Australian Government
Civil Aviation Safety Authority

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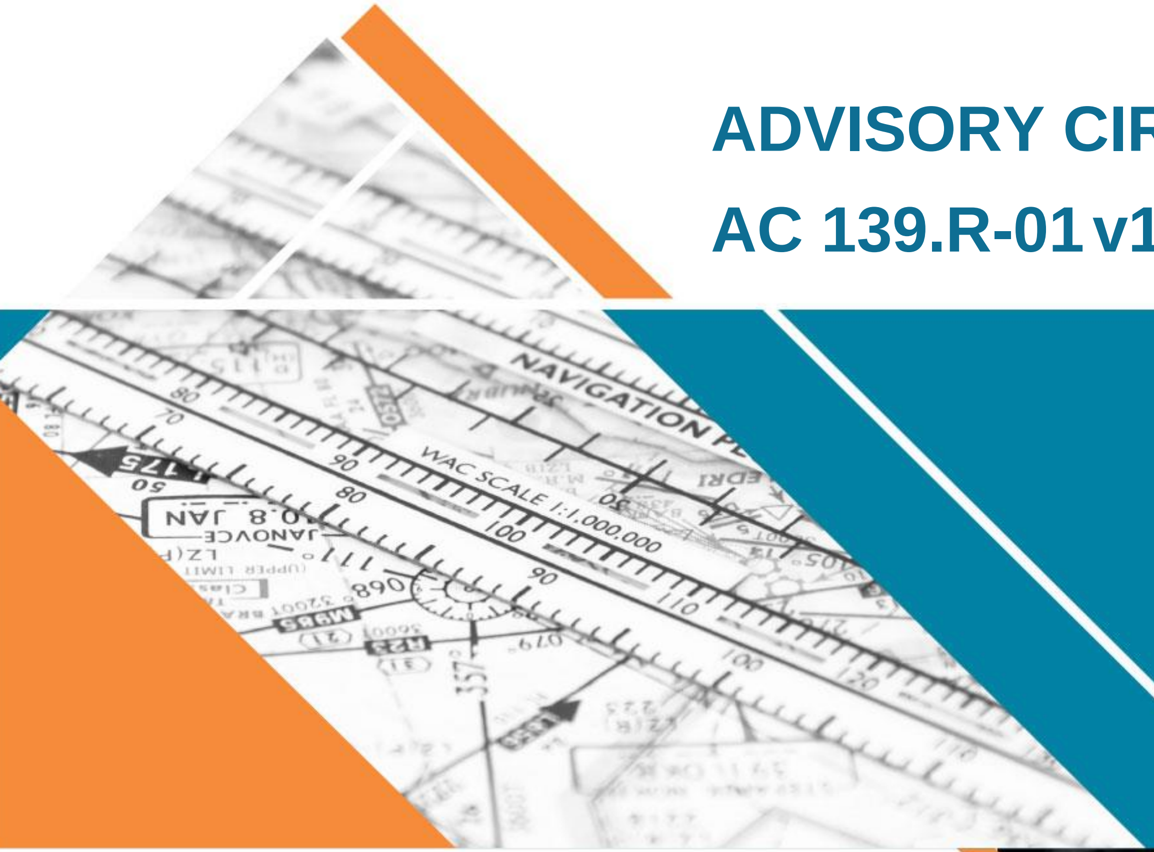


Guidelines for heliports - design and operation

Date	May 2022
Project number	AS 14/24
File ref	D17/406800

Audience

This advisory circular (AC) applies to:

- persons involved in the design, construction, and operation of heliports
- proponents of heliports
- helicopter owners/operators
- planning authorities
- aerodrome operators
- the Civil Aviation Safety Authority (CASA).

Purpose

The purpose of this AC is to provide guidance in the planning, design, and operation of heliports to support the safe and efficient operation of helicopters operating under both visual flight rules (VFR) and instrument flight rules (IFR).

This AC is not intended to restrict or limit a pilot from determining the most suitable landing area for the helicopter operation.

For further information

For additional information, contact CASA's Flight Standards Branch (telephone 131 757).

Unless specified otherwise, all subregulations, regulations, divisions, subparts and parts referenced in this AC are references to the *Civil Aviation Safety Regulations 1998 (CASR)*.

Status

This version of the AC is approved by the Manager, Flight Standards Branch.

Version	Date	Details
v1.0	April 2022	Initial issue. This concert with AC 91-29 this AC replaces CAAP 92-2(2) and CAAP 92-4(0).

Contents

1 Reference material

1.1 Acronyms

The acronyms and abbreviations used in this AC are listed in the table below.

Acronym	Description
AC	advisory circular
AEO	all engines operating
AIP	aeronautical information publication
ASPSL	arrays of segmented point source lighting
CASA	Civil Aviation Safety Authority
CASR	*Civil Aviation Safety Regulations 1998*
OEI	one engine inoperative
FATO	final approach and take-off
FOD	foreign object debris
HFM	helicopter (aircraft) flight manual
HRP	heliport reference point
ICAO	International Civil Aviation Organization
IFR	instrument flight rules
LOS	limited obstacle sector/surface
LP	luminescent panels
MOS	Manual of Standards
MTOW	maximum take-off weight
NASF	national airports safeguarding framework
OIE	one engine inoperative
OLS	obstacle limitation surface
PC1	performance class 1
PC2	performance class 2
PC3	performance class 3
PIC	pilot in command
PinS	point-in-space
SARPS	standards and recommended practices
TDPC	touchdown/positioning circle
TDPM	touchdown/positioning marking

Acronym	Description
TLOF	touchdown and lift off area
UCW	undercarriage width
VFR	visual flight rules
VMC	visual meteorological conditions

1.2 Definitions

Terms that have specific meaning within this AC are defined in the table below. Where definitions from the legislation have been reproduced for ease of reference, these are identified by grey shading. Should there be a discrepancy between a definition given in this AC and the Regulations, the definition in the Regulations prevails.

Term	Definition
aerodrome	Repeated from the *Civil Aviation Act 1988*: An area on land or water (including any buildings, installations, and equipment), the use of which as an aerodrome is authorised under the regulations, being such an area intended to be used either wholly or in part for the arrival, departure, and movement of aircraft.
D	For rotorcraft, the maximum dimension of the rotorcraft. Typically, it is 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	The following: a. take off distance available (TODAH): length of the FATO plus the length of helicopter clearway (if provided) declared available and suitable for helicopters to complete the take-off. b. rejected take-off distance available (RTODAH): 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): 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 with a TLOF surface 2.5m or higher above the ground in the immediate vicinity.
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)	For the operation of a rotorcraft at an aerodrome, means the area of the aerodrome: a. from which a take-off is commenced; or b. over which the final phase of approach to hover is completed.
flight manual	for an aircraft: see clause 37 of Part 2 of the CASR Dictionary.
helicopter clearway	A defined area on the ground or water, selected and/or prepared as a suitable

Term	Definition
	area over which a helicopter operated in performance class 1 may accelerate and achieve a specific height.
helicopter landing site	An aerodrome intended to be used wholly or in part for the arrival, departure, and surface movement of helicopters.
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.
helicopter taxiway	A defined path on a heliport intended for the ground movement of helicopters and that may be combined with an air taxi-route to permit both ground and air taxiing.
helicopter taxi-route	A defined path established for the movement of helicopters from one part of a heliport to another. a. Air taxi-route. A marked taxi-route intended for air taxiing. b. Ground taxi-route. A taxi-route centred on a taxiway.
helideck	Notwithstanding the definition of helideck contain in flight operations regulations, in relation to heliport design specifications, it is a heliport located on a fixed or floating offshore facility such as an exploration and/or production unit used for exploitation of oil or gas.
heliport	A helicopter landing site that meets or exceeds the specifications contained within this advisory circular.
heliport elevation	The elevation of the highest point of the FATO.
heliport reference point	The designated location of a heliport.
point-in-space (PinS) approach	The point-in-space approach is based on GNSS and is an approach procedure designed for helicopter only. 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) visual segment	This is the segment of a helicopter PinS approach procedure from the MAPt to the landing location for a PinS “proceed visually” procedure. This visual segment connects the PinS to the landing location.
protection area	A defined area surrounding a stand intended to reduce the risk of damage from helicopters accidentally diverging from the stand.
obstacle	A fixed (whether temporarily or permanently) or mobile object, structure, or part of such objects and structures, that: a. is located on an area provided for the surface movement of aircraft; or b. extends above a defined surface designated to protect aircraft in flight; or c. stands outside the defined surfaces mentioned in paragraphs (a) and (b) and that have been assessed as being a hazard to air navigation.
obstacle limitation surfaces	Means surfaces extending outwards and upwards from the FATO or safety area at angles compatible with the flight characteristics of the helicopter, used to evaluate approach and take-off climb surfaces for clearance of obstacles.
performance class	For a stage of flight of a rotorcraft, has the meaning given by the Part 133 Manual of Standards.
rejected take-off area	A defined area on a heliport suitable for helicopters operating in performance

Term	Definition
	class 1 to complete a rejected take-off.
runway-type FATO	A FATO having characteristics similar in shape to a runway
safety area	A defined area on a heliport surrounding the FATO which is free of obstacles, other than those required for air navigation purposes, and intended to reduce the risk of damage to helicopters accidentally diverging from the FATO.
shipboard heliport	Notwithstanding the definition of helideck contain in flight operations regulations, in relation to heliport design specifications, it is a heliport located on a ship that may be purpose or non-purpose built. A purpose-built shipboard heliport is one designed specifically for helicopter operations. A non-purpose-built shipboard heliport is one that utilises as area of the ship that is capable of supporting a helicopter but not specifically designed for that task.
static load bearing surface	A surface capable of supporting the mass of a helicopter situated on it.
surface-level heliport	A heliport located on the ground or surface of the water or a structure with the TLOF no higher than 2.5m above the ground or water in the immediate vicinity.
touchdown and lift-off area (TLOF)	The surface over which the touchdown and lift-off is conducted.
touchdown positioning circle (TDPC)	A touchdown positioning marking in the form of a circle use for omnidirectional positioning in a TLOF.
touchdown/positioning marking (TDPM)	A marking or set of markings providing visual cues for the positioning of helicopters.
winching area	An area provided for the transfer by helicopter of personnel or stores to or from a ship.

1.3 References

Legislation

Legislation is available on the Federal Register of Legislation website https://www.legislation.gov.au/

Document	Title
Part 139 MOS	Part 139 (Aerodromes) Manual of Standards 2019
Part 133	Civil Aviation Safety Amendment (Part 133) Regulations 1998
Part 133 MOS	Part 133 (Australian Air Transport Operations—Rotorcraft) Manual of Standards 2020
Part 91	Civil Aviation Safety Amendment (Part 91) Regulations 1998
Part 91 MOS	Part 91 (General Operating and Flight Rules) Manual of Standards 2020

Advisory material

CASA's advisory material is available at https://www.casa.gov.au/publications-and-resources/guidance-materials

Document	Title
AC 91-29	Guidelines for helicopters - suitable places to take-off and land
AC 133-01	Performance class operations

International Civil Aviation Organization documents

International Civil Aviation Organization (ICAO) documents are available for purchase from http://store1.icao.int/ or may be available from the ICAO e-Library (https://elibrary.icao.int/home)

Document	Title
ICAO SARPs	Annex 14 to the Convention on International Civil Aviation - Aerodromes - Volume II Heliports
ICAO Doc 9261	Heliport Manual
ICAO SARPs	Annex 3 to the Convention on International Civil Aviation - Meteorological Services for International Air Navigation

2 Introduction

2.1 Background

2.1.1 While regulation 91.410 of CASR places the onus on the helicopter operator and pilot in command (PIC) to consider all circumstances associated with safely taking off or landing at a place prior to doing so, it also ensures via subregulation 91.410(3) that any place that can be safely used for such operations is considered an aerodrome for the purposes of the legislation.

2.1.2 Places generally used for the purposes of the taking-off or landing of helicopters are known as helicopter landing sites (HLS). Heliports are a specific type of HLS which are designed and constructed in accordance with the guidance for design and construction outlined within this AC.

2.1.3 Owners and operators of helicopter landing sites may support their users by designing, maintaining and operating their facility to internationally recognised standards. This is recommended for operators who wish to support operations in performance classes 1, 2 or 2 with exposure. Therefore, this AC aligns with the International Civil Aviation Organization's (ICAO) Annex 14 Volume II, whose standards and recommended practices cover physical characteristics, visual aids, obstacle control and emergency response facilities.

2.1.4 Under Annex 14, heliports are divided and sub-divided into separate categories depending on their location. This AC follows this approach which is summarised in figure 1. Guidance specifications are assumed to apply to all categories and sub-categories of heliports unless specifically identified in the text of the specification or section title.

2.1.5 Annex 14 uses the concept of defined areas and relating the design and characteristics of the defined areas of the heliport to the design helicopter. The design helicopter is a helicopter having the most demanding set of dimensions, the greatest maximum take-off weight (MTOW) and the most critical obstacle avoidance criteria. It may not be a single helicopter type but rather a combination of critical aspects from numerous helicopters that the heliport intends to serve.

Note: Further guidance on the determination of the design helicopters characteristics is contained in Appendix A to Chapter 3 of the ICAO Heliport Manual (Doc 9261).

2.1.6 CASA does not expect operators of existing heliports who do not currently meet the guidance set out in this circular to upgrade their facility immediately. Where the specifications are not met, a risk assessment should be conducted to identify any alternate mitigation measures to be put in place to achieve an acceptable level of safety of helicopter operations at the heliport.

2.1.7 Heliport operators and designers should adopt the specifications in this circular when upgrading and replacing existing or building new heliport facilities.

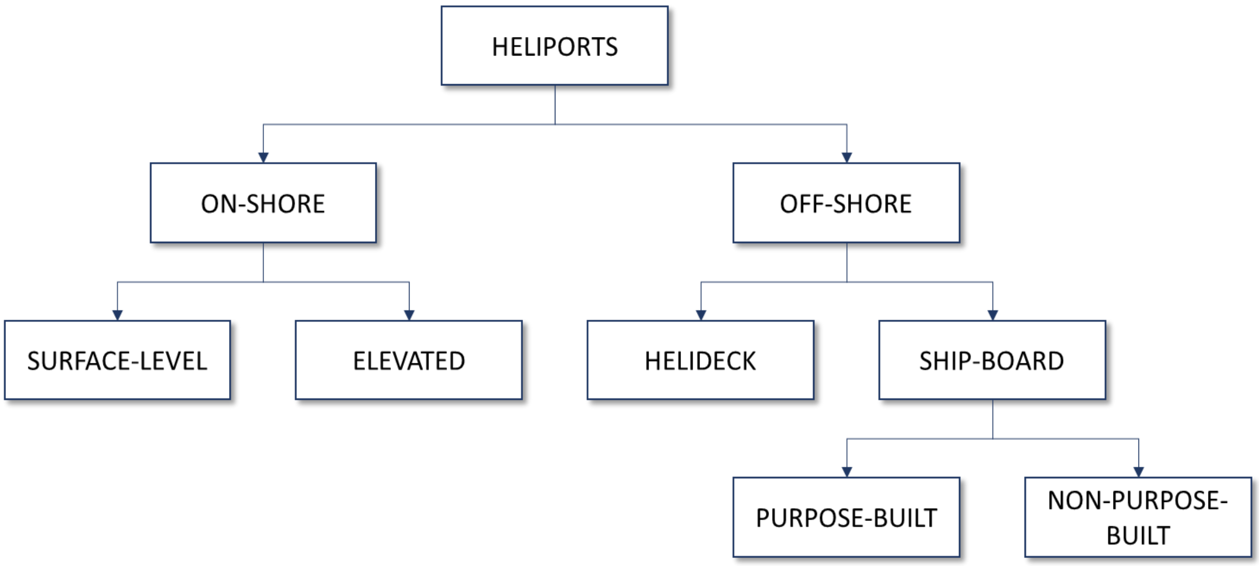


Figure 1: Heliport categories

2.2 Site selection to minimise effects on third parties

2.2.1 Impact on nearby certified aerodromes

2.2.1.1 Where heliports need to be located within the vicinity of a certified aerodrome, the siting and design of final approach and take-off (FATO) areas should be carefully considered to minimize the interactions between heliport traffic and pre-existing aerodrome traffic. An operational study of helicopter flight-path trajectories should determine whether conflict detection by on board traffic advisory systems or ground surveillance radars is likely to occur.

2.2.1.2 Where interactions cannot be avoided, coordination between the heliport and helicopter operators, as well as the relevant air traffic services, should determine the appropriate operational measures to ensure there is no conflict (i.e., there is compatibility) between the heliport and aerodrome traffic.

2.2.2 Rotor downwash considerations

2.2.2.1 When manoeuvring at slow speeds, especially during take-off and landing, helicopters generate significant rotor downwash extending out to a distance of 2 to 3 rotor diameters below the generating aircraft. This downwash produces effects comparable to high and gusty wind conditions which may cause light or insecure cladding and other light objects and structures to become detached.

2.2.2.2 The design of a FATO should minimize the exposure of persons or loose objects to the downwash of helicopters. Within a distance of 3 rotor diameters from the FATO, no loose objects or light cladding should be allowed in areas which might be overflown by helicopters at low level, and no non-essential personnel should be present in these areas during helicopter operations. The backwards or sideways initial climb phase of PC1 operations should also be considered when assessing areas sensitive to the potential exposure to helicopter rotor wash. Experience suggests, when adopting these procedures, the characteristics of the downwash may exhibit a hard jet on the surface, which though localized, can nevertheless be quite intense.

2.2.2.3 Provided the elements of the infrastructure surrounding the heliport are designed to withstand gusty conditions up to Beaufort scale 10/11, no extra measures should be required to protect the structure against regular planned helicopter operations.

2.2.2.4 Specific data on downwash speeds for common aircraft types are included in Appendix A.

3 Heliport physical characteristics

3.1 Onshore heliports

3.1.1 General

3.1.1.1 A heliport consists of set of essential components or defined areas as well as some optional components. These are the basic building blocks of a heliport, as shown in Figure 2, and include:

a. one or more final approach and take-off (FATO) areas
b. one or more touchdown/lift-off (TLOF) areas
c. helicopter stands
d. helicopter taxiways and/or taxi-routes.

3.1.1.2 In addition to these defined areas, there are subsidiary areas that also impact directly on heliport design. They are:

a. safety areas
b. clearways
c. obstacle protection areas.

3.1.1.3 The following specifications are based on the design assumption that no more than one helicopter will be in the final approach and take-off (FATO) area at the same time.

3.1.1.4 Further, it is also assumed that operations to/from a FATO in proximity to another FATO will not be simultaneous. If simultaneous operations are planned, appropriate separation distances between FATOs should be determined with due regard to issues such as rotor downwash, flight paths and other airspace limitations.

Note: Further guidance on this as well as structural considerations for elevated heliports and site selection is available in the ICAO Heliport Manual (Doc 9261).

3.1.2 Final approach and take-off (FATO) area

3.1.2.1 A heliport should be provided with at least one FATO, which does not need to be solid.

3.1.2.2 A FATO should have the following features:

a. 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 every part of the design helicopter in the final phase of approach and commencement of take-off in accordance with the intended procedures.
b. When solid, resistant to the effects of rotor downwash.
c. When collocated with a touchdown and lift-off (TLOF) area, contiguous and flush with the TLOF, and a bearing strength capable of withstanding the intended loads and effective drainage.
d. When non-collocated with a TLOF, free of hazards to a potential forced landing.
e. Associated with a safety area.

3.1.2.3 The dimensions of a FATO should be:

a. where intended to be used by helicopters operated in performance class 1:
   i. the length of the rejected take-off distance (RTOD) for the most demanding required take-off procedure for the heliport prescribed in the flight manual (FM) of the helicopters for which the FATO is intended, or 1.5 Design D, whichever is greater
   ii. the width for the required procedure prescribed in the FM of the helicopters for which the FATO is intended, or 1.5 Design D, whichever is greater

or

b. where intended to be used by helicopters operated in performance class 2 or 3, the lesser of:
   i. an area within which can be drawn a circle of diameter of 1.5 Design D

   or

   ii. when there is a limitation on the direction of approach and touchdown, an area of sufficient width to meet the specification of 3.1.3.2 (a) but not less than 1.5 times the overall width of the design helicopter.

3.1.2.4 Essential objects (see 3.1.3.2 (a)) should not penetrate the horizontal plane at the FATO elevation by more than 5 cm.

3.1.2.5 When solid, the slope of a FATO should not exceed 2 per cent in any direction, except when the FATO is elongated and:

a. intended to be used by helicopters operated in performance class 1, it should not exceed 3 per cent overall, or have a local slope exceeding 5 per cent

   or

b. intended to be used solely by helicopters operated in performance class 2 or 3, exceed 3 per cent overall, or have a local slope exceeding 7 per cent.

3.1.2.6 A FATO should be located so as to minimize the influence of the surrounding environment, including turbulence, which could have an adverse impact on helicopter operations.

3.1.3 Safety area

3.1.3.1 A FATO should be surrounded by a safety area, which does not need to be solid.

3.1.3.2 A safety area should have the following features:

a. Free of obstacles, except for essential objects which because of their function are located on it, to compensate for manoeuvring errors.
b. When solid, contiguous surface flush with the FATO, that is resistant to the effects of rotor downwash and ensures effective drainage.

