GUIDANCE FOR

THE CLASSIFICATION AND CONSTRUCTION

PART 7. CLASS NOTATION

VOLUME A

GUIDANCE FOR THE CLASS NOTATION

HELICOPTER DECK AND FACILITIES

(HELIL & HELIL(SRF))

2013 EDITION

BIRO KLASIFIKASI INDONESIA

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THE CLASSIFICATION AND CONSTRUCTION

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Foreword

BKI currently has requirements for design of helicopter decks and helicopter facilities in several Rules and Guidelines, including the *Rules for Classification and Surveys, Rules for Hull Construction* and the *Rules for Machinery Installation*.

This Guidances consolidates the above requirements for easy application of the Rule requirements for the optional notations **HELIL** and **HELIL(SRF)**.

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Section 1
General

A. Introduction

1. Application

1.1 This Guidance is applicable to helicopter decks and helicopter facilities on steel vessels of all lengths, steel barges, mobile offshore drilling units, and lift-boats.

1.2 Vessels in compliance with this Guidance will be assigned the following notations:

– Vessels with a helicopter deck intended for landing with no provision for storage or refueling and complying with Sections 2 and 6 of this Guidance will be assigned the notation **HELIL**.

– Vessels with a helicopter deck and a helicopter facility for storage and/or refueling and complying with Sections 2 through 6 of this Guidance will be assigned the notation **HELILSRF**

B. Submission of Design Plans and Data

1 Structural Plans

Plans showing the arrangement, scantlings and details of the helicopter deck are to be submitted for review and approved before the work of construction is commenced.

– These plans are to clearly indicate the scantlings, structural details and welding, or other methods of connection.

– The arrangement plan is to show, in both plan view and elevation, the overall size of the helicopter deck and the designated landing area. If the arrangement provides for the securing of a helicopter or helicopters to the deck, the predetermined position(s) selected to accommodate the secured helicopter, in addition to the locations of deck fittings for securing the helicopter, are to be shown.

– The type of helicopter to be considered is to be specified and calculations for appropriate loading conditions are to be submitted.

2 Machinery and Systems Plans

In addition to the above, for helicopter facilities for storage and refueling of helicopters, the following plans are to be submitted:

– Helicopter refueling system, fuel storage tank and its securing and bonding arrangements

– Helicopter operations fire fighting system (where applicable), see also SOLAS Chapter II-2 Regulation 18.

3 Operation Manual

Each helicopter facility is to have an operation manual, specifying a description and a checklist of safety precautions, procedures and equipment requirements. This manual may be part of the Operation Manual for the vessel, mobile offshore drilling unit or lift-boat, as applicable.

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Section 2
Helicopter Facilities

A. General

1.1 This Section summarizes main design considerations relating to helicopter landing facilities. Aspects which are mostly aeronautically determined, like size and marking of the helicopter deck, clearances around the platform, sectors for approach and take-off have to be treated according to the relevant international and national regulations or codes, compare 2.

1.2 In this Section it is assumed that the structure of the helicopter deck is made of steel or other material with equivalent ability to retain structural capacity in a fire (at least A-0 class). If the helicopter deck forms the deckhead of a deckhouse or superstructure, it is to be insulated to A-60 class standard.

1.3 Aluminum alloys may be used for helicopter decks above deckhouses, the design should follow the BKI Rules for Hull, Volume II or recognized standards, like standards of the American Petroleum Institute (API), provided the following conditions are complied with:

– There are to be no openings in the exterior bulkheads directly below the helicopter deck

– All windows in the lower exterior bulkheads are to be fitted with steel shutters.

1.4 For electrical installations on helicopter facilities, see Volume 5 - Rules for Electrical Installations, Section 14.

2. Standards and regulations

2.1 Depending on the location of the offshore installation or the flag state of the offshore unit relevant national and international standards and regulations have to be fulfilled besides of these BKI Rules. The following examples can be defined:

– ISO/CD 19901-3 Standard: Petroleum and Gas Industries - Specific Requirements for Offshore Structures - Topside Structure, 8.5

– IMO: Code for the Construction and Equipment of Mobile Offshore Drilling Units (MODU Code), Chapters 9 and 13

– IMO Res. A.855(20): Standards for on board Helicopter Facilities

– ICS (International Chamber of Shipping): Guide to Helicopter/Ship Operations

– CAP 437: Offshore Helicopter Landing Areas - Guidance on Standards, Civil Aviation Authority, Gatwick Airport South, West Sussex, RH60YR, UK

3. Helicopter data

For providing relevant helicopter facilities the owner/operator has to deliver the following information:

– types of helicopters to be operated

– geometrical main dimensions, especially length of fuselage, number and diameters of rotors, etc.

– total overall length of the helicopter when the rotors are turning (D-value)

– weight, weight distribution and wheel or skid configuration

– highest vertical rate of descent on the helicopter deck, e.g. because of a single engine failure, etc.

– data for winching operations, if applicable

– lashing systems to be provided

– possibility of an unserviceable helicopter stowed on the side of the deck while a relief helicopter is required to land, if applicable

– fuel used and type and capacity of re-fueling equipment to be provided

– starting equipment, if applicable

4. Arrangement of the helicopter deck

4.1 For the arrangement of the helicopter deck the following aspects have to be considered:

– location on the installation/unit with respect to prevailing wind conditions, air turbulence and quality of the air flow due to adjacent structures

– hot gas thermal effects due to flare plumes or exhaust emissions, which may degrade helicopter performance by increasing the ambient temperature

– emergency (blowdown) systems which are designed to discharge hydrocarbon gases shall be designed that any emissions are controllable and are not initiated without consideration of sufficient warning to helicopter operators

– clear approach and take-off sector as recommended in international or national standards, see 2.

– helidecks should be at or above the highest point of the main structure

– the obstacle-free sector should be positioned facing into the prevailing wind so that the elicopter can approach into wind with the deck in the right-hand quadrant as viewed from the helicopter and facilitating an into wind overshoot in the clear sector

– ready and protected access to and from the accommodation area without the need to pass through working areas

– effect of adjacent structures of one installation or vessel affecting the air quality and obstacle protected surfaces of another installation or vessel

4.2 In addition regarding the arrangement of the helicopter facilities within the whole installation or unit arrangement, applicable national regulations shall be observed, see 2.

4.3 Size

4.3.1 In general, the helicopter deck is to be of sufficient size to contain a circle of a diameter equal to at least the rotor diameter of the largest helicopter using the helicopter deck. The helicopter deck is to have an approach/departure sector of at least 180° free of obstructions. The base of this sector is to be tangent to the periphery of the circle described above, as shown in Fig. 2.3. Outside the approach/departure sector, obstructions within one-third of the rotor diameter from the periphery of the circle described above are not to extend above a plane measured vertically from the edge of the deck with a rise equal to half of the horizontal distance from the periphery of the above circle.

4.3.2 Where adverse climatic conditions are prevalent for normal helicopter operation, a helicopter deck is to have sufficient size to contain a circle of a diameter at least equal to the overall length of the largest helicopter using the helicopter deck. The approach/departure sector is to be not less than 210° free of obstruction and is to intersect the periphery of the circle described above, as shown in Fig. 2.3. Outside the approach/departure sector, obstructions within one-third of the helicopter's overall length from the periphery of the circle described above are not to extend more than 1/20 of the helicopter overall length above the level of the helicopter deck. 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.

5. Documentation to be submitted

5.1 Plans showing the arrangement, scantlings and details of the helicopter deck are to be submitted. The arrangement plan is to show the overall size of the helicopter deck and the designated landing area. If the arrangement provides for the securing of a helicopter or helicopters to the deck, the predetermined position(s) selected to accommodate the secured helicopter, in addition to location of deck fittings for securing the helicopter is to be shown.

5.2 The helicopter for which the deck is designed is to be specified and calculations for the relevant loading conditions are to be submitted.

5.3 Technical documentation for equipment, aviation fuel system and fire protection/fighting is to be provided.

B. Structure of the helicopter deck

1. General

1.1 The helicopter deck shall be dimensioned for the largest helicopter type expected to use the deck.

1.2 For scantling purposes, other loads (cargo, snow/ice, etc.) are to be considered simultaneously or separately, depending on the conditions of operation to be expected. Where these loads are not known, the data contained in 2. may be used as a basis.

