

HSAC RP 2008-01

GULF OF MEXICO HELIDECK MARKINGS

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Contents

1.	INTRODUCTION	2
1.1.	Background information	3
1.2.	Definitions.....	3
2.	GENERAL.....	4
2.1.	Helideck FATO/TLOF Marking.....	4
2.2.	Perimeter Line.....	7
2.3.	Helideck Obstacle Free Sector Marking (Chevron).....	7
2.4.	Installation Identification Marking	7
2.5.	Radio Frequency	8
2.6.	Helideck Access Points.....	8
2.7.	Maximum Allowable Weight Marking.....	8
2.8.	FATO Dimensions	8
2.9.	Limiting Size.....	8
2.10.	Touchdown Positioning Marking/Aiming Circle	11
2.11.	Restricted Size Helidecks.....	12
2.12.	Prohibited Landing Sector Markings	14
2.13.	Prohibited Landing marker	15
2.14.	Wind Socks	15
	APPENDIX 1 HELIDECK OBSTACLE PROTECTED AREAS	16
	APPENDIX 2: USEFUL DIMENSIONS FOR DIFFERENT HELICOPTER TYPES	19

Introduction

The current situation in the Gulf of Mexico (GOM) is that there is no consistently adopted form of fixed platform helideck markings and no enforced regulation that requires them. While some platform owners use the US API RP21, others, including many mobile platforms and vessels that operate elsewhere in the world, use the ICAO or UK CAP437 marking system. For those using API RP 2L, this document has not been updated in line with currently accepted worldwide practices. In many cases fixed platform owners have used none of these systems and have devised their own marking code. As a result, pilots face a wide variety of visual cues, some of which can be relied upon to give obstacle clearance and others which offer no obstacle clearance, with no way of determining between the two. The regularity with which accidents and incidents in the GOM relate to obstacle strikes on helidecks can be partly linked to the lack of effective and consistent markings.

This RP has been designed to give guidance to fixed platform owners and helicopter operators on an HSAC recommended practice for marking offshore helidecks. The guidance has been based on the current ICAO International Standards and Recommended Practices Annex 14 Volume II (Heliports)¹ and also takes best practice from CAP 437 and current practice in the Gulf of Mexico. For facilities other than fixed platforms, the following applies:

(ICS) "Guide to Helicopter/Ship Operations" for vessels
International Maritime Organization (IMO) Code for Mobile Offshore Drilling Units (MODU)
U.S. Coast Guard (USCG) Combined Federal Regulation (CFR) 46 - Part 108 and CFR 33 - Part 143 for Floating Facilities in OCS Waters
MMS 30CFR 250-134 Identification Signs

The guide's aim is to standardize the marking system across the GOM and to align wherever possible with the international marking system or those mandated for non-fixed facilities as noted above. It will therefore allow pilots to become familiar with a common system that will give consistent cues and information, wherever they may be operating.

The key principle on which the markings have been devised is to assist helicopter pilots in making a safe landing and departure from correctly identified platforms and for maneuvering safety over the helideck. The markings are not designed to advertise individual company logos, although scope is included for such identification.

It is recognized that a number of fixed platforms in the GOM do not comply with the minimum size requirements of ICAO and in some cases the obstacle clearances normally provided by the ICAO markings cannot be assured. Therefore to inform pilots when the markings do not provide the obstacle clearance normally assured, an additional warning marking has been included in the guidance. (See **Section 2.11**)

Where differences from ICAO exist in this RP, the ICAO practice has also been added for information.

¹ The current International Civil Aviation Organisation (ICAO) International Standards and Recommended Practices Annex 14 Volume II is being revised/update and some changes have tentatively agreed at meeting held in December 2006: these changes are also reflected in this document.

1.1. BACKGROUND INFORMATION

Although this RP is designed as a comprehensive guide, further details of many of the requirements should be sought in the reference documents of ICAO International Standards and recommended Practices (Aerodromes) Annex 14 Vol II (Heliports), CAP 437 and API RP 2L.

Background information on the ICAO helideck obstacle protected areas, on which the markings are based, is detailed in **Appendix 1** to this RP and a table of useful dimensions relating to the *D value* of different helicopter types is at **Appendix 2**.

1.2. DEFINITIONS

Terms used throughout this RP are defined as follows:

Aiming Circle or TDPM	The touch down positioning marker or aiming circle is a circle painted on the helideck, used by the pilot for guidance and obstacle clearance information while landing, taking off, or maneuvering.
D - Value	A measurement equal to the overall length of a helicopter (O/L), from the front of the rotor disc area to the rear of the tail rotor disc area.
D Circle -	An imaginary circle with a diameter equal to <i>D</i> used in connection with obstacle clearance areas.
FATO -	The <i>final approach and take off</i> area. It is a defined area over which the final phase of the approach to hover and landing is completed and from which the take-off maneuver is commenced. For this RP the FATO is considered coincidental with the TLOF.
Limited Obstacle Sector (LOS) -	An area limited to an arc of 150° on the structure side of the helideck in which obstacles may be permitted, provided the height of the obstacle is limited.
Obstacle free area -	Obstacle protection provided below the helideck level to consider the possibility of helicopter loss of height due to power unit failure during the latter stages of the approach or early stages of take off.
Obstacle free 210° sector (OFS) -	An area free of all obstructions higher than the <i>FATO</i> out to a distance of 3,280 feet (1,000 meters)
Obstacle free surface	The load-bearing portion of the helideck, enclosed by the <i>D Circle</i> , which is free of obstacles.
RD -	A measurement, in feet, equal to the rotor diameter of a helicopter.
SLA -	The <i>safe landing area</i> . This term is used by ICAO for the final approach and take off area (<i>FATO</i>).
TDPM	See <i>Aiming circle</i> .
TLOF -	The <i>touchdown and lift-off</i> area. It is a load bearing area on which a helicopter may touch down or lift off. For an offshore helideck, the <i>FATO</i> and <i>TLOF</i> are considered synonymous.
1D Helideck	A helideck on which the <i>FATO</i> is no less than <i>D</i> of the largest helicopter that will use that helideck.
.83D Helideck	A helideck on which a <i>FATO</i> is no less than .83 <i>D</i> of the largest helicopter that will use that helideck and should have no obstacles located within the <i>D Circle</i> .

2. GENERAL

Helideck markings are used by pilots to obtain a final pre-landing confirmation that the correct helideck is being approached and to provide safe maneuver information for obstacle clearance. It is therefore **VITAL** that the helideck markings are maintained in the best possible condition, regularly re-painted and kept free of all visibility-reducing contaminants. Helideck owners/operators should ensure that specific inspection and re-painting maintenance procedures and schedules for helideck markings take account of the importance of their purpose.