3.1.3.3 For heliports with non-instrument approaches, the safety area surrounding a FATO should extend outwards from the periphery of the FATO for a distance of at least 3 m or 0.25 Design D, whichever is greater.

3.1.3.4 For heliports with instrument approaches, the safety area surrounding a FATO should extend:

a. laterally to a distance of at least 45 m on each side of the centre line
b. longitudinally to a distance of at least 60 m beyond the ends of the FATO.

3.1.3.5 No mobile object should be permitted in a safety area during helicopter operations.

3.1.3.6 Essential objects located in the safety area should not penetrate a surface originating at the edge of the FATO at a height of 25 cm above the plane of the FATO sloping upwards and outwards at a gradient of 5 per cent.

3.1.3.7 When solid, the slope of the safety area should not exceed an upward slope of 4 per cent outwards from the edge of the FATO.

3.1.4 Protected side slope

3.1.4.1 A heliport should be provided with at least one protected side slope, rising at 45 degrees from the edge of the safety area and extending to a distance of 10 m. Both sides may be protected by a side slope of the same dimensions.

3.1.4.2 The surface of a protected side slope should not be penetrated by obstacles.

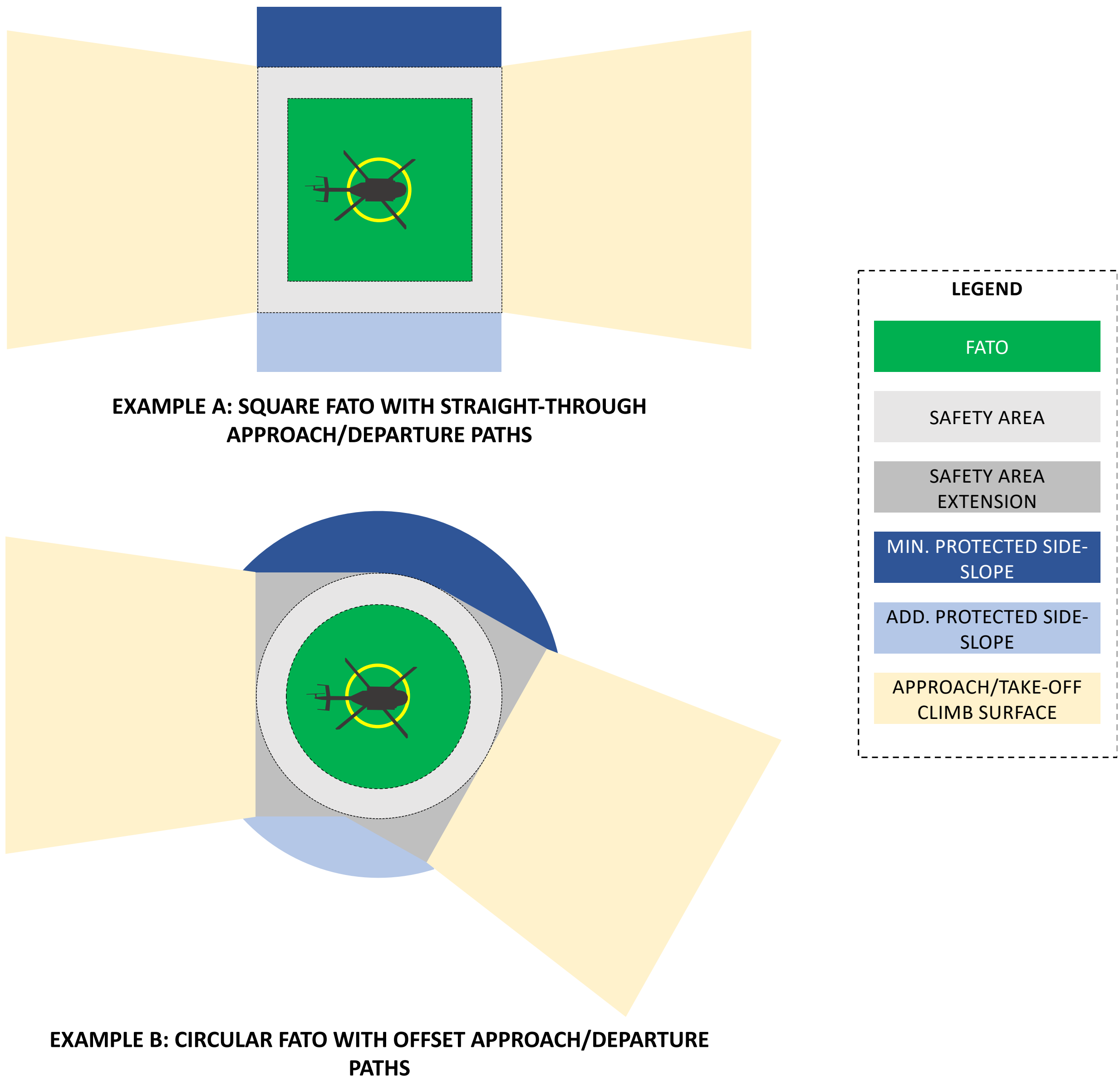


Figure 2: Basic features of onshore heliports

3.1.5 Helicopter clearway

3.1.5.1 When a helicopter clearway is provided, it should be located beyond the end of the FATO.

3.1.5.2 A helicopter clearway should have the following features:

a. 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

b. when solid, contiguous surface flush with the FATO, is resistant to the effects of rotor downwash and is free of hazards should a forced landing be required.

3.1.5.3 The width of a helicopter clearway should not be less than that of the FATO and associated safety area.

3.1.5.4 When solid, the ground in a helicopter clearway should not project above a plane having an overall upward slope of 3 per cent or having a local upward slope exceeding 5 per cent, the lower limit of this plane being a horizontal line which is located on the periphery of the FATO.

3.1.5.5 No object, which may endanger helicopters in the air, should be permitted in the helicopter clearway.

Note: For heliports which are capable of supporting vertical PC1 category A procedures, clearways may be elevated to elevate the origin of the take-off climb or approach surfaces as necessary to minimise obstacle environment complexity. Refer Appendix A to chapter 4 of ICAO Heliport Manual Doe 9261 fifth edition for more information.

3.1.6 Touchdown and lift-off (TLOF) area

3.1.6.1 A heliport should be provided with at least one TLOF.

3.1.6.2 A TLOF should be provided whenever it is intended that the undercarriage of the helicopter will touch down within a FATO or stand or lift off from a FATO or stand.

3.1.6.3 A TLOF should have the following features:

a. Free of obstacles and sufficient size and shape to ensure containment of the undercarriage of the most demanding helicopter the TLOF is intended to serve in accordance with the intended orientation.
b. A surface which:
   i. has sufficient bearing strength to accommodate the dynamic loads associated with the anticipated type of arrival of the helicopter at the designated TLOF
   ii. is free of irregularities that would adversely affect the touchdown or lift-off of helicopters
   iii. has sufficient friction to avoid skidding of helicopters or slipping of persons
   iv. is resistant to the effects of rotor downwash
   v. ensures effective drainage while having no adverse effect on the control or stability of a helicopter during touchdown and lift-off, or when stationary.
c. Associated with a FATO or a stand.

3.1.6.4 The dimensions of the TLOF should be:

a. when in a FATO intended to be used by helicopters operated in performance class 1, the dimensions for the required procedure prescribed in the FMs of the helicopters for which the TLOF is intended
b. when in a FATO intended to be used by helicopters operated in performance class 2 or 3, or in a stand:
   i. when there is no limitation on the direction of touchdown, of sufficient size to contain a circle of diameter of at least 0.83 D of:
      A. in a FATO, the design helicopter

      or
      B. in a stand, the largest helicopter the stand is intended to serve.

ii. when there is a limitation on the direction of touchdown, of sufficient width to meet the requirement of 3.1.6.3 (a) but not less than twice the undercarriage width (UCW) of:

A. in a FATO, the design helicopter

or

B. in a stand, the most demanding helicopter the stand is intended to serve.

3.1.6.5 For an elevated heliport, the minimum dimensions of a TLOF, when in a FATO, should be of sufficient size to contain a circle of diameter of at least 1 Design D.

3.1.6.6 The slope of a TLOF should not exceed 2 per cent in any direction, except when the TLOF is elongated and:

a. intended to be used by helicopters operated in performance class 1, it should not exceed 3 per cent overall, or have a local slope exceeding 5 per cent

or

b. intended to be used solely by helicopters operated in performance class 2 or 3, exceed 3 per cent overall, or have a local slope exceeding 7 per cent.

3.1.6.7 When a TLOF is within a FATO, it should be:

a. centred on the FATO

or

b. for an elongated FATO, centred on the longitudinal axis of the FATO.

3.1.6.8 When a TLOF is within a helicopter stand, it should be centred on the stand.

3.1.6.9 A TLOF should be provided with markings which clearly indicate the touchdown position and, by their form, any limitations on manoeuvring.

3.1.6.10 Where an elongated performance class 1 FATO/TLOF contains more than one touchdown position marking (TDPM), measures should be in place to ensure that only one can be used at a time.

3.1.6.11 Where alternative TDPMs are provided, they should be placed to ensure containment of the undercarriage within the TLOF and the helicopter within the FATO.

3.1.6.12 Safety devices such as safety nets or safety shelves should be located around the edge of an elevated heliport but should not exceed the height of the TLOF.

3.1.7 Helicopter taxiways

3.1.7.1 A helicopter taxiway is a surface intended for the ground movement of a wheeled helicopter under its own power. This does not prevent a taxiway from being used for air taxi if it is associated with a helicopter taxi route.

3.1.7.2 A helicopter taxiway should have the following features:

a. Free of obstacles and of sufficient width to ensure containment of the undercarriage of the most demanding wheeled helicopter the taxiway is intended to serve.

b. Surface which:

i. has the bearing strength to accommodate the taxiing loads of the helicopters the taxiway is intended to serve

    - ii. is free of irregularities that would adversely affect the ground taxiing of helicopters
    - iii. is resistant to the effects of rotor downwash
    - iv. ensures effective drainage while having no adverse effect on the control or stability of a wheeled helicopter when being manoeuvred under its own power, or when stationary.
  - c. Associated with a taxi-route.

3.1.7.3 The minimum width of a helicopter taxiway should be the lesser of:

- a. Twice the UCW of the most demanding helicopter the taxiway is intended to serve; or
- b. A width meeting the requirements of 3.1.7.2 (a).

3.1.7.4 The transverse slope of a taxiway should not exceed 2 per cent and the longitudinal slope should not exceed 3 per cent.

3.1.8 Helicopter taxi-routes

3.1.8.1 A helicopter taxi-route, examples shown in Figure 3, should have the following features:

- a. Free of obstacles, except for essential objects which because of their function are located on it, established for the movement of helicopters; of sufficient width to ensure containment of the largest helicopter the taxi-route is intended to serve.
- b. When solid, surface which is resistant to the effects of rotor downwash; and
  - i. when collocated with a taxiway:
    - A. is contiguous and flush with the taxiway
    - B. does no present a hazard to operations
    - C. ensures effective drainage.
  - ii. when not collocated with a taxiway, is free of hazards should a forced landing be required.

3.1.8.2 No mobile object should be permitted on a taxi-route during helicopter operations.

3.1.8.3 When solid and collocated with a taxiway, the taxi-route should not exceed an upward transverse slope of 4 per cent outwards from the edge of the taxiway.

3.1.8.4 A helicopter ground taxi-route should have a minimum width of 1.5 times the overall width of the largest helicopter it is intended to serve be centred on a taxiway.

3.1.8.5 Essential objected located in a helicopter ground taxi-route should not:

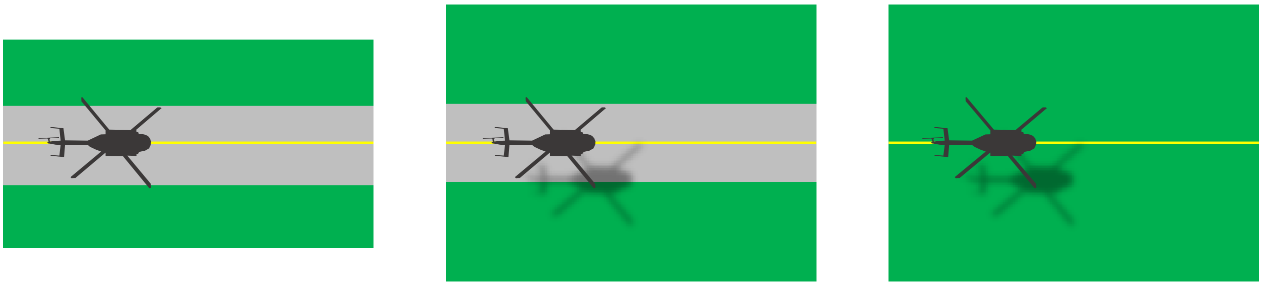
- a. be located at a distance of less than 50 cm outwards from the edge of the helicopter taxiway
- b. penetrate a surface originating 50 cm outwards of the edge of the helicopter taxiway and a height of 25 cm above the surface of the taxiway and sloping upwards and outwards at a gradient of 5 per cent.

3.1.8.6 A helicopter air taxi-route should have a minimum width of twice the overall width of the largest helicopter it is intended to serve.

3.1.8.7 If collocated with a taxiway for the purpose of permitting both ground and air taxi operations:

a. the helicopter air taxi-route should be centre on the taxiway
b. essential objects located in the helicopter air taxi-route should not:
   i. be located at a distance of less than 50 cm outwards from the edge of the helicopter taxiway
   ii. penetrate a surface originating 50 cm outwards of the edge of the helicopter taxiway and a height of 25 cm above the surface of the taxiway and sloping upwards and outwards at a gradient of 5 per cent.

3.1.8.8 When not collocated with a taxiway, the slopes of the surface of an air taxi-route should not exceed the slope landing limitations of the helicopters the taxi-route is intended to serve. In any event, the transverse slope should not exceed 10 per cent and the longitudinal slope should not exceed 7 per cent.



EXAMPLE A: GROUND-TAXI ROUTE WIDTH – 1.5x D

EXAMPLE B: AIR-TAXI ROUTE (ABOVE TAXIWAY) WIDTH – 2x D

EXAMPLE C: AIR-TAXI ROUTE (NO TAXIWAY) WIDTH – 2x D

Figure 3: Taxi route examples

3.1.9 Helicopter stands

3.1.9.1 While this section does not specify the location for helicopters stands, they should not be located under a final approach or initial departure flight path.

3.1.9.2 A helicopter stand, examples shown in Figure 4, has the following features:

a. Free of obstacles and sufficient size and shape to ensure containment of every part of the largest helicopter the stand is intended to serve when it is being positioned within the stand.
b. Surface which:
   i. is resistant to the effects of rotor downwash
   ii. is free of irregularities that would adversely affect the manoeuvring of helicopters
   iii. has bearing strength capable of withstanding the intended loads
   iv. has sufficient friction to avoid skidding of helicopters or slipping of persons

v. ensures effective drainage while having no adverse effect on the control or stability of a wheeled helicopter when being manoeuvred under its own power, or when stationary.

c. Associated with a protection area.

3.1.9.3 The minimum dimensions of a helicopter stand should be:

a. a circle diameter of 1.2 D of the largest helicopter the stand is intended to serve or

b. when there is a limitation on manoeuvring and positioning, of sufficient width to meet the requirement of 3.1.9.2 (a) but not less than 1.2 times the overall width of largest helicopter the stand is intended to serve.

3.1.9.4 The mean slope of a helicopter stand in any direction should not exceed 2 per cent.

3.1.9.5 Each helicopter stand should be provided with positioning markings to clearly indicate where the helicopter is to be positioning and, by their form, any limitation on manoeuvring.

3.1.9.6 A stand should be surrounded by a protection area when need not be solid.

3.1.10 Protection areas

3.1.10.1 A protection area should have the following features:

a. Free of obstacles, except for essential objects which because of the function are located on it.

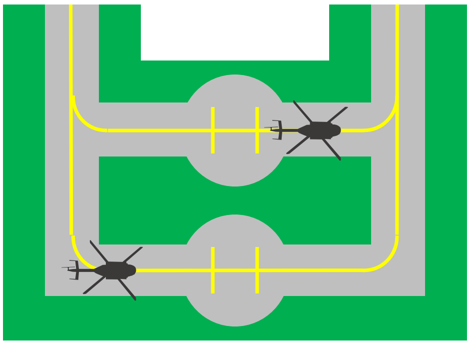
b. When solid, contiguous surface flush with het stand, resistant to the effects of rotor downwash and ensures effective drainage.

3.1.10.2 When associated with a stand designed for turning, the protection area should extend outwards from the periphery of the stand for a distance of 0.4 D.

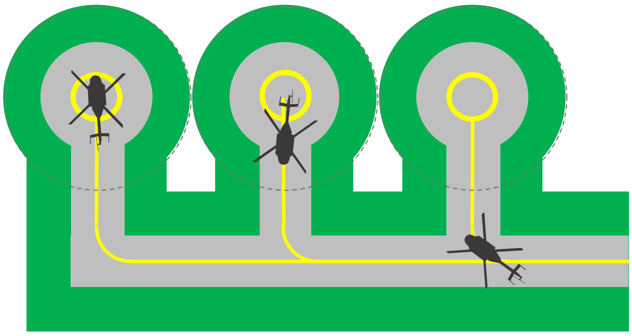
3.1.10.3 When associated with a stand designed for taxi-through, the minimum width of the stand and the protection area should not be less than the width of the associated taxi-route.

3.1.10.4 When associated with a stand designed for non-simultaneous use:

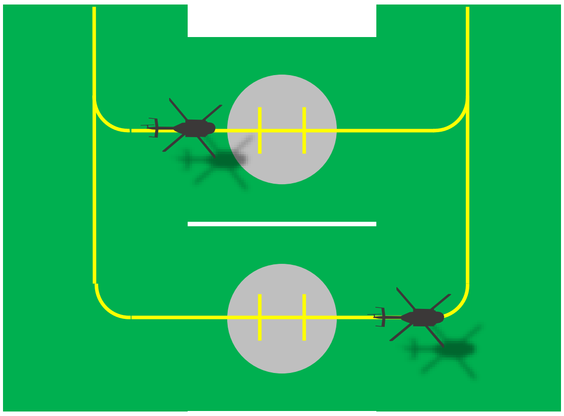
a. the protection area of adjacent stands may overlap but should not be less than the required protection area for the larger of the adjacent standards
b. the adjacent non-active stand may contain a static object, but it should be wholly with the boundary of the stand.



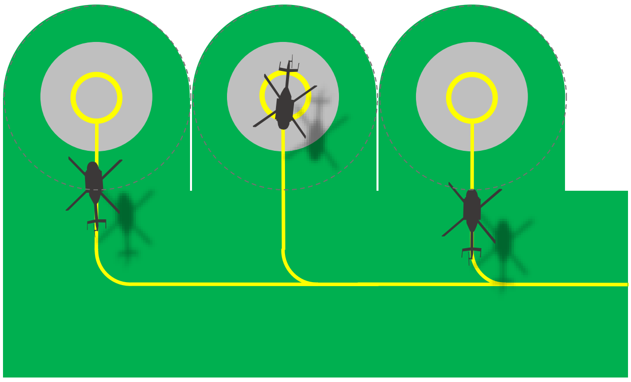
EXAMPLE A: INDEPENDENT GROUND TAXI-THROUGH STANDS



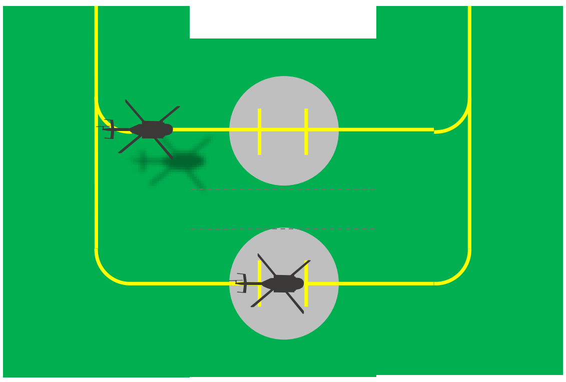
EXAMPLE B: INDEPENDENT GROUND TAXI-ROUTE TURNING STANDS



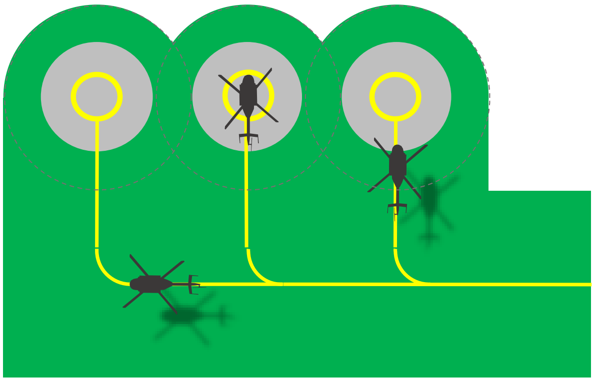
EXAMPLE C: INDEPENDENT AIR TAXI-THROUGH STANDS



EXAMPLE D: INDEPENDENT AIR TAXI-ROUTE TURNING STANDS



EXAMPLE E: TAXI-THROUGH STANDS WITH AIR-TAXI ROUTE & DEPENDENT ON OTHER STAND BEING CLEAR OR WITH STATIC OBJECTS ONLY



EXAMPLE F: TURNING STAND WITH AIR-TAXI ROUTE & DEPENDENT ON OTHER STAND BEING CLEAR OR WITH STATIC OBJECTS ONLY

Figure 4: Helicopter stand examples

3.1.10.5 Essential objects located in the protection area should not:

a. If located at a distance of less than 0.75 D from the centre of the helicopter stand, penetrate a surface at a height of 5 cm above the surface of the central zone.
b. If located at a distance of 0.75 D or more from the centre of the helicopter stand, penetrate a surface at a height of 25 cm above the plane of the central zone and sloping upwards and outwards at a gradient of 5 per cent.

