

Revision 3

## Aerodrome Design: Heliports

5 April 2018

### General

Civil Aviation Authority (CAA) Advisory Circulars (ACs) contain information about standards, practices, and procedures that the Director has found to be an **acceptable means of compliance** with the associated rule.

Consideration will be given to other methods of compliance that may be presented to the Director. When new standards, practices, or procedures are found to be acceptable they will be added to the appropriate AC.

### Purpose

This AC describes an acceptable means of compliance with the general requirements for design and layout of heliports under Civil Aviation Rule Part 139 *Aerodromes Certification, Operation and Use*.

### Change Notice

Revision 3 replaces non-ICAO abbreviation for touchdown and lift-off area, TALO, with the correct abbreviation, TLOF.

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## 1. GENERAL

### 1.1 Introduction

**1.1.1** This advisory circular provides acceptable design specifications for heliports located in populous areas. This advisory circular is not exhaustive and further detailed specifications can be found in *ICAO Annex 14, Volume II, Heliports*.

**1.1.2** The function of the touchdown and lift-off area (TLOF) and certain associated elements are vital in providing for safe and efficient helicopter touch downs and lift offs. The design of these areas must take into account the operational and physical characteristics of the helicopters expected to use the heliport.

### 1.2 Heliport site selection

**1.2.1** Heliport design and location should be such that cross wind operations are kept to a minimum and downwind operations avoided. Ideally heliports should have two approaches 180° apart, which should give an acceptable degree of usability provided one approach is into the prevailing wind direction.

**1.2.2** The presence of buildings or some other obstacles may prevent a 180° approach orientation. In such a situation, the approached should not be less than 90° apart.

**1.2.3** If the heliport is to be used by other than a performance Class 1 helicopter, it should be so located that an emergency landing can be conducted at any time along the inbound and outbound routes including the take-off and approach paths without any undue risk to any person or property on the ground.

### 1.3 Definitions

See also Part 1 of the Civil Aviation Rules for other terms.

**Aiming point** means a triangular marking, displayed on a FATO, to which point a pilot is required to make the final approach before proceeding to a TLOF.

**Air taxiway** means a defined path on the surface established for the air taxiing of helicopters.

**Approach** means a series of predetermined manoeuvres for the orderly transfer of an aircraft to a point either where a landing may be made or where an aircraft may drop, off-load or pick up persons or load of any description.

**Elevated heliport** means a heliport located on a raised structure on land.

**Final approach and take-off area (FATO)** means 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 and, where the FATO is to be used by performance Class 1 helicopters, includes the rejected take-off area available.

**Helideck** means a heliport located on a floating or fixed off-shore structure.

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

**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.

**Overall helicopter length** means the maximum length of a helicopter including rotors, measured through the fore and aft centre line of the aircraft.

**Overall helicopter width** means the diameter of the main rotor.

**Performance Class 1 helicopter** means a helicopter with performance such that, in case of engine failure, it is able to land on the rejected take-off area or continue the flight to an appropriate landing area.

**Safety area** means 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. It should be capable of supporting the weight of a helicopter.

**Surface level heliport** means a heliport located on the ground or on the water.

**Touchdown and lift-off area (TLOF)** means a load bearing area on which a helicopter may touch down or lift off.

## 2. HELIPORT DATA

### 2.1 Heliport dimensions and related information

The following data should be measured or described, as appropriate, for each facility provided on a heliport if the data is to be promulgated to the users of the heliport:

- (a) heliport type – surface level, elevated helideck
- (b) touchdown and lift-off area – dimensions, slope, surface type, bearing strength in tonnes (1000 kg)
- (c) final approach and take-off areas – length, width, slope, surface type
- (d) safety area – length, width and surface type
- (e) helicopter air taxiway designation, width, surface type
- (f) apron – surface type
- (g) significant obstacles on and in the vicinity of the heliport – location, top elevation to the nearest (next higher) metre or foot, type
- (h) visual aids for approach procedures, marking and lighting of FATO, TLOF, taxiways and aprons
- (i) location of any windsock and whether lit.

### 3. PHYSICAL CHARACTERISTICS

#### 3.1 Surface level heliport

##### Final approach and take-off areas (FATO)

**3.1.1** A surface level heliport should be provided with at least one FATO.

**3.1.2** The dimensions of a FATO should be of sufficient size and shape to contain an area within which can be drawn a circle of diameter not less than 1.5 times the over-all length or width, whichever is the greater, of the longest or widest helicopter the heliport is intended to serve.

**3.1.3** The overall slope above the horizontal in any direction on the FATO should not exceed 3 percent. No portion should have a local slope exceeding 5 percent.

**3.1.4** The surface of a surface level FATO should be resistant to the effects of rotor downwash.

**3.1.5** There should be no obstacles within the FATO area likely to interfere with the manoeuvring of the helicopter.

##### Separation between FATO

**3.1.6** Separation between minimum sized final approach and take-off areas should be one rotor diameter of the largest helicopter using either FATO.

##### Touchdown and lift-off areas (TLOF)

**3.1.7** At least one TLOF should be provided at a heliport. It may or may not be located within the FATO.

**3.1.8** The TLOF should be of sufficient size to contain a circle of diameter 1.5 times the length or width of the undercarriage, whichever is the greater, of the largest helicopter the area is intended to serve.

**3.1.9** The TLOF should preferably be level or if a slope cannot be avoided it should not exceed the slope limitations in the flight manual of the helicopters that it is intended to serve.

**3.1.10** When a TLOF is not contained within a FATO, it should be located to provide a minimum horizontal main rotor clearance of half the rotor diameter from any fixed obstacle (building, hangar, pole and so on).

##### Separation between TLOF

**3.1.11** The TLOF should be of sufficient strength to bear twice the gross weight of the largest helicopter to use the area.

**3.1.12** The surface of the TLOF should be slip resistant both for the helicopter and for the safety of people moving about on the area.

**3.1.13** When FATO contains more than one TLOF, the separation between touchdown and lift-off areas should be at least one rotor diameter of the largest helicopter using either TLOF.

##### Safety area

**3.1.14** A FATO should be surrounded by a safety area.

**3.1.15** The safety area should extend outwards from the periphery of the FATO for a distance of at least 3000 mm or 0.25 times the over-all length or width, whichever is the greater, of the longest or widest helicopter the area is intended to serve.

**3.1.16** No fixed object should be permitted on a safety area, except for frangible mounted objects which, because of their function, must be located on the area. No mobile objects should be permitted on a safety area during helicopter operations.

**3.1.17** Objects whose functions require them to be located on the safety area should not exceed a height of 250 mm when located along the edge of the FATO nor penetrate a plane originating at a height of 250 mm above the edge of the FATO and sloping upwards and outwards from the edge of the FATO at a gradient of 5 percent.

**3.1.18** The surface of the safety area should not exceed an upward slope of 4 percent outwards from the edge of the FATO.

#### **Parking area**

**3.1.19** Helicopter parking should be adequate to accommodate the number of helicopters to be served. A design which requires a helicopter to be parked in a minimum sized FATO or on a TLOF makes that area unavailable for take offs and landings by other helicopters.

**3.1.20** To maintain the usability of the heliport, parking areas should be located clear of the approach and take-off surfaces and have at least one third rotor diameter clearance from any adjacent fixed or movable object.

#### **Air taxiway**

**3.1.21** An air taxiway should be provided for the inflight movement of a helicopter to a TLOF which is not situated within a FATO.