1.3 The following provisions shall in principle apply to landing areas on special, pillar-supported landing decks or on the upper deck, superstructure deck or deckhouse of a fixed or mobile installation/unit.

2. Design loads

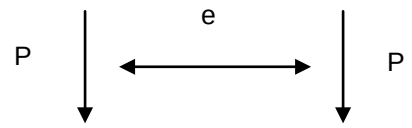
The following design load cases (**LC**) are to be considered:

2.1 Load case LC 1

Helicopter lashed on deck of mobile units, where helicopter deck is used in floating condition, with the following vertical forces acting simultaneously :

2.1.1 Wheel and/or skid force P acting vertically at the points resulting from the lashing position and distribution of the wheels and/or supports according to helicopter construction, see Figure. 2.1.

FIGURE. 2.1 Skid/wheel loads of a helicopter



$$P = 0.5 \cdot G\,(1 + a_v)\ [kN]$$

G = maximum permissible take-off weight [kN]

P = evenly distributed force over the contact area f = 30x30 cm^2 for single wheel or according to data supplied by helicopter manufacturers; for dual wheels or skids to be determined individually in accordance with given dimensions

e = wheel or skid distance according to helicopter types to be expected

a_V = acceleration addition to be defined primarily by a motion analysis

a_V = acceleration addition for non self-propelled units where the towing speed $v \leq \mathbf{L}^{0,5}$ [kn] to be estimated as follows :

a_V = $0{,}11 \cdot m$

$$m = 1{,}61 - 3{,}05\,\frac{x}{L} \qquad 0 \leq \frac{x}{L} \leq 0{,}2$$

$$= 1{,}0 \qquad 0{,}2 < \frac{x}{L} \leq 0{,}7$$

$$= 1 + 8{,}7\left(\frac{x}{L} - 0{,}7\right) \qquad 0{,}7 < \frac{x}{L} \leq 1{,}0$$

L = length of the unit [m] as defined in Volume 2- Rules for Mobile Offshore Units, Section 1, B.4.

2.1.2 Evenly distributed vertical load over the entire helicopter deck, taking into account snow, cargo, personnel, etc.

$$p = 2{,}0 \text{ kN/m}^2$$

2.1.3 Vertical force on supports of the deck due to weight of helicopter deck M_e :

$$M_e\ (1 + a_v)\ [\text{kN}]$$

2.2 Load case LC 2

Helicopter lashed on deck with the following vertical and horizontal forces acting simultaneously :

2.2.1 Wheel and/or skid force P acting vertically at the points resulting from the lashing position and distribution of the wheels and/or supports according to helicopter construction, see Fig. 2.1.

$$P = 0.5 \,.\, G\ [\text{kN}]$$

2.2.2 Vertical force on supports of the deck due to weight of helicopter deck:

M_e [kN]

2.2.3 Evenly distributed vertical load over the entire helicopter deck, taking into account snow, cargo, personnel, etc.

p = 2,0 kN/m^2 for fixed installations and units
= 0,0 kN/m^2 for floating units

2.2.4 Horizontal forces on the lashing points of the helicopter:

$$H = a_h \,.\, G.\, W_{He}\ [\text{kN}]$$

a_h = acceleration on the helicopter in horizontal direction
= to be defined primarily by a motion analysis if no details are known, the following values may be used:
= 0 for fixed installations and units
= 0,6 for floating units
w_{he} = wind load on the helicopter at the lashing points

2.2.5 Horizontal force on supports of the deck due to weight and structure of helicopter deck:

$$H = a_h \,.\, M_e.\, W_{He}\ [\text{kN}]$$

W_{St} = wind load on the structure of the helicopter deck, compare 2.3.4

2.3 Load case LC 3

Normal landing impact on fixed offshore installations and floating offshore units, with the following forces acting simultaneously :

2.3.1 Wheel and/or skid load P at two points simultaneously, at an arbitrary (most unfavourable) point of the helicopter deck (landing zone + safety zone), see Figure. 2.1.

$$P = 0{,}75 \ . \ P \quad [kN]$$

P to be increased by 15 % if the helicopter deck is part of a deckhouse with accommodations below.

2.3.2 Evenly distributed load over the entire helicopter deck, taking into account snow or other environmental loads:

$$p = 0{,}5 \ kN/m^2$$

2.3.3 Vertical force on supports of the deck due to deadweight of helicopter deck:

$$M_e \quad [kN]$$

2.3.4 Horizontal force on supports of the deck due to structure of helicopter deck:

$$H = W_{St} \quad [kN]$$

Wst = wind load on the structure of the helicopter deck for the wind velocity admitted for helicopter operation v_W'

v_W' = wind velocity, to be taken according to local weather conditions

= 25 m/s if no other relevant data available

2.4 Load case LC 4

Emergency/crash landing impact on fixed and floating offshore installations/units, with the following vertical force :

2.4.1 Wheel and/or skid load P at two points simultaneously, at an arbitrary (most unfavourable) point of the helicopter deck (landing zone + safety zone), see Figure. 2.1

$$P = 1{,}25 \cdot G \quad [kN]$$

2.4.2 Forces according to 2.3.2 to 2.3.4

3. Scantlings of structural members

3.1 Structural analysis

3.1.1 Structural analysis of the supporting structure shall be effected in accordance with Section 3 by direct calculations. Regarding construction and materials employed, see Rules for the Classification and Construction of Offshore Installations, Volume 4, Section 4.

3.1.2 Proof of sufficient buckling strength is to be carried out in accordance with the Rules for the Classification and Construction of Offshore Installations, Volume 4, Section 3, G. for structures subjected to compressive stresses.

3.2 Permissible stresses
Permissible stresses for stiffeners, girders and sub- structure:

$$\sigma_{perm} = 235 / (k \cdot \gamma) \ [N/mm^2]$$

k = material factor
= 295 / (R_{eH} + 60)
= safety factor according to Table 9.1

Table 2.1 Safety factors for different load cases of helicopter decks

Structural element	γ_f		
	LC 1 + LC 2	LC 3	LC 4
Stiffeners (deck beams)	1,25	1,1	1,00
Main girders (deck girders)	1,45	1,45	1,10
Load-bearing structure (pillar system)	1,7	2,0	1,20

3.3 Plating

The thickness of the plating is not to be less than the greater of the two following values:

$$t = n \,.\, c \,.\, \sqrt{P \,.\, k}\; t_k \quad [mm]$$

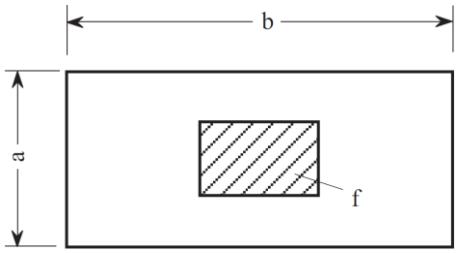
or

$$t = 1{,}1 \,.\, a \,.\, \sqrt{P \,.\, k} + t_k \quad [mm]$$

n = 1 in general
= 0,9 for crash landing of helicopters (**LC 4**)
P = total load in [kN] of one wheel or group of wheels with print area f on a plate panel
F = ab, see Figure. 2.2
= values for different load cases **LC 1 - 4** according to 2.
a = width of smaller side of plate panel (in general beam spacing)
b = width of larger side of plate panel

F need not be taken greater than 2,5 a2

FIGURE 2.1 Area of plate panel influenced by a wheel print



In case of narrowly spaced wheels these may be grouped together to one wheel print area.

tK = corrosion allowance depending on material, protection, service and maintenance conditions, if any [mm]
c = factor to be determined as follows:

– for the aspect ratio b/a = 1 and for the range 0 < f / F ≤ 0,3 :

$$c = 0{,}95\,\{1{,}87 - \sqrt{\left(\frac{f}{F}\right) \,.\, \left(3{,}4 - 4{,}4 \,.\, \frac{f}{F}\right)}\}$$

– for the aspect ratio b/a = 1 and for the range 0,3 < f / F . 1,0:

$$c = 0{,}95\,\left(1{,}20 - 0{,}40 \,.\, \frac{f}{F}\right)$$

– for the aspect ratio b/a . 2,5 and for the range 0 < f / F . 0,3:

$$c = 0{,}95\ \{2{,}0 - \sqrt{\left(\frac{f}{F}\right) .\ \left(5{,}2 - 7{,}2\ .\ \frac{f}{F}\right)}\}$$

– for the aspect ratio b/a . 2,5 and for the range 0,3 < f / F . 1,0:

$$c = 0{,}95\ \left(1{,}20 - 0{,}517\ .\frac{f}{F}\right)$$

For intermediate values of b/a the factor c is to be obtained by direct interpolation.

p = evenly distributed pressure load [kN/m^2]
= values for different load cases **LC 1 - 4** according to 2.

