Civil Aviation Authority of Bangladesh

Gazette

Dhaka, ৯ই অগ্রহায়ণ, ১৪৩২ /26 November, 2025

File No: CAAB 30.31.0000.116.43.002.23 – In exercise of the power conferred by Section 47, read with Section 14 of the Civil Aviation Act, 2017 (Act No. 18 of 2017), hereinafter referred as the "Act", the Chairman of the Civil Aviation Authority of Bangladesh is pleased to issue this **Amendment -1** to Air Navigation Order (ANO) ANO 14 VOL-II, Issdue-1.

2. This **Amendment-1** to ANO 14 VOL-II, Issue-1 shall come into force with immediate effect.

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Chairman

Civil Aviation Authority of Bangladesh

INTRODUCTION

1.1 Short Title and Commencement

The ANO under reference No: CAAB 30.31.0000.116.43.003.23 which was published on 24 March 2024.through gazette notification (pages 3031 to 3141) is called as "Air Navigation Order on Heliport (Ground/Elevated) shortly ANO 14 VOL-II, Issue -1 became effective from the date as mentioned in the ANO. This ANO will be called as Amendment-1 to ANO 14 VOL-II, Issue-1 on Heliport (Ground/Elevated) issued in accordance with Amendment 10 to Annex 14 VOL-II to the Convention on International Civil Aviation. This ANO shall be referred to herein as **Amendment-1 to ANO 14 VOL-II, Issue-1.**

This Amendment-1 to ANO 14 VOL-II, Issue-1 shall be the integral part of ANO 14 VOL-II, Issue-1 and shall be effective immediately upon published in this Official Gazette.

1.2 Explanation

The whole document ANO 14 VOL-II, Issue-1 and its amendment-1 contain the Provisions in accordance with the Annex 14 Vol 2 (up to 10th amendment) to the Chicago Convention on Heliports.

1.3 Control of ANO 14 VOL-II and its Review Process

a) ANO 14 VOL-II and its amendment document are the property of the Civil Aviation Authority of Bangladesh.

b) The ANO 14 VOL-II is under the full authority of the Chairman, Civil Aviation Authority of Bangladesh. Member (Flight Standard & Regulations) of CAAB is the custodian of the ANO 14 VOL-II.

c) Member (Flight Standard & Regulations) is responsible for revision, distribution, retention, and processing of the approval of the ANO 14 VOL-II.

d) This ANO will be reviewed:-

- after changes or amendment of ICAO Annex 14 V-II; after changes of other Annexes which dictate to change ANO 14 VOL-II ;
- if necessary, after changes of Act, Laws, Rules etc. relating to aviation;
- if there are any mistakes/errors in the document and perform reviews as and when it deems necessary;

e) After reviewing, if it becomes necessary to review the existing provision or any portion of a provision of this ANO, it will be reflected through the issuance of amendment.

f) If the amendment requires more than 50% of pages to be updated/changed, it is recommended that a complete issue of the document be published, with new issue number and issue date, with the issue number incremented by I (one) with the previous issue number.

g) After approval and gazette notification, ANO will be published in the CAAB website for the use of the stakeholders.

1.4 Dispute Resolution

a) Should there be any confusion of understanding of the content(s) of this ANO 14 VOL-II and its amendment, the matter should be brought to the attention of the Member (Flight Standard & Regulations) of CAAB for clarification.

b) In the circumstances, when any dispute or contradiction arises for compliance with the provisions of the ANO 14 VOL-II and which cannot be resolved through the existing provisions of the ANO, the final decision lies with the Member (Flight Standard & Regulations) of CAAB. However, Member (Flight Standard & Regulations) of CAAB may submit the issue before the Chairman, CAAB, if deemed necessary.

1.5 Notes on The Presentation of The Amendment-1 To ANO 14, Vol- II

The text of the amendment is arranged to show deleted text with a line through it and new text highlighted with grey shading, as shown below:

~~Text to be deleted is shown with a line through it.~~	text deleted
New text to be inserted is highlighted with grey shading.	new text inserted
~~Text to be deleted is shown with a line through it~~ followed by the replacement text which is highlighted with grey shading.	modified,- meaning existing text replaced by new text

1.6 Amendment to ANO 14 VOL-II, Issue-1 has been given Chapter by Chapter.

CHAPTER 1. GENERAL

New Note has been inserted as Note-1 and the existing Introductory Note has been modified & renamed as

Note 2,-

~~*Introductory*~~ *Note 1.— Annex 14, Volume II, contains Standards and Recommended Practices (specifications) that prescribe the physical characteristics and obstacle limitation surfaces to be provided for at heliports, and certain facilities and technical services normally provided at a heliport. It is not intended that these specifications limit or regulate the operation of an aircraft.*

Note 2.— When designing a heliport, a ~~the critical~~ design helicopter~~, having~~ which represents the largest ~~set of~~ dimensions ~~and~~; the greatest maximum take-off mass (MTOM); and the most critical obstacle avoidance criteria of the population of helicopters the heliport is intended to serve, ~~would need to be considered~~ is taken into account. For guidance on establishing a design helicopter see the Heliport Manual *(Doc 9261).*

It is to be noted that provisions for helicopter flight operations are contained in ANO 6, Part III.

1.1 Definitions

Following Definitions have been inserted and modified in Section 1.1 as given below,-

ANO 14 VOL-I, contains definitions for the terms which are used in both volumes. Those definitions are not reproduced in this volume, with the exception of the following two, which are included for ease of reference:

Heliport. An aerodrome or a defined area on a structure intended to be used wholly or in part for the arrival, departure and surface movement of helicopters.

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The following list contains definitions of terms that are used only in Volume II, with the meanings given below.

Ascent/Descent surface. An inclined plane or complex surface that slopes upward from the centre of the FATO to indicate the path helicopters are expected to follow when vertical procedures are utilized – it can consist of:

a) an inverted triangle when there is no lateral component; or

b) an inverted conical surface when there is a lateral component.

D. The largest overall dimension of the helicopter when rotor(s) are turning measured from the most forward position of the main rotor tip path plane to the most rearward position of the tail rotor tip path plane or helicopter structure.

Design D. The D of the design helicopter.

D-value. A limiting dimension, in terms of "D", for a heliport, helideck or shipboard heliport, or for a defined area within.

Declared distances — heliports.

a) *Take-off distance available (TODAH).* The length of the FATO plus the length of helicopter clearway or elevated helicopter clearway (if provided) declared available and suitable for helicopters to complete the take-off.

b) *Rejected take-off distance available (RTODAH).* The length of the FATO declared available and suitable for helicopters operated in performance class 1 to complete a rejected take-off.

c) *Landing distance available (LDAH).* The length of the FATO plus any additional area declared available and suitable for helicopters to complete the landing manoeuvre from a defined height.

Dynamic load-bearing surface. A surface capable of supporting the loads generated by a helicopter in motion.

Elevated heliport. A heliport located on a raised structure on land.

Elevated helicopter clearway. A helicopter clearway that has been raised to a level that provides obstacle clearance.

Elongated. When used with TLOF or FATO, elongated means an area which has a length more than twice its width.

Final approach and take-off area (FATO). A defined area over which the final phase of the approach manoeuvre to hover or landing is completed and from which the take-off manoeuvre is commenced. Where the FATO is to be used by helicopters operated in performance class 1, the defined area includes the rejected take-off area available.

Helicopter clearway. A defined area ~~on the ground or water, selected and/or prepared as a suitable area~~ over which a helicopter ~~operated in performance class 1~~ may accelerate and achieve a ~~specific height~~ specified set of helicopter flight conditions.

Helicopter stand. A defined area intended to accommodate a helicopter for purposes of: loading or unloading passengers, mail or cargo; fuelling, parking or maintenance; and, where air taxiing operations are contemplated, the TLOF.

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Heliport reference point (HRP). The designated location of a heliport.

Initial departure fix (IDF). The terminal fix for the visual segment and the fix where the instrument phase of the PinS departure begins.

Point-in-space (PinS) approach. ~~The point-in-space approach is based on GNSS and is a~~An approach procedure designed for helicopters only that includes both a visual and an instrument segment. ~~It is aligned with a reference point located to permit subsequent flight manoeuvring or approach and landing using visual manoeuvring in adequate visual conditions to see and avoid obstacles.~~

Point-in-space (PinS) departure. A departure procedure designed for helicopters only that includes both a visual and an instrument segment.

Point-in-space (PinS) reference point (PRP). Reference point for the point-in-space approach as identified by the latitude and longitude of the MAPt.

Point-in-space (PinS) visual segment. ~~This is t~~The segment of a helicopter PinS ~~approach~~ procedure ~~from the~~ between a point (MAPt or IDF) and the heliport. ~~to the landing location for a PinS "proceed visually" procedure. This visual segment connects the PinS to the landing location.~~

Note.— The ~~procedure~~ design criteria for ~~a~~ PinS ~~approach and the detailed design requirements for a visual segment~~ procedures are established in the Procedures for Air Navigation Services — Aircraft Operations, Volume II *(PANS-OPS, Doc 8168 – Volume II).*

Protection area. A defined area surrounding a stand intended to reduce the risk of damage from helicopters accidentally diverging from the stand.

Rejected take-off area. A defined area on a heliport suitable for helicopters operating in performance class 1 to complete a rejected take-off.

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Touchdown/positioning marking (TDPM). A marking or set of markings providing visual cues for the positioning of helicopters.

Vertical procedures. Take-off and landing procedures that include an initial vertical or steep climb and a final vertical or steep descent profile. The profile may or may not include a lateral component.

Winching area. An area provided for the transfer by helicopter of personnel or stores to or from a ship.

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ABBREVIATIONS AND SYMBOLS

(used in ANO 14, Volume II)

Following Abbreviations have been inserted/modified, in Section 1.2.4

AIP	Aeronautical Information Publication
. . .	
HAPI	Helicopter approach path indicator
HFM	Helicopter flight manual (also known as RFM)
Hz	Hertz
IDF	Initial departure fix
kg	Kilogram
. . .	
NVIS	Night vision imaging systems
OCS	Obstacle clearance surface
OFS	Obstacle-free sector
. . .	
PinS	Point-in-space
PRP	Point-in-space reference point
RFF	Rescue and firefighting
RFFS	Rescue and firefighting service
RFM	Rotorcraft flight manual (also known as HFM)
R/T	Radiotelephony or radio communications
. . .	

A new Section named 1.4 has been inserted as below,-

1.4 Certification of heliports

(Applicable as of 26 November 2026)

Note.— When an heliport is granted a certificate, it signifies to helicopter operators and other organizations operating on the heliport that, at the time of certification, the heliport meets the specifications regarding the facility and its operation, and that it has, according to the Chairman, the capability to maintain these specifications for the period of validity of the certificate. The certification process also establishes the baseline for continued monitoring of compliance with the specifications. Information on the status of certification of heliports is to be provided to the appropriate aeronautical information services for promulgation in the Aeronautical Information Publication of Bangladesh (AIP). See 2.6.1 and PANS-AIM (Doc 10066), Appendix 2, AD 1.5.

1.4.1 Heliports used for international operations in accordance with the specifications contained in this ANO as well as other relevant specifications of other ANOs through an appropriate regulatory framework.

Note .— In addition to certifying heliports intended to be used by helicopters in international civil aviation, certifying heliports that are open to public use is deemed also to be beneficial for the safety, regularity and efficiency of these operations.

