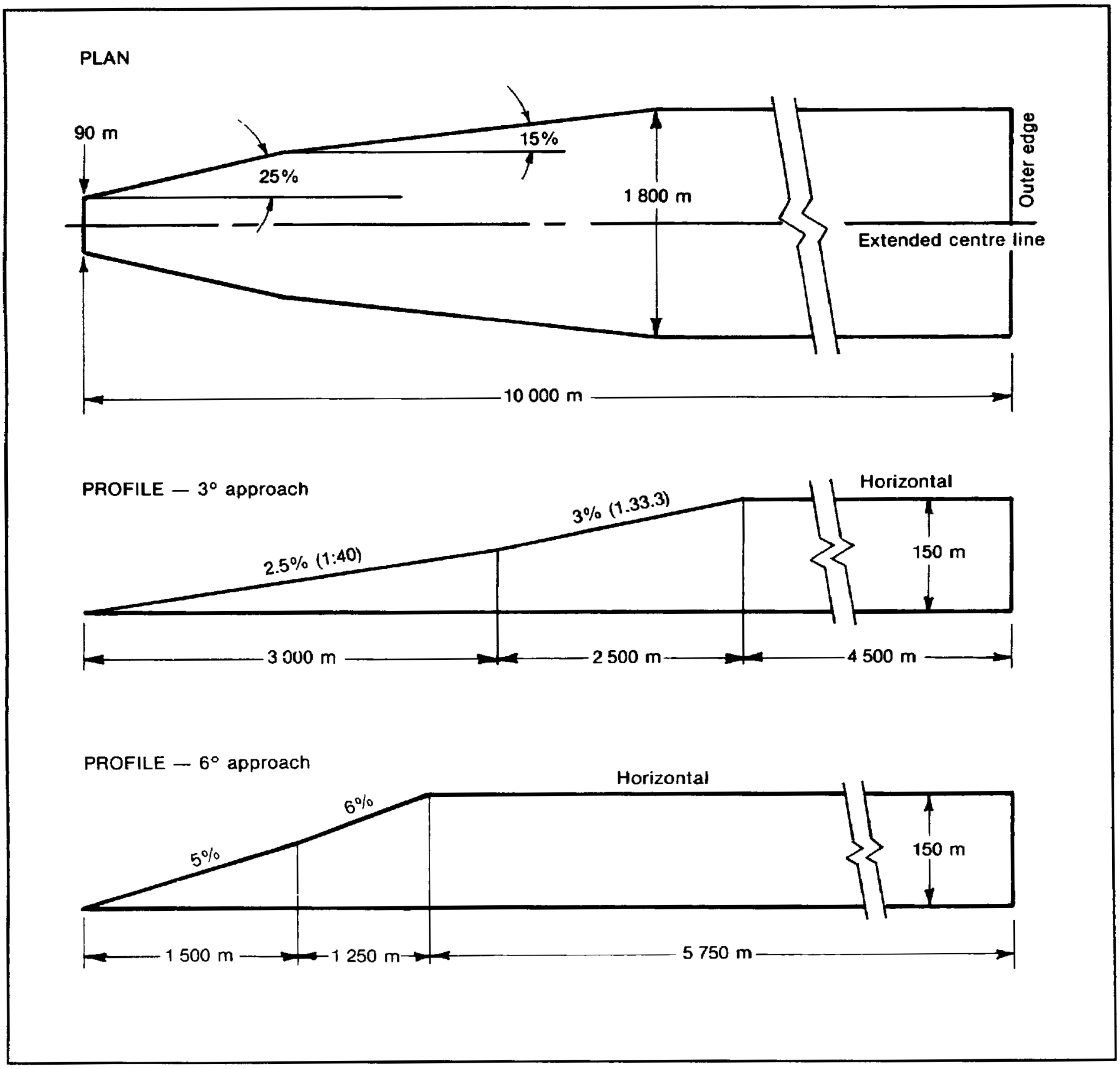

Figure 3-11. Approach surface for precision approach FATO