**3.1.22** The width of an air taxiway should be at least two times the overall width of the helicopters that the air taxiway is intended to serve.

**3.1.23** The surface of the air taxiway should:

- (a) be resistance to the effects of rotor downwash
- (b) be suitable for emergency landings
- (c) provide ground effect.

**3.1.24** The separation distance between an air taxiway and another air taxiway, an air taxiway and an obstruction, or a TLOF and an air taxiway, should not be less than the appropriate dimension in Table 3-1.

**Table 3-1. Helicopter air taxiway separation distances**

Air taxiway	Obstruction	TLOF
4 <sup>a</sup> between centre lines)	1.5 <sup>a</sup> (centre line to obstruction	4 <sup>a</sup> (centre line to edge)

<sup>a</sup> - Multiples of over-all width of helicopter with rotor turning

### Location of a final approach and take-off area in relation to a runway or taxiway

**3.1.25** Where a FATO is located near a runway or taxiway, and simultaneous VMC 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 dimensions in Table 3-2.

**Table 3-2. FATO minimum separation distances**

If aeroplane mass and/or helicopter mass are	Distance between FATO edge and runway edge or taxiway edge
Up to but not including 2720 kg	60 m
2720 kg up to but not including 5760 kg	120 m
5760 kg up to but not including 100 000 kg	180 m
100 000 kg and over	250 m

**3.1.26** A FATO should not be located:

- (a) near a taxiway intersection 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 Elevated heliport

### General specification

**3.2.1** FATO, TLOF and safety area dimensions, slopes, etc., should be as for surface level heliports. The minimum diameter of the surface area should not be less than the overall length of the longest helicopter for which the heliport is intended to be used.

### Strength requirement

**3.2.2** The elevated heliport should have the same strength as specified for helidecks in 3.3.8.

### Egress

**3.2.3** Not less than two exits should be provided. They should be outside the heliport area, on opposite sides of the area, and associated stairways should be at least 1000 mm wide, with handrails.

**3.2.4** Stairways should be constructed of non-combustible materials and may not be covered by hatches.

**3.2.5** Where stairway handrails intrude into the approach/departure sector obstacle free surface, they should be retractable to the heliport surface level and should not obstruct the stairway when retracted.

### Paint colour

**3.2.6** Where an elevated heliport is to be used at night, the paint colour used for handrails, safety-net frames, step edges and such like. It should be a light colour that will reflect any available scattered light.



### Safety area

**3.2.7** A safety area surrounding an elevated heliport may be wholly or partly beyond the side of the structure.

### Safety net

**3.2.8** A safety net should be placed on the perimeter of the platform at the places where it is not possible to install a guard rail which would otherwise infringe clear area requirements. The net should have the following characteristics:

Width:	At least 1500 mm
Minimum strength:	200 kg per linear meter
Slope:	The net should be fixed to the structure at such a height below the FATO surface to slope upwards and outwards at 1:4 with its outer edge no higher than the TLOF surface.

**3.2.9** By its design, the net may also double as a guard rail when the heliport is not being used for helicopter operations. Refer Fig. 3-1. Each section of netting should be enclosed in a solid frame such as galvanised pipe.

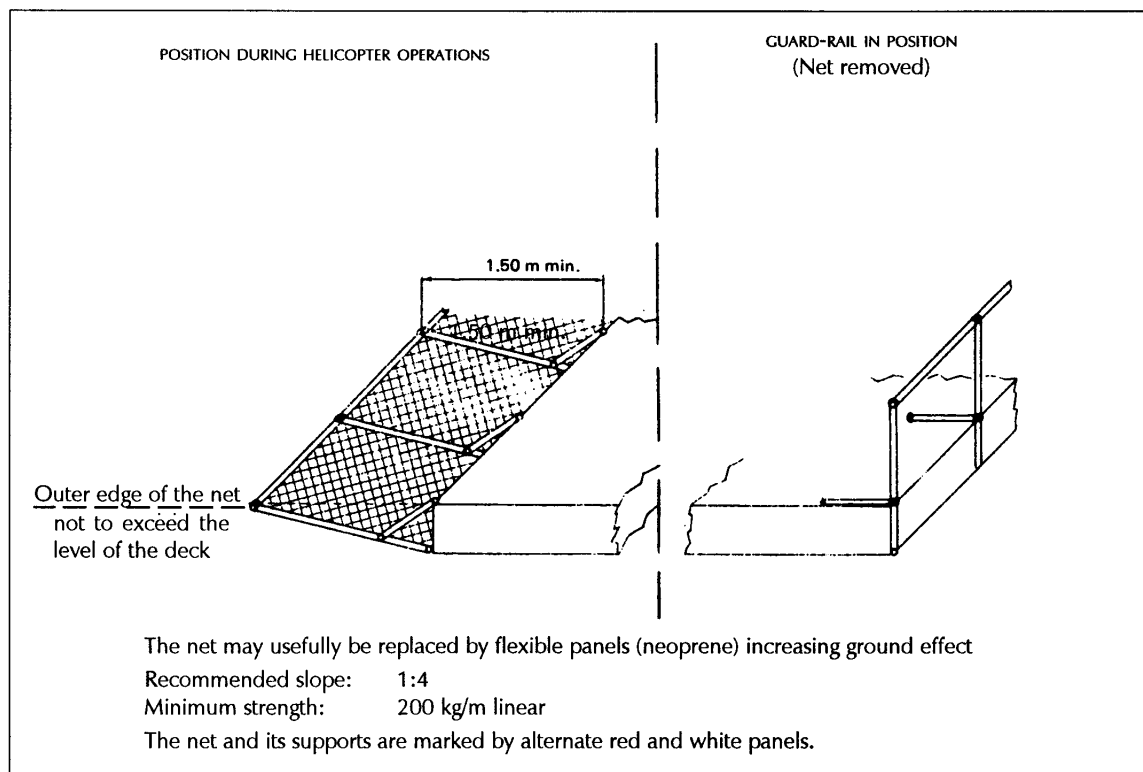


Figure 3-1. Collapsible guard-rail with movable safety net

**3.2.10** The surface of the TLOF and that part of the FATO used by persons boarding, or disembarking from, the helicopter should be skid resistant.

### 3.3 Helidecks

*The following specifications are for helidecks located on structures engaged in such activities as oil and mineral exploration, development, and recovery. See 3.4 for shipboard heliport provisions.*

#### **Final approach and take-off area and touchdown and lift-off area**

*The FATO and TLOF will be coincident on a helideck.*

**3.3.1** A helideck should be provided with at least one FATO.

**3.3.2** A FATO may be any shape but should, for a single main rotor helicopter or side-by-side twin main rotor helicopter, be of sufficient size to contain an area within which can be drawn a circle of diameter not less than 1.0 times D of the largest helicopter the helideck is intended to serve, where D is the largest dimension of the helicopter when the rotors are turning.

**3.3.3** Where omnidirectional landings by helicopters having tandem main rotors are intended, the FATO should be of sufficient size to contain an area within which can be drawn a circle of diameter not less than 0.9 times the distance across the rotors fore and aft. Where these provisions cannot be met, the FATO may be in the form of a rectangle with a small side not less than 0.75D and a long side not less than 0.9D but within this rectangle, bi-directional landings should be in the direction of the 0.9D dimension.

**3.3.4** There should be no fixed object around the edge of the FATO, except for frangible mounted objects, which, because of their function, have to be located there.

