Transport Canada
Coast Guard

TP4414E

Guidelines Respecting Helicopter Facilities on Ships

Ship Safety

December 1986

Canadian Garde côtière
Coast Guard canadienne
Ottawa, Ontario.
K1A 0N7

9456 - 33
(AMSEC)

March 23, 1987

Dear Sir or Madam:

Guidelines Respecting Helicopter
Facilities on Ships
Dated December 1986

Attached please find one copy of the above named Guidelines.

These Guidelines are developed from the “Standard Respecting Helicopter Facilities on Ships” dated May 1986 , which was discussed and accepted at the Marine Safety Advisory Council Machinery Committee meeting held November 5 , 1986.

The use of the term “Guidelines” rather than Standard follows the Federal Government’s recently introduced Regulatory Reform Strategy and Regulatory Process Action Plan. Appropriate wording changes within the document have been made to reflect “Guidelines” rather than “Standard”.

Notwithstanding these phraseology changes, the need for hazard protection coverage stated in the document is such that the Ship Safety Branch will still require compliance with the document prior to certificating ships to carry out helicopter operations.

Yours sincerely,

J. Hornsby ,
Director General,
Ship Safety Branch,
Canadian Coast Guard.

Att

Guidelines Respecting Helicopter Facilities on Ships

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Guidelines Respecting Helicopter Facilities on Ships

Part I

Introduction, Interpretation and Application

Introduction

These Guidelines may be cited as the Ships' Helicopter Facilities Guidelines.

1 (1) The Guidelines prescribe Transport Canada Marine and Aviation Groups' standards for ships' helicopter operational facilities.

2 (1) The Guidelines are divided into five parts:

(a) Part I: Introduction, Interpretation and Application;

(a) Part II: Helicopter decks and winching areas;

(b) Part III: Helicopter fuelling and servicing facilities;

(c) Part IV: Fire-protection and personnel-rescue facilities; and

(d) Part V: Helicopter operations.

Interpretation

3 (1) "Act" means the Canada Shipping Act.

"Approved" means approved by the Board of Steamship Inspection.

"Aviation Group" means the Transport Canada Aviation Group, responsible for aviation safety.

"Board" means the Board of Steamship Inspection authorized under the Act.

“Bridge” means the location of the command position of the ship.

“Design Helicopter” means the most demanding helicopter used to determine the dimensions, bearing strength and other aspects of the helicopter deck design, which has been identified from the helicopters the deck is intended to serve.

“Downwash” means the volume of air displaced downward by the lifting rotor, which, when it strikes the helicopter deck or other solid surface, causes a turbulent outflow from beneath the helicopter.

“Ground Effect” means the improvement in flight capability that develops whenever a helicopter flies or hovers near the helicopter deck or other solid surface, as a result of the cushion of denser air built up between the surface and the helicopter by the air displaced downward by the lifting rotor.

“Harmful Substance” means any substance subject to control under the Canada Shipping Act and the Arctic Waters Pollution Prevention Act that, if introduced into the sea, is liable to create hazards to human health, to harm living resources and marine life, to damage amenities or to interfere with other legitimate uses of the sea.

“Helicopter” means any heavier-than-air aircraft supported in flight by the reactions of the air on one or more power-driven rotors on a substantially vertical axis.

“Helicopter Approach-and-Departure Area” means the area where a helicopter may safely approach and manoeuvre during any part of the landing or takeoff operation.

“Helicopter Deck” means a helicopter landing and takeoff area aboard a ship.

“Helicopter Operations Officer” means the senior aviation officer aboard ship.

“Helicopter Overall Length” means the distance between the extremities of the helicopter including the rotors.

“Inspector” means a steamship inspector appointed under the provisions of the Act.

“Jet A-1 Fuel” means an aviation turbine fuel having a minimum flashpoint of 38°C (approved closed-cup test)

“Jet B (JP4) Fuel” means an aviation turbine wide-cut fuel that has a minimum flashpoint estimated to be between -2°C and -23°C (approved closed-cup test) and a Reid vapour pressure such that, at normal temperature and pressure, the vapour-air mixture above the liquid in a closed tank may settle in the flammability range.

“JP5 (High Flashpoint) Fuel” means an aviation turbine fuel having a minimum flashpoint of 60° (approved closed cup-test)

“Limited Obstacle Area” means an area on a ship adjacent to the helicopter deck and within which the height of objects is limited.

“Markers” means objects displayed above deck level in order to indicate an obstacle or delineate a boundary.

“Markings” means symbols or groups of symbols displayed on the surface of the deck in order to convey aeronautical information.

“Obstacle” means any fixed obstacle, whether temporary or permanent, any mobile obstacle, or any part thereof, located on an area intended for the surface movement of aircraft or extending above a defined surface intended to protect aircraft in flight.