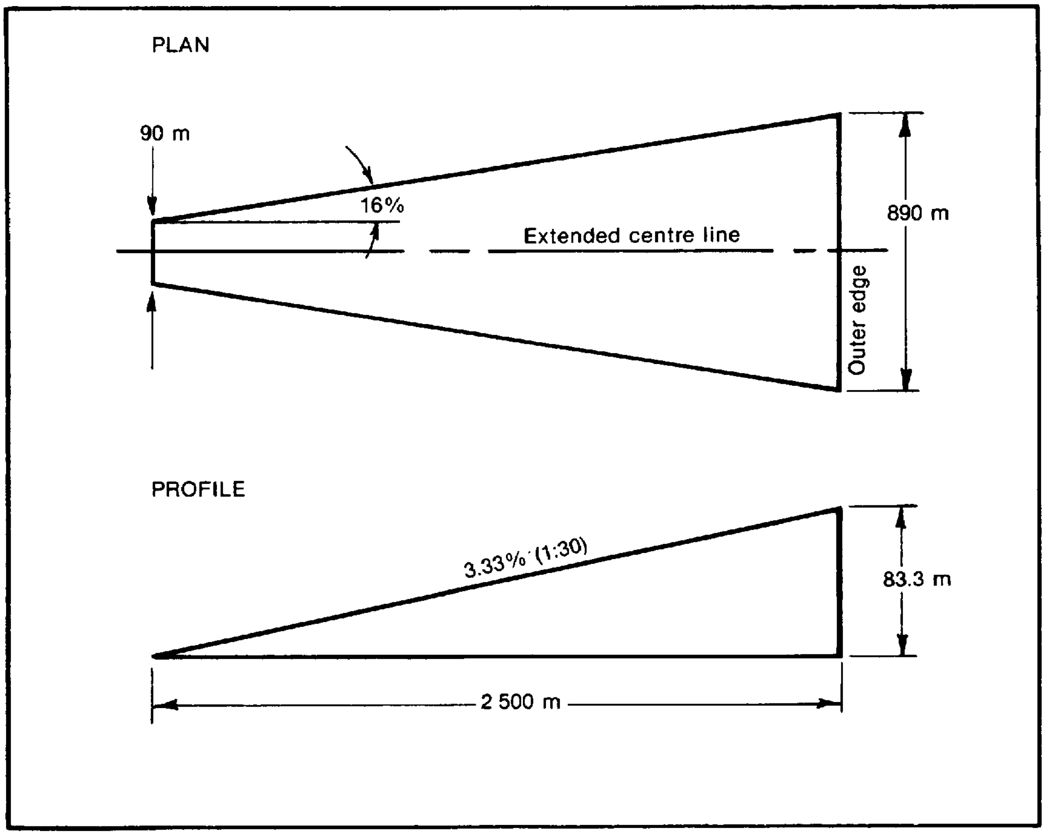

Figure 3-12. Approach surface for non-precision approach FATO