**3.3.5** Objects whose function require them to be located on the edge of the FATO should not exceed a height of 250 mm.

**3.3.6** The surface of the FATO should be skid-resistant to both helicopters and persons and be sloped to prevent pooling of liquids. Where the helideck is constructed in the form of a grating, the underdeck design should be such that the ground effect is not reduced.

**3.3.7** A helideck should comply with egress, paint and safety net requirements as prescribed for elevated heliports.

#### **Strength requirement**

**3.3.8** Loads during landing

The deck should be designed to withstand a load equal to:

- (a) for wheeled helicopters, 75percent of the total weight of the heaviest helicopter on the contact area of the tyre or tyres of one main landing gear leg, or
- (b) for skid equipped helicopters 1.5 times the fully laden weight of the heaviest helicopter.

If the contact area of one main landing gear unit is not known, then an area of 300 mm x 300 mm is to be used.

### 3.4 Shipboard heliport

**3.4.1** When helicopter operating areas are provided in the bow or stern of a ship or purpose-built above the ship's structure, they should be regarded as helidecks and the criteria given in 3.3 should apply.

#### **Final approach and take-off area and touchdown and lift-off area**

*On heliports located in other areas of ships, the FATO and TLOF are coincidental.*

- 3.4.2** Shipboard heliports should be provided with at least one FATO.
- 3.4.3** A FATO on a shipboard heliport should be circular and should be of sufficient size to contain a diameter not less than 1.0 times D of the largest helicopter the heliport is intended to serve. D is the largest dimension of the helicopter when the rotors are turning.
- 3.4.4** The surface of the FATO should be skid-resistant to helicopters and persons.
- 3.4.5** The shipboard heliport should have the same strength as specified for helidecks in 3.3.8.

## 4. OBSTACLE RESTRICTION AND REMOVAL

*The specifications in this chapter define the airspace around heliports that should be kept free of obstacles so that helicopter operations may be conducted safely. Refer Fig.4-1.*

### 4.1 Obstacle limitation surfaces and sector

#### Approach and take-off climb surface

**4.1.1** The heliport should have sufficient approach and take-off climb surfaces to ensure that a helicopter can conduct a landing or take off in the existing wind conditions.

**4.1.2** The approach and take-off climb surface should:

- (a) extend from the edge of the safety area
- (b) have an inner edge that is at least equal in length to the width or diameter of the FATO plus the safety area to either side
- (c) for day operations, have sides splaying out at 1:10 until the surface is 7 rotor diameters wide, after which they may become parallel
- (d) for night operations, have sides splaying out at 1:6.66 until the surface is 10 rotor diameters wide, after which they may become parallel
- (e) have an obstacle free gradient not steeper than 1:8
- (f) terminate at an elevation of 500 feet above the inner edge which equates to 1220 m horizontally from the inner edge and
- (g) where a turned flight path is required —
  - (i) not turn below 100 feet above the inner edge elevation
  - (ii) not turn through more than 120°
  - (iii) have a turning radius, on centre line, of not less than 270 m.

#### Operational safety

**4.1.3** A major safety consideration of a heliport is the availability of suitable approach and take-off climb surfaces for compliance with rule 139.309(c)(3). This rule requires the selected approach and take-off paths to be such that, if the helicopter is not a performance-Class 1 helicopter, an autorotative landing can be conducted without any undue risk to any person on the ground.

**4.1.4** The approach and take-off flight paths should be over terrain which affords emergency landing areas in relation to the proposed altitude of the helicopter and its autorotative performance. Ideally the approach and take-off surfaces should be over water, or land, free of third parties and with a minimum of obstructions. Approach and take-off flight paths over residential or industrial areas, playgrounds, occupied car parks, or any other populated area should be avoided.

#### Helidecks and shipboard heliport

**4.1.5** A helideck should have an approach and take-off climb sector of at least 210° free of obstacles and a limited obstacle sector of 150°.

**4.1.6** The limited obstacle sector should extend outwards from that part of the FATO periphery that is not contained within the approach and take-off climb sector, for a distance of not less than one third the overall helicopter length. Within this sector no obstruction should be permitted above a 1:2 gradient. Refer Fig. 4-2.

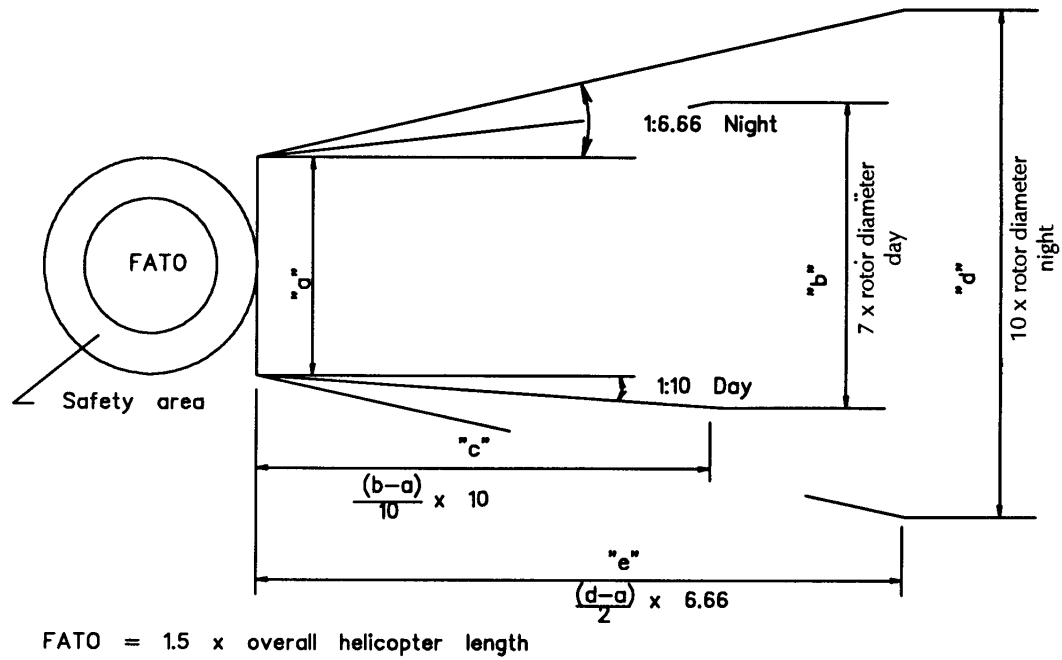
**Midship heliport**

**4.1.7** A helideck located midship should have two diametrically opposed approach and take-off surfaces free of obstacles and limited obstacle sectors extending from the periphery of the FATO and the edges of the approach and take-off climb surfaces. Refer Fig. 4-3.

**4.1.8** The limited obstacle sectors should extend outwards to a distance of not less than the length of the largest helicopter the heliport intends to serve.

Within this sector no obstruction should be permitted above a 1:5 gradient.