3.1.10.6 When solid, the slope of the protection area should not exceed an upward slope of 4 per cent outwards from the edge of the stand.

3.1.10.7 Where a FATO is located near a runway or taxiway, and where simultaneous operations are planned, the separation distance between the edge of a runway or taxiway and the edge of a FATO should not be less than the appropriate dimension in Table 1.

Table 1: FATO minimum separation distance for simultaneous operations

If aeroplane mass and/or helicopter mass are	Distance between FATO edge and runway or taxiway edge
Up to but not including 3,175 kg	60 m
3,175 kg up to but not including 5,760 kg	120 m
5,670 kg up to but not including 100,000 kg	180 m
100,000 kg and over	250 m

3.1.10.8 A FATO should not be located:

a. near taxiway intersections or holding points where jet engine efflux is likely to cause high turbulence

   or
b. near areas where aeroplane vortex wake generation is likely to exist.

3.2 Helidecks

3.2.1 The following specifications are for helidecks located on structures engaged in such activities as mineral exploitation and production, scientific research, construction and maintenance taskings (such as offshore windfarms).

3.2.2 FATOs and TLOFs

3.2.2.1 A helideck should be provided with one FATO and one coincident or collocated TLOF.

3.2.2.2 A FATO may be any shape but should 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.

3.2.2.3 A TLOF may be any shape but should be of sufficient size of contain 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.

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

3.2.2.5 The FATO should be located to avoid, as far as practicable, the influence of environmental effects, including turbulence, over the FATO, which could have an adverse impact on helicopter operations.

3.2.2.6 The TLOF should be dynamic load-bearing.

3.2.2.7 The TLOF should provide ground effect.

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

3.2.2.9 For any TLOF 1 D or greater and any TLOF designed for use by helicopters having a D-value of greater than 16.0 m, objects installed in the obstacle free sector whose function requires them to be located on the edge of the TLOF should be as low as possible and in any case, not exceed a height of 15 cm.

3.2.2.10 For any TLOF designed for use by helicopters having a D-value of 16.0 m or less, and any TLOF having dimensions of less than 1 D, objects installed in the obstacle-free sector whose function requires them to be located on the edge of the TLOF, should not exceed a height of 5 cm.

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

3.2.2.12 Safety devices such as safety nets or safety shelves should be located around the edge of a helideck but should not exceed the height of the TLOF.

3.2.2.13 The surface of the TLOF should be skid-resistant to both helicopters and persons and be sloped to prevent pooling of water.

3.3 Shipboard heliports

3.3.1 When helicopter operating areas are provided in the bow or stern of a ship or are purpose-built above the ship’s structure, they should be regarded as purpose-built shipboard heliports.

3.3.2 FATOs and TLOFs

3.3.2.1 A shipboard heliport should be provided with one FATO and one coincidental or collocated TLOF.

3.3.2.2 A FATO may be any shape but should 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 heliport is intended to serve.

3.3.2.3 The TLOF of a shipboard heliport should be dynamic load-bearing.

3.3.2.4 The TLOF of a shipboard heliport should provide ground effect.

3.3.2.5 For purpose-built shipboard heliports provided in a location other than the bow or stern, the TLOF should be of sufficient size to contain a circle with a diameter not less than 1 D of the largest helicopter the heliport is intended to serve.

3.3.2.6 For purpose-built shipboard heliports provided in the bow or stern of a ship, the TLOF should be of sufficient size to:

a. contain a circle with a diameter not less than 1 D of the largest helicopter the heliport is intended to serve

or

b. for operations with limited touchdown directions, contain an area within which can be accommodated two opposing arcs of a circle with a diameter of not less than 1 D in the helicopter's longitudinal direction. The minimum width of the heliport should be not less than 0.83 D (see Figure 5). The touchdown heading of the helicopter should be limited to the angular distance subtended by the 1 D arc headings, minus the angular distance which corresponds to 15 degrees at each end of the arc.

3.3.2.7 For non-purpose-built shipboard heliports, the TLOF should be of sufficient size to contain a circle with a diameter not less than 1 D of the largest helicopter the heliport is intended to serve.

3.3.2.8 A shipboard heliport should be arranged to ensure that a sufficient and unobstructed air-gap is provided which encompasses the full dimensions of the FATO.

3.3.2.9 The FATO should be located so as to avoid, as far as is practicable, the influence of environmental effects, including turbulence, over the FATO, which could have an adverse impact on helicopter operations.

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

3.3.2.11 For any TLOF 1 D or greater and any TLOF designed for use by helicopters having a D-value of greater than 16.0 m, objects installed in the obstacle-free sector whose function requires them to be located on the edge of the TLOF should be as low as possible and in any case not exceed a height of 15 cm.

3.3.2.12 For any TLOF designed for use by helicopters having a D-value of 16.0 m or less, and any TLOF having dimensions of less than 1 D, objects in the obstacle-free sector, whose function requires them to be located on the edge of the TLOF, should not exceed a height of 5 cm.

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

3.3.2.14 Safety devices such as safety nets or safety shelves should be located around the edge of a shipboard heliport, except where structural protection exists, but should not exceed the height of the TLOF.

3.3.2.15 The surface of the TLOF should be skid-resistant to both helicopters and persons.

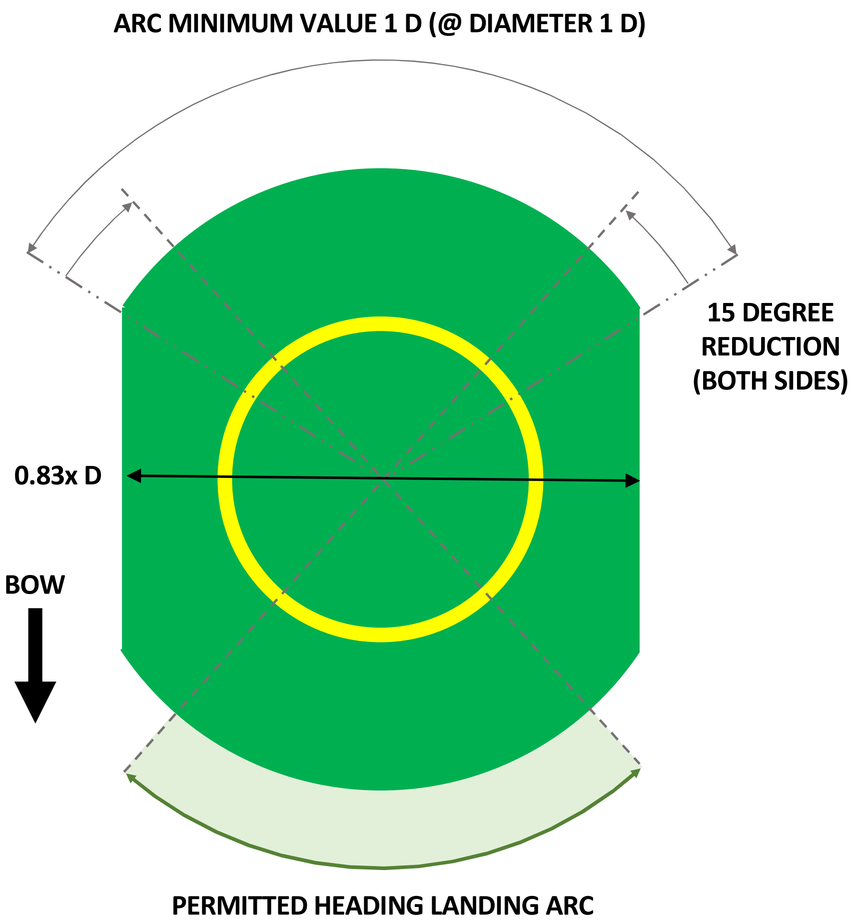


Figure 5: Shipboard permitted landing headings for limited heading operations

4 Obstacle control

4.1 Obstacle limitation surfaces and sectors

4.1.1 The following sections outline the characteristics of each obstacle limitation surface (OLS) and sector.

4.1.2 Approach surface

4.1.2.1 The approach surface consists of an inclined plane or a combination of planes or, when a turn is involved, a complex surface sloping upwards from the end of the safety area and centred on a line passing through the centre of the FATO.

4.1.2.2 The limits of an approach surface comprise of:

a. an inner edge horizontal and 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 the outer edge of the safety area
b. two side edges originating at the ends of the inner edge:
    i. for heliports with non-instrument and non-precision approaches, diverging uniformly at a specified rate from the vertical plane containing the centre line of the FATO
    ii. for heliports with precision approaches, diverging uniformly at a specified rate from the vertical plane containing the centre line of the FATO, to a specified height above FATO, and then diverging uniformly at a specified rate to a specified final width and continuing thereafter at that width for the remaining length of the approach surface
c. an outer edge horizontal and perpendicular to the centre line of the approach surface and at a specified height above the elevation of the FATO.

4.1.2.3 The elevation of the inner edge is the elevation of the FATO at the point on the inner edge that is intersected by the centre line of the approach surface. 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.

4.1.2.4 The slope(s) of the approach surface are measured in the vertical plane containing the centre line of the surface.

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

4.1.2.6 In the case of an approach surface involving a turn, the surface is limited to one curved portion.

4.1.2.7 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 is limited to a maximum length of 575 m.

4.1.2.8 For any variation in the direction of the centre line of an approach surface, the minimum turn radius is 270 m.

Note: For heliports intended to be used by helicopters operated in performance class 2 or 3, it is good practice for the approach 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 area.

4.1.3 Transitional surface

4.1.3.1 The transitional surface is a surface along the side of the safety area and part of the side of the approach/take-off climb surface, that slopes upwards and outwards to a predetermined height of 45 m.

4.1.3.2 The limits of a single transitional surface comprise of:

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

b. an upper edge located at:

   i. 45 m above the FATO

   or

   ii. when vertical procedures are being utilised; 15 m above the elevation of the upper edge of the ascent/descent surface.

4.1.3.3 For heliports with opposing approach/take-off climb surfaces at angles less than 180 degrees (including heliports with more than two approach/take-off climb surfaces), adjacent transitional surfaces will be bound according to the limits specified in section 4.1.3.2 to the point of intersection of the two surfaces.

4.1.3.4 The elevation of a point on the lower edge is:

a. along the side of the approach/take-off climb surface — equal to the elevation of the approach/take-off climb surface at that point

b. if provided, along the helicopter clearway - equal to the elevation of the helicopter clearway

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

4.1.3.5 The slope of the transitional surface is measured in a vertical plane at right angles to the centre line of the approach/take-off climb surface.

4.1.4 Take-off climb surface

4.1.4.1 The take-off climb surface is an inclined plane, a combination of planes or, when a turn or turns are involved, a complex surface sloping upwards from the end of the safety area, or the helicopter clearway, when it is provided, and centred on a line passing through the centre of the FATO.

4.1.4.2 The limits of a take-off climb surface comprise of:

a. an inner edge horizontal and perpendicular to the centre line of the take-off climb surface with a length equal to
   i. when located at the outer edge of the safety area or helicopter clearway, width/diameter the FATO plus the safety area

      or
   ii. when located at the outer edge of an elevated helicopter clearway, the width of 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

c. an outer edge horizontal and perpendicular to the centre line of the take-off climb surface. and at a specified height of 152 m above the elevation of the FATO.

4.1.4.3 The elevation of the inner edge is 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. For heliports intended to be used by helicopters operated in performance class 1 the origin of the inclined plane may be raised directly above the FATO.

4.1.4.4 Where a clearway is provided, the elevation of the inner edge of the take-off climb surface is located at the outer edge of the clearway at the highest point on the ground based on the centre line of the clearway or at the height of the clearway when elevated.

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

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

4.1.4.7 In the case of a take-off climb surface involving a turn, the surface is limited to one curved portion.

4.1.4.8 Where a curved portion of a take-off climb surface, 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 is limited to a maximum length of 575 m.

4.1.4.9 For any variation in the direction of the centre line of a take-off climb surface, the minimum turn radius is 270 m.

4.2 Obstacle limitation requirements

4.2.1 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.

4.2.2 Onshore heliports

4.2.2.1 The following obstacle limitation surfaces should be established for a FATO at heliports with a PinS approach procedure utilizing a visual segment surface:

a. take-off climb surface
b. approach surface
c. transitional surfaces.

4.2.2.2 The following obstacle limitation surfaces should be established for a FATO at heliports, other than specified in 4.2.2.1, including heliports with a PinS approach procedure where a visual segment surface is not provided:

a. take-off climb surface
b. approach surface.

4.2.2.3 For heliports with non-instrument approaches, the slopes of the obstacle limitation surfaces should not be greater than, and their other dimensions not less than, the one engine inoperative (OEI) category A performance capability of the design helicopter for this parameter. Table 2 outlines some slopes which can be related to PC1, PC2 and PC3 capability and indicative performance. Designers should ensure, if the heliport is to be used for PC1 operations, that a full review of the potential OEI performance of the most limiting helicopters intended to be operated is carried out. Further information is provided in Figure 7 sub-figures A, B and C.

4.2.2.4 For heliports with instrument approaches, the slopes of the obstacle limitation surfaces should not be greater than, and their other dimensions not less than, those specified in Tables 3, 4 and 5 and as shown in Figures 8, 9, and 10.

4.2.2.5 For heliports with non-instrument approaches that have an approach/take-off climb surface with a 4.5 per cent slope design, objects should be permitted to penetrate the obstacle limitation surface if the results of a safety assessment have reviewed the associated risks and mitigation measures and found them to be satisfactory.

4.2.2.6 New objects or extensions of existing objects should not be permitted above any of the surfaces in 4.2.2.1 and 4.2.2.2 except when shielded by an existing immovable object or after a safety assessment that the object will not adversely affect the safety or significantly affect the regularity of operations of helicopters.

4.2.2.7 Existing objects above any of the surfaces in 4.2.2.1 and 4.2.2.2 should, as far as practicable, be removed except when the object is shielded by an existing immovable object or after a safety assessment determines that the object will not adversely affect the safety or significantly affect the regularity of operations of helicopters.

4.2.2.8 An onshore heliport should have at least two approach and take-off climb surfaces to avoid downwind conditions, minimize crosswind conditions and permit for a balked landing.

Table 2: Dimensions and slopes of obstacle limitation surfaces for all non-instrument FATOs

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 (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	3386 m	245 m	1220 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)	3386 m	1075 m	1220 m
Transitional surface: (FATOs with a PinS approach procedure with a VSS)			
Slope	50% (1:2)	50% (1:2)	50% (1:2)
Height	45 m	45 m	45 m

(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 above FATO elevation.

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

Note: The slope design categories in Table 2 may not be restricted to a specific performance class of operation and may be applicable to more than one performance class of operation. The slope design categories depicted in Table 2 represent minimum design slope angles and not operational slopes. Slope category “A” generally corresponds with helicopters operated in performance class 1; slope category “B” generally corresponds with helicopters operated in performance class 3; and slope category “C” generally corresponds with helicopters operated in performance class 2. Consultation with helicopter operators will help to determine the appropriate slope category to apply according to the heliport environment and the most critical helicopter type for which the heliport is intended.

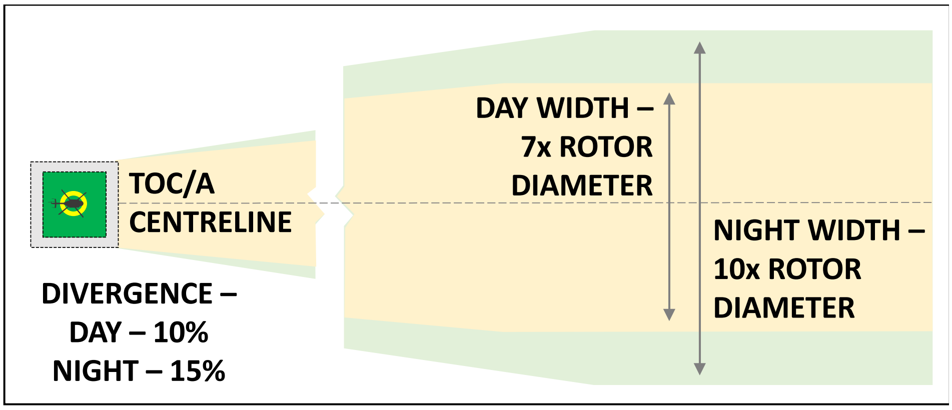


Figure 6: Overview of take-off climb/approach surface for non-instrument FATOs

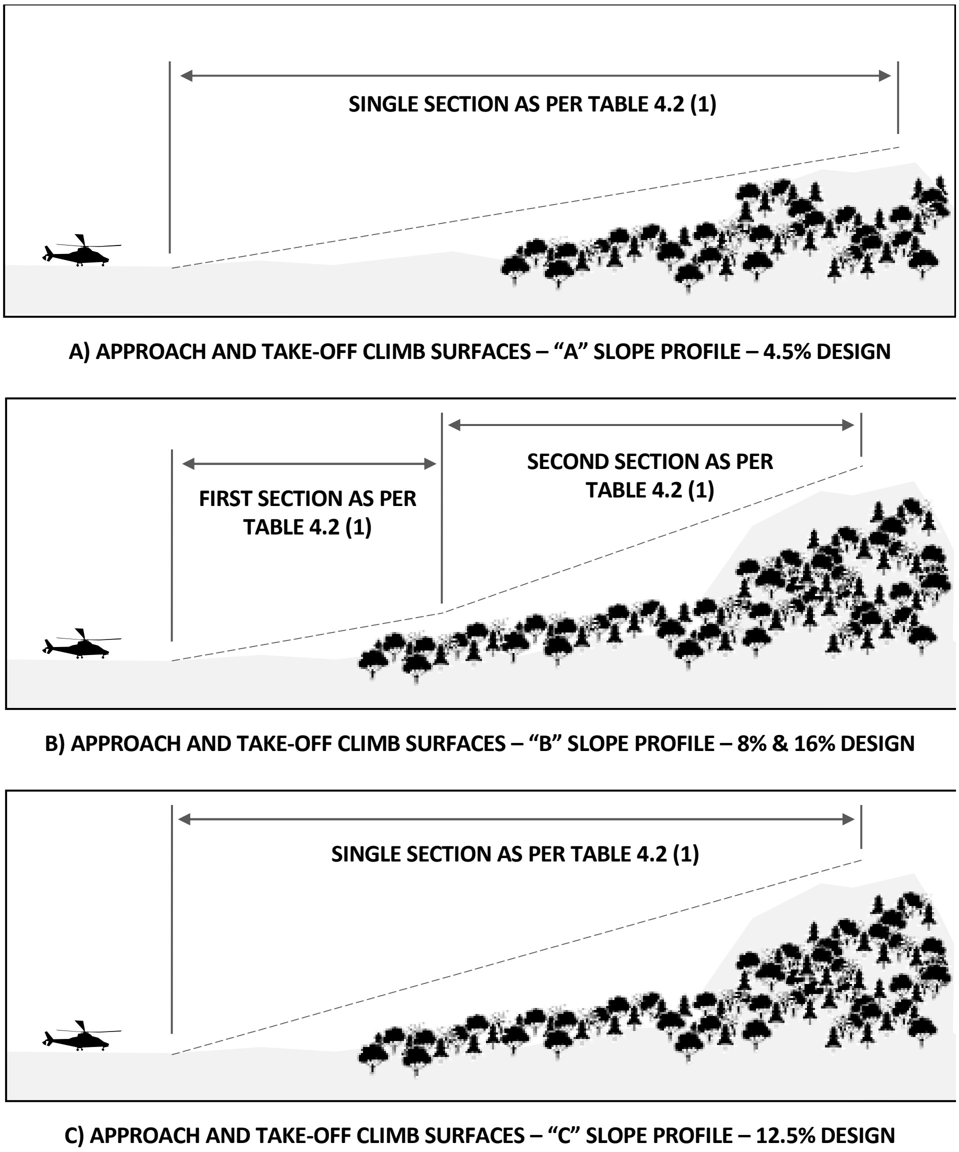


Figure 7: Profile of take-off climb/approach surface slope design categories for non-instrument FATOs

Table 3: Dimensions and slopes of obstacle limitation surfaces for non-precision FATOs

Surface		Dimensions
Approach surface:		
Length of inner edge		90 m
Location of inner edge		Safety area boundary (Clearway boundary, if provided)
First section:		
Divergence		16%
Length		2500 m
Outer width		890 m
Slope (maximum)		3.33%
Second section:		
Divergence		-
Length		-
Outer width		-
Slope (maximum)		-
Third section:		
Divergence		-
Length		-
Outer width		-
Slope (maximum)		-
Transitional surface:		
Slope		20%
Height		45 m