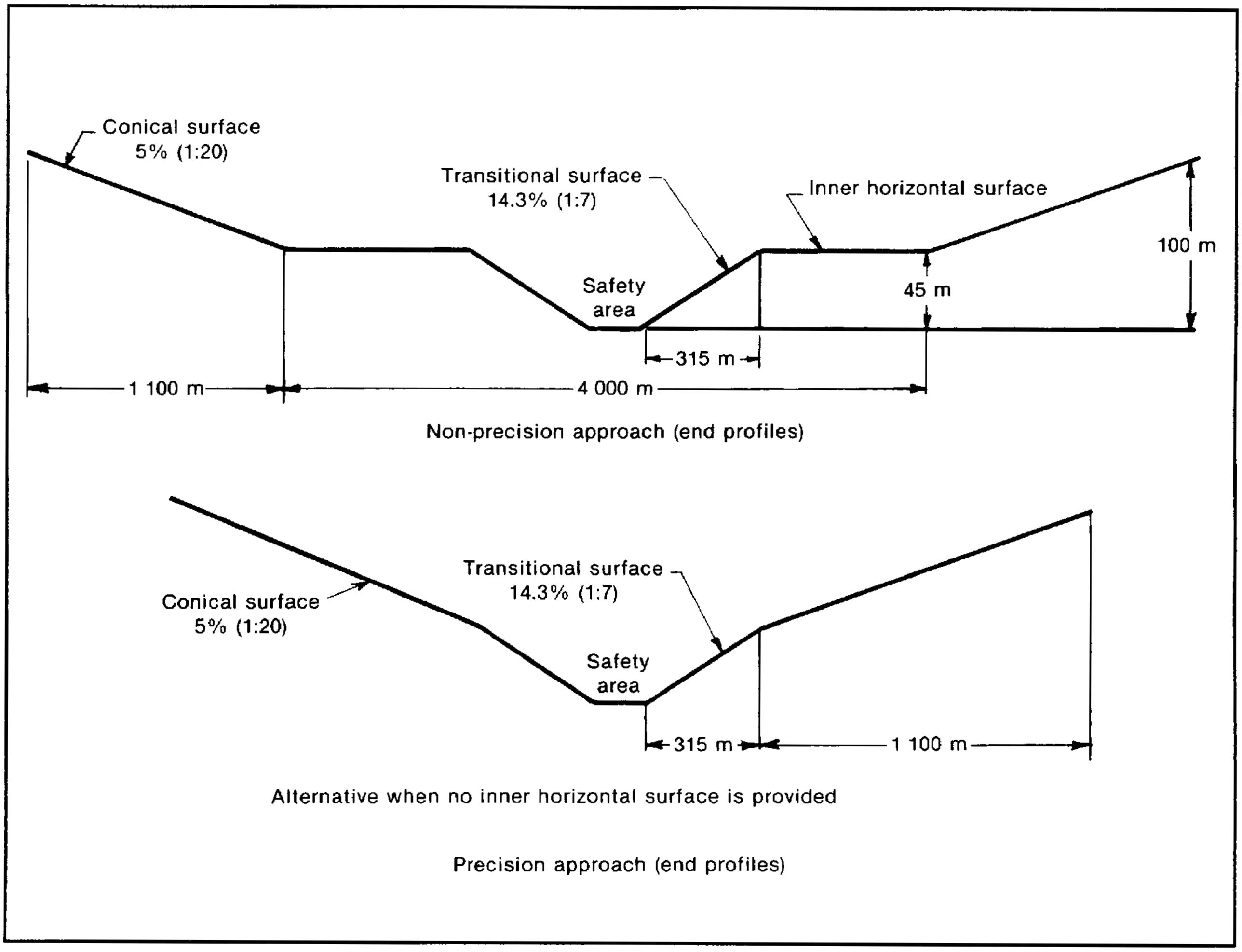

Figure 3-13. Transitional, inner horizontal and conical obstacle limitation surfaces