*For further details of helidecks and shipboard heliports, see ICAO Annex 14 Vol. II Heliports.*



Helicopter	Safety Area (m)	FATO (m)	"a" (m)	Day		Night	
				"b" (m)	"c" (m)	"d" (m)	"e" (m)
SA 350B/D	3.38	19.5	26.26	74.9	243	107	269
UH-1D/H	4.35	26.1	34.8	103	341	147	373
Robinson R22	3.0	13.2	19.2	53.7	173	77	192

Figure 4-1. Approach departure path calculation

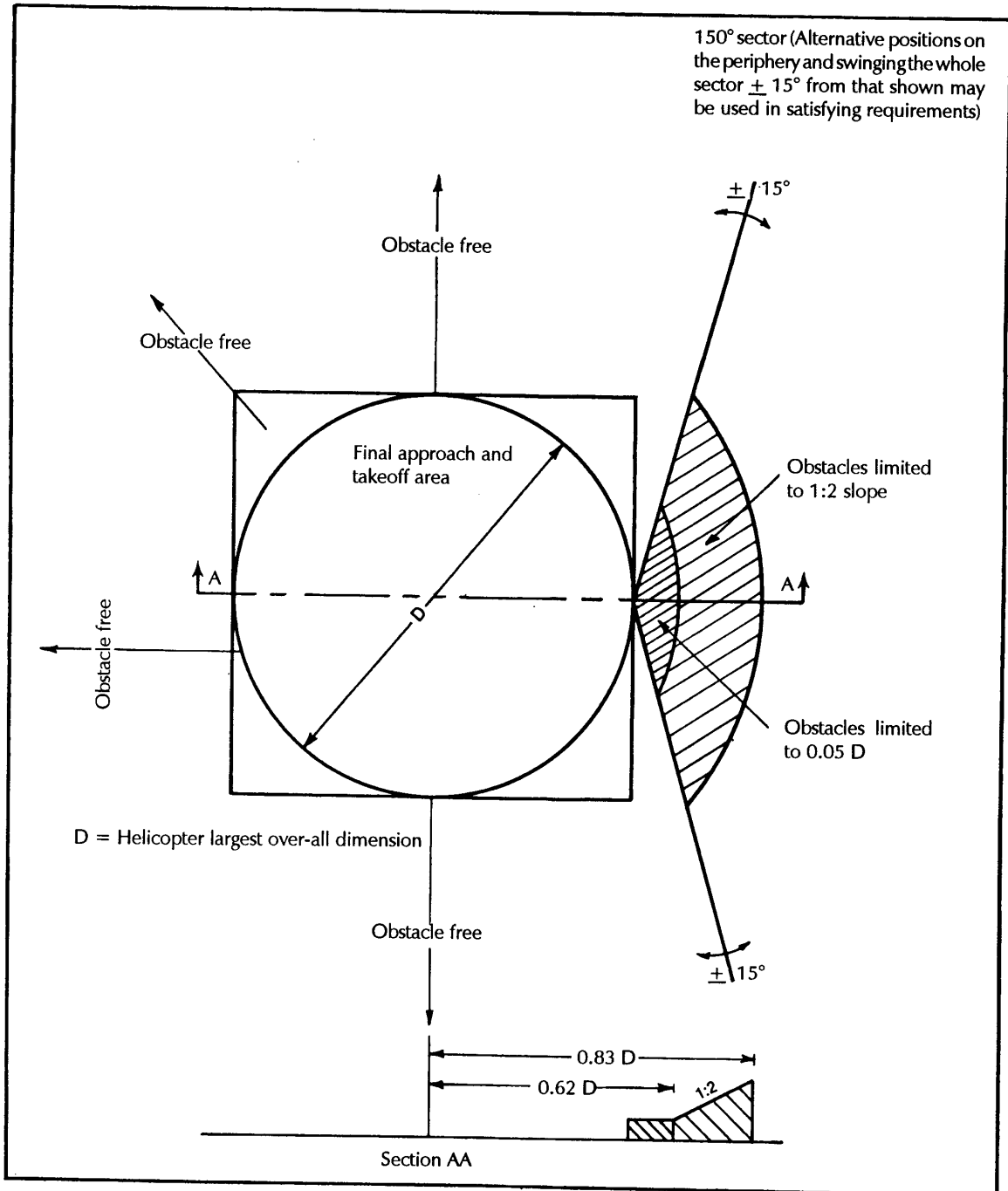


Figure 4-2. Helideck obstacle limitation sectors  
Single-main-rotor and side-by-side twin rotor helicopters

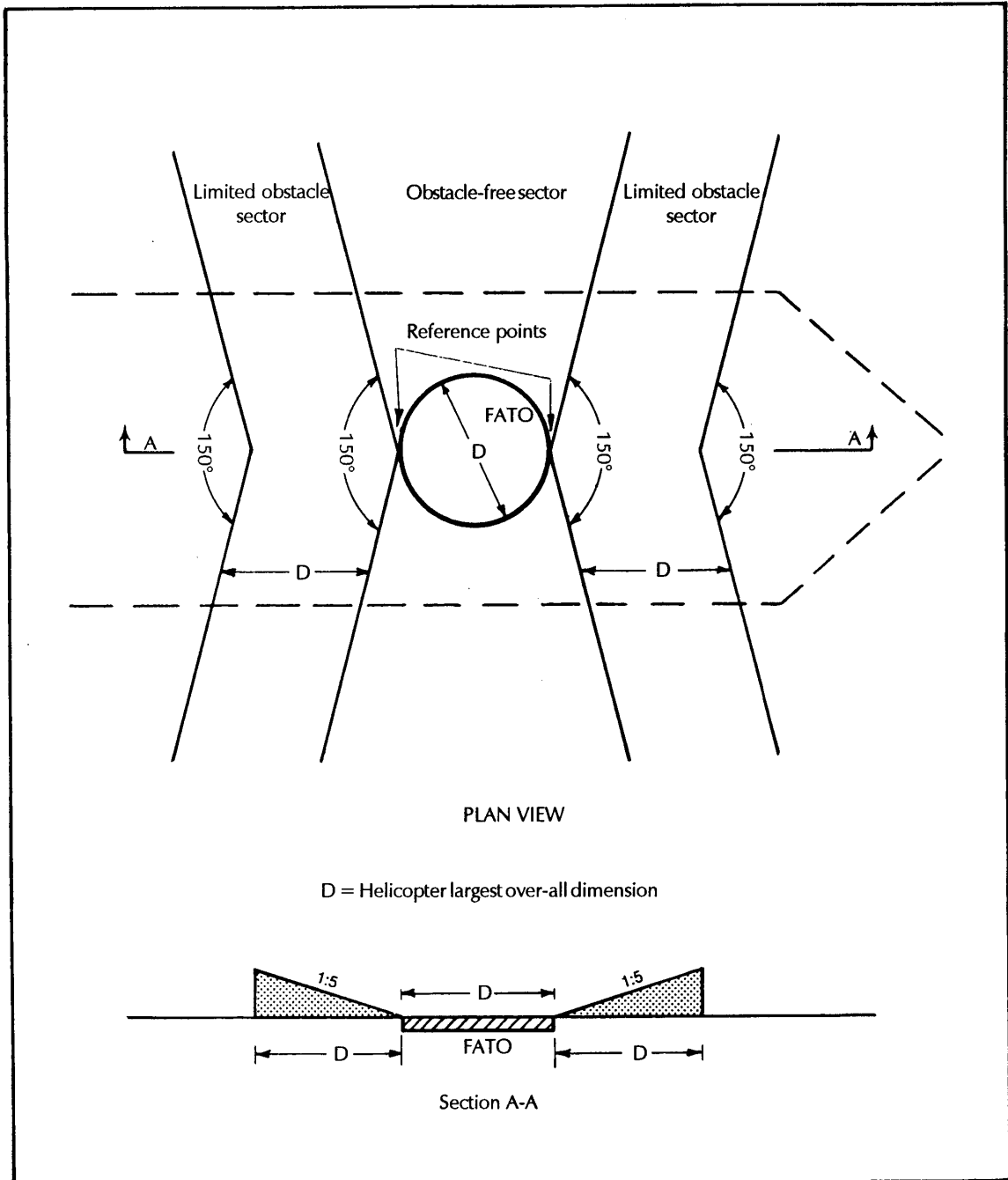


Figure 4-3. Midship non-purposed built heliport obstacle limitation surfaces



## 5. VISUAL AIDS

### 5.1 Wind direction indicator

#### *Application*

**5.1.1** A heliport should have a means of assessing the surface wind direction which should be visible to pilots of helicopters approaching the FATO.