C. Helicopter deck equipment

1. Landing deck surface

1.1 Deck sheathing

1.1.1 The landing deck sheathing has to comply with the following requirements:

– resistant against increased mechanical impact at starting and landing procedure
– resistant against aircraft fuel, hydraulic and lubricating oils
– resistant against dry fire extinguishing powder and foams
– resistant against defrosting expedient and salt
– friction coefficient μ = 0,65 at minimum, to be checked periodically

1.1.2 Especially for normally unattended offshore installations guano and associated bird debris may become a major problem on the helicopter deck. Thus the friction surface may be destroyed and the essential visual aids will quickly become obliterated. Adequate cleaning operations or preventive measures have to be brought in place. No flights shall be undertaken to helicopter decks where essential visual aids for landing are insufficient.

1.2 Rope netting

1.2.1 Tautly-stretched rope netting should be provided to aid the landing of helicopters with wheeled undercarriages in adverse weather conditions. The intersections should be knotted or otherwise secured to prevent distortion of the mesh. It is preferable that the rope be 20 mm diameter sisal, with a maximum mesh size of 200 mm. The rope should be secured every 1,5 metres round the landing area perimeter and tensioned to at least 2225 N.

1.2.2 The location of the net should ensure coverage of the area of the aiming circle but should not cover helicopter deck markings.

1.2.3 For fixed offshore installations with no significant movements, provided the helicopter deck can be shown to achieve an average surface friction value of not less than 0,65, determined by a test method approved by BKI, the helicopter deck netting may be not applied.

1.3 Helicopter lashing points

Sufficient flush fitting (when not in use) or removable semi-recessed lashing points shall be provided for fastening the maximum sized helicopter for which the helicopter deck is designed. They shall be so located and be of such strength and construction to secure the helicopter when subjected to weather conditions pertinent to the design considerations of the installation/ unit. They shall also take into account, where significant, the inertial forces resulting from the movement of floating units.

1.4 Markings

Unless specific requirements are provided by the flag Administration or the cognizant authority (in which territorial waters the vessel or unit is being operated), the helicopter deck is to be marked in a contrasting color as follows (see also, A.2 or Fig. 2.3.) :

– The perimeter with a continuous line of 400 mm in width

– Vessel or unit identification

– Aiming circles in yellow, taking into account deck configuration, helicopter type and operational requirements (e.g., MODU Code: an inside diameter equal to 0.5 × overall length. The width of the line should be 1 m.)

– A white "H" centered on the landing area with the horizontal on the bisector of the obstacle-free sector. The "H" should be 3 m high, 1.8 m wide and 0.4 m wide lines.

2. Wind direction indicator

A wind direction indicator shall be located on the installation/unit which, in so far as is practicable, indicates the actual wind conditions over the helicopter deck. Units on which night helicopter operations take place shall have provisions to illuminate the wind direction indicator, see Rules for the Classification and Construction of Offshore Installations, Volume 6, Section 14.

3. Personnel safety measures

3.1 Means of escape

The helicopter deck is to be provided with both a main and an emergency means of escape and access for fire fighting and rescue personnel. These means are to be located as far apart from each other as is practicable and preferably on opposite sides of the helicopter deck.

3.2 Safety net and railings

3.2.1 Safety nets for personnel protection shall be installed around the landing area except where adequate structural protection against falls exists. The netting used shall be of a flexible nature, with the inboard edge fastened level with, or just below, the edge of the helicopter landing deck. The net itself shall extend 1,5 m in the horizontal plane and be arranged so that the outboard edge is slightly above the level of the landing area, but by not more than 0,25 m, so that it has an upward and outward slope of at least 10°. For vessels subject to MODU Certification only a height of the outboard edge of 0,15 m is permissible. The net shall be strong enough to withstand and contain, without damage a 75 kg weight being dropped from a height of 1 m.

3.2.2 If handrails are used, they shall be retractable, collapsible and removable and painted in a contrasting colour scheme. Procedures shall be in place to retract, collapse or remove them prior to helicopter arrival. Once the helicopter has landed and the crew have indicated that passenger movement may commence, the hand rails may be raised and locked in position. The hand rails shall be retracted, collapsed or removed again prior to the helicopter take-off.

4. Drainage

4.1 Every helicopter deck shall have a drainage system which will direct any rainwater and fuel spills within its boundary to a safe place. Any distortion of the deck’s surface due to, for example, loads from a helicopter at rest shall not modify the landing area drainage system to the extent of allowing spilled fuel to remain on deck. A system of guttering or a slightly raised kerb shall be provided around the perimeter to prevent spilled fuel falling on to other parts of the installation/unit and to conduct the spillage to an appropriate drainage system.

4.2 The capacity of the drainage system shall be sufficient to accept a maximum spillage of fuel on the deck. The calculation of the amount of spillage to be contained shall be based on an analysis of the helicopter type, fuel capacity, typical fuel loads and uplifts. The design of the drainage system shall preclude blockage by debris. The helicopter deck area shall be properly sealed so that spillage will only route into the drainage system.

5. Helicopter operations support equipment

Provision shall be made for equipment needed for use in connection with helicopter operations including:

– chocks and lashing strops/ropes (strops are preferable)

– heavy-duty, calibrated, accurate scales for passenger baggage and freight weighing

– a suitable power source for starting helicopters if helicopter shut-down is seen as an operational requirement

– equipment for clearing the helicopter landing area of snow and ice, if applicable, and other contaminants

