Recommended Practice for Planning, Designing, and Constructing Heliports for Fixed Offshore Platforms

API RECOMMENDED PRACTICE 2L
FOURTH EDITION, MAY 1996

EFFECTIVE DATE: JUNE 1, 1996

REAFFIRMED, MARCH 2006

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Exploration and Production Department

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FOREWORD

This recommended practice provides a basis for planning, designing, and constructing heliports for fixed offshore platforms. This recommended practice does not propose a "standard" heliport, but recommends basic criteria to be considered in the design of future heliports. It is not to be construed as being applicable to existing heliports.

Metric conversions of British Imperial Units are provided throughout the text of the publication in parenthesis, for example, 6 inches (152 millimeters). Most of the converted values have been rounded off for practical purposes; however, precise conversions have been used where safety and technical considerations dictate. In case of dispute, the British Imperial Units should govern.

Suggested revisions are invited and should be submitted to the director of the Exploration and Production Department, American Petroleum Institute, 1220 L Street, N.W., Washington, D.C. 20005.

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Recommended Practice for Planning, Designing, and Constructing Heliports for Fixed Offshore Platforms

1 Scope

This recommended practice provides a guide for planning, designing, and constructing heliports for fixed offshore platforms. It includes operational consideration guidelines, design load criteria, heliport size, marking recommendations, and other heliport design recommendations.

2 References

2.1 STANDARDS

The following publications and recommended practices are cited herein. The most recent edition shall be used, unless otherwise specified.

API

RP 2A *Recommended Practice for Planning, Designing and Constructing Fixed Offshore Platforms*

FAA[1]

AC 150/5390—1B *Federal Aviation Administration Helicopter Design Guide*.

OSHA[2]

33 *Code of Federal Regulations*, Chapter N, Parts 140–146

2.2 OTHER REFERENCES

LDOT[3]

Offshore Heliport Design Guide

3 Definitions

For the purpose of this standard, the following definitions apply.

3.1 approach and departure obstruction: Any object which protrudes above the 8 to 1 clearance plane from the edge of the ground cushion area.

3.2 approach and departure zone: A clear zone available for flight of a helicopter as it approaches or departs from the heliport's designated takeoff and landing area.

3.3 fixed offshore platform: A platform extending above and supported by the sea bed by means of piling, spread footings, or other means with the intended purpose of remaining stationary over an extended period.

3.4 flight deck: Flight deck area is the portion of a heliport surface provided for helicopter takeoff and landing.

3.5 gross weight: Gross weight is defined as the certified maximum takeoff weight of the helicopter for which the heliport is designed to accommodate.

3.6 ground cushion: An improvement in flight capability that develops whenever the helicopter flies or hovers near the heliport or other surface. It results from the cushion of denser air built up between the surface and helicopter by the air displaced downward by the rotor.

3.7 ground cushion area: Ground cushion area is the solid portion of a heliport surface provided for proper ground cushion effect. This area may be only the flight deck or the flight deck plus its perimeter safety shelf.

3.8 helicopter: A rotary wing aircraft which depends principally for its support and motion in the air upon the lift generated by one or more power-driven rotors, rotating on substantially vertical axes.

3.9 heliport: An area on a structure used for the landing and takeoff of helicopters and which includes some or all of the various facilities useful to helicopter operation, such as parking, tiedown, fueling, maintenance, and so forth.

3.10 hover: A flight characteristic peculiar to helicopters which enables them to remain stationary above a fixed point.

3.11 multi-helicopter heliport: A heliport designed for use by more than one helicopter at any one time.

3.12 overall helicopter length: The overall length of a helicopter is the distance from the tip of the main rotor blade to the tip of the tail rotor when the rotor blades are aligned along the longitudinal axis of the helicopter. Similarly, for a tandem rotor helicopter, the overall length is from the tip of the front main rotor to the tip of the rear main rotor. Herein the overall length is referred to as OL.

3.13 rotor diameter: Rotor diameter is the diameter of a circle made by the rotor blades while rotating. Herein the main rotor diameter is referred to as RD.

3.14 safety net: A safety net is a netting section around the perimeter of the flight deck used for personnel safety, and is normally provided in lieu of a safety shelf where the flight deck alone provides ground cushion effect.

[1]Federal Aviation Administration, 800 Independence Avenue, S.W., Washington, DC 20591. Note: The FAA booklet sets forth recommendations for the design, marking, and use of heliports for fixed offshore platforms.

[2]Occupational Safety and Health Administration, U.S. Department of Labor. The *Code of Federal Regulations* is available from the U.S. Government Printing Office, Washington, DC 20402.

[3]Louisiana Department of Transportation and Development, P.O. Box 94245, Baton Rouge, LA 70804-9245.

3.15 safety shelf: A safety shelf is a section of solid construction around the perimeter of the flight deck used for safety of personnel, and may be included in the ground cushion area.

4 Planning

4.1 GENERAL

4.1.1 This section serves as a guide for the design and construction of heliports on offshore platforms. Adequate planning should be performed before actual design is started in order to obtain a safe and practical heliport with which to accomplish the design objective. Initial planning should include all criteria pertaining to the design of the heliport. The safety departments of the helicopter companies can provide valuable assistance during the planning phase.

4.1.2 In planning the heliport, consideration should be given to the helicopter's gross weight, landing load distribution, rotor diameter, overall length, and landing gear configuration, as well as ground cushion area and the number of helicopters to be accommodated by the heliport.

4.1.3 Design criteria presented herein include operational requirements, safety considerations, and environmental aspects which could affect the design of the heliport.

4.2 HELICOPTER SELECTION

Considerations for selecting the helicopter for heliport design are:

a. Distance from onshore staging areas or helicopter bases.
b. Proximity to other offshore heliports, on either satellite structures or adjacent field structures.
c. Status as to whether the platform is manned or unmanned and with or without living quarters.
d. Helicopter transportation requirement for the platform.
e. Crew change requirements.
f. Night helicopter needs, whether routine service, medical removal, or emergency evacuation.
g. Environmental conditions.

4.3 OPERATIONAL CONSIDERATIONS

The following are the operational considerations:

4.3.1 Function

The function of the heliport should be classified as either single-helicopter or multi-helicopter operation although a heliport designed for one large helicopter may accommodate two smaller helicopters if the minimum clearance requirements are met.

4.3.2 Location

Before final location of the heliport is selected, obstruction clearances, personnel safety, and environmental conditions, as well as proximity of the approach-departure zone to flammable materials, engine exhaust, and cooler discharge should be considered. For clearance from obstructions the following should be considered:

4.3.2.1 Approach-Departure Zone

This zone should be free from obstruction for at least 180 degrees beginning at the base of the ground cushion area and extending outward and upward on an 8 to 1 slope (8 outward to 1 upward). See Figure 1. For design considerations, a properly parked helicopter on a multi-helicopter heliport does not constitute an approach and departure obstruction.

4.3.2.2 Obstruction Free Zone

This zone should include an area outward to one-third RD greater than diameter OL and also should extend one-third RD beyond the edge of the approach and departure zone. See Figure 1.