### 5.2 Markers and marking

#### Heliport identification marking

#### *Application*

**5.2.1** A heliport identification marking should be provided at a hospital heliport, elevated heliports, helidecks, and shipboard heliports.

#### *Location*

**5.2.2** A heliport identification marking should be located within the aiming point marking, or within the TLOF if no aiming point marking is provided.

#### *Characteristics*

**5.2.3** A heliport identification marking, except for a heliport at a hospital, should consist of a letter H, white in colour.

**5.2.4** A heliport identification marking at a hospital should consist of a letter H, red in colour, on a white cross.

**5.2.5** A heliport identification marking should be orientated with the cross arm of the H at right angles to the preferred final approach direction.

The dimensions of the marking are shown in Fig. 5-1(a).

*Where the size of the TLOF is less than 9000 mm x 9000 mm, the white cross should be scaled disproportionately and the H likewise reduced but to a height of not less than 2800 mm. Refer Fig.5-1(b).*

*On a helideck covered with a rope netting, it may be advantageous to increase the height of the marking from 3000 mm to 4000 mm and the other dimensions proportionally.*

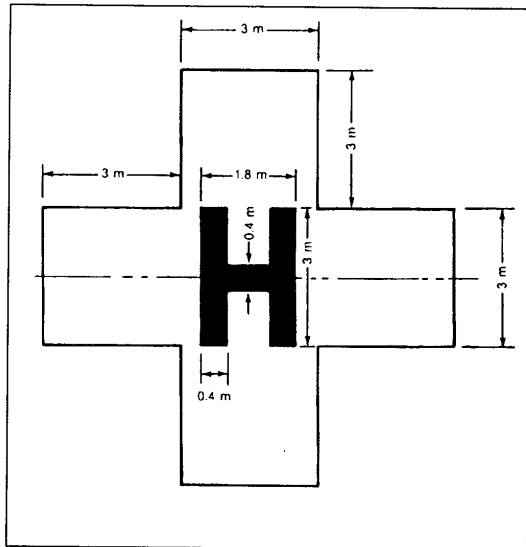


Figure 5-1(a). Heliport identification marking shown with a hospital cross and orientated to be read on approach

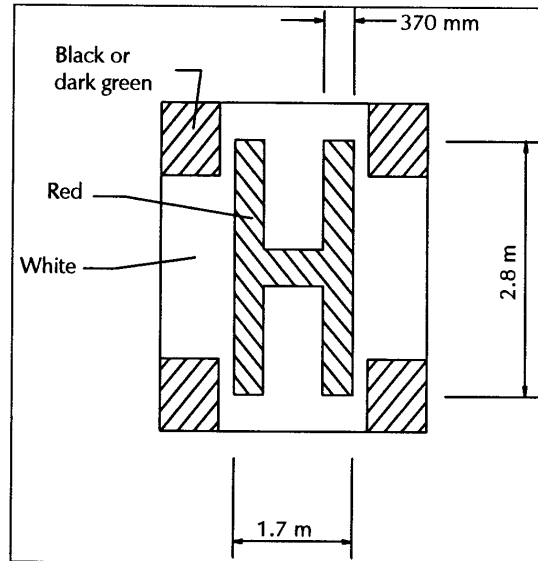


Figure 5-1(b). Heliport identification and disproportional cross for a hospital TALO less than 9000 mm x 9000 mm

## Maximum allowable mass marking

### Application

**5.2.6** A maximum allowable mass marking should be displayed at an elevated heliport and at a helideck.

### Location

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

### Characteristics

**5.2.8** A maximum allowable mass marking should consist of two digit number followed by the lower case letter *t* to indicate the allowable helicopter mass in tonnes (thousands of kilograms).

**5.2.9** The numbers and the letter of the marking should be in the form and proportion shown in Fig.5-2 and white in colour.

## FATO marking or marker

### Application

**5.2.10** FATO area marking or markers should be provided at a surface level heliport on ground where the extent of the FATO is not self evident.

### Location

**5.2.11** FATO marking or markers should be located on the boundary of the FATO.

### Characteristics

**5.2.12** The marking on a permanent surface should be a continuous white line, 600 mm wide. Where the FATO is on grass the perimeter marking should be kept clearly defined by mowing, weed killed bare earth, conventional aerodrome white marker boards, or by other distinctive means.

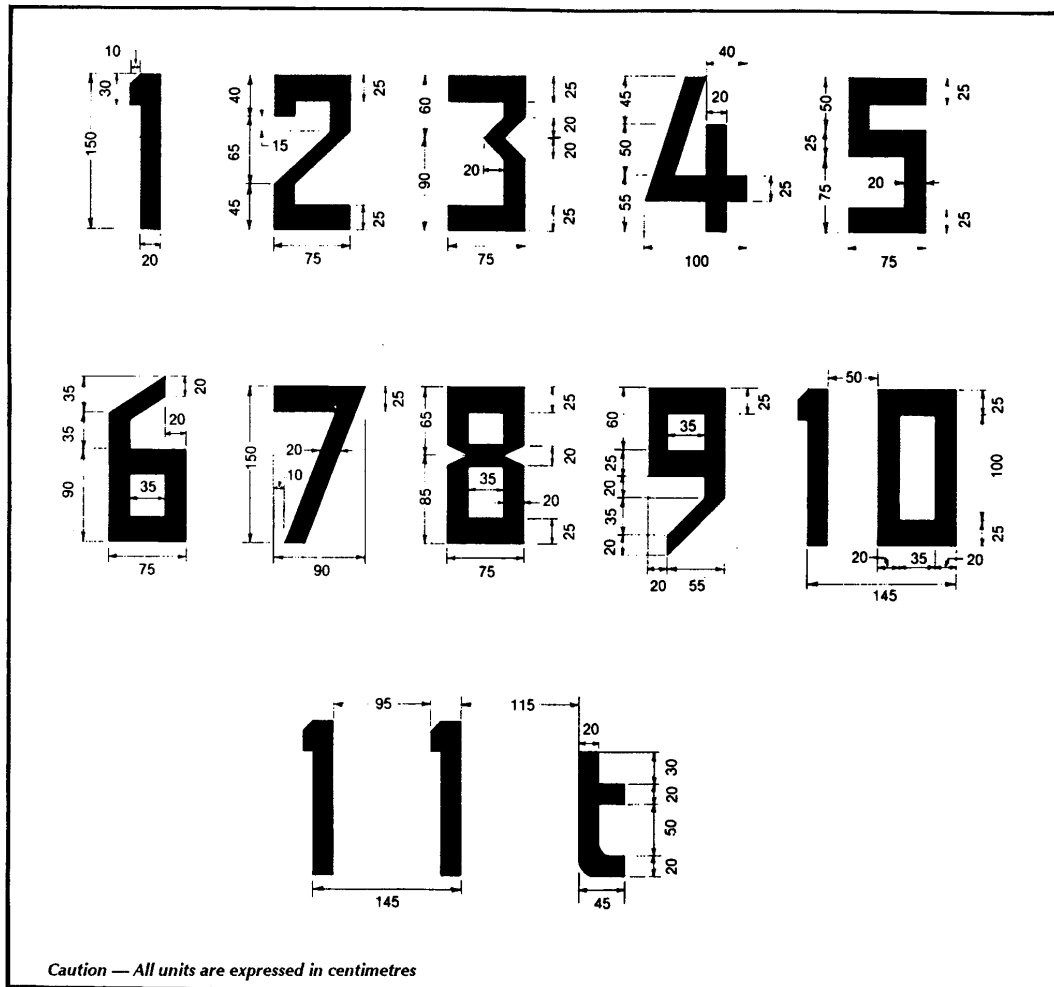


Figure 5-2. Forms and proportion of numbers and letter for maximum allowable mass marking

