should be coloured.

(b) Marking by colours: The supporting towers of overhead wires, cables, etc. that require marking should be marked in accordance with CS ADR-DSN.Q.845(b), except that the marking of the supporting towers may be omitted when they are lighted by high-intensity obstacle lights by day.

(c) Marking by markers:

(1) Markers displayed on or adjacent to objects should be located in conspicuous positions so as to retain the general definition of the object and should be recognisable 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 should be distinctive to the extent necessary to ensure that they are not mistaken for markers employed to convey other information, and they should be such that the hazard presented by the object they mark is not increased.

(2) A marker displayed on an overhead wire, cable, etc., should be spherical and have a diameter of not less than 60 cm.

(3) The spacing between two consecutive markers, or between a marker and a supporting tower, should be appropriate to the diameter of the marker. The spacing should normally not exceed:

(i) 30 m where the marker diameter is 60 cm, increasing progressively with increase of the marker diameter to:

(ii) 35 m where the marker diameter is 80 cm; and

(iii) further progressive increases to a maximum of 40 m where the marker diameter is of at least 130 cm.

Where multiple wires, cables, etc., are involved, a marker should be located not lower than the level of the highest wire at the point marked.

(4) A marker should be of one colour. When installed, white and red, or white and orange, markers should be displayed alternately. The colour selected should contrast with the background against which it should be seen.

(5) 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, should be provided on their supporting towers.

(d) Lighting:

(1) High-intensity obstacle lights, Type B, should be used to indicate the presence of the tower supporting overhead wires, cables, etc. where:

(i) a safety assessment indicates such light to be essential for the recognition of the presence of wires, cables, etc.; or

(ii) it has not been found practicable to install marker on the wires, cables, etc.

(2) Where high-intensity obstacle lights, Type B, are used, they should be located at three levels:

(i) at the top of the tower;

(ii) at the lowest level of the catenary of the wires or cables; and

(iii) at approximately midway between these two levels.

(3) High-intensity obstacle lights, Type B, indicating the presence of a tower supporting overhead wires, cables, etc., should flash sequentially; first the middle light, second the top light, and last

the bottom light. The intervals between flashes of the lights should 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

(4) The installation setting angles for high-intensity obstacle lights, Types B, should be in accordance with Table Q-5.

[Editorial Note: Insert new Table Q-1]

1	2	3	4	5	6	7
Light type	Colour	Signal type/ (Flash Rate)	Peak intensity (cd) at given Background Luminance (b)			Light Distribution Table
			Day (Above 500 cd/m^2)	Twilight (50-500 cd/m^2)	Night (Below 50 cd/m^2)	
Low-intensity Type A (fixed obstacle)	Red	Fixed	N/A	N/A	10	Table Q-2
Low-intensity Type B (fixed obstacle)	Red	Fixed	N/A	N/A	32	Table Q-2
Low-intensity Type C (mobile obstacle)	Yellow/Blue (a)	Flashing (60-90 fpm)	N/A	40	40	Table Q-2
Low-intensity Type D (follow-me vehicle)	Yellow	Flashing (60-90 fpm)	N/A	200	200	Table Q-2
Low-intensity, Type E	Red	Flashing (c)	N/A	N/A	32	Table Q-2 (Type B)
Medium-intensity Type A	White	Flashing (20-60 fpm)	20 000	20 000	2 000	Table Q-3
Medium-intensity Type B	Red	Flashing (20-60 fpm)	N/A	N/A	2 000	Table Q-3
Medium-intensity Type C	Red	Fixed	N/A	N/A	2 000	Table Q-3
High-intensity Type A	White	Flashing (40-60 fpm)	200 000	20 000	2 000	Table Q-3
High-intensity Type B	White	Flashing (40-60 fpm)	100 000	20 000	2 000	Table Q-3

(a) CS ADR-DSN.Q.850(b)

(b) For flashing lights, effective intensity as determined in accordance with ICAO Doc 9157, Aerodrome Design Manual, Part 4, Visual Aids.

(c) For wind turbine application, to flash at the same rate as the lighting on the nacelle.

Table Q-1. Characteristics of obstacle lights

[Editorial Note: Insert new Table Q-2]

	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. CS ADR-DSN.Q.846(c) 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 ICAO, Aerodrome Design Manual, Part 4, Visual Aids.

(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 should be located at approximately 2.5° vertical.

(e) Peak intensity should be located at approximately 17° vertical.

(f) Beam spread is defined as the angle between the horizontal plan and the directions for which the intensity exceeds that mentioned in the 'intensity' column.

Table Q-2. Light distribution for low-intensity obstacle lights

[Editorial Note: Insert new Table Q-3]

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)
200 000	200 000	150 000	75 000	3°	75 000	250 000	112 500	7 500	7°	75 000
100 000	100 000	75 000	37 500	3°	37 500	125 000	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: This table does not include recommended horizontal beam spreads. CS ADR-DSN.Q.846(c) 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 ICAO Doc 9157, Aerodrome Design Manual, Part 4, Visual Aids.

(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 plan and the directions for which the intensity exceeds that mentioned in the 'intensity' column.

Note: an extended beam spread may be necessary under specific configuration and justified by an aeronautical study.

Table Q-3. Light distribution for medium- and high-intensity obstacle lights according to benchmark intensities of Table Q-1

Longest dimension		
Greater than	Not exceeding	Band width
1.5 m	210 m	1/7 of longest dimension
210 m	270 m	1/9 " " "
270 m	330 m	1/11 " " "
330 m	390 m	1/13 " " "
390 m	450 m	1/15 " " "
450 m	510 m	1/17 " " "
510 m	570 m	1/19 " " "
570 m	630 m	1/21 " " "

Table Q-43. ~~Obstacle m~~Marking band widths

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°

Table Q-51. Installation setting angles for high-intensity obstacle lights

1	2	3	4	5	6	7	8	9	10	11	12
			Peak intensity (cd) at given background luminance			Vertical beam spread [a]	Intensity (cd) at given elevation angles when the light unit is levelled [d]				
Light type	Colour	Signal type/flash rate	Above 500 cd/m²	50-500 cd/m²	Below 50 cd/m²		-10° [e]	-1° [f]	±0° [f]	+6°	+10°
Low-intensity Type A (fixed obstacle)	Red	Fixed	N/A	10 mnm	10 mnm	10°	—	—	—	10 mnm [g]	10 mnm [g]
Low-intensity Type B (fixed obstacle)	Red	Fixed	N/A	32 mnm	32 mnm	10°	—	—	—	32 mnm [g]	32 mnm [g]
Low-intensity Type C (mobile obstacle)	Yellow/blue [a]	Flashing (60-90 fpm)	N/A	40 mnm [b] 400 max	40 mnm [b] 400 max	12° [h]	—	—	—	—	—
Low-intensity Type D (follow-me vehicle)	Yellow	Flashing (60-90 fpm)	N/A	200 mnm [b] 400 max	200 mnm [b] 400 max	12° [i]	—	—	—	—	—
Medium-intensity Type A	White	Flashing (20-60 fpm)	20 000 [b] ±25 %	20 000 [b] ±25 %	2 000 [b] ±25 %	3° mnm	3°% max	50 % mnm 75 % max	100 % mnm	—	—
Medium-intensity Type B	Red	Flashing (20-60 fpm)	N/A	N/A	2 000 [b] ±25%	3° mnm	—	50 % mnm 75 % max	100 % mnm	—	—
Medium-intensity Type C	Red	Fixed	N/A	N/A	2 000 [b] ±25%	3° mnm	—	50 % mnm 75 % max	100 % mnm	—	—
High-intensity Type A	White	Flashing (40-60 fpm)	200 000 [b] ±25%	20 000 [b] ±25%	2 000 [b] ±25%	3°-7°	3°% max	50 % mnm 75 % max	100 % mnm	—	—
High-intensity Type B	White	Flashing (40-60 fpm)	100 000 [b] ±25%	20 000 [b] ±25%	2 000 [b] ±25%	3°-7°	3°% max	50 % mnm 75 % max	100 % mnm	—	—

[a] CS ADR.DSN.Q.850, (d) (3)

[b] Effective intensity as determined in accordance with the ICAO Doc 9157, Aerodrome Design Manual, Part 4, Visual Aids.

[c] Beam spread is defined as the angle between two directions in a plane for which the intensity is equal to 50 % of the lower tolerance value of the intensity shown in columns 4, 5, and 6. The beam pattern is not necessarily symmetrical about the elevation angle at which the peak intensity occurs.

~~[d] Elevation (vertical) angles are referenced to the horizontal.~~

~~[e] Intensity at any specified horizontal radial as a percentage of the actual peak intensity at the same radial when operated at each of the intensities shown columns 4, 5, and 6.~~

~~[f] Intensity at any specified horizontal radial as a percentage of the lower tolerance value of the intensity shown in columns 4, 5, and 6.~~

~~[g] In addition to specified values, lights should have sufficient intensity to ensure conspicuity at elevation angles between ±0° and 50°.~~

~~[h] Peak intensity should be located at approximately 2.5° vertical.~~

~~[i] Peak intensity should be located at approximately 17° vertical.~~

~~fpm = flashes per minute; N/A = not applicable~~

~~Table Q-2. Characteristics of obstacle lights~~

[Editorial Note: Delete existing Table Q-2]

Amend CS ADR-DSN.R.855 as follows:

CS ADR-DSN.R.855 Closed runways and taxiways, or parts thereof

(a) Applicability ~~of closed marking~~:

~~(1)~~ A closed marking should be displayed on a runway, or taxiway, or portion thereof which is permanently closed to the use of all aircraft.

~~(2) A closed marking should 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, and adequate warning by air traffic services is provided.~~

(...)

(c) Characteristics of closed markings: ~~(1)~~The closed marking should be of the form and proportions as detailed in Figure R-1, Illustration (a), when displayed on a runway, and should be of the form and proportions as detailed in Figure R-1, Illustration (b), when displayed on a taxiway. The marking should be white when displayed on a runway and should be yellow when displayed on a taxiway.

(d)~~(2)~~ When a runway, or taxiway, or portion thereof is permanently closed, all normal runway and taxiway markings should be obliterated.

~~(d) Lighting on a closed runway, or taxiway, or portion thereof should not be operated, except as required for maintenance purposes.~~

(...)

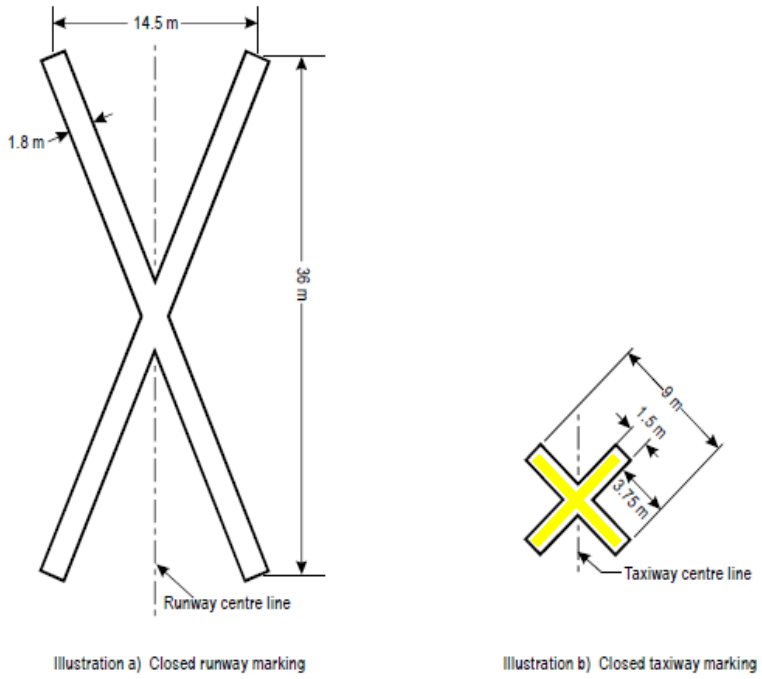


Figure R-1. Runway and taxiway closed markings

Amend CS ADR-DSN.R.860 as follows:

CS ADR-DSN.R.860 Non-load-bearing surfaces

(a) 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, should have the boundary between such areas and the load-bearing surface marked by a taxi side stripe marking ~~(specifications for markings are in CS ADR-DSN.L.550)~~.

(...)

Amend CS ADR-DSN.S.880 as follows:

CS ADR-DSN.S.880 Electrical power supply systems ~~for visual aids~~

(...)

(c) At an aerodrome where the primary runway is a non-precision approach runway, a secondary power supply capable of meeting the requirements of Table S-1 should be provided except that a secondary power supply for visual aids need not be provided for more than one non-precision approach runway.

(...)

[Editorial Note: Insert new Table S-1]

Runway	Lighting aids requiring power	Maximum switch-over time
Non-instrument	Visual approach slope indicators[a] Runway edge[b] Runway threshold[b] Runway end[b] Obstacle[a]	See CS ADR-DSN.M.875(d) and CS ADR-DSN.M.880(d)
Non-precision approach	Approach lighting system Visual approach slope indicators[a, d] Runway edge[d] Runway threshold[d] Runway end[d] 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 indicators[a, 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 taxiway[a] Obstacle[a]	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. The use of emergency lighting should be in accordance with any procedures established.
c. One second where no runway centre line lights are provided.
d. One second where approaches are over hazardous or precipitous terrain.

Table S-1. Secondary power supply requirements (see CS ADR-DSN.S.875(d))

Amend CS ADR-DSN.S.890 as follows:

CS ADR-DSN.S.890 Monitoring

(...)

(d) For a runway meant for use in runway visual range conditions less than a value of 550 m, the lighting systems detailed in Table S-1 should be monitored automatically so as to provide an indication when the serviceability level of any element falls below a minimum serviceability level specified in CS ADR-DSN.S.895(c) to (g). This information should be automatically relayed to the maintenance crew.

(e) For a runway meant for use in runway visual range conditions less than a value of 550 m, the lighting systems detailed in Table S-1 should be monitored automatically to provide an indication when the serviceability level of any element falls below a minimum level ~~specified in CS ADR-DSN.S.895~~, below which operations should not continue. This information should be automatically relayed to the air traffic services unit and displayed in a prominent position.

Amend CS ADR-DSN.S.895 as follows:

CS ADR-DSN.S.895 Serviceability levels

(...)

(c) The system of preventive maintenance employed for a precision approach runway ~~c~~Category II or III should have as its objective that, during any period of ~~c~~Category II or III operations, all approach and runway lights are serviceable and that, in any event, at least:

(1) 95 % of the lights are serviceable in each of the following particular significant elements:

(i) precision approach ~~c~~Category II and III lighting system, the inner 450 m;

(ii) runway centre line lights;

(iii) runway threshold lights; and

(iv) runway edge lights.

(...)

(...)

(f) The system of preventive maintenance employed for a precision approach runway ~~c~~Category I should have as its objective that, during any period of ~~c~~Category I operations, all approach and runway lights are serviceable and that, in any event, at least 85 % of the lights are serviceable in each of the following:

(1) precision approach ~~c~~Category I lighting system;

(2) runway threshold lights;

(3) runway edge lights; and

(4) runway end lights.

In order to provide continuity of guidance an unserviceable light should not be permitted adjacent to another unserviceable light unless the light spacing is significantly less than that specified.

(...)

~~Runway~~	~~Lighting aids requiring power~~	~~Maximum switch-over time~~
~~Non-instrument~~	~~Visual approach slope indicators[a]~~ ~~Runway edge[b]~~ ~~Runway threshold[b]~~ ~~Runway end[b]~~ ~~Obstacle[a]~~	~~See CS ADR-DSN.M.875(d) and CS ADR-DSN.M.880(d)~~
~~Non-precision approach~~	~~Approach lighting system~~ ~~Visual approach slope indicators[a, d]~~ ~~Runway edge[d]~~ ~~Runway threshold[d]~~ ~~Runway end[d]~~ ~~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 indicators[a, 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 taxiway[a]~~ ~~Obstacle[a]~~	~~15 seconds~~ ~~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. The use of emergency lighting should be in accordance with any procedures established.~~
~~c. One second where no runway centre line lights are provided.~~
~~d. One second where approaches are over hazardous or precipitous terrain.~~

~~Table S-1. Secondary power supply requirements~~

Amend CS ADR-DSN.T.900 as follows:

CS ADR-DSN.T.900 Emergency access and service roads

Emergency access roads and service roads should be equipped with a road-holding position, in accordance with CS ADR-DSN.L.600, CS ADR-DSN.M.770 and CS ADR-DSN.N.800, as appropriate, at all intersections with runway and taxiways.

Amend CS ADR-DSN.T.915 as follows:

CS ADR-DSN.T.915 Siting of equipment and installations on operational areas

(...)

(d) Unless its function requires it to be there for air navigation or for aircraft safety purposes, or if after a safety assessment, it is determined that it would not adversely affect the safety or significantly affect the regularity of operations of aeroplanes, no equipment or installation should be located within 240 m from the end of the strip and within:

(1) 60 m of the extended centre line where the code number is 3 or 4; or

(2) 45 m of the extended centre line where the code number is 1 or 2;

of a precision approach runway ~~c~~Category I, II or III.

(e) Any equipment or installation required for air navigation or for aircraft safety purposes which should be located on or near a strip of a precision approach runway ~~c~~Category I, II, or III and which:

(...)

(...)

Amend CS ADR-DSN.U.930 as follows:

CS ADR-DSN.U.930 Colours for aeronautical ground lights

(...)

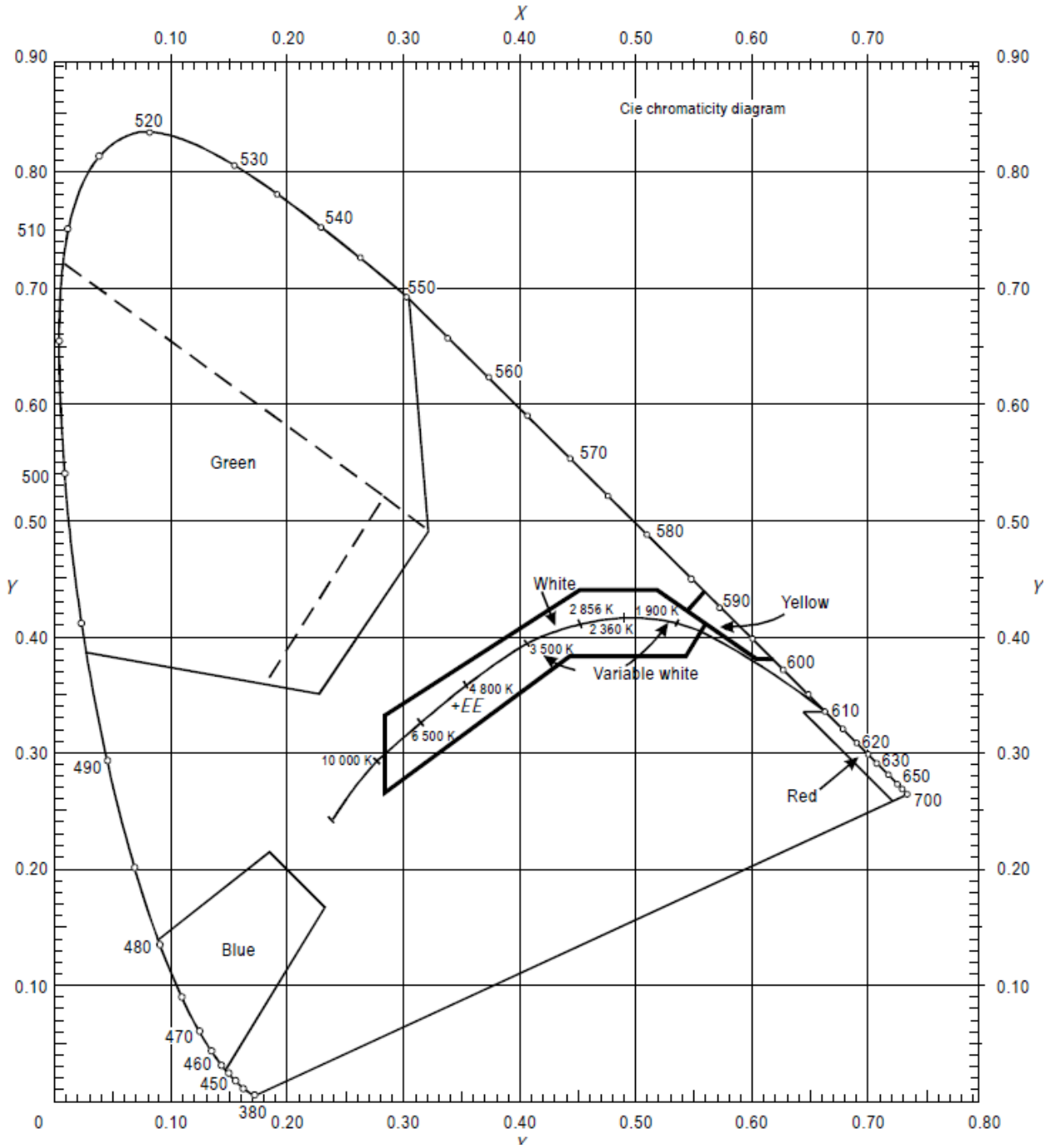
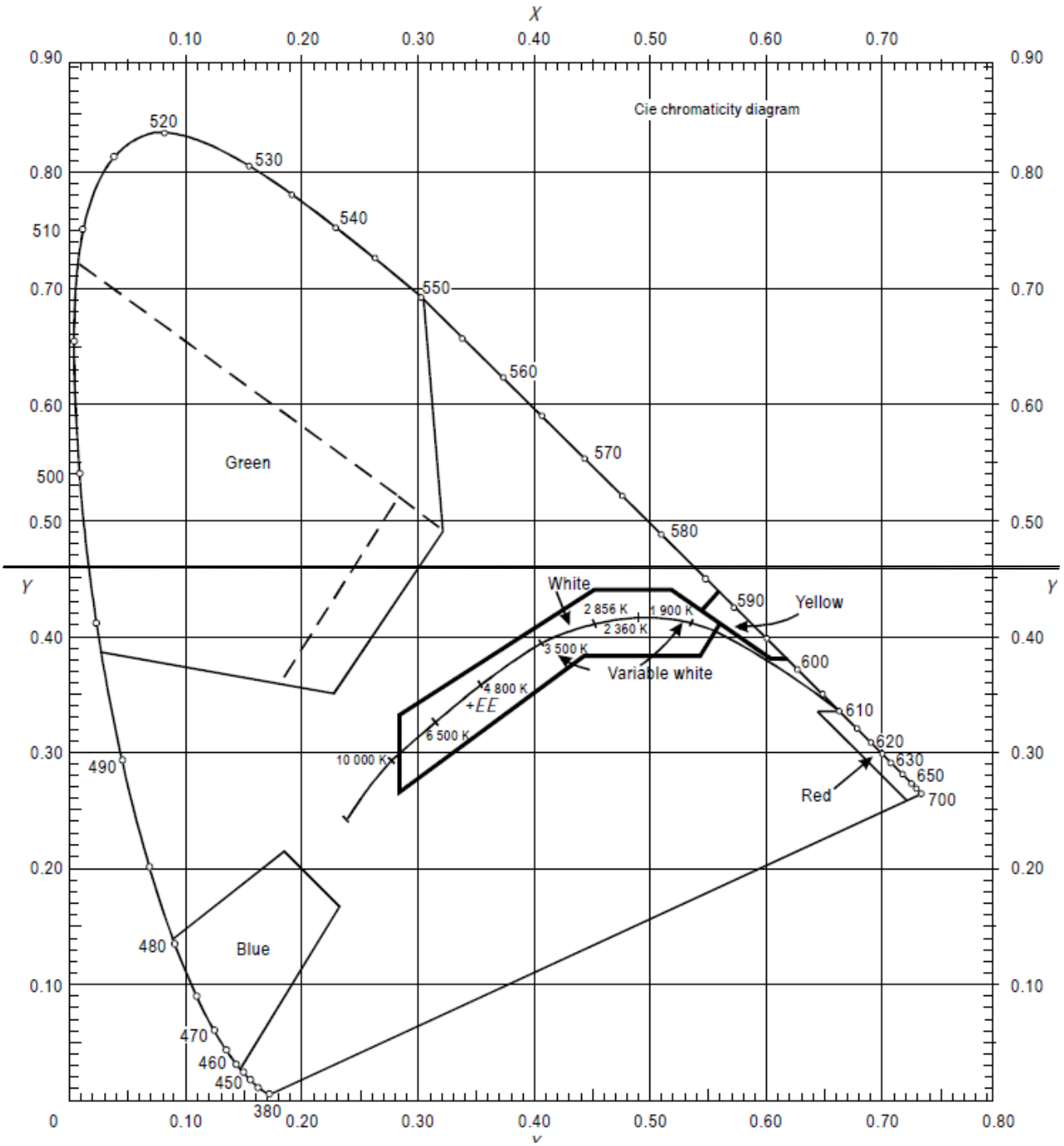


Figure U-1. Colours for aeronautical ground lights

Amend CS ADR-DSN.U.935 as follows:

CS ADR-DSN.U.935 Colours for markings, signs and panels

(...)



~~Figure U-1. Colors for aeronautical ground lights~~

Amend CS ADR-DSN.U.940 as follows:

CS ADR-DSN.U.940 Aeronautical ground light characteristics

(...)

