



## **CIVIL AVIATION ADVISORY PUBLICATION**

### **CAAP 71**

### **HELIDECKS (OFF-SHORE)**

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***STANDARDS, GUIDANCE AND INFORMATION REGARDING HELIDECKS***

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## **CHAPTER 1 – INTRODUCTION**

### **2 GENERAL**

In this publication the term 'helideck' refers to all helicopter landing areas on fixed or floating off-shore facilities used for mineral exploitation (for the exploration of oil and gas), research or construction. For helicopter landing areas on vessels (private or commercial use), the term 'shipboard heliport' may be used in preference to 'helideck'.

### **3 PURPOSE**

The purpose of this CAAP is to provide guidance and policy information to all helideck operators of UAE off-shore installations.

### **4 IMPLEMENTATION OF SAFETY OVERSIGHT**

4.1 CAR Part IX (Aerodromes), Appendix 16 - Heliports: This Appendix currently directs readers to ICAO Annex 14 Volume II (Heliports). It is proposed that this Appendix will be amended to refer to CAAP 71.

4.2 It is intended that implementation will be a phased approach, with new construction and operations conforming to regulation from the implementation date.

4.3 Compliance with regulation at established facilities will be phased over a set period in agreement with the GCAA.

### **5 STATUS OF THIS CAAP**

This is the initial issue of CAAP 71. This issue is based on NPA 09-2013. There have been no comments received disagreeing with the content of the CAAP. This issue will enter into force on 30<sup>th</sup> June 2014.

### **6 APPLICABILITY**

This CAAP is applicable to all operators or prospective operators of helidecks in the UAE.

### **7 REFERENCES**

- a) CAR Part IV: Operational Regulations OPS 3: Commercial & Private Air Transportation (Helicopter)
- b) CAR Part IX (Aerodromes)
- c) CAR Part X (Safety Management Requirements)
- d) CAR Part XI (Aerodrome Emergency Services, Facilities and Equipment)
- e) ICAO Annex 14 Volume II (Aerodromes – Heliports)
- f) ICAO Heliport Manual Doc 9261-AN/903
- g) ICAO Airport Service Manual Part 1 Rescue & Fire-Fighting
- h) National Fire Protection Association (NFPA) 418 Standards for Heliports

- i) CAAP 22 (Safety Incident Reporting)
- j) CAAP 30 (The Issue and Verification of an Aerodrome Certificate– including Aircraft Landing Area Acceptance)
- k) CAAP 35 (Inspecting and Testing of Rescue and Fire-Fighting Equipment)
- l) CAAP 36 (Runway and Movement Area Inspections)
- m) CAAP 43 (Foreign Object Debris – FOD)
- n) CAAP 50 (Safety Management Systems)
- o) CAAP 57 (Voluntary Occurrence Reporting System)
- p) CAAP 70 Heliports: Air Service and Private Use (Not Air Service)
- q) ICAO Annex 15 (Aeronautical Information Services)
- r) UK CAP 437 (Offshore Helicopter Landing Areas – Guidance on Standards).

## 8 GUIDANCE

For guidance on points that are not covered within this publication, advice should be sought from the Aviation Safety Affairs Sector, GCAA; email: [ana@gcaa.gov.ae](mailto:ana@gcaa.gov.ae).

## 9 POLICY

9.1 The criteria described in this CAAP, CAAP 70 and CAR Part IV OPS 3 form part of the requirements, acceptable means of compliance and guidance material issued by the GCAA to helideck and helicopter operators, which is to be accounted for in Operations Manuals required under CAR Part IV OPS 3.

9.2 For information which relates to both on-shore as well as off-shore facilities, such as heliport data / aeronautical data quality requirements, fuel management, and aerodrome (helideck) operations – including SMS, and mandatory reporting (ROSI), then in addition, reference shall be made to **CAAP 70** and **CAR Part IX**.

9.3 For additional information specific to helidecks and shipboard heliports, reference is made within this CAAP to ICAO Heliport Manual Doc 9261.

9.4 It is recommended that helicopter operators refer to UK CAP 437 (Off-shore Helicopter Landing Areas – Guidance on Standards). UK CAP 437 is an amplification of internationally agreed standards contained in ICAO Annex 14 Volume II, 'Heliports' and the ICAO Heliport Manual Doc 9261-AN/903.

9.5 CAR Part IV – OPS 3 (Operational Regulations: Helicopters) provides regulation specifically for helicopter operations. Helideck operators should make reference to this document as an appreciation of the helicopter operators' responsibilities as holder of an air operator certificate (AOC). Such operators shall ensure that all pilots are familiar with the regulations and procedures pertinent to the performance of their duties.

## 10 DEFINITIONS

Aerodrome	A defined area on land or water (including any buildings, installations, and equipment) intended to be used either wholly or in part for the arrival, departure and surface movement of aircraft.
Aircraft	Any machine that can derive support in the atmosphere from the reactions of the air other than the reactions of the air against the earth's surface.
Air Service	An air service operation open to the public and performed by an aircraft for the public transport of passengers, mail or cargo for remuneration or hire.
Approved by the Authority	Documented by the Authority as suitable for the purpose intended.
Authority	The General Civil Aviation Authority of the United Arab Emirates is the competent body responsible for the safety regulation of Civil Aviation.
Commercial Air Transport Operation	An aircraft operation involving the transport of passengers, cargo or mail for remuneration or hire.
Declared Distances	<ul style="list-style-type: none"> <li>a) Take-off distance available (TODAH). The length of the FATO plus the length of helicopter clearway (if provided) declared available and suitable for helicopters to complete the take-off.</li> <li>b) Rejected take-off distance available (RTODAH). The length of the FATO declared available and suitable for helicopters operated in performance class 1 to complete a rejected take-off.</li> <li>c) Landing distance available (LDAH). The length of the FATO plus any additional area declared available and suitable for helicopters to complete the landing manoeuvre from a defined height.</li> </ul>
D	<p>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.</p> <p>Note — "D" is sometimes referred to in the text using the terminology "D-value".</p>
Dynamic load-bearing surface	A surface capable of supporting the loads generated by a helicopter conducting an emergency touchdown on it.
Elevated heliport	A heliport located on a raised structure on land.

Final approach and take-off area (FATO)	A defined area over which the final phase of the approach manoeuvre to hover or landing is completed and from which the take-off manoeuvre is commenced. Where the FATO is to be used by helicopters operated in performance class 1, the defined area includes the rejected take-off area available.
GCAA Inspector	An Inspector from any discipline within the GCAA, dependent upon discipline being inspected or audited.
Helicopter Landing Area (Helideck) Project Plan	A comprehensive plan detailing as a minimum: <ul style="list-style-type: none"> <li>a) timescales and milestones with reference to meeting regulatory requirements; for example: Aerodromes, Aerodrome Emergency Services (AES), Air Navigation Services (ANS) including but not limited to Air Traffic Services (ATS), Communication Navigation Surveillance Systems (CNS), Meteorology (MET) and or Aeronautical Information Services (AIS); and</li> <li>b) a compliance matrix, demonstrating compliance with GCAA regulations, detailing physical characteristics, appropriate to the scope and scale of the proposed operations.</li> </ul>
Helicopter stand	An aircraft stand which provides for parking a helicopter and where ground taxi operations are completed or where the helicopter touches down and lifts off for air taxi operations.
Helideck	A heliport located on an offshore structure such as an exploration or production platform used for the exploitation of oil or gas.
Helideck Facilities and Equipment	Facilities and equipment, inside or outside the boundaries of the helideck, that are constructed or installed, operated and maintained for the arrival, departure and surface movement of aircraft.
Helideck Manual	The Manual that forms part of the application for Acceptance.
Helideck Operator	In relation to an accepted helicopter landing area, the Helicopter Landing Area Acceptance holder.
Heliport	An aerodrome or a defined area on a structure intended to be used wholly or in part for the arrival, departure or surface movement of helicopters.
Manoeuvring area	That part of an aerodrome to be used for the take-off, landing and taxiing of aircraft, excluding aprons.
Movement area	That part of an aerodrome to be used for the take-off, landing and taxiing of aircraft, consisting of the manoeuvring area and the apron(s).
Operator (Flight Operator)	A person, organization or enterprise engaged in or offering to engage in an aircraft operation.