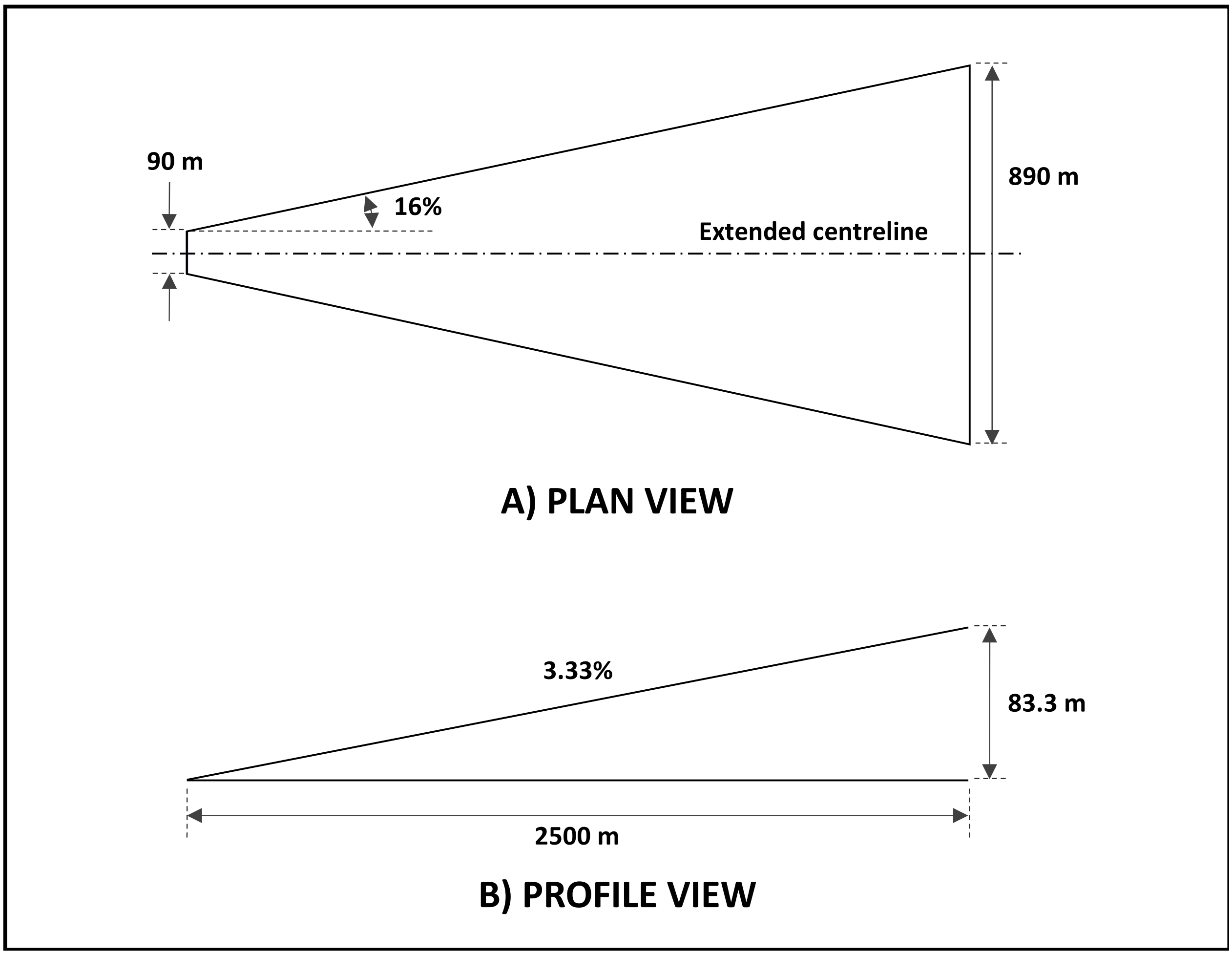


Figure 8: Approach surface for non-precision approach FATOs

Table 4: Dimensions and slopes of obstacle limitation surfaces for precision FATOs

Surface and dimensions	3-degree approach				6-degree approach			
	Height above FATO				Height above FATO			
	90 m	60 m	45 m	30 m	90 m	60 m	45 m	30 m
Approach surface:								
Length of inner edge	90 m	90 m	90 m	90 m	90 m	90 m	90 m	90 m
Distance from end of FATO	60 m	60 m	60 m	60 m	60 m	60 m	60 m	60 m
Divergence each side to height above FATO	25%	25%	25%	25%	25%	25%	25%	25%
Distance to height above FATO	1745 m	1163 m	872 m	581 m	870 m	580 m	435 m	290 m
Width at height above FATO	962 m	671 m	526 m	380 m	521 m	380 m	307.5 m	235 m
Divergence to parallel section	15%	15%	15%	15%	15%	15%	15%	15%
Distance to parallel section	2793 m	3763 m	4246 m	4733 m	4250 m	4733 m	4975 m	5217 m
Width of parallel section	1800 m	1800 m	1800 m	1800 m	1800 m	1800 m	1800 m	1800 m
Distance to outer edge	5462 m	5074 m	4882 m	4686 m	3380 m	3187 m	3090 m	2993 m
Width at outer edge	1800 m	1800 m	1800 m	1800 m	1800 m	1800 m	1800 m	1800 m
Slope of first section	2.5%	2.5%	2.5%	2.5%	5.0%	5.0%	5.0%	5.0%
Length of first section	3000 m	3000 m	3000 m	3000 m	1500 m	1500 m	1500 m	1500 m
Slope of second section	3.0%	3.0%	3.0%	3.0%	6.0%	6.0%	6.0%	6.0%
Length of second section	2500 m	2500 m	2500 m	2500 m	1250 m	1250 m	1250 m	1250 m
Total length of surface	10000 m	10000 m	10000 m	10000 m	10000 m	10000 m	10000 m	10000 m
Transitional surface:								
Slope	14.3%	14.3%	14.3%	14.3%	14.3%	14.3%	14.3%	14.3%
Height	45 m	45 m	45 m	45 m	45 m	45 m	45 m	45 m

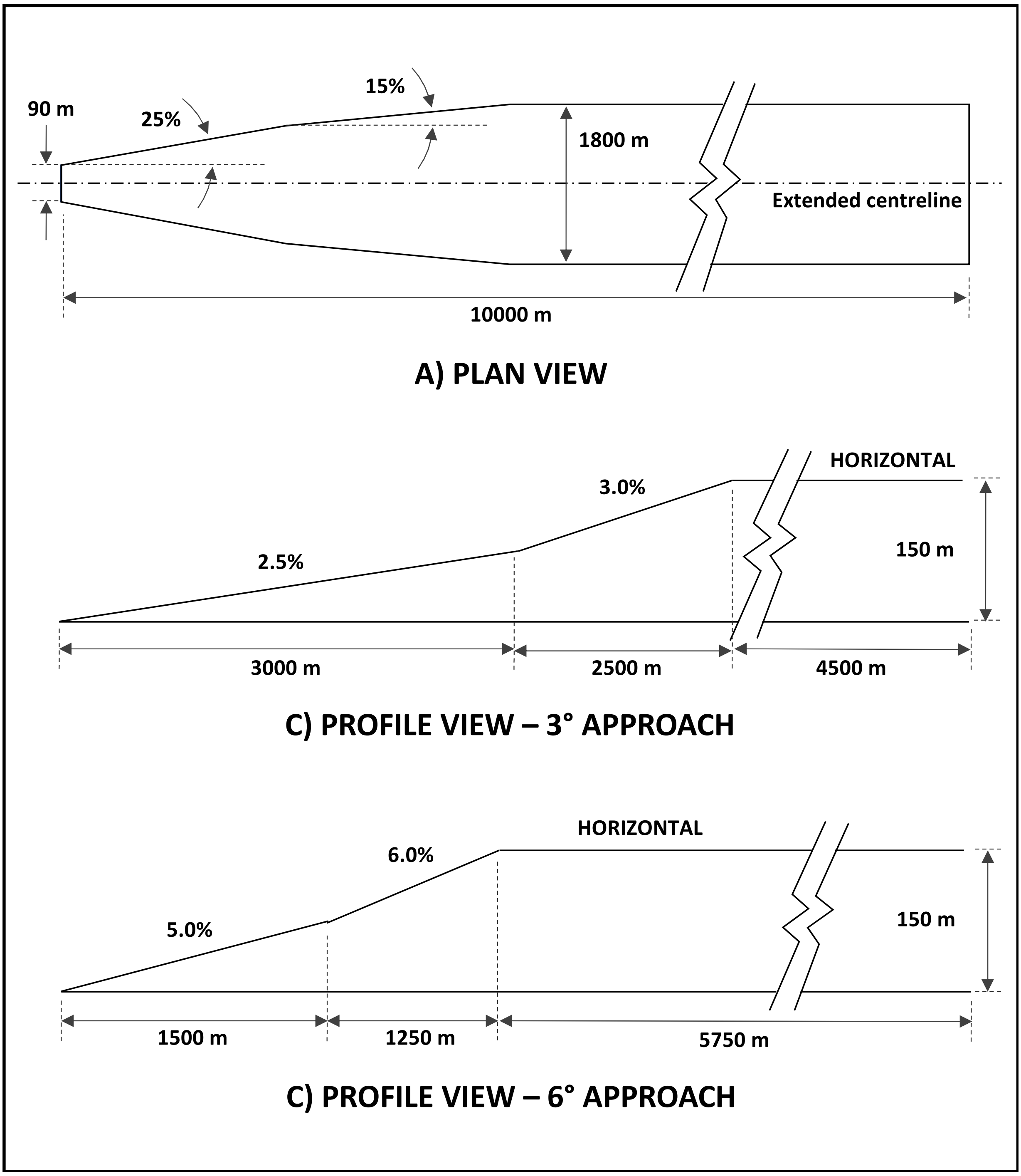


Figure 9: Approach surface for precision approach FATOs

Table 5: Dimensions and slopes of obstacle limitation surfaces for instrument FATOs with straight take-offs

Surface		Dimensions
Take-off climb surface:		
Length of inner edge		90 m
Location of inner edge		Clearway boundary
First section:		
Divergence		30%
Length		2850 m
Outer width		1800 m
Slope (maximum)		3.5%
Second section:		
Divergence		parallel
Length		1510 m
Outer width		1800 m
Slope (maximum)		3.5%*
Third section:		
Divergence		parallel
Length		7640 m
Outer width		1800 m
Slope (maximum)		2%

* This slope exceeds the maximum mass one-engine-inoperative climb gradient of many helicopters which are currently operating.

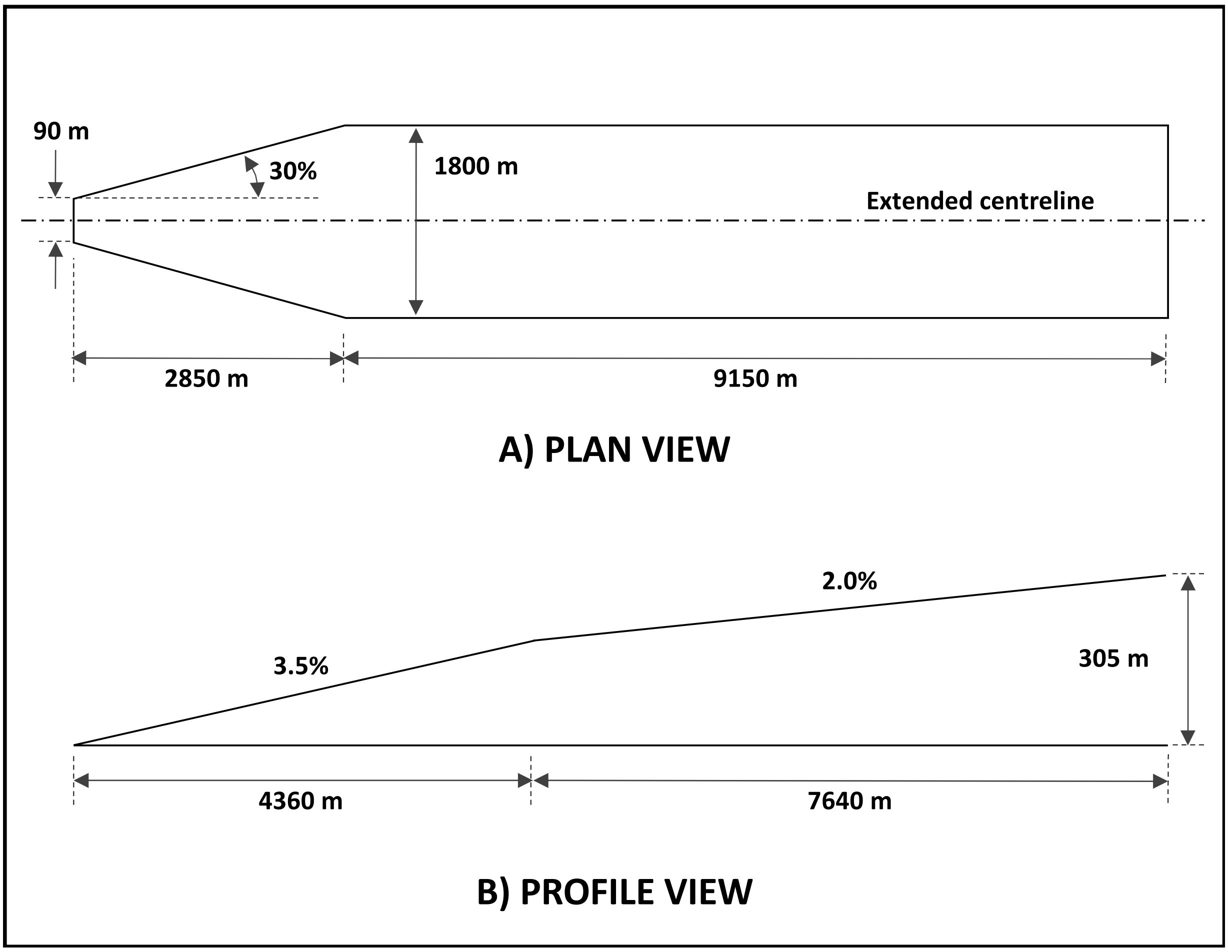


Figure 10: Take-off climb surface for instrument FATOs with straight take-offs

4.2.3 Helidecks

4.2.3.1 A helideck should have an obstacle-free sector.

4.2.3.2 There should be no fixed obstacles within the obstacle-free sector above the obstacle-free surface.

4.2.3.3 In the immediate vicinity of the helideck, obstacle protection for helicopters should be provided below the helideck level. This protection should 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 11)

4.2.3.4 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 should 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 12)

4.2.3.5 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 should 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 12)

4.2.3.6 Due to the complex nature and the limited space associated with the operational environment of an offshore facility, where obstacles are necessarily located on the structure near the helideck, the helideck may have a limited obstacle sector (LOS).

4.2.3.7 The limited obstacle sector/surface (LOS) is 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.

4.2.3.8 A limited obstacle sector is a subtended arc greater than 150 degrees originating at the edge of the FATO and extending from an edge 0.62 D to a maximum distance of 0.83 D from the centre of the FATO/TLOF.

4.2.3.9 The elevation of the lower limit of the limited obstacle sector/surface is 0.05 D above the TLOF surface.

4.2.3.10 The slope of the limited obstacle sector/surface extends upwards and outwards from the centre of the TLOF at a gradient of 1:2.

4.2.4 Shipboard heliports

4.2.4.1 When purposed-built helicopter operating areas are provided in the bow or stern of a ship they should apply the obstacle criteria for helidecks.

4.2.4.2 For shipboard heliports located amidships, forward and aft of a TLOF of 1 D and larger should 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 should 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.

4.2.4.3 For purpose-built and non-purpose-built shipboard heliports located amidships, objects whose function requires them to be located within the TLOF (such as lighting or nets) should not exceed a height of 2.5 cm. Such objects should only be present if they do not represent a hazard to helicopters.

4.2.4.4 For purpose-built and non-purpose-built shipboard heliports located amidships, to provide further protection from obstacles fore and aft of the TLOF, rising surfaces with gradients of one unit vertically to five units horizontally should extend from the entire length of the edges of the two 150-degree sectors. These surfaces should extend for a horizontal distance equal to at least 1 D of the largest helicopter the TLOF is intended to serve and should not be penetrated by any obstacle. (See Figure 13)

4.2.4.5 For non-purpose-built shipboard heliports located on the ship's side, no objects should 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 should only be present if they do not represent a hazard to helicopters.

4.2.4.6 For non-purpose-built shipboard heliports located on the ship's side, from the fore and aft mid-points of the D circle in two segments outside the circle, limited obstacle areas should 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 should be no objects rising above a maximum height of 25 cm above the level of the TLOF. (See Figure 14) Such objects should only be present if they do not represent a hazard to helicopters.

4.2.4.7 For non-purpose-built shipboard heliports located on the ship's side, a LOS horizontal surface should be provided, at least 0.25 D beyond the diameter of the D circle, which should surround the inboard sides of the TLOF to the fore and aft mid-points of the D circle. The LOS should 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 should be no objects rising above a maximum height of 25 cm above the level of the TLOF.

4.2.4.8 An area designated for winching on-board ships should 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 15)

4.2.4.9 The manoeuvring zone should 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

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.