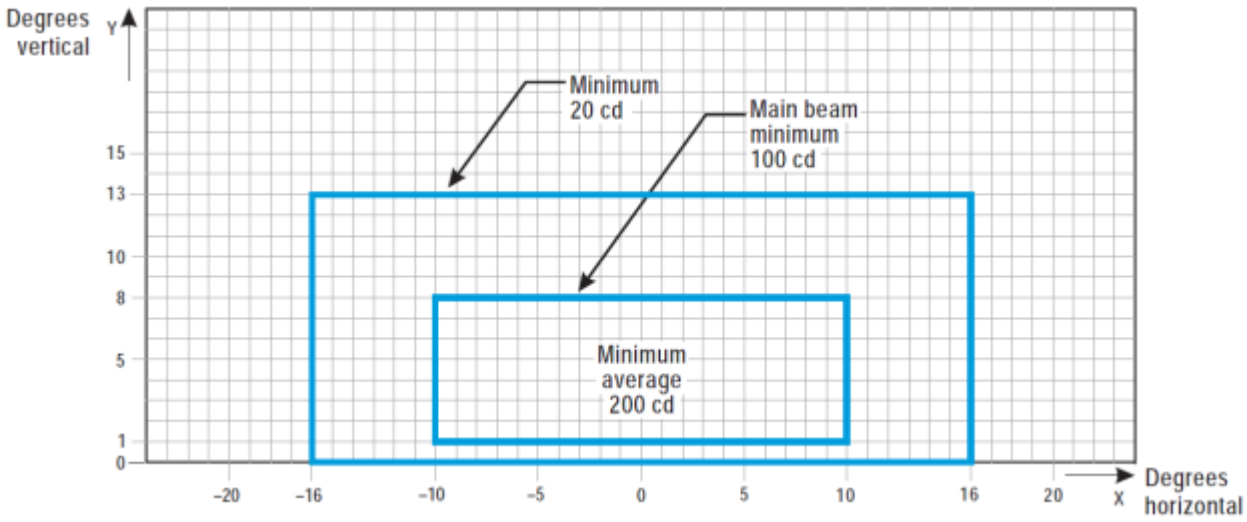


Figure U-16. Isocandela diagram for taxiway centre line (15 m spacing), no-entry bar, and stop bar lights in straight sections intended for use in runway visual range conditions of less than a value of 350 m where large offsets can occur and for low-intensity runway guard lights, Configuration B

Notes:

(a) 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.

(b) See collective notes for Figures U-16 to U-25.

(c) Increased intensities for enhanced rapid exit taxiway centre line lights are four times the respective intensities in the figure (i.e. 800 cd for minimum average main beam).

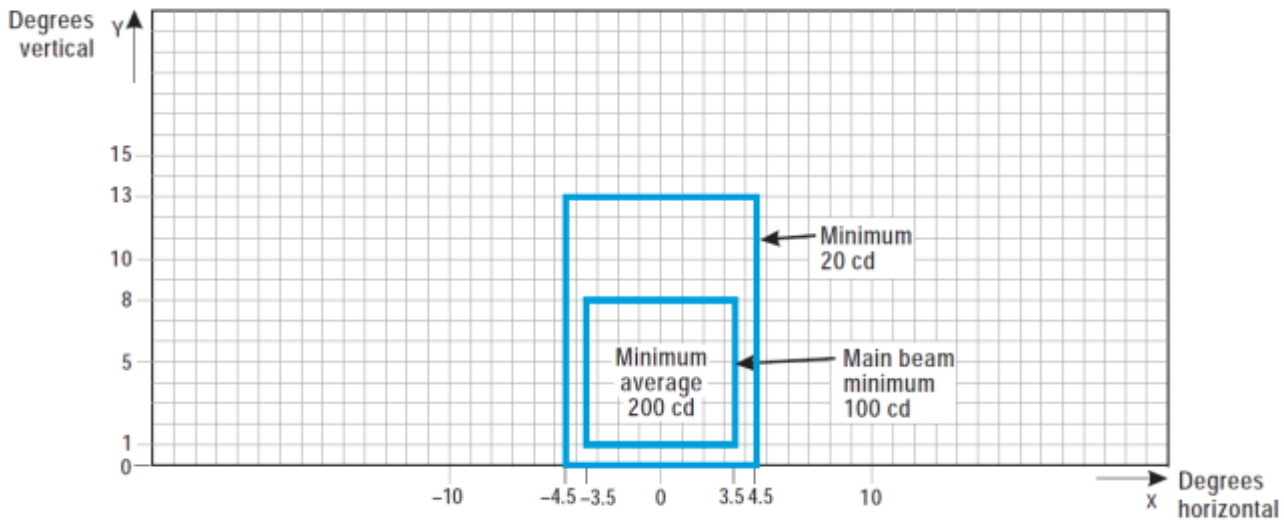


Figure U-17. Isocandela diagram for taxiway centre line (15 m spacing), no-entry bar, and stop bar lights in straight sections intended for use in runway visual range conditions of less than a value of 350 m

Notes:

(a) These beam coverages are generally satisfactory and cater for a normal displacement of the cockpit from the centre line of approximately 3 m.

(b) See collective notes for Figures U-16 to U-25.

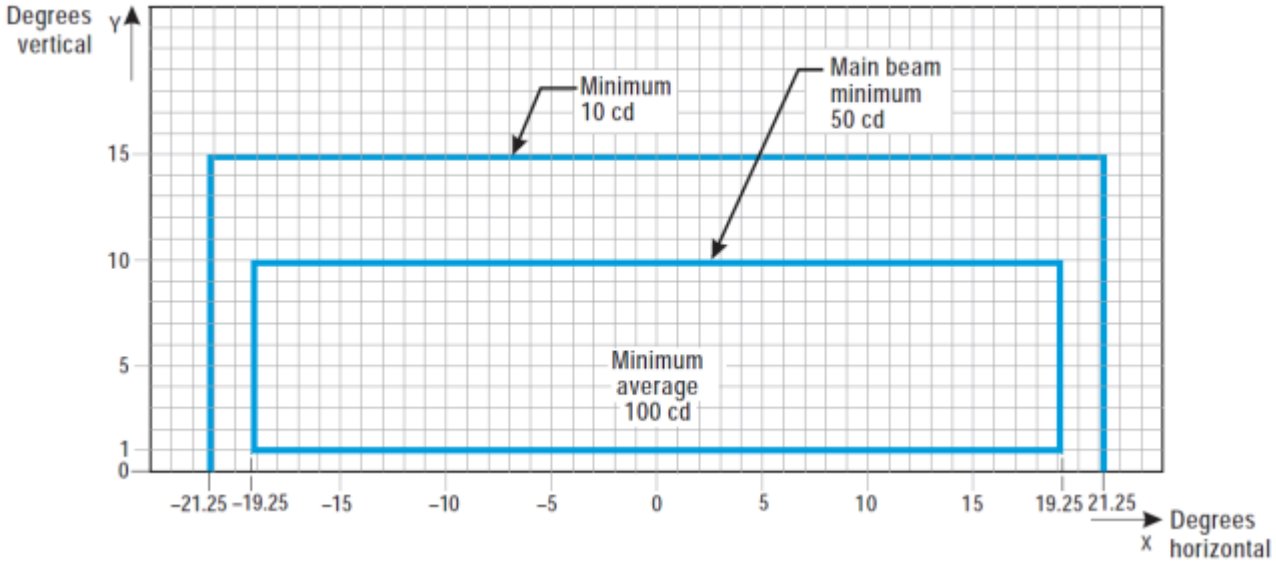


Figure U-18. Isocandela diagram for taxiway centre line (7.5 m spacing), no-entry bar, and stop bar lights in curved sections intended for use in runway visual range conditions of less than a value of 350 m

Notes:

(c) Lights on curves to be toed-in 15.75 degrees with respect to the tangent of the curve.

(d) See collective notes for Figures U-16 to U-25.

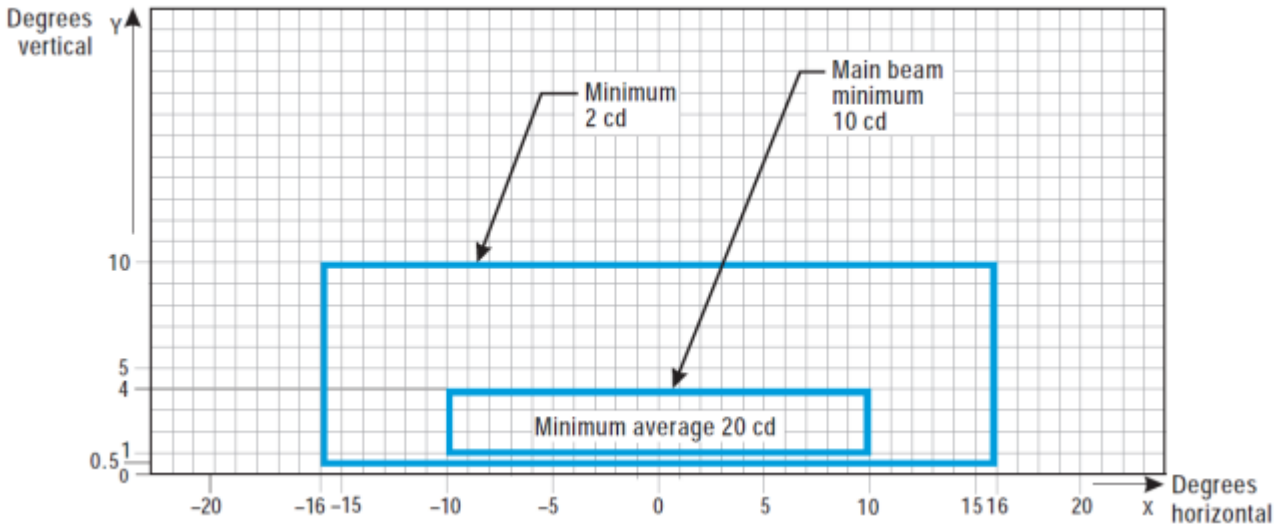


Figure U-19. Isocandela diagram for taxiway centre line (30 m, 60 m spacing), no-entry bar, and stop bar lights in straight sections intended for use in runway visual range conditions of 350 m or greater

Notes:

(a) At locations where high background luminance is usual, and where deterioration of light output resulting from dust, snow, and local contamination is a significant factor, the cd-values should be multiplied by 2.5.

(b) Where omnidirectional lights are used they should comply with the vertical beam requirements in this Figure.

(c) See collective notes for Figures U-16 to U-25.

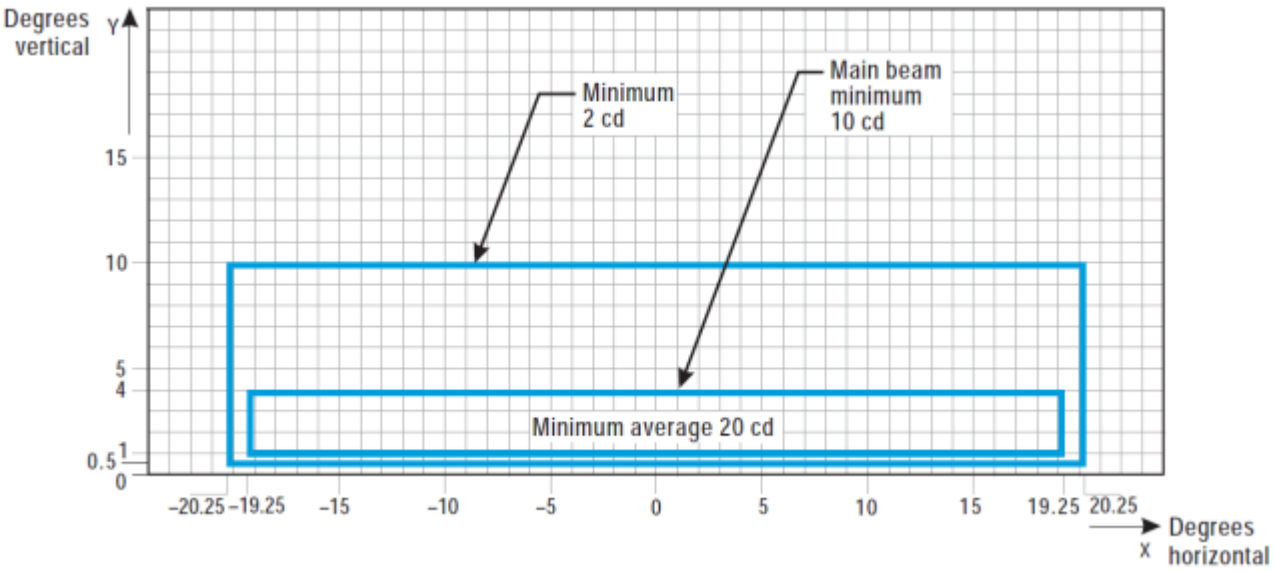


Figure U-20. Isocandela diagram for taxiway centre line (7.5 m, 15 m, 30 m spacing), no-entry bar, and stop bar lights in curved sections intended for use in runway visual range conditions of 350 m or greater

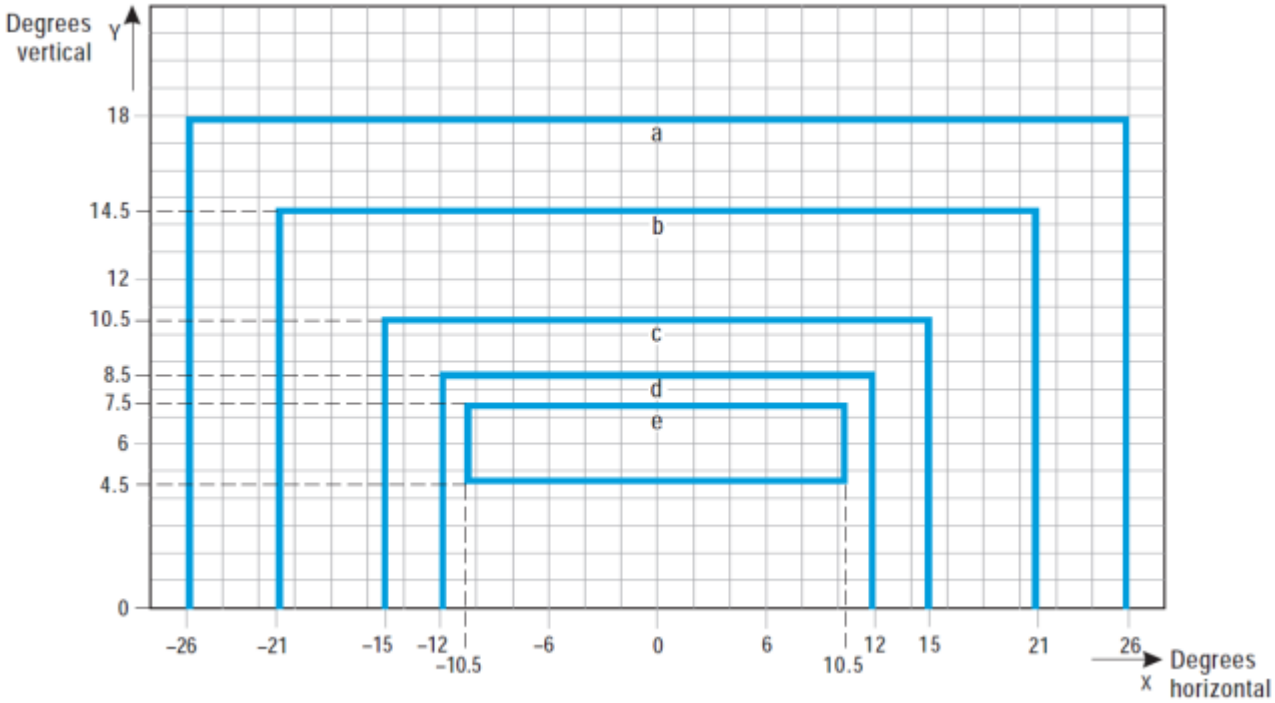
Notes:

(a) Lights on curves to be toed-in 15.75 degrees with respect to the tangent of the curve.

(b) At locations where high background luminance is usual and where deterioration of light output resulting from dust, snow and, local contamination is a significant factor, the cd-values should be multiplied by 2.5.

(c) 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.

(d) See collective notes for Figures U-16 to U-25.



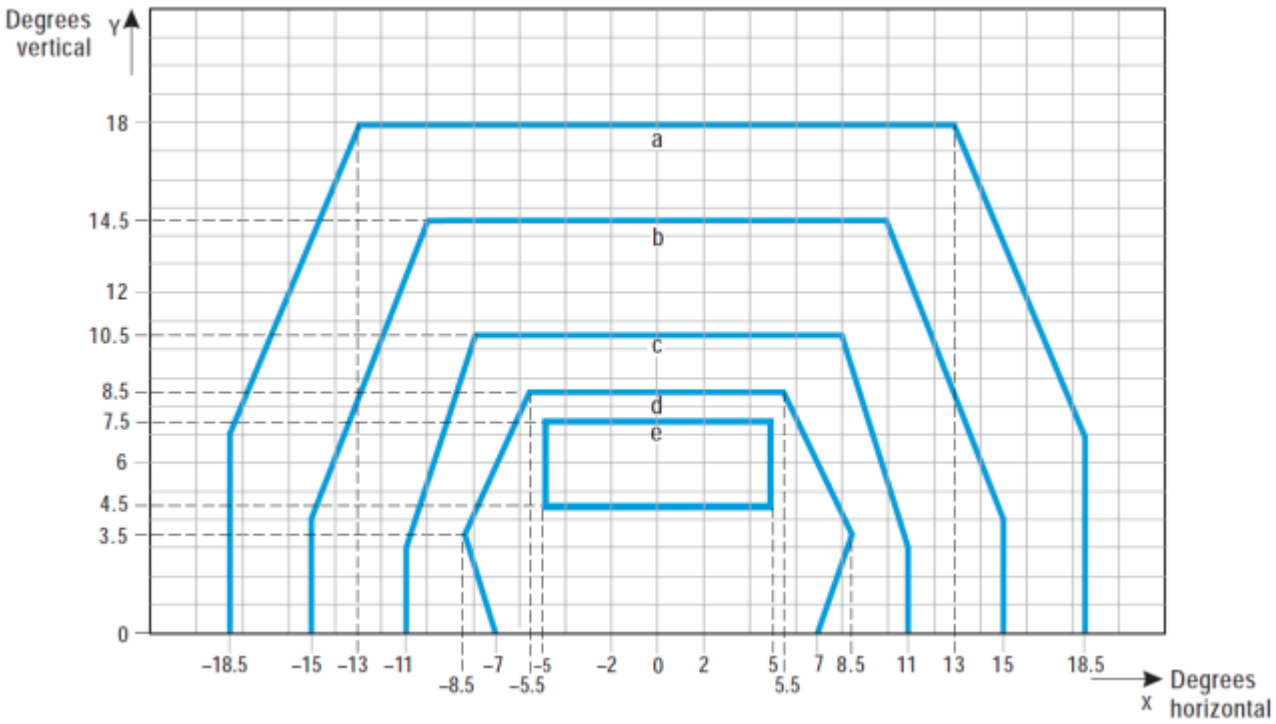
Curve	a	b	c	d	e
Intensity (cd)	8	20	100	450	1800

Figure U-21. 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.

Notes:

(a) 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.

(b) See collective notes for Figures U-16 to U-25.



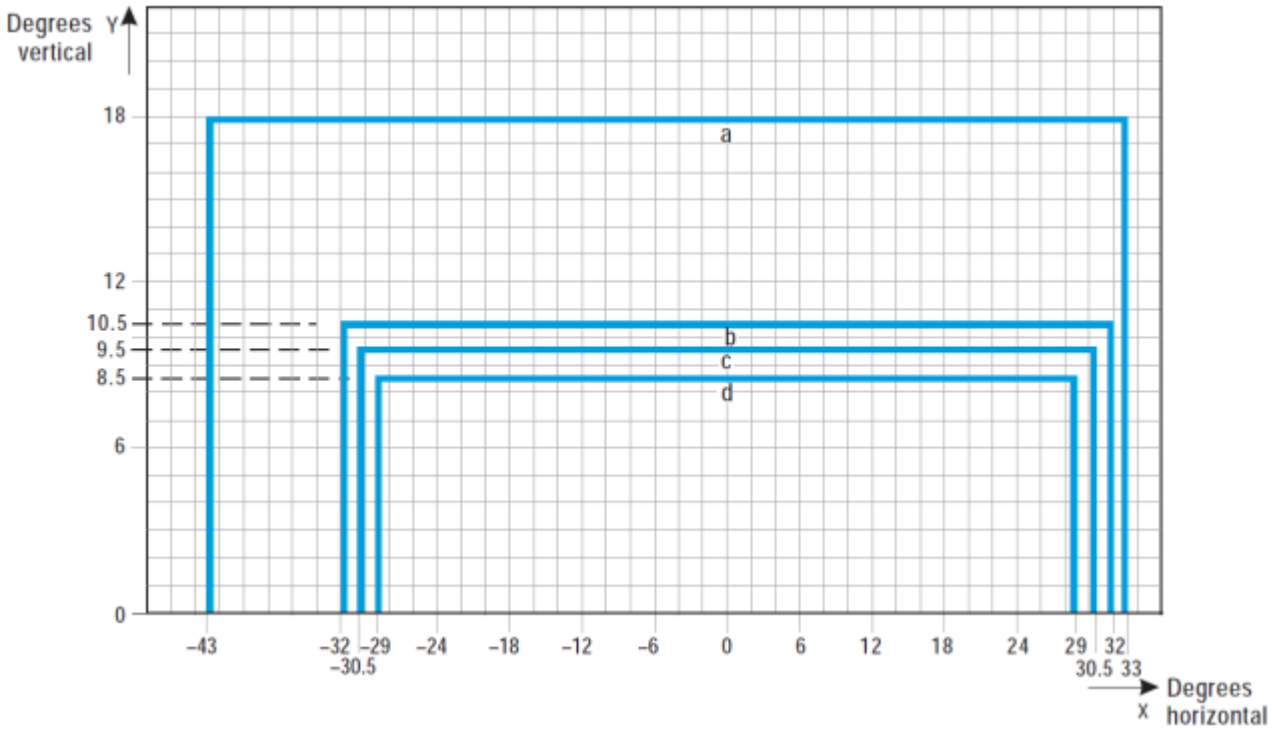
Curve	a	b	c	d	e
Intensity (cd)	8	20	100	450	1800

Figure U-22. 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

Notes:

(a) 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.

(b) See collective notes for Figures U-16 to U-25.



Curve	a	b	c	d
Intensity (cd)	8	100	200	400

Figure U-23. 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:

(a) Lights on curves to be toed-in 17 degrees with respect to the tangent of the curve.

(b) See collective notes for Figures U-16 to U-25.

BOOK 2 – GUIDANCE MATERIAL FOR AERODROMES

Amend GM1 ADR-DSN.A.002 as follows:

GM1 ADR-DSN.A.002 Definitions

i~~I~~ntentionally left blank

Amend GM1 ADR-DSN.A.005 as follows:

GM1 ADR-DSN.A.005 Aerodrome Reference Code

(...)

(c) In addition to the reference code, other aircraft characteristics, such as aircraft length and tail height, may also have an impact on the design of an aerodrome. Additionally, some characteristics of a piece of infrastructure are directly related to one element of the code (wingspan or wheel span) but are not impacted by other. The ~~art of the~~ aerodrome designer should ~~be to~~ consider all the relationships between aircraft characteristics and aerodromes and piece of infrastructures characteristics.

(...)

(e) It is recognised that not all areas of the aerodrome should need to correspond to the critical aeroplane ~~aircraft~~ that determines the Aerodrome Reference Code. Elements of the aerodrome infrastructure that do not meet the requirements of the Aerodrome Reference Code for the design aeroplane ~~aircraft~~ should be designated with an appropriate code letter for its dimensions. Limitations should be identified to aircraft ~~a/c~~ size permitted or operating limitations. ICAO, Annex 14 does not provide sufficient flexibility for infrastructure intended for different sizes of aircraft. It only addresses ~~only~~ the 'design aircraft'. This enables all areas of the aerodrome to reflect the aerodrome reference code.

(f) Further guidance on aerodrome reference code is given in ICAO Doc 9157, Aerodrome Design Manual, Part 1, Runways.

Amend GM1 ADR-DSN.A.010 as follows:

GM1 ADR-DSN.A.010

i~~I~~ntentionally left blank

Amend GM1 ADR-DSN.B.015 as follows:

GM1 ADR-DSN.B.015 Number, siting, and orientation of runways

(...)

(e) 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 in CS~~1~~ ADR-DSN.H.425. Further guidance on these and other factors is given ~~i~~in ICAO Annex 14, 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 should be required to fly when following instrument approach and missed

approach procedures so as to ensure that obstacles in these areas or other factors should not restrict the operation of the aeroplanes for which the runway is intended.

Amend GM1 ADR-DSN.B.035 as follows:

GM1 ADR-DSN.B.035 ~~Actual L~~length of the runway and declared distances

(a) Length of the runway:

(...)

(d) 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~~ICAO Doc 9157, Aerodrome Design Manual, Part 1, Runways.

(...)

Amend GM1 ADR-DSN.B.045 as follows:

GM1 ADR-DSN.B.045 Width of runways

(...)

(b) Factors affecting runway width are given in ~~the~~ICAO Doc 9157, Aerodrome Design Manual, Part 1, Runways.

Amend GM1 ADR-DSN.B.055 as follows:

GM1 ADR-DSN.B.055 Minimum distance between parallel instrument runways

Guidance on procedures and facilities requirements for simultaneous operations on parallel or near-parallel instrument runways are contained in ICAO, PANS-ATM, Doc 4444, Chapter 6 and ICAO, PANS-OPS, Doc 8168, Volume I, Part III, Section 2, and Volume II, Part I, Section 3; Part II, Section 1; and Part III, Section 3, and relevant guidance is contained in ICAO Doc, 9643, Manual on Simultaneous Operations on Parallel or Near-Parallel Instrument Runways (SOIR).~~Intentionally blank~~

Amend GM1 ADR-DSN.B.070 as follows:

GM1 ADR-DSN.B.070 Sight distance for slopes of runways

Runway longitudinal slopes and slopes changes are so designed that the pilot in the aircraft has an unobstructed line of sight over all or as much of the runway as possible, thereby enabling him to see aircraft or vehicles on the runway, and to be able to manoeuvre and take avoiding action.

Amend GM1 ADR-DSN.B.080 as follows:

GM1 ADR-DSN.B.080 Transverse slopes on runways

~~i~~Intentionally left blank

Amend GM1 ADR-DSN.B.085 as follows:

GM1 ADR-DSN.B.085 Runway strength

(...)