Point-in-space approach (PinS)	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 Point-in-space (PinS) to the landing location. <i>Note — The procedure design criteria for a PinS approach and the detailed design requirements for a visual segment are established in the Procedures for Air Navigation Services — Aircraft Operations, (PANS-OPS, Doc 8168).</i>
Private Operator	Private operator means a person, organisation or enterprise engaged in the carriage of persons or cargo not for hire or reward.
Protection area	An area within a taxi-route and around a helicopter stand which provides separation from objects, the FATO, other taxi-routes and helicopter stands, for safe manoeuvring of helicopters
Rejected take-off area	A defined area on a heliport suitable for helicopters operating in performance class 1 to complete a rejected take-off.
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	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 utilizes an area of the ship that is capable of supporting a helicopter but not designed specifically for that task.
Static load-bearing surface	A surface capable of supporting the mass of a helicopter situated upon it.
Surface-level heliport	A heliport located on the ground or on the water.
Touchdown and lift-off area (TLOF)	An area on which a helicopter may touch down or lift off.
Winching area	An area provided for the transfer by helicopter of personnel or stores to or from a ship.

## 11 ABBREVIATIONS

<b>AIP</b>	Aeronautical Information Publication
<b>(A)PAPI</b>	Abbreviated Precision Approach Path Indicator
<b>ASPSL</b>	Arrays of Segmented Point Source Lighting
<b>FATO</b>	Final Approach and Take-Off Area
<b>FOD</b>	Foreign Object Debris
<b>GNSS</b>	Global navigation satellite system
<b>HAPI</b>	Helicopter Approach Path Indicator
<b>HFM</b>	Helicopter Flight Manual
<b>ICAO</b>	International Civil Aviation Organisation
<b>LED</b>	Light Emitting Diodes
<b>LOA</b>	Limited obstacle area
<b>LOS</b>	Limited obstacle sector
<b>LP</b>	Luminescent Panel
<b>MAPt</b>	Missed approach point
<b>MTOM</b>	Maximum Take-Off Mass
<b>OFS</b>	Obstacle free sector
<b>PinS</b>	Point-in-space
<b>SMS</b>	Safety Management System
<b>TLOF</b>	Touchdown and Lift-Off Area
<b>UCW</b>	Width of undercarriage

## CHAPTER 2 – PROCESS FOR GAINING A HELICOPTER LANDING AREA ACCEPTANCE

### 1 ACCEPTANCE

1.1 GCAA acceptance is applicable for helicopter landing areas on fixed or floating off-shore facilities used for mineral exploitation (for the exploration of oil and gas), research or construction.

1.2 GCAA acceptance is also applicable for on-shore sites which are dedicated to the exploration of oil and gas.

1.3 Service Fees applicable to the scale of operations will be required.

1.4 The GCAA may choose to follow a more detailed assessment, which may involve site inspections and this will be undertaken by the following departments:

- a) **Air Navigation and Aerodrome Department:** will assess visual aids (markings and markers); Heliport Manual and AES (RFFS and Emergency Response) in relation to CAR Part IX, CAR Part X and CAR Part XI and any ANS such as CNS, MET, AIS, ATS in relation to CAR Part VIII.
- b) **Flight Operations Department:** will assess the application of the operations for which the facility is designed, in relation to CAR Part IV – OPS 3. This will include the direction of flight; the assessment of the obstacle environment on the basis of the intended use of a FATO; the acceptance of the Declared Distances and obstacle limitation surfaces in relation to the most critical helicopter type for which the helideck is intended.
- c) **Aviation Security Affairs Sector:** Aviation security is an integral part of aerodrome planning and operations. Contact should be made with GCAA Aviation Security Affairs Sector for details regarding security requirements<sup>1</sup>.

1.5 It will be the responsibility of each oil/gas producer to maintain their registry or list of active facilities.

1.6 Each oil/gas organisation should submit details to the GCAA. This should include details of their safety oversight programme and their actions or programme to address non-compliant elements. Details may take the form of an Aeronautical Study or a Helicopter Landing Area (Helideck) Project Plan and should reflect the regulations in CAR Part IV-OPS 3, CAAP 70, CAAP 71 and UK CAP 437.

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<sup>1</sup> GCAA CAR Part VII Aviation Security Regulations

## CHAPTER 3 – PHYSICAL CHARACTERISTICS: HELIDECKS

***In addition to the specification listed within this Chapter, reference shall also be made to CAAP 70.***

*Note — The following specifications are for helidecks located on structures engaged in such activities as mineral exploitation (for the exploration of oil and gas), research or construction. See Chapter 4 for shipboard heliport provisions.*

### **1. FINAL APPROACH AND TAKE-OFF AREAS AND TOUCHDOWN AND LIFT-OFF AREAS**

*Note 1 — For helidecks that have a 1 D or larger FATO it is presumed that the FATO and the TLOF will always occupy the same space and have the same load bearing characteristics so as to be coincidental. For helidecks that are less than 1 D, the reduction in size is only applied to the TLOF which is a load bearing area. In this case, the FATO remains at 1 D but the portion extending beyond the TLOF perimeter need not be load bearing for helicopters. The TLOF and the FATO may be assumed to be collocated.*

*Note 2 — Guidance on the effects of airflow direction and turbulence, prevailing wind velocity and high temperatures from gas turbine exhausts or flare-radiated heat on the location of the FATO is given in the Heliport Manual (Doc 9261).*

1.1 A helideck shall be provided with one FATO and one coincident or collocated TLOF.

1.2 A FATO may be any shape but shall be of sufficient size to contain an area within which can be accommodated a circle of diameter of not less than 1 D of the largest helicopter the helideck is intended to serve.

1.3 A TLOF may be any shape but shall be of sufficient size to contain:

- a) for helicopters with an MTOM of more than 3,175 kg, an area within which can be accommodated a circle of diameter not less than 1 D of the largest helicopter the helideck is intended to serve; and
- b) for helicopters with an MTOM of 3,175 kg or less, an area within which can be accommodated a circle of diameter not less than 0.83 D of the largest helicopter the helideck is intended to serve.

1.4 Recommendation — For helicopters with an MTOM of 3,175 kg or less, the FATO should be of sufficient size to 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.

1.5 Recommendation— 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.

1.6 The TLOF shall be dynamic load-bearing.

1.7 The TLOF shall provide ground effect.

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

1.9 For any TLOF designed for use by helicopters having a D-value of greater than 16.0 m, objects in the obstacle free sector whose function requires them to be located on the edge of the TLOF shall not exceed a height of 25 cm.

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

1.11 For any TLOF having dimensions of less than 1 D, the maximum height of such objects in the obstacle-free sector whose function requires them to be located on the edge of the TLOF shall not exceed a height of 5 cm.