2.1. HELIDECK FATO/TLOF MARKING

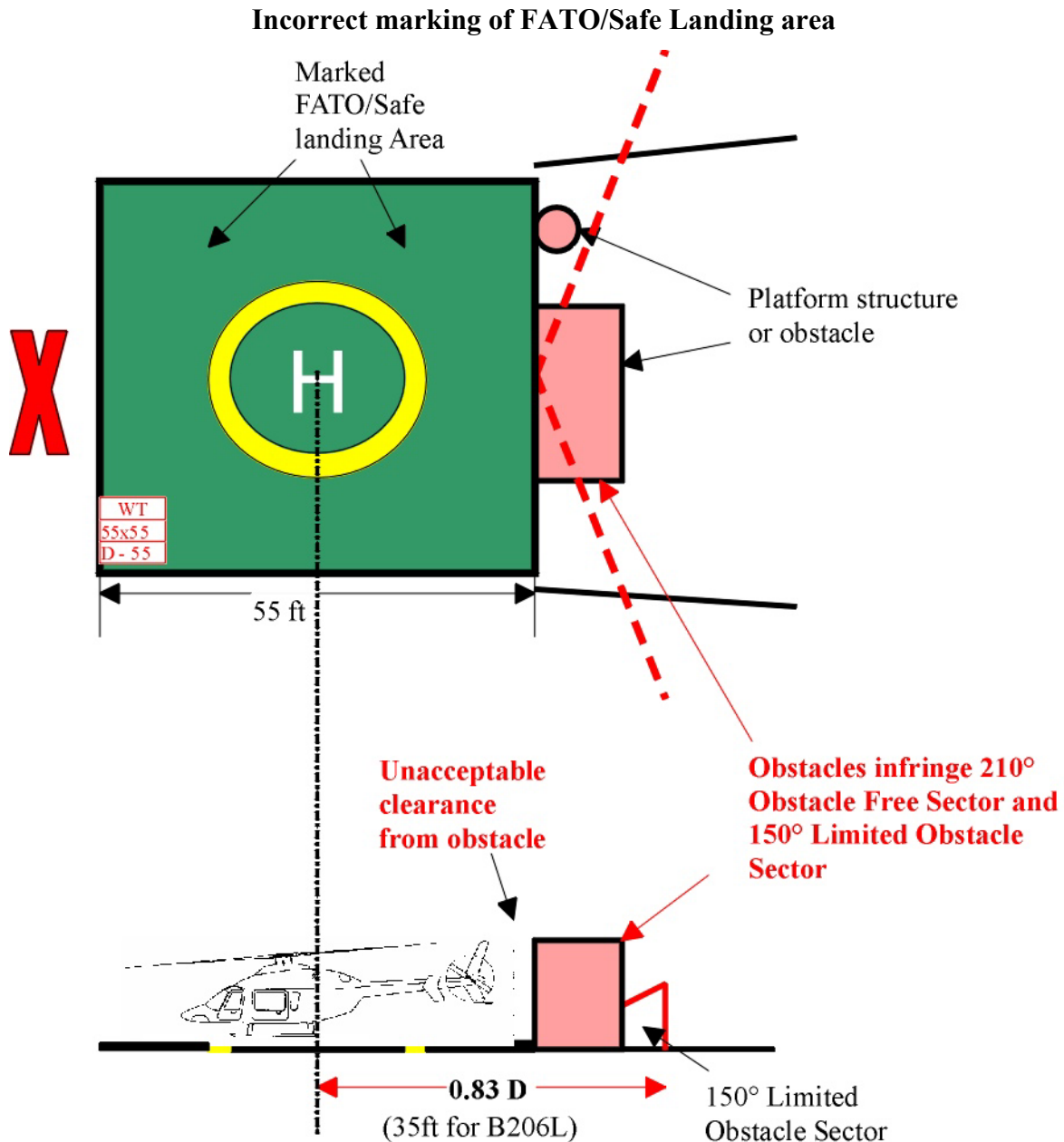
The helideck surface bounded by the FATO should be painted in a dark color using a high friction coating (dark green is the recommended color). Any load bearing portion of the helideck which is **not** part of the FATO due to obstacles, should be painted in a contrasting color, such as white, as shown in **Figure 2**.

Trip hazards or landing gear obstructions on the FATO may be marked in red with a 2" diameter circle.

Where the surface coating may have a degrading effect on friction qualities or where the surface presents painting difficulties, for instance on Aluminum helidecks, it may be necessary to leave the helideck surface untreated. In such cases, the conspicuity of the markings should be enhanced by outlining the deck markings with a contrasting color, such as a black line (typically 4 inches).

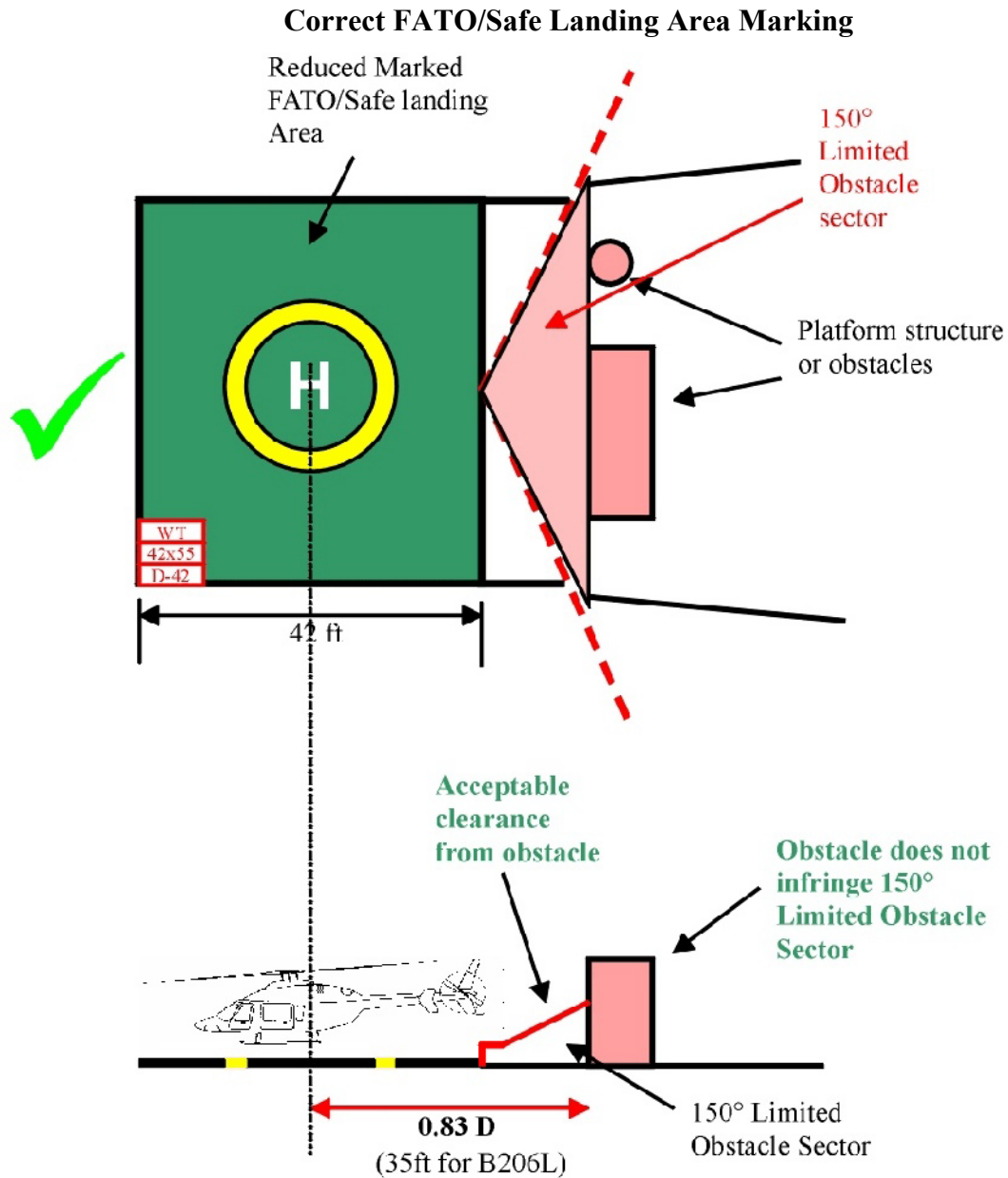
When assessing the extent of the FATO it should be noted that it should not necessarily always cover the full extent of a platform's designed helideck surface, which may be obstructed by obstacles or platform superstructure located adjacent to the helideck. The full helideck can only be marked as a FATO if the 150° Limited Obstacle Sector, located inboard of the helideck, is clear of significant obstructions, as illustrated in the examples in **Figures 1 and 2**, which show the incorrect and correct markings respectively.

Figure 1.



In the **Figure 1** example a 55ft helideck has obstacles such as a post or superstructure block at the edge of the marked FATO area. This infringes the 150° limited obstacle sector (LOS) (See App1) and provides an unacceptable clearance for the helicopter when it is maneuvering over the aiming circle. The size of the marked FATO should therefore be reduced and the aiming circle moved to ensure the 150° LOS is contained before the obstructions.

Figure 2.



In the example in **figure 2**, the marked FATO/Safe Landing area is restricted to 42 ft and does not cover all the available helideck; this enables the obstacles and platform structure to be outside the 150° LOS.