~~(d) Overload operations~~

~~(1) Overloading of pavements can result either from loads too large, or from a substantially increased application rate, or both. Loads larger than the defined (design or evaluation) load shorten the design life, whilst smaller loads extend it. With the exception of massive overloading, pavements in their structural behaviour are not subject to a particular limiting load above which they suddenly or catastrophically fail. Behaviour is such that a pavement can sustain a definable load for an expected number of repetitions during its design life. As a result, occasional minor overloading is acceptable, when expedient, with only limited loss in pavement life expectancy and relatively small acceleration of pavement deterioration. For those operations in which magnitude of overload and/or the frequency of use do not justify a detailed analysis, the following criteria are suggested:~~

~~(i) for flexible pavements, occasional movements by aircraft with ACN not exceeding 10 % above the reported PCN should not adversely affect the pavement;~~

~~(ii) for rigid or composite pavements in which a rigid pavement layer provides a primary element of the structure, occasional movements by aircraft with ACN not exceeding 5 % above the reported PCN should not adversely affect the pavement, and~~

~~(iii) if the pavement structure is unknown, the 5 % limitation should apply; and~~

~~(iv) the annual number of overload movements should not exceed approximately 5 % of the total annual aircraft movements.~~

~~(e) Such overload movements should not normally be permitted on pavements exhibiting signs of distress or failure. Furthermore, overloading should be avoided during any periods of thaw following frost penetration, or when the strength of the pavement or its subgrade could be weakened by water. Where overload operations are conducted, the relevant pavement condition should be reviewed regularly. Also the criteria for overload operations should be reviewed periodically since excessive repetition of overloads can cause severe shortening of pavement life or require major rehabilitation of pavement. Further information is contained in the ICAO Doc 9157, Aerodrome Design Manual, Part 3, Pavements.~~

Amend GM1 ADR-DSN.B.090 as follows:

GM1 ADR-DSN.B.090 Surface of runways

(a) In adopting tolerances for runway surface irregularities, the following standard of construction is achievable for short distances of 3 m and conform to ~~a~~ good engineering practice ~~is that~~: 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 3 m 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.

(...)

(c) Additional guidance on surface of runways is given in ICAO Doc 9157, Aerodrome Design Manual, Part 3, Pavements.

(d) Macrotexture and microtexture should be taken into consideration in order to provide the required surface friction characteristics. Additional guidance is given in GM1 ADR-DSN.B.191. Additional guidance on design and methods for improving runway surface texture is given in ICAO Doc 9157, Aerodrome Design Manual, Part 3, Pavements.

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

Delete SECTION 1 as follows:

~~**SECTION 1 — RUNWAY TURN PADS**~~

Amend GM1 ADR-DSN.B.095 as follows:

GM1 ADR-DSN.B.095 Runway turn pads

(...)

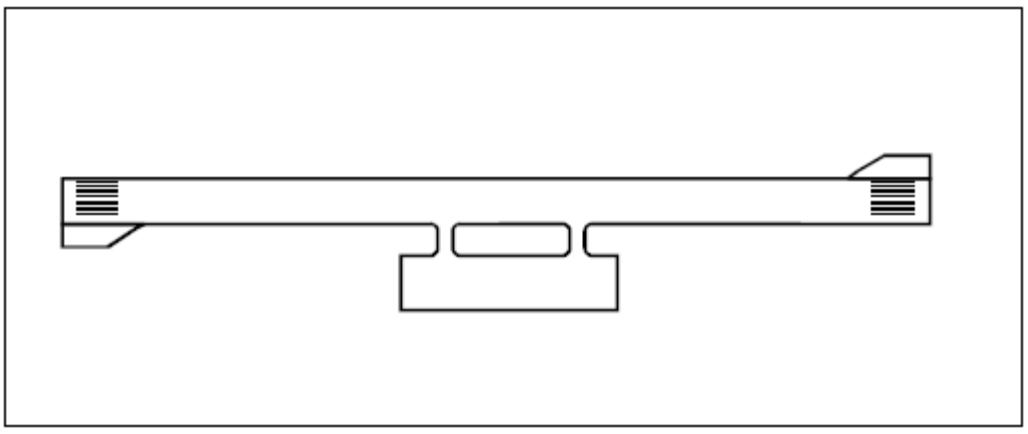


Figure GM-B-3. Typical turn pad layout

Amend GM1 ADR-DSN.B.105 as follows:

GM1 ADR-DSN.B.105 Strength of runway turn pads

i~~I~~ntentionally left blank

Amend GM1 ADR-DSN.B.110 as follows:

GM1 ADR-DSN.B.110 Surface of runway turn pads

i~~I~~ntentionally left blank

Amend GM1 ADR-DSN.B.120 as follows:

GM1 ADR-DSN.B.120 Strength of shoulders for runway turn pads

i~~I~~ntentionally left blank

Delete SECTION 2 as follows:

~~**SECTION 2 — RUNWAY SHOULDERS**~~

Amend GM1 ADR-DSN.B.125 as follows:

GM1 ADR-DSN.B.125 Runway shoulders

(...)

(c) However, for runways where the code letter is D, there may be circumstances where the shoulder need not be paved. Where the runway is not used by 4-engined aircraft, it may be possible to contain the risk from erosion or the ingestion of debris in the absence of paved shoulders. In such cases:

(1) The ground should be prepared so that there is full grass coverage with no loose gravel or other material. This may include additional materials if the bearing strength and surface of the ground are not sufficient.

(2) A programme of inspections of the shoulders and runway may be implemented to confirm its continuing serviceability, and ensure that there is no deterioration that could create a risk of foreign object debris (FOD), or otherwise hazard aircraft operations.

(...)

The runway shoulder width may be reduced if the width of the runway and the configuration of the aircraft so permit, and confirmed by safety assessment. Further guidance is given in ICAO Doc 9157, Aerodrome Design Manual, Part 1, Runways~~)~~.

Amend GM1 ADR-DSN.B.130 as follows:

GM1 ADR-DSN.B.130 Slopes on runway shoulders

i~~I~~ntentionally left blank

Amend GM1 ADR-DSN.B.135 as follows:

GM1 ADR-DSN.B.135 Width of runway shoulders

i~~I~~ntentionally left blank

Amend GM1 ADR-DSN.B.140 as follows:

GM1 ADR-DSN.B.140 Strength of runway shoulders

Additional ~~G~~guidance on strength of runway shoulders is given in ~~the~~ ICAO~~,~~ Doc 9157, Aerodrome Design Manual Part 1, Runways.

~~(b) Additional guidance on strength of runway shoulders is given in ICAO Doc 9157, Aerodrome Design Manual, Part 1, Runways.~~

Delete SECTION 3 as follows:

~~**SECTION 3 — RUNWAY STRIP**~~

Amend GM1 ADR-DSN.B.150 as follows:

GM1 ADR-DSN.B.150 Runway strip to be provided

i~~I~~ntentionally left blank

Amend GM1 ADR-DSN.B.155 as follows:

GM1 ADR-DSN.B.155 Length of runway strip

i~~I~~ntentionally left blank

Amend GM1 ADR-DSN.B.160 as follows:

GM1 ADR-DSN.B.160 Width of runway strip

~~i~~Intentionally left blank

Amend GM1 ADR-DSN.B.165 as follows:

GM1 ADR-DSN.B.165 Objects on runway strips

Within the graded ~~general~~ portion ~~area~~ of the runway strip ~~adjacent to the runway~~, measures should be taken to prevent an aeroplane's wheel when sinking into the ground, from striking a hard vertical face. Special problems may arise for runway light fittings or other objects mounted in the strip or at the intersection with a taxiway or another runway. In the case of constructions within the graded portion of the runway strip, such as intersecting runways or taxiways, where the surface should also be flush with the strip surface, they should be delethalised, that is, so constructed as to avoid presenting a buried vertical face to aircraft wheels in soft ground conditions in any direction from which an aircraft is likely to approach. A~~a~~ vertical face can be eliminated by chamfering from the top of those constructions to not less than 30 cm below the strip surface level. Other objects situated within the graded portion of the runway strip, the functions of which do not require them to be at surface level, should be buried to a depth of not less than 30 cm. Where this is not feasible, to eliminate a buried vertical surface, a slope should be provided which extends from the top of the construction to not less than 30 cm below ground level. The slope can be created by using a mixture of compacted gravel or asphalt or crushed aggregates and soil. ~~The slope should be no greater than 1:10.~~

Amend GM1 ADR-DSN.B.170 as follows:

GM1 ADR-DSN.B.170

~~i~~Intentionally left blank

Amend GM1 ADR-DSN.B.175 as follows:

GM1 ADR-DSN.B.175 Grading of runway strips

(a) For a precision approach runway, where the code number is 3 or 4, it may be desirable ~~to adopt~~ a greater width of that portion of a strip to be graded should be considered. ~~where the code number is 3 or 4.~~ Figure GM-B-4 shows the shape and dimensions of a wider strip that may be considered for such a runway. This strip has been designed using information on aircraft running off runways. The portion to be graded extends to a distance of 105 m from the centre line, except that the distance is gradually reduced to 75 m from the centre line at both ends of the strip, for a length of 150 m from the runway end.

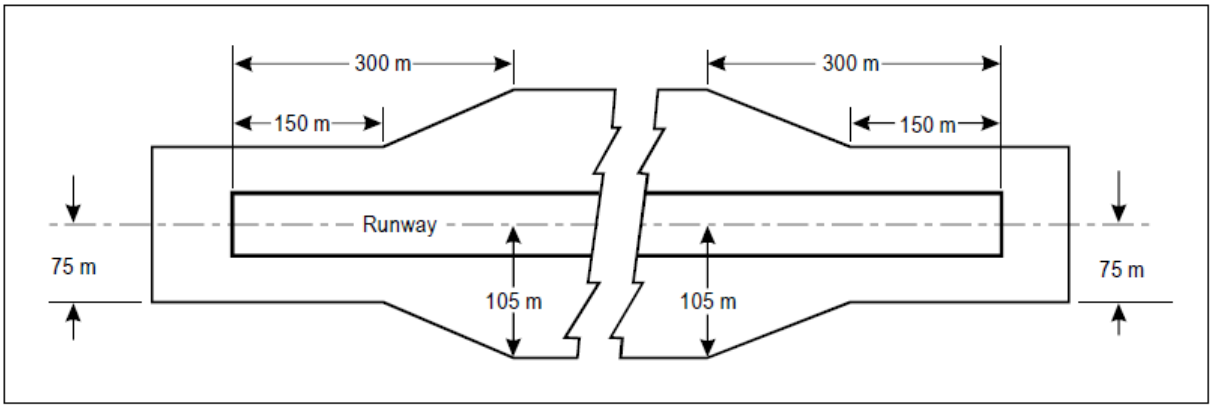


Figure GM-B-4. Graded portion of a strip including a precision approach runway where the code number is 3 or 4

(b) Where the areas in paragraph (a) above have paved surface, they should be able to withstand the occasional passage of the critical aeroplane for runway pavement design.

(c) The area adjacent to the end of a runway may be referred to as a blast pad.

(d) Additional guidance on grading is given in ICAO Doc 9157, Aerodrome Design Manual Part 1, Runways.

Amend GM1 ADR-DSN.B.180 as follows:

GM1 ADR-DSN.B.180 Longitudinal Slopes on runway strips

i~~I~~ntentionally left blank

Amend GM1 ADR-DSN.B.185 as follows:

GM1 ADR-DSN.B.185 Transverse slopes on runway strips

i~~I~~ntentionally left blank

Amend GM1 ADR-DSN.B.190 as follows:

GM1 ADR-DSN.B.190 Strength of runway strips

Since the graded portion of a strip is provided to minimise the hazard to an aircraft running off the runway, it should ~~be graded~~ grant sufficient strength in such a manner as to prevent the collapse of the ~~landing~~ nose landing gear of the aircraft. The surface should be prepared in such a manner as to provide drag to an aircraft and below the surface, it should have sufficient bearing strength to avoid damage to the aircraft. To meet these divergent needs, the following guidelines are provided for preparing the strip. It is noted, that a depth of 15 cm is a depth to which the nose gear may sink without collapsing. Therefore, it is recommended that the soil at a depth of 15 cm below the finished strip surface should be prepared to have a sufficient stability, demonstrated by bearing strength of California Bearing Ratio (CBR) value of 15 to 20. The intention of this is to prevent the nose gear

from damage. The top 15 cm may be of lesser strength which would facilitate deceleration of aircraft. There are also other methods ~~technical systems~~ for soil investigation. In case of a deeper sinking than 15 cm, the maximum wheel sinking without collapsing should be examined by using different ~~technical systems~~ methods of soil investigation. ~~The intention of this is to prevent the nose gear from damage. The top 15 cm may be of lesser strength which would facilitate deceleration of aircraft.~~

Insert new GM1 ADR-DSN.B.191 as follows:

GM1 ADR-DSN.B.191 Drainage characteristics of the movement area and adjacent areas

(a) Rapid drainage of surface water is a primary safety consideration in the design, construction and maintenance of movement area and adjacent areas.

(b) There are two distinct drainage processes:

(1) natural drainage of the surface water from the top of the pavement surface until it reaches the final recipient such as rivers or other water bodies; and

(2) dynamic drainage of the surface water trapped under a moving tire until it reaches outside the tire-to-ground contact area.

Both drainage processes can be controlled through design, construction and maintenance of the pavements in order to prevent accumulation of water on the pavement surface.

(c) Surface drainage is a basic requirement and serves to minimise water depth on the surface. Adequate surface drainage is provided primarily by an appropriately sloped surface (in both the longitudinal and transverse directions). The resulting combined longitudinal and transverse slope is the path for the drainage runoff. This path can be shortened by adding transverse grooves.

(d) Dynamic drainage is achieved through built-in texture in the pavement surface. The rolling tire builds up water pressure and squeezes the water out the escape channels provided by the texture. The dynamic drainage of the tire-to-ground contact area may be improved by adding transverse grooves provided that they are subject to rigorous maintenance.

(e) Through construction, the drainage characteristics of the surface are built into the pavement. These surface characteristics are:

(1) Slopes;

(2) Texture:

(i) Microtexture;

(ii) Macrotexture.

(f) Slopes for the various parts of the movement area and adjacent parts are described in Chapters B to G and figures are given as per cent. Further guidance is given in ICAO Doc 9157, Aerodrome Design Manual, Part 1, Runways, Chapter 5.

(g) Texture in the literature is described as microtexture or macrotexture. These terms are understood differently in various part of the aviation industry.

(h) Microtexture is the texture of the individual stones and is hardly detectable by the eye. Microtexture is considered a primary component in skid resistance at slow speeds. On a wet surface at higher speeds a water film may prevent direct contact between the surface asperities and the tire due to insufficient drainage from the tire-to-ground contact area. Microtexture is a built-in quality of the pavement surface. By specifying crushed material that will withstand polishing microtexture, drainage of thin water films are ensured for a longer period of time. Resistance against polishing is expressed in terms of the polished stone values (PSV) which is in principle a value obtained from a friction measurement in accordance with international standards. These standards define the PSV minima that will enable a material with a good microtexture to be selected. A major problem with microtexture is that it can change within short time periods without being easily detected. A typical example of this is the accumulation of rubber deposits in the touchdown area which will largely mask microtexture without necessarily reducing macrotexture.

(k) Macrotexture is the texture among the individual stones. This scale of texture may be judged approximately by the eye. Macrotexture is primarily created by the size of aggregate used or by surface treatment of the pavement and is the major factor influencing drainage capacity at high speeds. Materials should be selected so as to achieve good macrotexture.

(l) The primary purpose of grooving a runway surface is to enhance surface drainage. Natural drainage can be slowed down by surface texture, but grooving can speed up the drainage by providing a shorter drainage path and increasing the drainage rate.

(m) For measurement of macrotexture, simple methods such as the ‘sand and grease patch’ methods described in ICAO Doc 9137, Airport Services Manual, Part 2, Pavement Surface Conditions were developed. These methods were used for the early research on which current airworthiness requirements are based and which refer to a classification categorising macrotexture from A to E. This classification was developed, using sand or grease patch measuring techniques, and issued in 1971 by the Engineering Sciences Data Unit (ESDU).

Runway classification based on texture information from ESDU 71026:	
Classification	Texture depths (mm)
A	0.10 – 0.14
B	0.15 – 0.24
C	0.25 – 0.50
D	0.51 – 1.00
E	1.01 – 2.54

(n) Using this classification, the threshold value between microtexture and macrotexture is 0.1 mm mean texture depth (MTD). Related to this scale, the normal wet runway aircraft performance is based upon texture giving drainage and friction qualities midway between

classification B and C (0.25 mm). Improved drainage through better texture might qualify for a better aircraft performance class. However, such credit must be in accordance with aeroplane manufacturers' documentation. Presently credit is given to grooved or porous friction course runways following design, construction and maintenance criteria. The harmonised certification standards of some States refer to texture giving drainage and friction qualities midway between classification D and E (1.0 mm).

(o) For construction, design and maintenance, various international standards are used. Currently ISO 13473-1: 'Characterization of pavement texture by use of surface profiles — Part 1: Determination of Mean Profile Depth' links the volumetric measuring technique with non-contact profile measuring techniques giving comparable texture values. These standards describe the threshold value between microtexture and macrotexture as 0.5 mm. The volumetric method has a validity range from 0.25 to 5 mm MTD. The profilometry method has a validity range from 0 to 5 mm mean profile depth (MPD). The values of MPD and MTD differ due to the finite size of the glass spheres used in the volumetric technique and because the MPD is derived from a two-dimensional profile rather than a three-dimensional surface. Therefore, a transformation equation must be established for the measuring equipment used to relate MPD to MTD.

(p) The ESDU scale groups runway surfaces based on macrotexture from A through E, where E represents the surface with best dynamic drainage capacity. The ESDU scale thus reflects the dynamic drainage characteristics of the pavement. Grooving any of these surfaces enhances the dynamic drainage capacity. The resulting drainage capacity of the surface is thus a function of the texture (A through E) and grooving. The contribution from grooving is a function of the size of the grooves and the spacing between the grooves. Aerodromes exposed to heavy or torrential rainfall must ensure that the pavement and adjacent areas have drainage capability to withstand these rainfalls or put limitations on the use of the pavements under such extreme situations. These airports should seek to have the maximum allowable slopes and the use of aggregates providing good drainage characteristics. They should also consider grooved pavements in the E classification to ensure that safety is not impaired.

Delete SECTION 4 as follows:

~~**SECTION 4 — CLEARWAYS, STOPWAYS AND RADIO ALTIMETER OPERATING AREA**~~

Amend GM1 ADR-DSN.B.200 as follows:

GM1 ADR-DSN.B.200 Stopways

(...)

(3) The economy of a stopway can be entirely lost if, after each usage, it should be regraded and compacted. Therefore, it should be designed to withstand at least a certain number of loadings of the aeroplane which the stopway is intended to serve without inducing structural damage to the aeroplane. Notwithstanding that a stopway may have a paved surface, it is not intended that PCN Figures need to be developed for a stopway. Further guidance is given ~~may be found~~ in ICAO Doc 4444, PANS-OPS.

Amend GM1 ADR-DSN.B.205 as follows:

GM1 ADR-DSN.B.205 Radio altimeter operating area

(...)

(a) In order to accommodate aeroplanes making auto-coupled approaches and automatic landings (irrespective of weather conditions), it is desirable that slope changes be avoided or kept to a minimum, on a rectangular area at least 300 m long before the threshold of a precision approach runway. The area should be symmetrical about the extended centre line, 120 m wide. When special circumstances so warrant, the width may be reduced to no less than 60 m if a~~n~~ safety assessment indicates that such reduction would not affect the safety of operations of aircraft. This is desirable because these aeroplanes are equipped with a radio altimeter for final height and flare guidance, and when the aeroplane is above the terrain immediately prior to the threshold, the radio altimeter should begin to provide information to the automatic pilot for auto-flare. Where slope changes cannot be avoided, the rate of change between two consecutive slopes should not exceed 2 % per 30 m.

~~(b) The inclusion of detailed specifications for radio altimeter operating area in this GM is not intended to imply that a radio altimeter operating area has to be provided.~~

(b)~~(c)~~ With a radio altimeter operating area in the pre-threshold area of a precision approach runway the margin to calculate the decision altitude should be smaller and the usability of the adjacent runway may be enhanced.

(c)~~(d)~~ Further guidance on radio altimeter operating area is given in ICAO Doc 9365, Manual of All-Weather Operations, ~~(ICAO, Doc 9365,~~ Section 5.2~~)~~. Guidance on the use of radio altimeter is given in the ICAO, PANS-OPS, Volume II, Part II, Section 1.

Amend GM1 ADR-DSN.C.210 as follows:

GM1 ADR-DSN.C.210 Runway end safety areas (RESA)

(a) General

(1) A runway end safety area should provide an area long and wide enough, and suitable to contain overruns and undershoots resulting from a reasonably probable combination of adverse operational factors. On a precision approach runway, the ILS localiser is normally the first upstanding obstacle, and the runway end safety area should extend up to this facility. In other circumstances ~~and on a non-precision approach runway~~, the first upstanding obstacle may be a road, a railroad, or other constructed or natural feature. ~~In such circumstances,~~ ~~t~~The provisions of a runway end safety area should ~~extend as far as the obstacle~~ take such obstacle into consideration.

(...)

(b) Assessment of runway end safety areas

(...)

(2) Combined with this, measures may be considered that would reduce the severity of the consequences should an event occur. Wherever practicable, aerodrome operators should seek to optimise the RESA. This may be achieved through a combination of:

(...)

(iii) reducing runway declared distances in order to provide the necessary RESA may be a viable option where the existing runway length exceeds that required for the existing or projected design aircraft. If the take-off distance required for the critical aircraft operating at the aerodrome is less than the take-off distance available, there may be an opportunity to reduce the relevant runway declared distances. 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/or installation of an arresting system;

(...)

(...)

(c) Arresting systems on runway end safety areas

(1) In recent years, recognising the difficulties associated with achieving a standard runway end safety area (RESA) at all aerodromes, research programmes have been undertaken on the use of various materials for arresting systems. Furthermore, research programmes have been undertaken to evaluate and develop arrestor systems using engineered materials ~~(EMAS)~~. This research was driven by the recognition that many runways where natural obstacles, local development, and/or environmental constraints inhibit the provision of RESA ~~(as required by changes to ICAO SARPS in 1999)~~ and lead to limited dimension of RESA~~s~~. Additionally, there had been accidents at some aerodromes where the ability to stop an overrunning aeroplane within the RESA would have prevented major damage to aeroplane and/or injuries to passengers.

(2) The research programmes, as well as evaluation of actual aeroplane overruns into arresting system, ~~an EMAS installation,~~ have demonstrated that the performance of some arresting ~~EMAS~~ systems can be predictable and ~~are~~ effective in arresting aeroplane overruns.

(3) ~~EMAS or other a~~Arresting system designs should be supported by a validated design method that can predict the performance of the system. The design method should be derived from field or laboratory tests. Testing may be based either on passage of an actual aircraft or an equivalent single wheel load through a test bed. The design should 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. The model should calculate imposed aircraft gear loads, g-forces on aircraft occupants, deceleration rates, and stopping distances within the arresting system. Any rebound of the crushed material that may lessen its effectiveness, should also be considered.

(4) 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 should be based on the type of aeroplane ~~aircraft~~ anticipated to use the associated runway that imposes the greatest demand upon the arresting system. The ~~system~~ design of an arresting system should be based on a critical (or design) aircraft which is defined as aircraft using the associated runway that imposes the greatest demand upon the arresting system. This is usually but not always, the heaviest/largest aircraft that regularly uses the runway. Arresting system performance is dependent not only on aircraft weight but allowable aeroplane ~~landing~~ gear loads, gear configuration, ~~and~~ tire contact pressure, aeroplane centre of gravity and aeroplane

speed. Accommodating undershoots should also be addressed. All configurations should be considered in optimising the arresting system design. The aerodrome operator and arresting system manufacturer should consult regarding the selection of the design aeroplane ~~aircraft~~ that should optimise the arresting system for a particular aerodrome. Additionally, the design should allow the safe operation of fully loaded rescue and fire fighting vehicles, including their ingress and egress.

~~(5) EASA considers that the FAA performance specifications and requirements which have been accepted by the ICAO Aerodromes Panel, provide suitable information for aerodromes considering the installation of arresting systemEMAS. Therefore, attention is drawn to the documents listed below which give guidance on the requirements and evaluation process used by the FAA:~~

~~(i) FAA Advisory Circular 150/5300-13 — 'Airport Design';~~

~~(ii) FAA Advisory Circular 150/5220-22BA — 'Engineered Materials Arresting Systems(EMAS) for Aeroplane Overruns';~~

(iii) ~~FAA Order 5200.8 — 'Runway Safety Area Program';~~

~~(iv) FAA Order 5200.9 — 'EMAS Financial Feasibility and Equivalency'.~~

~~(6) The presence of an arresting system should be published in the AIP entry and information/instructions promulgated to local runway safety teams and others to promote awareness in the pilot community.~~

(5)~~(7)~~ Additional information is given in ~~the~~ ICAO Doc 9157, Aerodrome Design Manual, Part 1, Runways.

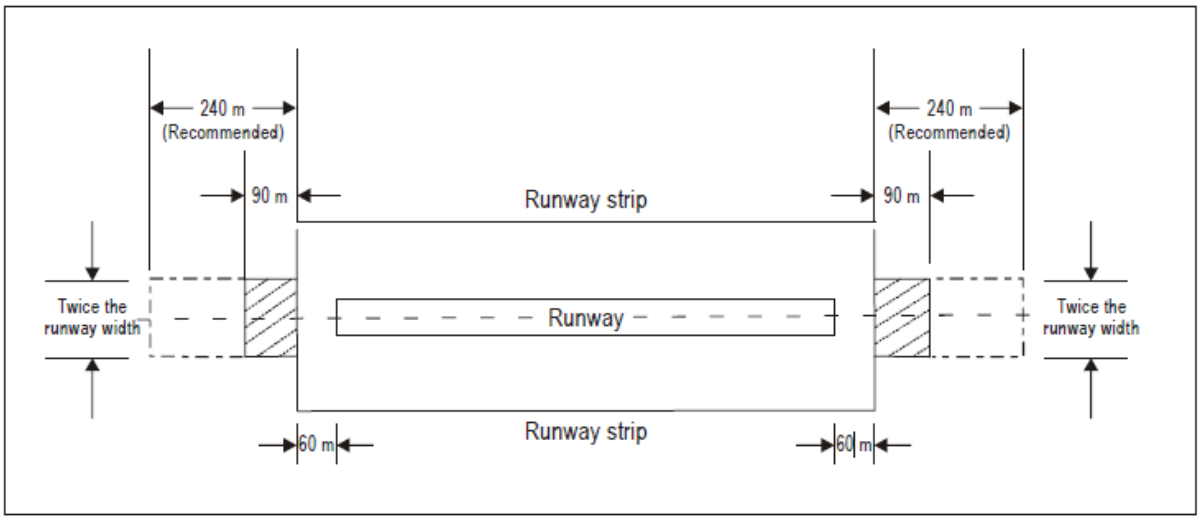


Figure GM-C-1. Runway end safety area for a runway where the code number is 3 or 4

Amend GM1 ADR-DSN.C.225 as follows:

GM1 ADR-DSN.C.225 Clearing and grading of runway end safety areas

(...)