### Aiming-point marking

#### Application

**5.2.13** An aiming-point marking should be provided at a heliport where it is necessary for a pilot to make an approach to, or departure from, a particular point remote from a TLOF.

#### Location

**5.2.14** The aiming-point marking should be located within the FATO.

#### Characteristics

**5.2.15** 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 a continuous white line and the dimensions of the marking should conform to those shown in Fig. 5-3.

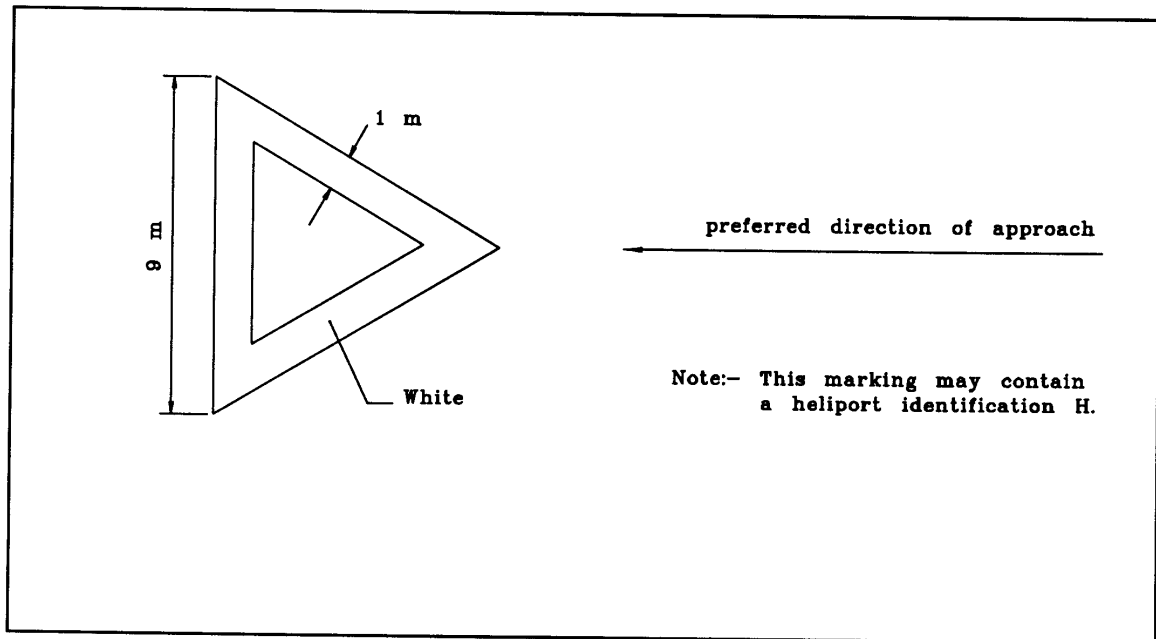


Figure 5-3. Aiming point marking

### TLOF area marking

#### **Application**

**5.2.16** A TLOF marking should be provided on a helideck, elevated heliport, and on a heliport if the perimeter of the TLOF is not distinguishable.

#### **Location**

**5.2.17** The TLOF marking should be located along the perimeter of the TLOF.

#### **Characteristics**

**5.2.18** A TLOF marking should consist of a continuous white line at least 300 mm wide.

### Touchdown marking

#### **Application**

**5.2.19** A touchdown marking should be provided where it is necessary for a helicopter to touch down at a specific position.

#### **Location**

**5.2.20** The touchdown marking should be located so that, when a helicopter is positioned over the marking, it provides a minimum horizontal main rotor clearance of half the rotor diameter from any fixed obstacle (building, hangar, pole and so on).

#### **Characteristics**

**5.2.21** A touchdown marking should be a yellow circle of appropriate diameter and have a line width of at least 500 mm, or 1000 mm for a helideck.

## **Heliport name marking**

### ***Application***

**5.2.22** A heliport name marking should be provided at a heliport where there is insufficient means of visual identification.

### ***Location***

**5.2.23** The heliport name marking should be placed on the heliport so as to be visible, as far as practicable, at all angles above the horizontal. Where an obstacle sector exists the marking should be located on the obstacle side of the H identification marking.

### ***Characteristics***

**5.2.24** A heliport name marking should consist of the name or identification symbol of the heliport, or both. The characters of the markings should not be less than 3000 mm in height at surface level heliports and not less than 1200 mm on elevated heliports. The colour of the markings should contrast with the background.

## **Safety area marking**

**5.2.25** In areas to which the public has direct vehicle or pedestrian access, the outer edge of the safety area should be marked by a barrier to prevent inadvertent entry by vehicles or pedestrians not associated with the helicopter operations.

## **Air taxiway markers**

### ***Application***

**5.2.26** When the marking of an air taxiway is necessary, it should be marked with air taxiway markers.

### ***Location***

**5.2.27** Air taxiway markers should be located along the centre line of the air taxiway and should be spaced at intervals of not more than 30 m on straight sections and 15 m on curves.

### ***Characteristics***

**5.2.28** An air taxiway marker should be frangible and, when installed, have a maximum height above ground or snow level of 350 mm. The surface of the marker, as viewed by the pilot, should be a rectangle and should have a minimum viewing area of 15000 mm<sup>2</sup>, with a height to width ratio of approximately 3 to 1 as shown in Fig.5-4.

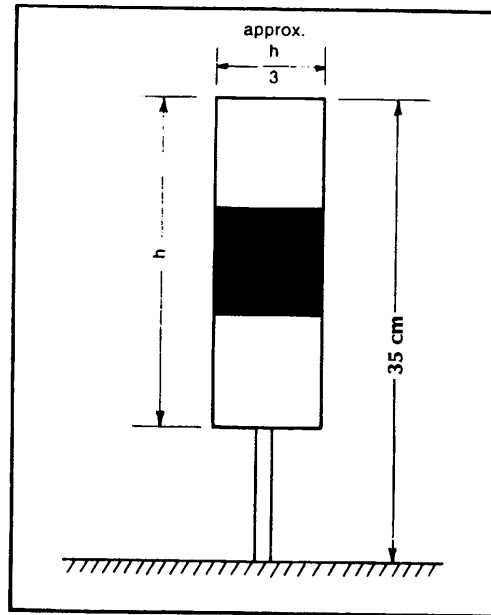


Figure 5-4. Air taxiway marker

### 5.3 Lights

#### Wind direction indicator

5.3.1 A heliport intended to be used at night should be at least floodlit, and should have an illuminated wind direction indicator or some other method of continually determining the surface wind speed and direction.