6. Lights

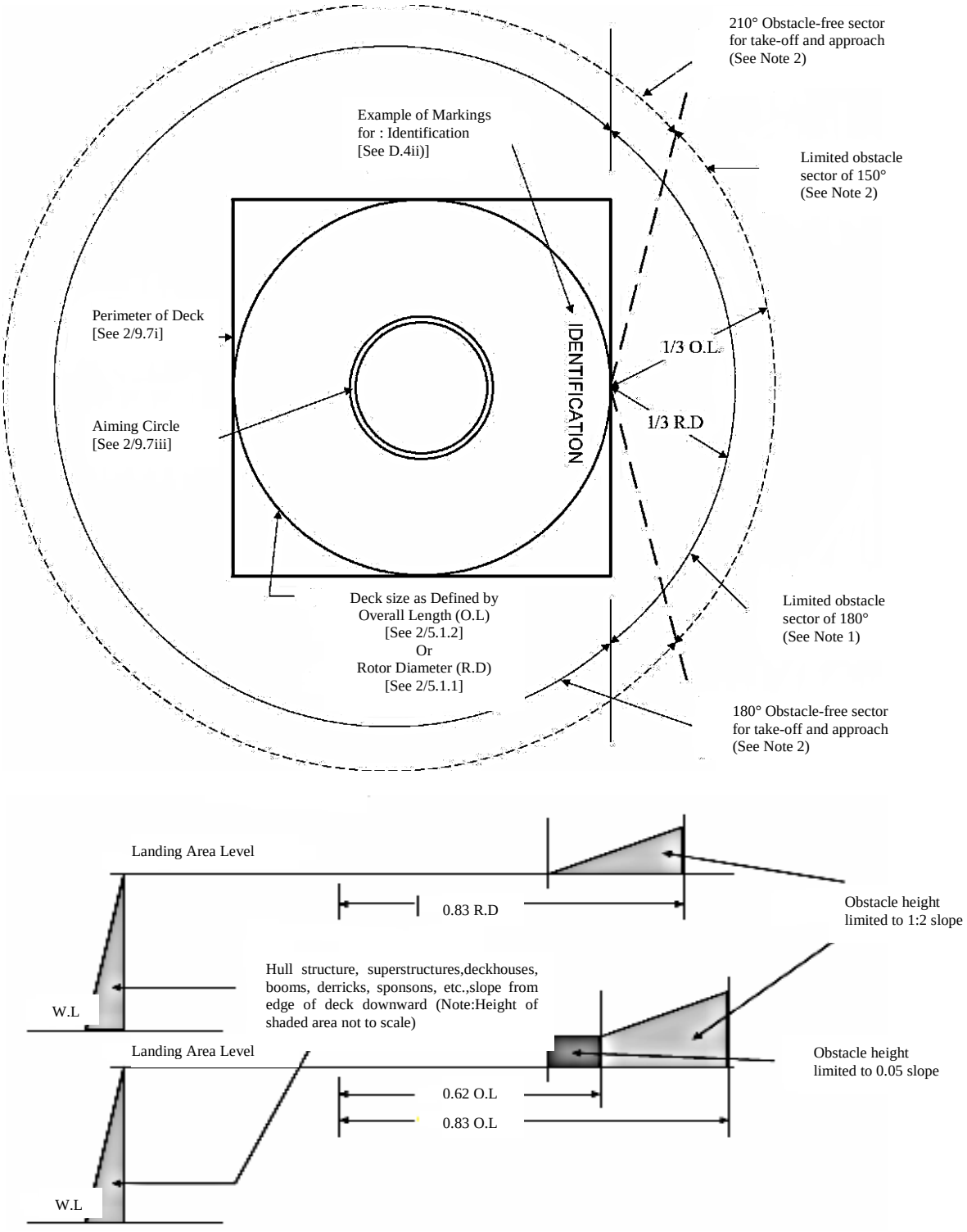
6.1 Perimeter Lights

Each helicopter deck is to be fitted with omni-directional yellow and blue lights, in alternate order, to enable the landing area to be easily identified at night. These lights should be positioned around the perimeter of the deck not more than 3 m apart.

6.2 Floodlights

Helicopter deck floodlights, where fitted, should be located so as to avoid glare to pilots. The arrangement and aiming of floodlights should be such that helicopter deck markings are illuminated and that shadows are kept to a minimum.

FIGURE 2.2 Example of helicopter deck arrangement



Notes:

1 Approach/departure sector and limited obstruction area defined in 2/5.1.1 shown by solid line ——— .

2 Approach/departure sector and limited obstruction area defined in 2/5.1.2 shown by broken line – – – – – .

3 Although a square helicopter deck is shown, other configurations are commonly used.

Section 3
Helicopter Refuelling Systems

A. Seagoing Steel Ships

The following requirements for helicopter refuelling systems apply to seagoing steel vessels with class HELILSRF notation.

1. Application

The requirements of Subsection 3/1 are applicable to helicopter refuelling facilities for fuel with a flash point at or below 60°C close cup test. For fuel with a flash point of above 60°C, the requirements for spill containment in 3 hereunder and the requirements for fuel oil storage and transfer systems in Rules BKI for Machinery Installations Vol.III sec.10 and sec.11 are applicable, as appropriate.

2. Fuel Storage and Refuelling Equipment Area

2.1 Isolation

2.1.1 The designated fuel storage and refuelling areas are to be isolated from the following:

- Accommodation areas including vent openings;
- Embarkation stations;
- Escape routes;
- Helicopter landing area; and
- Areas containing any source of vapour ignition.

2.1.2 The method of isolation may be by means of a safe and adequate distance or suitably erected barriers capable of preventing the spread of fire.

2.2 Hazardous Area

The fuel storage and refuelling area is to be permanently marked to identify it as a restricted area where smoking or other naked flame is not permitted. “NO SMOKING” signs are to be displayed. Open spaces within 3 m of the refuelling equipment and within 3 m of the storage tank vent outlet are to be regarded as hazardous areas (see section 5.A.1).

3 Spill Containment

The fuel storage area is to be provided with arrangements whereby fuel spillage can be collected and drained to a safe location. These arrangements are to be at least as provided hereunder.

3.1 Coaming

A coaming surrounding the fuel storage tanks, associated piping and the pumping unit is to be provided. The height of this coaming is be at least 150 mm, so as to contain fuel spillage as well as fire extinguishing agents. Where the pumping unit is situated at a remote distance from the fuel storage tank, a separate coaming of the same minimum height is to be provided around the pumping unit.

3.2 Drainage

Arrangements for drainage from within the coaming area are to be as follows.

- Permanent piping and a suitable holding tank are to be fitted so that drainage can be either led to the holding tank (for draining oil) or discharged overboard (for draining water) through a three-way valve. No other valve is permitted in the drain piping.
- The cross sectional area of the drain pipe is to be twice that of the storage tank outlet pipe.
- The area within the coaming is to be sloped towards the drain pipe.

Where the area within the coaming is not provided with drainage arrangements, the height of the coming is to be sufficient to contain the full volume of the fuel storage tank plus 150 mm. Drainage piping of helicopter decks is to be constructed of steel. The piping is to be independent of any other piping system and is to be led directly overboard close to the waterline. The drain is not to discharge onto any part of the vessel.

4. Fuel Storage Tanks

4. 1 Construction

Fuel storage tanks are to be of metallic construction. Mounting, securing arrangements and electrical bonding arrangements are to be submitted for approval.

4. 2 Tank Valves

Fuel storage tank outlet valves are to be provided with a means of remote closure. Such means is not to be cut off in the event of a fire in the fuel storage and the refuelling area. In general, the provisions of Rules for Machinery Installations BKI *Vol.III section 10.B and 11.G* are to be complied with.

4. 3 Tank Vents and Sounding

In general, the provisions of Rules for Machinery Installations BKI *Vol.III section 11.R* are applicable. However, tank vents are to be extended at least 2.4 m above the weather deck. Other venting arrangements will be considered.

5. Refuelling Pumps

The refuelling pump is to be arranged to connect to only one tank at a time. Piping between the refuelling pump and the tank is to be as short as practicable and protected against damage. Fuel piping is to be of steel or equivalent material and to comply with the provisions of Rules for Machinery Installations BKI *Vol.III 11.G*. The piping system and all equipment used during refuelling operation are to be electrically bonded.

6. Fuel Piping

The refuelling pump is to be arranged to connect to only one tank at a time. Piping between the refuelling pump and the tank is to be as short as practicable and protected against damage. Fuel piping is to be of steel or equivalent material and to comply with the provisions of Rules for Machinery Installations BKI *Vol.III section III B*. The piping system and all equipment used during refuelling operation are to be electrically bonded.

7. Fuel Storage and Refuelling Systems Installed in Enclosed Spaces

7.1 Machinery Spaces

In general, the compartment containing refuelling facilities is to be regarded as having the same fire and explosion hazards as ro-ro cargo space,for ventilation capacity of the compartment : Closed ro-ro spaces are to be provided with an effective power

7.2 For acceptable certified safe equipment and alternative electrical equipment in the compartment : Ro-Ro Cargo Spaces Intended to Carry Vehicles with Fuel in Their Tanks

7.2.1 Hazardous areas . Areas where flammable or explosive gases, vapors or dust are normally present or likely to be present are known as hazardous areas. Closed ro-ro cargo spaces carrying motor vehicles with fuel in their tanks for their own propulsion are to be regarded as hazardous areas. Electrical equipment and wiring, except where permitted otherwise in (b) below, are to be of the types certified safe

and suitable for use in flammable petrol and air mixture. Specifically, certified safe equipment for use in Zone 1 areas in accordance with IEC Publication 60079 Part 14 (Gas Group IIA and Temperature Class T3) is required.

7.2.2 Alternative electrical equipment . Electrical equipment of a type so enclosed and protected as to prevent the escape of sparks is permitted in the following locations within the cargo spaces:

– Above a height of 450 mm from vehicle deck, and

– Above a height of 450 mm from vehicle platform, if fitted, except platforms which may be invaded by petrol vapor from a perforated vehicle platform above.

Specifically, an enclosure of at least IP55 or apparatus suitable for use in Zone 2 areas in accordance with IEC 60079 Part 14 is required.

In such cases, the ventilation system is to be so designed and operated as to provide continuous ventilation of the cargo spaces at the rate of at least ten air changes per hour whenever vehicles are onboard.

7.2.3 for exhaust fan and ducting: Exhaust ventilation duct. Electrical equipment and wiring in an exhaust ventilation duct is to be of a type certified safe for use in explosive petrol and air mixtures see 7.3.2. (a) above), and the outlet from any exhaust duct is to be sited in a safe location, having regard to other possible sources of ignition. Exhaust fans are to be of non-sparking construction complying with:

7.2.3.1 Non-sparking Fans

7.2.3.1.1 Design

– **Air Gap**

The air gap between the impeller and the casing is to be not less than 10% of the shaft diameter in way of the impeller bearing but, in any case, not to be less than 2 mm It need not be more than 13 mm .