1.4.2 The regulatory framework shall include the establishment of criteria and procedures for the certification of heliports.

Note.— Guidance on a regulatory framework is given in the Heliport Manual *(Doc 9261*).

1.4.3 As part of the certification process, an Heliport Operator shall submit ~~States shall ensure that~~ a heliport manual which includes all pertinent information on the heliport site, facilities, services, equipment, operating procedures, organization and management including a safety management system (SMS), for approval/acceptance by the Chairman prior to granting the heliport certificate.

Note 1.— Guidance on the contents of a heliport manual, including procedures for its submission and approval/acceptance, verification of compliance and granting of a heliport certificate, can be found in the Heliport Manual *(Doc 9261).*

Note 2.— Annex 19 — Safety Management *contains SMS provisions applicable to certified heliports. Overarching guidance on SMS is contained in the* Safety Management Manual *(Doc 9859) with sector-specific guidance found in the* Heliport Manual *(Doc 9261).*

CHAPTER 2. HELIPORT DATA

New sub -section g) under Section 2.4.1 has been inserted; existing sub-sections g) & h) renumbered as h) (text modified) and i) respectfully. Section 2.6.1 a) has been modified.

2.4 Heliport dimensions and related information

2.4.1 The following data shall be measured or described, as appropriate, for each facility provided on a heliport:

a) heliport type — surface-level, elevated, shipboard or helideck;

. . .

f) apron — surface type, helicopter stands;

g) approach surface — when elevated, the height of the inner edge above the FATO;

Note.— When the take-off climb surface is elevated, its inner edge and height will be the outer edge of the elevated helicopter clearway as specified in 4.1.14.

~~g~~h) helicopter clearway — length, ground profile, ~~or~~, when elevated, height above the FATO, length and width; and

~~h~~i) visual aids for approach procedures, marking and lighting of FATO, TLOF, helicopter taxiways, helicopter taxi-routes and helicopter stands.

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

a) information on the status of certification of heliports and information on heliport conditions;

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CHAPTER 3. PHYSICAL CHARACTERISTICS

Sections 3.1.16 , 3.1.17, 3.2.1, 3.2.4, 3.2.5, 3.2.10 & 3.3.12 have been modified

Helicopter clearways

Note.— The inclusion of detailed specifications for helicopter clearways in this section is not intended to imply that a clearway has to be provided.

3.1.16 A helicopter clearway shall provide:

a) an area free of obstacles, except for essential objects which because of their function are located on it, and of sufficient size and shape to ensure containment of the design helicopter when it is accelerating ~~in level flight, and close to the surface,~~ to achieve its safe climbing speed; ~~and~~

b) when solid, a surface which is contiguous and flush with the FATO and safety area, is resistant to the effects of rotor downwash and is free of hazards should a forced landing be required; or

c) when elevated, clearance above all obstacles.

3.1.17 When a helicopter clearway is provided, ~~it~~ the inner edge shall be located ~~beyond the end of the FATO~~:

a) at the outer edge of the safety area; or

b) when elevated, directly above, or directly below, the outer edge of the safety area.

Note.— Guidance on designing a clearway that is below the FATO of an elevated heliport/helideck is provided in Heliport Manual *(Doc 9261).*

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3.2 Helidecks

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3.2.1 The specifications in paragraphs 3.~~3~~2.14 and 3.~~3~~2.15 shall be applicable for helidecks completed on or after 1 January 2012.

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3.2.4 A TLOF may be any shape but, subject to an appropriate risk assessment, shall be of sufficient size to contain~~:~~

~~a) for helicopters with an MTOM of more than 3 175 kg, an area within which can be accommodated a circle of diameter not less than 1 D of the largest helicopter the helideck is intended to serve; and~~

~~b) for helicopters with an MTOM of 3 175 kg or less,~~ an area within which can be accommodated a circle of diameter not less than 0.83 D of the largest helicopter the helideck is intended to serve.

Note.— Further guidance on factors to inform the risk assessment are given in the Heliport Manual *(Doc 9261).*

3.2.5 *For helicopters with a ~~MTOM of 3 175 kg or less, t~~ The TLOF shall be of sufficient size to contain an area within which can be accommodated a circle of diameter of not less than 1 D of the largest helicopter the helideck is intended to serve.*

3.2.6 A helideck shall be arranged to ensure that a sufficient and unobstructed air-gap is provided which encompasses the full dimensions of the FATO.

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3.2.10 No fixed object shall be permitted around the edge of the TLOF except for ~~frangible~~ objects, which, because of their function, must be located thereon.

. . .

3.3 Shipboard heliports

. . .

3.3.12 No fixed object shall be permitted around the edge of the TLOF except for ~~frangible~~ objects, which, because of their function, must be located thereon.

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CHAPTER 4. OBSTACLE ENVIRONMENT

Note.— The objectives of the specifications in this chapter are to describe the airspace around heliports so as to permit intended helicopter operations to be conducted safely and to prevent, where appropriate State controls exist, heliports from becoming unusable by the growth of obstacles around them. This is achieved by establishing a series of obstacle limitation surfaces that define the limits to which objects may project into the airspace.

Note 1 to Note 4 under Section 4.1 have been inserted; **Sections 4.1.1 to 4.1.5 have been modified; Section 4.1.6 deleted; Sections 4.1.7 to 4.1.15 renumbered as 4.1.6 to 4.1.14 respectively and modified as given; Section 4.1.16 deleted;** ***Section 4.1.17 renumbered as 4.1.15 & section 4.1.18 renumbered as 4.1.16 & modified; Section 4.1.19 deleted; Section 4.1.20 renumbered as 4.1.17 & modified; Section 4.1.21 renumbered as 4.1.18 & Note-1 deleted; Sections 4.1.22 to 4.1.26 renumbered as 4.1.19 to 4.1.23 and associated Figure number modified;*** **New note inserted after Note-2 of Section 4.2;**
Caption modified; Sections 4.2.1 to 4.2.7modified; section 4.2.8 deleted; ***Editorial Note.— Delete*** **Figures 4-1 to 4-4 and Figure 4-6 and associated notes in toto. Figure 4-5 to be** ***renumbered*** **as Figure 4-1.** ***Sections 4.2. 9 to 4.2.11 deleted; Sections 4.2.12 to 4.2.29 renumbered as 4.2.8 to 4.2.25 respectively;***

4.1 Obstacle limitation surfaces and sectors

Note 1.— A full description, detailed explanation and visual depiction of the obstacle limitation surfaces and sectors is provided in the Heliport Manual *(Doc 9261).*

Note 2.— For guidance on the provision of vertical procedures, see the Heliport Manual *(Doc 9261).*

Note 3.— For guidance on the provision of elevated helicopter clearways and elevated surfaces, see the Heliport Manual *(Doc 9261).*

Note 4.— See Table 4-1 for dimensions and slopes of surfaces.

Approach surface

4.1.1 *Description.* An inclined plane or a combination of planes or, when a turn ~~is~~ or turns are involved, a complex surface sloping upwards from the inner edge ~~end of the safety area~~ and centred on a line passing through the centre of the FATO.

~~*Note.— See Table 4-1 for dimensions and slopes of surfaces. See Figures 4-1, 4-2, 4-3 and 4-4 for depiction of surfaces.*~~

4.1.2 *Characteristics.* The limits of an approach surface shall comprise:

a) an inner edge horizontal and perpendicular to the centre line of the approach surface, with a minimum width equal ~~in length~~ to the ~~minimum~~ specified width/diameter of the FATO plus the safety area~~, perpendicular to the centre line of the approach surface~~ and located at:

1) the outer edge of the safety area; or

2) when vertical procedures are being utilized, directly above the outer edge of the safety area.

b) two side edges originating at the ends of the inner edge diverging uniformly at a specified rate from the vertical plane containing the centre line of the FATO; and:

c) an outer edge horizontal and perpendicular to the centre line of the approach surface ~~and~~ at:

1) a ~~specified~~ height of 152 m (500 ft) above the elevation of the FATO.~~;~~ or

2) when a PinS approach procedure with proceed visually instruction is defined, a specified height above the elevation of the FATO.

4.1.3 The elevation of the inner edge shall be:

a) ~~t~~The elevation of the FATO at the point on the inner edge that is intersected by the centre line of the approach surface; or ~~. For heliports intended to be used by helicopters operated in performance class 1 and when approved by an appropriate authority, the origin of the inclined plane may be raised directly above the FATO.~~

b) when vertical procedures are being utilized; the level at which obstacle clearance is achieved.

4.1.4 The slope(s) of the approach surface shall be measured in the vertical plane containing the centre line of the surface.

4.1.5 In the case of an approach surface involving a turn or turns, the surface shall be a complex surface containing the horizontal normals to its centre line and the slope of the centre line shall be the same as that for a straight approach surface.

Note.— See Figure 4-~~5~~1. For guidance on construction of turns in approach or take-off climb surfaces see the Heliport Manual *(Doc 9261).*

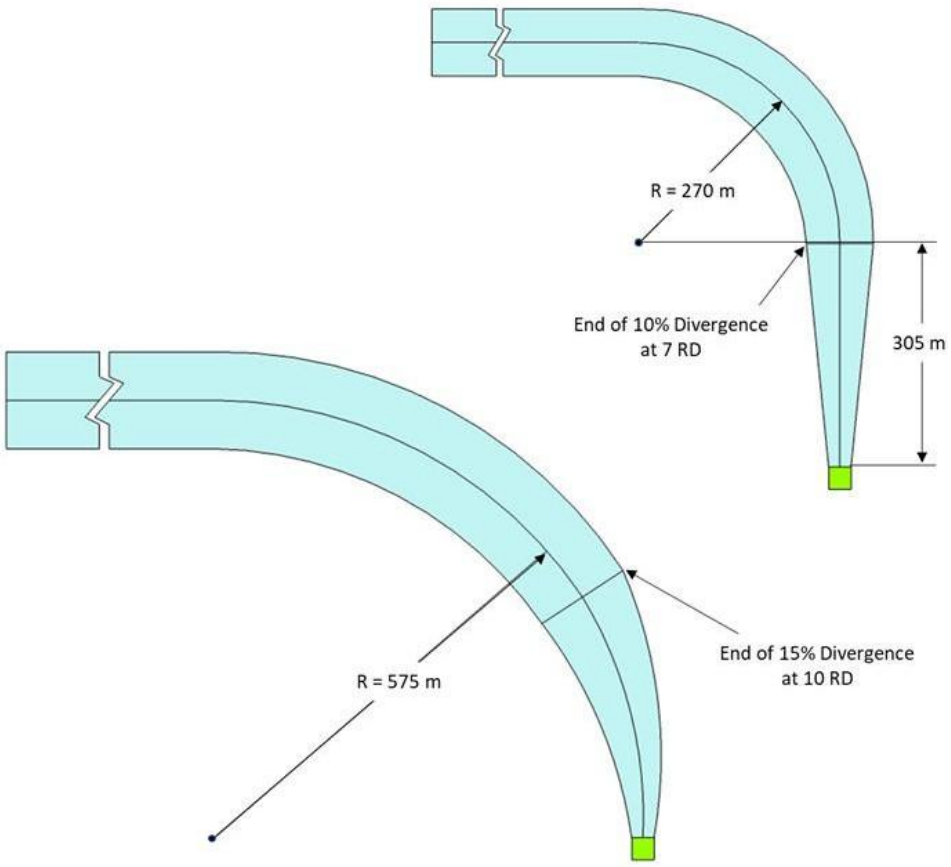

Figure 4-~~5.~~1. Curved approach and take-off climb surface for all FATOs

4.1.6 ~~In the case of an approach surface involving a turn, the surface shall not contain more than one curved portion.~~

4.1.~~6.~~7 Where a curved portion of an approach surface is provided, the sum of the radius of arc defining the centre line of the approach surface and the length of the straight portion originating at the inner edge shall not be less than 575 m.