4.3.3 Size

Heliport size should depend on platform configuration and equipment arrangement, platform orientation, obstruction clearances, the selected helicopters to be utilized, and prevailing environmental conditions. The heliport ground cushion area should cover a circle of at least one main rotor diameter for helicopters operating at maximum gross weight. See Figure 2. For tandem rotor helicopters, or in harsh environmental areas (such as the Gulf of Alaska), the dimensions of the ground cushion area should equal or exceed the OL of the limiting helicopter. When ground cushion area is less than one RD (or OL for tandem rotor helicopters or in harsh environments), the approach and departure zone should be extended to 360 degrees, and helicopters landing or taking off from such a heliport should be restricted to less than the certified maximum takeoff weight.

For multi-helicopter heliports, the heliport should be of sufficient size to allow for the OL of the operating helicopter plus at least one-third the main RD clearance to any portion of a properly parked helicopter with its main rotor secured (see Figure 3).

4.3.4 Orientation

Orientation of the heliport should be determined by the platform configuration, equipment arrangement, and prevailing wind.

4.3.5 Access and Egress

The location of access and egress stairways or ladders should be determined from platform configuration, equipment arrangement, and safety objectives. One primary access and egress route should be provided. When possible the access and egress routes should be outside the approach and departure zone.

4.3.6 Fire Protection

Heliport fire protection should be considered in the platform fire protection system.

4.3.7 Air Turbulence

Platform configuration and equipment arrangement influence whether the heliport should be elevated. Air turbulence

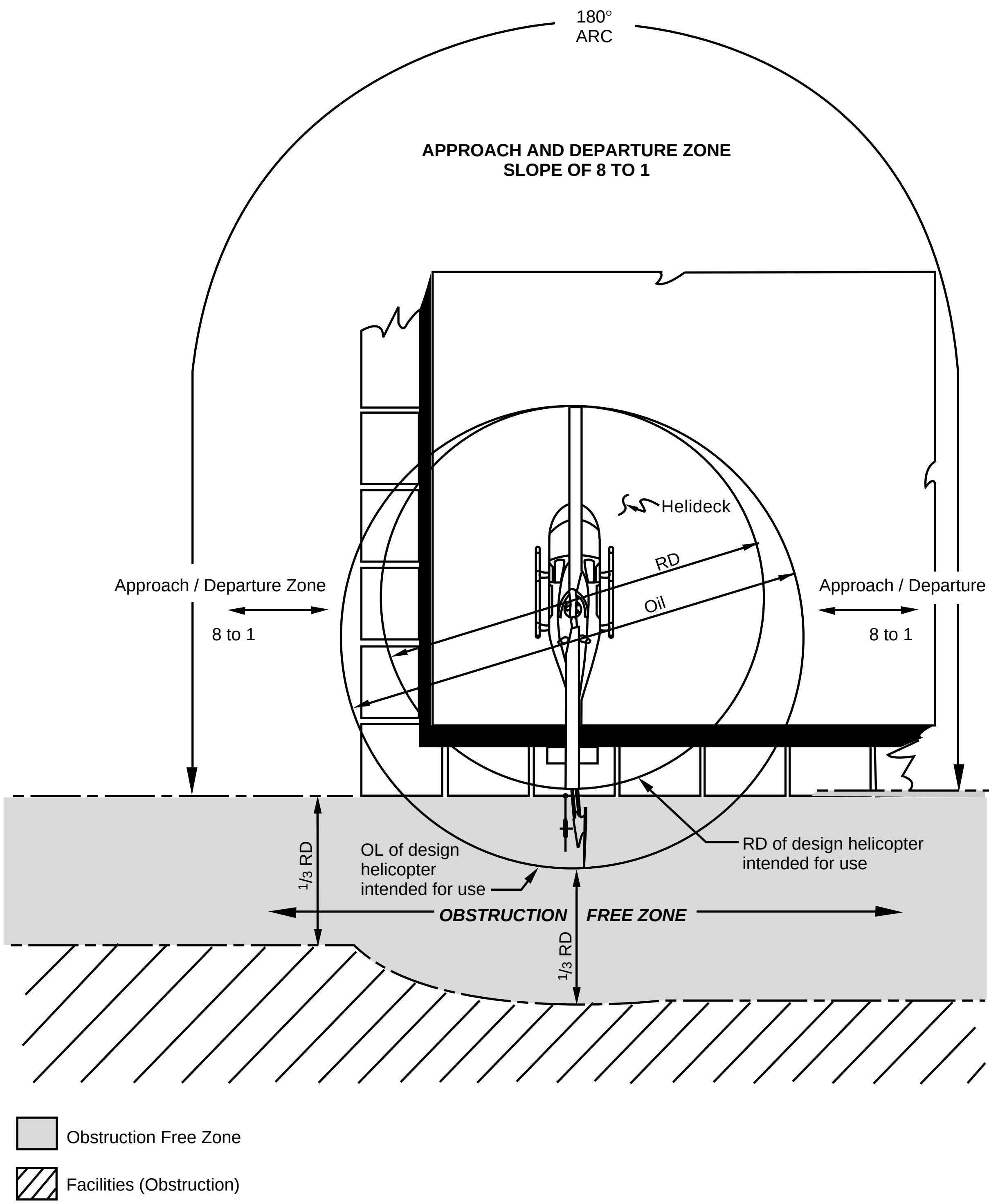

Figure 1—Flight Deck Approach/Departure Zone

spilling over the top of the heliport should be considered when determining heliport deck clearance.

When a clear airspace of a minimum of 6 feet (1.8 meters) is provided between a heliport elevated above a building and the building roof, turbulent air can flow under the heliport and will reduce the effect on helicopter operations. Consideration should be given to an airspace 6 feet (1.8 meters) or larger.