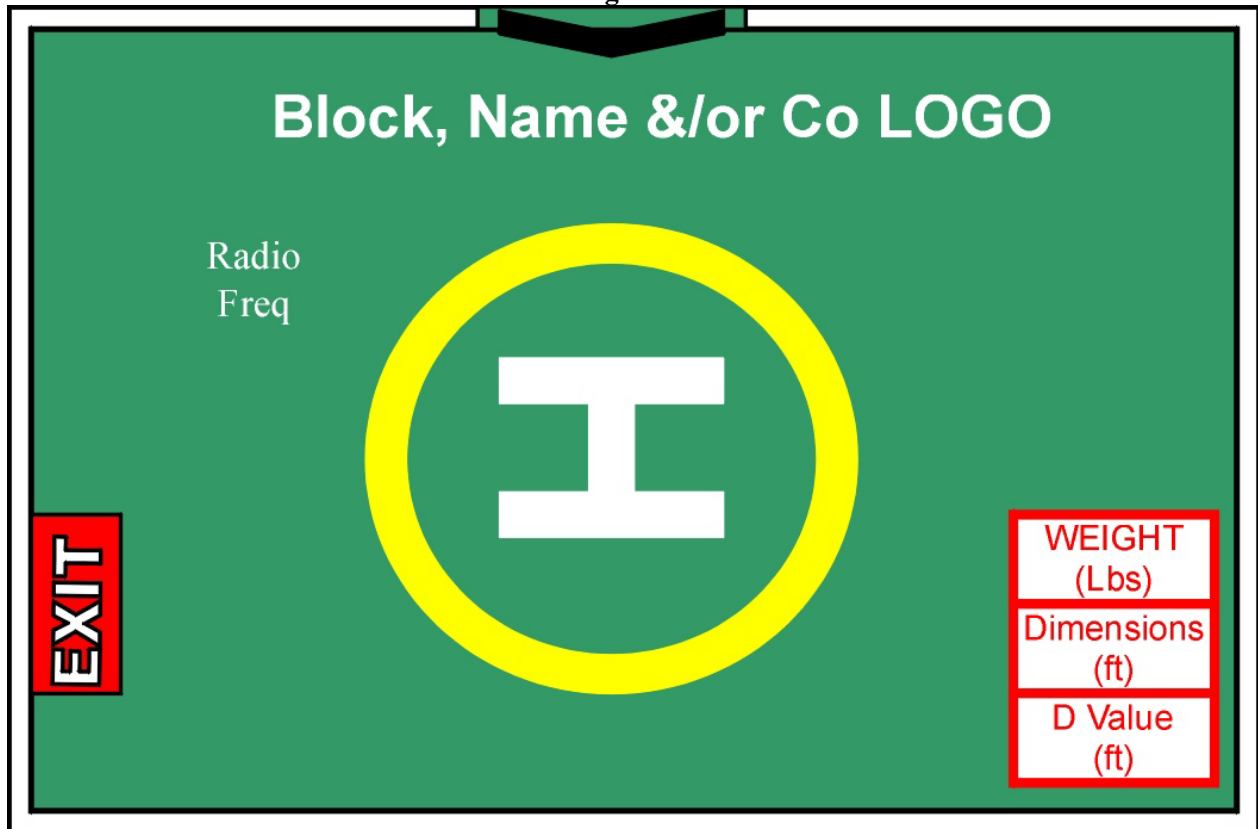
Note Under HSAC guidance², the size of the FATO can be reduced to 0.83D for all helicopters if the helideck is surrounded by a solid safety fence. However, a 1D obstacle free surface and 150° LOS is still required, as shown in **figure 4b**. HSAC also allows 0.62D FATO for helicopters under 7,000 pounds. Again this size FATO is required to have a solid safety fences and a 1D obstacle free surface and 150° LOS, as shown in **figure 4c**.

² The use of a FATO of 0.83 D has also been tentatively agreed for inclusion in the revised ICAO Annex 14 Vol II for helidecks designed for use by helicopter with a MTOW of 7000 lbs or less.

2.2. PERIMETER LINE.

The perimeter of the FATO should be marked by a white line with a width of at least 1 ft (0.3m) as shown in **Figure 3**

Figure 3



2.3. HELIDECK OBSTACLE FREE SECTOR MARKING (CHEVRON)

A **chevron** is used to delineate the separation of the **210° obstacle free sector (OFS)** and the **150° limited obstacle sector (LOS)**. Each leg of the chevron shall be a minimum of 2.5 ft long and 1 ft (0.3m) wide, forming an angle that indicates the direction of the limits of the sector. The chevron shall be marked in a conspicuous color, as shown in **Figure 3**.

On minimum sized helidecks, there may not be room to place the chevron on the edge of the deck. In this situation, the chevron marking, but not the point of origin, may be displaced towards the FATO center. On helidecks where there are no obstacles for 360 degrees, no chevron is required.

2.4. INSTALLATION IDENTIFICATION MARKING

The **installation identification** should be marked on the helideck surface between the **chevron** indicating the **OFS** and the **aiming circle** in symbols not less than 4 ft (1.2 meters) high as shown in **Figure 3**. It should be a color (normally white), which contrasts with the helideck surface. Block numbers should be augmented by the platform name or other identification when there is more than one platform in the block. Company logos, if used, shall be positioned so as not to interfere with any other required helideck marking.

When the size of the helideck restricts the space available to follow the marking dimensions stated above, the size of the lettering may be reduced, but should remain as close to the

dimensions stated a possible without interfering with other helideck markings. The minimum lettering size should be 12 inches high.

2.5. RADIO FREQUENCY

The installation radio frequency may be identified on the helideck, as shown in **Figure 3**, using symbols not less than 3ft (0.9m) high and in a color that contrasts with the helideck surface. It should be located to the left of the *aiming circle*. The approved radio call sign of the installation should be the same name as the helideck.

2.6. HELIDECK ACCESS POINTS

For helidecks that are not manned by a helideck crew and to provide direction to passengers, the access points should be highlighted by a red box on the perimeter line as shown in **Figure 3**. This box should be four feet wide by two feet high.

A walkway to the aiming circle may be painted on the helideck surface, although it should be noted that this may present a hazard for single access decks if the pilot is forced by wind direction to land with the tail rotor close to this marked walkway. If utilized, it should be marked in a color that contrasts with the deck, such as white. Yellow should not be used.

2.7. MAXIMUM ALLOWABLE WEIGHT MARKING

A maximum allowable weight marking should consist of a one-two digit number to indicate the allowable helicopter weight in thousands of pounds, rounded to the nearest 1000 pounds. (i.e. for 15,600 lbs marked as 16). It should be marked in red numerals on a white background, as shown in **Figure 3**. The height of the figures should be 3ft (0.9m) with a line width of approximately 5 inches (0.12m).

When the size of the helideck restricts the space available to follow the marking dimensions stated above, the size of the lettering may be reduced, but should remain as close to the dimensions stated a possible without interfering with other helideck markings. The minimum lettering size should be 12 inches high.

2.8. FATO DIMENSIONS

The actual size of the FATO, indicated by the perimeter line, should be shown in feet in red numerals on a white background, as shown in **figure 3**. The height of the figures should be 3ft (0.9m) with a line width of approximately 5 inches (0.12m), and it should be located below the maximum weight. For FATOs of non-rectangular shape the actual dimension shown should be the diameter of the largest circle that can be contained within the FATO.

When the size of the helideck restricts the space available to follow the marking dimensions stated above, the size of the lettering may be reduced, but should remain as close to the dimensions stated a possible without interfering with other helideck markings. The minimum lettering size should be 12 inches high.

2.9. LIMITING SIZE

The limiting size or D value marking will designate the length of the largest helicopter that can safely use the helideck and assume obstacle clearance from positioning over the aiming circle/TDPM.

The D value should be marked in feet, preceded by the letter “D”, to the nearest whole number, in red numerals on a white background, as shown in **Figure 3**. The height of the figures should be 3ft (0.9m) with a line width of approximately 5 inches (0.12m)³.