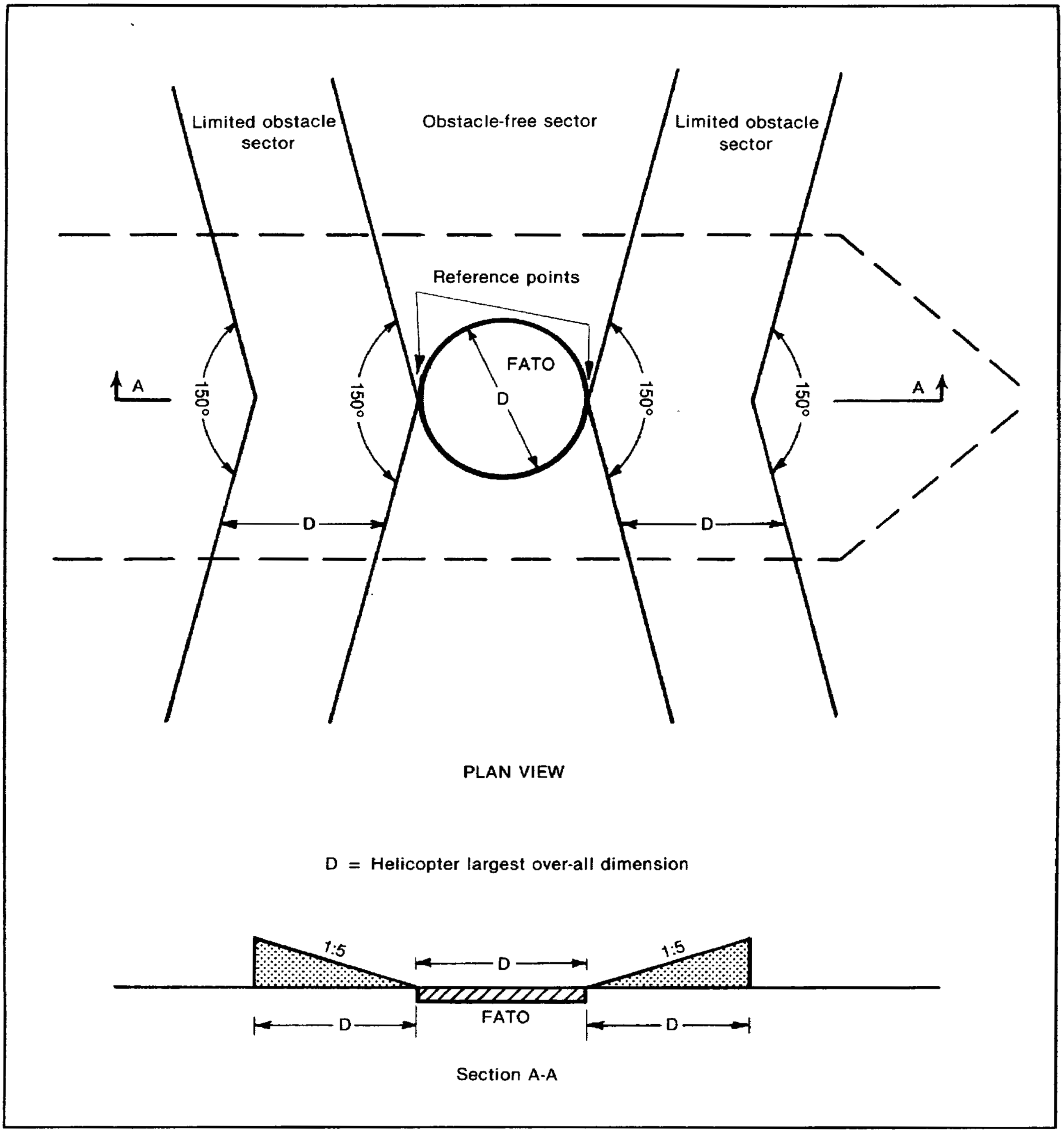

Figure 3-14. Midship non-purpose built heliport obstacle limitation surfaces

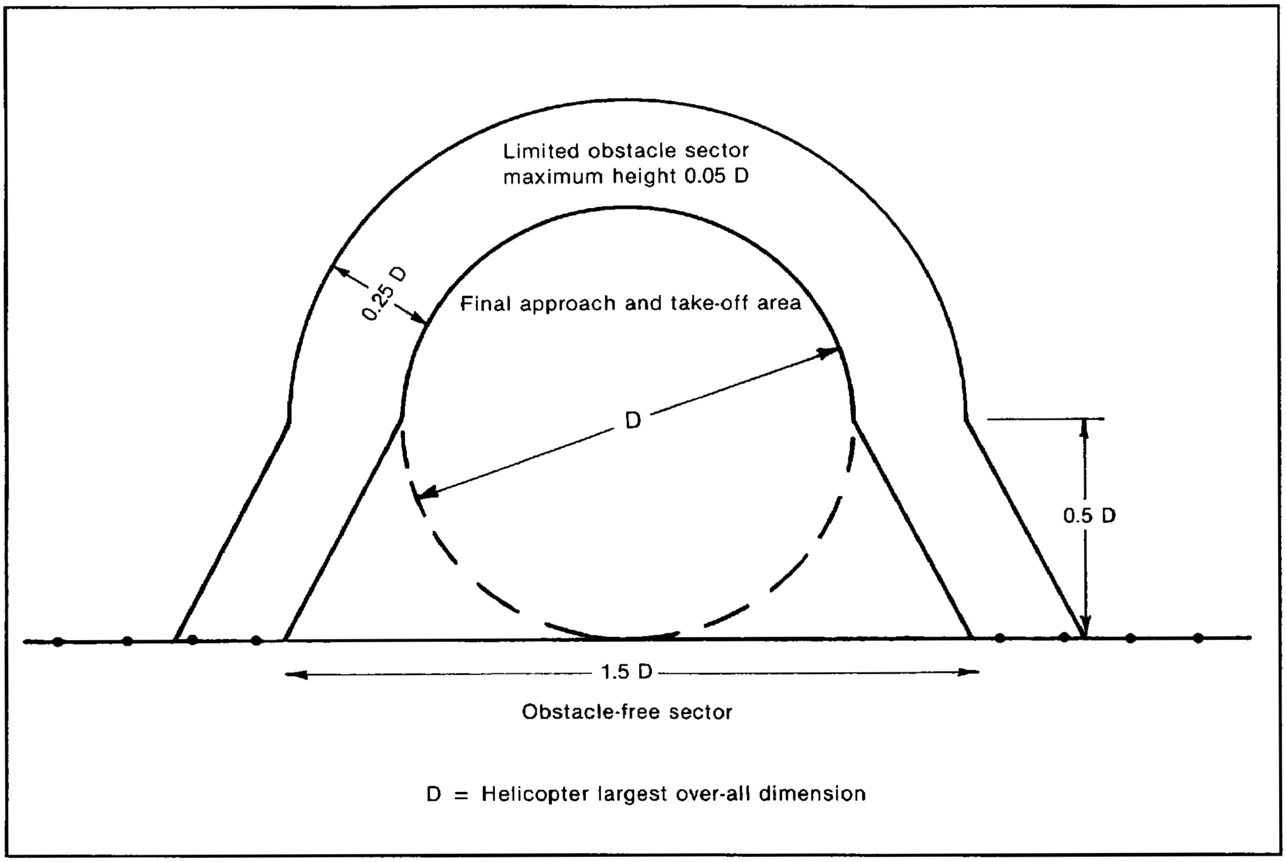

Figure 3-15. Ships-side non-purpose built heliport obstacle limitation surfaces

Table 3-1. Dimensions and slopes of obstacle limitation surfaces

NON-INSTRUMENT AND NON-PRECISION FATO

Surface and dimensions		*Non-instrument (visual) FATO* — *Helicopter performance class* 1	2	3	*Non-precision (instrument approach) FATO*
APPROACH SURFACE					
Width of inner edge			Width of safety area		Width of safety area
Location of inner edge			Boundary		Boundary
First section					
Divergence	— day	10%	10%	10%	16%
	— night	15%	15%	15%	
Length	— day	245 m[a]	245 m[a]	245 m[a]	2 500 m
	— night	245 m[a]	245 m[a]	245 m[a]	
Outer width	— day	49 m[b]	49 m[b]	49 m[b]	890 m
	— night	73.5 m[b]	73.5 m[b]	73.5 m[b]	
Slope (maximum)		8%[a]	8%[a]	8%[a]	3.33%
Second section					
Divergence	— day	10%	10%	10%	—
	— night	15%	15%	15%	
Length	— day	c	c	c	—
	— night	c	c	c	
Outer width	— day	d	d	d	—
	— night	d	d	d	
Slope (maximum)		12.5%	12.5%	12.5%	—
Third section					
Divergence		parallel	parallel	parallel	—
Length	— day	e	e	e	—
	— night	e	e	e	
Outer width	— day	d	d	d	—
	— night	d	d	d	
Slope (maximum)		15%	15%	15%	—
INNER HORIZONTAL					
Height		—	—	—	45 m
Radius		—	—	—	2 000 m
CONICAL					
Slope		—	—	—	5%
Height		—	—	—	55 m
TRANSITIONAL					
Slope		—	—	—	20%
Height		—	—	—	45 m

a. Slope and length enables helicopters to decelerate for landing while avoiding unsafe combinations of height and airspeed.
b. The width of the inner edge shall be added to this dimension.
c. Determined by the distance from the inner edge to the point where the divergence produces a width of 7 rotor diameters for day operations or 10 rotor diameters for night operations.
d. Seven rotor diameters over-all width for day operations or 10 rotor diameters over-all width for night operations.
e. Determined by the distance from inner edge to where the approach surface reaches a height of 150 m above the elevation of the inner edge.