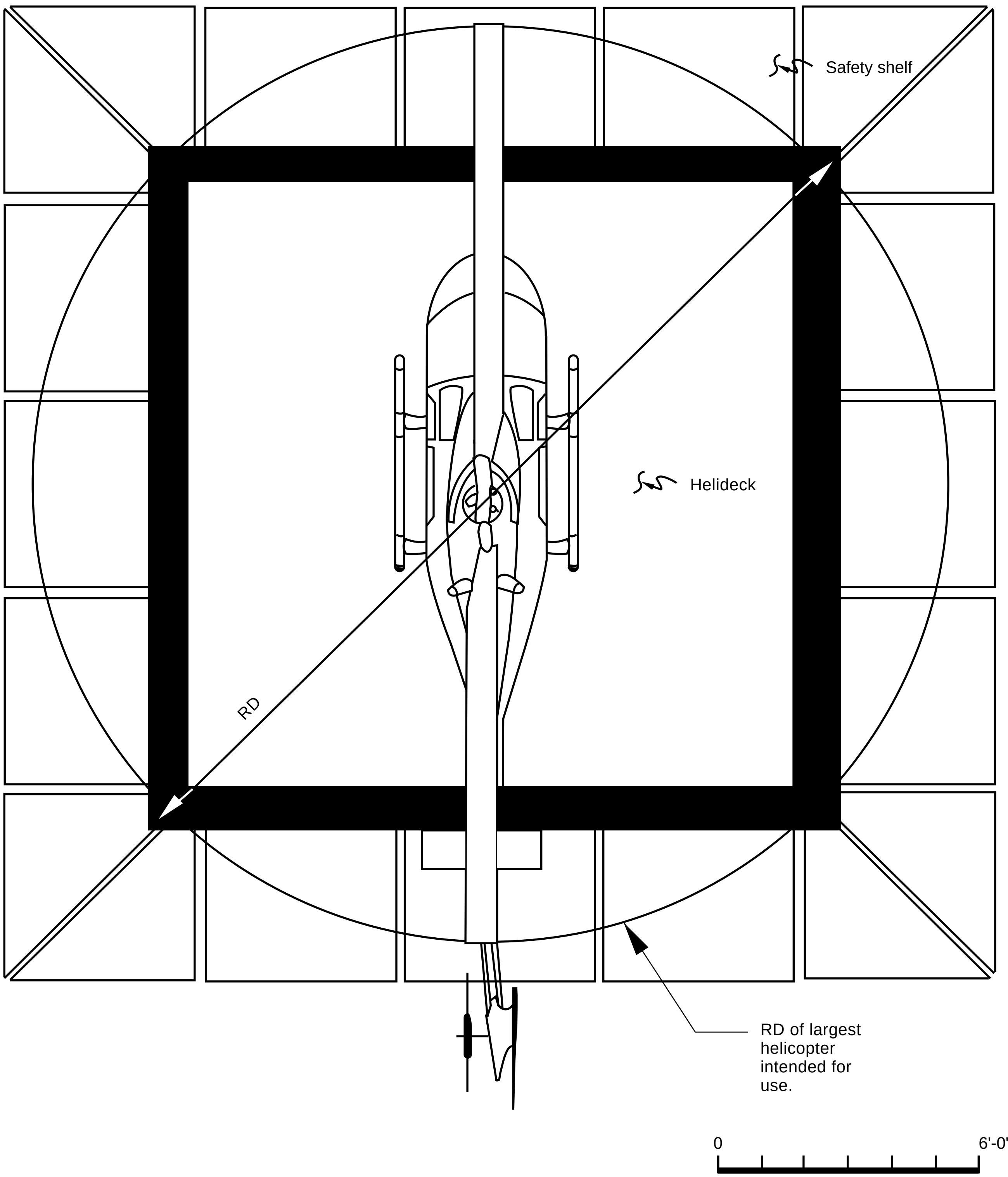

Figure 2—Recommended Size Heliport

A safety shelf can also reduce this turbulence problem on the heliports located on roofs or slab-sided buildings. This shelf should serve to break the turbulent effect of the wind.

4.3.8 Heliport Equipment

Lights, refueling hoses, fire extinguishers, tiedown points and ropes, wind indicators, and access and egress routes should be located to avoid obstructions in the heliport area.

4.3.9 Material Handling

Access to and egress from the heliport for handling material or equipment transported by the helicopter should be considered. Steep stairways or ladders should be avoided.

4.3.10 Drainage

The flight deck surface should be provided with adequate drainage to minimize standing rainwater on the surface.

4.3.11 Maintenance

Heliports which are to accommodate an offshore-based helicopter should be large enough to allow a mechanic performing routine maintenance to reach all parts of the aircraft safely.

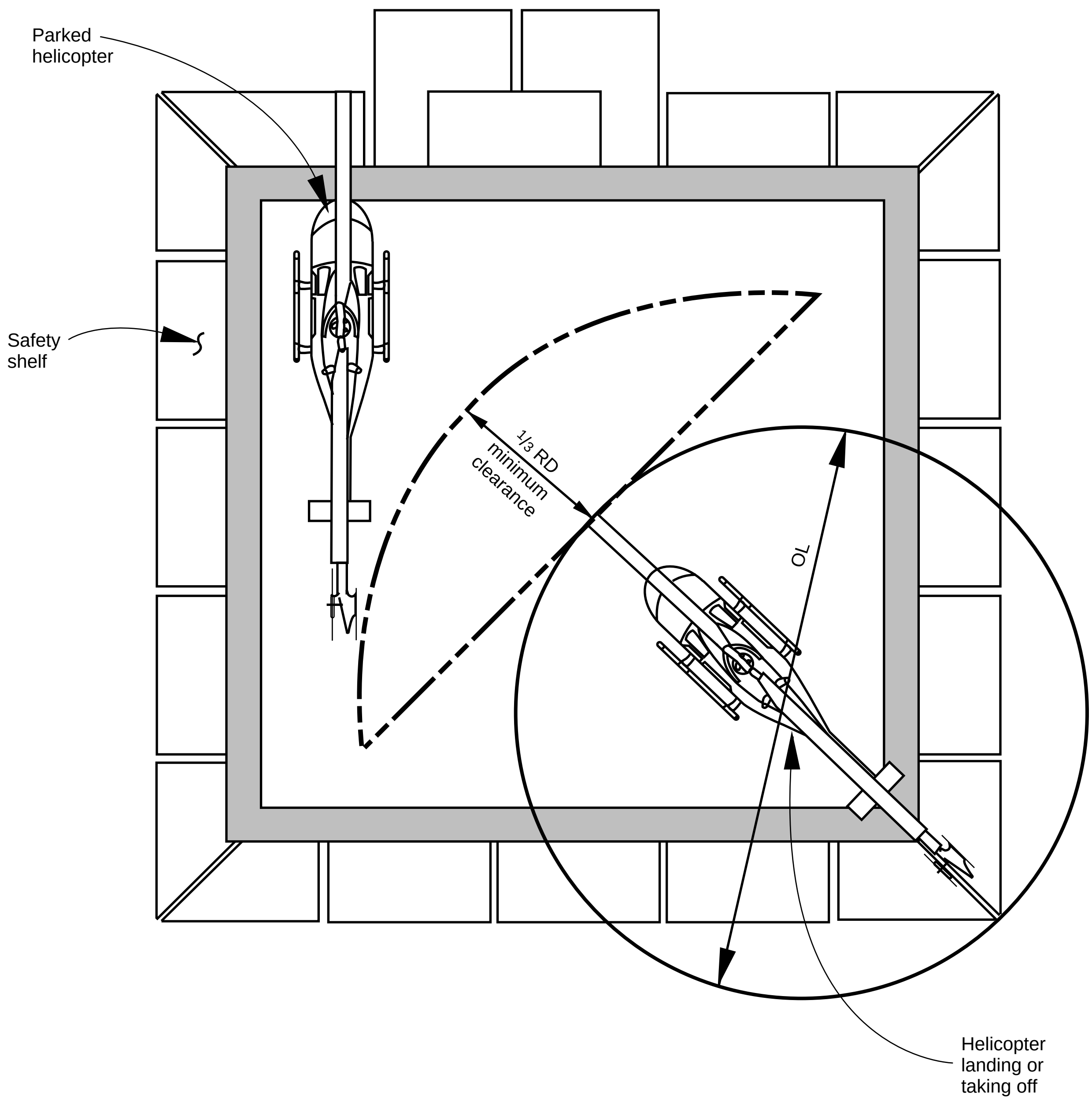

Figure 3—Multi-Helicopter Minimum Clearance

4.3.12 Environmental Consideration

In planning a heliport, environmental conditions expected during the operational life of the heliport should be considered.