4.1~~.7~~ 8 Any variation in the direction of the centre line of an approach surface shall be designed so as not to necessitate a turn radius less than 270 m.

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Transitional surface

~~*Note. — For a FATO at a heliport without a PinS approach incorporating a visual segment surface (VSS) there is no requirement to provide transitional surfaces.*~~

4.1.8~~9~~ *Description.* A complex surface along the side of the safety area and helicopter clearway, when provided, and part of the side of the approach~~/~~ or take-off climb surface, that slopes upwards and outwards to a predetermined height ~~of 45 m (150 ft)~~.

~~*Note. — See Figure 4-3. See Table 4-1 for dimensions and slopes of surfaces.*~~

4.1.9~~10~~ *Characteristics.* The limits of a transitional surface shall comprise:

a) a lower edge beginning at a point on the side of the approach~~/~~ or take-off climb surface at a specified height ~~above the lower edge~~ extending down the side of the approach~~/~~ or take-off climb surface to the inner edge ~~of the approach/take-off climb surface~~ and from there along the length of the side of the helicopter clearway, when provided, and safety area, parallel to the centre line of the FATO; and

b) an upper edge located at: ~~a specified height above the lower edge as set out in Table 4-1.~~

1) 45 m (150 ft) above the FATO; or

2) when vertical procedures are being utilized; 15 m (50 ft) above the elevation of the upper edge of the ascent/descent surface.

4.1.10~~11~~ The elevation of a point on the lower edge shall be:

a) along the side of the approach~~/~~ or take-off climb surface — equal to the elevation of the approach~~/~~ or take-off climb surface at that point; then ~~and~~

b) if provided, along the helicopter clearway – equal to the elevation of the helicopter clearway; and

~~b~~c) along the safety area — equal to the elevation of the ~~inner edge of the approach/take-off climb surface~~ FATO.

~~*Note 1. — If the origin of the inclined plane of the approach/take-off climb surface is raised as approved by an appropriate authority, the elevation of the origin of the transitional surface will be raised accordingly.*~~

~~*Note 2. — As a result of b), the transitional surface along the safety area will be curved if the profile of the FATO is curved, or a plane if the profile is a straight line.*~~

4.1.11~~2~~ The slope of the transitional surface shall be measured in a vertical plane at right angles to the centre line of the FATO.

Take-off climb surface

4.1.12~~3~~ *Description.* An inclined plane, a combination of planes or, when a turn is or turn~~s~~ are involved, a complex surface sloping upwards from the end of the safety area, or of the helicopter clearway, when provided, and centred on a line passing through the centre of the FATO.

~~*Note. — See Table 4-1 for dimensions and slopes of surfaces. See Figures 4-1, 4-2, 4-3 and 4-4 for depiction of surfaces.*~~

4.1.134 *Characteristics*. The limits of a take-off climb surface shall comprise:

a) an inner edge, horizontal and perpendicular to the centre line of the take-off climb surface, with a ~~equal in length to the~~ minimum ~~specified~~ width of the width/diameter of:

1) when located at the outer edge of the safety area or helicopter clearway, the FATO plus the safety area~~, perpendicular to the centre line of the take-off climb surface and located at the outer edge of the safety area~~; or

2) when located at the outer edge of the elevated helicopter clearway, the elevated helicopter clearway.

b) two side edges originating at the ends of the inner edge and diverging uniformly at a specified rate from the vertical plane containing the centre line of the FATO; and

c) an outer edge horizontal and perpendicular to the centre line of the take-off climb surface ~~and~~ at:

1) a ~~specified~~ height of 152 m (500 ft) above the elevation of the FATO; or

2) when a PinS departure procedure with proceed visually instruction is defined, a specified height above the elevation of the FATO.

4.1.145 The elevation of the inner edge shall be:

a) the elevation of the FATO at the point on the inner edge that is intersected by the centre line of the take-off climb surface; or~~. For heliports intended to be used by helicopters operated in performance class 1 and when approved by an appropriate authority, the origin of the inclined plane may be raised directly above the FATO.~~

b) when located at the outer edge of the helicopter clearway, the elevation of the helicopter clearway.

~~4.1.16 Where a clearway is provided, the elevation of the inner edge of the take-off climb surface shall be located at the outer edge of the clearway at the highest point on the ground based on the centre line of the clearway.~~

4.1.157 In the case of a straight take-off climb surface, the slope shall be measured in the vertical plane containing the centre line of the surface.

4.1.168 In the case of a take-off climb surface involving a turn or turns, the surface shall be a complex surface containing the horizontal normals to its centre line and the slope of the centre line shall be the same as that for a straight take-off climb surface.

Note.— See Figure 4-51. For guidance on construction of turns in approach or take-off climb surfaces see the Heliport Manual *(Doc 9261).*

~~4.1.19 In the case of a take-off climb surface involving a turn, the surface shall not contain more than one curved portion.~~

4.1.1720 Where a curved portion of a take-off climb surface, that does not have its inner edge at the outer edge of a clearway, is provided, the sum of the radius of arc defining the centre line of the take-off climb surface and the length of the straight portion originating at the inner edge shall not be less than 575 m.

Note.— Helicopter take-off performance is reduced in a turn and as such a straight portion along the take-off climb surface prior to the start of the curve allows for acceleration.

4.1.1821 Any variation in the direction of the centre line of a take-off climb surface shall be designed so as not to necessitate a turn of radius less than 270 m.

~~*Note 1. — Helicopter take-off performance is reduced in a curve and as such a straight portion along the take-off climb surface prior to the start of the curve allows for acceleration.*~~

Note ~~2~~.— For heliports intended to be used by helicopters operated in performance class 2 or 3, it is good practice for the departure paths to be selected so as to permit safe forced landings or one-engine-inoperative landings such that, as a minimum requirement, injury to persons on the ground or water or damage to property are minimized. The most critical helicopter type for which the heliport is intended and the ambient conditions may be factors in determining the suitability of such areas.

Obstacle-free sector/surface — helidecks

4.1.19~~22~~ *Description.* A complex surface originating at and extending from a reference point on the edge of the FATO of a helideck. In the case of a TLOF of less than 1 D, the reference point shall be located not less than 0.5 D from the centre of the TLOF.

4.1.20~~23~~ *Characteristics.* An obstacle-free sector/surface shall subtend an arc of specified angle.

4.1.21~~24~~ A helideck obstacle-free sector shall comprise of two components, one above and one below helideck level:

Note.— See Figure 4-2~~7~~.

. . .

4.1.22~~5~~ *Description.* A complex surface originating at the reference point for the obstacle-free sector and extending over the arc not covered by the obstacle-free sector within which the height of obstacles above the level of the TLOF will be prescribed.

4.1.23~~6~~ *Characteristics.* A limited obstacle sector shall not subtend an arc greater than 150 degrees. Its dimensions and location shall be as indicated in Figure 4-3~~8~~ for a 1 D FATO with coincidental TLOF and Figure 4-4~~9~~ for a 0.83 D TLOF.

4.2 Obstacle limitation requirements

Note 1.— The requirements for obstacle limitation surfaces are specified on the basis of the intended use of a FATO, i.e. approach manoeuvre to hover or landing, or take-off manoeuvre and type of approach, and are intended to be applied when such use is made of the FATO. In cases where operations are conducted to or from both directions of a FATO, then the function of certain surfaces may be nullified because of more stringent requirements of another lower surface.

Note 2.— Guidance on obstacle protection surfaces, for when a visual approach slope indicator (VASI) is installed, is given in the onshore section of the Heliport Manual *(Doc 9261).*

Note 3.— Guidance on obstacle protection surfaces, or operational limitations, when temporary obstacles are present, is given in the Heliport Manual *(Doc 9261).*

~~Surface-level heliports~~ Onshore heliports

4.2.1 The following obstacle limitation surfaces shall be established for a FATO at heliports with a PinS approach~~,~~ or departure ~~procedure utilizing a~~ visual segment surface with a proceed visually instruction:

a) take-off climb surface;

b) approach surface; and

c) transitional surfaces.

~~*Note 1. — See Figure 4-3.*~~

Note ~~2~~.— The Procedures for Air Navigation Services — Aircraft Operations*, (PANS-OPS, Doc 8168), Volume II, Part IV details procedure design criteria.*

4.2.2 The following obstacle limitation surfaces shall be established for a FATO at heliports, other than specified in 4.2.1, including heliports with a PinS approach or departure ~~procedure where a visual~~ segment surface is not provided without a proceed visually instruction:

a) take-off climb surface; and

b) approach surface.

4.2.3 The slopes of the obstacle limitation surfaces shall not be greater than, and their other dimensions not less than, those specified in Table 4-1 ~~and shall be located as shown in Figures 4-1, 4-2 and 4-6~~.

4.2.4 ~~–~~Except F~~f~~or heliports facilitating performance class 1 operations, that have an approach/take- off climb surface with a 4.5 per cent slope design, objects shall be permitted to penetrate the obstacle limitation surface if the results of an aeronautical study approved by an appropriate authority have reviewed the associated risks and mitigation measures.

Note 1.— The identified objects may limit the heliport operation.

Note 2.— Annex 6, Part 3, provides procedures that may be useful in determining the extent of obstacle penetration.

4.2.5 New objects or extensions of existing objects shall not be permitted above any of the surfaces in 4.2.1 and 4.2.2 except when shielded by an existing immovable object. ~~or after an aeronautical study approved by an appropriate authority determines that the object will not adversely affect the safety or significantly affect the regularity of operations of helicopters~~.

Note.— Circumstances in which the shielding principle may reasonably be applied are described in the Airport Services Manual *(Doc 9137), Part 6.*

4.2.6 Existing objects above any of the surfaces in 4.2.1 and 4.2.2 shall as far as practicable, be removed except when the object is shielded by an existing immovable object. ~~or after an aeronautical study approved by Chairman, determines that the object will not adversely affect the safety or significantly affect the regularity of operations of helicopters.~~

Note.— The application of curved approach or take-off climb surfaces and/or the utilization of vertical procedures ~~as specified in 4.1.5 or 4.1.18~~ may alleviate the problems created by objects infringing these surfaces.