(b) Guidance on ~~C~~clearing and grading of runway end safety areas is given in ~~the~~ ICAO Doc 9157, Aerodrome Design Manual, Part 1, Runways~~)~~.

Amend GM1 ADR-DSN.C.235 as follows:

GM1 ADR-DSN.C.235 Strength of runway end safety areas

(...)

(b) Guidance on the strength of a runway end safety area is given in the GM1 ADR-DSN.B.190 Strength of runway strips and in ICAO Doc 9157, Aerodrome Design Manual, Part 1, Runways~~)~~.

Amend GM1 ADR-DSN.D.240 as follows:

GM1 ADR-DSN.D.240 Taxiways general

(...)

(e) A perimeter taxiway is ideally designed according to the following criteria:

(1) Sufficient space is required between the landing threshold and the taxiway centre line where it crosses under the approach path, to enable the critical aeroplane ~~aircraft~~ to pass under the approach without violating the approach surface.

(...)

(...)

(g) The runway/taxiway junction configuration should be simple ~~'regular'~~, for example with single taxiway entrances; this is particularly relevant ~~especially important~~ for taxiways crossing ~~across~~ runways. ~~Examples of good configuration include:~~

(h) The main design principles for entry and exit taxiways are :

(1) Taxiways should be perpendicular to the runway centre line if possible.

(...)

(i) Aerodrome infrastructure can also be used to support design, whether by the systems installed or by their operating characteristics. Examples include:

(...)

(1) Avoid confusion between CAT I ~~Cat 1~~ and CAT III ~~Cat 3~~ holding positions. This may be achieved in some circumstances by combining both holding positions.

(j) Guidance on layout of taxiways is given in ~~the~~ ICAO Doc 9157, Aerodrome Design Manual, Part 2, Taxiways, Aprons and Holding Bays~~)~~.

Amend GM1 ADR-DSN.D.250 as follows:

GM1 ADR-DSN.D.250 Taxiways curves

(...)

(c) An example of widening taxiways to achieve the wheel clearance specified is illustrated in Figure GM-D-1. Guidance on the values of suitable dimensions is given in ~~the~~ ICAO Doc 9157, Aerodrome Design Manual, Part 2, Taxiways, Aprons and Holding Bays).

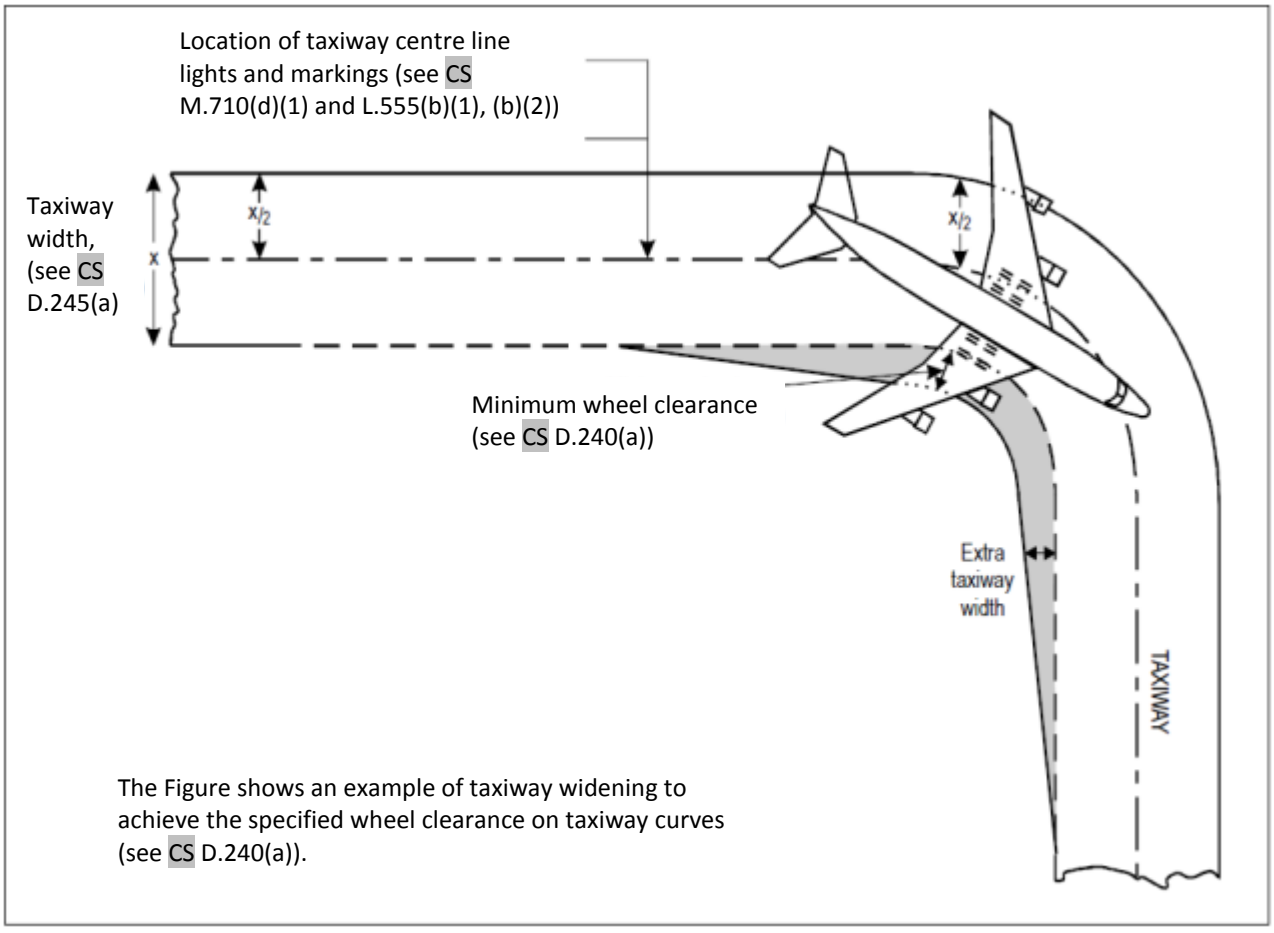


Figure GM-D-1. Taxiway curve

Amend GM1 ADR-DSN.D.255 as follows:

GM1 ADR-DSN.D.255 Junction and intersection of taxiways

Consideration should 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~~ ICAO Doc 9157, Aerodrome Design Manual, Part 2, Taxiways, Aprons and Holding Bays~~)~~.

Amend GM1 ADR-DSN.D.260 as follows:

GM1 ADR-DSN.D.260 Taxiway minimum separation distance

(a) Guidance on factors which may be considered in the safety assessment is given in ~~the~~ ICAO Doc 9157, Aerodrome Design Manual, Part 2, Taxiways, Aprons and Holding Bays.

(...)

(c) The separation distances, as prescribed in Table D-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~~ ICAO Doc 9157, Aerodrome Design Manual, Part 2, Taxiways, Aprons and Holding Bays.

Amend GM1 ADR-DSN.D.265 as follows:

GM1 ADR-DSN.D.265 Longitudinal slopes on taxiways

i~~I~~ntentionally left blank

Amend GM1 ADR-DSN.D.270 as follows:

GM1 ADR-DSN.D.270 Longitudinal slope changes on taxiways

i~~I~~ntentionally left blank

Amend GM1 ADR-DSN.D.275 as follows:

GM1 ADR-DSN.D.275 Sight distance of taxiways

i~~I~~ntentionally left blank

Amend GM1 ADR-DSN.D.285 as follows:

GM1 ADR-DSN.D.285 Strength of taxiways

Information regarding pavement bearing strength, including the ACN/PCN classification system may be found in GM1 -ADR-DSN.B.085.

Due consideration being given to the fact that a taxiway should 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.

Amend GM1 ADR-DSN.D.290 as follows:

GM1 ADR-DSN.D.290 Surface of taxiways

Suitable surface friction characteristics are those surface properties required on taxiways that assure safe operation of aeroplanes. ~~Intentionally blank~~

Amend GM1 ADR-DSN.D.295 as follows:

GM1 ADR-DSN.D.295 Rapid exit taxiways

(a) The following guidance applies particularly to rapid exit taxiways (s~~S~~ee Figure D-1). The general requirements for taxiways, as prescribed in Book 1 are also applicable to rapid exit taxiways. Guidance on the provision, location and design of rapid exit taxiways is included in ~~the~~ ICAO Doc 9157, Aerodrome Design Manual, Part 2, Taxiways, Aprons and Holding Bays~~)~~.

(b) The locations of rapid exit taxiways along a runway are based on several criteria described in ~~the~~ ICAO Doc 9157, Aerodrome Design Manual, Part 2, Taxiways, Aprons and Holding Bays~~)~~, in addition to different speed criteria.

Amend GM1 ADR-DSN.D.305 as follows:

GM1 ADR-DSN.D.305 Taxiway shoulders

Guidance on characteristics of taxiway shoulders and on shoulder treatment is given in ~~the~~ ICAO Doc 9157, Aerodrome Design Manual, Part 2, Taxiways, Aprons and Holding Bays~~)~~.

Amend GM1 ADR-DSN.D.310 as follows:

GM1 ADR-DSN.D.310 Taxiway Strip

A taxiway strip should be so prepared or constructed as to minimise hazards arising from differences in load bearing capacity to aeroplanes which the taxiway is intended to serve in the event of an aeroplane accidentally running off the taxiway.

Guidance on characteristics of taxiway strips is given in ~~the~~ ICAO Doc 9157, Aerodrome Design Manual, Part 2, Taxiways, Aprons and Holding Bays~~)~~.

Amend GM1 ADR-DSN.D.315 as follows:

GM1 ADR-DSN.D.315 Width of taxiway strips

i~~I~~ntentionally left blank

Amend GM1 ADR-DSN.D.325 as follows:

GM1 ADR-DSN.D.325 Grading of taxiway strips

i~~I~~ntentionally left blank

Amend GM1 ADR-DSN.D.330 as follows:

GM1 ADR-DSN.D.330 Slopes on taxiway strips

i~~)~~ntentionally left blank

Amend GM1 ADR-DSN.D.335 as follows:

GM1 ADR-DSN.D.335 Holding bays, runway-holding positions, intermediate holding positions, and road-holding positions

(...)

(e) Further guidance is given in ICAO Doc 9157, Aerodrome Design Manual, Part 2, Taxiways, Aprons and Holding Bays~~)~~ and ICAO Doc 4444, Procedures for Air Navigation Services — Air Traffic Management ~~(ICAO, Doc 4444)~~.

Amend GM1 ADR-DSN.D.340 as follows:

GM1 ADR-DSN.D.340 Location of holding bays, runway-holding positions, intermediate holding positions, and road-holding positions

(...)

(c) An aircraft taxiing could endanger aircraft operations when the aircraft is too close to the runway during take-off and landings. It is so advised to check if the aircraft taking off or landing could be hinder. For this OLS and specially approach surfaces, take-off climb surfaces and OFZ are the first aspects to consider. An aircraft taxiing could also endanger aircraft operations when the aircraft location and orientation are so that the aircraft interfere with navigation aids. It is specific to instrument runways and especially important for precision approach runways. The non-penetration of critical/sensitive areas is the first check. The areas within which this degradable interference of course or path signals are possible need to be defined and recognised. For the purposes of developing protective zoning criteria for ILS, these areas are critical areas and sensitive areas. The ILS critical area is an area of defined dimensions about the localizer and glide path antennas where vehicles, including aircraft, are excluded during all ILS operations. The critical area is protected, since the presence of vehicles and/or aircraft inside the critical area boundaries would cause unacceptable disturbance to the ILS signal. The ILS sensitive area is an area extending beyond the critical area where the parking and/or movement of vehicles, including aircraft, is controlled to prevent the possibility of unacceptable interference to the ILS signal during ILS operations.

(...)

(e) If the affected runway is used under precision approach procedures, it should be also verified that 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 is so that a holding aircraft or vehicle should not infringe the obstacle-free zone and the critical/sensitive areas of precision approach navigation aids (e.g. ILS/MLS).

(...)

(h) In radiotelephony phraseologies, the expression ‘holding point’ is used to designate the runway-holding position.

(i) Further guidance is given in ICAO Doc 9157, Aerodrome Design Manual, Part 2, Taxiways, Aprons and Holding Bays~~)~~.

Amend GM1 ADR-DSN.E.345 as follows:

GM1 ADR-DSN.E.345 General

~~I~~Intentionally left blank

Amend GM1 ADR-DSN.E.350 as follows:

GM1 ADR-DSN.E.350 Size of aprons

(...)

(b) The amount of area required for a particular apron layout depends upon the following factors:

(1) the size and manoeuvrability characteristics of the aircraft using the apron;

(2) the volume of traffic using the apron;

(3) clearance requirements;

(4) type of ingress and egress to the aircraft stand;

(5) basic terminal layout or other aerodrome use;

(6) aircraft ground activity requirements; and

(7) taxiways and apron service roads.

(c) Passenger aircraft services that are carried out during the time the aircraft is parked in a stand position include: galley; toilet and potable water service; baggage handling; fuelling; provision of air conditioning, oxygen, electrical power supply and starting air; and aircraft towing. Most of these functions have a vehicle and/or equipment associated with them, or have some type of fixed installation established to conduct these services. Further guidance is given in ~~(~~ICAO Doc 9157, Aerodrome Design Manual, Part 2, Taxiways, Aprons and Holding Bays, par. 3.4.6~~)~~.

(d) Consideration should be given to providing sufficient area on the starboard side of the aircraft to support the level of activity that take place in the turnaround operation. Further guidance is given in ~~(~~ICAO Doc 9157, Aerodrome Design Manual, Part 2, Taxiways, Aprons and Holding Bays, par. 3.4.6~~)~~.

Amend GM1 ADR-DSN.E.360 as follows:

GM1 ADR-DSN.E.360 Slopes on aprons

(...)

(b) Slopes on apron have the same purpose as other pavement slopes, meaning to prevent the accumulation of water (or possible fluid contaminant) on the surface and to facilitate rapid drainage of surface water (or possible fluid contaminant). Nevertheless, the design of the apron, especially for the parts containing airplane stands, should specifically take into account the impact of the slopes on the airplane during its braking at the stand and during its start for departure (with push-back or with its own engines). The aims are, on the one hand, to avoid that an airplane passes its stop point and goes on the apron service road or to the closest building and on the other hand, to save fuel and optimise the manoeuvrability of the airplane or of the push-back device.

(...)

Amend GM1 ADR-DSN.E.365 as follows:

GM1 ADR-DSN.E.365 Clearance distances on aircraft stands

(...)

(c) Any aircraft passing behind an aircraft parked on an aircraft stand should keep the required clearance distances defined in Table D-1.

Amend GM1 ADR-DSN.G.380 as follows:

GM1 ADR-DSN.G.380 Location

(...)

(2) To further maximise departure flow rates for all aeroplanes, the location and size of de-icing/anti-icing facilities should be such that they allow for bypass taxiing during de-icing/anti-icing operations. Additional guidance is given in ~~(~~ICAO~~,~~ Doc 9640, ~~:—~~ Manual of aircraft ground de-icing/anti-icing operations, paragraph 8.5(e).~~)~~

(...)

Amend GM1 ADR-DSN.G.385 as follows:

GM1 ADR-DSN.G.385 Size of de-icing/anti-icing pads

(a) It is recommended that the aerodrome have facilities with a de-icing/anti-icing capability equivalent to the maximum peak hour departure rate that can be managed by the ATC units during de-icing/anti-icing operations. Additional guidance is given in ~~(~~ICAO~~,~~ Doc 9640, ~~:~~Manual of aircraft ground de-icing/anti-icing operations, paragraph 8.3.~~)~~

(...)

Amend GM1 ADR-DSN.H.410 as follows:

GM1 ADR-DSN.H.410 Outer horizontal surface

(...)

(b) In the experience of some States, ~~significant~~ operational problems can arise from the erection of tall structures in the vicinity of aerodromes beyond the areas currently recognised in these aerodrome regulations and ICAO Annex 14 as areas in which restriction of new construction may be necessary. Such problems may be addressed through the provision of an outer horizontal surface, which is a specified portion of a horizontal plane around an aerodrome

beyond the limits of the conical surface. It represents the level above which consideration needs to be given to the control of new obstacles in order to facilitate practicable and efficient instrument approach procedures, and together with the conical and inner horizontal surfaces to ensure safe visual manoeuvring in the vicinity of an aerodrome.

(...)

(e) Guidance on Outer Horizontal Surface is included in ~~the~~ ICAO Doc 9137, Airport Services Manual, Part 6, Control of Obstacles.

(...)

Figure GM-H-1. Disposition of Outer Horiz~~s~~ontal Surface

Amend GM1 ADR-DSN.H.415 as follows:

GM1 ADR-DSN.H.415 Conical surface

i~~I~~ntentionally left blank

Amend GM1 ADR-DSN.H.420 as follows:

GM1 ADR-DSN.H.420 Inner horizontal surface

(...)

(c) For runways less than 1 800 m in length, the inner horizontal surface may be ~~is~~ defined as a circle centred on the midpoint of the runway.

(...)

(e) For relatively level runways the selection of elevation datum location is not critical, but when the thresholds differ by more than 6 m, the elevation datum should regard to the factors as the elevation of the most frequent used altimeter setting datum points, minimum circling altitudes in use or required and the nature of operations at the aerodrome. For more complex inner horizontal surfaces, with runways on different levels, as shown in Figure GM-H-2, ~~or runways where the thresholds differ more than 6 m,~~ a common elevation is not essential, but where surfaces overlap, the lower surface should be regarded as dominant.

(f) Further guidance is given ~~contained~~ in ~~the~~ ICAO Doc 9137, Airport Services Manual, Part 6, Control of Obstacles.

Amend GM1 ADR-DSN.H.425 as follows:

GM1 ADR-DSN.H.425 Approach surface

i~~I~~ntentionally left blank

Amend GM1 ADR-DSN.H.435 as follows:

GM1 ADR-DSN.H.435 Take-off climb surface

~~I~~intentionally left blank

Amend GM1 ADR-DSN.H.440 as follows:

GM1 ADR-DSN.H.440 Slewed ~~T~~take-off climb surface

The edge of a Take-off climb surface may be slewed in the direction of a turn away from the extended runway centre line up to a maximum of 15° splay. The portion of ~~T~~take-off climb surface encompassing the new departure track should be the same shape and dimensions as the original ~~T~~take-off climb surface measured relative to the new departure track. The opposite edge of the ~~T~~take-off climb surface should remain unchanged unless there is another turning departure towards that side as well, in which case, the edge may be slewed in that direction too.

Amend GM1 ADR-DSN.H.445 as follows:

GM1 ADR-DSN.H.445 Obstacle~~-~~free zone (OFZ)

~~I~~intentionally left blank

Amend GM1 ADR-DSN.H.450 as follows:

GM1 ADR-DSN.H.450 Inner approach surface

~~I~~intentionally left blank

Amend GM1 ADR-DSN.H.460 as follows:

GM1 ADR-DSN.H.460 Balked landing surface

~~I~~intentionally left blank

Amend GM1 ADR-DSN.J.470 as follows:

GM1 ADR-DSN.J.470 Non-instrument runways

(...)

(b) 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 they may endanger aeroplanes.

Amend GM1 ADR-DSN.J.475 as follows:

GM1 ADR-DSN.J.475 Non-precision approach runways

(...)

(b) Circumstances in which the shielding principle may reasonably be applied are described in ~~the~~ ICAO Doc 9137, Airport Services Manual, Part 6, Control of Obstacles.

(c) 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.

Amend GM1 ADR-DSN.J.480 as follows:

GM1 ADR-DSN.J.480 Precision approach runways

(a) The following obstacle limitation surfaces should be established for a precision approach runway ~~c~~Category I:

(1) inner approach surface;

(2) inner transitional surfaces; and

(3) balked landing surface.

(...)

(c) Guidance on obstacle limitation surfaces for precision approach runways is given in ~~the~~ ICAO Doc 9137, Airport Services Manual, Part 6, Control of Obstacles.

(d) Circumstances in which the shielding principle may reasonably be applied are described in ~~the~~ ICAO Doc 9137, Airport Services Manual, Part 6, Control of Obstacles.

(...)

(f) For information on code letter F aeroplanes equipped with digital avionics that provide steering commands to maintain an established track during the go-around manoeuvre. Additional guidance is given in ~~, see~~ ICAO Circular, 301, New Larger Aeroplanes — Infringement of the Obstacle Free Zone.

Amend GM1 ADR-DSN.J.485 as follows:

GM1 ADR-DSN.J.485 Runways meant for take-off

(...)

(c) Circumstances in which the shielding principle may reasonably be applied are described in ~~the~~ ICAO Doc 9137, Airport Services Manual, Part 6, Control of Obstacles.

(d) 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 is it 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 they may endanger aeroplanes. Similar considerations apply at the junction of a clearway and strip where differences in transverse slopes exist.

(...)

Amend GM1 ADR-DSN.J.490 as follows:

GM1 ADR-DSN.J.48690 Other objects

~~Intentionally blank~~In certain circumstances, objects that do not project above any of the obstacle limitation surfaces may constitute a hazard to aeroplanes as, for example, where there are one or more isolated objects in the vicinity of an aerodrome.

Insert new GM1 ADR-DSN.J.487 as follows:

GM1 ADR-DSN.J.487 Objects outside the obstacle limitation surfaces

(a) Beyond the limits of the obstacle limitation surfaces the safety assessment should be conducted for the proposed constructions that extend above the established limits in order to protect safe operation of aircarft.

(b) The safety assessment may have regard to the nature of operations concerned and may distinguish between day and night operations.

Amend GM1 ADR-DSN.K.490 as follows:

GM1 ADR-DSN.K.490 Wind direction indicator

(a) Wind direction indicators are important visual aids for all runway ends. Large wind direction indicators are particularly important at aerodromes where landing information is not available through radio communications. On the other hand, landing direction indicators are seldom used due to the necessity and, consequently, responsibility, of changing their direction as wind direction shifts. Visual ground signals for runway and taxiway serviceability are contained in ICAO Annex 2. Additional guidance is given in ~~See also~~ ICAO Doc 9157, Aerodrome Design Manual, Part 4, Visual Aids, Chapter 3~~)~~.

(...)

Amend GM1 ADR-DSN.K.515 as follows:

GM1 ADR-DSN.K.515 Characteristics of signal panels and signal area

(...)

(b) The signal area should be constructed of cement concrete reinforced with an adequate quantity of steel to avoid cracks resulting from unequal settlement. The top surface should be finished smooth with a steel trowel and coated with paint of appropriate colour. The colour of the signal area should be chosen to contrast with the colours of the signal panels to be displayed thereon. ~~(~~More guidance is given ~~could be find~~ in ICAO Doc 9157, Aerodrome Design Manual Part 4, Visual Aids, Chapter 3~~)~~.

(...)

Amend GM1 ADR-DSN.L.520 as follows:

GM1 ADR-DSN.L.520 General – Colour and conspicuity

(a) Where there is insufficient contrast between the marking and the pavement surface, the marking should include an appropriate border.

(1) This border should be white or black;

(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; and

(3) Markings should consist of solid areas or a series of longitudinal stripes providing an effect equivalent to the solid areas.

(4) Guidance on reflective materials is given in the ICAO~~,~~ Doc 9157, Aerodrome Design Manual, Part 4, Visual Aids.

(...)

~~(c) Circumstances may occur when it is not practicable to install permanent markings, for example during runway resurfacing. So as to provide sufficient visual guidance to aircraft, the following markings should be considered:~~

~~(1) runway centre line – required for operations below PA Category I;~~

~~(2) taxiway centre line lead on/off;~~

~~(3) runway edge line;~~

~~(4) runway threshold; and~~

~~(5) touchdown zone and aiming point markings.~~

~~(d) Centre line and edge markings widths can be replaced by reduced width temporary markings and can reduce from 0.9 m to 0.6 m if required.~~

~~(e) Touchdown zone and aiming point markings need not be repainted during the same shift as the asphalting but should be done as soon as practicable.~~

~~(f) Threshold markings should be returned as soon as possible initially in temporary materials, then permanent materials.~~

Amend GM1 ADR-DSN.L.525 as follows:

GM1 ADR-DSN.L.525 Runway designation marking

iIntentionally left blank

Amend GM1 ADR-DSN.L.535 as follows:

GM1 ADR-DSN.L.535 Threshold marking

iIntentionally left blank

Amend GM1 ADR-DSN.L.540 as follows:

GM1 ADR-DSN.L.540 Aiming point marking

iIntentionally left blank

Delete GM1 ADR-DSN.L.555 as follows:

~~**GM1 ADR-DSN.L.555 Taxiway centre line marking**~~

~~The term 'continuous guidance' is not intended to require that taxiway centre line markings are provided onto aircraft stands. Instead, it is intended that the centre line marking be provided on taxiways leading to aircraft stands or other apron areas, from which visual cues or other means exist, such as lead-in arrows and stand number indicators, to enable aircrew to manoeuvre the aircraft onto a stand or other parking area.~~

[Editorial Note: Move GM-L-1 and Table GM-L-1 to GM1 ADR-DSN.L.550]

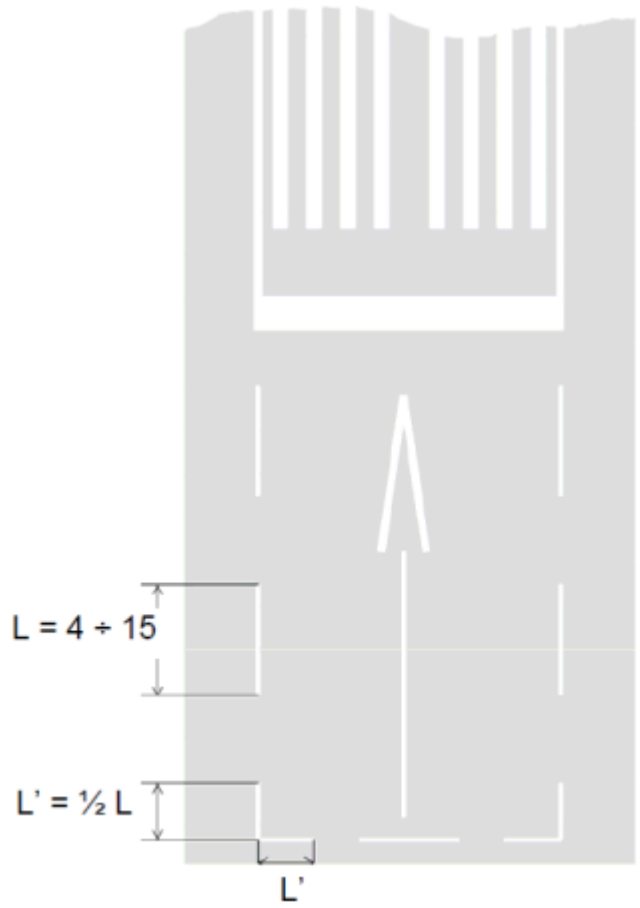


Figure GM-L-1. Dashed runway side stripe marking

Runway width (m)	Single dash dimensions	
	Length (minimum m)	Width (m)
60	15	0.45
45	15	0.45
30	10	0.45
23	6	0.25
18	4	0.25
Note: The length of the gap is as much as possible equal, but not longer, to the length of the corresponding marking		

Table GM-L-1. Dashed ~~R~~runway side stripe ~~dashed~~ markings

Insert new GM1 ADR-DSN.L.555 as follows:

GM1 ADR-DSN.L.555 Taxiway centre line marking

The term 'continuous guidance' is not intended to require that taxiway centre line markings are provided onto aircraft stands. Instead, it is intended that the centre line marking be provided on taxiways leading to aircraft stands or other apron areas from which visual cues or other means exist, such as lead-in arrows and stand number indicators, to enable aircrew to manoeuvre the aircraft onto a stand or other parking area.