5 Design Procedures For Offshore Heliports

5.1 GENERAL

The recommended procedures for heliport design are limited to landing sites of steel construction located on fixed offshore platforms. However, in no way should the design procedures be construed as a recommendation of steel over other suitable building materials. Unless otherwise noted, all related design procedures for fixed offshore platforms defined in Recommended Practice 2A apply to offshore heliports. When designing the heliport deck plate for the design landing load, the large deflection theory (membrane concept) may be used.

5.2 DESIGN LOAD

5.2.1 Dead Weight

The dead weight is the weight of the heliport decking, stiffeners, supporting structure, and accessories.

5.2.2 Live Load

The live load is uniformly distributed over the entire heliport area including safety shelves when applicable. To allow for personnel and cargo transfer, rotor down wash, wet snow or ice, and so forth, a minimum live load of 40 pounds per square foot (psf), 2 kilo newtons per square meter (^{2}kN/m^2) should be included in the design.

5.2.3 Wind Load

Wind load should be determined in accordance with API Recommended Practice 2A.

5.2.4 Helicopter Landing Load Considerations

5.2.4.1 General

The flight deck, stiffeners, and supporting structure should be designed to withstand the helicopter landing load encountered during exceptionally hard landing after power failure while hovering. Helicopter parameters are given in Table 1. It is recommended that helicopter parameters such as given in Table 1 be obtained from the manufacturer for any helicopter considered in the heliport design.

5.2.4.2 Contact Area

The maximum contact area per landing gear, used to design deck plate bending and shear, should conform to the manufacturer's furnished values given in Table 1. For multi-wheeled landing gear, the given value of the contact area is the sum of the areas for each wheel. The contact area for float or skid landing gear is that area of the float or skid around each support strut.

5.2.4.3 Load Distribution

The load distribution per landing gear in terms of percentage of gross weight is given in Table 1.

5.2.4.4 Design Landing Load

The design landing load is the landing gear load based on a percent of helicopter's gross weight times an impact factor of 1.5. (For percentage and helicopter gross weight, see Table 1.)

5.3 DESIGN LOAD CONDITIONS

The heliport should be designed for at least the following combinations of design loads:

a. Dead load plus live load.
b. Dead load plus design landing load. If icing conditions are prevalent during normal helicopter operations, superposition of an appropriate live load should be considered.
c. Dead load plus live load plus wind load.

5.4 INSTALLATION

Loads experienced during heliport construction including the static and dynamic forces that occur during lifting, load-out, and transportation should be considered in accordance with API Recommended Practice 2A.

5.5 MATERIAL

All structural materials should conform to API Recommended Practice 2A.

5.6 FLIGHT DECK SURFACE

The flight deck surface should be nonskid and of solid construction so that a ground cushion is created by the rotor downwash. All materials, covering, or coatings used to provide a nonskid surface should be structurally fastened to the heliport deck or bonded with an adhesive agent that is not chemically altered in the presence of fuel and oil contamination spills. For helicopters with wheel-type landing gear operating in harsh environmental areas, the heliport should be provided with a chocking system such as a grid to secure the helicopter after landing. The grid size, area, and number of securing points should be determined with due consideration given to the largest and smallest helicopter the heliport is designed to accommodate. Grid or rope net-covered flight decks may not be suitable for certain skid-type landing gear.

Table 1—Helicopter Parameters

Helicopter		Gross Weight		Rotor Diameter		Overall Length		Landing Gear												
									Number		Contact Area Per Fore		Contact Area Per Aft		Percentage of Gross Weight Per		Distance Between Fore and Aft Gears		Width Between Gears	
Manufacture Model	Common Name	lbs	kg	ft	m	ft	m	Type	Fore	Aft	in^2	cm^2	in^2	cm^2	Fore	Aft	ft	m	ft	m
Aerospatiable																				
315-B	Lama	5,070	2,305	36.2	11.0	42.4	12.9	Skid							38	62			7.8	2.4
316-B		4,850	2,205	36.2	11.0	42.2	12.9	Wheel	1	2	46	297	92	594	28	72	10.1	3.1	8.5	2.6
318-C	Alouette II	3,650	1,656	33.5	10.2	39.8	12.1	Skid											7.5	2.3
319-B	Alouette III	4,960	2,250	36.2	11.0	42.2	12.9	Wheel	1	2	46	297	92	594					8.5	2.6
330-J	Puma	16,315	7,400	49.5	15.1	59.8	18.2	Wheel	2	4	186	1,200	332	2,142	34	66	13.3	4.1	9.8	3.0
332-L	Super Puma	18,410	8,351	51.2	15.6	61.4	18.7	Wheel	2	2	72	465	114	735	36	64	17.3	5.3	9.8	3.0
332-C	Super Puma	18,410	8,351	51.2	15.6	61.4	18.7	Wheel	2	2	72	465	114	735	40	60	14.7	4.5	9.8	3.0
341-G	Gazelle	3,970	1,800	34.5	10.5	39.3	12.0	Skid							33	67			6.6	2.0
350-B/D	ASTAR	4,300	1,950.5	35.1	10.7	42.6	13.0	Skid							51	49			6.9	2.1
355-F	Twin Star	5,071	2,305	35.1	10.7	42.6	13.0	Skid							51	49			6.9	2.1
360	Dauphin	6,170	2,799	37.7	11.5	44.1	13.4	Wheel	2	1							23.7	7.2	6.5	2.0
360-C		6,610	2,994	37.7	11.5	44.1	13.4	Wheel	2	1	33	213	19	123	84	16	10.9	3.32	7.9	2.4
360-C		6,610	2,994	37.7	11.5	44.1	13.4	Skid							84	16	10.9	3.32	7.5	2.3
365-C		7,500	3,401	37.7	11.5	44.1	13.4	Wheel	2	1	33	213	19	123	84	16	10.9	3.32	7.9	2.4
365-C		7,500	3,401	37.7	11.5	44.1	13.4	Skid											7.5	2.3
365-N	Dauphin 2	8,487	3,850	39.1	11.9	44.2	13.5	Wheel	2	2	38	245	66	426	22	78	11.8	3.6	6.7	2.0
Augusta/Atlantic																				
A-109	Hirando	5,402	2,450	36.1	11.0	42.9	13.1	Wheel	1	2	20	129	20	129			11.6	3.5	7.5	2.3
A-19A	Mark II	5,730	2,600	36.1	11.0	42.8	13.1	Wheel	1	2	14	46	44	284	23	77	11.6	3.5	8.0	2.5
Bell Helicopter																				
47G		2.950	1,338	38.0	11.6	43.6	13.3	Skid			27	174	27	174			5.2	1.6	7.5	2.3
205A-1		9,500	4,309	48.2	14.7	57.1	17.4	Skid			48	310	48	310			7.6	2.3	8.7	2.7
206-B	Jet Ranger	3,200	1,451	33.3	10.2	39.2	12.0	Skid			27	174	27	174	19	81	4.5	1.4	6.0	1.8
206-L	Lone Ranger	4,150	1,882	37.0	11.3	42.5	13.0	Skid			27	174	27	174	29	71	6.8	2.1	7.2	2.2
212	Twin	11,200	5,080	48.0	14.6	57.3	17.5	Skid			48	310	48	310	22	78	7.6	2.3	8.3	2.5
214-B	Big Lifter	16,000	7,257	50.0	15.2	60.2	19.0	Skid											8.6	2.6
214-ST	Super Transport	17,500	7,938	52.0	15.9	62.2	19.0	Skid			49	319	49	319	22	78	7.6	2.3	8.3	2.5
214-ST	Super Transport	17,000	7,938	52.0	15.9	62.2	19.0	Wheel	2	2	38	247	90	581	22	78	15.7	4.8	9.3	2.8
222		7,850	3,561	39.8	12.1	47.5	14.5	Wheel	1	2	19	122	64	410	19	81	12.2	3.7	9.1	2.8
222-B		8,250	3,742	42.0	12.8	50.3	15.3	Wheel	1	2	19	123	64	413	19	81	12.2	3.7	9.1	2.8
222-UT		8,250	3,742	42.0	12.8	50.3	15.3	Skid			48	310	48	310	32	68	7.9	2.4	7.8	2.4
412		11,600	5,262	46.0	14.0	56.1	17.1	Skid			48	310	48	310	20	80	7.9	2.4	8.3	2.5