*Note — Lighting that is mounted at a height of less than 25 cm is typically assessed for adequacy of visual cues before and after installation.*

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

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

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

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

1.15 The landing area should have an overall coating of non-slip material and all markings on the surface of the landing area should be finished with the same non-slip materials. Whilst extruded section or grid construction aluminium (or other) decks may provide adequate resistance to sliding, they should be coated with a non-slip material unless adequate friction properties have been confirmed by measurement (refer to UK CAP 437). It is important that adequate friction exists in all directions and in worst case conditions, i.e. when the deck is wet. Over-painting friction surfaces on such designs with other than non-slip material will likely compromise the surface friction. Suitable surface friction material is available commercially.<sup>2</sup>

1.16 Every landing area should be equipped with adequate surface drainage arrangements and a free-flowing collection system that will quickly and safely direct any rainwater and/or fuel spillage and/or firefighting media away from the helideck surface to a safe place. Helidecks on fixed installations should be cambered (or laid to a fall) to approximately 1:100. Any distortion of the helideck surface on an installation due to, for example, loads from a helicopter at rest should not modify the landing area drainage system to the extent of allowing spilled fuel to remain on the deck. A system of guttering on a new-build or a slightly raised kerb should be provided around the perimeter to prevent spilled fuel from falling on to other parts of the installation and to conduct the spillage to an appropriate drainage system. The capacity of the drainage system should be sufficient to contain the maximum likely spillage of fuel on the helideck. The calculation of the amount of spillage to be contained should be based on an analysis of helicopter type, fuel capacity, typical fuel loads

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<sup>2</sup> UK CAP 437 Standards for Offshore Helicopter Landing Areas

and uplifts. The design of the drainage system should preclude blockage by debris. The helideck area should be properly sealed so that spillage will only route into the drainage system.<sup>3</sup>

*Note — Guidance on rendering the surface of the FATO skid-resistant is contained in the Heliport Manual (Doc 9261).*

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<sup>3</sup> UK CAP 437 Standards for Offshore Helicopter Landing Areas

## CHAPTER 4 – PHYSICAL CHARACTERISTICS: SHIPBOARD

**Note – In addition to the specification listed within this Chapter, reference shall also be made to CAAP 70.**

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

### 1 FINAL APPROACH AND TAKE-OFF AREAS & TOUCHDOWN AND LIFT-OFF AREAS

*Note — Except for the arrangement described in paragraph 1.6 b), for shipboard heliports it is presumed that the FATO and the TLOF will be coincidental. Guidance on the effects of airflow direction and turbulence, prevailing wind velocity and high temperature from gas turbine exhausts or flare-radiated heat on the location of the FATO is given in the Heliport Manual (Doc 9261).*

1.1 A shipboard heliport shall be provided with one FATO and one coincidental or collocated TLOF.

1.2 A FATO may be any shape but shall be of sufficient size to contain an area within which can be accommodated a circle of diameter of not less than 1 D of the largest helicopter the helideck is intended to serve.

1.3 The TLOF of a shipboard heliport shall be dynamic load-bearing.

1.4 The TLOF of a shipboard heliport shall provide ground effect.

1.5 For purpose-built shipboard heliports provided in a location other than the bow or stern, the TLOF shall 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.

1.6 For purpose-built shipboard heliports provided in the bow or stern of a ship, the TLOF shall 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 not less than 1 D in the helicopter's longitudinal direction. The minimum width of the heliport shall be not less than 0.83 D (see Figure 4-1).

*Note 1 — The ship will need to be manoeuvred to ensure that the relative wind is appropriate to the direction of the helicopter touchdown heading.*

*Note 2 — The touchdown heading of the helicopter is 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.*

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

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

*Note — Specific guidance on the characteristics of an air-gap is given in the Heliport Manual (Doc 9261). As a general rule, except for shallow superstructures of three stories or less, a sufficient air-gap will be at least 3 m.*

1.9 Recommendation — 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.

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

1.11 For any TLOF designed for use by helicopters having a D-value of greater than 16.0 m, objects in the obstacle free sector whose function requires them to be located on the edge of the TLOF shall not exceed a height of 25 cm.

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

1.13 For any TLOF having dimensions of less than 1 D, the maximum height of such objects in the obstacle-free sector whose function requires them to be located on the edge of the TLOF shall not exceed a height of 5 cm.

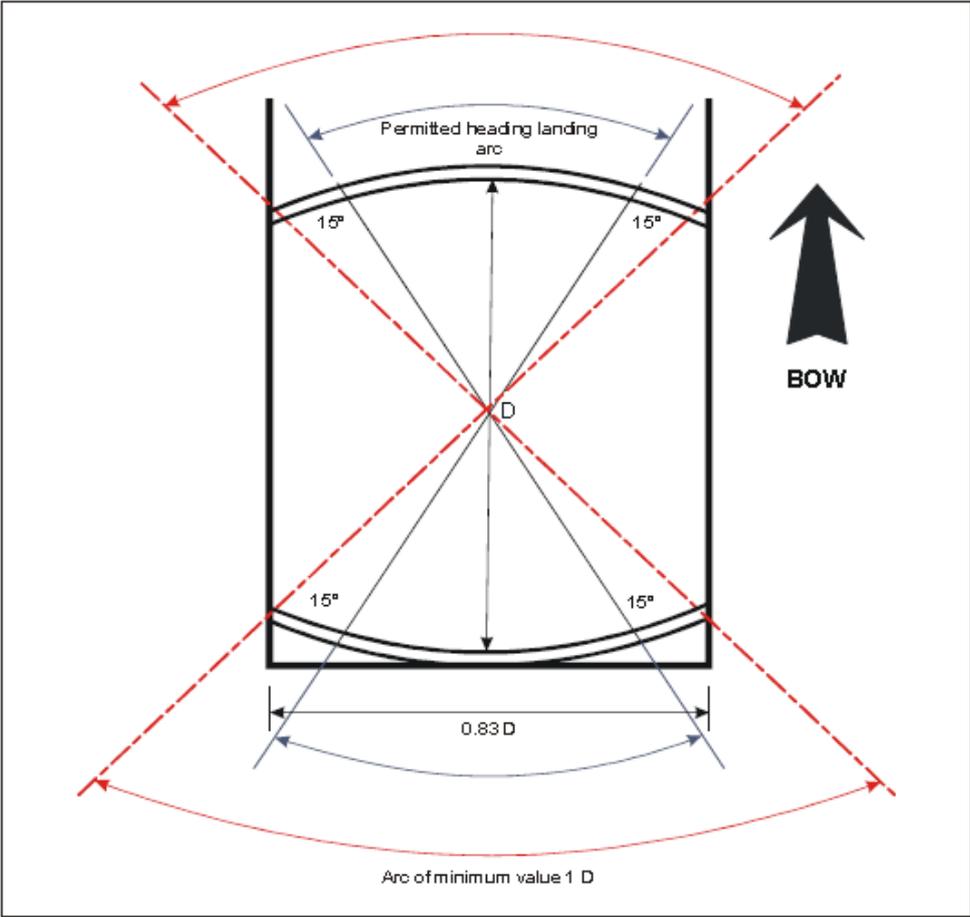
*Note — Lighting that is mounted at a height of less than 25 cm is typically assessed for adequacy of visual cues before and after installation.*

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

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

1.16 The surface of the TLOF shall be skid-resistant to both helicopters and persons. (Refer to Chapter 3 paragraphs 1.16 and 1.17).

Figure 4-1 Shipboard permitted landing headings for limited heading operations



## CHAPTER 5 – PHYSICAL CHARACTERISTICS: SAFETY NET & STRUCTURAL DESIGN

### 1. SAFETY NET<sup>4</sup>

1.1 Safety nets for the protection of personnel should be installed around the helideck except where structural protection exists. The netting used should be of a flexible nature and be manufactured from non-flammable material. The inboard edge should be fastened level with, or just below, the edge of the helideck, including drainage, guttering, etc. The net itself should extend at least 1.5 m in the horizontal plane and be so arranged that the outboard edge is slightly above the level of the helideck edge, but by not more than 0.25 m, having an upward and outward slope of at least 10 degrees. The net should be strong enough to withstand, without damage, a 75 kg mass being dropped from a height of 1.0 m.

1.2 A safety net designed to meet these criteria may nevertheless be too rigid and act as a trampoline giving a "bounce" effect. Further, if lateral or longitudinal centre bars are provided to strengthen the net structure, there is a risk of serious injury to persons falling across them. The ideal design should produce a "hammock" effect which should securely contain a body falling or jumping into the net, without injury.