Amend GM1 ADR-DSN.L.560 as follows:

GM1 ADR-DSN.L.560 Interruption of runway markings

i~~I~~ntentionally left blank

Amend GM1 ADR-DSN.L.565 as follows:

GM1 ADR-DSN.L.565 Runway turn pad marking

i~~I~~ntentionally left blank

Amend GM1 ADR-DSN.L.570 as follows:

GM1 ADR-DSN.L.570 Enhanced taxiway centre line marking

~~(a) Enhanced taxiway centre line marking may be provided to denote the proximity of a runway-holding position.~~ The provision of enhanced taxiway centre line marking may form part of runway incursion prevention measures.

~~(b) Enhanced taxiway centre line marking may be installed at taxiway/runway intersections at that aerodrome as determined by the aerodrome operator/runway safety team as part of the aerodrome's runway incursion prevention programme.~~

~~(c) Those locations where enhanced taxiway centre lines are installed, should be promulgated to AIS and included on the aerodrome chart if required.~~

Amend GM1 ADR-DSN.L.580 as follows:

GM1 ADR-DSN.L.580 Intermediate holding position marking

i~~I~~ntentionally left blank

Amend GM1 ADR-DSN.L.585 as follows:

GM1 ADR-DSN.L.585 VOR aerodrome checkpoint marking

Further guidance on the selection of sites for VOR aerodrome checkpoints is given in ICAO Annex 10, Volume I, Attachment E. ~~Intentionally blank~~

Amend GM1 ADR-DSN.L.595 as follows:

GM1 ADR-DSN.L.595 Apron safety lines

~~Intentionally blank~~

(a) Ground equipment and vehicles should be kept outside predetermined limits when aircraft are manoeuvring or when the equipment is left unattended.

(b) Safety lines are required on an apron to mark the limits of parking areas for ground equipment, apron service roads and passengers' paths, etc. These lines are narrower and of a different colour to differentiate them from the guidelines used for aircraft.

(1) Wing tip clearance lines. These lines should delineate the safety zone clear of the path of the critical aeroplane wing tip. The line should be drawn at appropriate distance outside the normal path of the wing tip of the critical aeroplane;

(2) Equipment limit lines. These lines are used to indicate the limits of areas which are intended for parking vehicles and aircraft servicing equipment when they are not in use.

(c) Several methods may be used to identify which side of a safety line is safe for storage of such vehicles and equipment:

(1) Spurs or an additional line (a discontinuous line of the same colour or a continuous line of a different conspicuous colour) may be provided on one side of the safety line. The

side on which such spurs or an additional line is located is considered safe for parking vehicles and equipment;

(2) The words 'Equipment Limit' may be painted on the side used by ground equipment and readable from that side;

(3) Passenger path lines. These lines are used to indicate to passengers and escorting personnel the route that needs to be followed, when walking on the apron, in order to be clear of hazards. A pair of lines with zebra hatching between them may be used.

Insert new GM1 ADR-DSN.L.597 as follows:

GM1 ADR-DSN.L.597 Apron service road marking

(a) The term service road encompasses also other types of roads, such as the perimeter service roads, which are used to provide access to security or maintenance services etc. of the aerodrome. However, such types of service roads do not fall under the term 'apron service road'.

(b) When an apron service road crosses a taxiway, a separate road-holding position sign, in accordance with CS ADR-DSN.N.800, or road-holding position marking, in accordance with CS ADR-DSN.L.600, should indicate that vehicles are required to stop.

(c) Markings located on an apron are prescribed in CS ADR-DSN.L.555, CS ADR-DSN.L.590 and CS ADR-DSN.L.595.

Amend GM1 ADR-DSN.L.600 as follows:

GM1 ADR-DSN.L.600 Road-holding position marking

(a) Where a road that accesses a runway or a taxiway is unpaved, it may not be possible to install markings. In such cases, a road-holding position signs and/or lights should be installed, combined with appropriate instructions on how the driver of a vehicle should proceed.

(...)

Amend GM1 ADR-DSN.M.620 as follows:

GM1 ADR-DSN.M.620 Aeronautical beacons

i~~I~~ntentionally left blank

Delete SECTION 1 as follows:

~~**SECTION 1 — APPROACH LIGHTING SYSTEMS**~~

Amend GM1 ADR-DSN.M.625 as follows:

GM1 ADR-DSN.M.625 Approach lighting systems~~, general and applicability~~

(a) Types and characteristics

(1) The approach lighting patterns that have been generally adopted are shown in Figures M-1 and M-2. A diagram of the inner 300 m of the precision approach ~~c~~Category II and III lighting system is shown in Figures M-3A and M-3B.

(2) The approach lighting configuration is to be provided irrespective of the location of the threshold, i.e. whether the threshold is at the extremity of the runway or displaced from the runway extremity. In both cases, the approach lighting system should extend up to the threshold. However, in the case of a displaced threshold, inset lights are used from the runway extremity up to the threshold to obtain the specified configuration. These inset lights are designed to satisfy the structural requirements specified in CS ADR.DSN.M.615(d~~c~~)(1~~2~~). ~~and the chromaticity and~~ The characteristics of these inset lights should be in accordance with the specifications in CS ADR-DSN.U.940, Figures U-5 or U-6, as appropriate and~~specified in CS ADR-DSN.U.930 and CS ADR-DSN.U.940.~~ the chromaticity should be in accordance with the specifications in CS ADR-DSN.U.930 and Figure U-1.

(3) Examples of flight path envelopes used in designing the lighting are shown in Figure GM-M-2.

(...)

(c) Vertical installation tolerances:

(...)

(4) In order to avoid giving a misleading impression of the plane of the ground, the lights should not be mounted below a gradient of 1 in 66 downwards from the threshold to a point 300 m out, and below a gradient of 1 in 40 beyond the 300 m point. For a precision approach ~~c~~Category II and III lighting system, more stringent criteria may be necessary, e.g. negative slopes not permitted within 450 m of the threshold.

(...)

(...)

(...)

(e) Consideration of the effects of reduced lengths:

(...)

(3) In such cases, every effort should be made to provide as much approach lighting system as possible. Restrictions on operations could be imposed on runways equipped with reduced lengths of approach lighting. There are many factors which determine at what height the pilot should have decided to continue the approach to land or execute a missed approach. It should be understood that the pilot does not make an instantaneous judgement upon reaching a specified height. The actual decision to continue the approach and landing sequence is an accumulative process which is only

concluded at the specified height. Unless lights are available prior to reaching the decision point, the visual assessment process is impaired and the likelihood of missed approaches should increase substantially. There are many operational considerations which should be taken into account in deciding if any restrictions are necessary to any precision approach and these are detailed in ICAO Annex 6 ~~– Operation of Aircrafts~~.

(f) For Non precision approach runways it is advisable to give consideration to the installation of a precision approach ~~c~~Category I lighting system or to the addition of a runway lead-in lighting system.

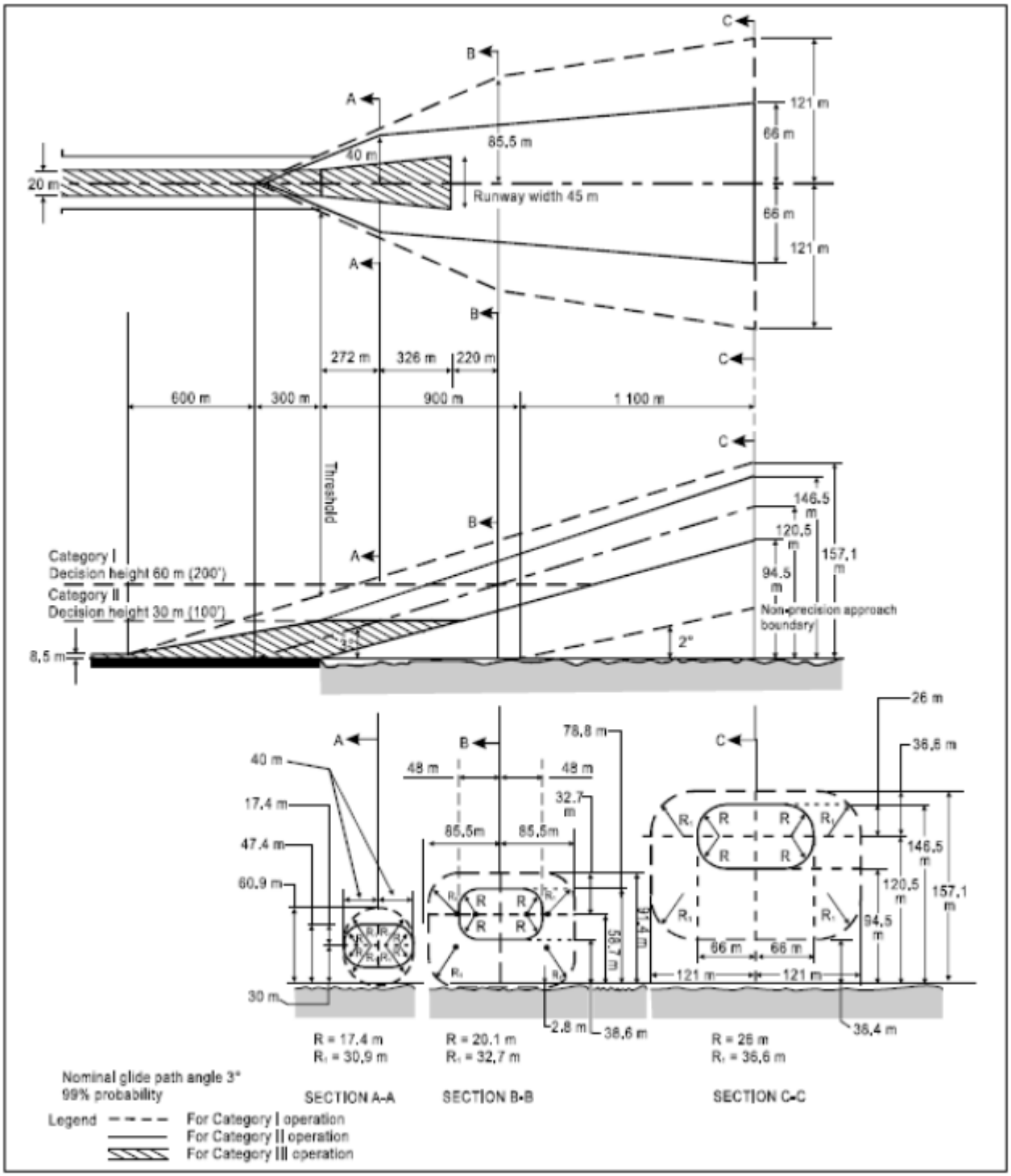


Figure GM-M-2. Flight path envelope examples for lighting design for ~~c~~Category I, II and III operations — Centre line lights

Amend GM1 ADR-DSN.M.626 as follows:

GM1 ADR-DSN.M.626 Simple approach lighting systems

i~~I~~ntentionally left blank

Amend GM1 ADR-DSN.M.630 as follows:

GM1 ADR-DSN.M.630 Precision approach ~~c~~Category I lighting system

(...)

Amend GM1 ADR-DSN.M.635 as follows:

GM1 ADR-DSN.M.635 Precision approach ~~c~~Category II and III lighting system

The length of 900 m is based on providing guidance for operations under ~~c~~Category I, II and III conditions. Reduced lengths may support ~~c~~Category II and III operations but may impose limitations on ~~c~~Category I operations. Additional guidance is given in ~~See~~ ICAO Annex 14, Attachment A, Section 11.

Delete SECTION 2 as follows:

~~**.SECTION 2 — Visual approach slope indicator systems**~~

Amend GM1 ADR-DSN.M.645 as follows:

GM1 ADR-DSN.M.645 Precision approach path indicator and Abbreviated precision approach path indicator (PAPI and APAPI)

i~~I~~ntentionally left blank

Amend GM1 ADR-DSN.M.650 as follows:

GM1 ADR-DSN.M.650 Approach slope and elevation setting of light units ~~(~~for PAPI and APAPI~~)~~

iIntentionally left blank

Amend GM1 ADR-DSN.M.655 as follows:

GM1 ADR-DSN.M.655 Obstacle protection surface for PAPI and APAPI

i~~I~~ntentionally left blank

Amend GM1 ADR-DSN.M.660 as follows:

GM1 ADR-DSN.M.660 Circling guidance lights

i~~I~~ntentionally left blank

Delete SECTION 3 as follows:

~~**SECTION 3 — RUNWAY & TAXIWAY LIGHTS**~~

Amend GM1 ADR-DSN.M.675 as follows:

GM1 ADR-DSN.M.675 Runway edge lights

i~~I~~ntentionally left blank

Amend GM1 ADR-DSN.M.680 as follows:

GM1 ADR-DSN.M.680 Runway threshold and wing bar lights

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Amend GM1 ADR-DSN.M.690 as follows:

GM1 ADR-DSN.M.690 Runway centre line lights

(a) Runway centre line lights should be provided on a precision approach runway ~~c~~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.

(...)

Insert new GM1 ADR-DSN.M.696 as follows:

GM1 ADR-DSN.M.696 Simple Touchdown Zone Lights

(a) Simple touchdown zone lights should be supplied with power on a separate circuit to other runway lighting so that they may be used when other lighting is switched off.

Amend GM1 ADR-DSN.M.700 as follows:

GM1 ADR-DSN.M.700 Rapid exit taxiway indicator lights

(...)

(d) Characteristics:

(1) Rapid exit taxiway indicator lights are fixed lights and 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.

(2) Rapid exit taxiway indicator lights should be supplied with power on a separate circuit to other runway lighting so that they may be used when other lighting is switched off.

(3) Following a landing, runway occupancy time has a significant effect on achievable runway capacity. Rapid exit taxiway indicator lights 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 kt until the first RETIL (three-light barrette) is reached is seen as the optimum.

(4) Rapid exit taxiway indicator lights characteristics should be in accordance with the specifications in CS ADR-DSN.U.940, Figure U-10 or U-11, ~~Chapter U,~~ as appropriate.

(5) Rapid exit taxiway indicator lights chromaticity should be in accordance with the specifications in CS ADR-DSN.U.930 and Figure U-1.

Amend GM1 ADR-DSN.M.705 as follows:

GM1 ADR-DSN.M.705 Stopway lights

i~~I~~ntentionally left blank

Amend GM1 ADR-DSN.M.710 as follows:

GM1 ADR-DSN.M.710 Taxiway centre line lights

(a) In the case where taxiway centre line lights are provided and where there may be a need to delineate the edges of a taxiway, e.g. on a rapid exit taxiway, narrow taxiway, or in snow conditions, this may be done with taxiway edge lights or markers. 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.

(b) Care should be taken to limit the light distribution of green lights on or near a runway so as to avoid possible confusion with threshold lights.

(c) The provisions of CS ADR-DSN.M.710(c)(3) can form part of effective runway incursion prevention measures.

Amend GM1 ADR-DSN.M.715 as follows:

GM1 ADR-DSN.M.715 Taxiway centre line lights on taxiways, runways, rapid exit taxiways, or on other exit taxiways

i~~l~~ntentionally left blank

Amend GM1 ADR-DSN.M.720 as follows:

GM1 ADR-DSN.M.720 Taxiway edge lights

i~~l~~ntentionally left blank

Amend GM1 ADR-DSN.M.725 as follows:

GM1 ADR-DSN.M.725 Runway turn pad lights

i~~l~~ntentionally left blank

Amend GM1 ADR-DSN.M.730 as follows:

GM1 ADR-DSN.M.730 Stop bars ~~lights~~

(a) A stop bar is intended to be controlled either manually or automatically by air traffic services.

(b) 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 and in visibility conditions greater than 550 m runway visual range can form part of effective runway incursion prevention measures.

(c)~~(a)~~ A pair of elevated lights should 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. ~~Where the normal 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, then a pair of elevated lights should be added to each end of the stop bar.~~

(d) Where necessary, to enhance conspicuity of an existing stop bar, extra lights are installed uniformly.

(e)~~(b)~~ Where the additional lights specified in (c)~~(a)~~ above are provided, these lights should be located not less than 3 m from the taxiway edge.

(f)~~(c)~~ Where the additional lights specified in (c)~~(a)~~ above are provided, these lights should have the same characteristics as the lights in the stop bar but should be visible to approaching aircraft up to the stop bar position.

(g) High-intensity stop bars should only be used in case of an absolute necessity and following a specific study.

(h) 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 ICAO Doc 9157, Aerodrome Design Manual, Part 5, Electrical Systems.

Amend GM1 ADR-DSN.M.735 as follows:

GM1 ADR-DSN.M.735 Intermediate holding position lights

i~~I~~ntentionally left blank

Amend GM1 ADR-DSN.M.740 as follows:

GM1 ADR-DSN.M.740 De-icing/anti-icing facility exit lights

i~~I~~ntentionally left blank

Amend GM1 ADR-DSN.M.745 as follows:

GM1 ADR-DSN.M.745 Runway guard lights

(...)

(e) Active runway is to consider any runway or runways currently being used for take-off or landing. When multiple runways are used, they are all considered active runways.

Delete SECTION 4 as follows:

~~**SECTION 4 — APRON LIGHTING**~~

Amend GM1 ADR-DSN.M.765 as follows:

GM1 ADR-DSN.M.765 Aircraft stand manoeuvring guidance lights

i~~I~~ntentionally left blank

Insert new GM1 ADR-DSN.M.771 as follows:

GM1 ADR-DSN.M.771 No-entry bar

(a) A no-entry bar is intended to be controlled either manually or automatically by air traffic services.

(b) Runway incursions may take place in all visibility or weather conditions. The provision of no-entry bars at taxiway/runway intersections and their use at night and in all visibility conditions can form part of effective runway incursion prevention measures.

(c) Where necessary to enhance conspicuity, extra lights should be installed uniformly.

(d) A pair of elevated lights should be added to each end of the no-entry bar where the in-pavement no-entry bar lights might be obscured from a pilot's view, 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.

(e) 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 should be in accordance with the specifications in CS ADR-DSN.U.940, Figures U-21, U-22 or U-23, as appropriate.

(f) High-intensity no-entry bars are typically used only in case of an absolute necessity and following a safety assessment.

(g) Where a wide beam fixture is required, the intensity in red light and beam spreads of no-entry bar lights should be in accordance with the specifications in CS ADR-DSN.U.940, Figures U-21 or U-23, as appropriate.

(h) Care is required in the design of the electrical system to ensure that all of the lights of a no-entry bar will not fail at the same time. No-entry bar lights should be supplied with power on a separate circuit to other runway lighting so that they may be used when other lighting is switched off.

Amend GM1 ADR-DSN.N.775 as follows:

GM1 ADR-DSN.N.775 General

(...)

(c) Guidance on signs is contained in ~~the~~ ICAO Doc 9157, Aerodrome Design Manual, Part 4, Visual Aids, Chapter 11.

(d) Guidance on frangibility is contained in ~~the~~ ICAO Doc 9157, Aerodrome Design Manual, Part 6, Frangibility.

(e) Guidance on measuring the average luminance of a sign is contained in ~~the~~ ICAO Doc 9157, Aerodrome Design Manual, Part 4, Visual Aids.

Amend GM1 ADR-DSN.N.780 as follows:

GM1 ADR-DSN.N.780 Mandatory instruction signs

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Amend GM1 ADR-DSN.N.785 as follows:

GM1 ADR-DSN.N.785 Information signs

(a) When an installation of information sign on the left-hand side is not possible, e.g. due to infrastructural or operational restrictions, an installation on the right-hand side of the taxiway in accordance with the specifications given in Table N-1 may also be acceptable when a safety assessment indicates that it would not adversely affect the safety of operations of aeroplanes.

(b) At a 'T' intersection, information signs may be located in the direction of the taxiway centre line to the opposite side of the crossing taxiway when a safety assessment indicates that guidance could be assured under all intended operating conditions and that it would not adversely affect the safety of operations of aeroplanes.

~~Intentionally blank~~

Amend GM1 ADR-DSN.N.790 as follows:

GM1 ADR-DSN.N.790 VOR aerodrome checkpoint sign

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Amend GM1 ADR-DSN.N.795 as follows:

GM1 ADR-DSN.N.795 Aircraft stand identification signs

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Amend GM1 ADR-DSN.N.800 as follows:

GM1 ADR-DSN.N.800 Road-holding position sign

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Amend GM1 ADR-DSN.P.805 as follows:

GM1 ADR-DSN.P.805 General

~~I~~intentionally left blank

Amend GM1 ADR-DSN.P.810 as follows:

GM1 ADR-DSN.P.810 Unpaved runway edge markers

~~I~~intentionally left blank

Amend GM1 ADR-DSN.P.815 as follows:

GM1 ADR-DSN.P.815 Stopway edge markers

~~I~~intentionally left blank

Amend GM1 ADR-DSN.P.820 as follows:

GM1 ADR-DSN.P.820 Edge markers for snow-covered runways

~~(a)~~ Characteristics: Runway lights could be used to indicate the limits.

Amend GM1 ADR-DSN.P.825 as follows:

GM1 ADR-DSN.P.825 Taxiway edge markers

(...)

(b) On a straight section of a taxiway, taxiway edge markers should be spaced at uniform longitudinal intervals of not more than 60 m. On a curve the markers should be spaced at intervals less than 60 m so that a clear indication of the curve is provided. The markers should be located as near as practicable to the edges of the taxiway, or outside the edges at a distance of not more than 3 m. Additional guidance is given in ~~(~~ICAO Doc 9157, Aerodrome Design Manual, Part 4, Visual Aids, Chapter 2, par. 2.4.2~~)~~.

(c) The markers commonly used are cylindrical in shape. Ideally, the design of the marker should be such that when installed properly, no portion should exceed 35 cm total height above the mounting surface. However, where significant snow heights are possible, markers exceeding 35 cm in height may be used but their total height should be sufficiently low to preserve

clearance for propellers, and for the engine pods of jet aircraft. Additional guidance is given is ~~(~~ICAO Doc 9157, Aerodrome Design Manual, Part 4, Visual Aids, Chapter 2, par. 2.4.4~~)~~.

(d) A taxiway edge marker should be lightweight and frangible. One type of marker meeting these requirements is detailed in Figure 2-10. The post is made up of flexible PVC and its colour is blue. The sleeve which is retro-reflective, is also blue. Note that the area of the marked surface is 150 cm^2. Additional guidance is given in ~~(~~ICAO Doc 9157, Aerodrome Design Manual, Part 4, Visual Aids, Chapter 2, par. 2.4.5~~)~~.

Amend GM1 ADR-DSN.P.830 as follows:

GM1 ADR-DSN.P.830 Taxiway centre line markers

i~~I~~ntentionally left blank

Amend GM1 ADR-DSN.P.835 as follows:

GM1 ADR-DSN.P.835 Unpaved taxiway edge markers

i~~I~~ntentionally left blank

Amend GM1 ADR-DSN.Q.840 as follows:

GM1 ADR-DSN.Q.840 Objects to be marked and/or lighted within the lateral boundaries of the obstacle limitation surfaces

(a) 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.

(b) Other objects inside the obstacle limitation surfaces should be marked and/or lighted if a safety assessment indicates that the object could constitute a hazard to aircraft (this includes objects adjacent to visual routes e.g. waterway or highway).

(c) Overhead wires, cables, etc., crossing a river, waterway, valley or highway should be marked and their supporting towers marked and lighted if a safety assessment indicates that the wires or cables could constitute a hazard to aircraft.

Insert new GM1 ADR-DSN.Q.841 as follows:

GM1 ADR-DSN.Q.841 Objects to be marked and/or lighted outside the lateral boundaries of the obstacle limitation surfaces

(a) Other objects outside the obstacle limitation surfaces should be marked and/or lighted if a safety assessment indicates that the object could constitute a hazard to aircraft (this includes objects adjacent to visual routes e.g. waterway, highway).

(b) Overhead wires, cables, etc., crossing a river, waterway, valley or highway should be marked and their supporting towers marked and lighted if a safety assessment indicates that the wires or cables could constitute a hazard to aircraft.

Amend GM1 ADR-DSN.Q.845 as follows:

GM1 ADR-DSN.Q.845 Marking of fixed objects

(a) Orange and white or alternatively red and white are preferably used, except where such colours merge with the background.