Note: Table 1 does not list all helicopter manufacturers—only those responding to API's survey. Manufacturers who are not listed above should be consulted with respect to their parameters.

Table continued on next page.

Table 1—Helicopter Parameters (Cont.)

Helicopter		Gross Weight		Rotor Diameter		Overall Length		Landing Gear												
									Number		Contact Area Per Fore		Contact Area Per Aft		Percentage of Gross Weight Per		Distance Between Fore and Aft Gears		Width Between Gears	
Manufacture Model	Common Name	lbs	kg	ft	m	ft	m	Type	Fore	Aft	in^2	cm^2	in^2	cm^2	Fore	Aft	ft	m	ft	m
Boeing Vertol																				
BO-105C		5,070	2,300	32.2	9.8	38.8	11.8	Skid											8.5	2.6
B0-105CBS	Twin Jet II	5,291	2,400	32.3	9.8	38.9	11.9	Skid			28	181	28	181	36	64			8.3	2.5
BK-117	Space Ship	6,283	2,850	36.1	11.0	42.7	13.0	Skid			32	206	32	206	34	66			8.2	2.5
234		48,500	21,900	60.0	18.3	99.0	30.2	Wheel	4	2	392	2,529	248	1,600	58	42	25.8	7.9	11.2	3.4
CH-47-234		50,000	22,680	60.0	18.3	99.0	30.2	Wheel	4	2	156	1,007	78	503			22.5	6.9	11.2	3.4
107-II		22,000	10,030	50.0	5.2	83.1	25.3	Wheel	2	4	50	323	50	323			24.8	7.6	12.9	3.9
179		18,700	8,482	49.0	14.9	59.5	18.1	Wheel	2	2	164	1,058	82	529			15.3	4.7	8.8	2.7
Fairchild																				
FH-1100		2,750	1,247	35.3	10.8	41.5	12.7	Skid											7.2	2.2
Hiller																				
UH-12-L-4		3,100	1,406	35.4	10.8	40.7	12.4	Skid											7.5	2.3
UH-12E/E-4		2,800	1,270	35.4	10.8	40.7	12.4	Skid											7.5	2.3
Hughes																				
269A/B	Hughes 300	1,670	758	25.3	7.7	28.9	8.8	Skid											6.5	2.0
269C	Hughes 300C	2,050	930	26.8	8.2	30.8	9.4	Skid			11	71	11	71	41	59			6.5	2.0
369HS (Std)	Hughes 500C	2,550	1,158	26.3	8.0	30.3	9.2	Skid											6.8	2.1
369D	Hughes 500D/E	3,000	1,361	26.5	8.	30.5	9.3	Skid			30	194	37.5	242	33	67			6.8	2.1
Sikorsky																				
S-55T		7,200	3,266	53.0	16.2	62.3	19.0	Wheel	2	2	40	258	40	258			10.4	3.2	11.0	3.4
S-58T		13,000	5,897	56.0	17.1	65.8	20.1	Wheel	2	1	160	1,032	45	290	88	12	28.3	8.6	12.0	3.7
S-61N L		20,500	9,299	62.0	18.9	73.0	22.3	Wheel	2	1	232	1,497	43	277	5	15	23.5	7.2	14.0	4.3
S-62		7,900	3,583	53.0	16.2	62.3	19.0	Wheel	2	1	108	697	54	348	87	13	17.8	5.4	12.2	3.7
S-64	Skycrane	42,000	19,050	72.3	22.0	88.5	27.0	Wheel	1	2							24.4	7.4	19.8	6.0
S-65C		42,000	19,050	72.3	22.0	88.2	26.9	Wheel	2	4	154	994	154	994			27.0	8.2	13.0	4.0
S-76		10,300	4,672	44.0	13.4	52.5	16.0	Wheel	1	2	19	123	48	310	25	75	16.4	5.0	8.0	2.4
S-78-C		20,000	9,072	53.7	16.4	64.8	19.8	Wheel	2	1	73	471	73	471			28.9	8.8	9.0	2.7

Note: Table 1 does not list all helicopter manufacturers—only those responding to API's survey. Manufacturers who are not listed above should be consulted with respect to their parameters.

5.7 ACCESS AND EGRESS ROUTE

The heliport should be provided with a primary access and egress route. Where practical, the primary route should be provided with a depressed waiting area minimum of 7 feet (2.0 meters) below the elevation of the flight deck surface. Where a secondary route is provided, it should be limited to emergency use only, where normal passenger flow is prohibited.

5.8 SAFETY NET AND SHELF

The heliport should provide a safety net or shelf for protection of personnel at least 5 feet (1.5 meters) wide (measured horizontally) around the perimeter, except that at stairwells the safety net or shelf should extend completely around the opening. The safety net or shelf need not extend around stairways oriented perpendicular to the heliport perimeter. The safety net or shelf should produce an outward and upward inclined surface beginning at a slight drop in elevation below the flight deck. The outer edge should not protrude above the flight deck. Such safety nets or shelves should be designed to support a minimum concentrated load of 200 pounds (100 kilograms) at any point. The safety shelf should also be designed in accordance with 5.3, Items a and c.

5.9 TIEDOWN POINTS

A minimum of four tiedown points should be provided for securing each helicopter to the flight deck. These tiedown points should be recessed where practical. If not recessed, the tiedowns constitute a landing gear hazard and require obstruction markings. The tiedown points should be arranged so as to secure one helicopter in the middle of the heliport. On multi-helicopter heliports sufficient tiedown points should be provided for each helicopter parking area. The tiedown points should be so located and of such strength and construction as to be suitable for securing the largest helicopter the heliport is designed to accommodate during the maximum anticipated environmental condition.