4.2.7 A ~~surface-level~~ heliport shall have at least ~~one~~ two approach and take-off climb surfaces, separated by not less than 135°. ~~An aeronautical study shall be undertaken by Chairman when only a single approach and take-off climb surface is provided considering as a minimum, the following factors:~~

~~a) the area/terrain over which the flight is being conducted;~~

~~b) the obstacle environment surrounding the heliport and the availability of at least one protected side slope;~~

~~c) the performance and operating limitations of helicopters intending to use the heliport; and~~

~~d) the local meteorological conditions including the prevailing winds.~~

~~4.2.8 A surface-level heliport normally shall have at least two approach and take off climb surfaces to avoid downwind conditions, minimize crosswind conditions and permit for a balked landing.~~

Note.— See the Heliport Manual *(Doc 9261) for guidance.*

Table 4-1. ~~Dimensions and slopesof obstacle limitation surfaces for all visual FATOs~~ Approach and take-off climb slope design categories

Surface and dimensions	*Slope design categories*		
	A	*B*	*C*
Approach and take-off climb surface:			
Length of inner edge	Width of safety area	Width of safety area	Width of safety area
Location of inner edge	Safety area boundary (Helicopter ~~C~~clearway boundary if provided)	Safety area boundary	Safety area boundary
Divergence: (1st and 2nd section)			
Day use only	10%	10%	10%
Night use	15%	15%	15%
First section:			
Length	3 386 m	245 m	1 220 m
Slope	4.5% (1:22.2)	8% (1:12.5)	12.5% (1:8)
Outer width	(b)	N/A	(b)
Second section:			
Length	N/A	830 m	N/A
Slope	N/A	16% (1:6.25)	N/A
Outer width	N/A	(b)	N/A
Total length from inner edge (a)	3 386 m[c]	1 075 m[c]	1 220 m[c]
Transitional surface: ~~(FATOs with a PinS approach procedure with a VSS)~~			
Slope	50% (1:2)	50% (1:2)	50% (1:2)
Height	45 m[d]	45 m[d]	45 m[d]

a. The approach and take-off climb surface lengths of 3 386 m, 1 075 m and 1 220 m associated with the respective slopes brings the helicopter to 152 m (500 ft) above FATO elevation.

b. Seven rotor diameters overall width for day operations or 10 rotor diameters overall width for night operations.

c. This length may be reduced if vertical procedures are in place or extended/reduced if the approach or take-off climb surface is extended/reduced to meet the OCS of the PinS approach or departure procedure.

d. See 4.1.9 b).

Note.— Guidance on the application of slope categories is provided in the Heliport Manual *(Doc 9261).*

Editorial Note.— Delete Figures 4-1 to 4-4 and Figure 4-6 and associated notes in toto. Figure 4-5 to be *renumbered* as Figure 4-1. *Sections 4.2. 9 to 4.2.11 deleted; Sections 4.2.12 to 4.2.29 renumbered to 4.2.8 to 4.2.25 respectively;*

~~**Figure 4-1. Obstacle limitation surfaces — take-off climb and approach surface**~~

~~**Figure 4-2. Take-off climb/approach surface width**~~

~~**Figure 4-3. Transitional surface for a FATO with a PinS approach procedure with a VSS**~~

~~**Figure 4-4. Example of raised inclined plane during operations in performance class 1**~~

~~*Note 1.— This example diagram does not represent any specific profile, technique or helicopter type and is intended to show a generic example. An approach profile and a back-up procedure for departure profile are depicted. Specific manufacturers' operations in performance class 1 may be represented differently in the specific helicopter flight manual (HMF). Annex 6, Part 3, Attachment A provides back-up procedures that may be useful for operations in performance class 1.*~~

~~*Note 2.— The approach/landing profile may not be the reverse of the take-off profile.*~~

~~*Note 3.— Additional obstacle assessment might be required in the area that a back-up procedure is intended. Helicopter performance and the HFM limitations will determine the extent of the assessment required.*~~

~~**Figure 4-5. Curved approach and take-off climb surface for all FATOs**~~

~~**Figure 4-6. Approach and take-off climb surfaces with different slope design categories**~~

~~***Elevated heliports***~~

4.2.9 ~~The obstacle limitation surfaces for elevated heliports shall conform to the requirements for surface-level heliports specified in 4.2.1 to 4.2.6.~~

4.2.10 ~~An elevated heliport shall have at least one approach and take-off climb surface. An aeronautical study shall be undertaken by an appropriate~~ authority when only a single approach and take- ~~off climb surface is provided considering as a minimum, the following factors:~~

~~a) the area/terrain over which the flight is being conducted;~~

~~b) the obstacle environment surrounding the heliport and the availability of at least one protected side slope;~~

~~c) the performance and operating limitations of helicopters intending to use the heliport; and~~

~~d) the local meteorological conditions including the prevailing winds.~~

4.2.11 ~~An elevated heliport shall have at least two approach and take-off climb surfaces to avoid downwind conditions, minimize crosswind conditions and permit for a balked landing.~~

~~*Note.— See the* Heliport Manual *(Doc 9261) for guidance.*~~

Helidecks

4.2.8~~12~~ A helideck shall have an obstacle-free sector.

Note.— A helideck may have a LOS (see 4.1.23~~6~~).

4.2.9~~13~~ There shall be no fixed obstacles within the obstacle-free sector above the obstacle-free surface.

4.2.10~~14~~ In the immediate vicinity of the helideck, obstacle protection for helicopters shall be provided below the helideck level. This protection shall extend over an arc of at least 180 degrees with the origin at the centre of the FATO, with a descending gradient having a ratio of one unit horizontally to five units vertically from the edges of the FATO within the 180-degree sector. This descending gradient may be reduced to a ratio of one unit horizontally to three units vertically within the 180-degree sector for multi-engine helicopters operated in performance class 1 or 2. (See Figure 4-2~~7~~.)

Note.— Where there is a requirement to position, at sea surface level, one or more offshore support vessel(s) (e.g. a Standby Vessel) essential to the operation of a fixed or floating offshore facility, but located within the proximity of the fixed or floating offshore facility, any offshore support vessel(s) would need to be positioned so as not to compromise the safety of helicopter operations during take-off departure and/or approach to landing.

4.2.11~~5~~ For a TLOF of 1 D and larger, within the 150-degree limited obstacle surface/sector out to a distance of 0.12 D measured from the point of origin of the LOS, objects shall not exceed a height of 25 cm above the TLOF. Beyond that arc, out to an overall distance of a further 0.21 D measured from the end of the first sector, the limited obstacle surface rises at a rate of one unit vertically for each two units horizontally originating at a height 0.05 D above the level of the TLOF. (See Figure 4-3~~8~~.)

Note.— Where the area enclosed by the TLOF perimeter marking is a shape other than circular, the extent of the LOS segments are represented as lines parallel to the perimeter of the TLOF rather than arcs. Figure 4-3~~8~~ has been constructed on the assumption that an octagonal helideck arrangement is provided. Further guidance for square (quadrilateral) and circular FATO and TLOF arrangements is given in the Heliport Manual *(Doc 9261).*

4.2.126 For a TLOF less than 1 D within the 150-degree limited obstacle surface/sector out to a distance of 0.62 D and commencing from a distance 0.5 D, both measured from the centre of the TLOF, objects shall not exceed a height of 5 cm above the TLOF. Beyond that arc, out to an overall distance of 0.83 D from the centre of the TLOF, the limited obstacle surface rises at a rate of one unit vertically for each two units horizontally originating at a height 0.05 D above the level of the TLOF. (See Figure 4-49.)

Note.— Where the area enclosed by the TLOF perimeter marking is a shape other than circular, the extent of the LOS segments are represented as lines parallel to the perimeter of the TLOF rather than arcs. Figure 4-49 has been constructed on the assumption that an octagonal helideck arrangement is provided. Further guidance for square (quadrilateral) and circular FATO and TLOF arrangements is given in the Heliport Manual *(Doc 9261).*

Shipboard heliports

4.2.137 The specifications in 4.2.1620 and 4.2.1822 shall be applicable for shipboard heliports completed on or after 1 January 2012.

Purpose-built heliports located forward or aft

4.2.148 When helicopter operating areas are provided in the bow or stern of a ship they shall apply the obstacle criteria for helidecks.

Amidships location — Purpose-built and non-purpose-built

4.2.159 Forward and aft of a TLOF of 1 D and larger shall be two symmetrically located sectors, each covering an arc of 150 degrees, with their apexes on the periphery of the TLOF. Within the area enclosed by these two sectors, there shall be no objects rising above the level of the TLOF, except those aids essential for the safe operation of a helicopter and then only up to a maximum height of 25 cm.

4.2.2016 Objects whose function requires them to be located within the TLOF (such as lighting or nets) shall not exceed a height of 2.5 cm. Such objects shall only be present if they do not represent a hazard to helicopters.

Note.— Examples of potential hazards include nets or raised fittings on the deck that might induce dynamic rollover for helicopters equipped with skids.

4.2.217 To provide further protection from obstacles fore and aft of the TLOF, rising surfaces with gradients of one unit vertically to five units horizontally shall extend from the entire length of the edges of the two 150-degree sectors. These surfaces shall extend for a horizontal distance equal to at least 1 D of the largest helicopter the TLOF is intended to serve and shall not be penetrated by any obstacle. (See Figure 4-510.)

Non-purpose-built heliports — Ship's side location

4.2.1822 No objects shall be located within the TLOF except those aids essential for the safe operation of a helicopter (such as nets or lighting) and then only up to a maximum height of 2.5 cm. Such objects shall only be present if they do not represent a hazard to helicopters.

4.2.1923 From the fore and aft mid-points of the D circle in two segments outside the circle, limited obstacle areas shall extend to the ship's rail to a fore and aft distance of 1.5 times the fore-to-aft-dimension of the TLOF, located symmetrically about the athwartships bisector of the D circle. Within these areas there shall be no objects rising above a maximum height of 25 cm above the level of the TLOF. (See Figure 4-611.) Such objects shall only be present if they do not represent a hazard to helicopters.

4.2.2024 A LOS horizontal surface shall be provided, at least 0.25 D beyond the diameter of the D circle, which shall surround the inboard sides of the TLOF to the fore and aft mid-points of the D circle. The LOS shall continue to the ship's rail to a fore and aft distance of 2.0 times the fore-to-aft dimension of the TLOF, located symmetrically about the athwartships bisector of the D circle. Within this sector there shall be no objects rising above a maximum height of 25 cm above the level of the TLOF.

Note.— Any objects located within the areas described in 4.2.1923 and 4.2.2024 that exceed the height of the TLOF are notified to the helicopter operator using a ship's helicopter landing area plan. For notification purposes, it may be necessary to consider immoveable objects beyond the limit of the surface prescribed in 4.2.1924, particularly if objects are significantly higher than 25 cm and in close proximity to the boundary of the LOS. See the Heliport Manual *(Doc 9261) for guidance.*

Winching areas

4.2.2115 An area designated for winching on-board ships shall be comprised of a circular clear zone of diameter 5 m and, extending from the perimeter of the clear zone, a concentric manoeuvring zone of diameter 2 D. (See Figure 4-712.)

4.2.2226 The manoeuvring zone shall be comprised of two areas:

a) the inner manoeuvring zone extending from the perimeter of the clear zone and of a circle of diameter not less than 1.5 D; and

b) the outer manoeuvring zone extending from the perimeter of the inner manoeuvring zone and of a circle of diameter not less than 2 D.S

4.2.2337 Within the clear zone of a designated winching area, no objects shall be located above the level of its surface.

4.2.2448 Objects located within the inner manoeuvring zone of a designated winching area shall not exceed a height of 3 m.

4.2.2559 Objects located within the outer manoeuvring zone of a designated winching area shall not exceed a height of 6 m.