“Regional Manager” means the Manager, Ship Safety, for a Canadian Coast Guard Region.

“Ship” means any type of vessel, boat or craft designed, used, or capable of being used, solely or partly, for marine navigation, without regard to method, or lack, of propulsion.

“Ship Safety Branch” means the branch of Transport Canada Marine Group responsible for ship safety.

“Winching” means the transfer of personnel or materiel between the internal spaces of a helicopter and a ship’s deck by means of a hoisting mechanism fitted in the helicopter.

“Winching Area” means the clear deck area over which a helicopter may hover for winching personnel and materiel to and from a ship, where no landing facilities are provided.

(2) Unless otherwise stated, the numerical units used in these Guidelines are as defined in the Metric Practice Guide, published by the Canadian Standards Association; unless otherwise specified, pressures are gauge pressures.

Application

4 (1) These Guidelines apply to:

(a) all Canadian-registered ships,

(b) foreign-registered ships certificated for operations under the Non-Canadian Ships Safety Order, and

(c) foreign-registered ships subject to, and operating in those areas under, the jurisdiction of the Canada Oil and Gas Lands Administration.

(2) These Guidelines apply to new ships or existing ships to be outfitted with permanent facilities for helicopter operations.

(3) In the case of ships with existing permanent helicopter facilities, these Guidelines apply as far as is reasonable and practicable.

(4) Notwithstanding subsections (1) to (3), these Guidelines do not apply in emergency situations involving safety of life or prevention of pollution at sea; in such circumstances, helicopter operations shall be conducted in accordance with the judgment of the ship's Master and the helicopter Pilot-in-Command.

(5) Where a ship is being outfitted for temporary helicopter operations, facilities should be acceptable to the Regional Manager, Ship Safety, and the Regional Director General, Aviation and the outfitting should take into account:

(a) the characteristics of the design helicopter;

(b) the area in which the ship will operate;

(c) the length of the period and the time of year during which the ship will engage in helicopter operations;

(d) the proposed operations and expected visibility.

(e) the potential safety hazards presented by other systems aboard the ship;

(f) the ship's weight, trim and stability characteristics;

(g) the helicopter deck and its support structure materials and scantlings;

(h) the helicopter-securing arrangements and the helicopter-deck markings;

(i) the Dangerous Goods Shipping Regulations and the International Maritimes Dangerous Goods Code covering shipping and storing arrangements for aviation fuel in portable tanks or drums;

(j) the amount and type of aviation fuel to be used;

(k) the dispensing and bunkering arrangements for aviation fuel;

(l) provisions for ship's personnel and equipment associated with:

(i) helicopter landing and take off; and

(ii) firefighting and personnel rescue; and

(m) the radio and visual-communication arrangements between ship and helicopter.

(6) Except where otherwise prescribed in these Guidelines, the design, construction, installation, inspection and testing of helicopter decks, including securing arrangements, winching areas and fuelling and firefighting facilities, should be in accordance with relevant Ship Safety Branch regulations.

(7) The Board, on receipt of written application, may exempt any ship from standards prescribed in these Guidelines, provided that the ship meets standards that, in the opinion of the Board or Aviation Group, as applicable, are adequate for the overall safety of the ship and the helicopter.

Part II

Helicopter Decks and Winching Areas

Decks - General

5 (1) Ship's weight, trim and stability calculations should allow for the maximum loaded weight of the design helicopter.

(2) The location of a helicopter deck should take into account ship motions, turbulent wind conditions owing to superstructures or vertical airflow up slab-sided hulls, hot or hazardous gases from funnels, exhausts, flare booms or vents, and any restrictions or obstacles in a helicopter approach-and-departure area.

(3) A helicopter deck should not:

(a) form part of the upper boundary of a cargo tank in oil tankers, chemical tankers or liquefied-gas carriers;

(b) be located in cargo areas in vessels in which dangerous goods are stored, as defined in the Dangerous Goods Shipping Regulations.

(4) The helicopter deck should be free of all obstacles and openings other than;

(a) recesses or openings in the deck, which should not exceed 105 mm length or diameter;

(b) retractable hangar track channels, which should not exceed 105 mm width;

(c) peripheral safety nets in accordance with subsection 5(20); and

(d) where required, perimeter lights in accordance with subsection 6(4).

(5) Where full compliance with the prescribed helicopter deck size would restrict the operations of helicopters from a ship engaged in tasks directly related to the safety of life at sea, a smaller deck size to dimensions specially determined by the Board and Aviation Group may be accepted.