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

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

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

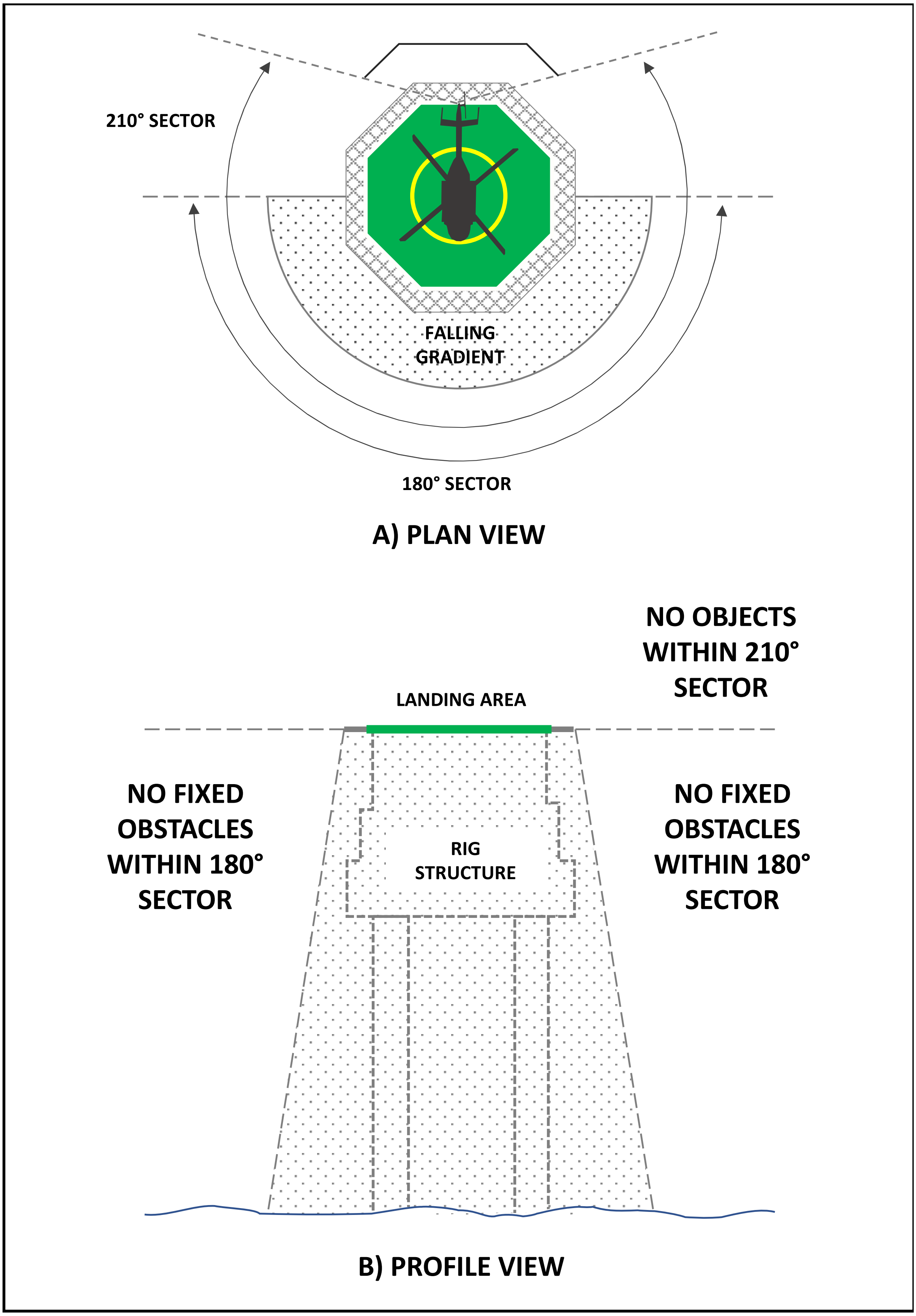


Figure 11: Helideck obstacle-free sector overview

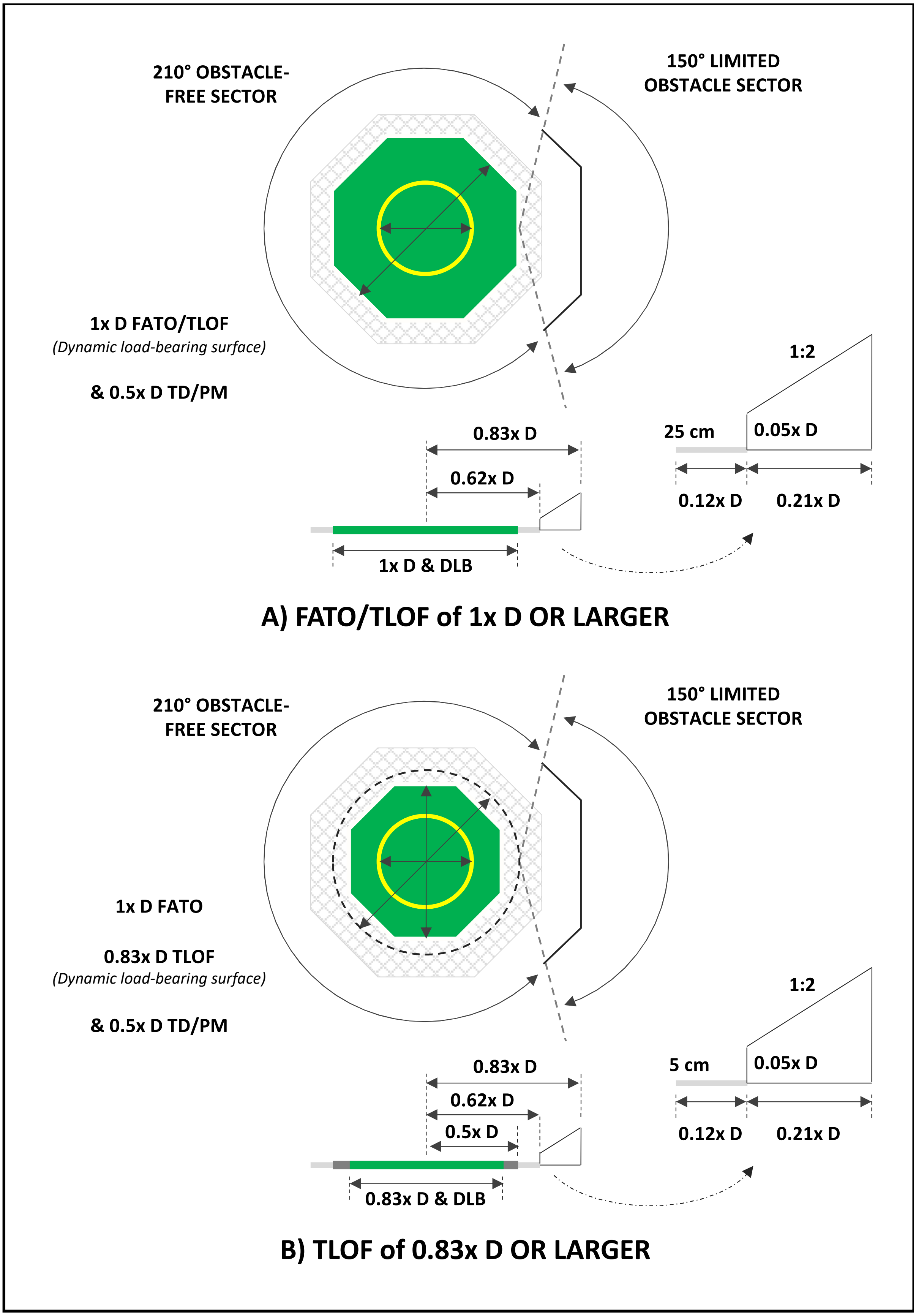


Figure 12: Helideck obstacle limitation surfaces and sectors

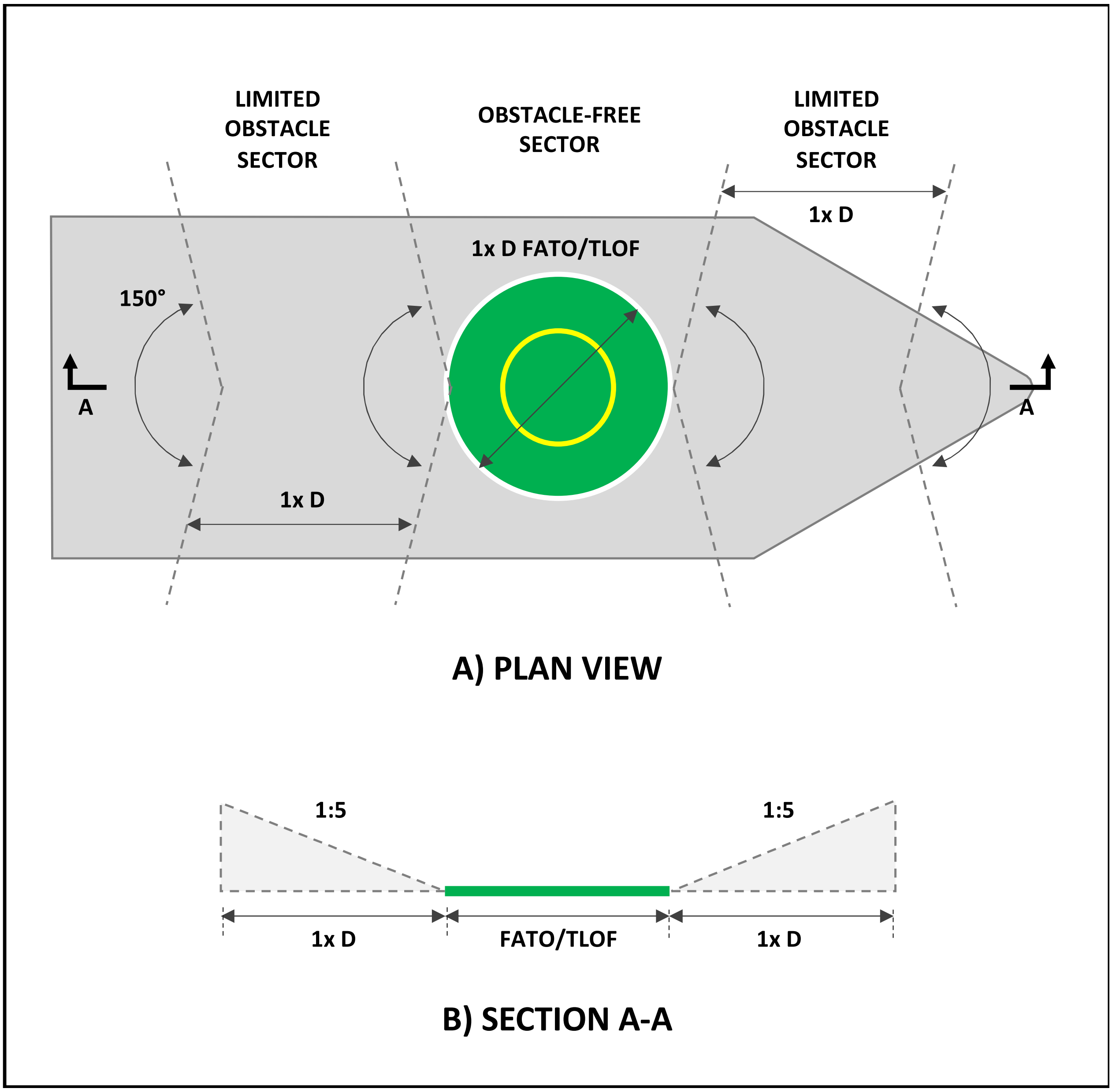


Figure 13: Amidships location – shipboard heliport obstacle limitation surfaces

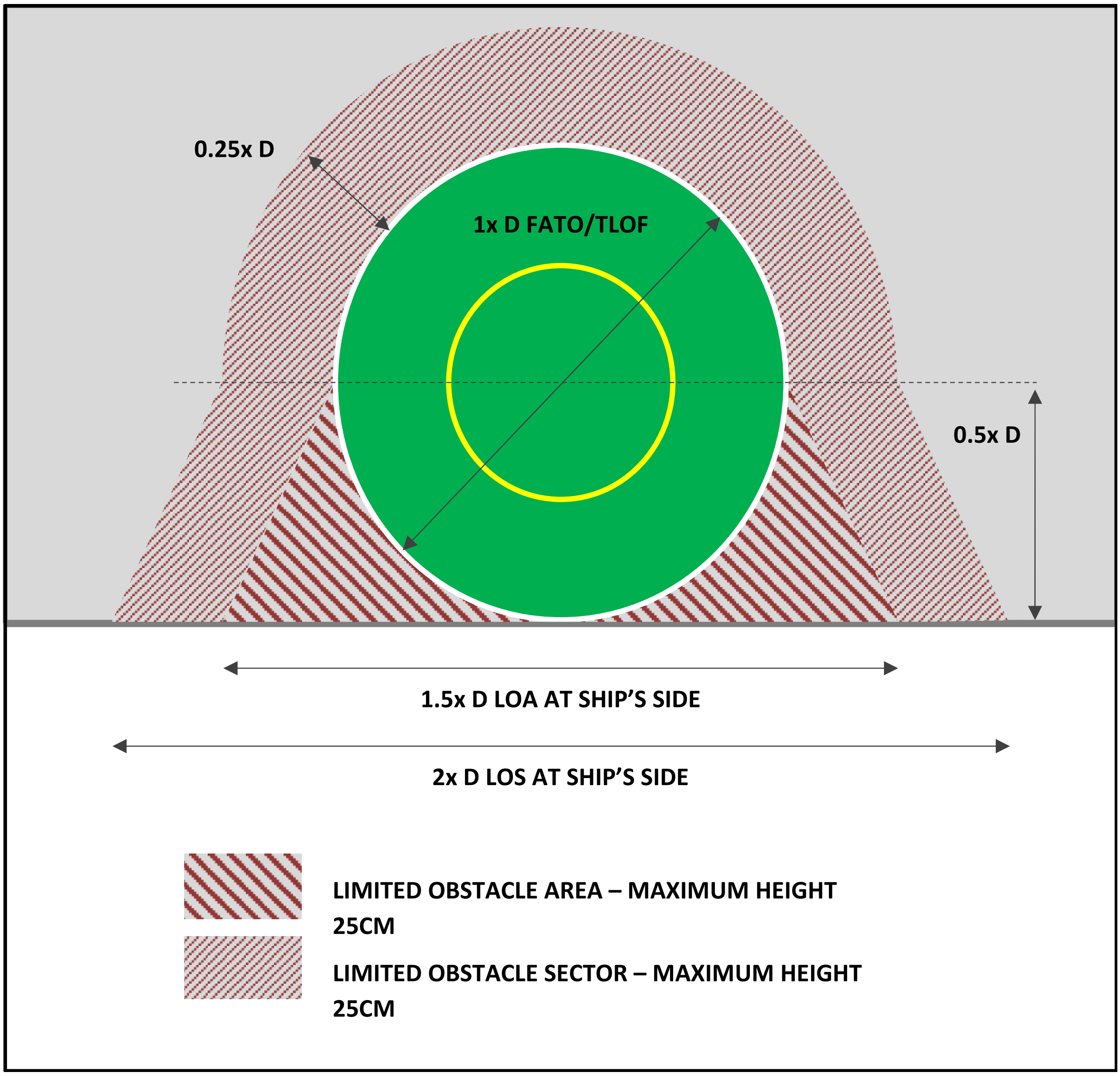


Figure 14: Ships-side non-purpose-built shipboard heliport obstacle limitation sectors and surfaces

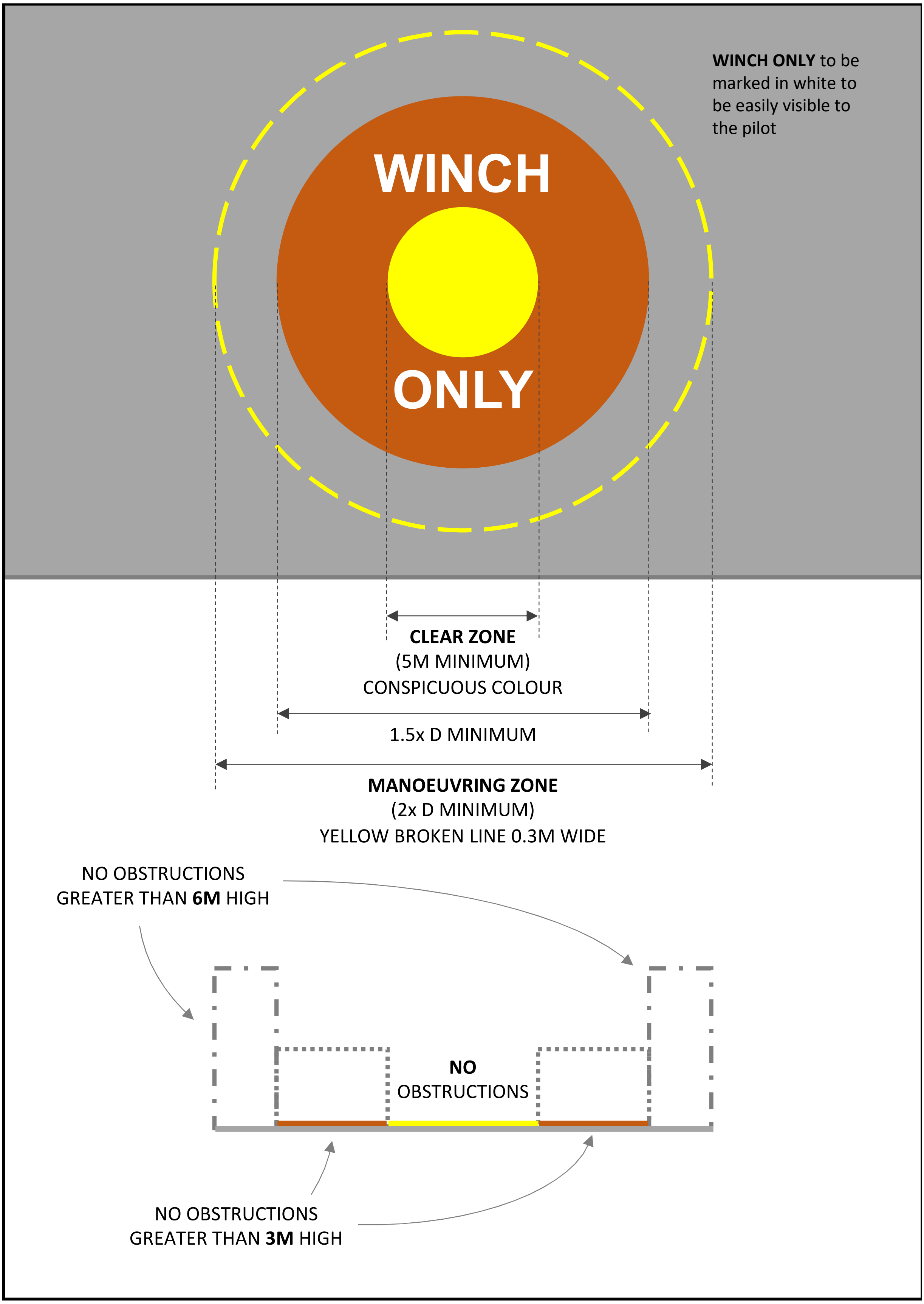


Figure 15: Shipboard winching area obstacle limitations and markings

5 Visual aids

5.1 Wind direction indicators

5.1.1 A heliport should be equipped with at least one wind direction indicator.

5.1.2 A wind direction indicator should be located to indicate the wind conditions over the FATO and TLOF and in such a way as to be free from the effects of airflow disturbances caused by nearby objects or rotor downwash. It should be visible from a helicopter in flight, in a hover or on the movement area.

5.1.3 Where a TLOF and/or FATO may be subject to a disturbed airflow, additional wind direction indicators located close to the area should be provided to indicate the surface wind on the area.

5.1.4 A wind direction indicator should be constructed so that it gives a clear indication of the direction of the wind and a general indication of the wind speed.

5.1.5 A wind direction indicator should be a truncated cone made of lightweight fabric and should have the dimensions described in Table 6.

Table 6: Wind direction indicator characteristics

Characteristics	Surface-level heliports	Elevated heliports and helidecks
Length	2.4 m	1.2 m
Diameter (larger end)	0.6 m	0.3 m
Diameter (smaller end)	0.3 m	0.15 m

5.1.6 The colour of the wind direction indicator should be so selected as to make it clearly visible and understandable from a height of at least 200 m above the heliport, having regard to background. Where practicable, a single colour, preferably white or orange, should be used. Where a combination of two colours is required to give adequate conspicuity against changing backgrounds, they should preferably be orange and white, red and white, or black and white, and should be arranged in five alternate bands the first and last band being the darker colour.

5.1.7 A wind direction indicator at a heliport intended for use at night should be illuminated.

5.2 Markings and markers

5.2.1 Winching area marking

5.2.1.1 The objective of winching area markings is to provide to the pilot visual cues to assist a helicopter to be positioned over, and retained within, an area from which a passenger or equipment can be lowered or raised.

5.2.1.2 Winching area markings should be provided at a designated winching area.

5.2.1.3 Winching area markings should be located so that their centre(s) coincides with the centre of the clear zone of the winching area.

5.2.1.4 Winching area markings should comprise a winching area clear zone marking and a winching area manoeuvring zone marking.

5.2.1.5 A winching area clear zone marking should consist of a solid circle of diameter not less than 5 m and of a conspicuous colour.

5.2.1.6 A winching area manoeuvring zone marking should consist of a broken circle line of 30 cm in width and of a diameter not less than 2 D and be marked in a conspicuous colour. Within it “WINCH ONLY” should be marked to be easily visible to the pilot, see Figure 15.

5.2.2 Heliport identification marking

5.2.2.1 A heliport identification marking should be provided at a heliport.

5.2.2.2 For all FATOs except runway type FATOs, a heliport identification should be located at or near the centre of the FATO.

5.2.2.3 For all FATOs except runway-type FATOs which also contain a TLOF, heliport identification marking should be located in the FATO so the position of it coincides with the centre of the TLOF.

5.2.2.4 For runway-type FATOs, a heliport identification marking should be located in the FATO and when used in conjunction with FATO designation markings, should be displayed at each end of the FATO as shown in Figure 17.

5.2.2.5 A heliport identification marking, except for a heliport at a hospital, should consist of a letter H, in white. The dimensions of the H marking should be no less than those shown in Figure 17 and where the marking is used for a runway-type FATO, its dimensions should be increased by a factor of 3 as shown in Figure 17.

5.2.2.6 A heliport identification marking for a heliport at a hospital should consist of a letter H, red in colour, on a white cross made of squares adjacent to each of the sides of a square containing the H as shown in Figures 16 and 17.

5.2.2.7 A heliport identification marking should be oriented with the cross arm of the H at right angles to the preferred final approach direction. For a helideck, the cross arm should be on or parallel to the bisector of the obstacle-free sector. For a non-purpose-built shipboard heliport located on a ship’s side, the cross arm should be parallel with the side of the ship.

5.2.2.8 On a helideck or a shipboard heliport where the D-value is 16.0 m or larger, the size of the heliport identification H marking should have a height of 4 m with an overall width not exceeding 3 m and a stroke width not exceeding 0.75 m. Where the D-value is less than 16.0 m, the size of the heliport identification H marking should have a height of 3 m with an overall width not exceeding 2.25 m and a stroke width not exceeding 0.5 m.

5.2.3 Maximum allowable mass marking

5.2.3.1 A maximum allowable mass marking should be displayed at a heliport.

5.2.3.2 A maximum allowable mass marking should be located within the TLOF or FATO and so arranged as to be readable from the preferred final approach direction.

5.2.3.3 A maximum allowable mass marking should consist of a one-, two- or three-digit number.

5.2.3.4 The maximum allowable mass should be expressed in tonnes to the nearest 100 kg. The marking should be presented to one decimal place and rounded to the nearest 100 kg followed by the letter “t”.

5.2.3.5 When the maximum allowable mass is expressed to 100 kg, the decimal place should be preceded with a decimal point marked with a 30 cm square.

5.2.3.6 For all FATOs except runway-type FATOs, the numbers and the letter of the marking should have a colour contrasting with the background and should be in the form and proportion shown in Figure 18 for a D-value of more than 30 m. For a D-value between 15 m and 30 m, the height of the numbers and the letter of the marking should be a minimum of 90 cm, and for a D-value of less than 15 m, the height of the numbers and the letter of the marking should be a minimum of 60 cm, each with a proportional reduction in width and thickness.

5.2.3.7 For runway-type FATOs, the numbers and the letter of the marking should have a colour contrasting with the background and should be in the form and proportion shown in Figure 18.

5.2.4 D-value marking

5.2.4.1 For all FATOs except runway-type FATOs, a D-value marking should be displayed at a heliport.

5.2.4.2 A D-value marking should be located within the TLOF or FATO and so arranged as to be readable from the preferred final approach direction.