When the size of the helideck restricts the space available to follow the marking dimensions stated above, the size of the lettering may be reduced, but should remain as close to the dimensions stated as possible without interfering with other helideck markings

The D value indicates the size of the obstacle free surface, which on larger helidecks should be coincident with the FATO, and is also related to the 150° LOS. On smaller platforms the D value must still indicate the size of an obstacle free surface and 150° LOS, but may not conform to the actual size of the helideck/FATO. Examples of how to calculate and mark the D value of a helideck are shown in **Figures 4a, 4b & 4c**.

As a guideline for calculating the D value of an existing helideck, the distance from the centre of the aiming circle/TDPM to the outer edge of the 150° LOS (closest significant obstacle) should be 0.83D. For a further explanation of the obstacle free surface, 150° LOS and related measurements, see **Appendix 1**.

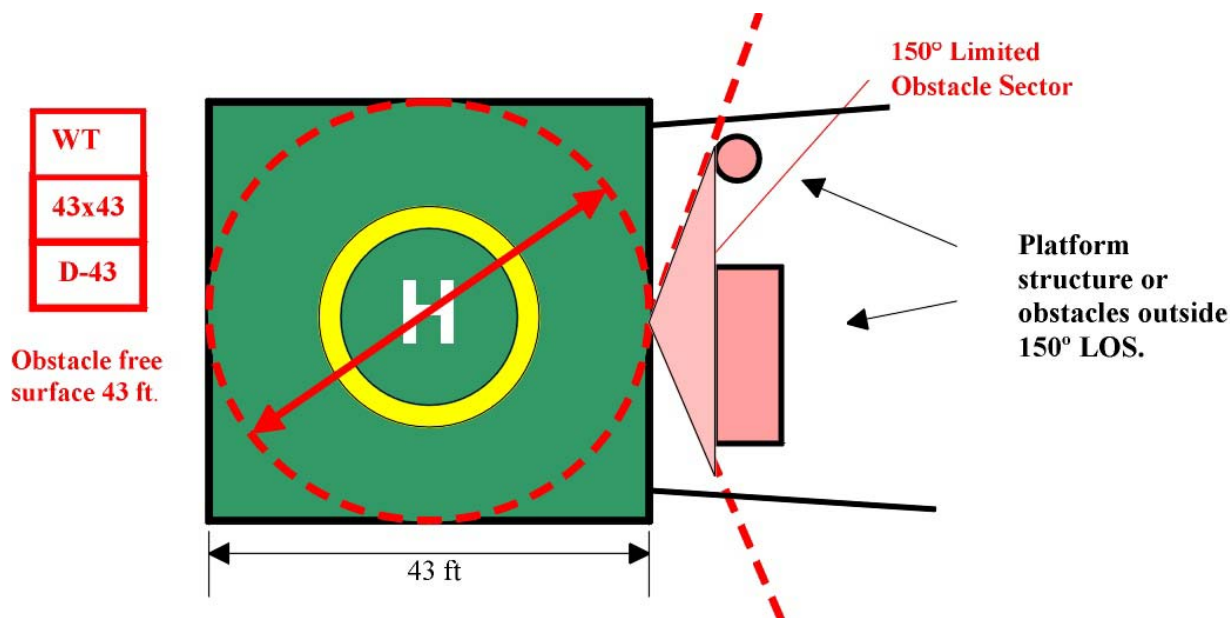
For restricted size decks that do not allow a 1D obstacle free surface and 150° obstacle free sector for the largest type of aircraft used, the markings at Section 2.11 should be used. These are designed to clearly indicate to the pilot that maneuvering obstacle clearance is not assured.

Figure 4.a
Example of 1 D Helideck

FATO/Helideck size 43 ft

Largest intended helicopter A109 (D Value 43 ft, RD 36ft)

Helideck marking:



³ Helidecks marked fully in accordance with CAP437 will have the D Value marked in metres, with the figures marked around the helideck perimeter. D Values marked in accordance with **figure 3** shall be assumed to be in feet, whilst markings in the perimeter line in accordance with CAP 437 shall be assumed to be in meters.

Figure 4.b

Example of 0.83D Helideck

FATO/Helideck size 37 ft

Largest intended helicopter A109 (D Value 43 ft)

Obstacles on platform allow 43 ft obstacle free surface + 150° sector

Helideck Marking

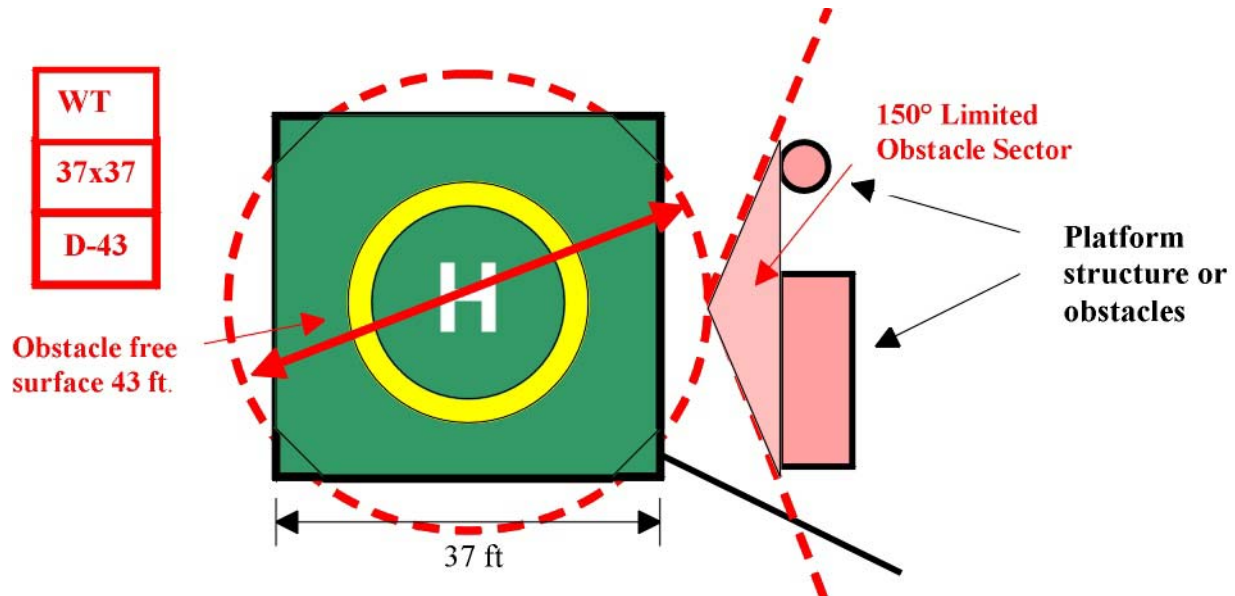


Figure 4.c

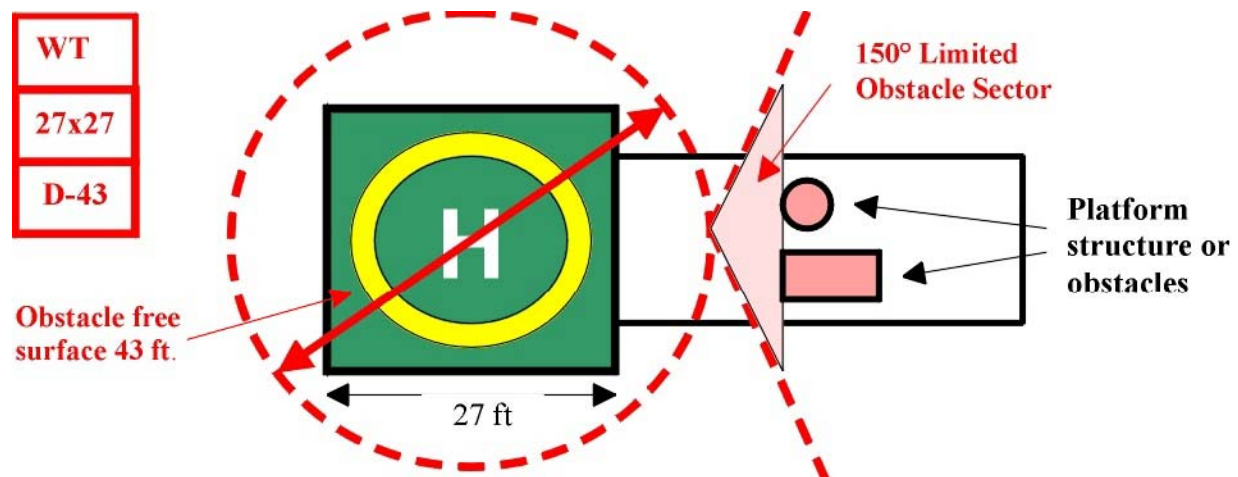
Example of a 0.62D Helideck

FATO/Helideck size 27 ft

Largest intended helicopter A109 (D Value 43ft)