### 2. STRUCTURAL DESIGN STRENGTH<sup>5</sup>

2.1 Elevated helidecks may be designed for a specific helicopter type though greater operational flexibility will be obtained from a classification system of design. The FATO should be designed for the largest or heaviest type of helicopter that it is anticipated will use the helideck, and account taken of other types of loading such as personnel, freight, refueling equipment, etc. For the purpose of design, it is to be assumed that the helicopter will land on two main wheels, irrespective of the actual number of wheels in the undercarriage, or on two skids if they are fitted. The loads imposed on the structure should be taken as point loads at the wheel centres; details are specific in the ICAO Doc 9261: Heliport Manual.

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<sup>4</sup>ICAO Heliport Manual (Doc 9261) Chapter 1, paragraph 1.4.4

<sup>5</sup>ICAO Heliport Manual (Doc 9261) Chapter 1, paragraph 1.3.2 and CAAP 70

## CHAPTER 6 – OBSTACLE RESTRICTION AND REMOVAL

**Note – In addition to the specification listed within this Chapter, reference shall also be made to CAAP 70 with reference to obstacle restriction and removal.**

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

### 1 OBSTACLE-FREE SECTOR / SURFACE - HELIDECKS

#### **Description**

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

#### **Characteristics**

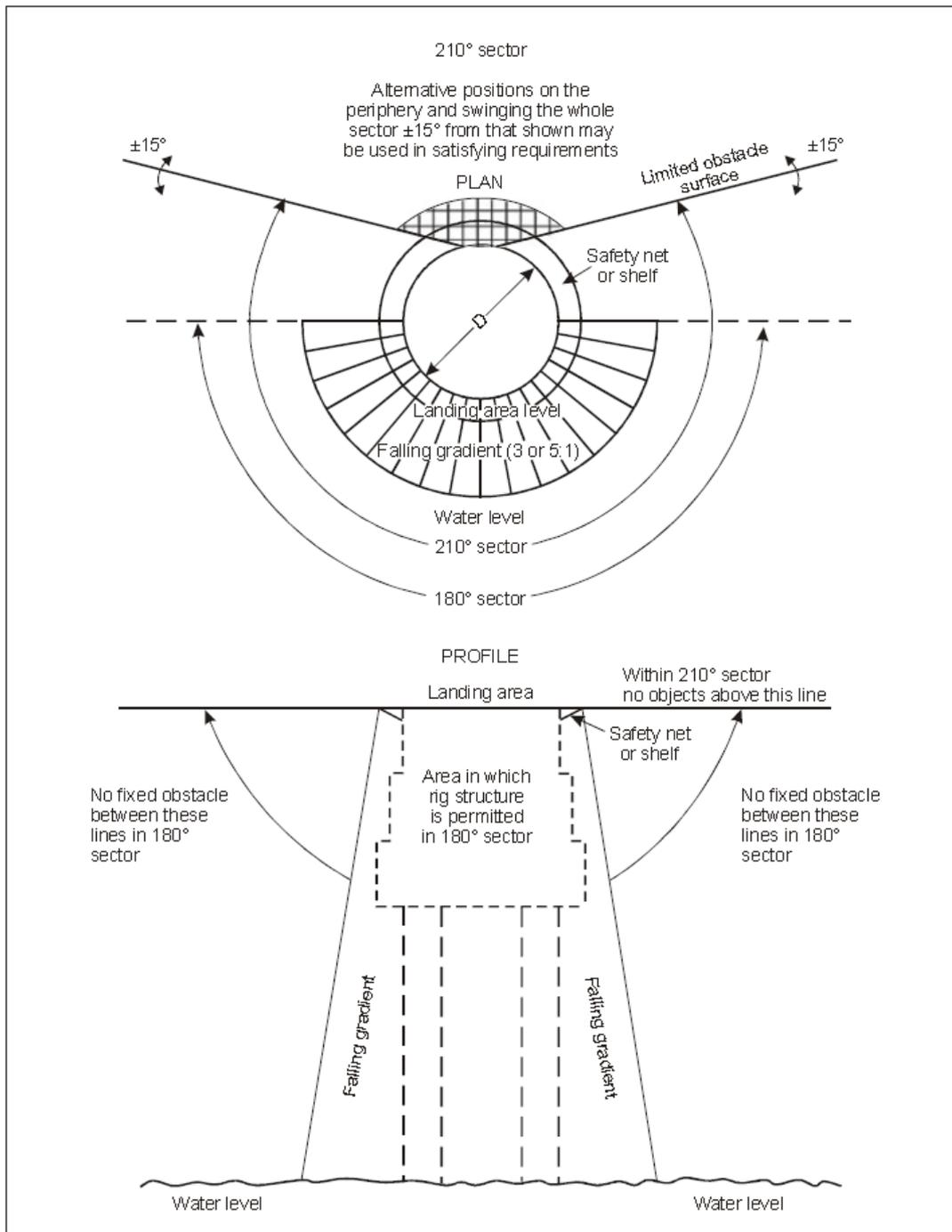
An obstacle-free sector/surface shall subtend an arc of specified angle.

1.1 A helideck obstacle-free sector shall comprise two components, one above and one below helideck level (see Figure 6-1):

- a) *Above helideck level.* The surface shall be a horizontal plane level with the elevation of the helideck surface that subtends an arc of at least 210 degrees with the apex located on the periphery of the D circle extending outwards to a distance that will allow for an unobstructed departure path appropriate to the helicopter the helideck is intended to serve.
- b) *Below helideck level.* Within the (minimum) 210-degree arc, the surface shall additionally extend downward from the edge of the FATO below the elevation of the helideck to water level for an arc of not less than 180 degrees that passes through the centre of the FATO and outwards to a distance that will allow for safe clearance from the obstacles below the helideck in the event of an engine failure for the type of helicopter the helideck is intended to serve.

*Note — For both the above obstacle-free sectors for helicopters operated in performance class 1 or 2, the horizontal extent of these distances from the helideck will be compatible with the one-engine-inoperative capability of the helicopter type to be used.*

**Figure 6-1 Helideck obstacle-free sector**



## 2 LIMITED OBSTACLE SECTOR / SURFACE - HELIDECKS

*Note — Where obstacles are necessarily located on the structure, a helideck may have a limited obstacle sector (LOS).*