Note.— See the Heliport Manual *(Doc 9261) for guidance.*

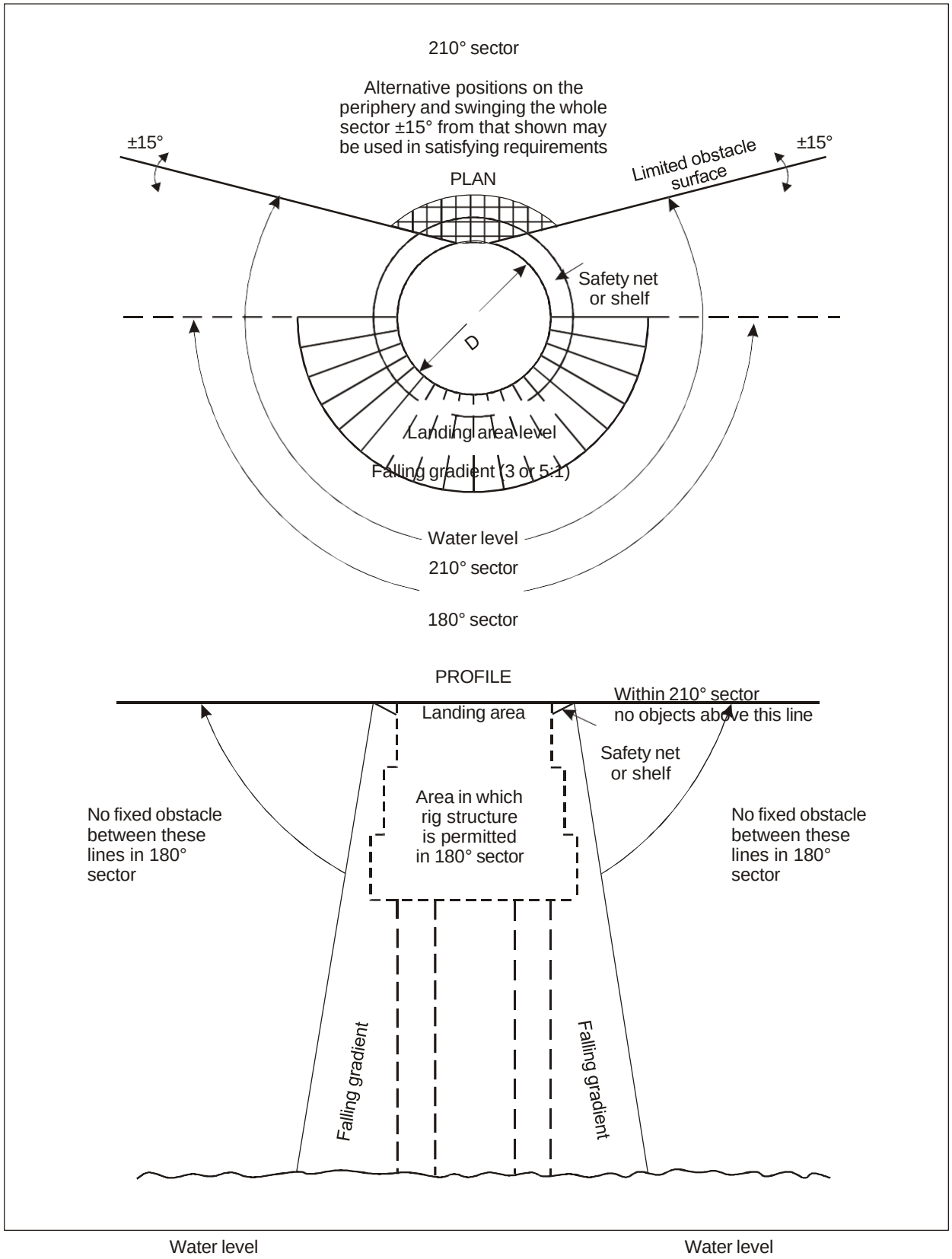


Figure 4-27. Helideck obstacle-free sector

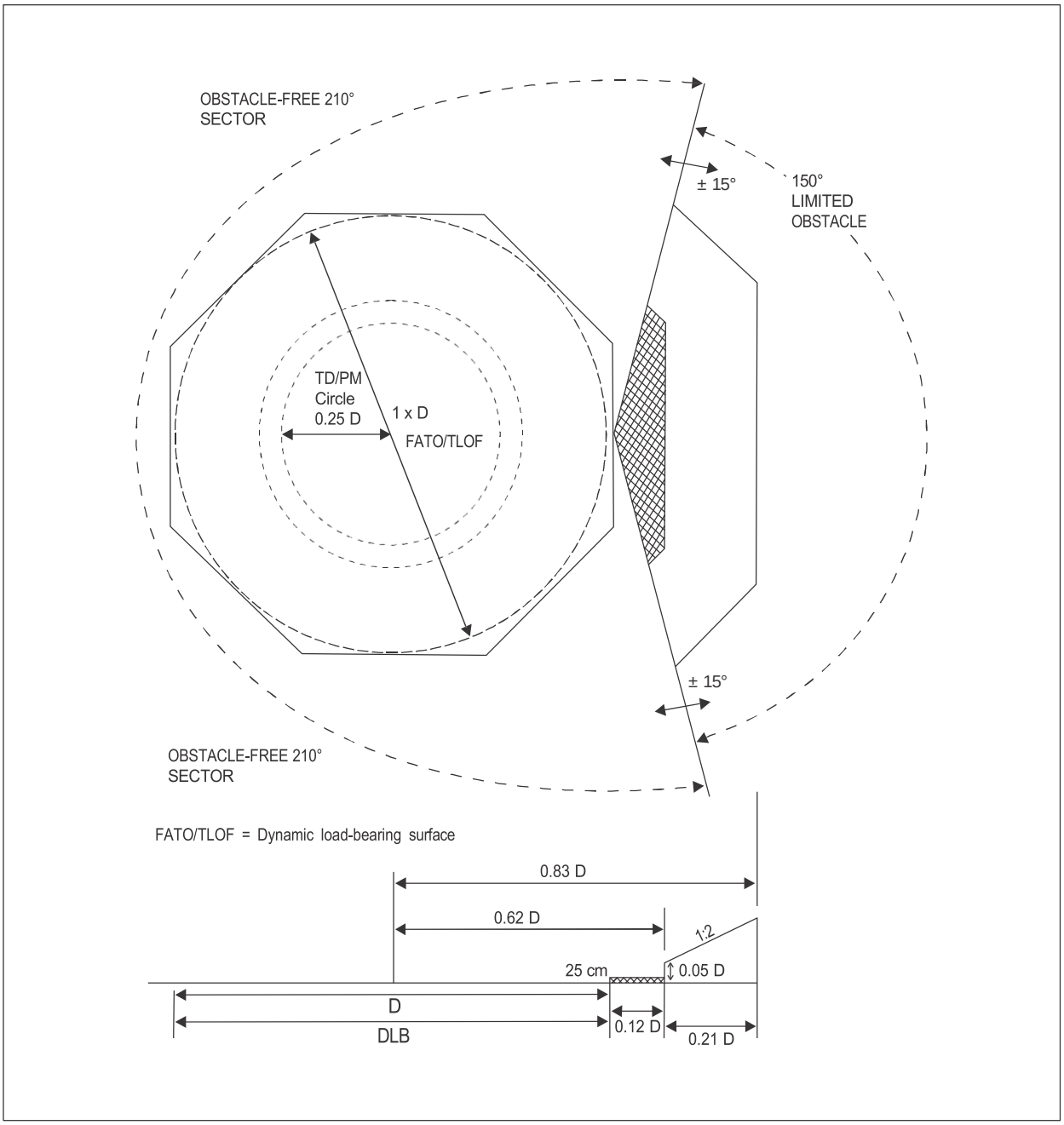
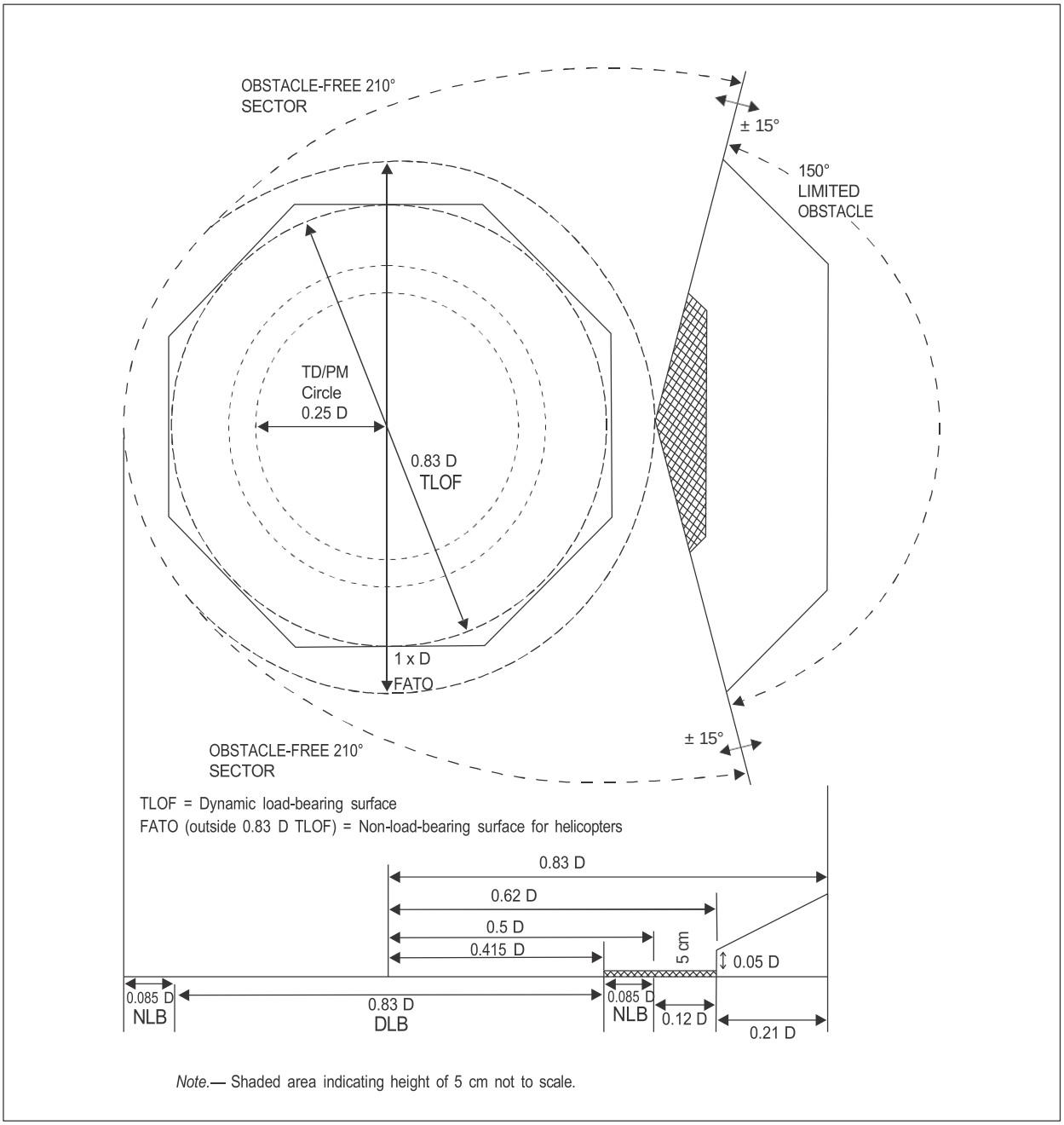


Figure 4-38. Helideck obstacle limitation sectors and surfaces for a FATO and coincidental TLOF of 1 D and larger



Note.— Shaded area indicating height of 5 cm not to scale.