Obstacles on platform allow a 43ft obstacle free surface & 150° limited obstacle sector

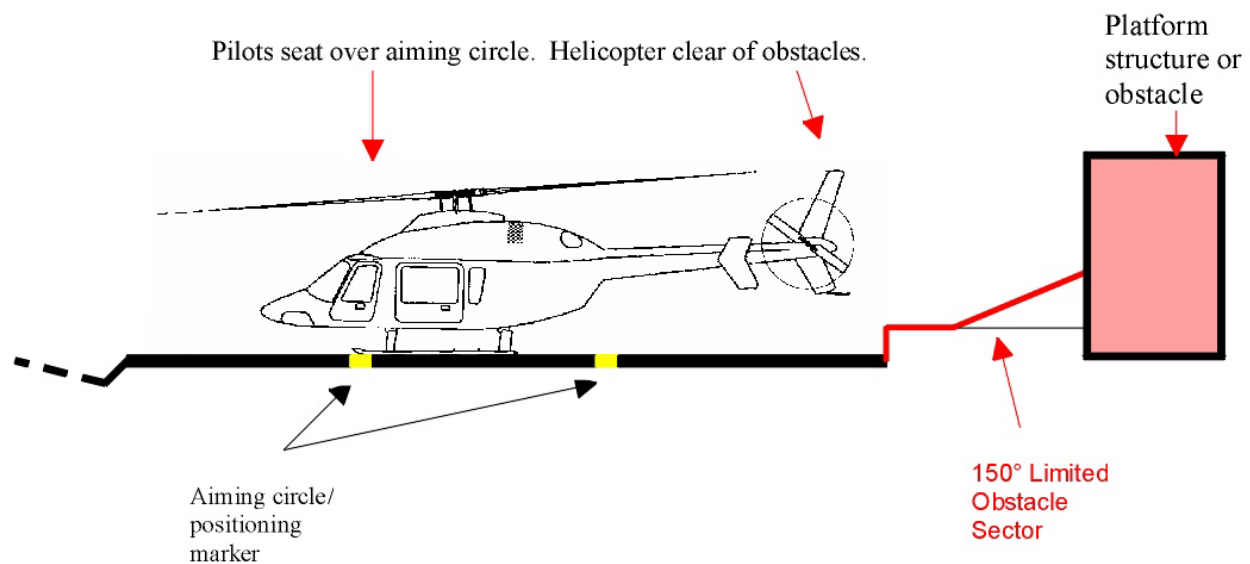
Helideck marking



2.10. TOUCHDOWN POSITIONING MARKING/AIMING CIRCLE

A touchdown positioning marking (TDPM) or aiming circle shall be provided as detailed below. The TDPM shall be located so that when operating a helicopter, whose size is equal to or less than the D value of the deck, with the pilots seat is over the marking, the undercarriage will be inside the load bearing area and all parts of the helicopter will be clear of any obstacle by a safe margin, as indicated in **Figure 5**. For this reason the diameter of the aiming circle will vary depending on the D value of the deck.

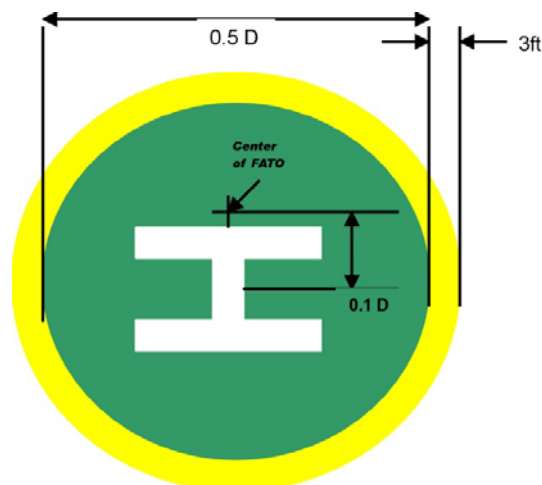
Figure 5.



The marking should be a yellow circle with an inner diameter of 0.5 of the D-value of the helideck and a line width of 3 ft, as shown in **Figure 6**.

In order to achieve an increased safety margin for tail rotor clearance, the aiming circle center may be displaced 0.1 D from the center of the FATO towards the outboard edge of the helideck, along the bisector of the obstacle-free sector. On smaller helidecks with a FATO/helideck surface up to and including 52ft, there is a case for making the TDPM concentric with the FATO center to ensure maximization of space all round for safe personnel movement and optimization of the visual cueing environment.

Figure 6



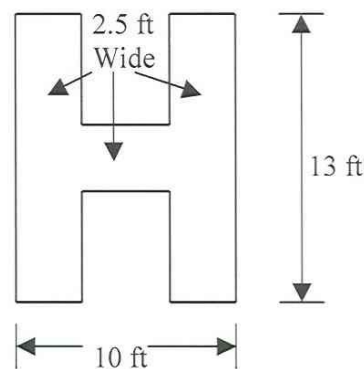
On some very small helidecks complying with the HSAC 0.62D size restriction, the use of a 0.5D inner diameter for the TDPM may result in the TDPM outer edge being too close to the FATO edge, which would mean a pilot positioning over the marking would land the helicopter too close to the FATO edge. In this case the diameter of the TDPM may be reduced to allow a 4ft gap between the FATO edge and the outer edge of the TDPM.

However, to ensure continued tail rotor obstacle clearance when maneuvering over this reduced TDPM, a reduction in the TDPM diameter below 0.5D can only be undertaken when the 1D obstacle free surface and 150° LOS can be offset towards the obstacles by a distance equivalent to 0.5 x the reduction in TDPM diameter from the 0.5D figure.

(i.e. if the TDPM diameter is reduced by 8ft, the edge of the 1D obstacle free surface and edge of the 150° LOS must be extended by 4ft in the direction of the nearest obstacles.)

A white 'H' should be marked co-located with the TDPM/aiming circle with the crossbar of the 'H' lying along the bisector of the obstacle-free sector. Its dimensions are as shown in **Figure 7**.

Figure 7



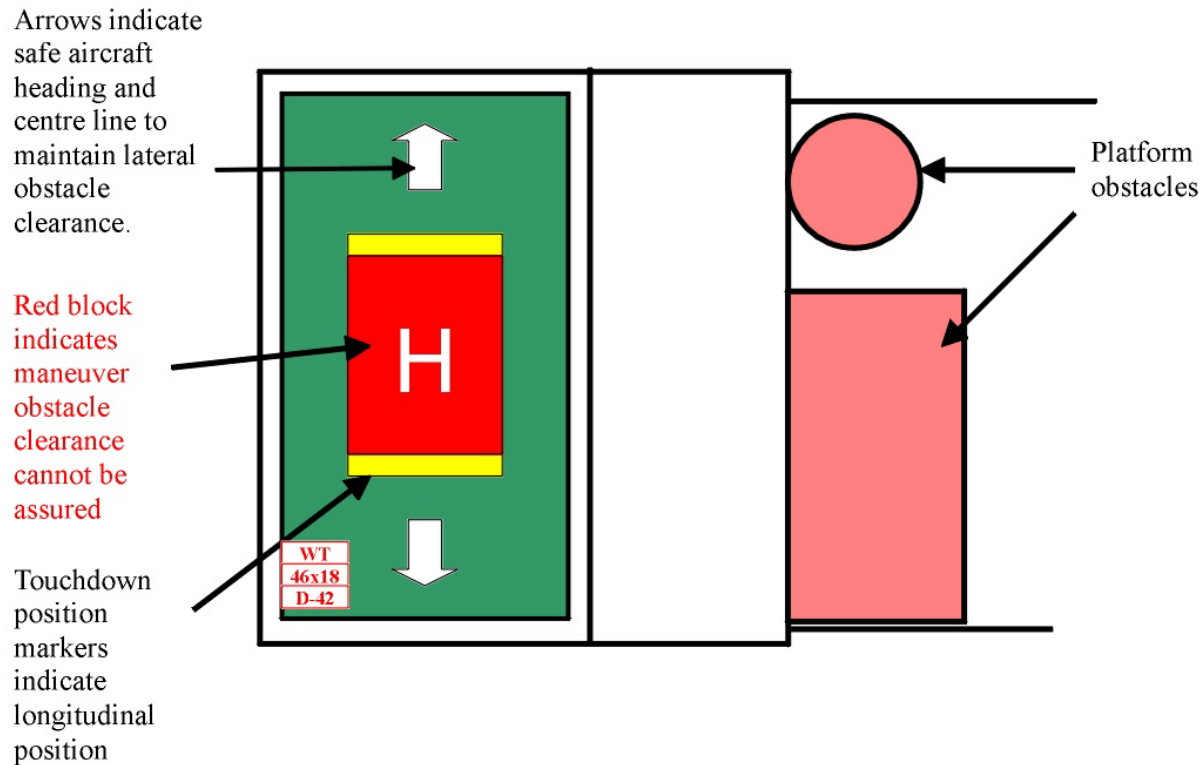
For very small helidecks or when the TDPM diameter has been reduced below 0.5D, the dimensions of the "H" may be reduced to fit within the TDPM.