Table 3-2. Dimensions and slopes of obstacle limitation surfaces

INSTRUMENT (PRECISION APPROACH) FATO

	3° approach				*6° approach*			
	Height above FATO				*Height above FATO*			
Surface and dimensions	*90 m (300 ft)*	*60 m (200 ft)*	*45 m (150 ft)*	*30 m (100 ft)*	*90 m (300 ft)*	*60 m (200 ft)*	*45 m (150 ft)*	*30 m (100 ft)*
APPROACH SURFACE								
Length of inner edge	90 m	90 m	90 m	90 m	90 m	90 m	90 m	90 m
Distance from end of FATO	60 m	60 m	60 m	60 m	60 m	60 m	60 m	60m
Divergence each side to height above FATO	25%	25%	25%	25%	25%	25%	25%	25%
Distance to height above FATO	1 745 m	1 163 m	872 m	581 m	870 m	580 m	435 m	290 m
Width at height above FATO	962 m	671 m	526 m	380 m	521 m	380 m	307.5 m	235 m
Divergence to parallel section	15%	15%	15%	15%	15%	15%	15%	15%
Distance to parallel section	2 793 m	3 763 m	4 246 m	4 733 m	4 250 m	4 733 m	4 975 m	5 217 m
Width of parallel section	1 800 m	1 800 m	1 800 m	1 800 m	1 800 m	1 800 m	1 800 m	1 800 m
Distance to outer edge	5 462 m	5 074 m	4 882 m	4 686 m	3 380 m	3 187 m	3 090 m	2 993 m
Width at outer edge	1 800 m	1 800 m	1 800 m	1 800 m	1 800 m	1 800 m	1 800 m	1 800 m
Slope of first section	2.5% (1:40)	2.5% (1:40)	2.5% (1:40)	2.5% (1:40)	5% (1:20)	5% (1:20)	5% (1:20)	5% (1:20)
Length of first section	3 000 m	3 000 m	3 000 m	3 000 m	1 500 m	1 500 m	1 500 m	1 500 m
Slope of second section	3% (1:33.3)	3% (1:33.3)	3% (1:33.3)	3% (1:33.3)	6% (1:16.66)	6% (1:16.66)	6% (1:16.66)	6% (1:16.66)
Length of second section	2 500 m	2 500 m	2 500 m	2 500 m	1 250 m	1 250 m	1 250 m	1 250 m
Total length of surface	10 000 m	10 000 m	10 000 m	10 000 m	8 500 m	8 500 m	8 500 m	8 500 m
CONICAL								
Slope	5%	5%	5%	5%	5%	5%	5%	5%
Height	55 m	55 m	55 m	55 m	55 m	55 m	55 m	55 m
TRANSITIONAL								
Slope	14.3%	14.3%	14.3%	14.3%	14.3%	14.3%	14.3%	14.3%
Height	45 m	45 m	45 m	45 m	45 m	45 m	45 m	45 m

Table 3-3. Dimensions and slopes of obstacle limitation surfaces

STRAIGHT TAKE-OFF

Surface and dimensions		*Non-instrument (visual)* *Helicopter performance class* *1*	*2*	*3*	*Instrument*
TAKE-OFF CLIMB					
Width of inner edge		Width of safety area			90 m
Location of inner edge		Boundary or end of clearway			Boundary or end of clearway
First section					
Divergence	— day	10%	10%	10%	30%
	— night	15%	15%	15%	
Length	— day	a	245 m[b]	245 m[b]	2 850 m
	— night	a	245 m[b]	245 m[b]	
Outer width	— day	c	49 m[d]	49 m[d]	1 800 m
	— night	c	73.5 m[d]	73.5 m[d]	
Slope (maximum)		4.5%*	8%[b]	8%[b]	3.5%
Second section					
Divergence	— day	parallel	10%	10%	parallel
	— night	parallel	15%	15%	
Length	— day	e	a	a	1 510 m
	— night	e	a	a	
Outer width	— day	c	c	c	1 800 m
	— night	c	c	c	
Slope (maximum)		4.5%*	15%	15%	3.5%*
Third section					
Divergence		—	parallel	parallel	parallel
Length	— day	—	e	e	7 640 m
	— night	—	e	e	
Outer width	— day	—	c	c	1 800 m
	— night	—	c	c	
Slope (maximum)		—	15%	15%	2%

a. Determined by the distance from the inner edge to the point where the divergence produces a width of 7 rotor diameters for day operations or 10 rotor diameters for night operations.
b. Slope and length provides helicopters with an area to accelerate and climb while avoiding unsafe combinations of height and airspeed.
c. Seven rotor diameters over-all width for day operations or 10 rotor diameters over-all width for night operations.
d. The width of the inner edge shall be added to this dimension.
e. Determined by the distance from the inner edge to where the surface reaches a height of 150 m above the elevation of the inner edge.