#### Heliport beacon

##### *Application*

5.3.2 Where a heliport is difficult to locate due to surrounding lights, or for some other reason, a heliport beacon should be provided.

##### *Location*

5.3.3 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.

##### *Characteristics*

5.3.4 The characteristics of the heliport beacon are contained in Chapter 5 of ICAO Annex 14 to the Convention on International Civil Aviation, *Aerodromes Volume II Heliports*.

#### *FATO area light*

##### *Application*

5.3.5 Where a surface level heliport is intended for use at night, the FATO should be lit unless the FATO and TLOF are coincident and the TLOF is lit: or the extent of the FATO is self-evident.

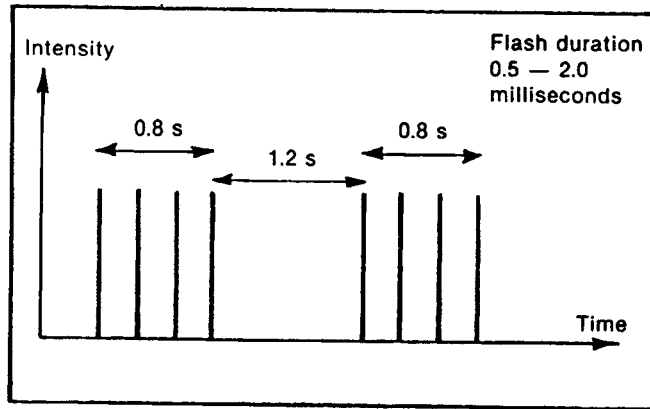


Figure 5-5. Heliport beacon flash characteristics

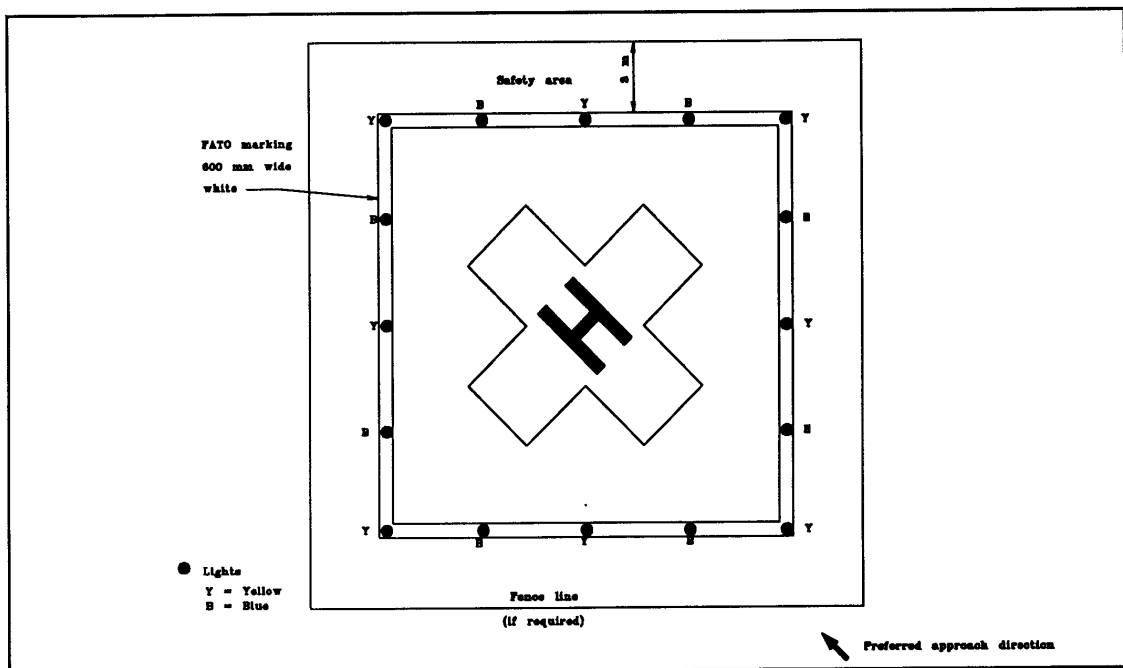


Figure 5-6(a). Hospital heliport

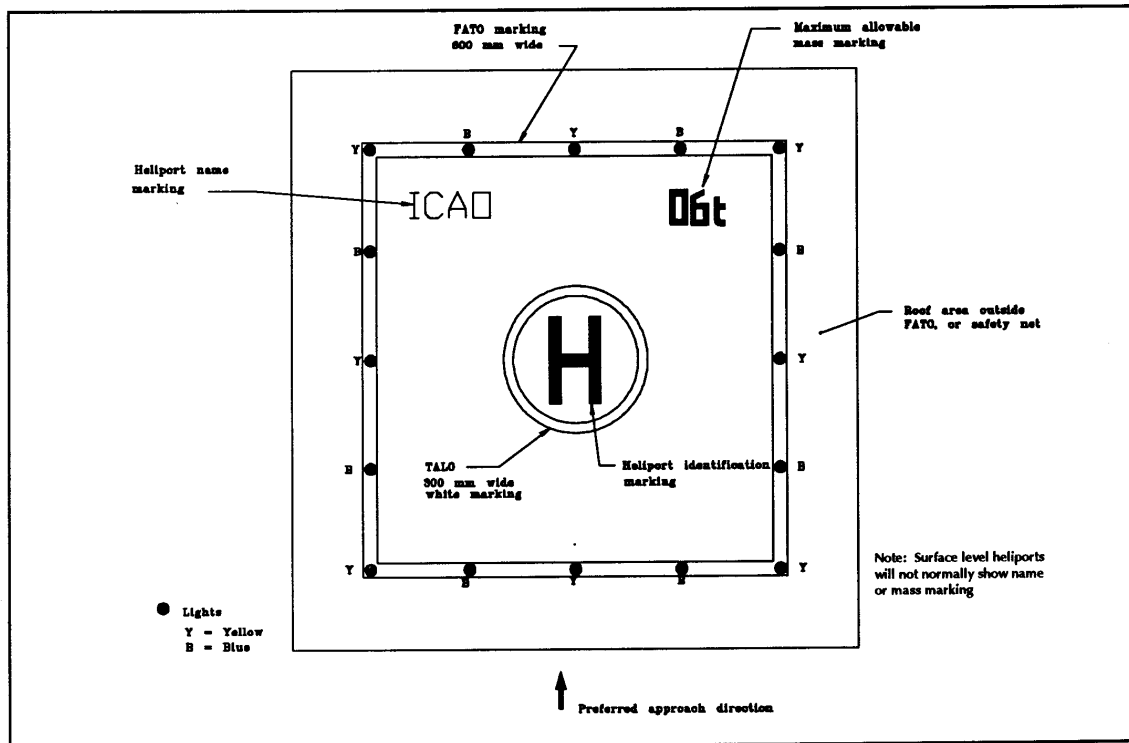


Figure 5-6(b). Elevated heliport

### Location

**5.3.6** FATO lights should be placed along the edges of the FATO. The lights should be uniformly spaced as follows: *Refer Fig. 5-6(a) and 5-6(b).*

- (a) for an area in the form of a square or rectangle, at intervals of not more than 5000 mm with a minimum of four lights on each side including a light at each corner
- (b) for any other shaped area, including a circular area, at intervals of not more than 5000 mm with a minimum of 10 lights.