2.11. RESTRICTED SIZE HELIDECKS

Some helidecks cannot meet the 1D obstacle free surface and 150° LOS requirement detailed in **Section 2.8**, due to old design or the presence of permanent obstructions. A good example of this would be a small jack-up drilling rig with a leg located next to the deck. Since maneuvering obstacle clearance cannot be obtained for the largest type of helicopter flown to that deck, the variance and departure from the standard must be clearly indicated to the pilot.

This should be indicated by the marking of a **red aiming block**, as shown in **Figure 8**, rather than the normal aiming circle. Touch down position lines, marked in yellow are to be placed on the sides of the square that indicate the safe touchdown positions on the restricted headings, indicated by white arrows, marked on the deck outside of the block.

Figure 8
Restricted Maneuvering Size Helideck Marking



The touch down position lines are to be of the same width as the circular TDPM, 3ft. The length of the lines (and width of the aiming block) is to be sufficient for them to be seen clearly by the pilot when hovering over the centre line indicated by the white arrows. A minimum length of 8ft is recommended for B206 type helicopters.

The white centre line arrows, with a minimum shaft width of 2 ft and height of 6 ft, should indicate the safe direction for landing and take off. The aiming block and arrows should be positioned on the deck to indicate a centre line position for the largest type of helicopter used, that will give lateral rotor disk separation from the nearest obstacle(s) of at least $0.25D$ ($1/3^{\text{rd}}$).

Once the position of the *aiming block* is determined, the marked *FATO* will cover only that portion of the deck on the obstacle side, which is equal to the distance between the edge of the deck on the non-obstacle side and the edge of the *aiming block*.

The maximum allowable weight, FATO dimensions and D value should be marked as per **Sections 2.7, 2.8 & 2.9**. The D value in this instance will indicate the overall length of the largest helicopter for which the $1/3$ RD separation is provided by the centreline arrows. For relative D and RD values see Appendix 2. The absence of a 1D obstacle free surface is indicated by the red aiming block.

2.12. PROHIBITED LANDING SECTOR MARKINGS

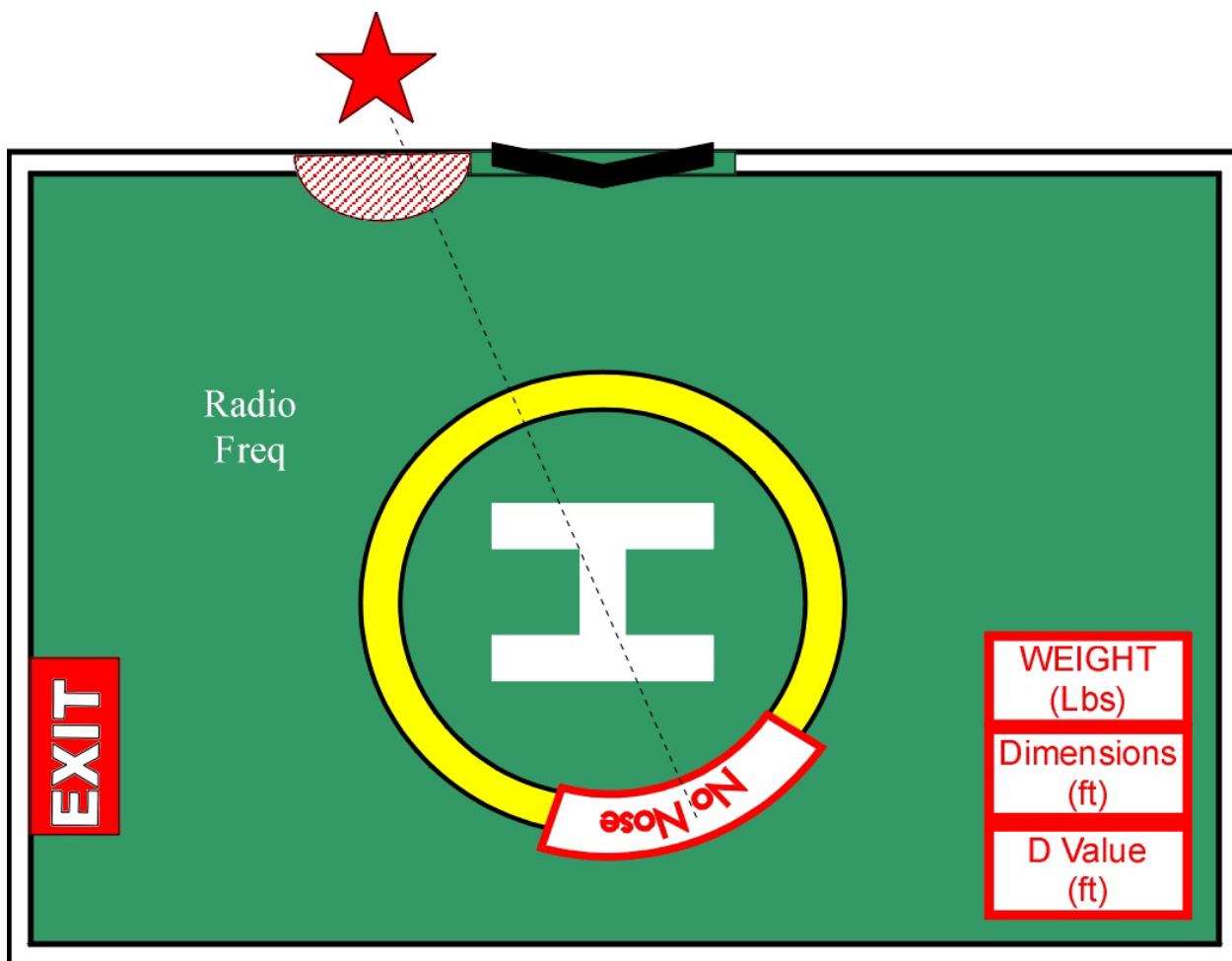
Where an isolated obstruction infringes the 150° limited obstacle sector, causing a danger of tail rotor impact when maneuvering around the TDPM, the obstruction should be clearly marked to give the pilot unambiguous directions to keep clear.

In addition to the existing API recommended tail rotor obstruction marking of a 3 ft wide, solid red or hatched border around the obstacle, the sector of the TDPM, opposite from the obstacle, is to be bordered in Red, with the words “No Nose” clearly marked in red, on a white background, as shown in **Figure 9**. When positioning over the TDPM, helicopters should be maneuvered so as to keep the aircraft **nose** clear of the “No Nose” marked sector of the TDPM at all times. This will ensure that the tail rotor is clear of the obstruction.