Figure 4-49. Helideck obstacle limitation sectors and surfaces for a TLOF of 0.83 D and larger

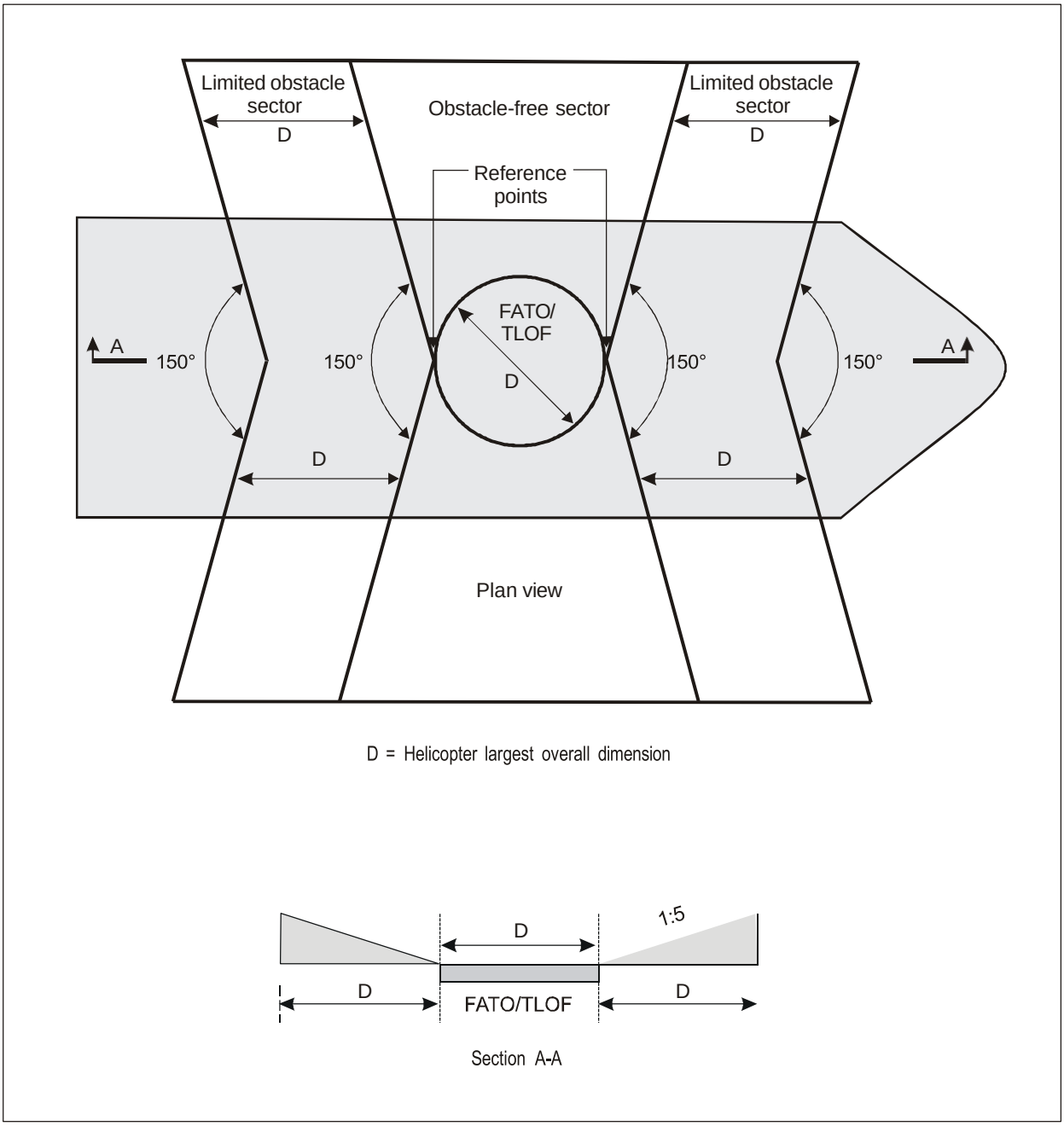


Figure 4-5~~10~~. Amidship's location — shipboard heliport obstacle limitation surfaces

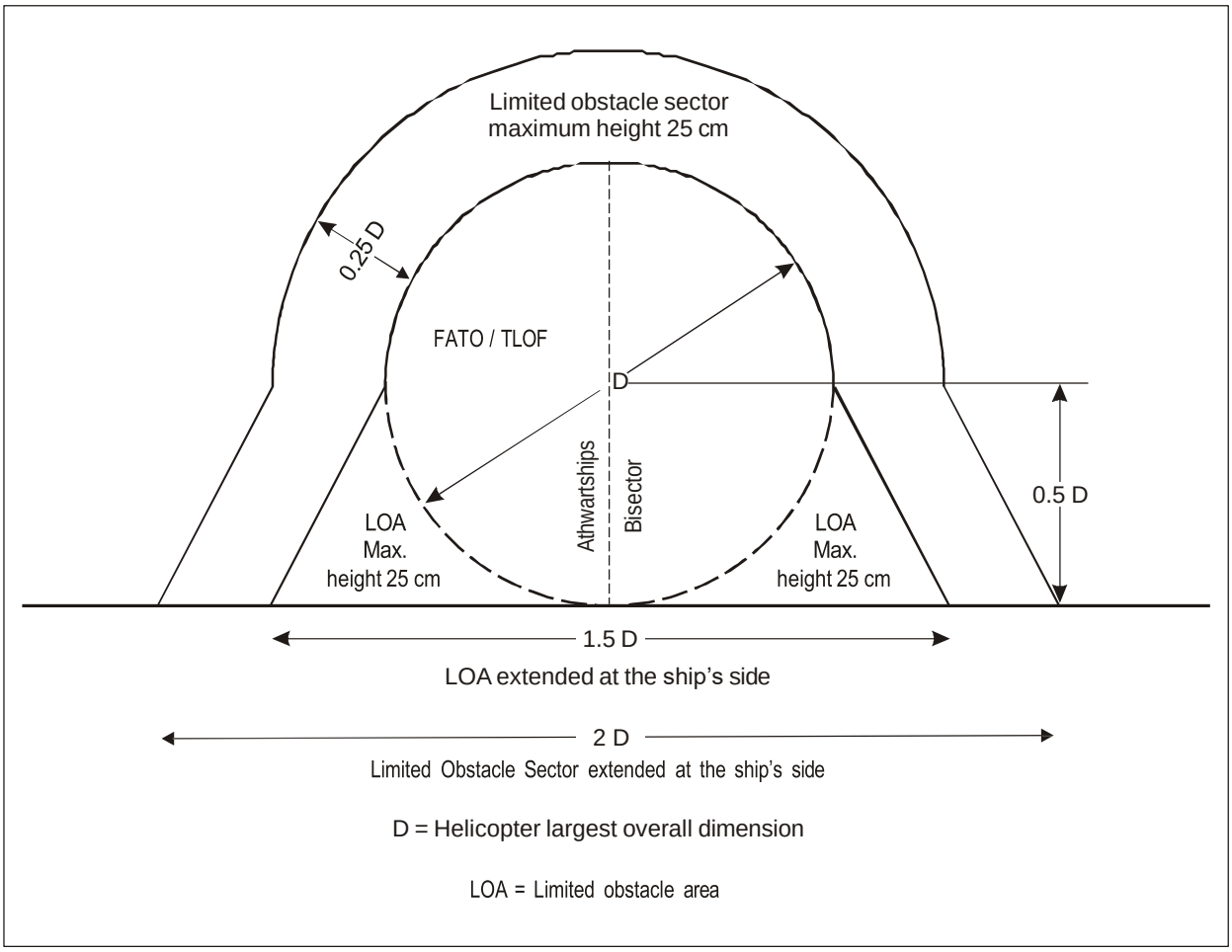


Figure 4-~~611~~. Ships-side non-purpose-built heliport obstacle limitation sectors and surfaces

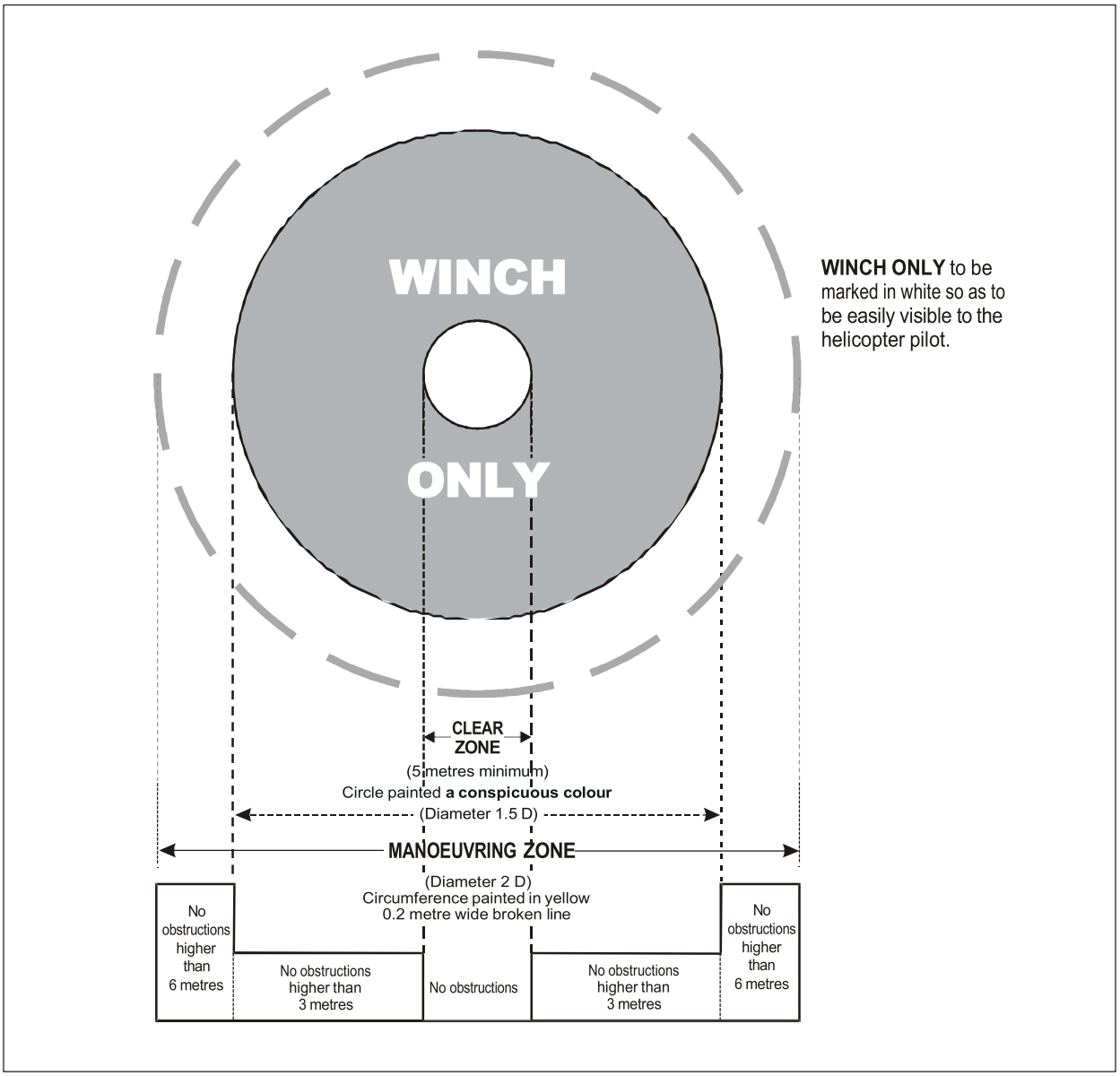


Figure 4-~~7~~12. Winching area of a ship

CHAPTER 5. VISUAL AIDS

. . .