(b) Table Q-4~~3~~ 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.

(c) Against some backgrounds it may be found necessary to use a different colour from orange or red to obtain sufficient contrast.

~~(d) A single colour, preferably red or yellowish green for emergency vehicles and yellow for service vehicles, is generally used.~~

(d)~~(e)~~ Alternative spacing may be suitable; priority is to highlight the location and definition of the object.

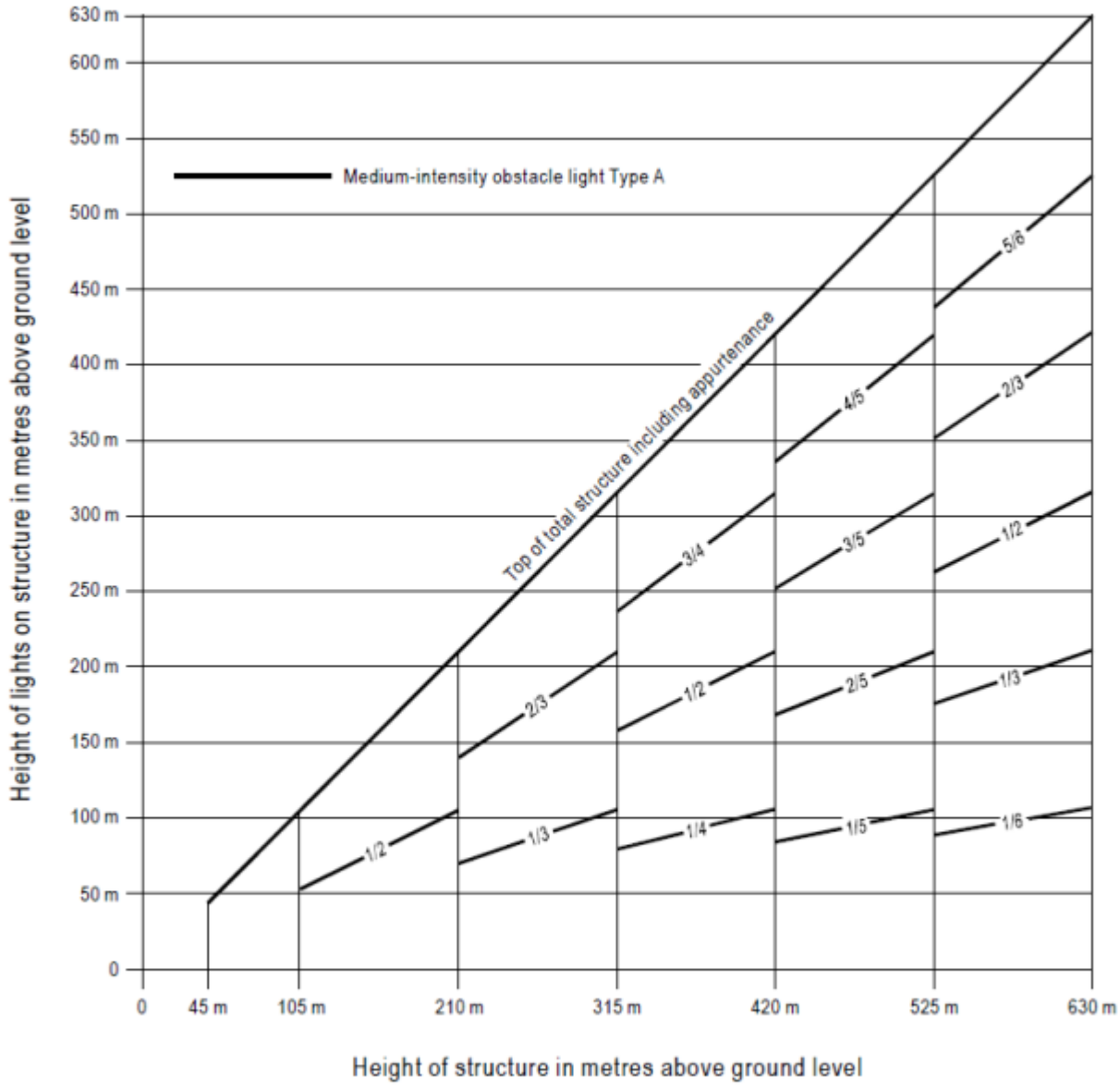
Insert new GM1 ADR-DSN.Q.846 as follows:

GM1 ADR-DSN.Q.846 Lighting of fixed objects

(a) Guidance on how a combination of low-, medium-, and/or high-intensity lights on obstacles should be displayed is given in Figures GM-Q-1 to GM-Q-8.

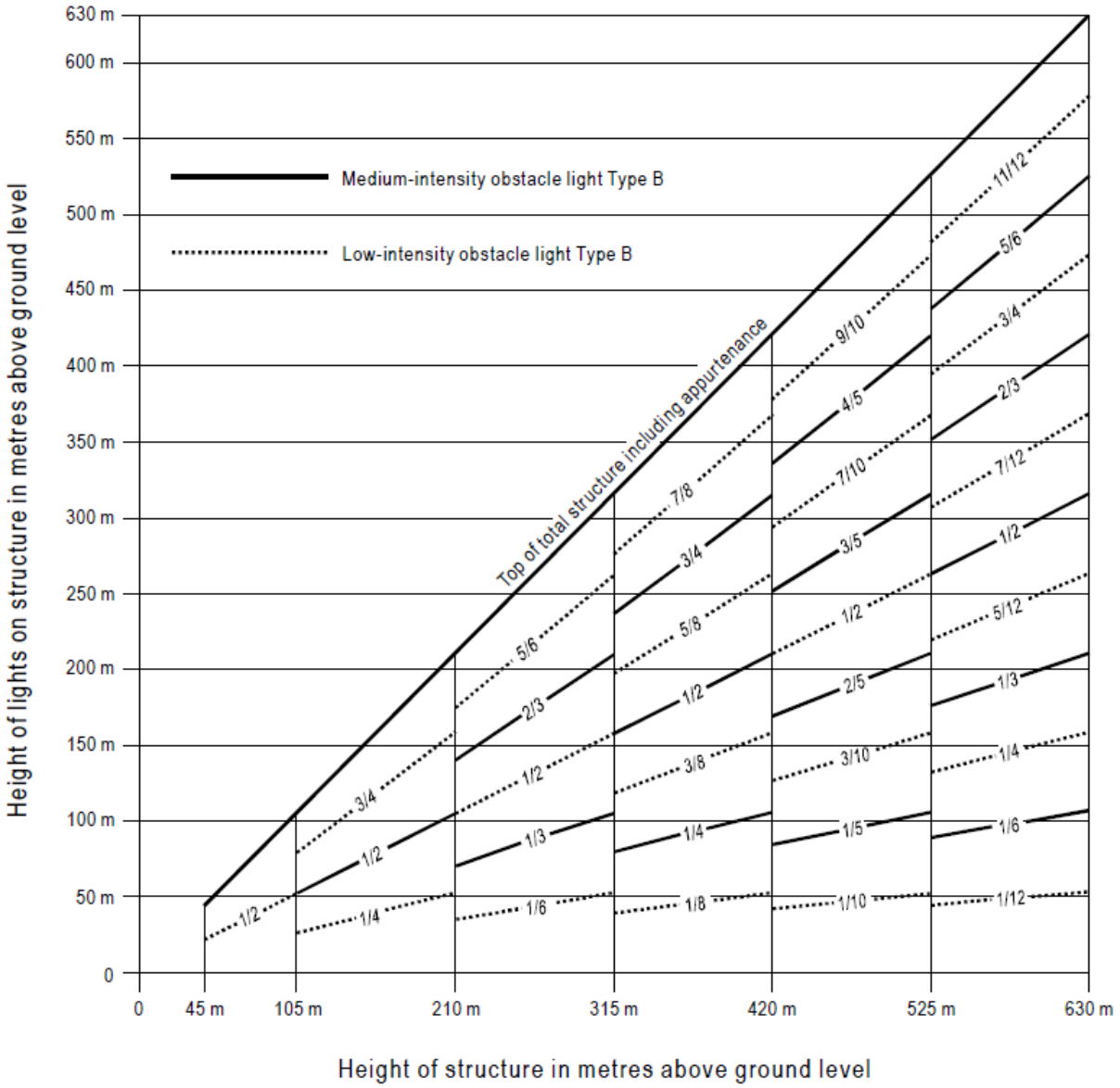
(b) High-intensity obstacle lights are intended for day use as well as night use. Care should be taken to ensure that these lights do not create disconcerting dazzle or environmental concerns. Guidance on the design, location, and operation of high-intensity obstacle lights is given in ICAO Doc 9157, Aerodrome Design Manual, Part 4, Visual Aids.

(c) Where, the use of high-intensity obstacle lights, Type A, or medium-intensity obstacle lights, Type A, at night may dazzle pilots in the vicinity of an aerodrome (within approximately 10 000 m radius) or cause significant environmental concerns, a dual obstacle lighting system should be provided. This system should 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 light, Type B or C, for night-time use.



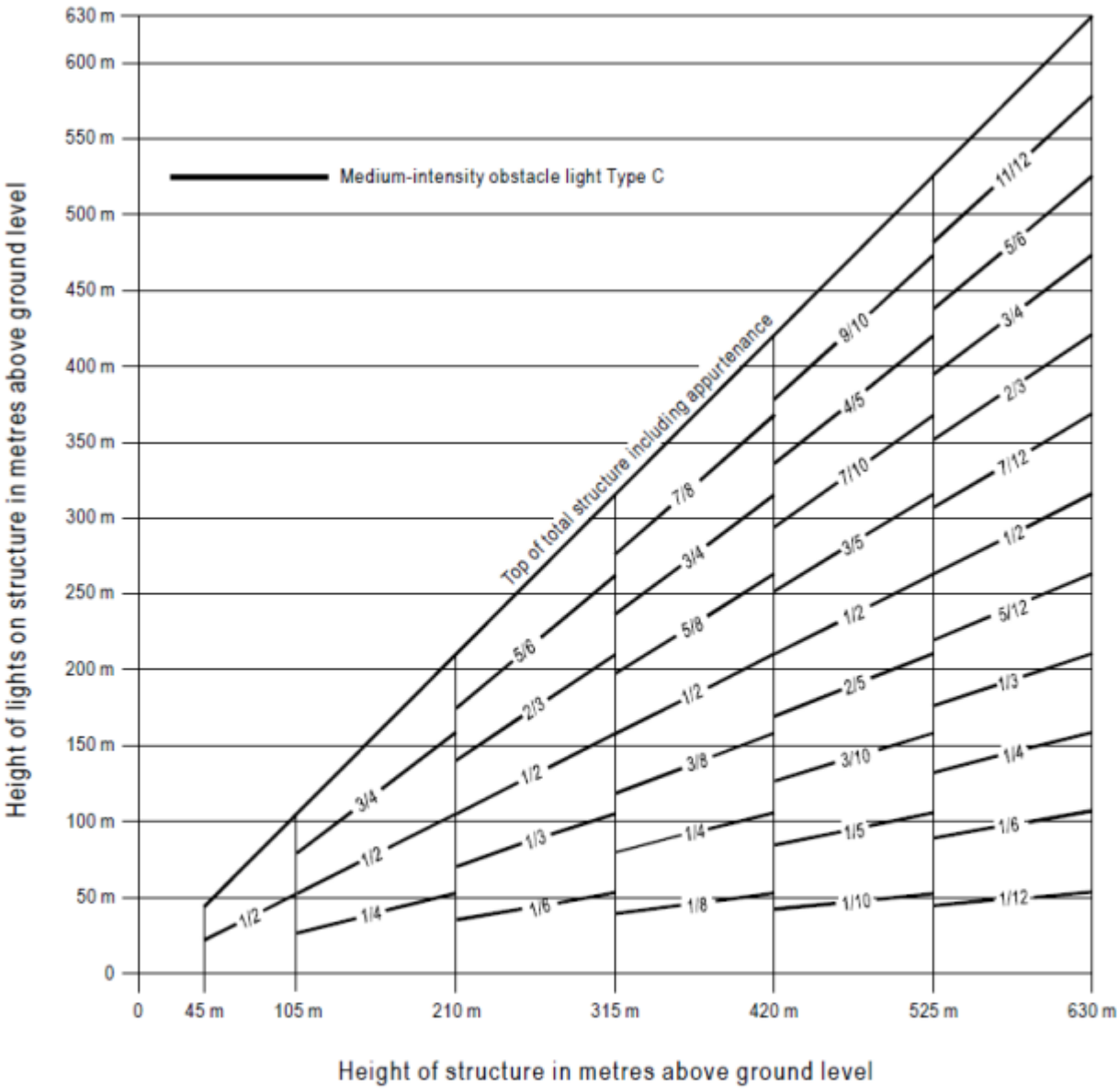
Note.— High-intensity obstacle lighting is recommended on structures with a height of more than 150 m above ground level. If medium-intensity lighting is used, marking will also be required.

Figure GM-Q-1.Medium-intensity flashing-white obstacle lighting system, Type A



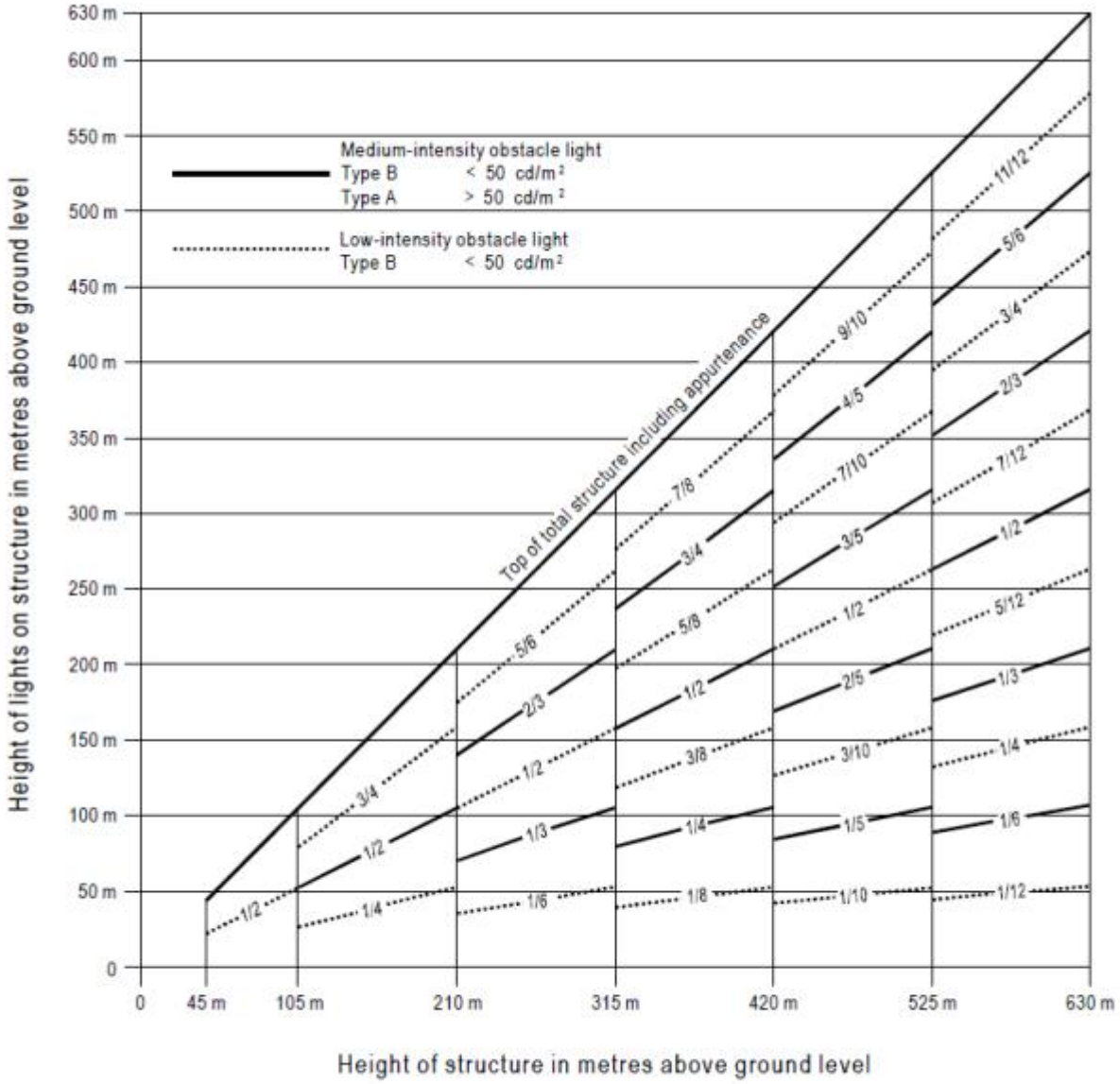
Note.— For night-time use only.

Figure GM-Q-2. Medium-intensity flashing-red obstacle lighting system, Type B



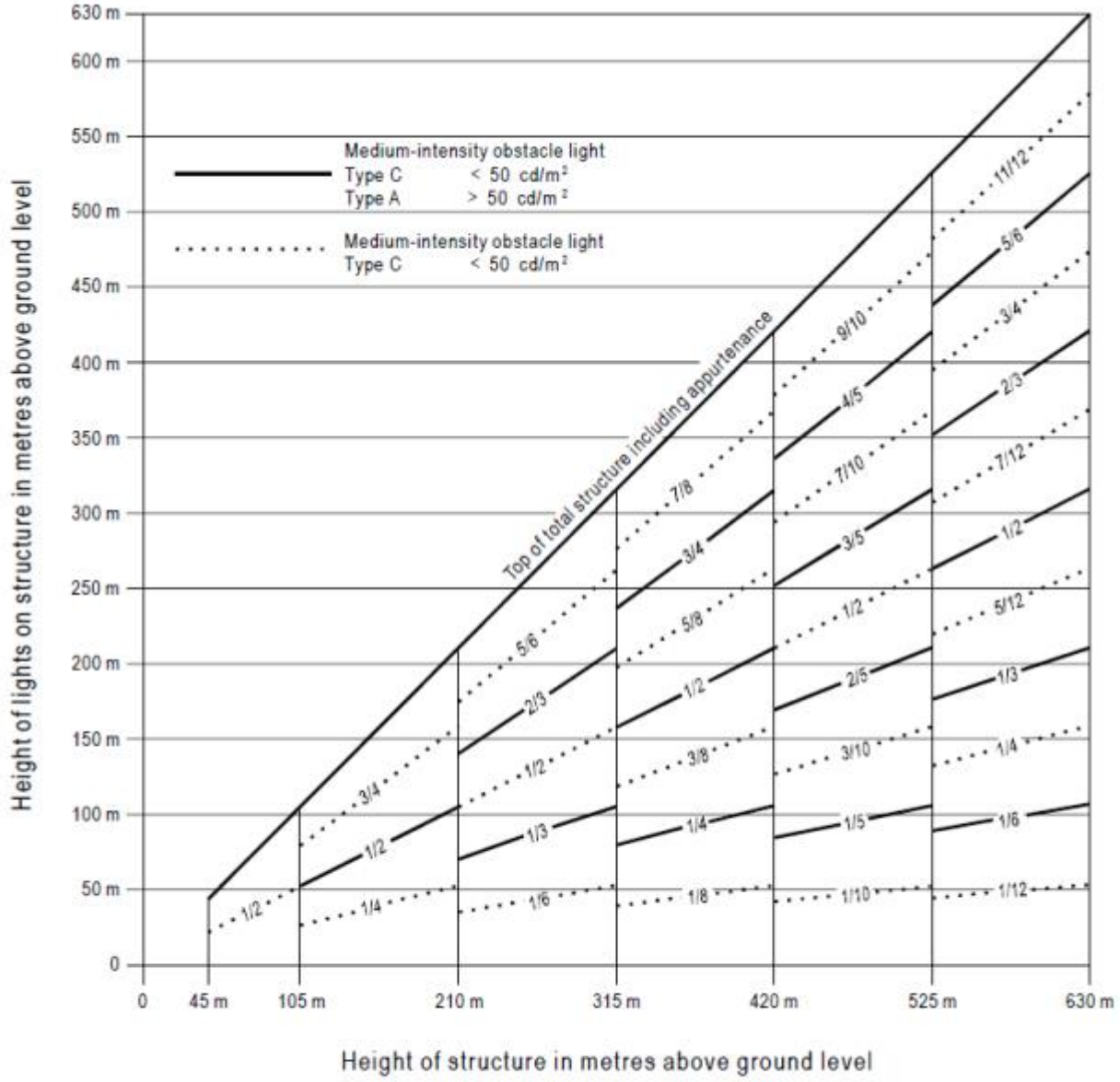
Note.— For night-time use only.

Figure GM-Q-3. Medium-intensity fixed-red obstacle lighting system, Type C



Note.— High-intensity obstacle lighting is recommended on structures with a height of more than 150 m above ground level. If medium-intensity lighting is used, marking will also be required.

Figure GM-Q-4. Medium-intensity dual obstacle lighting system, Type A/Type B



Note.— High-intensity obstacle lighting is recommended on structures with a height of more than 150 m above ground level. If medium-intensity lighting is used, marking will also be required.

Figure GM-Q-5. Medium-intensity dual obstacle lighting system, Type A/Type C

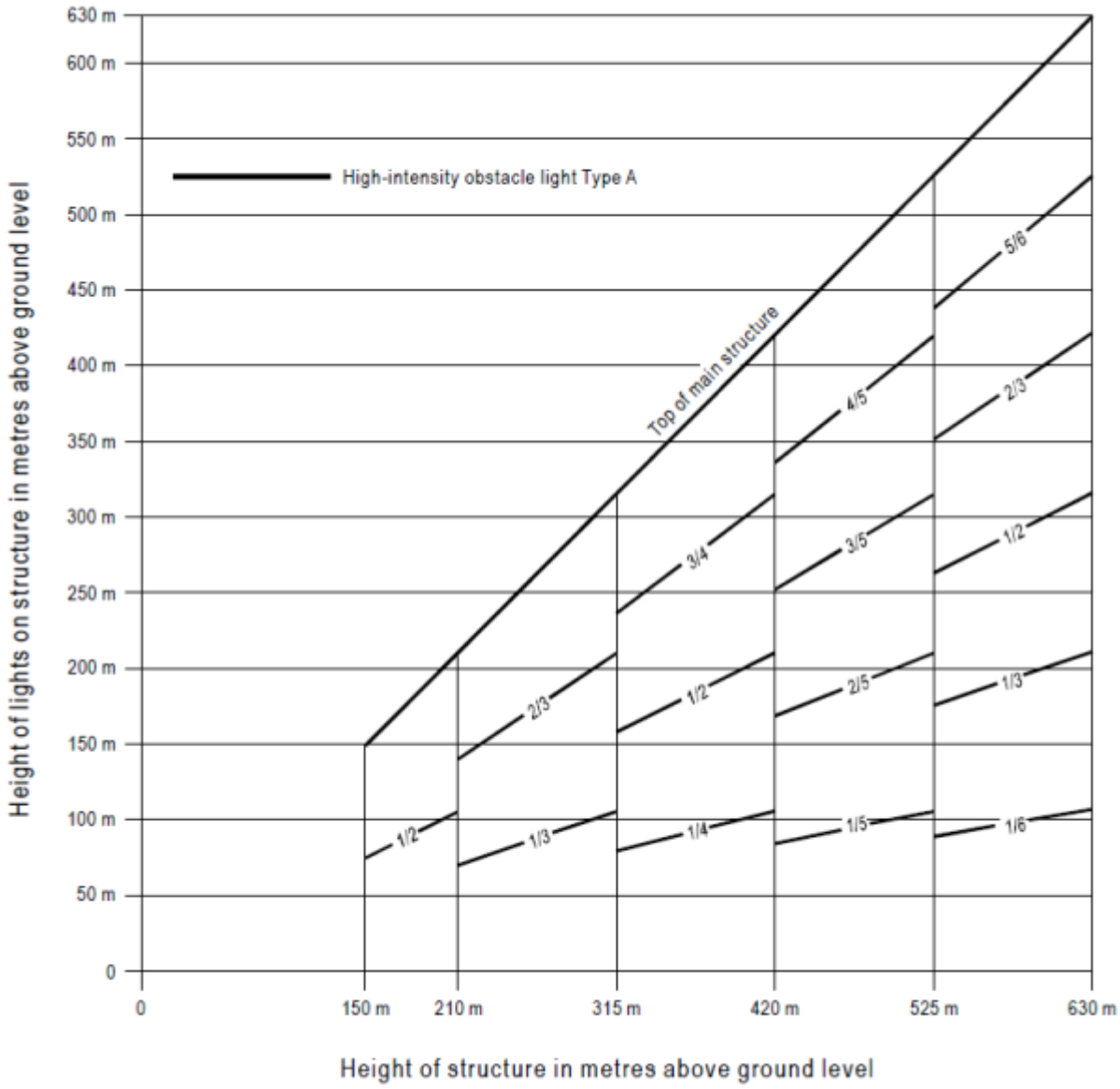


Figure GM-Q-6. High-intensity flashing-white obstacle lighting system, Type A

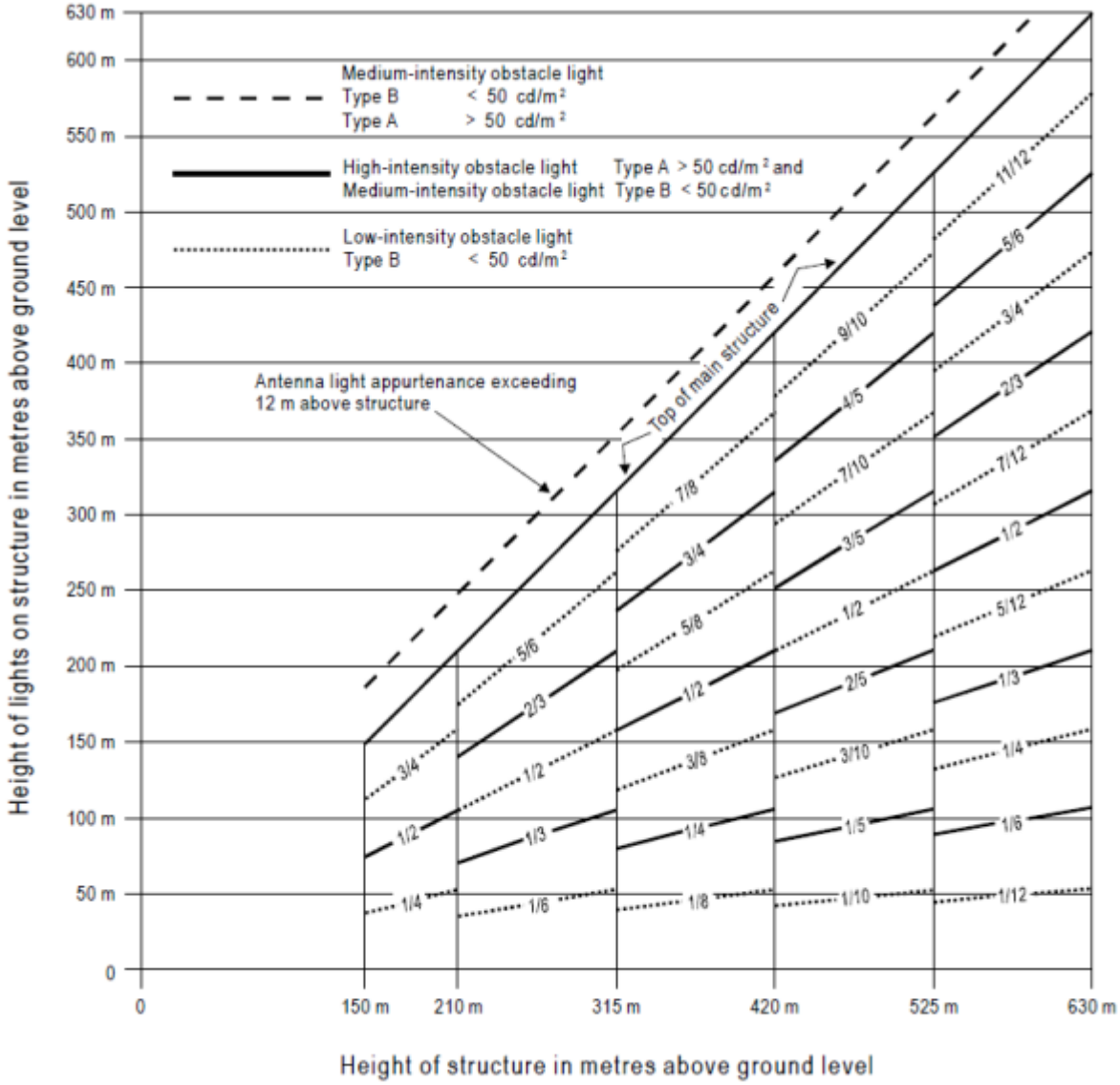


Figure GM-Q-7. High-/medium-intensity dual obstacle lighting system, Type A/Type B