The previous API main rotor obstacle marking requirement is no longer required if the FATO/TLOF marking in **Section 2.1** is applied.

On a helideck where the number of access points is limited, a “No Nose” prohibited landing heading sector marking may be desirable to avoid placing the tail rotor in close proximity to the stairs.

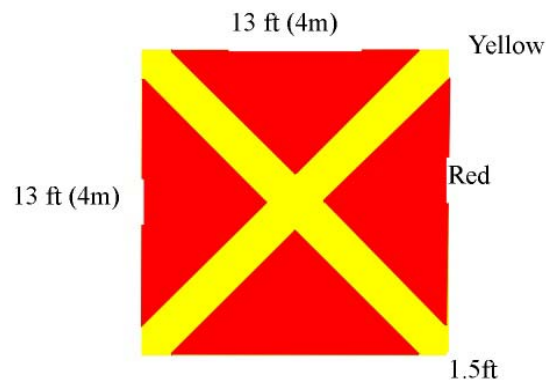
Figure 9
Prohibited Landing Sector Marking



2.13. PROHIBITED LANDING MARKER

For certain operational or technical reasons an installation may have to prohibit helicopter operations. In such circumstances, where the helideck cannot be used, the “closed” state of the helideck should be indicated by use of the signal shown in **Figure 10**. This signal is the international standard ‘landing prohibited’ signal given in the Air Traffic Control Regulations, except that it has been altered in size to just cover the letter ‘H’ inside the aiming circle.

Figure 10



2.14. WIND SOCKS

A platform shall be equipped with at least one windsock. Where a helideck may be subject to a disturbed air flow, then additional windsocks located close to the area should be provided to indicate the surface wind on the area.

Consideration should also be given to additional automated/electronic wind speed and direction indicating equipment to provide actual conditions via radio, but not to replace the windsock, which is mandatory for every platform.

A windsock shall be located in accordance with the required obstacle clearances, so as to indicate the (clear) area wind conditions at the platform and in such a way as to be free from the effects of airflow disturbances caused by nearby objects or rotor downwash. It is often inappropriate to locate the windsock as close to the helideck as possible, but it shall be visible from a helicopter in flight, in a hover or on the maneuvering area. For toadstool helidecks, windsocks may need to be located below deck level.

The windsock shall be illuminated where night flights are anticipated. This lighting should not be a hazard to flight.

The recommended size for a windsock is 4 feet in length, with a large opening size of approximately 14 inches and an exit size of 8 inches.

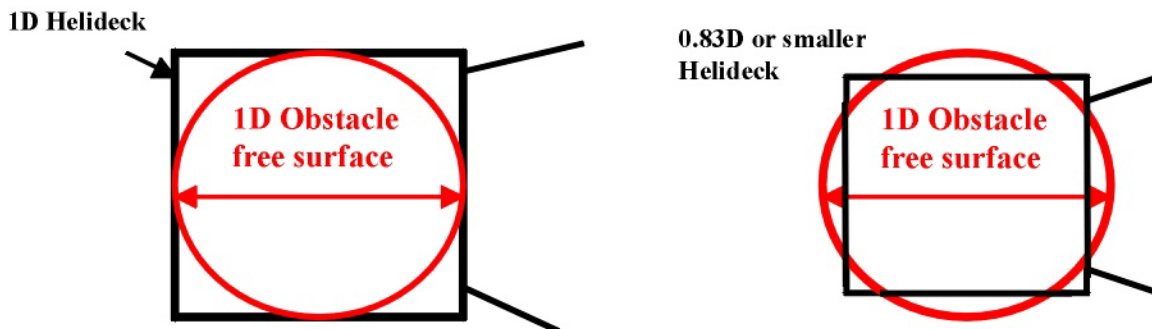
Appendix 1 Helideck Obstacle Protected Areas

The following obstacle protected area guidance is based on the requirements of ICAO Annex 14 and CAP 437.

1 Obstacle-Free Surface

A helideck shall have an obstacle free surface. This obstacle free surface should be sufficiently large to contain a circle of diameter D , equal to the largest dimension of the helicopter when rotors are turning. This circle should normally be encompassed within the helideck area for a $1D$ deck, but when applied to a $0.83D$ deck or smaller, the extent of the circle will extend beyond the physical boundary of the deck

Figure 1



From any point on the periphery of the above D circle, an obstacle-free approach and take off sector should be provided which totally encompasses the FATO/landing area and D circle and which extends over an area of at least 210° . Within this sector and out to a distance of 3280 ft (1000m) from the periphery of the landing area, only the following items may exceed the height of the landing area, but should not do so by more than 10 inches (0.25m)

- Guttering
- Deck lighting
- The outboard edge of the safety net.
- Foam monitors
- Handrails and other items associated with the landing area which are incapable of complete retraction or lowering for helicopter operations.

For $0.83D$ helidecks or below, where the items above will be inside the $1D$ obstacle free surface, it is recommended that the maximum height above the landing area should not exceed 2 inches.

2 Limited Obstacle Sector

A helideck should have a 150° Limited Obstacle Sector (LOS). The Diagram at **Figure 2** shows the extent of the two segments of the 150° LOS and how these are measured from the center of the (imaginary) 'D' Circle and from the perimeter of the FATO. This diagram assumes that the 'D' Circle perimeter and FATO perimeter are coincidental. On a $0.83D$ helideck where the FATO and D circle are not coincidental, the LOS will be measured from the edge of the D circle, **not** the edge of the FATO.

Within the 150° LOS out to a distance of $0.62D$, measured from the center of the FATO (hatched area in Figure 1), objects shall not exceed a height of $0.05D$ above the FATO. Beyond that arc, out to an overall distance of $0.83D$, the limited obstacle surface rises at a rate of one unit vertically for each two units horizontally, as shown in **Figure 2**.