Deck Location, Size and Obstacle Limitations

(6) Except as prescribed in subsection (12), a helicopter deck to be located at the bow or stern should be of sufficient size:

(a) for a single main rotor helicopter, to contain a circle of a diameter not less than the main rotor diameter of the design helicopter and to be bounded by an athwartship line tangential to the inboard periphery of the circle (Fig. No.1); and,

(b) for a tandem-main-rotor helicopter, to meet dimensions specially determined by the Board and Aviation Group.

(7) Except as prescribed in subsection (12) a helicopter deck to be located on one side of a ship only should be of sufficient size:

(a) for a single-main-rotor helicopter, to contain a circle of a diameter not less than the overall length of the design helicopter, and to be bounded by lines perpendicular to the side of the ship and tangential to the circle (Fig. No.2); and

(b) for a tandem-main-rotor helicopter, to meet dimensions specially determined by the Board and Aviation Group.

(8) Except as prescribed in subsection (12), a helicopter deck to be located amidship for operations from both sides of a ship should be of sufficient size:

(a) for a single main rotor helicopter, to contain a rectangle having sides not less than the overall length of the design helicopter, with the ship's deck obstacle free on the port and starboard sides (Fig. No.3.); and

(b) for tandem-main-rotor helicopter, to meet dimensions specially determined by the Board and Aviation Group.

(9) Except as prescribed in subsection (13), a ship with a bow or stern helicopter deck should,

(a) have a limited-obstacle area containing no obstacle higher than 0.05 x the overall length of the design helicopter and extending inboard not less than 3 m beyond the athwartship boundary of the helicopter deck (Fig. No.1); and,

(b) have an approach-departure area that encloses the helicopter deck, extends outward through a sector of 180° originating at the inboard athwartship boundary and is unrestricted outward, except for approved air navigation aids to flight safety, such as a visual-approach approach slope indicator (Fig. No.1).

(10) Except as prescribed in subsection (13), a ship with a side helicopter deck should,

(a) have a limited-obstacle area containing no obstacle higher than 0.05 x the overall length of the design helicopter and extending not less than 0.25 x the overall length of the design helicopter, or 3 m, whichever is greater, beyond the perimeter of the helicopter deck (Fig. No.2); and

(b) have two approach-departure paths with their centre lines originating at the centre of the helicopter deck separated by at least 90°; these paths should extend each side of the centre line not less than 0.75 x the rotor diameter of the design helicopter and be unrestricted outwards except for approved air navigation aids to flight safety, such as a visual-approach slope indicator (Fig. No.2).

(11) Except as prescribed in subsection (13), a ship with an amidship helicopter deck should have a limited-obstacle area fore and aft of the helicopter deck subtending an angle not greater than 150 degrees and within the 150 degree angle extending out to a distance equal to the overall length of the design helicopter measured from the boundary of the enclosing angle; the obstacle limitation surface should rise at a rate of one unit vertically for each five units horizontally, fore and aft of the helicopter deck (Fig No.3).

(12) For a ship, including a mobile unit, directly engaged in oil or gas exploration or production, the helicopter deck should be of sufficient size:

(a) for a single-main-rotor helicopter

(i) operating outside the Inland Waters of Canada, to contain a circle of a diameter not less than the overall length of the design helicopter;

(ii) operating within the Inland Waters of Canada, to contain a circle of a diameter not less than the main-rotor diameter of the design helicopter (Fig. No.4), and,

(b) for a tandem main rotor helicopter

(i) where omnidirectional landings are desired, to contain a circle of a diameter not less than 0.9 x the overall length of the design helicopter; and

(ii) where bidirectional landings are desired in the direction of the major axis only, to contain a rectangle with sides 0.9 x the overall length by 0.75 x the overall length of the design helicopter, except that the corners of this rectangle may be omitted provided that neither side of the right angle of the triangle thus formed exceeds 5 m in length (Fig. No.5).

(13) A ship, including a mobile unit, directly engaged in oil or gas exploration or production, should have an obstacle free area around the helicopter deck, except that obstacles may be located in an area within an angle not greater than 150° extending outwards from a point on the deck periphery, subject to the following conditions

(a) for a single-main-rotor helicopter, the height of obstacles should not exceed 0.05 OL from the periphery of the helicopter deck out to an arc having a radius of 0.62 OL from the centre of the helicopter deck, with the allowable obstacle height rising one unit vertically for each two units horizontally out to an arc having a radius of 0.83 OL from the centre of the helicopter deck,

(b) for a tandem-main-rotor helicopter operating from an omnidirectional facility, the height of obstacles should not exceed 0.05 OL from the periphery of the helicopter deck out to a circular arc having a radius of 0.83 OL from the centre of the helicopter deck, and

(c) for a tandem-main-rotor helicopter operating from a bidirectional facility, the height of obstacles is unlimited within the two straight lines which should be equidistant from the deck perimeter line.