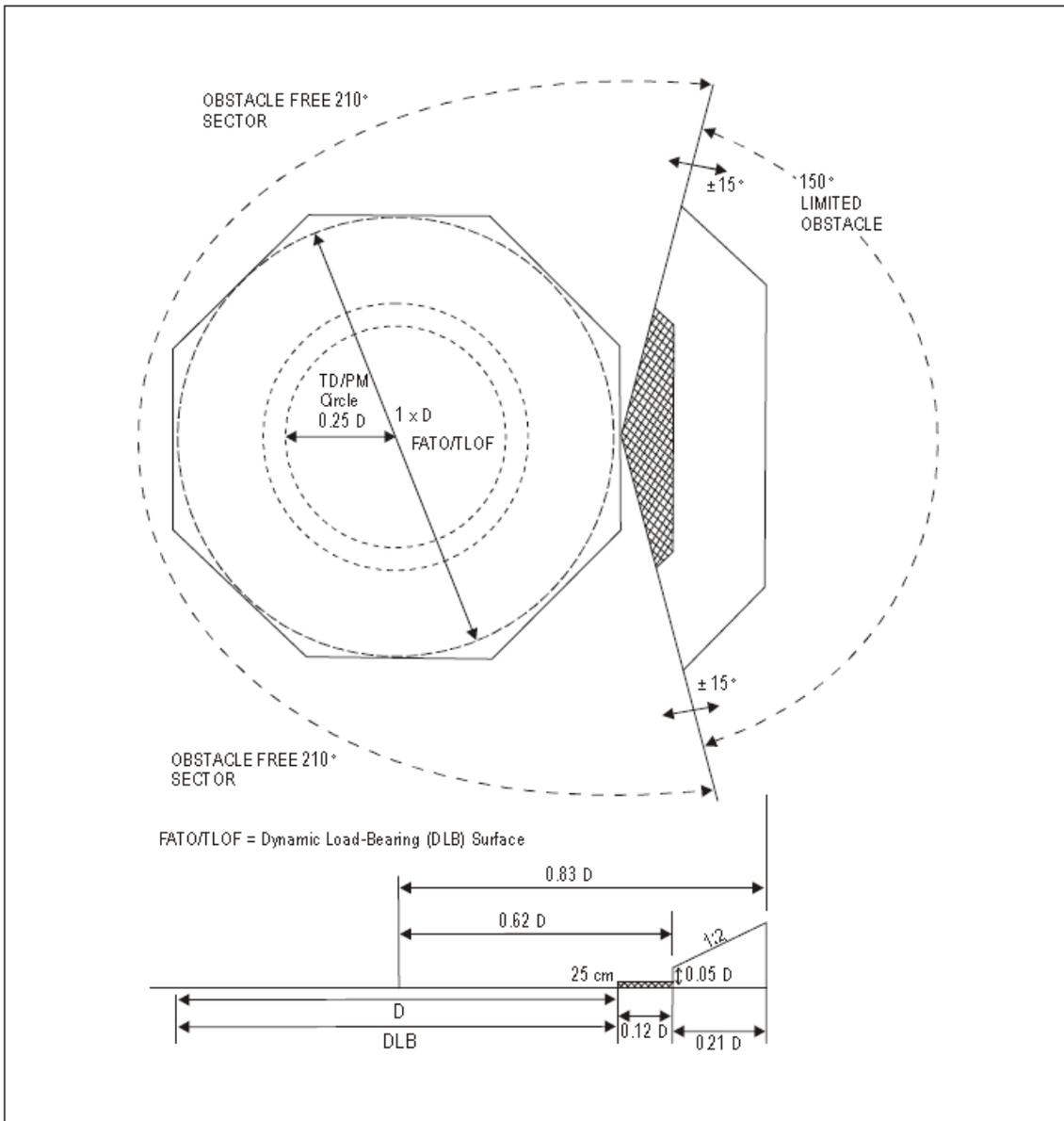
### **Description**

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

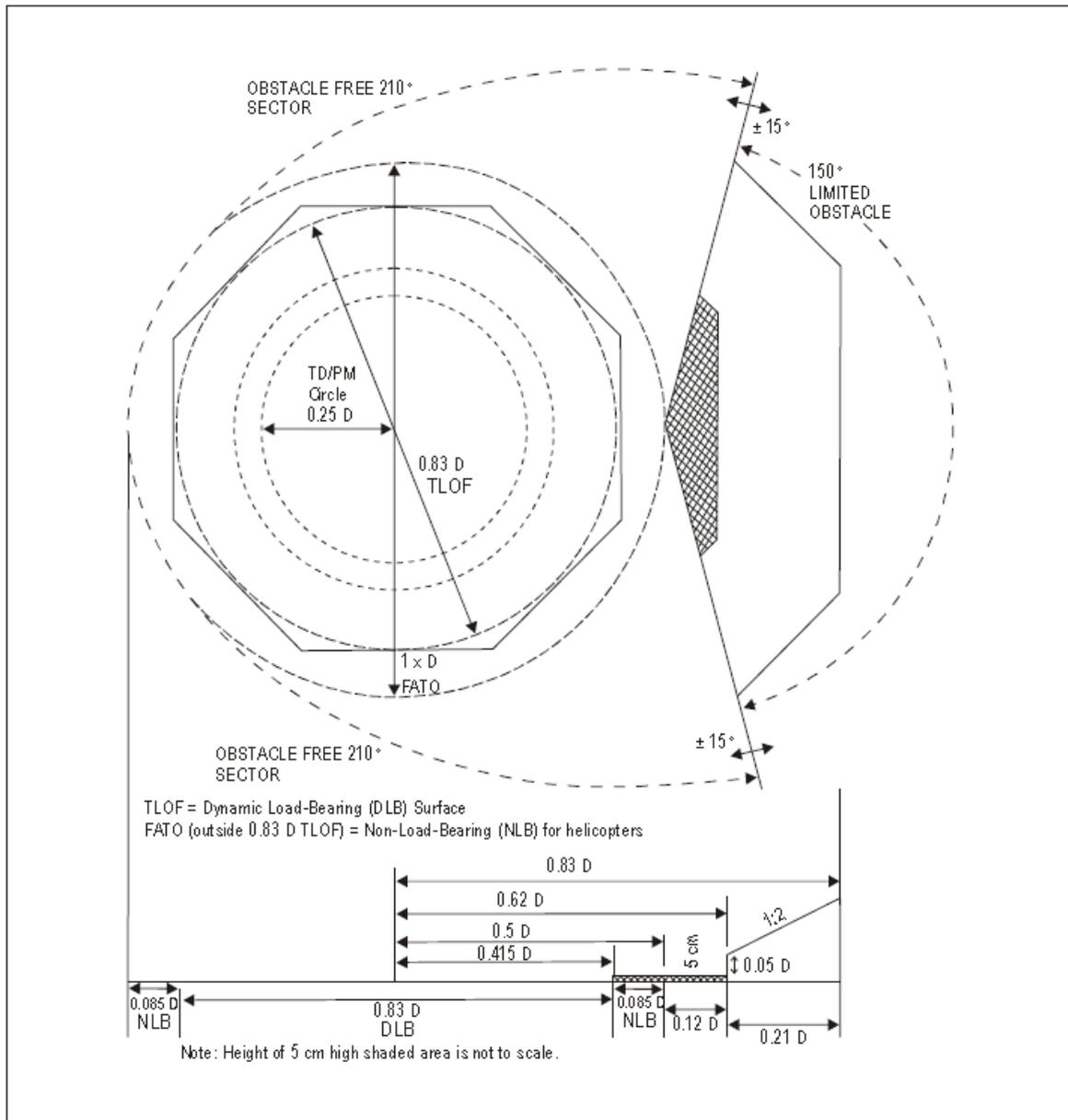
**Characteristics**

A limited obstacle sector shall not subtend an arc greater than 150 degrees. Its dimensions and location shall be as indicated in Figure 6-2 for a 1 D FATO with coincidental TLOF and Figure 6-3 for a 0.83 D TLOF.

**Figure 6-2 Helideck obstacle limitation sectors and surfaces for a FATO and coincidental TLOF of 1 D and larger**



**Figure 6-3 Helideck obstacle limitation sectors and surfaces for a TLOF of 0.83 D and larger**



### 3 OBSTACLE LIMITATION REQUIREMENTS

#### Helidecks

3.1 A helideck shall have an obstacle-free sector.

*Note — A helideck may have a limited obstacle sector (LOS), (see Chapter 6 section 2, Characteristics).*

3.2 There shall be no fixed obstacles within the obstacle-free sector above the obstacle-free surface.

3.3 In the immediate vicinity of the helideck, obstacle protection for helicopters shall be provided below the heliport level. This protection shall extend over an arc of at least 180 degrees with the origin at the centre of the FATO, with a descending gradient having a ratio of one unit horizontally to five units vertically from the edges of the FATO within the 180-

degree sector. This descending gradient may be reduced to a ratio of one unit horizontally to three units vertically within the 180-degree sector for multi-engine helicopters operated in performance class 1 or 2 (see Figure 6-1).

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

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 limited obstacle sector, objects shall not exceed a height of 25 cm above the TLOF. Beyond that arc, out to an overall distance of a further 0.21 D measured from the end of the first sector, the limited obstacle surface rises at a rate of one unit vertically for each two units horizontally originating at a height 0.05 D above the level of the TLOF. (See Figure 6-2).