5.2.4.3 Where there is more than one approach direction, additional D-value markings should be provided such that at least one D-value marking is readable from the final approach direction. For a non-purpose-built heliport located on a ship’s side, D-value markings should be provided on the perimeter of the D circle at the 2 o’clock, 10 o’clock and 12 o’clock positions when viewed from the side of the ship facing towards the centre line

5.2.4.4 The D-value marking should be rounded to the nearest whole metre or foot with 0.5 rounded down.

5.2.4.5 The numbers of the marking should have a colour contrasting with the background and should be in the form and proportion shown in Figure 18 for a D-value of more than 30 m. For a D-value between 15 m and 30 m, the height of the numbers of the marking should be a minimum of 90 cm, and for a D-value of less than 15 m, the height of the numbers of the marking should be a minimum of 60 cm, each with a proportional reduction in width and thickness.

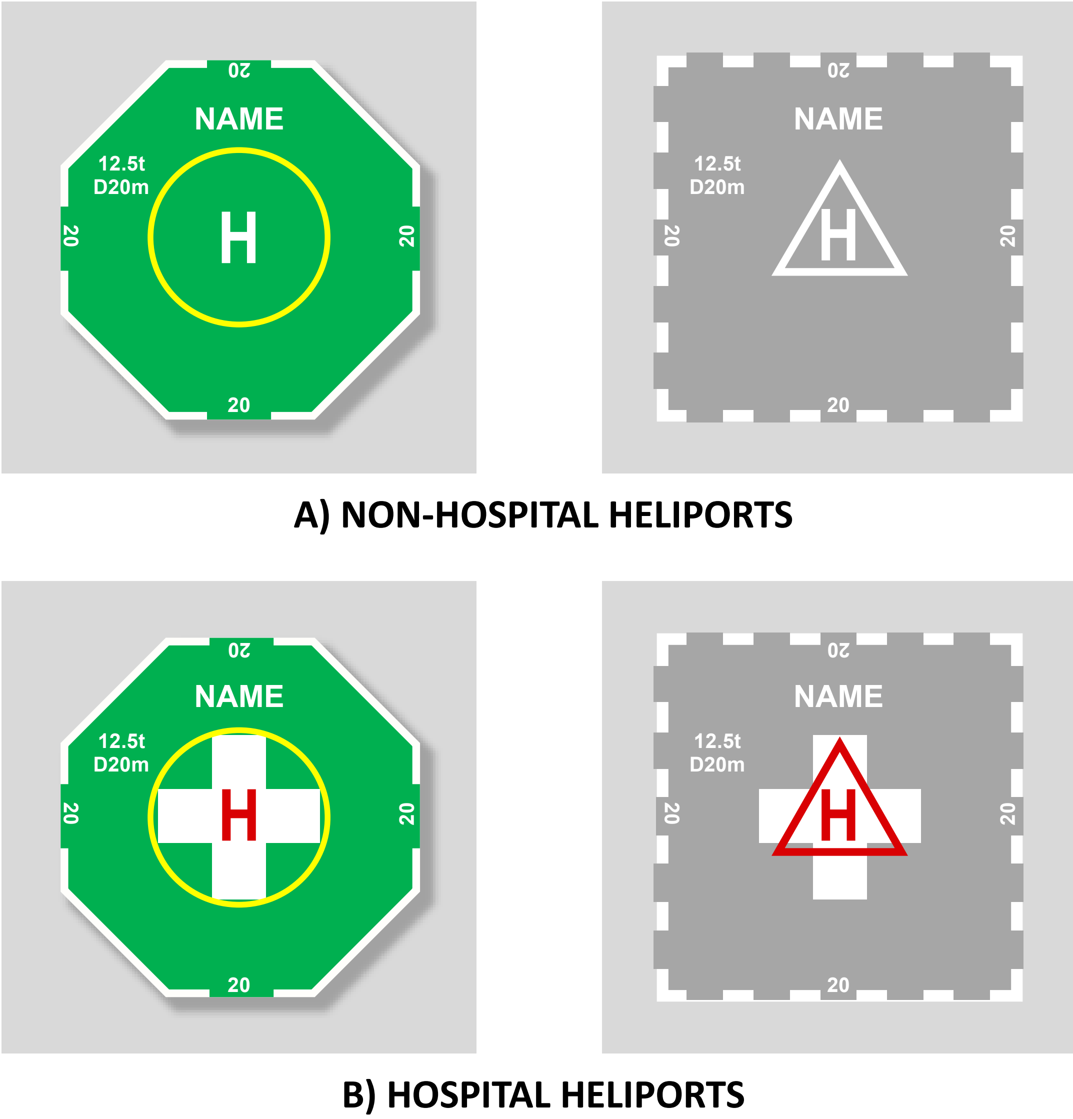


Figure 16: Heliport identification markings with TLOF and aiming markings for heliports and hospital heliports

5.2.5 FATO perimeter marking or markers for surface-level heliports

5.2.5.1 FATO perimeter marking or markers should be provided at a surface-level heliport where the extent of a FATO with a solid surface is not self-evident.

5.2.5.2 The FATO perimeter marking or markers should be located on the edge of the FATO.

5.2.5.3 For runway-type FATOs, the perimeter of the FATO should be defined with markings or markers spaced at equal intervals of not more than 50 m with at least three markings or markers on each side including a marking or marker at each corner.

5.2.5.4 For runway-type FATOs, a FATO perimeter marking should be a rectangular stripe with a length of 9 m or one-fifth of the side of the FATO which it defines and a width of 1 m.

5.2.5.5 For runway-type FATOs, FATO perimeter markings should be white.

5.2.5.6 For runway-type FATOs, a FATO perimeter marker should be a gable marker shape, 1 m in width, 3 m in length, and 0.25 m high.

5.2.5.7 For runway-type FATOs, FATO perimeter markers should be a single colour, orange or red, or two contrasting colours, orange and white or, alternatively, red and white should be used except where such colours would merge with the background.

5.2.5.8 For all FATOs except runway-type FATOs, an unpaved FATO the perimeter should be defined with flush in-ground markers. The FATO perimeter markers should be 30 cm in width, 1.5 m in length, and with end-to-end spacing of not less than 1.5 m and not more than 2 m.

5.2.5.9 For all FATOs except runway-type FATOs, the corners of a square or rectangular FATO should be defined.

5.2.5.10 For all FATOs except runway-type FATOs, a paved FATO the perimeter should be defined with a dashed line. The FATO perimeter marking segments should be 30 cm in width, 1.5 m in length, and with end-to-end spacing of not less than 1.5 m and not more than 2 m. The corners of the square or rectangular FATO should be defined.

5.2.5.11 For all FATOs except runway-type FATOs, FATO perimeter markings and flush in-ground markers should be white.

5.2.6 FATO designation markings for runway-type

5.2.6.1 A FATO designation marking should be provided at a heliport where it is necessary to designate the FATO to the pilot.

5.2.6.2 A FATO designation marking should be located at the beginning of the FATO as shown in Figure 17.

5.2.6.3 A FATO designation marking should consist of a two-digit number. The two-digit number should be the whole number nearest to one-tenth of the magnetic North when viewed from the direction of approach. When this rule would give a single digit number, it should be preceded by a zero. The marking, as shown in Figure 17, should be supplemented by the heliport identification marking.

5.2.7 Aiming point marking

5.2.7.1 An aiming point marking should be provided at a heliport where it is necessary for a pilot to make an approach to a particular point above a FATO before proceeding to a TLOF.

5.2.7.2 For runway-type FATOs, the aiming point marking should be located within the FATO.

5.2.7.3 All FATOs except runway-type FATOs, the aiming point marking should be located at the centre of the FATO as shown in Figure 17.

5.2.7.4 The aiming point marking should be an equilateral triangle with the bisector of one of the angles aligned with the preferred approach direction. The marking should consist of continuous lines providing a contrast with the background colour, and the dimensions of the marking should conform to those shown in Figure 17.

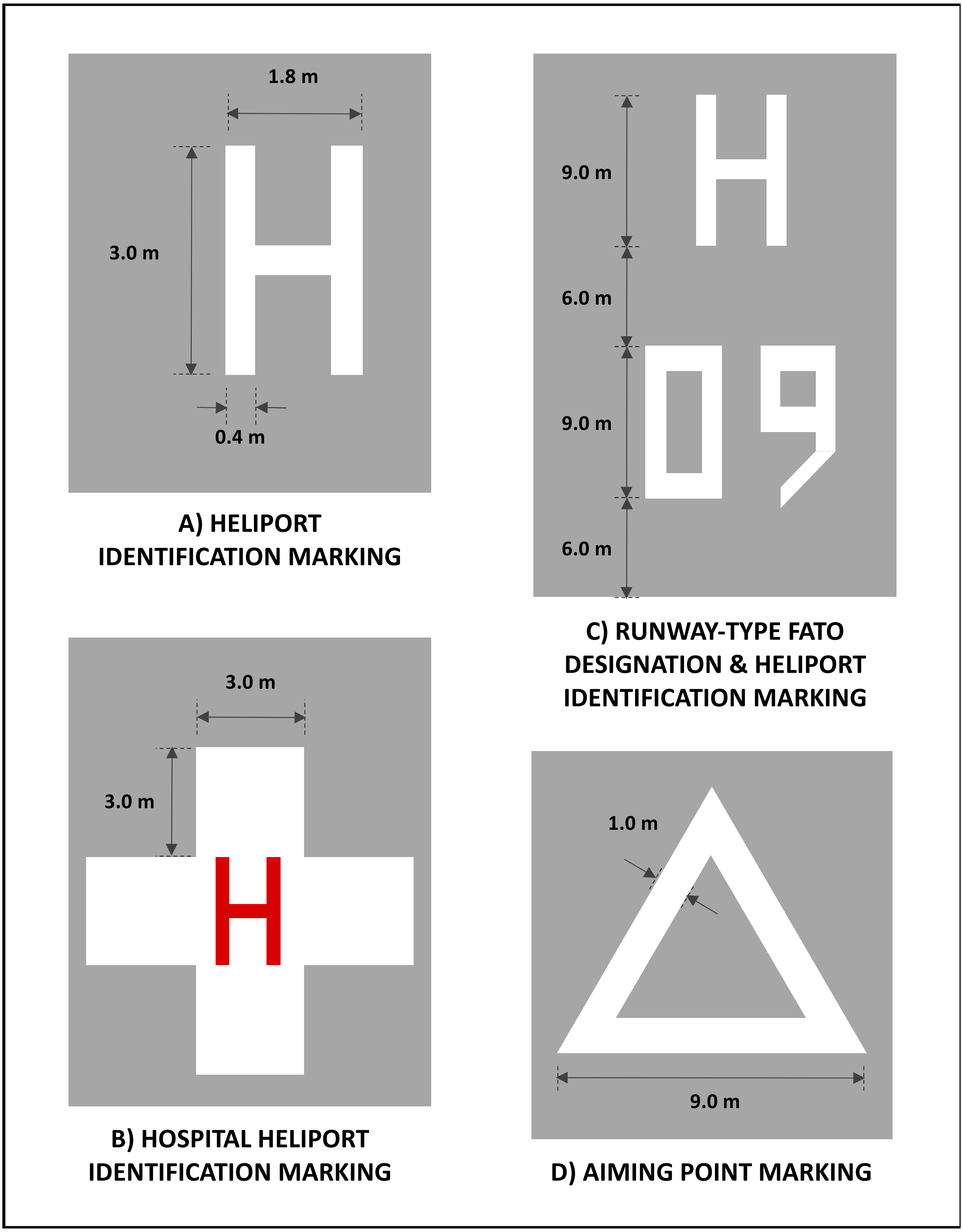
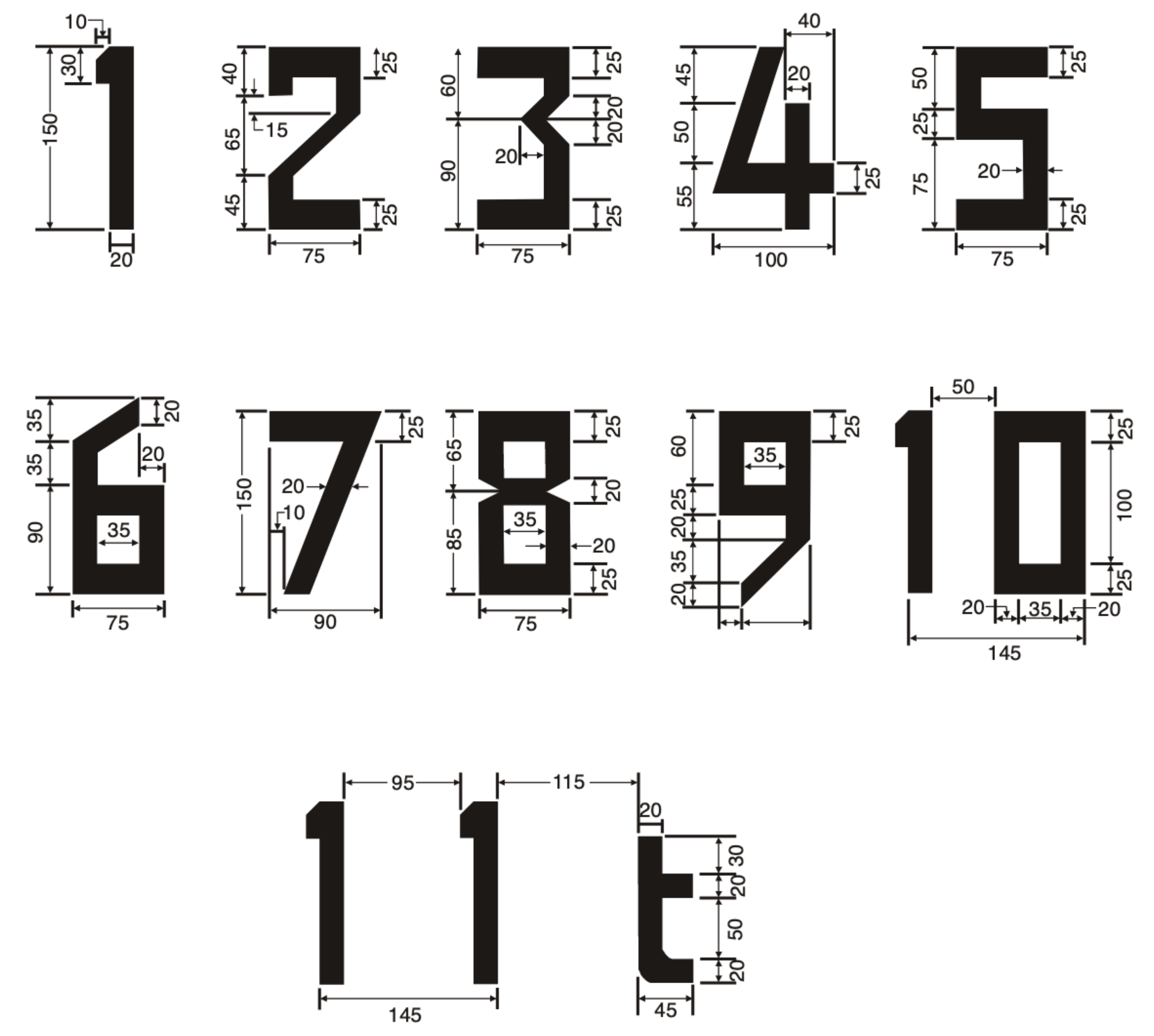


Figure 17: Heliport identification marking details

5.2.8 TLOF perimeter marking

5.2.8.1 A TLOF perimeter marking should:

a. be displayed on a TLOF located in a FATO at a surface-level heliport if the perimeter of the TLOF is not self-evident
b. be displayed on an elevated heliport, a helideck and a shipboard heliport
c. be located along the edge of the TLOF
d. consist of a continuous white line with a width of at least 30 cm.



Note.— All units are expressed in centimetres.

Figure 18: Form and proportion of numbers and letters

5.2.9 Touchdown/positioning marking

5.2.9.1 The objective of touchdown/positioning marking (TDPM) is to provide visual cues which permit a helicopter to be placed in a specific position such that, when the pilot’s seat is above the marking, the undercarriage is within the load bearing area and all parts of the helicopter will be clear of any obstacles by a safe margin.

5.2.9.2 A TDPM should be provided for a helicopter to touch down or be accurately placed in a specific position.

5.2.9.3 The TDPM should be:

a. when there is no limitation on the direction of touchdown/positioning, a touchdown/positioning circle (TDPC) marking
b. when there is a limitation on the direction of touchdown/positioning:
   i. for unidirectional applications, a shoulder line with an associated centreline

   or
   ii. for multidirectional applications, a TDPC marking with prohibited landing sector(s) marked.

5.2.9.4 The inner edge/inner circumference of the TDPM should be at a distance of 0.25 D from the centre of the area in which the helicopter is to be positioned.

5.2.9.5 On a helideck, the centre of the TDPC marking should be located at the centre of the FATO, except that the marking may be offset away from the origin of the obstacle-free sector by no more than 0.1 D where an aeronautical study indicates such offsetting is necessary and would not impair safety.

5.2.9.6 Prohibited landing sector markings, when provided, should be located on the TDPM, within the relevant headings, and extend to the inner edge of the TLOF perimeter marking.

5.2.9.7 The inner diameter of the TDPC should be 0.5 D of the largest helicopter the area is intended to serve.

5.2.9.8 A TDPM should have a line width of at least 0.5 m. For a helideck and a purpose-built shipboard heliport, the line width should be at least 1 m.

5.2.9.9 The length of a shoulder line should be 0.5 D of the largest helicopter the area is intended to serve.

5.2.9.10 The prohibited landing sector marking, when provided, should be indicated by white and red hatched markings as shown in Figure 19.

5.2.9.11 The TDPM should take precedence when used in conjunction with other markings on the TLOF except for the prohibited landing sector marking.

5.2.10 Heliport name marking

5.2.10.1 A heliport name marking should be provided at a heliport and helideck where there is insufficient alternative means of visual identification.

5.2.10.2 Where a limited obstacle sector (LOS) exists on a helideck, the marking should be located on that side of the heliport identification marking. For a non-purpose-built heliport located on a ship's side, the marking should be located on the inboard side of the heliport identification marking in the area between the TLOF perimeter marking and the boundary of the LOS.

5.2.10.3 A heliport name marking should consist of the name or the alphanumeric designator of the heliport as used in the radio (R/T) communications.

5.2.10.4 A heliport name marking intended for use at night or during conditions of poor visibility should be illuminated, either internally or externally.

5.2.10.5 For runway-type FATOs, the characters of the marking should be not less than 3 m in height.

5.2.10.6 For all FATOs except runway-type FATOs, the characters of the marking should be not less than 1.5 m in height at surface-level heliports and not less than 1.2 m on elevated heliports, helidecks and shipboard heliports. The colour of the marking should contrast with the background and preferably be white.

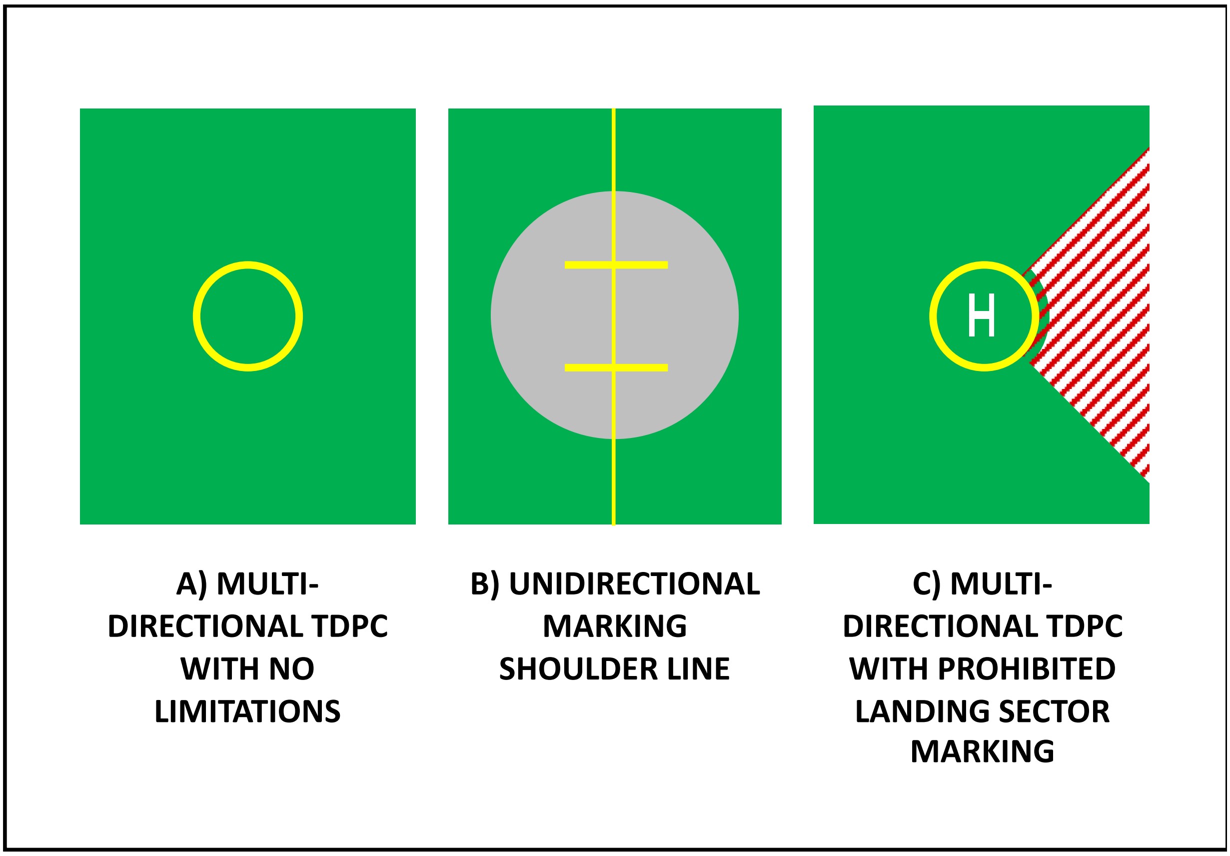


Figure 19: Examples of touchdown/positioning markings

5.2.11 Helideck obstacle-free sector (chevron) marking

5.2.11.1 A helideck with adjacent obstacles that penetrate above the level of the helideck should have an obstacle-free sector marking.