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

Table 3-4. Criteria for curved take-off climb/approach area

NON-INSTRUMENT FINAL APPROACH AND TAKE-OFF

Facility	*Requirement*
Directional change	As required (120° max).
Radius of turn on centre line	Not less than 270 m.
Distance to inner gate*	(a) For performance class 1 helicopters — not less than 305 m from the end of the safety area or helicopter clearway. (b) For performance class 2 and 3 helicopters — not less than 370 m from the end of the FATO.
Width of inner gate — day	Width of the inner edge plus 20% of distance to inner gate.
— night	Width of the inner edge plus 30% of distance to inner gate.
Width of outer gate — day	Width of inner edge plus 20% of distance to inner gate out to minimum width of 7 rotor diameters.
— night	Width of inner edge plus 30% of distance to inner gate out to a minimum width of 10 rotor diameters.
Elevation of inner and outer gates	Determined by the distance from the inner edge and the designated gradient(s).
Slopes	As given in Tables 3-1 and 3-3.
Divergence	As given in Tables 3-1 and 3-3.
Total length of area	As given in Tables 3-1 and 3-3.

* This is the minimum distance required prior to initiating a turn after take-off or completing a turn in the final phase.

Note.— More than one turn may be necessary in the total length of the take-off climb/approach area. The same criteria will apply for each subsequent turn except that the widths of the inner and outer gates will normally be the maximum width of the area.

Chapter 4

WINCHING AREAS AND UNDERSLUNG LOAD OPERATING AREAS ON SHIPS

4.1 WINCHING AREAS

4.1.1 Certain types of ships are unable to provide the space or obstacle limitation surfaces required to provide either a helideck or a heliport whilst still requiring helicopter support. Therefore they must resort to the provision of an area for winching operations only. Due to the ship's motion, it becomes a difficult handling manoeuvre for the pilot to maintain station whilst winching up or down. For this reason, the winching area is frequently provided over accommodation or similar modules.

4.1.2 The winching area should contain a clear zone which shall be completely free of obstacles. It shall comprise a circle whose diameter is not less than 5.0 m.

4.1.3 Surrounding the clear zone shall be a circular manoeuvring area whose over-all diameter shall be not less than 30 m. Within this area, and outside the clear zone, obstacles may be permitted up to a maximum height of 3.0 m above the clear zone.

4.1.4 The helicopter will normally hover approximately 3.0 m above the highest obstacle in the manoeuvring area (see Figure 4-1).

4.1.5 The following safety precautions should be applied:

a) personnel should be kept well clear of any space immediately beneath the operating area;

b) safe means of access to the winching area should be provided from at least two opposite sides;

c) all doors, portholes, skylights, etc., must be closed in the operating area, in its immediate vicinity and, where appropriate, on all decks below; and

d) all fire and rescue parties should be deployed well clear and sheltered from the operating area, yet within range for immediate fire fighting or rescue duties.

Note.— Because of the hazardous nature of winching operations and the difficult handling control for the pilot during the prolonged hovering manoeuvre necessary, safety will be enhanced if provisions are made for helicopter landing operations in preference to winching, wherever this is practicable.

4.2 UNDERSLUNG LOAD OPERATING AREAS

4.2.1 General considerations

4.2.1.1 When an item of cargo cannot reasonably be stowed in the helicopter cabin area, it must be slung under the helicopter, usually in a suitable cargo net, and suspended from the sling apparatus, provided that the maximum permitted all-up-weight for the helicopter is not exceeded. Similarly, the floor of the cabin may not be stressed sufficiently to accept the weight of a particular load.

4.2.1.2 The helicopter must be capable of hovering out of ground effect with the load attached.

4.2.1.3 When the helicopter moves into forward flight, the load may tend to swing fore and aft and in a turn the swing may also be sideways. The degree of swing will depend largely on the forward speed and radius of turn. The swings may be aggravated by the shape of the slung load and the combination of speed, turn and shape may well result in the load developing into a spin.