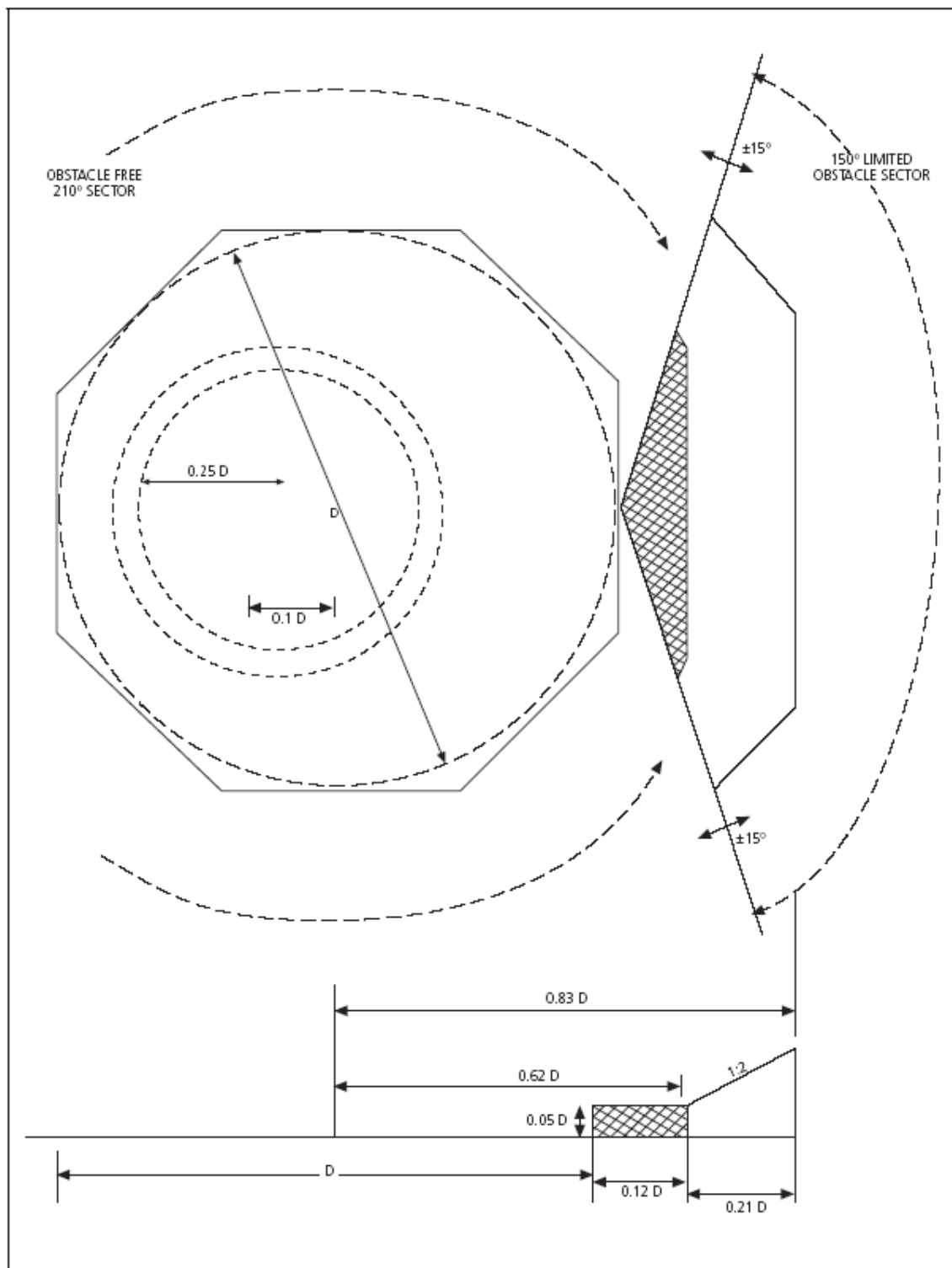


Figure 2

3 Obstacle Free Area – Below Landing Area Level

In the immediate vicinity of the helideck, obstacle protection shall be provided below the heliport level to consider the possibility of helicopter loss of height due to power unit failure during the latter stages of the approach or early stages of take off.

This protection shall extend over an arc of 180° with the origin at the center 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° sector, as shown in **figure 3** below. This descending gradient may be reduced to a ratio of one unit horizontally to three vertical within the 180° sector for multi engine helicopters operated in performance classes 1 or 2.

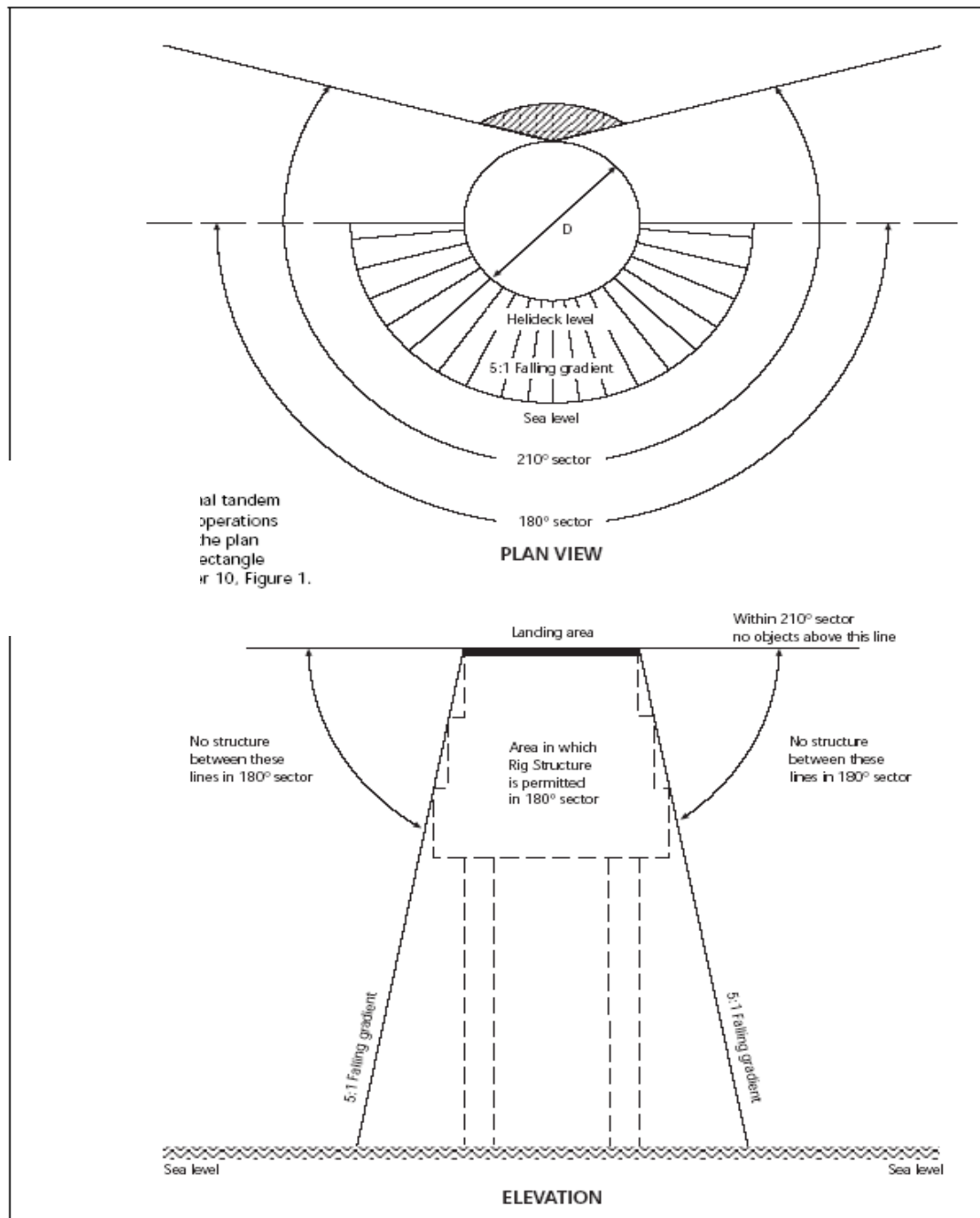


Figure 3

Appendix 2:

Useful Dimensions For Helicopter Types

Helicopter Type	D Value (feet)	Deck Size Marking	0.05 D (Feet)	0.62 D (Feet)	0.83 D (Feet)	Aiming circle inside diameter (0.5D)	Rotor Diameter (Feet)	Max weight (Lbs)	Deck weight marking
EC 120	37.8	38	1.89	23.44	31.37	18.9	32.9	3,704	3.7
B 206 B	39.2	39	1.96	24.3	32.54	19.6	33.25	3,350	3.4
BO 105	39.36	39	1.97	24.4	32.67	19.68	32.25	5,511	5.5
EC 135	39.9	40	2	24.74	33.12	19.95	33.5	6,400	6.4
Bell 407	41.75	42	2.09	25.86	34.65	20.88	35	5,000	5
AS 350	42.6	43	2.13	26.41	35.36	21.3	35.1	4,960	5
AS 355	42.6	43	2.13	26.41	35.36	21.3	35.1	5,732	5.7
B 206L	42.75	43	2.14	26.5	35.48	21.35	37	4,450	4.5
A119	43	43	2.15	26.66	35.69	21.5	36.1	5,997	6.0
A109	43	43	2.15	26.66	35.69	21.5	36.1	6,600	6.6
EC155B1	46.9	47	2.35	29.08	38.93	23.45	41.25	10,582	10.6
S 76	52.48	52	2.62	32.54	43.56	26.24	44	11,700	11.7
AW 139	54.65	55	2.73	33.88	45.36	27.33	45.28	14,110	14.2
B 412	56.1	56	2.8	34.78	46.56	28.05	46	11,900	11.9
B212	57.27	57	2.86	35.5	47.53	28.64	48.2	11,200	11.2
AS332 L	61.34	61	3.07	38.03	50.91	30.67	49.6	19,840	19.8
B 214 ST	62.16	62	3.1	38.54	51.59	31.08	52	17,500	17.5
AS332 L2	63.96	64	3.2	39.66	53.09	31.98	53.2	20,502	20.5
EC225	63.96	64	3.2	39.66	53.09	31.98	53.2	24,251	24.3
S92	68.49	68	3.42	42.46	56.85	34.25	56.32	28,293	28.3
S61	72.82	73	3.64	45.15	60.44	36.41	62	20,500	20.5