### Characteristics

**5.3.7** FATO lights should be fixed omni-directional lights alternating yellow and blue. The corner lights should be yellow. The purpose of this lighting pattern is for the pilot to be able to identify, without doubt, the FATO location amid the confusion of other surrounding lights.

**5.3.8** Reserved

### TLOF area lighting system

#### Application

**5.3.9** TLOF lighting system should be provided at a heliport intended for use at night.

**5.3.10** The TLOF lighting system for surface level heliport should consist of the following:

- (a) perimeter lights; or
- (b) floodlighting; or both.

**5.3.11** Perimeter lighting should only be required where a pilot might mis-identify a heliport because of a mass of surrounding suburban lighting.



**5.3.12** The TLOF lighting system for an elevated heliport or helideck should consist of:

- (a) perimeter lights
- (b) floodlighting.

#### **Location**

**5.3.13** TLOF perimeter lights should either be placed:

- (a) along the edge of the TLOF or within 1500 mm from the edge or
- (b) along the edge of the usable area of an elevated heliport. *(This may be at a dimension less than the FATO but should be at least at a distance of 1500 mm surrounding the TLOF)*
- (c) where the TLOF is a circle, the lights should be located on straight lines in a pattern that will provide information to pilots on drift displacement.

**5.3.14** TLOF perimeter lights should be uniformly spaced at intervals of not more than 3000 mm for elevated heliports and helidecks and not more than 5000 mm for surface level heliports. There should be a minimum number of eight lights with three lights on each side (including the lights at each corner).

**5.3.15** 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.

**5.3.16** The TLOF perimeter lights should 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.

**5.3.17** TLOF floodlights should be located 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.

#### **Characteristics**

**5.3.18** The TLOF perimeter lights should be fixed omni-directional yellow lights.

**5.3.19** The perimeter lights should not exceed a height of 250 mm and should be inset when a light extending above the surface could endanger helicopter operations.

**5.3.20** TLOF floodlighting, if mounted on the perimeter, should not exceed a height of 250 mm.

**5.3.21** The spectral distribution (colour) of the TLOF floodlights should be such that the surface and obstacle marking can be correctly identified.

#### **Aiming-point lights**

##### **Application**

**5.3.22** Where an aiming-point is provided at a heliport for use at night, aiming point lights should be provided.

##### **Location**

**5.3.23** Aiming-point lights should be co-located with the aiming point marking.

**Characteristics**

**5.3.24** There should be a minimum of six omni-directional white lights located as shown on Fig. 5-7. The lights should be inset when a light extending above the surface could endanger helicopter operations.

**Air taxiways**

**5.3.25** These should be clearly indicated by yellow bi-directional centre line lighting or adequate floodlighting.

**Obstacle lighting**

**5.3.26** Any obstacles in the vicinity of the heliport likely to affect the safety of operations should be marked with red obstacle lights, or floodlighting to produce a luminance of at least 10 cd/m<sup>2</sup> and so arranged as to minimise dazzling a pilot.

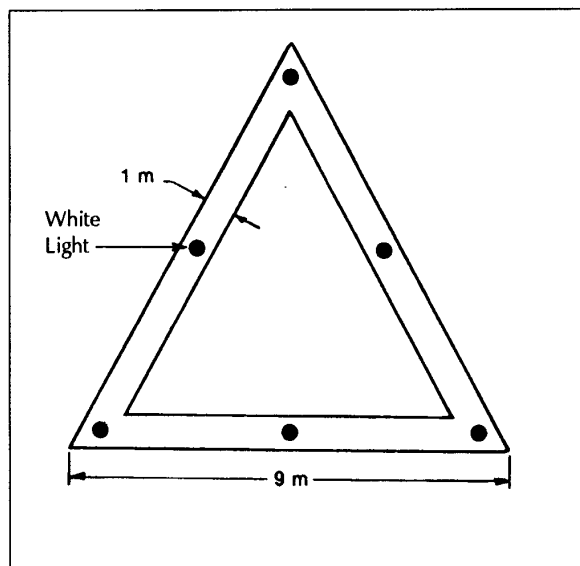


Figure 5-7. Aiming point lighting

## 6. HOSPITAL HELIPORTS

*By necessity, a hospital heliport is required to be in close proximity to the hospital to avoid medical complications during the transfer of patients or during the delivery of persons requiring urgent medical treatment. In recognition of this factor, and that some hospital sites and facilities are long established, the hospital heliports design standards may be reduced as follows.*

### 6.1 Safety area

Where it is impossible to provide a FATO with a surrounding 3000 mm safety area, the safety area may be omitted. Obstacle free surfaces and distances to objects should then be taken from the edge of the FATO.

## APPENDIX 1: Weight, dimensions and resulting FATO/TLOF sizes for some helicopters in New Zealand

		Max T/O weight (kg)	Rotor diameter (m)	Overall length (m)	Skid length (m)	Skid width (m)	Minimum dimensions		
							FATO (m)	Safety area (m)	(TLOF) (m)
Aerospatiale	SA 315B	1951	11.02	12.92	3.29	2.38	19.4	4.2	5.0
	SA 350B/D	1951	10.69	12.99	2.57	2.10	19.5	3.3	3.9
	AS 355F	2400	10.69	12.94	1.95	2.10	19.5	3.0	3.0
	SA 365N	4000	11.93	13.46	3.61	2.07	20.2	4.6	5.5
Augusta	A109A 11	2600	11.00	13.05	3.53	2.30	19.6	4.5	5.3
Bell	47G	1338	11.30	13.15	3.00	2.30	20	3.8	4.5
	205	4309	14.63	17.40	3.08	2.84	26.1	4.6	5.6
	206B	1520	10.15	11.92	2.40	1.77	17.9	3.0	3.6
	206L-1	1882	11.28	12.92	3.00	2.30	19.5	3.8	4.5
	212	5080	14.69	17.46	3.70	2.84	26.2	4.7	5.6
	214B	6260	15.24	18.35	3.70	2.84	27.6	4.7	5.6
Boeing	234LR	22000	18.29	30.18	7.87	3.40	45.3	9.9	11.9
Enstrom	F28 & F280C	1066	9.75	8.43	2.40	2.20	16.8	3.0	3.6
Hiller	UH-12E	1406	10.80	12.41	1.99	2.23	18.7	3.0	3.0
	FH1100	1247	10.79	12.60	2.40	2.20	17.9	2.4	3.6
Hughes	269	757	7.71	8.54	2.50	1.98	14.1	3.2	3.8
	369	1361	8.05	9.30	2.20	2.10	14.4	3.0	3.3
MBB BO	105	2300	9.84	11.86	2.50	2.53	17.8	3.2	3.8
Robinson	R22	622	7.67	8.74	1.92	1.92	13.2	3.0	2.9
Sikorski	S-55	3583	16.18	19.0	3.2	3.35	28.5	4.8	5.3
	S-58T	6169	17.07	20.06	8.61	3.66	30.09	5.1	5.5
	S-61	9980	18.9	22.14	7.16	3.96	33.21	5.6	6.0
<b>MILITARY</b>									
Bell	UH-1D/H	4309	14.63	17.40	3.68	2.84	26.1	4.6	5.6
Westland	HAS 1 Wasp	2495	9.83	12.28	2.77	2.64	18.5	3.5	4.2

This chart is representational. Different models of a series may have other weights and lengths