– **Protection Screen**

Protection screens of not more than 13 mm square mesh are to be fitted in the inlet and outlet of ventilation openings on the open deck to prevent the entrance of object into the fan casing.

7.2.3.1.2 Materials

– **Impeller and its Housing**

Except as indicated in 2.3 , the impeller and the housing in way of the impeller are to be made of alloys which are recognized as being spark proof by means of appropriate test procedures.

– **Electrostatic Charges**

Electrostatic charges both in the rotating body and the casing are to be prevented by the use of anti-static materials. Furthermore, the installation of the ventilation fan is to ensure its bonding to the hull.

– **Acceptable Combination of Materials**

Materials tests referred to in 2.1 above are not required for fans having the following combinations:

– Impellers and/or housings of nonmetallic material, due regard being paid to the elimination of static electricity;

– Impellers and housings of non-ferrous materials;

– Impellers of aluminum alloys or magnesium alloys and a ferrous (including austenitic stainless steel) housing on which a ring of suitable thickness of non-ferrous materials is fitted in way of the impeller;

– Any combination of ferrous (including austenitic stainless steel) impellers and housings with not less than 13 mm tip design clearance.

7.3 Unacceptable Combination of Materials

7.3.1 The following impellers and housings are considered as spark-producing and are not permitted:

- Impellers of an aluminum alloy or magnesium alloy and a ferrous housing, regardless of tip clearance;
- Housing made of an aluminum alloy or a magnesium alloy and a ferrous impeller, regardless of tip clearance;
- Any combination of ferrous impellers and housings with less than 13 mm design tip clearance.

7.4 Type Test

7.4.1 Type tests on the finished product are to be carried out in accordance with an acceptable national or international standard. Such type test reports are to be made available when requested by the Surveyor

7.4.2 for bilge system of the compartment :

7.4.2.1 Application

Where a gravity drain system is fitted, the system is to comply with the provisions of International Convention on Load Line (ICLL) Reg.22 . Where a bilge pumping system is fitted, the system is to comply with the provisions of Rules for Machinery Installation BKI Volume III Section 11.N and SOLAS Convention

7.4.2.2 Ro-Ro Cargo Spaces Intended to Carry Vehicles with Fuel in Their Tanks

Gravity drains from ro-ro cargo spaces carrying motor vehicles with fuel in their tanks for their own spropulsion are not to be led to machinery or other spaces where sources of ignition may be present.

7.5 Storage Tanks

7.5.1 Independent tanks. Independent fuel tanks may be installed in the same compartment as the refuelling system. The tank, vents, means of sounding and valves are to comply with A.4

7.5.2 Structural tanks. Fuel tanks may be integral with the vessel's structure. Cofferdams are to be fitted to separate such fuel tanks from machinery spaces, cargo spaces, accommodation, service spaces and other spaces containing a source of ignition. The compartment containing the refuelling equipment, ballast tanks and fuel oil tanks containing fuel oil having a flash point of more than 60°C may be regarded as a cofferdam. Tank vents, means of sounding and outlet valves are to be as in 7.4 (a) . Particular attention is to be directed to the height of the tank vent/overflow with respect to the design head of the tank. Overflows, where fitted, are to comply with Rules for Machinery Installation BKI Volume III Section 10.B, 11.G, and 11.R:

7.6 Fire Extinguishing System

Fixed fire extinguishing systems are to be fitted to protect helicopter fuel storage and refuelling equipment areas (or compartments), in accordance with the provisions of Section 4.A.2 and 4.A.3

B. Steel Barges

The following requirements for helicopter refuelling systems apply to steel barges.

1. Helicopter Fuel Oil Storage and Transfer Facilities

1.1 A designated area is to be provided for the storage of fuel tanks and transfer facilities which are to be as remote as is practicable from accommodation spaces, escape routes and embarkation stations, and suitably isolated from areas containing a source of vapor ignition. The storage and transfer area is to be permanently marked as an area where smoking and open flames are not permitted.

1.2 Fixed fuel storage tanks are to be of metal construction. Special attention is to be given to the design, mounting, securing arrangement and electrical bonding of the storage tank and the fuel transfer system.

1.3 Tank vents are to be sized in accordance with API Standard 2000, "Venting Atmospheric and Low-Pressure Storage Tanks," or other approved criteria. Vent outlets are to be fitted with corrosion resistant flame screens and are to be located such that vapors will disperse freely.

1.4 Storage tank outlet valves are to be provided with a means of remote closure in the event of fire. Means are also to be provided for remote shutdown of the fuel transfer unit.

1.5 The helicopter deck is to have drainage facilities to prevent the collection of liquids and prevent liquids from spreading to or falling on other parts of the barge having regard to the use of firefighting equipment and the possible spillage of fuel.

1.6 To contain spillage and retain fire extinguishing agents, a coaming at least 150 mm in height is to be provided. The coaming is to surround the fuel storage area, which consists of the fuel tank, associated piping and any pumping unit adjacent to the storage tank. Where the pumping unit is remote from the tank, a separate coaming around the unit is to be provided. A coaming will be required only around the fuel pumping unit where the installation is such that the fuel storage tank is cantilevered from the barge and arranged to be jettisoned. Drainage is to be provided for the area enclosed by the coaming and complying with the following:

– The area within the coaming is to be sloped toward the drain line.

– The drain line cross-sectional area is to be at least twice that of the fuel storage tank outlet connection.

Coamings not provided with drainage arrangements, in accordance with the above, are to be sized to contain the full volume of the fuel storage tank plus 150 mm of foam.

1.7 Tanks and associated equipment are to be protected against physical damage and from a fire in an adjacent space or area.

1.8 The fuel pumping unit is to be connected to one tank at a time and the piping between the tank and the pumping unit is to be of steel or equivalent material, as short as possible and protected against damage.

1.9 Fire-extinguishing arrangements for protection of the designated area are to be submitted for review.

2. Helicopter Fuel Oil Pumping Arrangements

2.1 Electrical fuel pumping units and associated control equipment are to be of a type suitable for the location and potential hazard.

2.2 Fuel pumping units are to incorporate a device which will prevent over-pressurization of the delivery or filling hose.

2.3 The procedures and precautions during refueling operations are to be in accordance with good recognized practice.

2.4 Attention is to be paid to the electrical bonding of all equipment used in refueling operations.

2.5 "NO SMOKING" signs are to be displayed at appropriate locations.

C. Mobile Offshore Drilling Units

The following requirements for helicopter refueling systems apply to Mobile Offshore Drilling Units.

1 General

Fixed fuel storage and transfer facilities are to comply with the following:

1.1 Isolation

Fuel storage and transfer facilities are to be remote or suitably isolated from areas which contain a source of vapor ignition and are not to be located on landing areas. The storage and transfer area is to be permanently marked as an area where smoking and open flames are not permitted.

1.2 Hazardous Areas

The requirements for hazardous areas are applicable for fuel with a flash point at or below 60°C close cup test. Open spaces within 3 m of the refuelling equipment and within 3 m of the storage tank vent outlets are to be regarded as hazardous areas. The first 1.5 m is to be regarded a Zone 1 hazardous area and the second 1.5 m is to be regarded a Zone 2 hazardous area.

Enclosed spaces containing refuelling equipment or storage tank vents are to be regarded as Zone 1 hazardous areas. for acceptable certified safe equipment, Electrical equipment used in hazardous areas is to be manufactured, tested, marked and installed in accordance with IEC Publication 60079, or other recognized standards and Electrical equipment located in hazardous drilling well areas and active mud processing areas is to meet at least Group IIA and temperature class T3. Enclosed spaces are to meet the following provisions.

1.2.1 Ventilation Capacity. The enclosed space is to be provided with an effective power ventilation system sufficient to provide at least six air changes per hours

1.2.2 Exhaust Ventilation Duct and Fan. The exhaust duct is to be regarded as a Zone 1 hazardous area and the outlet from any exhaust duct is to be sited in a safe location, having regard to other possible sources of ignition. See IEC Publication 60079-10. Exhaust fans are to be of non-sparking construction complying with A.7.3.2.1.

1.2.3 Dewatering System. Where a gravity drain system is fitted, the system is to comply with the provisions of International Convention on Load Line (ICLL) Reg.22 Where a bilge pumping system is fitted, the system is to comply with the provisions of *BKI Rules for Mobile Offshhore Drilling Units and Special Purpose Units, and these additional requierements below* as applicable.