5.2 Markings and markers

Note- See ANO- 14, Volume I, 5.2.1.4, Note 1, concerning improving conspicuity of markings.

. . . 5.2.14 Helicopter air taxi-route markings and markers

Section 5.2.14.2 modified; Section 5.2.14.2 & 5.2.14.4 modified and a new note has been inserted after 5.2.14.4;
Note 6 of section 5.3.1 modified; New note inserted after 5.3.2; ***New note after 5.3.3 inserted*** **A new note inserted after section 5.3.4; Section 5.3.7 and Note below modified; Sections 5.3.7.1 to 5.3.7.4 & section 5.3.8.3 modified & a new note inserted after section 5.3.7.3; Note below Section 5.3.9.1 modified; Sections 5.3.9.2 to 5.3.9.5 modified; section 5.3.9.6 deleted & note modified; sections 5.3.9.7 to 5.3.9.9 renumbered as 5.3.9.6 to 5.3.9.8 respectively; Sections 5.3.9.10 & 5.3.9.11 deleted; Section 5.3.9.12 renumbered as 5.3.9.9 and modified along with note; Sections 5.3.9.13 to 5.3.9.20 renumbered as 5.3. 9.10 to 5.3.9.17; Section 5.3.9.21 modified, renumbered as 9.3.9.18 & new note inserted; section 5..3.9.22 renumbered as 5.3.9.19; section 5.3.9.23 modified as new note; Section 5.3.9.24 renumbered as 5.3.9.20; Sections 5.3.9.25 & 5.3.9.26 deleted and section 5.3.9.27 modified and renumbered as 5.3.9.21; New note inserted after section 5.3.14.**

Location

5.2.14.2 A helicopter air taxi-route centre line marking or ~~flush-in-ground centre line~~ markers shall be located along the centre line of the helicopter air taxi-route.

Characteristics

5.2.14.3 A helicopter air taxi-route centre line, when on a paved surface, shall be marked with a continuous yellow line 15 cm in width.

5.2.14.4 A helicopter air taxi-route centre line, ~~when on an unpaved surface~~ that will not accommodate painted markings, shall be marked with ~~flush-in-ground 15-cm-wide and approximately 1.5 m-in-length yellow~~ markers, spaced at intervals of not more than 30 m on straight sections and not more than 15 m on curves, with a minimum of four equally spaced markers per section.

Note.— Further guidance on the characteristics of markers is provided in the Heliport Manual *(Doc 9261).*

5.2.14.5 If the helicopter air taxi-route is to be used at night, markers shall be either internally illuminated or retro-reflective.

. . .

5.3 Lights

5.3.1 General

Note 6.— In cases where operations into a heliport are to be conducted at night with night vision imaging systems (NVIS), it is important to ensure ~~establish the compatibility of the NVIS with~~ all heliport lighting are compatible with the NVIS such as through the addition of infrared emitters to the heliport lighting. Where such additional measures are not practicable, helicopter operators using NVIS are to be made aware of it. ~~an assessment by the helicopter operator prior to use.~~

5.3.2 Heliport beacon

Note.— The objective of a heliport beacon is to make a heliport more conspicuous to assist the pilot to locate and identify the heliport at night and/or by day in reduced visibility.

Application

5.3.2.1 *A heliport beacon shall be provided at a heliport where:*

a) long-range visual guidance is considered necessary and is not provided by other visual means; or

b) identification of the heliport is difficult due to surrounding lights.

Location

5.3.2.2 The heliport beacon shall be located on or adjacent to the heliport preferably at an elevated position and so that it does not dazzle a pilot at short range.

Note.— Where a heliport beacon is likely to dazzle pilots at short range, it may be switched off during the final stages of the approach and landing.

Characteristics

5.3.2.3 The heliport beacon shall emit repeated series of equispaced short duration white flashes in the format in Figure 5-11.

5.3.2.4 The light from the beacon shall show at all angles of azimuth.

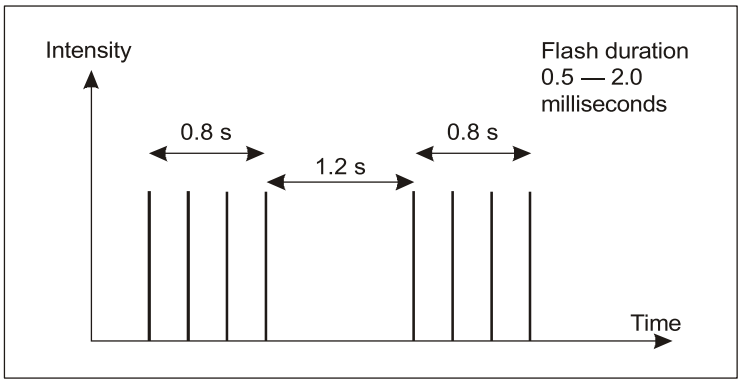


Figure 5-11. Heliport beacon flash characteristics

5.3.2.5 The effective light intensity distribution of each flash shall be as shown in Figure 5-12, Illustration 1.

Note.— Where brilliancy control is desired, settings of 10 per cent and 3 per cent have been found to be satisfactory. In addition, shielding may be necessary to ensure that pilots are not dazzled during the final stages of the approach and landing.

5.3.3 Approach lighting system

Note.— The objective of an approach lighting system is to allow the helicopter operator, by day and night, to visually identify the heliport and align the helicopter on the centreline of the FATO upon arriving at a prescribed point on the approach flight path.

Application

5.3.3.1 *An approach lighting system shall be provided at a heliport where it is desirable and practicable to indicate a preferred approach direction.*

Location

5.3.3.2 The approach lighting system shall be located in a straight line along the preferred direction of approach.

Characteristics

5.3.3.3 *An approach lighting system shall consist of a row of three lights spaced uniformly at 30 m intervals and of a crossbar 18 m in length at a distance of 90 m from the perimeter of the FATO as shown in Figure 5-13. The lights forming the crossbar shall be as nearly as practicable in a horizontal straight line at right angles to, and bisected by, the line of the centre line lights and spaced at 4.5 m intervals. Where there is the need to make the final approach course more conspicuous, additional lights spaced uniformly at 30 m intervals shall be added beyond the crossbar. The lights beyond the crossbar may be steady or sequenced flashing, depending upon the environment.*

Note.— Sequenced flashing lights may be useful where identification of the approach lighting system is difficult due to surrounding lights.

5.3.3.4 The steady lights shall be omnidirectional white lights.

5.3.3.5 Sequenced flashing lights shall be omnidirectional white lights.

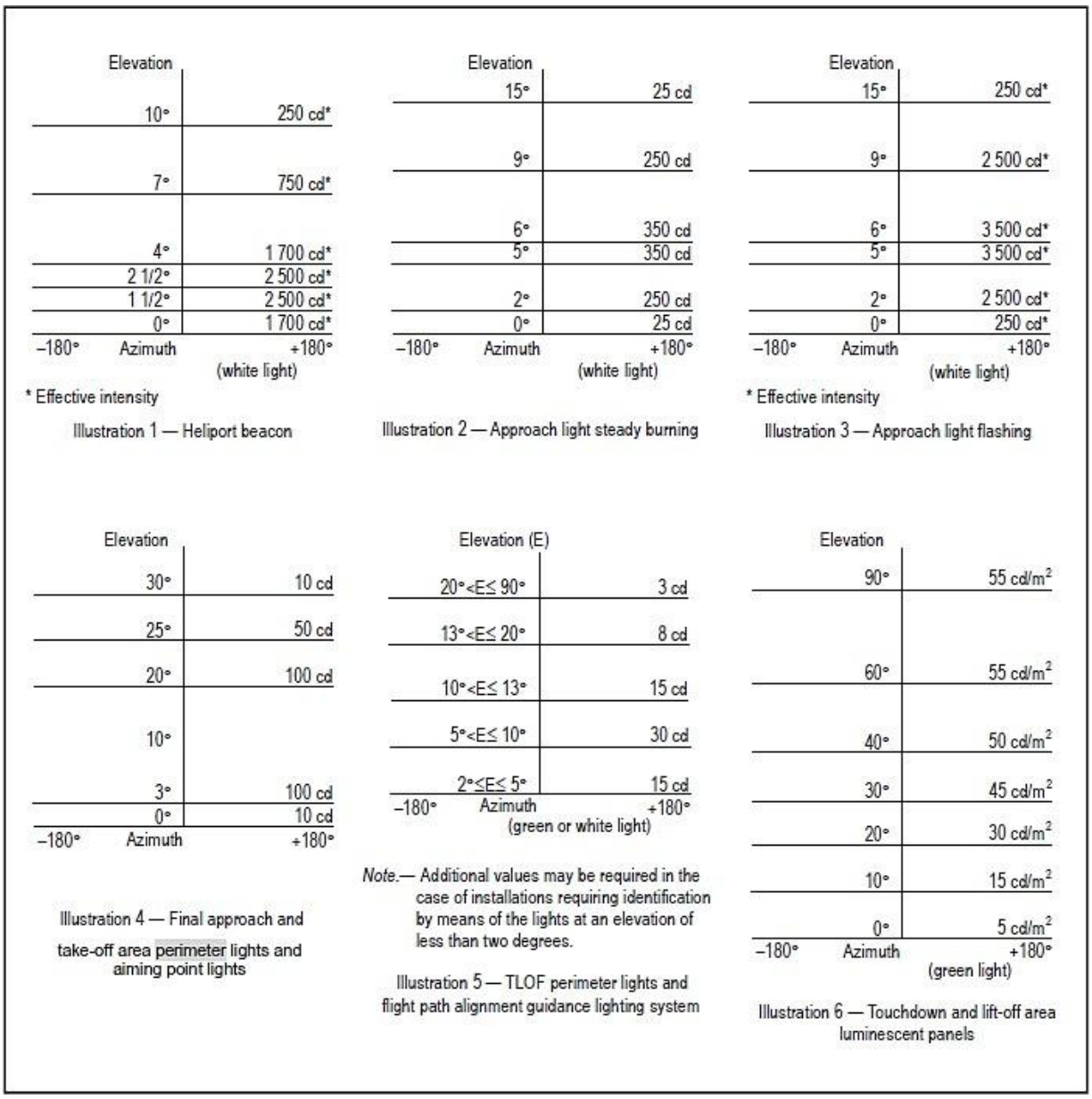


Figure 5-12. Isocandela diagrams

Illustration 4 modified

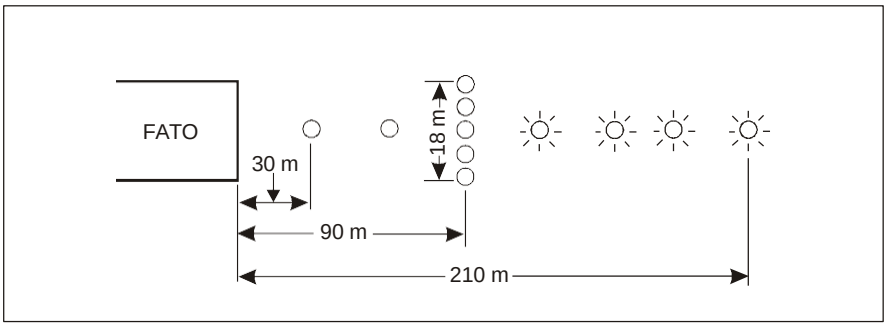


Figure 5-13. Approach lighting system

5.3.3.6 *The flashing lights where provided shall have a flash frequency of one per second and their light distribution should be as shown in Figure 5-12, Illustration 3. The flash sequence shall commence from the outermost light and progress towards the crossbar.*

5.3.3.7 *A suitable brilliancy control shall be incorporated to allow for adjustment of light intensity to meet the prevailing conditions.*

Note.— The following intensity settings have been found suitable:

a) steady lights — 100 per cent, 30 per cent and 10 per cent; and

b) flashing lights — 100 per cent, 10 per cent and 3 per cent.