5.10 LIGHTING

For night use, perimeter lights should be used to delineate the heliport flight deck. Alternating yellow and blue omnidirectional lights of approximately 30–60 watts should be spaced at intervals to adequately outline the flight deck. A minimum of eight lights are recommended for each heliport. Adequate shielding should be used on any floodlighting that could dazzle the pilot during an approach for landing. Obstructions that are not obvious should be marked with omnidirectional red lights of at least 30 watts. Where the highest point on the platform exceeds the elevation of the flight deck by more than 50 feet (15 meters), an omnidirectional red light should be fitted at that point, with additional such lights fitted at 35 feet (10 meters) intervals down to the elevation of the flight deck. An emergency power supply should provide power to the perimeter and obstruction lighting and to lighting along the heliport access and egress routes. Flight deck lights should be outboard of the flight deck and should not extend over 6 inches (15 centimeters) above the deck surface. They should be guarded, have no exposed wiring, and be located so as not to be an obstruction. Any inboard lighting should be flush mounted.

5.11 HELIPORT MARKINGS

5.11.1 General

A minimum aiming circle 20 feet (6 meters) outside diameter and 16 inches (40 centimeters) wide should mark the center of the available flight deck, not necessarily the center of the heliport. A 16 inch (40 centimeter) wide stripe should be used to mark the boundary of the heliport flight deck. Any contrasting color can be used; however, red is reserved for obstruction markings. In addition to the aiming circle and marking provided for normal helicopter operations, a company logo, or the internationally recognized marking for a helicopter flight deck may be provided. The internationally recognized marking consists of the letter H [10 feet high x $5^1/_2$ feet wide (3 meters x 1.7 meters)] painted white and centered in the middle of the aiming circle. The width of the legs of the H should be 16 inches (40 centimeters). If a color other than white is used, the letter coloring should contrast with the deck coloring but should not be red. The flight deck may also be marked with the operator's name, area, and block number. A walkway may be marked from the aiming circle to the primary access and egress route. See Figure 4. The secondary (emergency) exit should be prominently marked for pilot identification. See Figure 4.

5.11.2 Limitation Markings

Since an offshore heliport is limited to helicopters of or under a certain gross weight or size the heliport should be marked to indicate these limitations. The recommended method of designating the heliport limitation is to indicate the allowable weight to the nearest thousand pounds. Below this allowable weight designation, the flight deck dimension is shown to the nearest foot.

Square, octagonal, hexagonal, pentagonal, or circular flight deck dimensions should be indicated by a single number. Dimensions of rectangular flight decks should be indicated by the width times the length. These dimensions should not include the solid safety shelf or safety fence.

Metric equivalents should not be used for this purpose. It is recommended these limitations be marked by red numerals on a white background, located to the right and above the heliport symbol. They should be visible from the principal direction of approach. The square and numeral should be of such size as to be readily discernible by the pilot of the approaching helicopter in sufficient time to effect a go-around if necessary. See Figure 4.

5.11.3 Obstruction Marking

Marking should be placed on the heliport flight deck to alert the pilot of obstructions and guide him to select a safe landing area on the heliport. All obstruction markings should be painted a contrasting color, preferably red. A main rotor blade obstruction should be denoted by a 6 inch (15 centimeter) wide arc measured from the obstruction to a point on the flight deck, outside of which the pilot can set the helicopter landing gear and maintain proper main rotor blade clearance one-third RD. This distance is one-third the rotor diameter plus one-half the overall length minus one-half the width between the gears ($^1/_3$ RD + $^1/_2$ OL – $^1/_2$ GW). As a guideline, 40 feet (10.9 meters) provides suitable clearance for a large helicopter and 26 feet (8 meters) for a small helicopter. See Figure 5. This marking does not necessarily ensure tail rotor blade clearance. Tail rotor blade obstructions should be painted in a contrasting color, preferably red or international orange. If the obstruction is slender and hard to see, it may also be hash marked, A 3 feet (1 meter) wide rectangle, a mini-

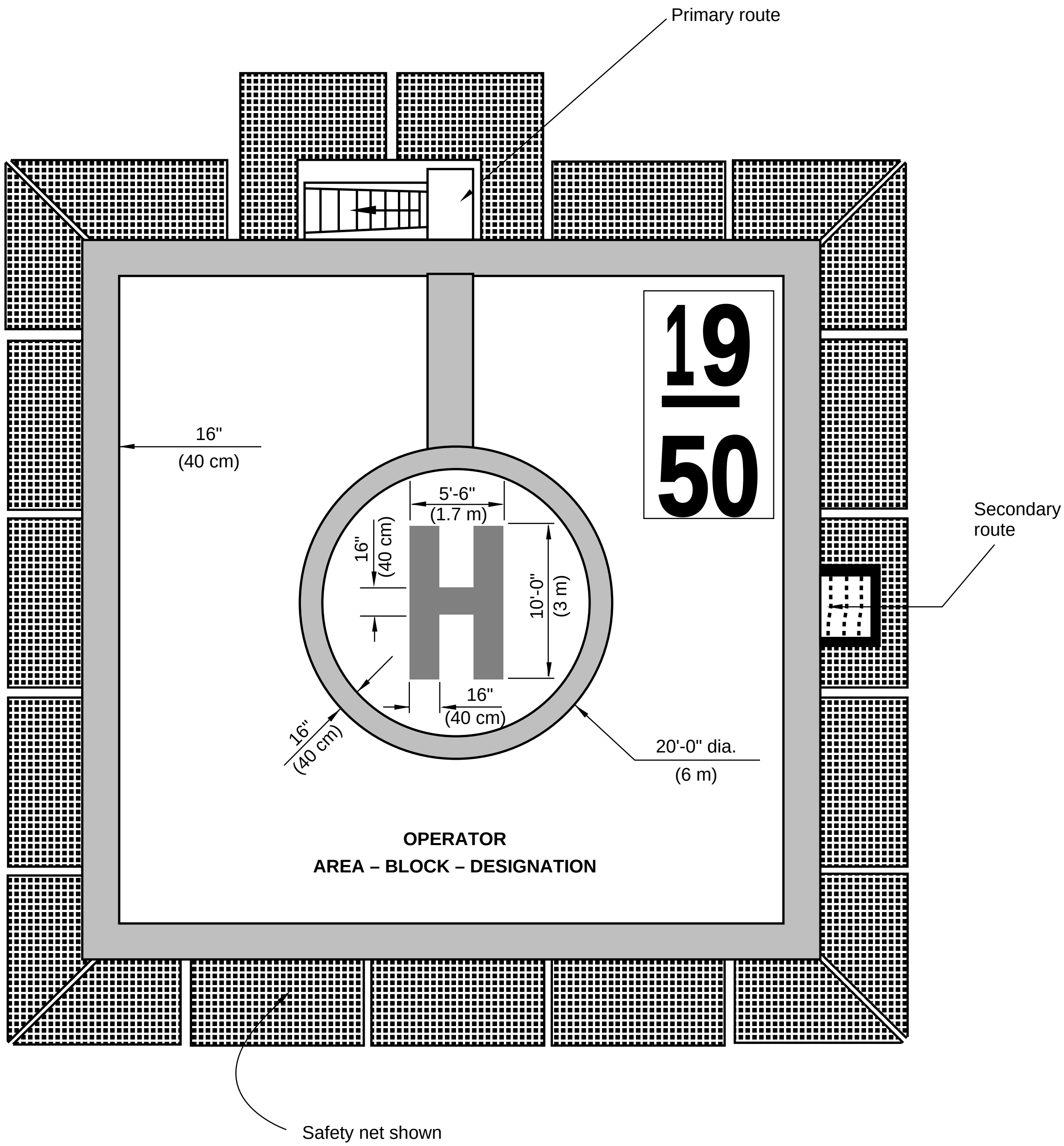

Figure 4—Heliport Marking Scheme

mum of 3 feet (1 meter) in length, of 6 inches (15 centimeters) wide alternating red and yellow diagonal stripes should be made on the flight deck to denote tail rotor obstructions. See Figure 6.