*Note — Where the area enclosed by the TLOF perimeter marking is a shape other than circular, the extent of the LOS segments are represented as lines parallel to the perimeter of the TLOF rather than arcs. Figure 6-2 has been constructed on the assumption that an octagonal helideck arrangement is provided. Further guidance for square (quadrilateral) and circular FATO and TLOF arrangements is given in the Heliport Manual (Doc 9261).*

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 shall not exceed a height of 5 cm above the TLOF. Beyond that arc, out to an overall distance of 0.83 D from the centre of the TLOF, the limited obstacle surface rises at a rate of one unit vertically for each two units horizontally originating at a height 0.05 D above the level of the TLOF. (See Figure 6-3).

*Note — Where the area enclosed by the TLOF perimeter marking is a shape other than circular, the extent of the LOS segments are represented as lines parallel to the perimeter of the TLOF rather than arcs. Figure 6-3 has been constructed on the assumption that an octagonal helideck arrangement is provided. Further guidance for square (quadrilateral) and circular FATO and TLOF arrangements is given in the Heliport Manual (Doc 9261).*

## **Shipboard heliports**

### *Purpose-built heliports located forward or aft*

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

### *Amidships location - purpose-built and non-purpose-built*

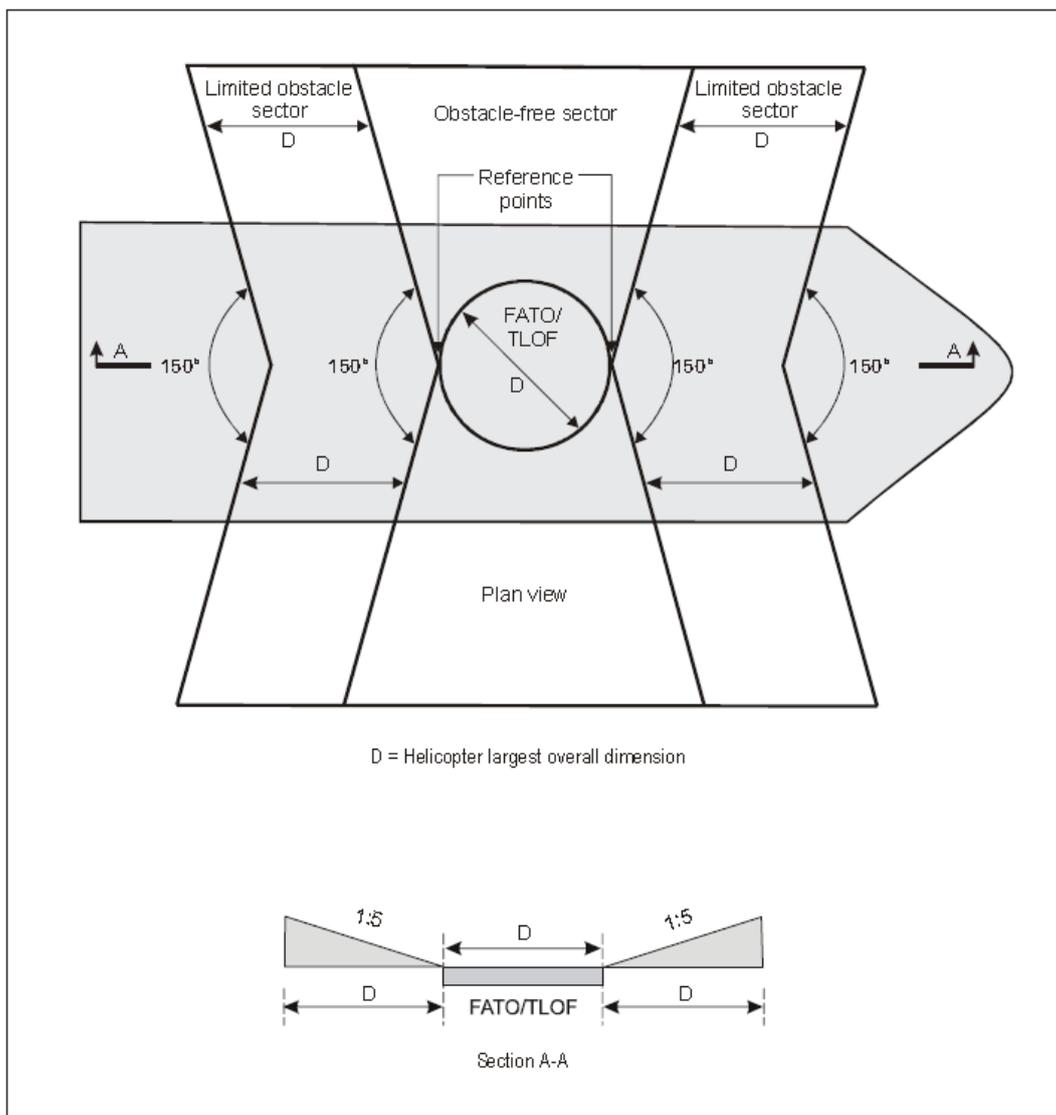
3.7 Forward and aft of a TLOF of 1 D and larger shall be two symmetrically located sectors, each covering an arc of 150 degrees, with their apexes on the periphery of the TLOF. Within the area enclosed by these two sectors, there shall be no objects rising above the level of the TLOF, except those aids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

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

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

3.9 To provide further protection from obstacles fore and aft of the TLOF, rising surfaces with gradients of one unit vertically to five units horizontally shall extend from the entire length of the edges of the two 150-degree sectors. These surfaces shall extend for a horizontal distance equal to at least 1 D of the largest helicopter the TLOF is intended to serve and shall not be penetrated by any obstacle. (See Figure 6-4).

**Figure 6-4 Amidship's location – Shipboard heliport obstacle limitation surfaces**



Non-purpose-built heliports

Ship's side location

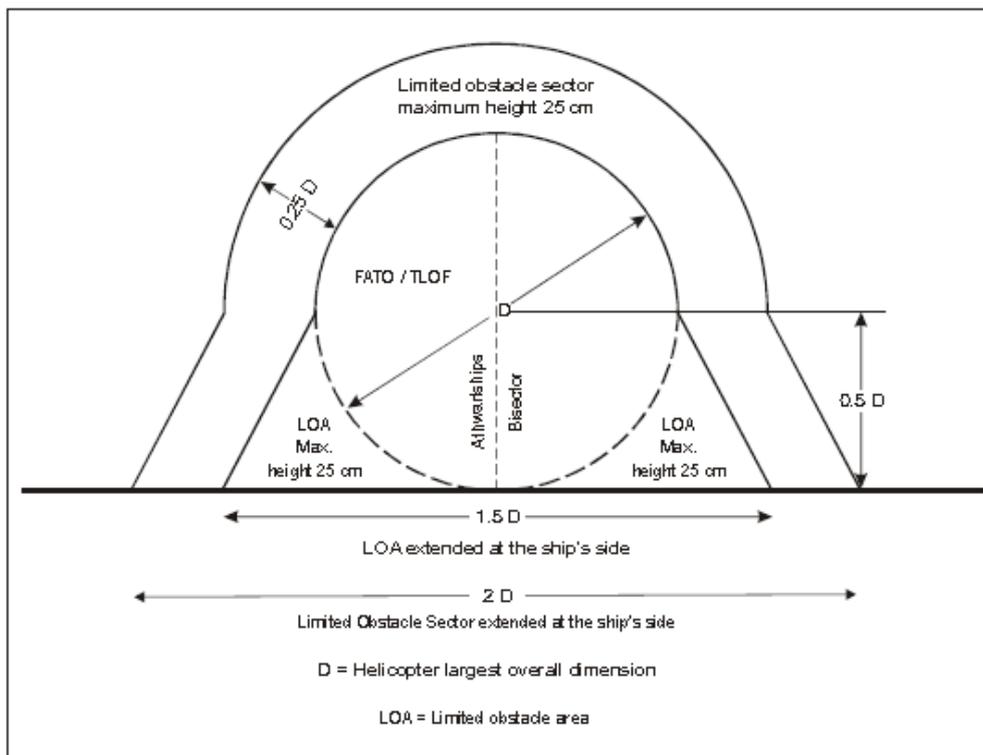
3.10 No objects shall be located within the TLOF except those aids essential for the safe operation of a helicopter (such as nets or lighting) and then only up to a maximum height of 2.5 cm. Such objects shall only be present if they do not represent a hazard to helicopters.