1.2.3.1 A satisfactory pumping plant is to be provided in all units capable of pumping from and draining any compartment when the unit is on an even keel and either upright or listed 5 degrees. For this purpose, wing suctions will often be necessary, except in narrow compartments at the ends of the unit. Arrangements are to be made whereby water in the compartment will drain to the suction pipes. Efficient means are to be provided for draining water from all tank tops and other watertight flats. Peak tanks and comparatively small compartments, such as chain lockers, echo sounder spaces and decks over peak tanks, etc., may be drained by ejectors or hand pumps.

Note: For the purpose of this Section, comparatively small compartments are those which comply with the following criteria:

– The volume of the compartment is not to exceed (L B D)/1000 where L, B and D. The wetted surface of the compartment, excluding stiffening members, when its volume is half-filled with water is not to exceed 100 m^2

– Direct Bilge Suctions

One of the independent power pumps is to be fitted with a suction led directly from the main machineryspace bilge to the suction valve chest of the pump so arranged that it can be operated independently of the bilge system. The size of this line is to be such that the pump will deliver its full capacity. If watertight bulkheads separate the main machinery space into compartments, such a direct suction is to be fitted to each compartment unless the pumps available for bilge service are distributed throughout these compartments, in which case, at least one pump in each such compartment is to be fitted with a direct suction in its compartment. The direct bilge suction is to be controlled by a stop-check valve.

1.2.3.2 Emergency Bilge Suctions

Emergency bilge suction is to be fitted for the main machinery space for ship-type units 55 m or more in length. The emergency bilge suction is to be directly connected to the largest independently driven pump in the main machinery space, other than the required bilge pumps. Where this pump is not suitable, the second largest suitable pump in the main machinery space may be used for this service, provided that the selected pump is not one of the required bilge pumps and its capacity is not less than that of the required bilge pump.

1.2.3.3 Remote control of bilge valves is to be clearly marked at the control station and means are to be provided to indicate whether the valves are open or closed. The indicator is to rely on movement of the valve spindle, or be otherwise arranged with equivalent reliability.

1.2.3.4 Sanitary, ballast and general-service pumps may be accepted as independent power bilge pumps, provided they are of the required capacity and are fitted with stop valves so that when a pump is used for one service, the other services can be isolated. Where centrifugal pumps are installed, suitable means for priming are to be provided.

1.3 Fuel Storage Tank Construction

Fixed fuel storage tanks are to be of approved metal construction. Special attention is to be given to the design, mounting, securing arrangement and electrical bonding of the storage tank and the fuel transfer system.

1.4 Fuel Storage Tank Vents

Tank vents are to be sized in accordance with, API Standard 2000, “Venting Atmospheric and Low-Pressure Storage Tanks”, or other approved criteria. Vent outlets are to be located such that vapours will disperse freely.

1.5 Fuel Storage Tank Valves

Storage tank outlet valves are to be provided with a means of remote closure in the event of fire. Means are also to be provided for remote shutdown of the fuel transfer unit.

2. Drainage Arrangements

Helicopter decks are to be arranged and provided with means to prevent collection of liquids and to prevent liquids from spreading to or falling on other parts of the unit.

3. Spill Containment

To contain spillage and retain fire extinguishing agents, a coaming at least 150 mm in height is to be provided. The coaming is to surround the fuel storage area, which consists of the fuel tank, associated piping and any pumping unit adjacent to the storage tank. Where the pumping unit is remote from the tank, a separate coaming around the unit is to be provided. A coaming will be required only around the fuel pumping unit where the installation is such that the fuel storage tank is cantilevered from the platform and arranged to be jettisoned. Drainage is to be provided for the area enclosed by the coaming complying with the following:

3.1 The area within the coaming is to be sloped toward the drain line.

3.2 Drainage from the area within the coaming is to be led through a valve designed for selective output (e.g., three-way valve) either to a holding tank or directly overboard. No other valves may be fitted in the drain line.

3.3 The drain line cross sectional area is to be at least twice that of the fuel storage tank outlet connection. Coamings not provided with drainage arrangements in accordance with the above are to be sized to contain the full volume of the fuel storage tank plus 150 mm of foam.

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Section 4
Fire Safety Systems

A. Seagoing Steel Ships and Lift-boats

The following requirements for fire safety systems apply to seagoing steel ships (other than barges) and life-boats.

1. Application

For each helicopter deck onboard a vessel designated for helicopter operations, a fire fighting system and equipment complying with 4/1.3 and 4/1.5, as applicable, are to be provided. A helicopter deck (helideck) is a purpose-built helicopter landing area on a vessel including all structure, fire fighting appliances and other equipment necessary for the safe operation of helicopters, but not those areas for occasional or emergency helicopter operations (e.g., circle H marked on hatch covers for dropoff/ pickup of pilot). A helicopter facility is a helideck including any refuelling and hangar facility.

2 Provisions for Helicopter Deck

2.1 Hoses and Nozzles

At least two combination solid stream and water spray nozzles and hoses sufficient in length to reach any part of the helicopter deck are to be provided.

2.2 Portable Extinguishers

The helicopter deck is to be protected by at least two dry powder extinguishers of a total capacity of not less than 45 kg

2.3 Back-up System

A back-up fire fighting system is to be provided consisting of CO_2 extinguishers of a total capacity of not less than 18 kg or equivalent, one of these extinguishers being equipped so as to enable it to reach the engine area of any helicopter using the helicopter deck. The back-up system is to be located so that the equipment would not be vulnerable to the same damage as the dry powder extinguisher required by 4/1.3.2.

2.4 Fixed Foam System

A suitable fixed foam fire extinguishing system, consisting of monitors or hose streams or both, is to be installed to protect the helicopter landing area in all weather conditions in which helicopters can operate. The system is to be capable of delivering foam solution at a discharge rate in accordance with the following table for at least five minutes. The operation of the foam system is not to interfere with the simultaneous operation of the fire main.

Category	Helicopter Overall Length, L_H	Discharge Rate	
		Liters/min	gpm
H1	$L_H < 15$ m	250	66
H2	15 m (49 ft) $\leq L_H < 24$ m	500	132
H3	24 m (79 ft) $\leq L_H < 35$ m	800	211

The foam agent is to meet the performance standards for Level B foam in the International Civil Aviation Organization's Airport Services Manual (Part 1 Chapter 8, Paragraph 8.1.5, Table 8-1) and be suitable for use with sea water.

2.5 Fireman's Outfits

In addition to the fireman's outfits required in Rules for the Classification and Construction of Offshore Installations Vol. 4 Section 9 D.2.3.1, t, two additional sets of fireman's outfits are to be provided and stored near the helicopter deck.

2.6 Other Equipment

The following equipment is to be provided near the helicopter deck and is to be stored in a manner that provides for immediate use and protection from the elements:

- Adjustable wrench
- Fire resistant blanket
- Bolt cutters with arm length of 60 cm or more
- Grab hook or salving hook
- Heavy duty hack saw, complete with six spare blades
- Ladder
- Lifeline of 5 mm diameter × 15 m length
- Side cutting pliers
- Set of assorted screwdrivers
- Harness knife, complete with sheath

3. Provisions for Enclosed Helicopter Facilities

Hangars, refuelling and maintenance facilities are to be treated as machinery space of category A with regard to structural fire protection, fixed fire-extinguishing system and fire detection system requirements. See Rules for the Classification and Construction of Offshore Installations Vol. 4 Section 10 I.1.

4 Operation Manual

Each helicopter facility is to have an operation manual, including a description and a checklist of safety precautions, procedures and equipment requirements. This manual may be part of the vessel's emergency response procedures.

B. Steel Barges

The following requirements for fire safety systems apply to steel barges

1. Fire Fighting for Helicopter Landing Areas with No Refuelling Capabilities and Facilities for Winching Only

1.1 Hoses and Nozzles

At least two approved combination solid stream and water spray nozzles and detachable applicators and hoses sufficient in length to reach any part of the helicopter landing or winching area are to be provided.

1.2 Portable Extinguishers

The helicopter landing or winching area is to be protected by approved dry powder extinguishers of a total capacity of not less than 45 kg.