A 3 feet (1 meter) wide marking should be made around all stairways. This area should be painted with alternating red and yellow 6 inch (15 centimeter) wide diagonal stripes if it is a physical tail rotor obstruction and solid red if there is no physical obstruction. See Figure 6.

Landing gear obstructions should be denoted by painting the area around the obstruction with a contrasting color. For obstructions such as non-recessed tiedown points located in the touchdown area, a circular marking 2 feet (0.6 meter) in diameter should denote the landing gear obstruc-

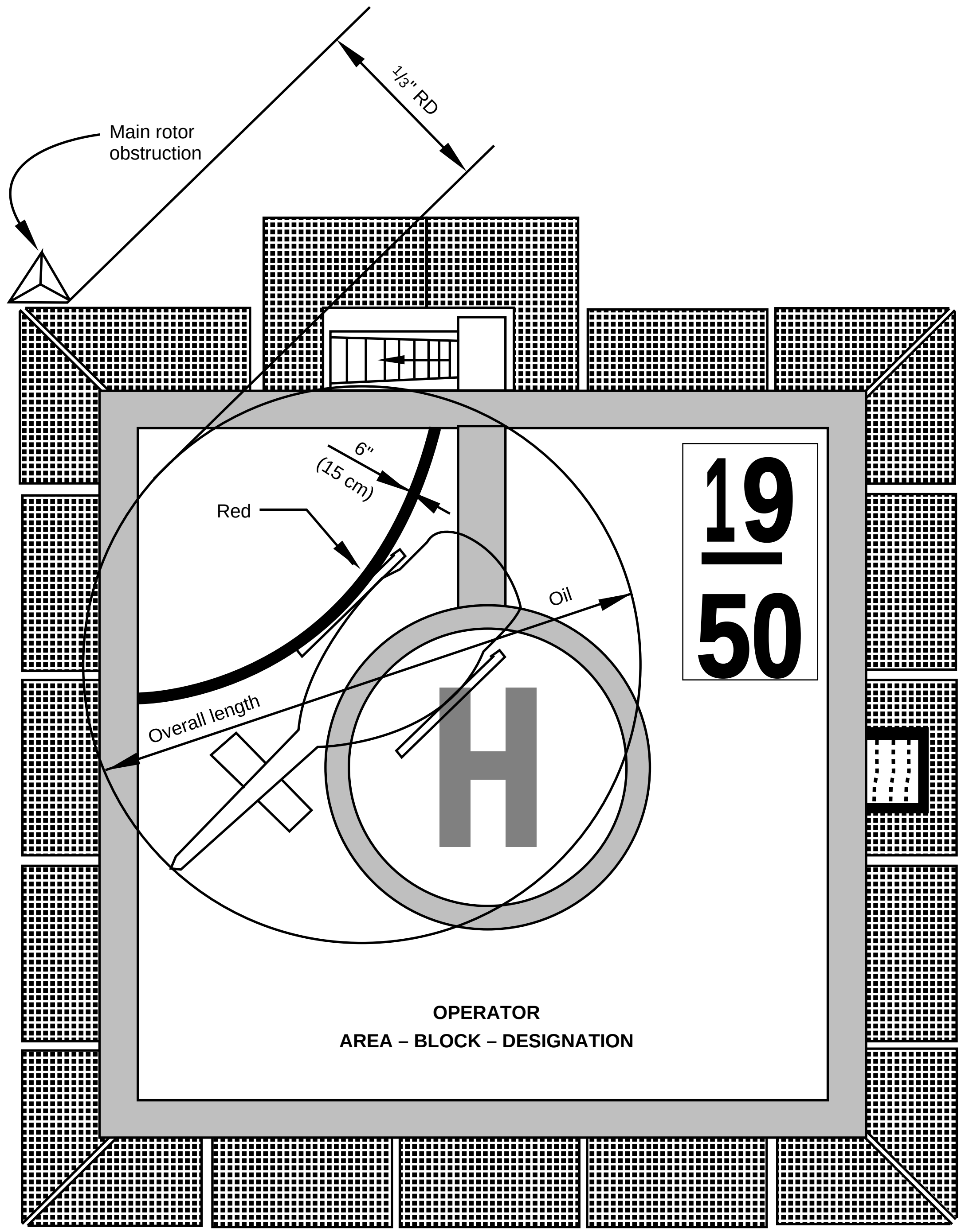

Figure 5—Marking for Main Rotor Blade Obstruction

tions. See Figure 7. In general, conflicts between obstruction markings and other visual aids should be avoided. If a conflict does exist, the obstruction markings color should control.

5.11.4 Closed Heliport

When a heliport is "closed," a large white or contrasting "X" should be made on the flight deck. It should be large enough to ensure pilot recognition a sufficient distance to effect a go-around. This marking should be used for permanently closed heliports, or when they are temporarily closed for hazardous conditions, and so forth.

5.12 DRAWINGS, SPECIFICATIONS AND CONSTRUCTION

The heliport drawings and specifications as well as the fabrication, installation, inspection, and surveys, should conform to API Recommended Practice 2A.

6 Safety Considerations

6.1 FUELING STATIONS

Helicopter fueling stations (hose reels) should be located to avoid obstructing any access or egress route serving the helicopter flight deck.