3.11 From the fore and aft mid-points of the D circle in two segments outside the circle, limited obstacle areas shall extend to the ship's rail to a fore and aft distance of 1.5 times the fore-to-aft-dimension of the TLOF, located symmetrically about the athwartships bisector of the D circle. Within these areas there shall be no objects rising above a maximum height of 25 cm above the level of the TLOF. (See Figure 6-5). Such objects shall only be present if they do not represent a hazard to helicopters.

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

*Note — Any objects located within the areas described in 3.11 and 3.12 that exceed the height of the TLOF are notified to the helicopter operator using a ship's helicopter landing area plan. For notification purposes it may be necessary to consider immovable objects beyond the limit of the surface prescribed in 3.12 particularly if objects are significantly higher than 25 cm and in close proximity to the boundary of the LOS. See the Heliport Manual (Doc 9261) for guidance.*

**Figure 6-5 Ships-side non-purpose-built heliport obstacle limitation sectors and surfaces**



### Winching areas

3.13 An area designated for winching on-board ships shall comprise 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 6-6).

3.14 The manoeuvring zone shall comprise of two areas:

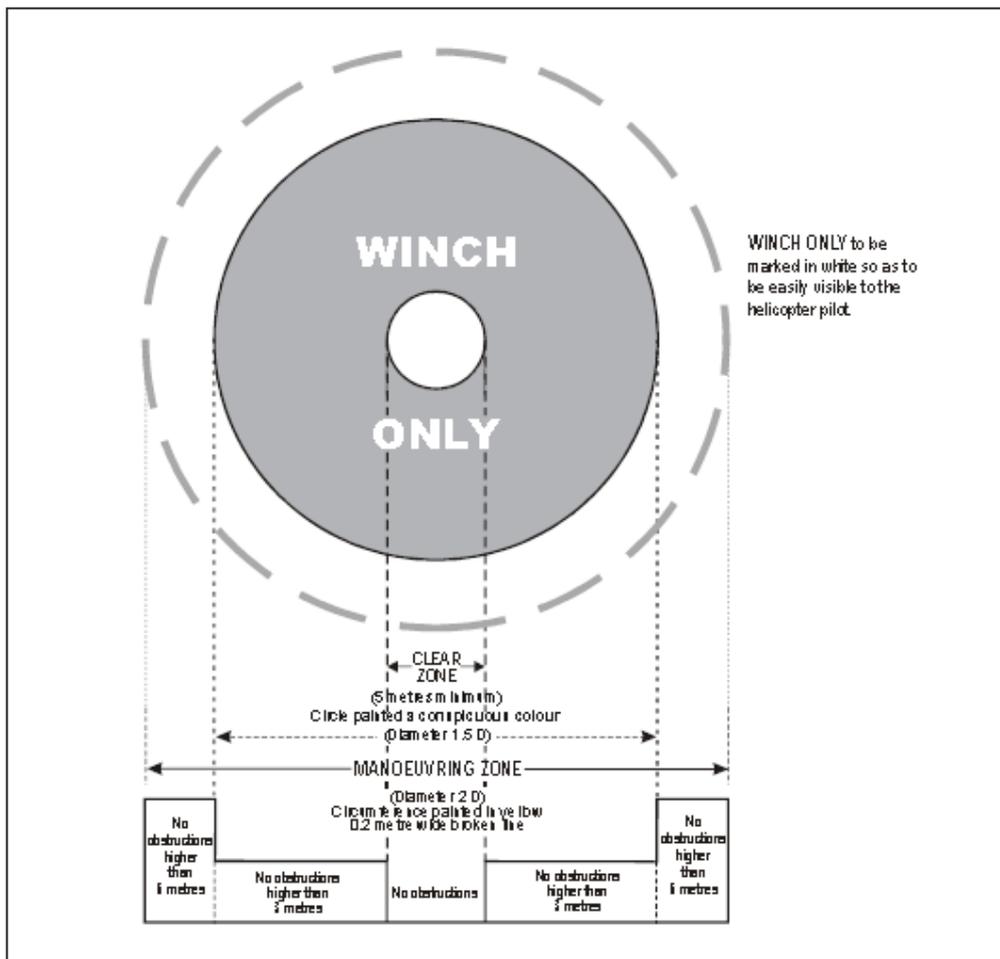
- a) the inner manoeuvring zone extending from the perimeter of the clear zone and of a circle of diameter not less than 1.5 D; and
- b) the outer manoeuvring zone extending from the perimeter of the inner manoeuvring zone and of a circle of diameter not less than 2 D.

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

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

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

**Figure 6-6 Winching area of a ship**



## CHAPTER 7 – VISUAL AIDS

**Note – In addition to the specification listed within this Chapter, reference shall also be made to CAAP 70.**

*Note — For a non-purpose-built heliport located on a ship's side the surface colour of the main deck can vary from ship to ship and therefore some discretion may need to be exercised in the colour selection of heliport paint schemes; the objective being to ensure that the markings are conspicuous against the surface of the ship and the operating background.*

### 1 WIND DIRECTION INDICATORS

**Application, Location and Characteristics:** refer to CAAP 70.

### 2 WINCHING AREA MARKING

#### **Application**

2.1 Winching area markings shall be provided at a designated winching area (see Figure 6-6).

#### **Location**

2.2 Winching area markings shall be located so that their centre(s) coincides with the centre of the clear zone of the winching area (see Figure 6-6).

#### **Characteristics**

2.3 Winching area markings shall comprise a winching area clear zone marking and a winching area manoeuvring zone marking.

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

2.5 A winching area manoeuvring zone marking shall consist of a broken circle of 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" shall be marked to be easily visible to the pilot.

### 3 HELIDECK IDENTIFICATION MARKING

#### **Application**

3.1 Heliport identification markings shall be provided at a heliport.

#### **Location** (in addition to CAAP 70)

*Note — If the touchdown/positioning marking is offset on a helideck, the heliport identification marking is established in the centre of the touchdown/positioning marking.*

#### **Characteristics** (in addition to CAAP 70)

3.2 For a helideck the cross arm shall 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 shall be parallel with the side of the ship.

3.3 Recommendation — On a helideck and shipboard heliport 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.

#### **4 MAXIMUM ALLOWABLE MASS MARKING**

##### **Application**

4.1 A maximum allowable mass marking shall be displayed at an elevated heliport, a helideck and a shipboard heliport.

**Location and Characteristics:** refer to CAAP 70.

#### **5 D-VALUE MARKING**

##### **Application**

5.1 The D-value marking shall be displayed at a helideck and at a shipboard heliport.

**Location** (in addition to CAAP 70)

5.2 Recommendation — 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 directions. 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.

**Characteristics:** refer to CAAP 70.

#### **6 FINAL APPROACH AND TAKE-OFF AREA DIMENSION(S) MARKING**

**Application, Location and Characteristics:** refer to CAAP 70.

#### **7 AIMING POINT MARKING**

**Application, Location and Characteristics:** refer to CAAP 70.

#### **8 TOUCHDOWN AND LIFT-OFF AREA PERIMETER MARKING**

##### **Application**

8.1 A TLOF perimeter marking shall be displayed on an elevated heliport, a helideck and a shipboard heliport.

##### **Location**

8.2 The TLOF perimeter marking shall be located along the edge of the TLOF.

##### **Characteristics**

8.3 A TLOF perimeter marking shall consist of a continuous white line with a width of at least 30 cm.

## **9 TOUCHDOWN / POSITIONING MARKING**

### **Application**

9.1 A touchdown/positioning marking shall be provided where it is necessary for a helicopter to touch down and/or be accurately positioned by the pilot. A touchdown/positioning marking shall be provided on a helicopter stand designed for turning.