1.3 Back-up System

A back-up fire-fighting system is to be provided, consisting of CO_2 extinguishers of a total capacity of not less than 18 kg or equivalent, one of these extinguishers being equipped so as to enable it to reach the engine area of any helicopter using the landing or winching area. The back-up system is to be located so

that the equipment would not be vulnerable to the same damage as the dry powder extinguishers required by 4/3.1.2.

2. Fire Fighting for Helicopter Landing Areas with Refuelling Capabilities

2.1 Fire- Fighting Systems

A fire-fighting system, as required by 4/3.1, is to be provided and arranged so as to adequately protect both the helicopter landing area and helicopter fuel storage areas.

2. 2 Fixed-Foam System

A fixed-foam fire-extinguishing system, consisting of monitors or hose streams or both, is to be installed to protect the helicopter landing area and fuel storage areas. The helicopter landing area is the area contained within a circle of diameter *D* where *D* is the distance, in m across the main rotor and tail rotor in the fore and aft line of a helicopter with a single main rotor and across both rotors for a tandem rotor helicopter or the full area of the deck, whichever is less. The system is to be capable of delivering foam solution at a rate of 6.0 liters per square meter per minute for protein foam or 4.1 liters per square meter per minute for aqueous film forming foam (AFFF) of the areas protected for at least five minutes. The operation of the foam system is not to interfere with the simultaneous operation of the fire main.

C. Mobile Offshore Drilling Units The following requirements for Fire safety systems apply to mobile offshore drilling units

1. General

Where areas of a unit are designated for helicopter operations, details of the facilities are to be submitted and the fire fighting systems of 4/5.3 and 4/5.5 are to be provided and stored near the access to those areas. Deckhouse tops directly below helicopter decks are to have no openings. See 3/7.3 for helicopter deck drainage.

2. Helicopter Decks with No Refuelling Capabilities

2.1 Hoses and Nozzles

At least two approved combination solid stream and water spray nozzles and detachable applicators and hoses sufficient in length to reach any part of the helicopter deck are to be provided.

2.2 Portable Extinguishers

The helicopter deck area is to be protected by at least two approved dry powder extinguishers of a total capacity of not less than 45 kg. At least one portable extinguisher is to be located at each helicopter deck access point.

2.3 Back-up System

A back-up fire fighting system is to be provided, consisting of CO^2 extinguishers of a total capacity of not less than 18 kg or equivalent, one of these extinguishers being equipped so as to enable it to reach the engine area of any helicopter using the deck. The back-up system is to be located so that the equipment would not be vulnerable to the same damage as the dry powder extinguishers required by 4/5.3.2.

3. Helicopter Decks with Refuelling Capabilities

3.1 Fire fighting Systems

A fire fighting system as required by 4/5.3 is to be provided and arranged so as to adequately protect both the helicopter deck and helicopter fuel storage areas.

3.2 Fixed-Foam System

A fixed-foam fire-extinguishing system consisting of monitors or hose streams or both is to be installed to protect the helicopter landing area and fuel storage areas. The helicopter landing area is the area contained within a circle of diameter “D” where “D” is the distance across the main rotor and tail rotor in the fore and aft line of a helicopter with a single main rotor and across both rotors for a tandem rotor helicopter or the full area of the deck, whichever is less. The system is to per square foot) for protein foam or 4.1 liters per square meter per minute for aqueous film forming foam (AFFF) of the areas protected for at least five minutes. The pump is to be capable of maintaining a pressure of 7 bar (7 kgf/cm^2), at the foam installation.

3.3 Fire Pumps

3.3.1 Pump Capacity

Each of the fire pumps required by Rules for the Classification and Construction of Offshore Installations Vol. 4 Section 10 D 1.1.1 is to have a capacity sufficient to deliver, while maintaining the pressure specified in Rules for the Classification and Construction of Offshore Installations Vol. 4 Section 10 D 1.1.3, two jets of water from nozzles that are connected to the two hydrants at which the pressure drop from the fire pump discharge pressure will be the greatest.

Where a fire pump is utilized for the foam system provided for helicopter deck protection, the pump is also to be capable of maintaining a pressure at the foam station as specified in 4/5.5.2. If the water consumption for any other fire protection or fire-fighting purposes exceed the rate of the helicopter deck foam installation, this consumption is to be the determining factor in calculating the required capacity of fire pumps. In no case is the single pump capacity to be less than 25 m^3/hr.

Section 5
Electrical Systems

Electrical systems are to comply with the relevant BKI Rules or Guidance. Specific requirements for electrical systems relating to helicopter decks are as follows

A. Seagoing Steel Ships

The following requirements apply to electrical systems for helicopter decks on seagoing steel ships greater than 90 meters in length.

1. Hazardous Areas – Helicopter Refuelling Facilities

A helicopter refueling facility, defined as an enclosed space containing components of the refueling pump/ equipment; and open deck area within 3 m from ventilation outlet of enclosed space containing refuelling pump/equipment, 3 m from tank vent outlet, and 3 m from refueling pump/equipment, is to be regarded as a hazardous area.

2. Certified Safe Equipment in Helicopter Refuelling Facilities

Electrical equipment installed in areas defined for helicopter refuelling facilities may be any of the types described below and is to be at least IEC Publication 60079 group IIA class T3.

Only electrical equipment of the following types complying with IEC Publication 60079, or other recognized standards, as described in 4-8-3/13, is to be considered for installation in hazardous areas.

- Intrinsically safe type (Ex i)
- Flameproof (explosion-proof) type (Ex d)
- Increased safety type (Ex e)
- Pressurized or purged type (Ex p)

Consideration is to be given to the flammability group and the temperature class of the equipment for suitability for the intended hazardous area, see IEC Publication 60079-20.

B. Steel Barges

The following requirements apply to electrical systems for helicopter decks on steel barges.

1. Permanent Equipment Grounding Arrangements

Where not obtained through normal construction, arrangements are to be provided to effectively ground all machinery, armored cables and metal structures of helicopter decks.

2 Emergency Source of Power

The power available is to be sufficient to supply for at least 18 hours all services necessary for safety in an emergency, particular attention being given to the following:

- Navigation and special purpose lights and warning systems including helicopter landing lights
- Emergency lighting for helicopter landing decks

C. Mobile Offshore Drilling Units

The following requirements apply to electrical systems for helicopter decks on mobile offshore drilling units.

1. Grounding Arrangements

Where not obtained through normal construction, arrangements are to be provided to effectively ground metal structures of helicopter decks. See also Section 3.2 for fuel storage for helicopter facilities. Grounding arrangements are also to be provided for tending vessels.

2. Emergency Source of Power

The electrical power available is to be sufficient to supply all those services that are essential for safety in an emergency, due regard being paid to such services as may have to be operated simultaneously, and for equipment which can be shown as not being required in actual service to draw their rated loads. In the latter case, supporting details are to be submitted.

Having regard to starting currents and the transitory nature of certain loads, the emergency source of electrical power is to be capable of supplying emergency lighting on the helicopter landing deck perimeter for at least 18 hours.

Section 6
Survey Requirements

Surveys for helicopter decks and facilities are to comply with the Rules for the Classification and Surveys Vol. 1 Section 3.C.1.1. Specific survey requirements are as follows.

A. All Vessel other than Mobile Offshore Drilling Units

1. Annual Surveys – Hull

In addition to the applicable requirements of Rules for the Classification and Surveys Vol. 1 Section 3.C.1.1 , the Annual Survey is to include the following. Where areas of the vessel are designated for helicopter operations, the helicopter deck, deck supporting structure, deck surface, deck drainage, tie downs, markings, lighting, wind indicator, securing arrangements where fitted, safety netting or equivalent, access arrangements including emergency escape, and access for fire fighting and rescue personnel, are to be examined.

2. Renewal Surveys – Hull

In addition to the applicable requirements of Rules for the Classification and Surveys Vol. 1 Section 3.C.1.3.2 the Renewal Survey I is to include the following.

Renewal Survey I is to include compliance with all Annual Survey requirements and in addition, the following requirements are to be carried out as applicable, the parts examined and placed in satisfactory condition:

– Structures such as helicopter landing pads and their respective attachment to the deck or hull.

3. Annual Surveys – Machinery

Where areas of the vessel are designated for helicopter operations, the following, where fitted, are to be examined.

– Ventilation and electrical equipment.

– Fire fighting appliances

– Refueling and hanger facilities including fuel storage system, tanks, pumps, piping, valves, vent, sounding, overflow, spill containment and remote shutdowns.