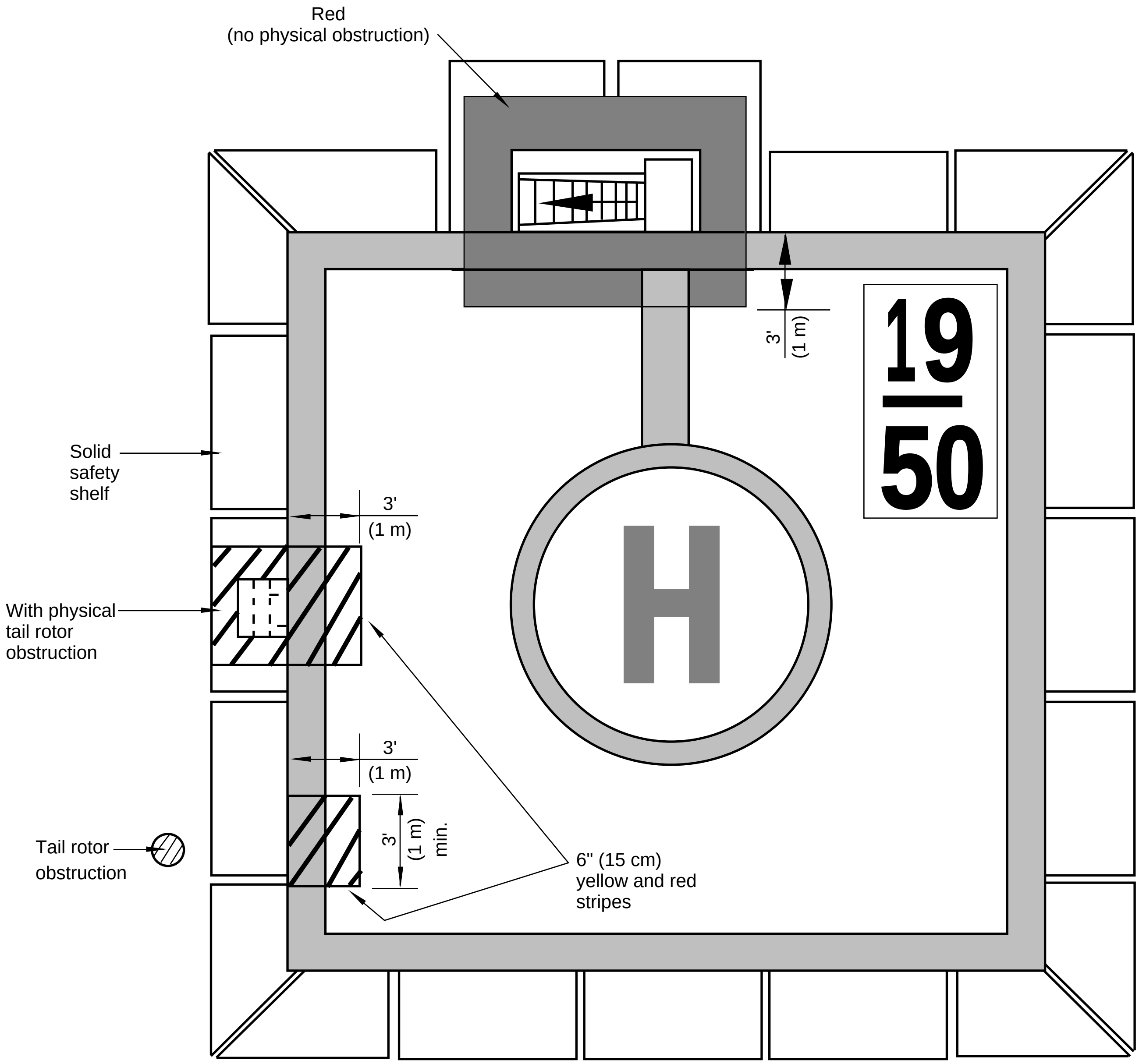

Figure 6—Marking for Tail Rotor Blade Obstruction

6.2 WIND DIRECTION INDICATOR

A wind sock or wind vane should be provided so as to be visible to the pilot on his final approach to land. It should be situated in accordance with the required obstruction clearances and should give a clear indication of the direction of the wind blowing across the deck. The wind direction indicator should be illuminated where night flights are anticipated. This lighting should not be a hazard to flight.

6.3 FIRE PROTECTION EQUIPMENT

Appropriate fire protection equipment should be available to service the heliport. A minimum of one 30 pound ABC hand-held dry chemical extinguisher should be provided in an easily accessible area.

7 Applicable Regulations

Refer to 33 *Code of Federal Regulations*, Parts 140–146, Chapter N, "U.S. Coast Guard Rules and Regulations for Artificial Islands and Fixtures on the Outer Continental Shelf." These regulations stipulate requirements for guard rails, fire extinguishers and first-aid kits.

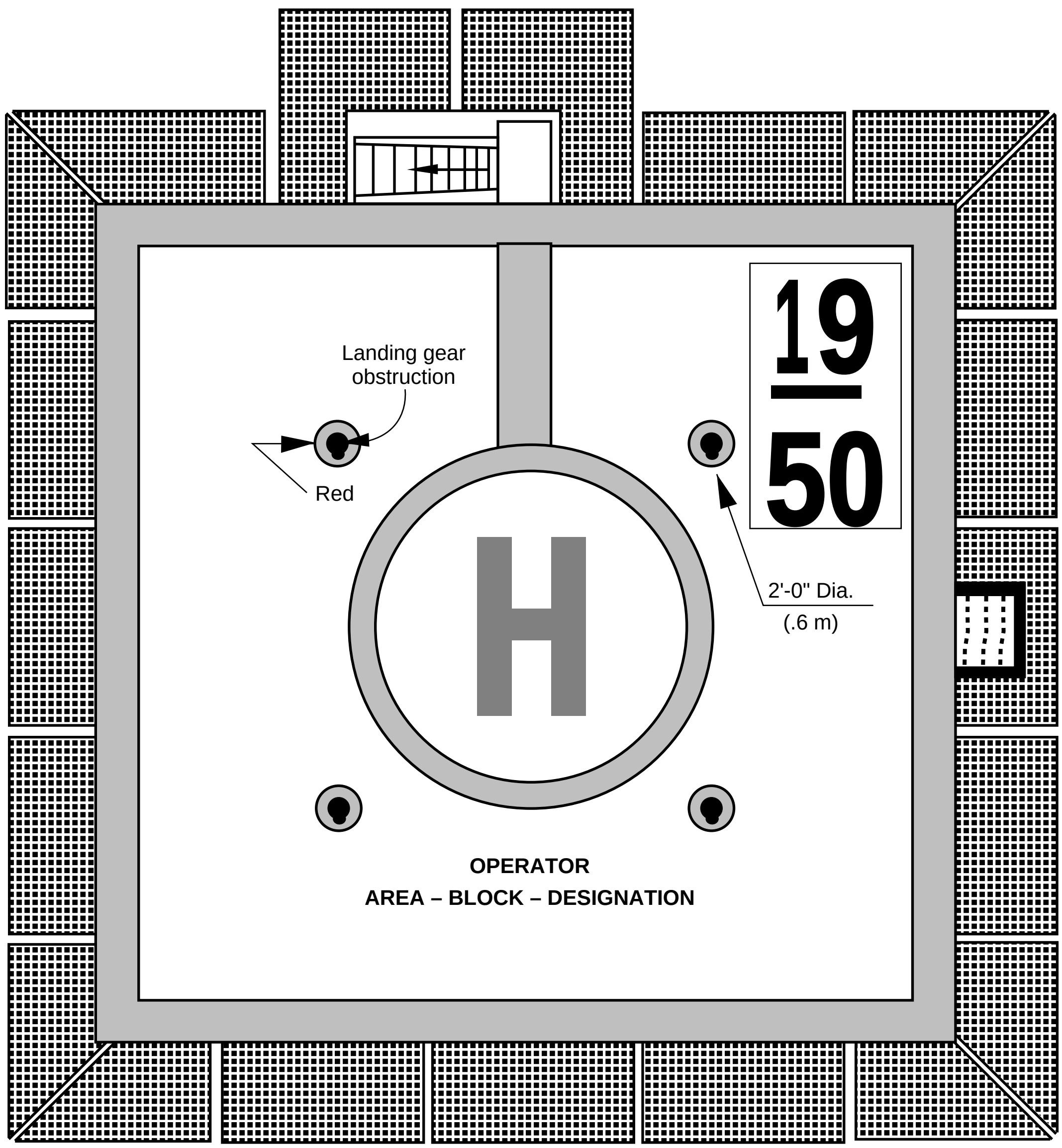

Figure 7—Marking for Landing Gear Obstruction

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