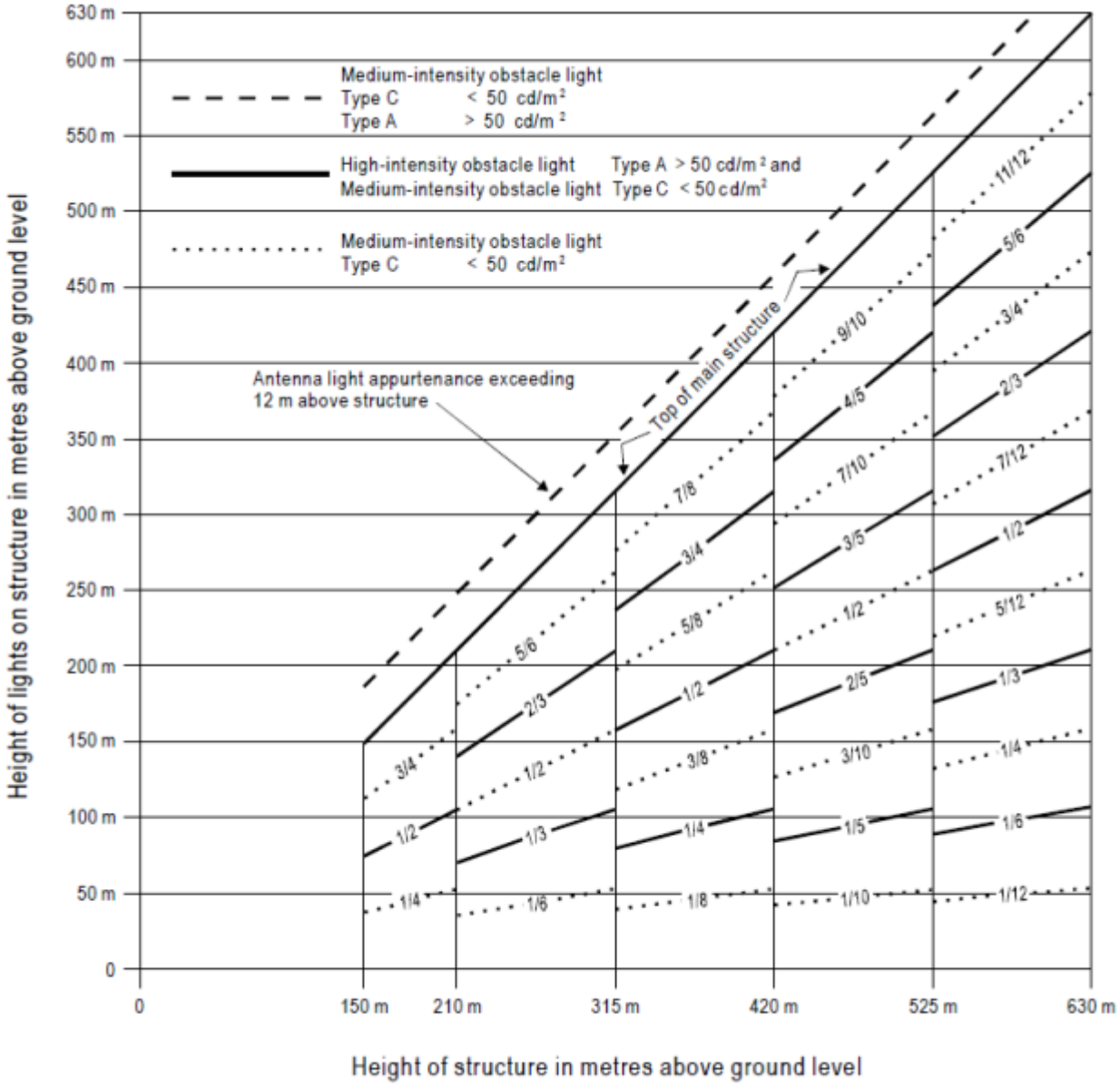


Figure GM-Q-8. High-/medium-intensity dual obstacle lighting system, Type A/Type C

In the cases as stated in CS ADR-DSN.Q.848(c) and (d), normally the spacing would not exceed 52 m.

Insert new GM1 ADR-DSN.Q.847 as follows:

GM1 ADR-DSN.Q.847 Lighting of fixed objects with a height less than 45 m above ground level

A group of buildings is regarded as an extensive object.

Insert new GM1 ADR-DSN.Q.848 as follows:

GM1 ADR-DSN.Q.848 Lighting of fixed objects with a height 45 m to a height less than 150 m above ground level

Low-intensity obstacle lights, Type A or B, may be used for obstacles higher than 45 m if it is determined to be sufficient.

Insert new GM1 ADR-DSN.Q.849 as follows:

GM1 ADR-DSN.Q.849 Lighting of fixed objects with a height 150 m or more above ground level

Where, 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, should be used alone, whereas medium-intensity obstacle lights, Type B, should be used either alone or in combination with low-intensity obstacle lights, Type B.

Amend GM1 ADR-DSN.Q.850 as follows:

GM1 ADR-DSN.Q.850 Lighting of other objects

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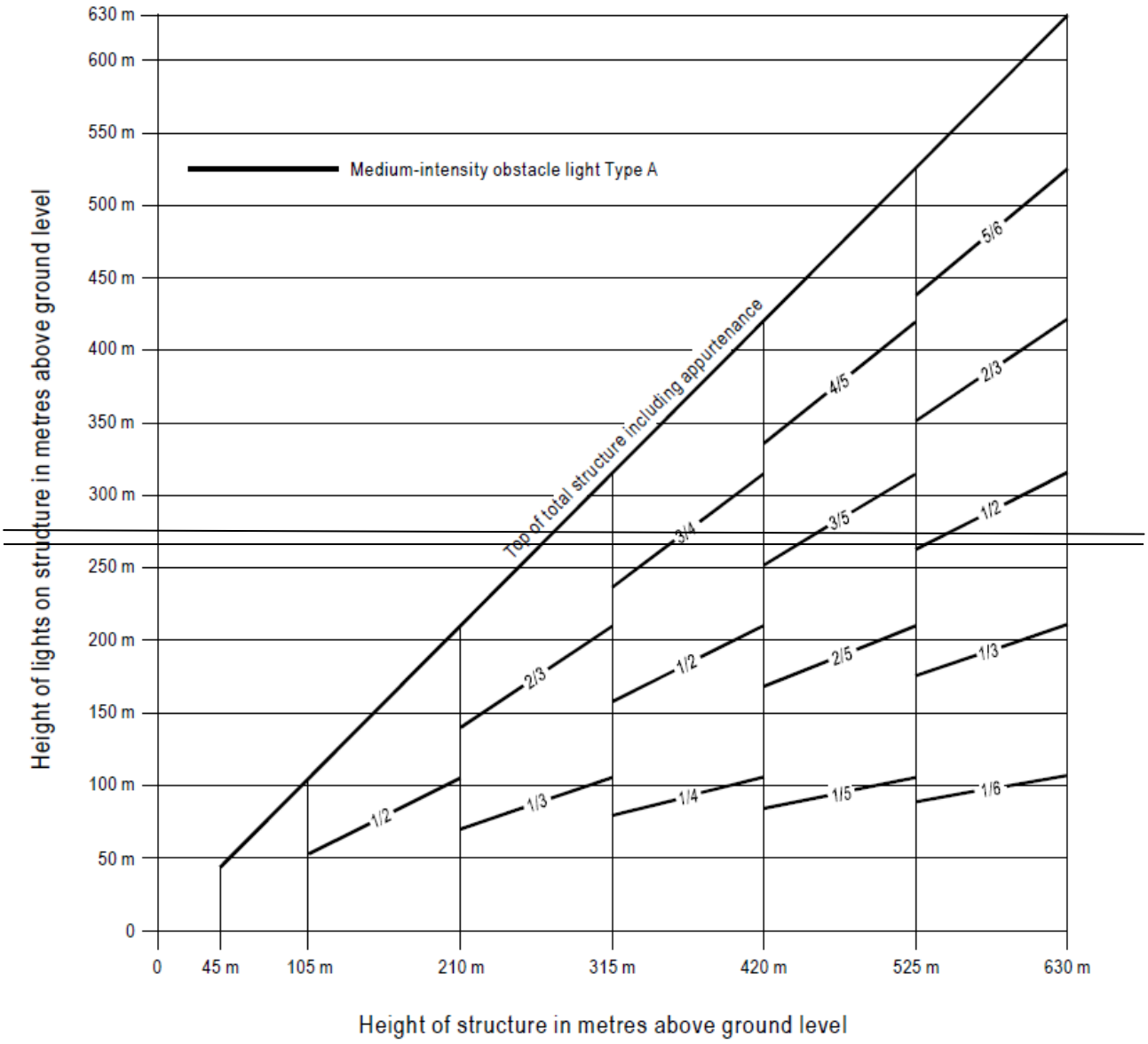
~~(a) High-intensity obstacle lights are intended for day use as well as night use. Care is needed to ensure that these lights do not create disconcerting dazzle or environmental concerns. Guidance on the design, location, and operation of high-intensity obstacle lights is given in the ICAO Doc 9157, Aerodrome Design Manual, Part 4, Visual Aids.~~

~~(b) Low-intensity obstacle lights may be used, Type A or B for obstacles higher than 45 m if it is determined to be sufficient.~~

~~(a) A group of trees or buildings is regarded as an extensive object.~~

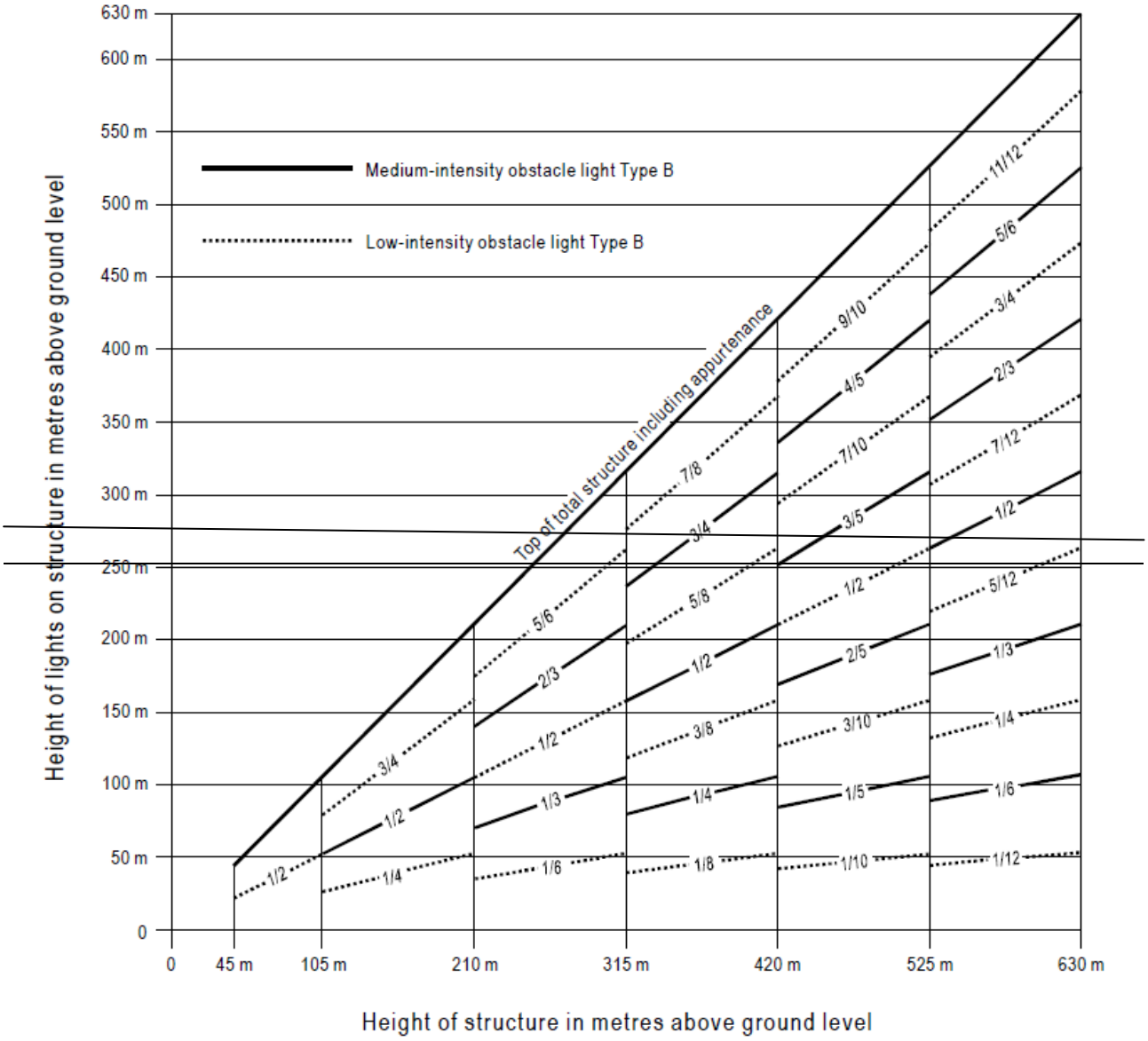
~~Note.— In some cases, this may require locating the lights off the tower.~~

~~(b) Guidance Material on how a combination of low, medium, and/or high intensity lights on obstacles should be displayed is given in the following Figures:~~



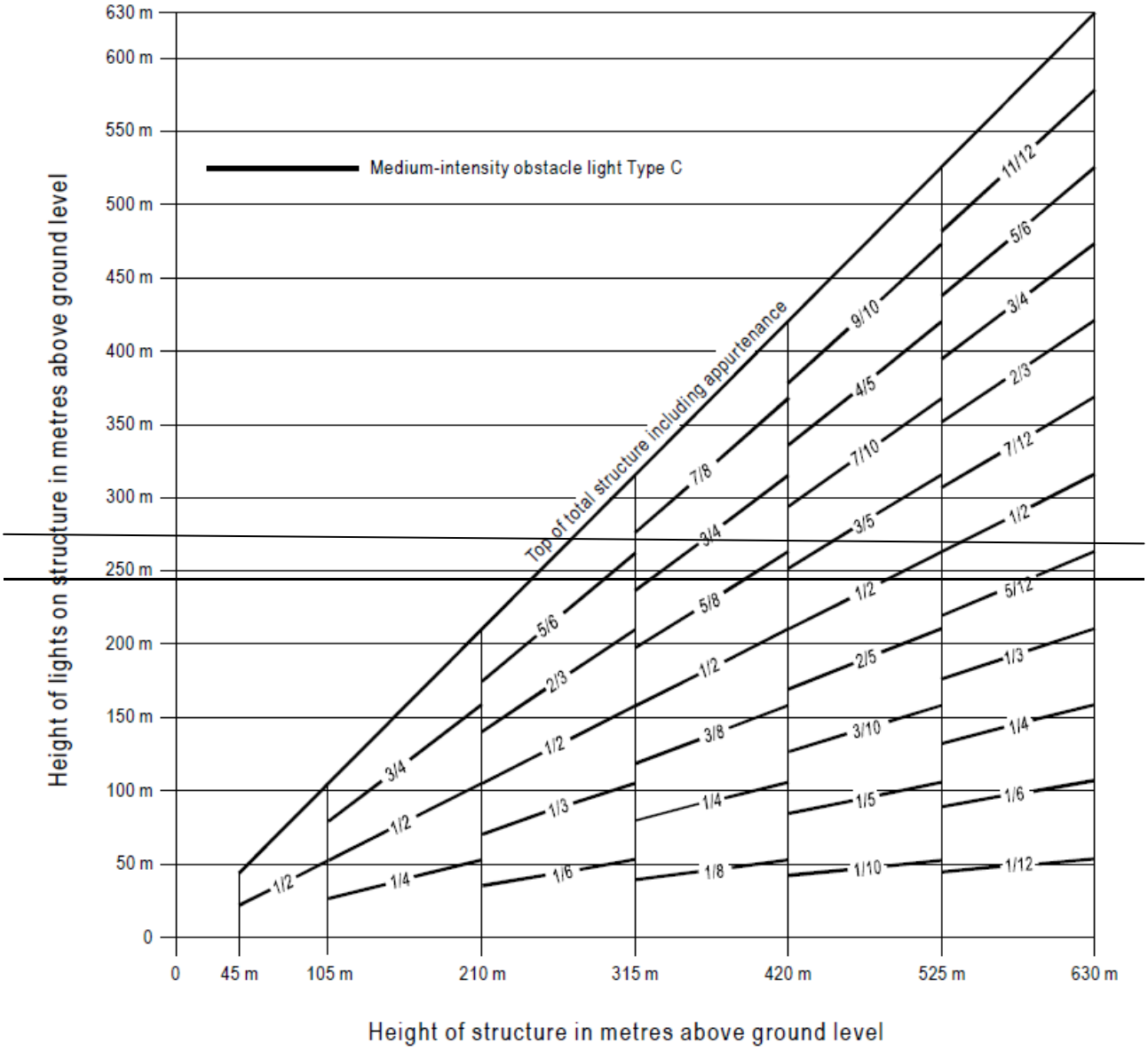
Note.— High-intensity obstacle lighting is recommended on structures with a height of more than 150 m above ground level. If medium-intensity lighting is used, marking will also be required.

~~Figure GM-Q-1.Medium-intensity flashing-white obstacle lighting system, Type A~~



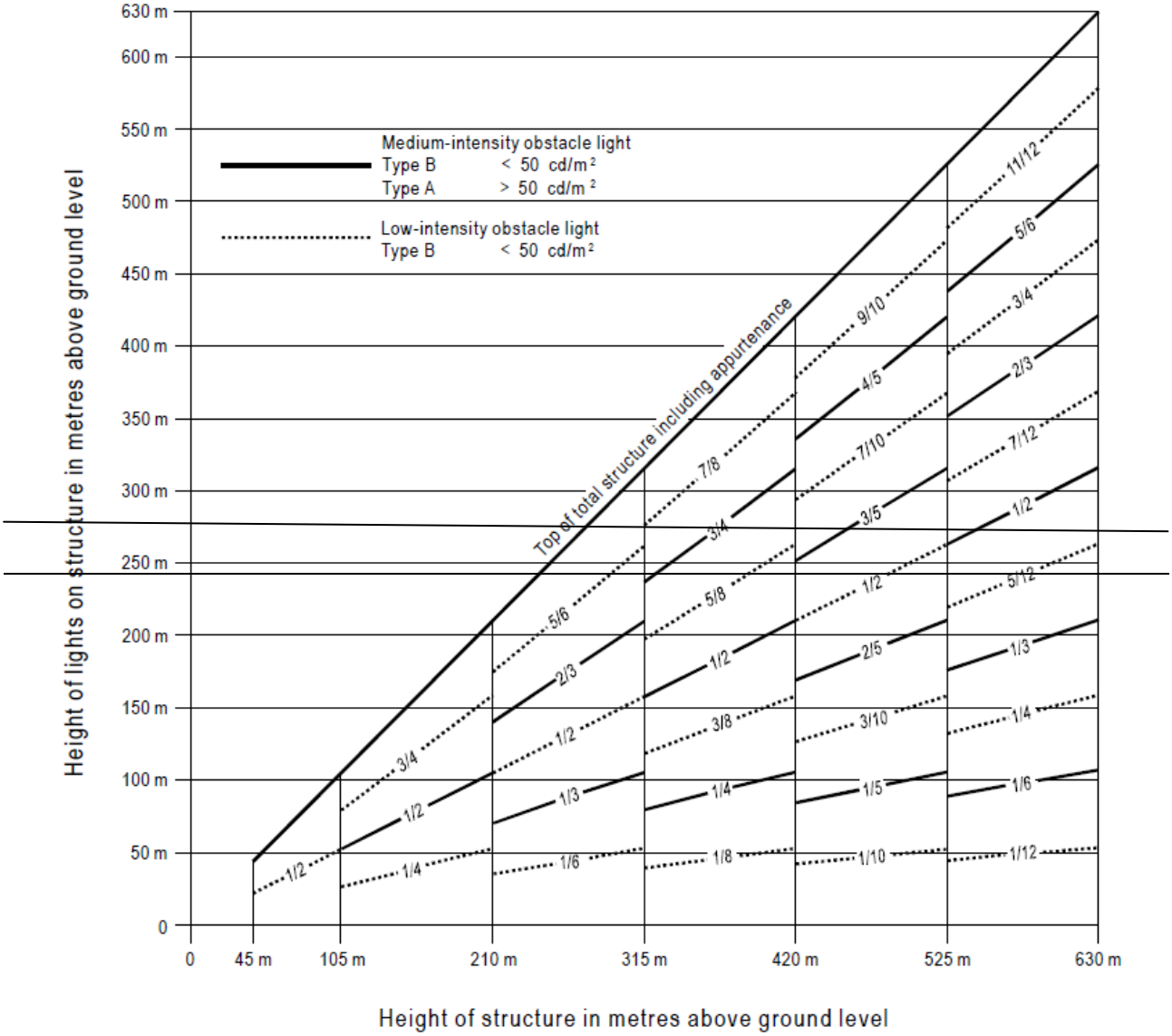
Note.— For night-time use only.

~~Figure GM-Q-2. Medium-intensity flashing-red obstacle lighting system, Type B~~



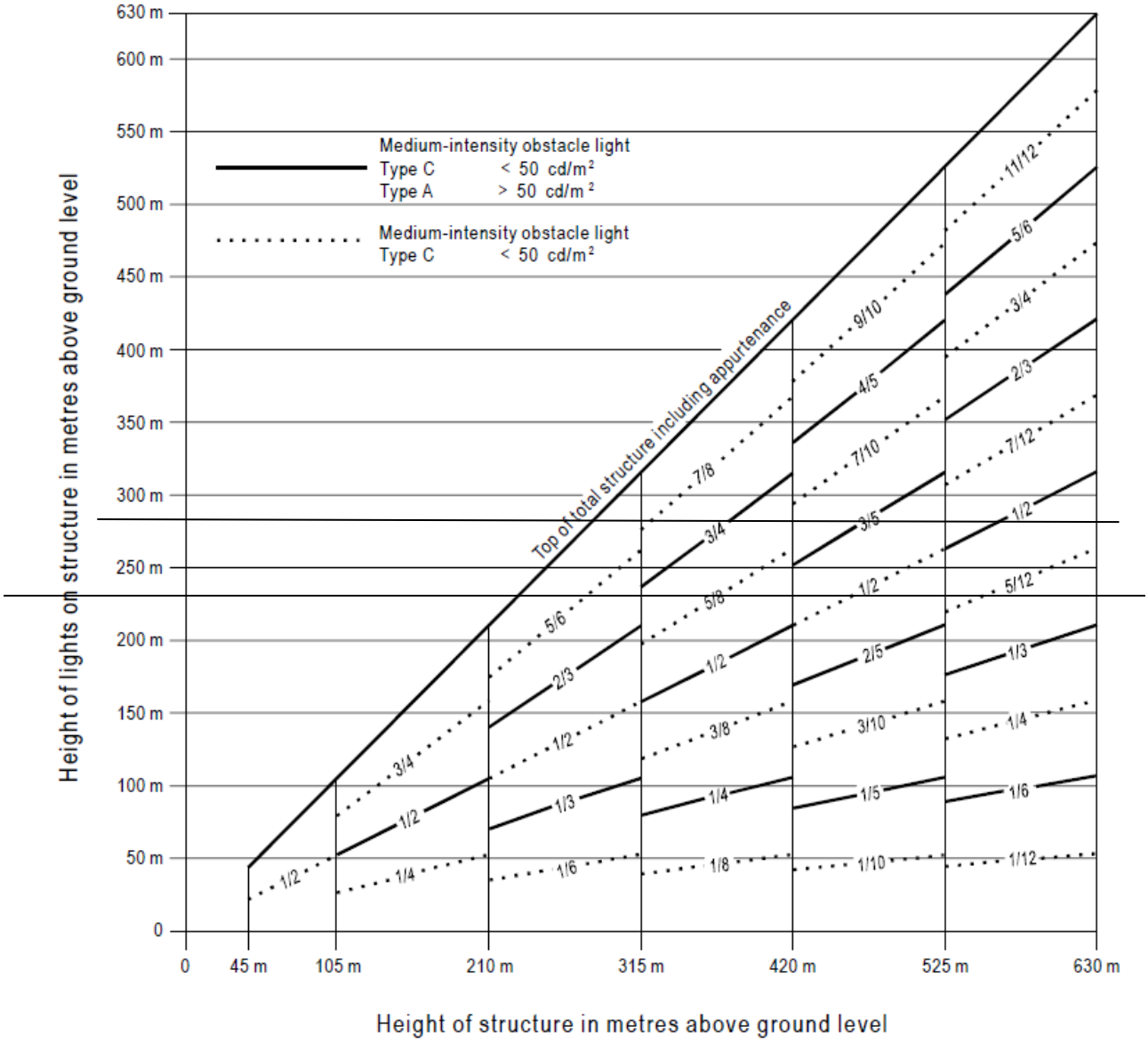
Note.— For night-time use only.