### **Location** (in addition to CAAP 70)

9.2 A touchdown/positioning marking shall be located so that when the pilot's seat is over the marking, the whole of the undercarriage will be within the TLOF and all parts of the helicopter will be clear of any obstacle by a safe margin.

9.3 On a helideck the centre of the touchdown marking shall 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 to be necessary and that a marking so offset would not adversely affect the safety.

### **Characteristics**

9.4 A touchdown/positioning marking shall be a yellow circle. For a helideck and a purpose-built shipboard heliport, the line width shall be at least 1 m.

9.5 The inner diameter of the circle shall be 0.5 D of the largest helicopter the TLOF is intended to serve.

## **10 HELIPORT NAME MARKING**

### **Application**

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

### **Location**

10.2 Recommendation — The heliport name marking should be displayed on the heliport so as to be visible, as far as practicable, at all angles above the horizontal. Where an obstacle sector exists on a helideck the marking should be located on the obstacle 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.

### **Characteristics** (in addition to CAAP 70)

10.3 Recommendation — The characters of the marking should be 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.

## **11 HELIDECK OBSTACLE-FREE SECTOR (CHEVRON) MARKING**

### **Application**

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

## **Location**

11.2 A helideck obstacle-free sector marking shall 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.

*Note — Where the Point of Origin is outside the TLOF, and it is not practicable to physically paint the chevron, the chevron is relocated to the TLOF perimeter on the bisector of the OFS. In this case the distance and direction of displacement, along with the attention getting “WARNING DISPLACED CHEVRON”, with the distance and direction of displacement, is marked in a box beneath the chevron in black characters not less than 10 cm high — an example Figure is given in the Heliport Manual (Doc 9261).*

## **Characteristics**

11.3 The helideck obstacle-free sector marking shall indicate the location of the obstacle-free sector and the directions of the limits of the sector.

*Note — Example figures are given in the Heliport Manual (Doc 9261).*

11.4 The height of the chevron shall not be less than 30 cm.

11.5 The chevron shall be marked in a conspicuous colour.

11.6 Recommendation — The colour of the chevron should be black.

## **12 HELIDECK AND SHIPBOARD HELIPORT SURFACE MARKING**

### **Application**

12.1 Recommendation — 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.

### **Location**

12.2 Recommendation — A surface marking should be applied to the dynamic load bearing area bounded by the TLOF perimeter marking.

### **Characteristics**

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

*Note — Where the application of a surface coating may have a degrading effect on friction qualities the surface might not be painted. In such cases the best operating practice to enhance the conspicuity of markings is to outline deck markings with a contrasting colour.*

## **13 HELIDECK PROHIBITED LANDING SECTOR MARKINGS**

### **Application**

13.1 Recommendation — Helideck prohibited landing sector markings should be provided where it is necessary to prevent the helicopter from landing within specified headings.

### **Location**

13.2 *The prohibited landing sector markings should be located on the touchdown/positioning marking to the edge of the TLOF, within the relevant headings.*

### **Characteristics**

13.3 The prohibited landing sector markings shall be indicated by white and red hatched markings as shown in Figure 7-1.

*Note — Prohibited landing sector markings, where deemed necessary, are applied to indicate a range of helicopter headings that are not to be used by a helicopter when landing. This is to ensure that the nose of the helicopter is kept clear of the hatched markings during the manoeuvre to land.*

**Figure 7-1 Helideck prohibited landing sector marking**



## **14 HELICOPTER STAND MARKINGS**

**Application, Location and Characteristics:** refer to CAAP 70.

## **15 FLIGHT PATH ALIGNMENT GUIDANCE MARKING**

### **Application**

15.1 Recommendation — 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).

**Location and Characteristics:** refer to CAAP 70.

## CHAPTER 8 – AERONAUTICAL LIGHTS

**Note – In addition to the specification listed within this Chapter, reference shall also be made to CAAP 70.**

*In addition to CAAP 70:*

*Note — In the case of helidecks and heliports located near navigable waters, consideration needs to be given to ensuring that aeronautical ground lights do not cause confusion to mariners.*

### **1 HELIPORT BEACON**

**Application, Location and Characteristics:** refer to CAAP 70.

### **2 APPROACH LIGHTING SYSTEM**

**Application, Location and Characteristics:** refer to CAAP 70.

### **3 FLIGHT PATH ALIGNMENT GUIDANCE LIGHTING SYSTEM**

**Application, Location and Characteristics:** refer to CAAP 70.

### **4 VISUAL ALIGNMENT GUIDANCE SYSTEM**

**Application, Location and Characteristics:** refer to CAAP 70.

### **5 VISUAL APPROACH SLOPE INDICATOR**

**Application, Location and Characteristics:** refer to CAAP 70.

### **6 AIMING POINT LIGHTS**

**Application, Location and Characteristics:** refer to CAAP 70.

### **7 TOUCHDOWN AND LIFT-OFF AREA LIGHTING SYSTEM**

#### **Application**

7.1 A TLOF lighting system shall be provided at a helideck intended for use at night.

7.2 The TLOF lighting system for an elevated heliport or helideck shall consist of:

- a) perimeter lights; and
- b) ASPSL and/or LPs to identify the touchdown marking where it is provided and/or floodlighting to illuminate the TLOF.

*Note — At elevated heliports and helidecks, surface texture cues within the TLOF are essential for helicopter positioning during the final approach and landing. Such cues can be provided using various forms of lighting (ASPSL, LP, floodlights or a combination of these lights, etc.) in addition to perimeter lights. Best results have been demonstrated by the combination of perimeter lights and ASPSL in the form of encapsulated strips of light emitting diodes (LEDs) to identify the touchdown and heliport identification markings.*

## Location

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

- a) located on straight lines in a pattern which will provide information to pilots on drift displacement; and
- b) where a) is not practicable, evenly spaced around the perimeter of the TLOF at the appropriate interval, except that over a sector of 45 degrees the lights shall be spaced at half spacing.

7.4 TLOF perimeter lights shall be uniformly spaced at intervals of not more than 3 m for elevated heliports and helidecks. There shall be a minimum number of four lights on each side including a light at each corner. For a circular TLOF, where lights are installed in accordance with 1.4 b) there shall be a minimum of fourteen lights.

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

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

7.6 The TLOF perimeter lights shall be installed at a floating helideck, such that the pattern cannot be seen by the pilot from below the elevation of the TLOF when the helideck is level.

7.7 Recommendation — 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 touchdown marking where it is provided or coincident with heliport identification marking.

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

*Note — ASPSL and LPs used to designate the touchdown and/or heliport identification marking have been shown to provide enhanced surface texture cues when compared to low-level floodlights. Due to the risk of misalignment, if floodlights are used, there will be a need for them to be checked periodically to ensure they remain within the specifications.*

**Characteristics:** refer to CAAP 70 and in addition:

7.9 Recommendation — When located within the safety area of a heliport or within the obstacle-free sector of a helideck, the TLOF floodlights should not exceed a height of 25 cm.

## 8 WINCHING AREA FLOODLIGHTING

### Application

8.1 Winching area floodlighting shall be provided at a winching area intended for use at night.

## **Location**

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

## **Characteristics**

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

8.4 *Recommendation — The average horizontal luminance should be at least 10 lux, measured on the surface of the winching area.*

## **9 VISUAL AIDS FOR DENOTING OBSTACLES**

**Application, Location and Characteristics:** refer to CAR Part IX.

## **10 FLOODLIGHTING OF OBSTACLES**

**Application, Location and Characteristics:** refer to CAAP 70.

## CHAPTER 9 – RESCUE AND FIRE FIGHTING FACILITIES

***Note – Reference shall also be made to CAAP 70.***

1.1 This Chapter refers directly to UK CAP 437 (Chapter 5); it sets out the requirements regarding provision of equipment, extinguishing media, personnel, training and emergency procedures for off-shore helidecks on installations and vessels.

1.2 Advice is available from the GCAA, Aerodrome Section regarding the choice and specification of fire extinguishing agents.