– Operations manual for helicopter facilities, including checklist of safety precautions and procedures, is to be verified.

B. Mobile Offshore Drilling Units

1. Renewal Survey I – Hull

Renewal Survey I of Hull is to include compliance with the Annual Survey and Drydocking Survey requirements in Rules for the Classification and Construction of Offshore Installations Vol. 1 Section 3 D and, in addition, the following requirements as listed below are to be carried out, as applicable, the parts examined, placed in satisfactory condition and reported upon. Non-destructive examination may be required of suspect areas.

– The hull or platform structure, including helicopter pad is to be examined externally and internally for damage, fractures or excessive wastage. Thickness gauging of plating and framing may be required where wastage is evident or suspected.

– Structures such as helicopter landing areas and their respective attachments to the deck or hull are to be examined.

2. Specific Survey on Self-Elevating Units After Ocean Transit Tow

A specific survey is to be carried out on self-elevating drilling units after the completion of an ocean transit tow. This survey should be carried out prior to elevating the unit and should include a comprehensive visual examination of the structure, including helicopter support structure, as well as surface non-destructive examination of critical locations. If the survey is carried out by the Owner and damage is found which affects or may affect classification, BKI is to be notified and arrangements are to be made for survey. If the survey is carried out by the Owner and no damages are found which affect or may affect classification, BKI is to be advised of the details of the tow, and a confirmation survey will be made at the next periodical survey.

C. Specific Vessel Types

1. Accommodation Barges and Hotel Barges

1.1 Annual Survey – Hull

In addition to the applicable requirements of Rules for the Classification and Surveys Vol. 1 Section 3.C.1.1, the Annual Survey – Hull is to include the following:

– The exposed parts of the hull, the deck, deck structures attached to the deck, including supporting structure, accessible internal spaces and equipment, which are to be generally examined and placed in satisfactory condition, as found necessary.

1.2 Survey After Ocean Transit Tow

For Accommodation Barges and Hotel Barge with self-elevating hulls, a specific survey is to be carried out on the self-elevating hull after the completion of an ocean transit tow. This survey should be carried out prior to elevating the hull and should include a comprehensive visual examination of the structure, including helicopter support structure, as well as surface non-destructive examination of critical locations. If the survey is carried out by the Owner and damage is found which affects or may affect classification, BKI is to be notified and arrangements are to be made for survey. If the survey is carried out by the Owner and no damages are found which affect or may affect classification, BKI is to be advised of the details of the tow and the inspection results, and a confirmation survey will be made at the next periodical survey.

2. Safety Standby Service Vessels

2.1 Annual Surveys and Surveys after Each Rescue Operation or Evacuation

At each Annual Survey, in addition to surveys of hull, machinery and equipment and after each Rescue Operation or Evacuation, the rescue equipment, safety equipment, arrangement, accommodation and assigned freeboard marks are to be examined and placed in satisfactory condition to the satisfaction of the attending Surveyor. The survey is also to include the following, as applicable:

– Rescue and safety equipment, including the helicopter winching area, is to be examined and confirmed in satisfactory operating condition.

– Radio and communication equipment, including the VHF radio telephone with helicopter communications frequencies and helicopter beacon, is to be examined and confirmed in satisfactory operating condition.

3. Lift-boats

3.1 Annual Surveys – Machinery

Where areas of the lift-boat are designated for helicopter operations, the following, where fitted, are to be examined and found or placed in satisfactory condition.

– Access arrangements, ventilation and electrical equipment.

– Fuel storage and refuelling system including tank, pumps, piping, valves, vent, sounding, overflow, spill containment, and remote shutdowns.

4. Floating Production Installations

4.1 Renewal Surveys – Hull

For column-stabilized vessels, the following are to be performed, as applicable, the parts examined, placed in satisfactory condition and reported upon:

– The helicopter pad is to be examined externally and internally for damage, fractures or excessive wastage.

– Applicable structures, such as helicopter landing areas and their respective attachments to the deck or hull.

5. Offshore LNG Terminals

5.1 Gravity-Based Terminals Annual Survey – Maintenance Records

Maintenance records are to be kept and made available for review by the attending Surveyor. The maintenance records will be reviewed to establish the scope and content of the required Annual and Renewal Surveys which are to be carried out by a Surveyor. During the service life of the unit, maintenance records are to be updated on a continuing basis. The operator is to inform BKI of any changes to the maintenance procedures and their frequencies as may be caused, for example, by changes or additions to the original equipment. The Surveyor may determine during his periodic survey if the changes are sufficient to warrant review by the BKI Engineering staff.

At each Annual Survey, in addition to a general review of the maintenance records and where applicable and required for Classification of the terminal, the Surveyor is to verify the effectiveness of the following items by visual examination and operational testing, as appropriate:

5.1.1 Safety Systems. Where areas of the terminal are designated for helicopter operations and where fitted, the following are to be generally examined:

– Access arrangements, ventilation, and electrical equipment.

– Fuel storage and refuelling system including tank, pumps, piping, valves, vent, sounding, overflow, spill containment and remote shutdowns

5.1.2 Hull Structure for Ship- or Barge-type Terminals. Where areas of the terminal are designated for helicopter operations, the helicopter deck, deck supporting structure, deck surface, deck drainage and safety netting or equivalent are to be examined.

5.2 Floating Terminals Annual Survey – Maintenance Records

5.2.1 Safety Systems. Where areas of the terminal are designated for helicopter operations and where fitted, the following are to be generally examined:

– Access arrangements, ventilation, and electrical equipment.

– Fuel storage and refuelling system including tank, pumps, piping, valves, vent, sounding, overflow, spill containment and remote shutdowns.

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Annex
List of Definition

Ambient Environment : Ambient environment refers to the environmental conditions that the crew is exposed to during periods of work, leisure or rest. Specifically, this Guidance provides criteria and limits for whole-body vibration, noise, indoor climate and lighting.

Associated Documentation : Documents referenced in this Guidance that are needed to provide measuring techniques and further Guidance.

Cargo Vessel: A cargo vessel is any vessel not specifically a passenger vessel and that is involved in commercial trade.

Crew Member: Any person on board a vessel, including the Master, who is not a passenger.

Crew Spaces: All areas on a vessel intended for crew only, such as crew accommodations spaces and crew work spaces.

External Specialists: Specialized test personnel who must meet the requirements of Appendix 2, "Procedural Requirements for External Specialists Performing Ambient Environmental Testing".

Habitability: The acceptability of the conditions of a vessel in terms of vibration, noise, indoor climate and lighting as well as physical and spatial characteristics, according to prevailing research and standards for human efficiency and comfort.

Helicopter Deck (Helideck) – a purpose-built helicopter landing area, on a vessel or unit including all structure, fire fighting appliances and other equipment necessary for the safe operation of helicopters, but not those areas for occasional or emergency helicopter operations (e.g., circle H marked on hatch covers for drop-off/pickup of pilot).

Helicopter Facility – a helideck including any refueling and hangar facility.

Accommodations: Vessel areas where the primary purpose is to rest or recreate. Accommodations spaces include cabins and staterooms, medical facilities (sick bays), offices, public and recreation rooms. For the purposes of this Guidance, accommodations also include service spaces such as the mess rooms, laundry, storerooms and workshops.

High Speed Craft : Vessels that meet the requirements of the BKI *Guide for Building and Classing High Speed Craft.*

Manned Crew Space : Any space where a crew member may be present for twenty (20) minutes or longer at one time during normal, routine daily activities. Such spaces would include working or living spaces.

Passenger: A passenger is every person other than the Master and the members of the crew or other persons employed or engaged in any capacity on board a vessel for the business of that vessel.

Passenger Vessel: A vessel whose primary purpose is to carry more than twelve (12) passengers for transportation or recreational purposes. This includes cruise ships and ferries (conventional and highspeed craft).

Recreational and Public Spaces : Those portions of the crew accommodations which are used for halls, dining rooms, lounges and similar permanently enclosed spaces.

Shall : Expresses a provision that is mandatory.

Should : Expresses a provision that is a recommended or preferred guidance.

Test Plan: Document containing the requisite information regarding vessel design and layout, test personnel, test conditions, measurement locations, data acquisition, instruments, data analysis and test schedule necessary for verifying the measurements for the ambient environmental aspects of habitability.

Workspaces: Areas allocated for work. Categories of workspaces include: navigation spaces, service spaces (galley, laundry) and machinery spaces.