5.2.11.2 A helideck obstacle-free sector marking should be located, where practicable, at a distance from the centre of the TLOF equal to the radius of the largest circle that can be drawn in the TLOF or 0.5 D, whichever is greater.

5.2.11.3 The helideck obstacle-free sector marking should indicate the location of the obstacle-free sector and the directions of the limits of the sector.

5.2.11.4 The height of the chevron should not be less than 30 cm.

5.2.11.5 The chevron should be marked in a conspicuous colour, preferably black.

5.2.12 Helideck and shipboard heliport surface marking

5.2.12.1 A surface marking should be provided to assist the pilot to identify the location of the helideck or shipboard heliport during an approach by day.

5.2.12.2 A surface marking should be applied to the dynamic load-bearing area bounded by the TLOF perimeter marking.

5.2.12.3 The helideck or shipboard heliport surface bounded by the TLOF perimeter marking should be of dark green using a high friction coating.

5.2.13 Helicopter taxiway markings and markers

5.2.13.1 The centre line of a helicopter taxiway should be identified with a marking.

5.2.13.2 The edges of a helicopter taxiway, if not self-evident, should be identified with markers or markings

5.2.13.3 Helicopter taxiway markings should be along the centre line and, if required, along the edges of a helicopter taxiway.

5.2.13.4 Helicopter taxiway edge markers should be located at a distance of 1 m to 3 m beyond the edge of the helicopter taxiway.

5.2.13.5 Helicopter taxiway edge markers should be spaced at intervals of not more than 15 m on each side of straight sections and 7.5 m on each side of curved sections with a minimum of four equally spaced markers per section.

5.2.13.6 On a paved taxiway, a helicopter taxiway centre line marking should be a continuous yellow line 15 cm in width.

5.2.13.7 On an unpaved taxiway that will not accommodate painted markings, a helicopter taxiway centre line should 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.

5.2.13.8 Helicopter taxiway edge markings should be a continuous double yellow line, each 15 cm in width, and spaced 15 cm apart (nearest edge to nearest edge).

5.2.13.9 A helicopter taxiway edge marker should be frangible to the wheeled undercarriage of a helicopter.

5.2.13.10 A helicopter taxiway edge marker should not exceed a plane originating at a height of 25 cm above the plane of the helicopter taxiway, at a distance of 0.5 m from the edge of the helicopter taxiway and sloping upwards and outwards at a gradient of 5 per cent to a distance of 3 m beyond the edge of the helicopter taxiway.

5.2.13.11 A helicopter taxiway edge marker should be blue.

5.2.13.12 If the helicopter taxiway is to be used at night, the edge markers should be internally illuminated or retro-reflective.

5.2.14 Helicopter air taxi-route markings and markers

5.2.14.1 The centre line of a helicopter air taxi-route should be identified with markers or markings.

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

5.2.14.3 A helicopter air taxi-route centre line, when on a paved surface, should 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, should 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.

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

5.2.15 Helicopter stand markings

5.2.15.1 A helicopter stand perimeter marking should be provided.

5.2.15.2 A helicopter stand should be provided with the appropriate TDPM. See Figure 19.

5.2.15.3 Alignment lines and lead-in/lead-out lines should be provided on a helicopter stand.

5.2.15.4 The TDPM, alignment lines and lead-in/lead-out lines should be located such that every part of the helicopter can be contained within the helicopter stand during positioning and permitted manoeuvring.

5.2.15.5 Alignment lines and lead-in/lead-out lines should be located as shown in Figure 20.

5.2.15.6 A helicopter stand perimeter marking should consist of a continuous yellow line and have a line width of 15 cm.

5.2.15.7 The TDPM should have the characteristics described in Section 5.2.9 above.

5.2.15.8 Alignment lines and lead-in/lead-out lines should be continuous yellow lines and have a width of 15 cm.

5.2.15.9 Curved portions of alignment lines and lead-in/lead-out lines should have radii appropriate to the most demanding helicopter type the helicopter stand is intended to serve.

5.2.15.10 Stand identification markings should be marked in a contrasting colour so as to be easily readable.

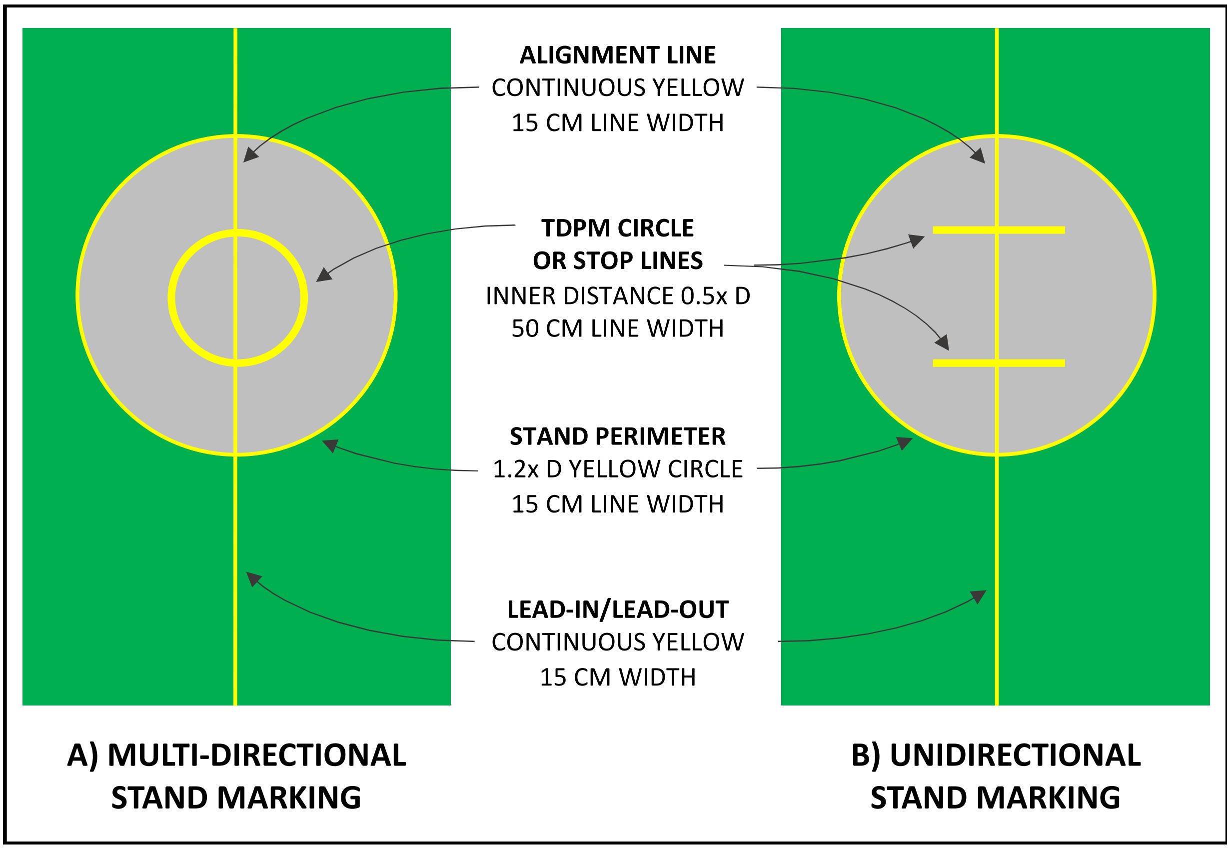


Figure 20: Helicopter stand markings

5.2.16 Flight path alignment guidance marking

5.2.16.1 Flight path alignment guidance marking(s) should be provided at a heliport where it is desirable and practicable to indicate available approach and/or departure path direction(s).

5.2.16.2 The flight path alignment guidance marking should be located in a straight line along the direction of approach and/or departure path on one or more of the TLOF, FATO, safety area or any suitable surface in the immediate vicinity of the FATO or safety area.

5.2.16.3 A flight path alignment guidance marking should consist of one or more arrows marked on the TLOF, FATO and/or safety area surface as shown in Figure 21. The stroke of the arrow(s) should be 50 cm in width and at least 3 m in length. When combined with a flight path alignment guidance lighting system it should take the form shown in Figure 21 which includes the scheme for marking “heads of the arrows” which are constant regardless of stroke length.

5.2.16.4 The markings should be in a colour which provides good contrast against the background colour of the surface on which they are marked, preferably white.

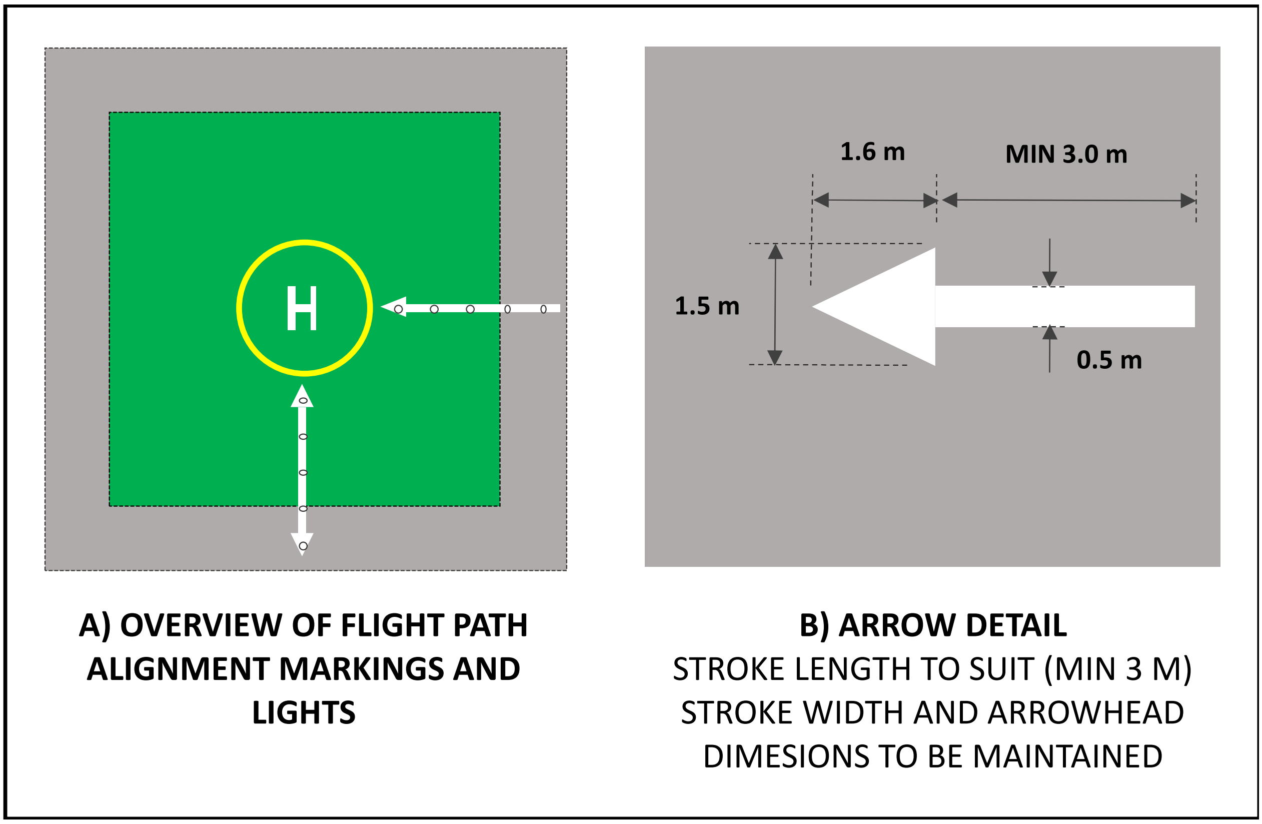


Figure 21: Flight path alignment guidance markings and lights

5.3 Lights

Note: In cases where operations into a heliport are to be conducted at night with night vision imaging systems (NVIS), it is important to ensure all heliport lighting are compatible with the NVIS through the addition of infrared emitters to the heliport lighting. Where the addition of infrared emitters is not practicable, helicopter operators using NVIS should be warned to use extra caution.

5.3.1 Heliport beacon

5.3.1.1 A heliport beacon should 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.

5.3.1.2 The heliport beacon should 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.

5.3.1.3 The heliport beacon should emit repeated series of equi-spaced short duration white flashes in the format in four flashes of 0.5 to 2.0 milliseconds, over 0.8 s with a gaps of 1.2 s before repetition.

5.3.1.4 The light from the beacon should show at all angles of azimuth.

5.3.1.5 The effective light intensity distribution of each flash should be as shown in table 7, column (A).

5.3.2 Approach lighting system

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

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

5.3.2.3 An approach lighting system should 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 22. The lights forming the 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 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 should be added beyond the crossbar. The lights beyond the crossbar may be steady or sequenced flashing, depending upon the environment.

5.3.2.4 Where an approach lighting system is provided for a non-precision FATO, the system should not be less than 210 m in length.

5.3.2.5 The steady lights should be omnidirectional white lights.

5.3.2.6 Sequenced flashing lights should be omnidirectional white lights.

5.3.2.7 The light distribution of steady lights should be as indicated in Table 7, column (B) except that the intensity should be increased by a factor of three for a non-precision FATO.

5.3.2.8 The flashing lights should have a flash frequency of one per second and their light distribution should be as shown in Table 7, column (C). The flash sequence should commence from the outermost light and progress towards the crossbar.

5.3.2.9 A suitable brilliancy control should be incorporated to allow for adjustment of light intensity to meet the prevailing conditions.

a. steady lights — 100 per cent, 30 per cent and 10 per cent
b. flashing lights — 100 per cent, 10 per cent and 3 per cent.

Table 7: Isocandela specifications

Elevation (degrees)	Lighting system - isocandela (cd & cd/m² for panels)					
	(A) Heliport beacon	**(B) Steady approach**	**(C) Flashing approach**	**(D) FATO & aiming point**	**(E) TLOF perimeter & FPAGLS**	**(F) TLOF luminescent panels**
90						55
60						55
40						50
30				10		45
25				50		
20				100	3	30
15		25	250		8	
13						
10	250				15	15
9		250	2500			
7	750					
6		350	3500			
5		350	3500		30	
4	1700					
3				100		
2.5	2500					
2		250	2500		15	
1.5	2500					
0	1700	25	250	10		5

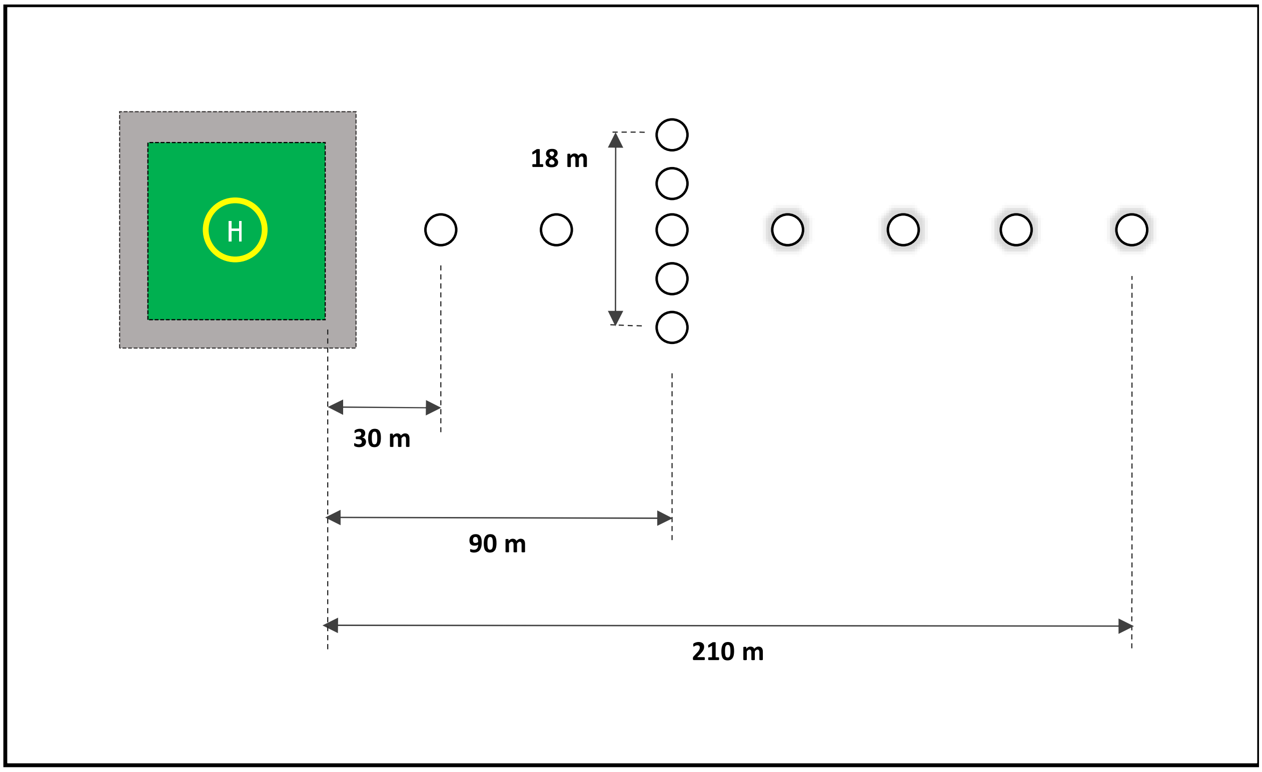


Figure 22: Approach lighting system

5.3.3 Flight path alignment guidance lighting system

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

5.3.3.2 The flight path alignment guidance lighting system should be in a straight line along the direction(s) of approach and/or departure path on one or more of the TLOF, FATO, safety area or any suitable surface in the immediate vicinity of the FATO, TLOF or safety area.

5.3.3.3 If combined with a flight path alignment guidance marking, as far as is practicable the lights should be located inside the “arrow” markings.

5.3.3.4 A flight path alignment guidance lighting system should consist of a row of three or more lights spaced uniformly with a total minimum distance of 6 m. Intervals between lights should not be less than 1.5 m and should not exceed 3 m. Where space permits, there should be 5 lights. (See Figure 21)

5.3.3.5 The lights should be steady omnidirectional inset white lights.

5.3.3.6 The distribution of the lights should be as indicated in Table 7, column (E).

5.3.3.7 A suitable control should 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.

5.3.4 Visual alignment guidance system

5.3.4.1 A visual alignment guidance system should be provided to serve the approach to a heliport where one or more of the following conditions exist, especially at night:

a. obstacle clearance, noise abatement or traffic control procedures require a particular direction to be flown
b. the environment of the heliport provides few visual surface cues
c. it is physically impracticable to install an approach lighting system.

5.3.5 Visual approach slope indicator

5.3.5.1 A visual approach slope indicator should be provided to serve the approach to a heliport, whether or not the heliport is served by other visual approach aids or by non-visual aids, where one or more of the following conditions exist, especially at night:

a. obstacle clearance, noise abatement or traffic control procedures require a particular slope to be flown
b. the environment of the heliport provides few visual surface cues
c. the characteristics of the helicopter require a stabilized approach.

5.3.5.2 Where provided, a visual approach slope indicator system should be protected by an obstacle protection surface of the dimensions described in Table 8.

Table 8: Dimensions and slopes of the obstacle protection surface

Surface and dimensions	Non-precision FATO	
Length of inner edge	Width of safety area	
Distance from end of FATO	60 m	
Divergence	15%	
Total length	2500 m	
Slope	PAPI	0.57°
	HAPI	0.65°
	APAPI	0.90°

5.3.6 FATO lighting systems for onshore surface-level heliports

5.3.6.1 Where a FATO with a solid surface is established at a surface-level heliport intended for use at night, FATO lights should 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.

5.3.6.2 FATO lights should be placed along the edges of the FATO. The lights should 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.

5.3.6.3 FATO lights should be fixed omnidirectional lights showing white or green. Where the intensity of the lights is to be varied, the lights should show variable white.

5.3.6.4 The light distribution of FATO lights should be as shown in Table 7, column (D).

5.3.6.5 The lights should not exceed a height of 25 cm and should be inset when a light extending above the surface would endanger helicopter operations. Where a FATO is not meant for lift-off or touchdown, the lights should not exceed a height of 25 cm above ground or snow level.

5.3.7 Aiming point lights

5.3.7.1 Where an aiming point marking is provided at a heliport intended for use at night, aiming point lights should be provided.