~~Figure GM-Q-3. Medium-intensity fixed-red obstacle lighting system, Type c~~



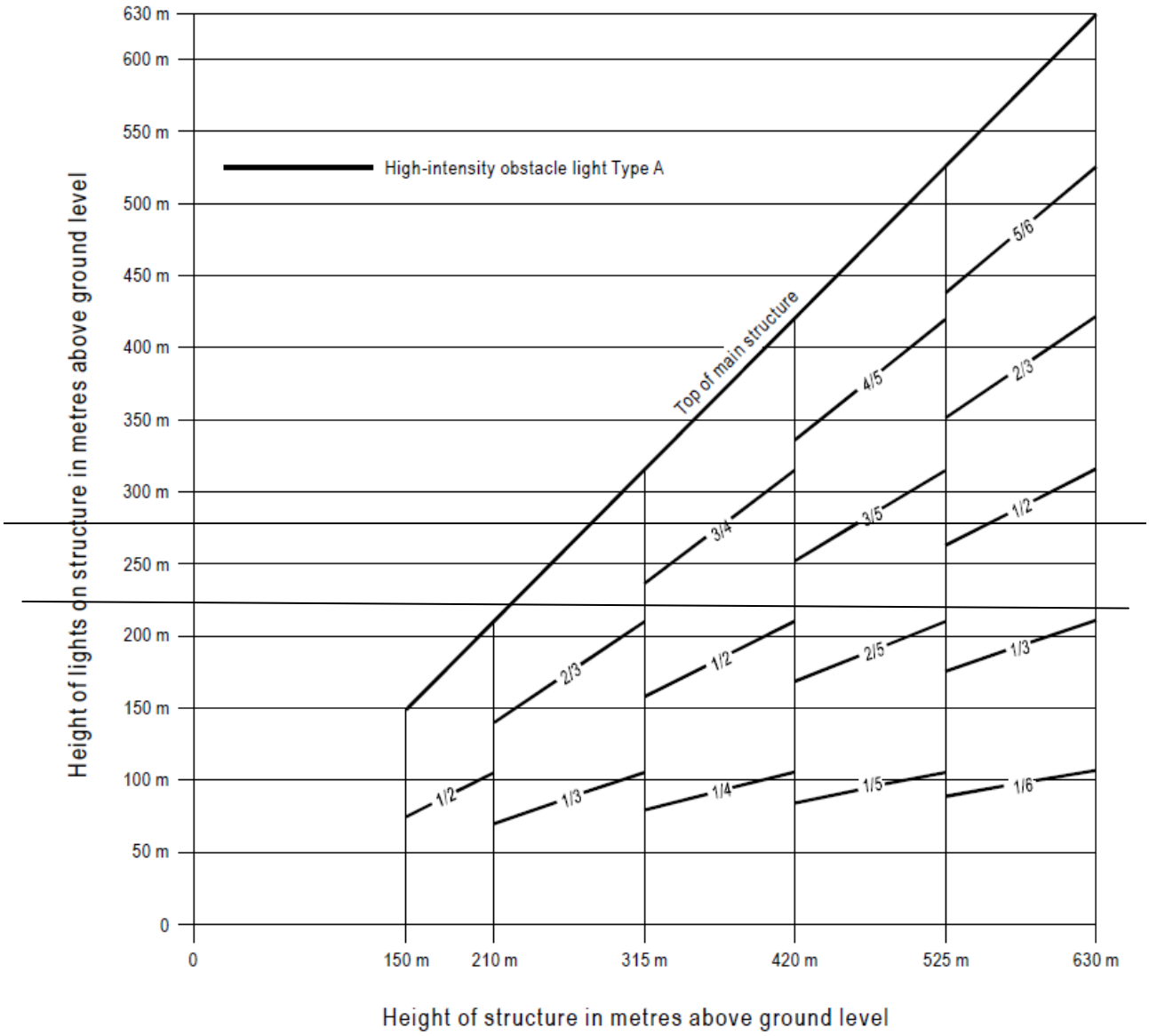
Note.— High-intensity obstacle lighting is recommended on structures with a height of more than 150 m above ground level. If medium-intensity lighting is used, marking will also be required.

~~Figure GM-Q-4. Medium-intensity dual obstacle lighting system, Type A/Type B~~

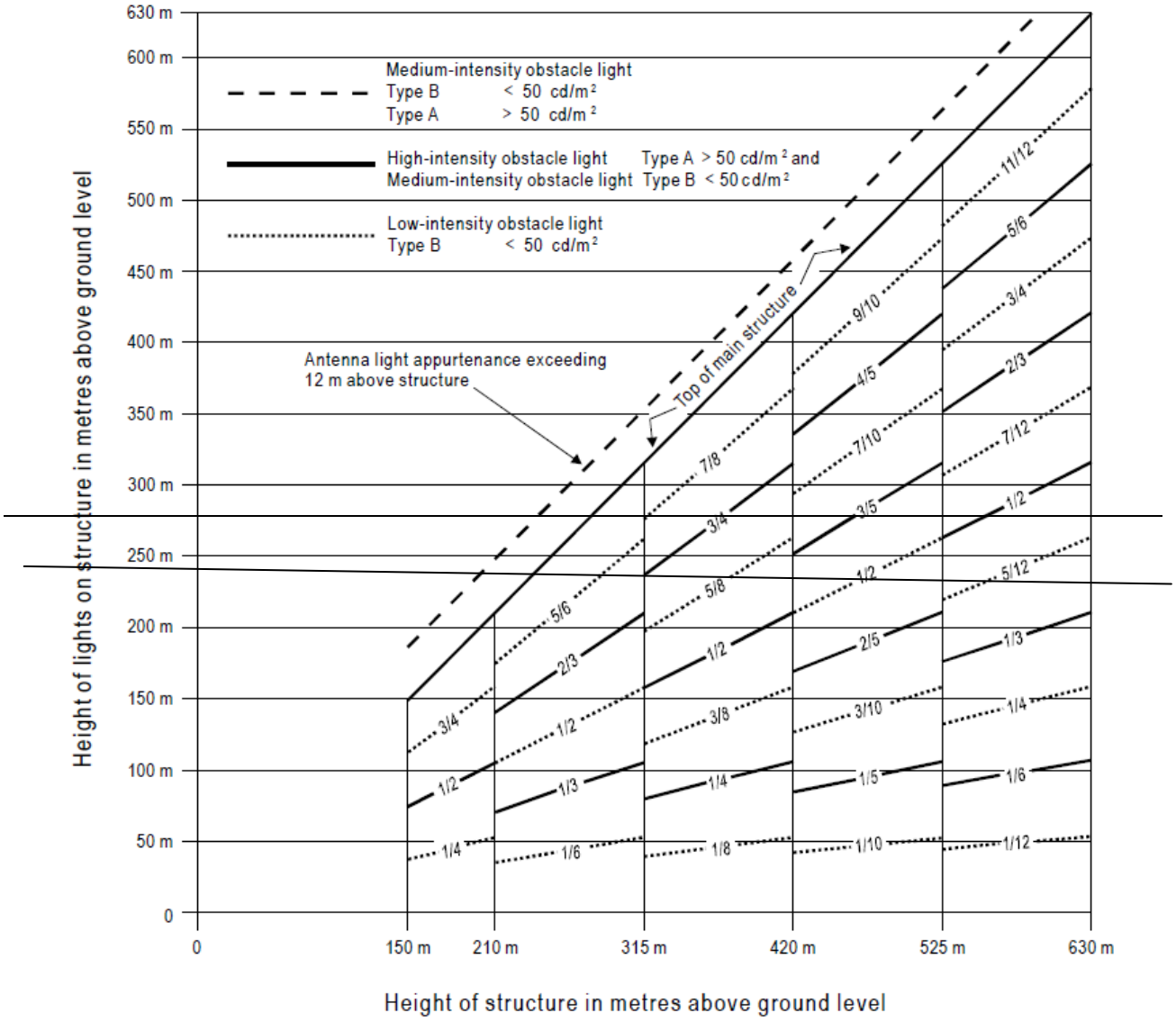


Note.— High-intensity obstacle lighting is recommended on structures with a height of more than 150 m above ground level. If medium-intensity lighting is used, marking will also be required.

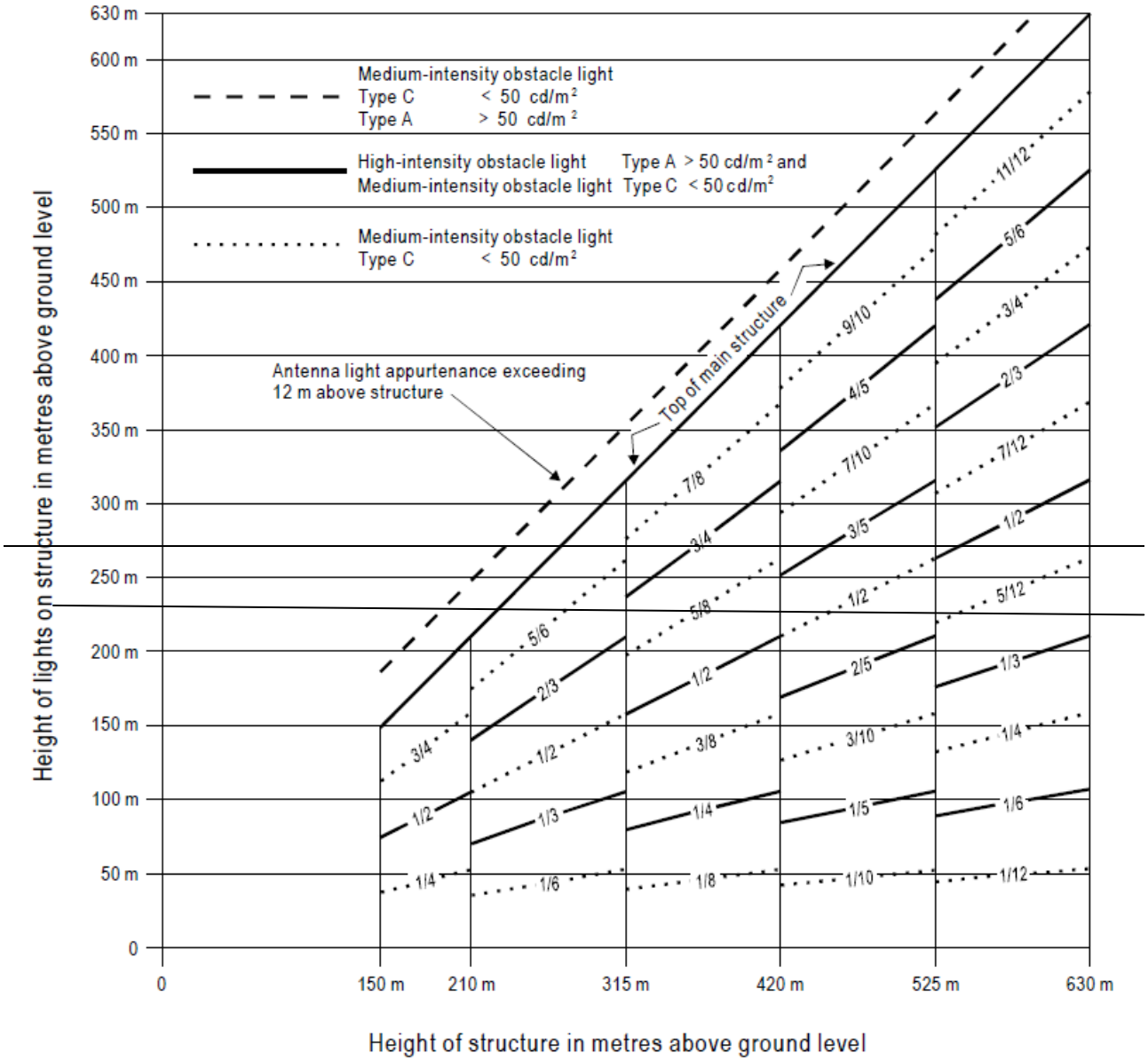
~~Figure GM-Q-5. Medium-intensity dual obstacle lighting system, Type A/Type C~~



~~Figure GM-Q-6. High-intensity flashing-white obstacle lighting system, Type A~~



~~Figure GM-Q 7. High /medium-intensity dual obstacle lighting system, Type A/Type B~~



~~Figure GM-Q-8. High-/medium-intensity dual obstacle lighting system, Type A/Type C~~

~~In the cases as stated in CS ADR-DSN.Q.850(c)(7) and (c)(8), normally the spacing would not exceed 52 m.~~

Insert new GM1 ADR-DSN.Q.851 as follows:

GM1 ADR-DSN.Q.851 Marking and lighting of wind turbines

(a) Additional markings and lighting may be provided to the wind turbines if indicated by a safety assessment.

(b) Case by case studies for wind turbines of more than 315 m of overall height may conclude that additional markings and lighting are required.

Insert new GM1 ADR-DSN.Q.852 as follows:

GM1 ADR-DSN.Q.852 Marking and lighting of overhead wires, cables, supporting towers, etc.

(a) Where high-intensity obstacle lights, Type B, are used, and it is not possible to locate them as described in CS ADR-DSN.Q.852(d)(2), in some cases, this may require locating the lights off the tower.

(b) High-intensity obstacle lights are intended for day use as well as night use. Care should be taken to ensure that these lights do not create disconcerting dazzle or environmental concerns. Guidance on the design, location, and operation of high-intensity obstacle lights is given in ICAO Doc 9157, Aerodrome Design Manual, Part 4, Visual Aids.

(c) Where 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 should be provided. This system should be composed of high-intensity obstacle lights, Type B, for daytime and twilight use and medium-intensity obstacle lights, Type B, for night-time use. Where medium-intensity lights are used they should be installed at the same level as the high-intensity obstacle light Type B.

Amend GM1 ADR-DSN.R.855 as follows:

GM1 ADR-DSN.R.855 Closed runways and taxiways, or parts thereof

i~~I~~ntentionally left blank

Amend GM1 ADR-DSN.R.860 as follows:

GM1 ADR-DSN.R.860 Non-load-bearing surfaces

~~The marking characteristics of runway sides is specified in CS ADR-DSN.L.550.~~

(a) A taxi side stripe marking could also be placed along the edge of the load-bearing pavement to emphasise the location of the taxiway edge, with the outer edge of the marking approximately on the edge of the load-bearing pavement.

(b) At intersections of taxiways and on other areas where, due to turning, the possibility for confusion between the side stripe markings and centre line markings may exist, or where the

pilot may not be sure on which side of the edge marking the non-load bearing pavement is, the additional provision of transverse stripes on the non-load bearing surface has been found to be of assistance.

(c) As shown in Figure GM-R-1, the transverse stripes should be placed perpendicular to the side stripe marking.

(d) On curves, a stripe should be placed at each point of tangency of the curve and at intermediate points along the curve so that the interval between stripes does not exceed 15 m. If deemed desirable to place transverse stripes on small straight sections, the spacing should not exceed 30 m.

(e) The width of the marks should be 0.9 m, and they should extend to within 1.5 m of the outside edge of the stabilised paving or be 7.5 m long whichever is shorter. The colour of the transverse stripes should be the same as that of the edge stripes, i.e. yellow.

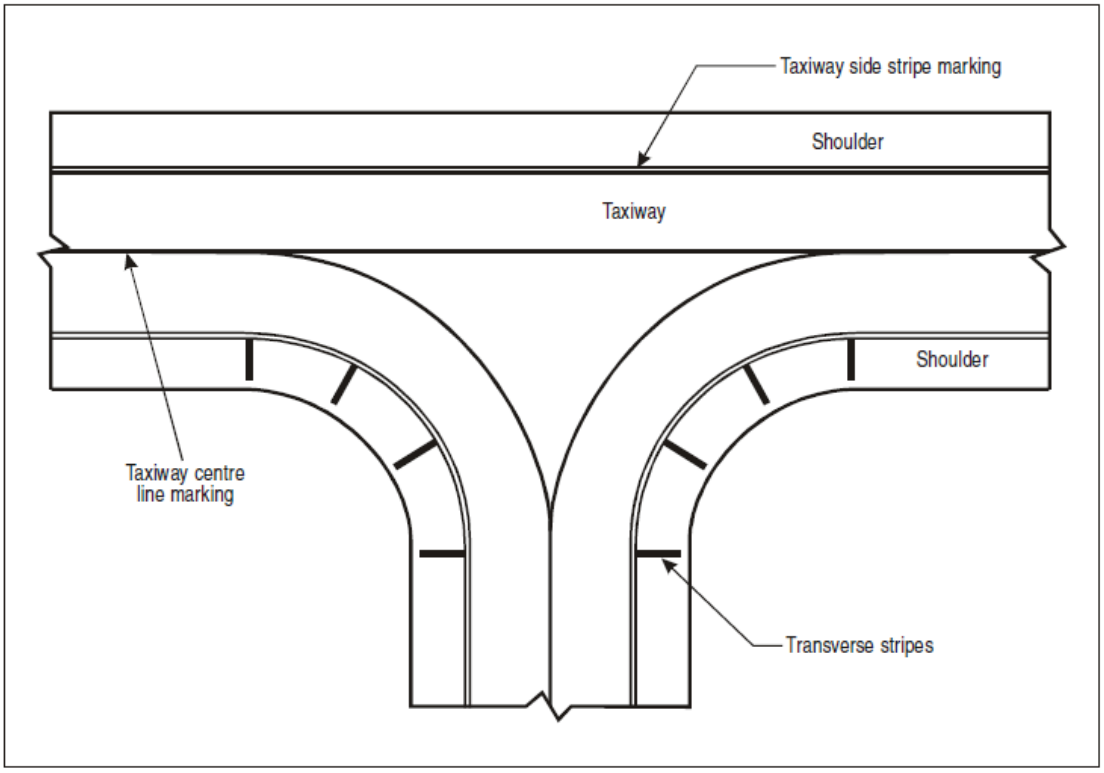


Figure GM-R-1. Marking of non-load bearing paved taxiway surface

More guidance on providing additional transverse stripes at an intersection or a small area on the apron is given in ~~the~~ ICAO Doc 9157, Aerodrome Design Manual, Part 4, Visual Aids~~)~~.

Amend GM1 ADR-DSN.S.875 as follows:

GM1 ADR-DSN.S.875 Electrical power supply systems for air navigation facilities

(...)

(b) 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~~ ICAO Doc 9157, Aerodrome Design Manual, Part 5, Electrical Systems~~)~~.

(c) Switch-over time is 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 changeover, when the light is being operated at intensities of 25 % or above.

(d) As a good practice, a measurement of the photometric parameters may be used for the evaluation of the switch-over time.

(1) If the switch-over time is greater than 1 second, the following corrective actions may be used to decrease the switch-over time:

(i) use of enhanced constant current regulators (CCR); or

(ii) use of uninterruptible power supply (UPS).

(2) If the photometric based switch-over time is below or equal 1 second, it is recommended to analyse the electrical system in order to find out an equivalent electrical switch-over time.

(e) For periodic measurement of the switch-over time a measurement of the equivalent electrical switch-over time at the feeding point of an aeronautical ground lights (AGL) system may be established.

Amend GM1 ADR-DSN.S.880 as follows:

GM1 ADR-DSN.S.880 Electrical power supply ~~for visual aids~~

(a) At an aerodrome where the primary runway is a non-instrument runway, a secondary power supply capable of meeting the requirements of CS ADR-DSN.S.875(d) should be provided, except that a secondary power supply for visual aids need not be provided when an emergency lighting system is provided and capable of being deployed in 15 minutes.

(b~~)(a~~) Specifications for secondary power supply for radio navigation aids and ground elements of communications systems are given in ICAO Annex 10, Volume I, Aeronautical Telecommunications, Chapter 2.

(c~~)(b~~) Requirements for a secondary power supply should be met by either of the following:

(1) 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

(2) standby power unit(s) which are engine generators, batteries, etc. from which electric power can be obtained.

(d~~)(c~~) Guidance on electrical systems is included in ~~the~~ ICAO Doc 9157, Aerodrome Design Manual, Part 5, Electrical Systems.

(e~~)(d~~) The requirement for minimum lighting may be met by other than electrical means.

Amend GM1 ADR-DSN.S.885 as follows:

GM1 ADR-DSN.S.885 System design

Guidance on means of providing this protection is given in ~~the~~ ICAO Doc 9157, Aerodrome Design Manual, Part 5, Electrical Systems.

Amend GM1 ADR-DSN.S.890 as follows:

GM1 ADR-DSN.S.890 Monitoring

(a) For a runway meant for use in runway visual range conditions less than a value of 550 m, the minimum serviceability level of any element of the lighting system detailed in Table S-1, below which operations should not continue, is set up by the competent authority.

(b) Additional g~~G~~uidance ~~on this subject and~~ on air traffic control interface and visual aids monitoring is given ~~included~~ in ~~the~~ ICAO Doc 9157, Aerodrome Design Manual, Part 5, Electrical Systems.

Amend GM1 ADR-DSN.S.895 as follows:

GM1 ADR-DSN.S.895 Serviceability levels

(a) Serviceability levels are intended to define the maintenance performance level objectives. ~~They are not intended to define whether the lighting system is operationally out of service.~~

(b) Guidance on preventive maintenance of visual aids is given in the, ICAO Doc 9137, Airport Services Manual, Part 9~~6~~, Airport Maintenance Practices.

(...)

Amend GM1 ADR-DSN.T.900 as follows:

GM1 ADR-DSN.T.900 Emergency access and service ~~access~~ roads

(a) ~~Air side~~ ~~s~~Service roads at air side are installed to support all apron processes. Furthermore, service roads can be used as aerodrome perimeter service roads, providing access to navigation aids, as temporary roads for construction vehicles, etc.

(b) Some general considerations in the planning of roads are described as follows:

(1) Every effort should be made to plan ~~air side~~ service roads at air side so that they do not cross runways and taxiways.

(2) The planning of the aerodrome road layout should take into account the need to provide emergency access roads for use by rescue and firefighting vehicles to various

areas on the aerodrome, and, in particular, to the approach areas. Service roads to navigation aids should be planned in such a manner as to present minimal interference to the function of the aids. If it is necessary for a~~n~~ service road to cross an approach area, the road should be located so that vehicles travelling on it are not obstacles to aircraft operations.

(3) The ~~air side~~ service roads system at air side should be designed to account for local security measures. Access points to the system should, thus, need to be restricted. Should ground vehicle movements affect surface movement of aircraft on runways and taxiways, it should be required that the ground vehicle movements be coordinated by the appropriate aerodrome control. Control is normally exercised by means of two-way radio communication although visual signals, such as signal lamps, are adequate when traffic at the aerodrome is light. Signs or signals may also be employed to aid control at intersections.

(...)

(d) Emergency access roads should be provided on an aerodrome where terrain conditions permit their construction, so as to facilitate achieving minimum response times. Particular attention should 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.

(...)

Amend GM1 ADR-DSN.T.905 as follows:

GM1 ADR-DSN.T.905 Fire stations

i~~I~~ntentionally left blank

Amend GM1 ADR-DSN.T.910 as follows:

GM1 ADR-DSN.T.910 Equipment frangibility requirements

(...)

(c) Guidance on design for frangibility is contained in ~~the~~ ICAO Doc 9157, Aerodrome Design Manual, Part 6, Frangibility.

Amend GM1 ADR-DSN.T.915 as follows:

GM1 ADR-DSN.T.915 Siting of equipment and installations on operational areas

(...)

(b) Guidance on siting of equipment and installations on operational areas is given in ICAO Doc 9157, Aerodrome Design Manuals, Part 2, Taxiways, Aprons and Holding Bays and Part 6, Frangibility~~)~~.

(c) Guidance on the frangible design of visual and non-visual aids for navigation is given in the ICAO D~~d~~oc 9157, Aerodrome Design Manual, Part 5~~6~~, Electrical Systems~~)~~.

(...)

Amend GM1 ADR-DSN.T.920 as follows:

GM1 ADR-DSN.T.920 Fencing

(...)

(e) Top and bottom selvages of the fence having a twisted and barbed finish. The bottom of the fence installed to within 5 cm of hard surfacing or stabilised soil. However, in areas where unstable soil conditions are prevalent, the fabric installed to extend at least 5 cm below the surface or imbedded in concrete curbing. All fencing should be grounded. Care should be taken that metallic fencing is not installed when it should interface with the operation of navigation aids. The fence itself should allow ~~is low maintenance, provides~~ clear visibility and easy maintenance.

(...)

Amend GM1 ADR-DSN.U.930 as follows:

GM1 ADR-DSN.U.930 Colours for aeronautical ground lights

(...)

(b) Guidance on chromaticity changes resulting from the effect of temperature on filtering elements is given in ICAO Doc 9157, Aerodrome Design Manual, Part 4, Visual Aids.

Amend GM1 ADR-DSN.U.935 as follows:

GM1 ADR-DSN.U.935 Colours for markings, signs and panels

i~~I~~ntentionally left blank