5.3.4 Flight path alignment guidance lighting system

Note.— The objective of a flight path alignment guidance lighting system is to indicate, by day, night, and in reduced visibility, available approach and/or departure flight path direction(s).

Application

5.3.4.1 *Flight path alignment guidance lighting system(s) shall be provided at a heliport where it is desirable and practicable to indicate available approach and/or departure path direction(s).*

. . .

Characteristics

5.3.4.4 *A flight path alignment guidance lighting system shall consist of a row of three or more lights spaced uniformly with a total minimum distance of 6 m. Intervals between lights shall not be less than 1.5 m and should not exceed 3 m. Where space permits, there should be 5 lights. (See Figure 5-10.)*

Note.— The number of lights and spacing between these lights may be adjusted to reflect the space available. If more than one flight path alignment system is used to indicate available approach and/or departure path direction(s), the characteristics for each system are typically kept the same. (See Figure 5-10.)

5.3.4.5 The lights shall be steady omnidirectional inset white lights.

5.3.4.6 *The distribution of the lights shall be as indicated in Figure 5-12, Illustration 5.*

The distribution of the lights shall be as indicated in Figure 5 -12

5.3.4.7 A suitable control shall be incorporated to allow for adjustment of light intensity to meet the prevailing conditions and to balance the flight path alignment guidance lighting system with other heliport lights and general lighting that may be present around the heliport.

5.3.5 Visual alignment guidance system

5.3.7 FATO ~~lighting systems~~ perimeter lights for onshore surface-level heliports

Note.— The objective of ~~a~~ FATO ~~lighting system~~ perimeter lights for onshore surface-level heliports is to provide to the pilot operating at night an indication of the shape, location and extent of the FATO.

Application

5.3.7.1 Where a FATO with a solid surface is established at a surface-level heliport intended for use at night, FATO perimeter lights shall be provided except that they may be omitted where the FATO and the TLOF are nearly coincidental or the extent of the FATO is self-evident.

Location

5.3.7.2 FATO perimeter lights shall be placed along the edges of the FATO. The lights shall be uniformly spaced as follows:

a) for an area in the form of a square or rectangle, at intervals of not more than 50 m with a minimum of four lights on each side including a light at each corner; and

b) for any other shaped area, including a circular area, at intervals of not more than 5 m with a minimum of ten lights.

Characteristics

5.3.7.3 FATO perimeter lights shall be fixed omnidirectional lights showing green or white with variable intensity. ~~Where the intensity of the lights is to be varied, the lights shall show variable white.~~ Green perimeter lights shall be permitted only when the FATO is a dynamic load-bearing surface.

Note.— Further guidance on colour selection of FATO perimeter lights is provided in the Heliport Manual *(Doc 9261).*

5.3.7.4 *The light distribution of FATO perimeter lights shall be as shown in Figure 5-12 Illustration 4.*

. . .

Characteristics

5.3.8.3 Aiming point lights shall form a pattern of at least six omnidirectional white lights as shown in Figure 5-7. The lights shall be arranged equidistantly with a light at the apex and at both corners. The lights shall be inset when a light extending above the surface could endanger helicopter operations.

5.3.8.4 *The light distribution of aiming point lights shall be as shown in Figure 5-12, Illustration 4.*

5.3.9 TLOF lighting system

Note.— The objective of a TLOF lighting system is to provide illumination of the TLOF and required elements within. For a TLOF located in a FATO, the objective is to provide discernibility to the pilot, on a final approach, of the TLOF and required elements within; while for a TLOF located on an elevated heliport, shipboard heliport or helideck, the objective is visual acquisition from a defined range and to provide sufficient shape cues to permit an appropriate approach angle to be established.

Application

5.3.9.1 A TLOF lighting system shall be provided at a heliport intended for use at night.

Note.— Where a TLOF is located in a stand, the objective may be met with the use of ambient lighting or stand floodlighting (see 5.3.10).

5.3.9.2 For a surface-level heliport, lighting for the TLOF in a FATO shall consist of ~~one or more~~ either of the following:

a) perimeter lights; or

b) ~~— floodlighting;~~

~~c~~b) arrays of segmented point source lighting (ASPSL) or luminescent panel (LP) lighting to identify the TLOF perimeter when a) is ~~and b) are~~ not practicable and FATO perimeter lights are available.

5.3.9.3 For an elevated heliport, shipboard heliport or helideck, lighting for the TLOF in a FATO shall consist of:

a) perimeter lights; and

b) ASPSL and/or LPs to identify the TDPC~~M~~ and/or floodlighting to illuminate the TLOF.

Note.— Guidance on suitable systems is contained in the Heliport Manual *(Doc 9261).*

5.3.9.4 *When enhanced surface texture cues are required at a TLOF ASPSL and/or LPs to identify the TDPC~~M~~ and/or floodlighting shall be provided at a surface-level heliport intended for use at night ~~when enhanced surface texture cues are required~~.*

Location

5.3.9.5 TLOF perimeter lights shall be placed along the edge of the area designated for use as the TLOF or within a distance of 1.5 m from the outer edge. TLOF perimeter lights shall be uniformly spaced at intervals of not more than 3 m for elevated heliports, helidecks and shipboard heliports and not more than 5 m for surface-level heliports.~~Where the TLOF is a circle the lights shall be:~~

~~a) located on straight lines in a pattern which will provide information to pilots on drift displacement; and~~

~~b) where a) is not practicable, evenly spaced around the perimeter of the TLOF at the appropriate interval, except that, over a sector of 45 degrees the lights shall be spaced at half spacing.~~

5.3.9.6 ~~— TLOF perimeter lights shall be uniformly spaced at intervals of not more than 3 m for elevated heliports and helidecks and not more than 5 m for surface-level heliports. There shall be a minimum number of four lights on each side including a light at each corner. For a circular TLOF where lights are installed in accordance with 5.3.9.5 b), there shall be a minimum of fourteen lights.~~

Note.— Where the TLOF is circular, drift of the helicopter may be difficult to discern by the pilot. Guidance on lighting patterns to counter drift displacement over the TLOF ~~this issue~~ is contained in the Heliport Manual *(Doc 9261).*

5.3.9.~~7~~6 The TLOF perimeter lights shall be installed at an elevated heliport or fixed helideck such that the pattern cannot be seen by the pilot from below the elevation of the TLOF.

5.3.9.~~8~~7 The TLOF perimeter lights shall be installed on a moving helideck or shipboard heliport such that the pattern cannot be seen by the pilot from below the elevation of the TLOF when the helideck or shipboard heliport is level.

5.3.9.~~9~~8 On surface-level heliports, ASPSL or LPs, if provided to identify the TLOF, shall be placed along the marking designating the edge of the TLOF. Where the TLOF is a circle, they shall be located on straight lines circumscribing the area.

~~5.3.9.10 : — D e l e t e d~~

~~5.3.9.11 : *Deleted.*~~

5.3.9.~~12~~9 TLOF floodlights where provided shall be arranged ~~located~~ so as to avoid glare to pilots in flight and ~~or~~ to personnel working on the area. ~~The arrangement and aiming of floodlights shall be such that shadows are kept to a minimum.~~

Note.— .Detailed specifications on the number of lights to be provided, based on the shape and size of the TLOF are contained in the Heliport Manual *(Doc 9261).*

Characteristics

5.3.9.~~13~~10 The TLOF perimeter lights shall be fixed omnidirectional lights showing green.

5.3.9.~~14~~11 At a surface-level heliport, ASPSL or LPs shall emit green light when used to define the perimeter of the TLOF.

5.3.9.~~15~~12 *The chromaticity and luminance of colours of LPs shall conform to Annex 14, Volume I, Appendix 1, 3.4.*

5.3.9.~~16~~13 An LP shall have a minimum width of 6 cm. The panel housing shall be the same colour as the marking it defines.

5.3.9.~~17~~14 For a surface-level or elevated heliport, the TLOF perimeter lights located in a FATO shall not exceed a height of 5 cm and shall be inset when a light extending above the surface could endanger helicopter operations.

5.3.9.~~18~~15 For a helideck or shipboard heliport, the TLOF perimeter lights shall not exceed a height of 5 cm, or for a FATO/TLOF, 15 cm.

5.3.9.~~19~~16 *When located within the safety area of a surface-level or elevated heliport, the TLOF floodlights shall not exceed a height of 25 cm.*

5.3.9.~~20~~17 For a helideck or shipboard heliport, the TLOF floodlights shall not exceed a height of 5 cm, or for a FATO/TLOF, 15 cm.

5.3.9.~~21~~18 The ASPSL and LPs shall not extend above the surface by more than 2.5 cm.

Note.— Guidance on panel profiles and loading limitations is contained in the Heliport Manual *(Doc 9261).*

5.3.9.~~22~~19 *The light distribution of the perimeter lights shall be as shown in Figure 5-12, Illustration 5.*

~~5.3.9.23. *Note. — The light* distribution of the ASPSL and/or LPs used to illuminate the TDPC and heliport identification marking, or cross (chevron) markings at a hospital, are detailed in the~~ Heliport Manual *(Doc 9261).* ~~*should be as shown in Figure 5-12, Illustration 6.*~~

5.3.9.~~24~~20 The spectral distribution of TLOF floodlights shall be such that the surface and obstacle markings can be correctly identified.

~~5.3.9.25 *The average horizontal illuminance of the floodlighting shall be at least 10 lux, with a uniformity ratio (average to minimum) of not more than 8:1 measured on the surface of the TLOF.*~~

~~5.3.9.26 Lighting used to identify the TDPC shall comprise a segmented circle of omnidirectional ASPSL strips showing yellow. The segments shall consist of ASPSL strips, and the total length of the ASPSL strips should not be less than 50 per cent of the circumference of the circle.~~

5.3.9.~~27~~21 *If utilized, the heliport identification marking lighting, or cross marking lighting at a hospital shall be omnidirectional showing green.*

5.3.10 Helicopter stand floodlighting

. . .

5.3.14 Floodlighting of obstacles

Note.— The objective of obstacle floodlighting is to highlight the shape and location of obstacles in the vicinity of the heliport, to assist a pilot flying at night to avoid all obstacles by a safe margin.

Application

5.3.14.1 At a heliport intended for use at night, obstacles shall be floodlighted if it is not possible to display obstacle lights on them.

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— END —