5.3.7.2 Aiming point lights should be collocated with the aiming point marking.

5.3.7.3 Aiming point lights should form a pattern of at least six omnidirectional white lights as shown in Figure 17. The lights should be inset when a light extending above the surface could endanger helicopter operations.

5.3.7.4 The light distribution of aiming point lights should be as shown in Table 7, column (D).

5.3.8 TLOF lighting system

5.3.8.1 A TLOF lighting system should be provided at a heliport intended for use at night.

5.3.8.2 For a surface-level heliport, lighting for the TLOF in a FATO should consist of one or more of the following:

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

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

a. perimeter lights
b. ASPSL and/or LPs to identify the TDPM and/or floodlighting to illuminate the TLOF.

5.3.8.4 TLOF ASPSL and/or LPs to identify the TDPM and/or floodlighting should be provided at a surface-level heliport intended for use at night when enhanced surface texture cues are required.

5.3.8.5 TLOF perimeter lights should be placed along the edge of the area designated for use as the TLOF or within a distance of 1.5 m from the edge. Where the TLOF is a circle, the lights should be:

a. located on straight lines in a pattern which will provide information to pilots on drift dis placement
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 should be spaced at half spacing.

5.3.8.6 TLOF perimeter lights should 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 should 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 5.3.8.5 b), there should be a minimum of fourteen lights.

5.3.8.7 The TLOF perimeter lights should 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.

5.3.8.8 The TLOF perimeter lights should 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.

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

5.3.8.10 On surface-level heliports, the minimum number of LPs on a TLOF should be nine. The total length of LPs in a pattern should not be less than 50 per cent of the length of the pattern. There should be an odd number with a minimum number of three panels on each side of the TLOF including a panel at each corner. LPs should be uniformly spaced with a distance between adjacent panel ends of not more than 5 m on each side of the TLOF.

5.3.8.11 When LPs are used on an elevated heliport or helideck to enhance surface texture cues, the panels should not be placed adjacent to the perimeter lights. They should be placed around a TDPM or coincident with heliport identification marking.

5.3.8.12 TLOF floodlights should be located so as to avoid glare to pilots in flight or to personnel working on the area. The arrangement and aiming of floodlights should be such that shadows are kept to a minimum.

5.3.8.13 The TLOF perimeter lights should be fixed omnidirectional lights showing green.

5.3.8.14 At a surface-level heliport, ASPSL or LPs should emit green light when used to define the perimeter of the TLOF.

5.3.8.15 The chromaticity and luminance of colours of LPs should conform to Annex 14, Volume I, Appendix 1, 3.4.

5.3.8.16 An LP should have a minimum width of 6 cm. The panel housing should be the same colour as the marking it defines.

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

5.3.8.18 For a helideck or shipboard heliport, the TLOF perimeter lights should not exceed a height of 5 cm, or for a FATO/TLOF, 15 cm.

5.3.8.19 When located within the safety area of a surface-level or elevated heliport, the TLOF floodlights should not exceed a height of 25 cm.

5.3.8.20 For a helideck or shipboard heliport, the TLOF floodlights should not exceed a height of 5 cm, or for a FATO/TLOF, 15 cm.

5.3.8.21 The LPs should not extend above the surface by more than 2.5 cm.

5.3.8.22 5The light distribution of the perimeter lights should be as shown in Table 7, column (E).

5.3.8.23 The light distribution of the LPs should be as shown in Table 7, column (F).

5.3.8.24 The spectral distribution of TLOF floodlights should be such that the surface and obstacle markings can be correctly identified.

5.3.8.25 The average horizontal illuminance of the floodlighting should 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.

5.3.8.26 Lighting used to identify the TDPC should comprise a segmented circle of omnidirectional ASPSL strips showing yellow. The segments should 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.

5.3.8.27 If utilized, the heliport identification marking lighting should be omnidirectional showing green.

5.3.9 Helicopter stand floodlighting

5.3.9.1 Helicopter stand floodlighting should be provided on a helicopter stand intended to be used at night.

5.3.9.2 Helicopter stand floodlights should be located so as to provide adequate illumination, with a minimum of glare to the pilot of a helicopter in flight and on the ground, and to personnel on the stand. The arrangement and aiming of floodlights should be such that a helicopter stand receives light from two or more directions to minimize shadows.

5.3.9.3 The spectral distribution of stand floodlights should be such that the colours used for surface and obstacle marking can be correctly identified.

5.3.9.4 Horizontal and vertical illuminance should be sufficient to ensure that visual cues are discernible for required manoeuvring and positioning, and essential operations around the helicopter can be performed expeditiously without endangering personnel or equipment.

5.3.10 Winching area floodlighting

5.3.10.1 Winching area floodlighting should be provided at a winching area intended for use at night.

5.3.10.2 Winching area floodlights should be located so as to avoid glare to pilots in flight or to personnel working on the area. The arrangement and aiming of floodlights should be such that shadows are kept to a minimum.

5.3.10.3 The spectral distribution of winching area floodlights should be such that the surface and obstacle markings can be correctly identified.

5.3.10.4 The average horizontal illuminance should be at least 10 lux, measured on the surface of the winching area.

5.3.11 Taxiway lights

5.3.11.1 See the specifications for taxiway centre line lights and taxiway edge lights in Part 139 (Aerodromes) Manual of Standards 2019 (as amended), are equally applicable to taxiways intended for ground taxiing of helicopters.

5.3.12 Visual aids for denoting obstacles outside and below the obstacle limitation surface

5.3.12.1 Where an aeronautical study indicates that obstacles in areas outside and below the boundaries of the obstacle limitation surface established for a heliport constitute a hazard to helicopters, they should be marked and lit, except that the marking may be omitted when the obstacle is lighted with high-intensity obstacle lights by day.

5.3.12.2 Where an aeronautical study indicates that overhead wires or cables crossing a river, waterway, valley or highway constitute a hazard to helicopters, they should be marked, and their supporting towers marked and lit.

5.3.13 Floodlighting of obstacles

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

5.3.13.2 Obstacle floodlights should be arranged so as to illuminate the entire obstacle and as far as practicable in a manner so as not to dazzle pilots.

5.3.13.3 Obstacle floodlighting should be such as to produce a luminance of at least 10 cd/m^2.

6 Heliport emergency response

6.1 Heliport emergency planning

6.1.1 A heliport emergency plan should be established commensurate with the helicopter operations and other activities conducted at the heliport.

6.1.2 The plan should identify agencies which could be of assistance in responding to an emergency at the heliport or in its vicinity.

6.1.3 The heliport emergency plan should provide for the coordination of the actions to be taken in the event of an emergency occurring at a heliport or in its vicinity.

6.1.4 Where an approach/departure path at a heliport is located over water, the plan should identify which agency is responsible for coordinating rescue in the event of a helicopter ditching and indicate how to contact that agency.

6.1.5 The plan should include, as a minimum, the following information:

a. the types of emergencies planned for
b. how to initiate the plan for each emergency specified
c. the name of agencies on and off the heliport to contact for each type of emergency with telephone numbers or other contact information
d. the role of each agency for each type of emergency
e. a list of pertinent on-heliport services available with telephone numbers or other contact information
f. copies of any written agreements with other agencies for mutual aid and the provision of emergency services
g. a grid map of the heliport and its immediate vicinity.

6.1.6 All agencies identified in the plan should be consulted about their role in the plan.

6.1.7 The plan should be reviewed and the information in it updated at least yearly or, if deemed necessary, after an actual emergency, so as to correct any deficiency found during an actual emergency.

6.1.8 A test of the emergency plan should be carried out at least once every three years.

6.2 Rescue and firefighting

6.2.1 Rescue and firefighting equipment and services should be provided at helidecks and at elevated heliports located above occupied structures.

6.2.2 Level of protection provided

6.2.2.1 For the application of primary media, the discharge rate (in litres/minute) applied over the assumed practical critical area (in m^2) should be predicated on a requirement to bring any fire which may occur on the heliport under control within one minute, measured from activation of the system at the appropriate discharge rate.

6.2.2.2 Practical critical area calculation where primary media is applied as a solid stream

6.2.2.3 The practical critical area should be calculated by multiplying the helicopter fuselage length (m) by the helicopter fuselage width (m) plus an additional width factor (W1) of 4 m. Categorization from H0 to H3 should be determined on the basis of the fuselage dimensions in Table 9.

Table 9: Heliport firefighting category

Category (1)	Maximum fuselage length (2)	Maximum fuselage width (3)
H0	up to but not including 8 m	1.5 m
H1	from 8 m up to but not including 12 m	2.0 m
H2	from 12 m up to but not including 16 m	2.5 m
H3	from 16 m up to 20 m	3.0 m

6.2.2.4 Practical critical area calculation where primary media is applied in a dispersed pattern

6.2.2.5 For heliports, except helidecks, the practical critical area should be based on an area contained within the heliport perimeter, which always includes the TLOF, and to the extent that it is load-bearing, the FATO.

6.2.2.6 For helidecks, the practical critical area should be based on the largest circle capable of being accommodated within the TLOF perimeter.

6.2.3 Extinguishing agents

6.2.3.1 Surface level heliports with primary media applied as a solid stream using a portable foam application system (PFAS)

6.2.3.2 Where a rescue and firefighting service (RFFS) is provided at a surface-level heliport, the amount of primary media and complementary agents should be in accordance with Table 10.

Table 10: Minimum usable amounts of extinguishing agents for surface-level heliports

Category (1)	Foam meeting performance level B		Foam meeting performance level C		Complimentary agents	
	Water (L) (2)	Discharge rate foam solution/ minute (L) (3)	Water (L) (4)	Discharge rate foam solution/ minute (L) (5)	Dry chemical powder (kg) (6)	Gaseous media (kg) (7)
H0	500	250	330	165	23	9
H1	800	400	540	270	23	9
H2	1200	600	800	400	45	18
H3	1600	800	1100	550	90	36

6.2.3.3 Elevated heliports with primary media applied as a solid stream using a fixed foam application system (FFAS)

6.2.3.4 Where an RFFS is provided at an elevated heliport, the amount of foam media and complementary agents should be in accordance with Table 11.

Table 11: Minimum usable amounts of extinguishing agents for elevated heliports

Category (1)	Foam meeting performance level B		Foam meeting performance level C		Complimentary agents	
	Water (L) (2)	Discharge rate foam solution/ minute (L) (3)	Water (L) (4)	Discharge rate foam solution/ minute (L) (5)	Dry chemical powder (kg) (6)	Gaseous media (kg) (7)
H0	1250	250	825	165	23	9
H1	2000	400	1350	270	45	18
H2	3000	600	2000	400	45	18
H3	4000	800	2750	550	90	36

6.2.3.5 Elevated heliports/limited-sized surface-level heliports with primary media applied in a dispersed pattern through an FFAS — a solid-plate heliport

6.2.3.6 The amount of water required for foam production should be predicated on the practical critical area (m2) multiplied by the appropriate application rate (L/min/m 2), giving a discharge rate for foam solution (in L/min). The discharge rate should be multiplied by the discharge duration to calculate the amount of water needed for foam production.

6.2.3.7 The discharge duration should be at least three minutes.

6.2.3.8 Complementary media should be in accordance with Table 11, for H2 operations.

6.2.3.9 Purpose-built elevated heliports/limited-sized surface-level heliports with primary media applied in a dispersed pattern through a fixed application system (FAS) — a passive fire retarding surface with water-only deck integrated firefighting system (DIFFS)

6.2.3.10 The amount of water required should be predicated on the practical critical area (m 2) multiplied by the appropriate application rate (3.75 L/min/m 2) giving a discharge rate for water (in L/min). The discharge rate should be multiplied by the discharge duration to determine the total amount of water needed.

6.2.3.11 The discharge duration should be at least two minutes.

6.2.3.12 Complementary media should be in accordance with Table 11, for H2 operations.

6.2.3.13 Purpose-built helidecks with primary media applied in a solid stream or a dispersed pattern through a fixed foam application system (FFAS) — a solid-plate heliport

6.2.3.14 The amount of water required for foam media production should be predicated on the practical critical area (m2) multiplied by the application rate (L/min/m2) giving a discharge rate for foam solution (in L/min). The discharge rate should be multiplied by the discharge duration to calculate the amount of water needed for foam production.

6.2.3.15 The discharge duration should be at least five minutes.

6.2.3.16 Complementary media should be in accordance with Table 11 to H0 levels for helidecks up to and including 16.0 m and to H1/H2 levels for helidecks greater than 16.0 m. Helidecks greater than 24 m should adopt H3 levels.

6.2.3.17 Purpose-built helidecks with primary media applied in a dispersed pattern through an FAS — a passive fire-retarding surface with water-only DIFFS

6.2.3.18 The amount of water required should be predicated on the practical critical area (m2) multiplied by the application rate (3.75 L/min/m2) giving a discharge rate for water (in L/min). The discharge rate should be multiplied by the discharge duration to calculate the amount of water needed.

6.2.3.19 The discharge duration should be at least three minutes.

6.2.3.20 Complementary media should be in accordance with Table 11 to H0 levels for helidecks up to and including 16.0 m and to H1/H2 levels for helidecks greater than 16.0 m. Helidecks greater than 24 m should adopt H3 levels.

6.2.4 Response time

6.2.4.1 At surface-level heliports, the operational objective of the RFF response should be to achieve response times not exceeding two minutes in optimum conditions of visibility and surface conditions.

6.2.4.2 At elevated heliports, limited-sized surface-level heliports and helidecks, the response time for the discharge of primary media at the required application rate should be 15 seconds measured from system activation. If RFF personnel are needed, they should be immediately available on or in the vicinity of the heliport while helicopter movements are taking place.

6.2.5 Rescue arrangements

6.2.5.1 Rescue arrangements commensurate with the overall risk of the helicopter operation should be provided at the heliport.

6.2.6 Communication and alerting system

6.2.6.1 A suitable alerting and/or communication system should be provided in accordance with the emergency response plan

6.2.7 Personnel

6.2.7.1 Where provided, the number of RFF personnel should be sufficient for the required task.

6.2.7.2 Where provided, RFF personnel should be trained to perform their duties, and maintain their competence.

6.2.7.3 Rescue and firefighting personnel should be provided with protective equipment.

6.2.8 Means of escape

6.2.8.1 Elevated heliports and helidecks should be provided with a main access and at least one additional means of escape.

6.2.8.2 Access points should be located as far apart from each other as is practicable.

7 Heliport data

7.1 Aeronautical data

7.1.1 Whereas certified aerodromes are required to publish aeronautical information through an aeronautical information services provider, uncertified aerodromes, such as heliports, should provide accurate, valid and timely aeronautical information direct to their users. The following aeronautical data requirements should be considered in the collation and distribution of heliport data.

7.1.2 Determination and reporting of heliport-related aeronautical data should be in accordance with the accuracy and integrity classification required to meet the needs of the end-users of aeronautical data.

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

7.2 Heliport reference point

7.2.1 A heliport reference point should be established for a heliport not collocated with an aerodrome.

7.2.2 The heliport reference point should be located near the initial or planned geometric centre of the heliport and should normally remain where first established.

7.2.3 The position of the heliport reference point should be measured and reported in degrees, minutes and seconds.

7.3 Heliport elevations

7.3.1 The heliport elevation and geoid undulation at the heliport elevation position should be measured and reported to the accuracy of:

a. one-half metre for heliports with non-instrument and non-precision approaches
b. one-quarter metre for heliports with precision approaches.

7.3.2 The elevation of the TLOF and/or the elevation and geoid undulation of each threshold of the FATO (where appropriate) should be measured and reported to the accuracy of one -half metre.

7.4 Heliport dimensions and related information

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

a. heliport type — surface-level, elevated, shipboard or helideck
b. TLOF — dimensions to the nearest metre or foot, slope, surface type, bearing strength in tonnes (1 000 kg)

c. FATO — type of FATO, true bearing to one-hundredth of a degree, designation number (where appropriate), length and width to the nearest metre or foot, slope, surface type
d. aircraft limitations - maximum allowable mass and D-value in accordance with markings on TLOF/FATO
e. safety area — length, width and surface type
f. helicopter taxiway and helicopter taxi-route — designation, width, surface type
g. apron — surface type, helicopter stands
h. clearway — length, ground profile
i. visual aids for approach procedures, marking and lighting of FATO, TLOF, helicopter taxiways, helicopter taxi-routes and helicopter stands.

7.4.2 The geographical coordinates of the geometric centre of the TLOF and/or of each threshold of the FATO (where appropriate) should be measured and reported in degrees, minutes, seconds and hundredths of seconds.

7.4.3 The geographical coordinates of appropriate centre line points of helicopter taxiways and helicopter taxi-routes should be measured and reported in degrees, minutes, seconds and hundredths of seconds.

7.4.4 The geographical coordinates of each helicopter stand should be measured and reported in degrees, minutes, seconds and hundredths of seconds.

7.4.5 The geographical coordinates of obstacles in Area 2 (the part within the heliport boundary) and in Area 3 should be measured and reported in degrees, minutes, seconds and tenths of seconds. In addition, the top elevation, type, marking and lighting (if any) of obstacles should be reported.

7.4.6 In addition to the above, for heliports with precision approaches the distances to the nearest metre of localizer and glide path elements comprising an instrument landing system (ILS) or azimuth and elevation antenna of a microwave landing system (MLS) in relation to the associated TLOF or FATO extremities should be measured.

7.5 Declared distances

7.5.1 The following distances to the nearest metre or foot should be declared, where relevant, for a heliport:

a. take-off distance available
b. rejected take-off distance available
c. landing distance available.

7.6 Coordination between heliport users and heliport authorities

7.6.1 To ensure that heliport users obtain up-to-date pre-flight information and to meet the need for in-flight information, arrangements should be made between heliport users and the heliport operator to report, with a minimum of delay:

a. information on heliport conditions

b. the operational status of associated facilities, services and navigation aids within their area of responsibility
c. any other information considered to be of operational significance.

7.7 Rescue and firefighting

7.7.1 The level of protection normally available at a heliport should be expressed in terms of the category of the rescue and firefighting service as described in 6.2 of this AC and in accordance with the types and amounts of extinguishing agents normally available at the heliport.

7.7.2 Changes in the level of protection normally available at a heliport for rescue and firefighting should be notified to heliport users. When such a change has been corrected, the heliport users should be advised accordingly.

7.7.3 A change should be expressed in terms of the new category of the rescue and firefighting service available at the heliport.

8 Weather reports at off-shore heliports

8.1 Add a heading

8.1.1 As per Part 91 MOS 7.02, the PIC of an aircraft must study authorised weather forecasts and reports as well as any other reasonably available weather information prior to take-off.

8.1.2 An authorised weather forecast is a forecast made by the Bureau of Meteorology for aviation purposes.

8.1.3 An authorised weather report is a report made by:

a. the Bureau of Meteorology for aviation purposes
b. an individual who holds a certificate from the Bureau of Meteorology to give weather reports for aviation purposes
c. an automatic weather station at an aerodrome that is approved by the Bureau of Meteorology as an automatic weather station for the aerodrome
d. an automatic broadcast service published in the AIP
e. an individual who holds a pilot licence
f. a person included in a class of persons specified in the AIP for this subparagraph.

8.1.4 Automatic weather stations

8.1.4.1 The Bureau of Meteorology has established policies and procedures for the approval of automatic weather stations in support of Part 91 compliance.

8.1.4.2 Details on these policies as well as the approval process can be accessed via the Bureau of Meteorology's Meteorological Authority Office website.

8.1.5 Radio licence requirements

8.1.5.1 Automatic Weather Stations connected to radio transmitters may also require an Apparatus Licence in accordance with procedures established by the Australian Communications and Media Authority.

8.1.5.2 For more information, see the Australian Communications and Media Authority's website.

Appendix A

Type specific aircraft downwash data

A.1.1 The following table provides data on the downwash impact associated with common helicopter types.

Table 12: Aircraft downwash data

Helicopter Data				Peak Wind Velocity					
Type	MTOW	Rotor Diameter	Disc Loading	Radius @ 40 km/h		Radius @ 60 km/h		Radius @ 80 km/h	
	(kg)	(m)	(kg/m2)	(radii)	(m)	(radii)	(m)	(radii)	(m)
AW101	15600	18.6	57.47	7.0	65	5.5	51	4.1	38
S92	12565	17.2	54.27	6.8	58	5.4	46	4.1	35
H225	11200	16.2	54.34	6.8	55	5.4	44	4.1	33
B525	9299	16.6	42.91	6.0	50	4.8	40	3.7	31
AW189	8300	14.6	49.58	6.5	47	5.2	38	3.9	29
H175	7800	14.8	45.34	6.2	46	5.0	37	3.8	28
AW139	6800	13.8	45.46	6.2	43	5.0	34	3.8	26
H160	6050	13.4	42.90	6.0	40	4.8	32	3.7	25
Bell 412	5398	14.0	34.97	5.5	38	4.1	29	3.5	25
S76	5306	13.4	37.57	5.6	38	4.4	29	3.6	24
AW169	4800	12.1	41.61	5.9	36	4.7	29	3.7	22
H145	3800	11.0	39.99	5.8	32	4.6	25	3.7	20
Bell 429	3175	11.0	33.41	5.3	29	4.0	22	3.5	19
EC135	2980	10.4	35.08	5.5	28	4.2	22	3.5	18