where OL is the overall length of the design helicopter (Fig Nos.4 and 5)

(14) A ship, including a mobile unit, directly engaged in oil or gas exploration or production, should,

(a) have an approach area, extending out 500 m and bounded by the obstacle-free area prescribed in subsection (13), within which no permanent obstacle should be located; other than approved air navigation aids to flight safety, such as a visual approach slope indicator;

(b) normally, have the approach area, as prescribed in paragraph (a), free also of all mobile obstacles, although operations may be carried out at the discretion of the Master and the helicopter Pilot-in-Command, even when such an obstacle is present within the approach area; and

(c) have no structural members protruding outside a gradient of 5 vertical units to every 1 horizontal unit running from the clear deck area down to the water level and extending horizontally around the clear deck over an arc of 180° centred within the approach area prescribed in para (a)
(Fig. Nos. 6 and 7.)

Deck Construction

(15) A helicopter deck should be of metal construction, and

(a) where the deck and a deckhead below are separated, the separation should be at least 1 m;

(b) where the deck forms part of the deckhead of an enclosed space. and where a fire hazard to the space exists, the metal should be steel and have “Class A-60” insulation in accordance with Hull Construction Regulations; or

(c) where the deck is of a grating form, the underdeck design should be such that the cushioning effect of the rotor downwash is not diminished.

(16) Scantling calculations for a helicopter deck and its support structure should be based on a load factor of 2.5 times the design helicopter's maximum loaded weight transmitted through the landing-gear configuration presenting the severest local loading; however, the Board may accept a lesser load factor in cases where a detailed loading analysis is submitted in which the design criteria are shown to provide for ship-motion conditions.

(17) Determination of deck and support structure materials and scantlings for any helicopter operations proposed for extremely cold climatic conditions should take the lowest ambient temperature into account.

(18) A helicopter deck should have:

(a) at least two means of access located as far as practicable from one another;

(b) an oil-resistant, fire-retardant, non-skid surface;

(c) means of removing ice accumulation, where applicable, and;

(d) means of chocking landing gear, particularly gear on wheeled helicopters.

(19) With the design helicopter's weight being taken into account, a helicopter deck should have a camber of about 1:50, or a slope sufficient to ensure fluid drainage, and a deck-edge trough with suitable drainage points such that fluids may safely drain directly overboard.

Safety Net

(20) A helicopter deck should be fitted with a peripheral safety net:

(a) not less than 1 m wide,

(b) inclined 10° upward from the horizontal, and

(c) strong enough to support at least 200 kg per running metre.

(21) Except where the helicopter deck is used solely for helicopter operations and can be isolated by approved gated guardrails or ladders, the safety net should be fitted with hinged stanchions and three wire-rope rails such that the stanchions can be secured in the upright position and the wire-rope rails tightened.

Securing Facilities

(22) Recessed facilities should be provided on the helicopter deck for helicopter tie-down; the strength of the tie-down arrangements should be such as to secure the design helicopter from the effects of ship motions and wind conditions.

Grounding Facilities

(23) Grounding facilities should be provided between the helicopter and the helicopter deck for the removal and control of electrostatic accumulations; such facilities should be capable of automatic detachment without hazard to the helicopter.

Safety Notice

(24) The following notice should be prominently displayed in permanent lettering at all entrances to the helicopter deck and fuelling area:

<u>During Helicopter Operations</u>

No unauthorized persons allowed

Secure all loose objects

No naked lights - No smoking

Helicopter Deck Lighting and Hazard Marking

6 (1) Helicopter-deck facilities should include such floodlighting arrangements as do not interfere with the vision of the Pilot-in-Command.

(2) For a ship, including a mobile unit, directly engaged in oil or gas exploration or production, the helicopter clear deck perimeter should be equipped at 3 m intervals with yellow omnidirectional lights having an average illumination intensity of between 20 and 25 candelas; the lights should meet the requirements of the Canadian Electrical Code for Division 2 of Class I locations.

(3) For a ship, other than one described in subsection (2), perimeter lights should be required only where floodlights may cause vision problems to the Pilot-in-Command.

(4) Perimeter lights, where required, should

(a) not exceed 250 mm height except that special consideration should be given to ships from which helicopters regularly engage in underslung cargo operations where it may be necessary that lights be of snag-free design and not exceed 25 mm height; and

(b) not be visible from below deck level.

(5) Where the Aviation Group specifies that a certain structure close to the boundary of the limited-obstacle area or obstacle-free area should be conspicuous by the application of surface markings, the following principles apply:

(a) the structure should be marked with alternating bands of contrasting colours if

(i) it has essentially unbroken surfaces and has one dimension, horizontal or vertical, greater than *1.5* m and the other dimension, horizontal or vertical, less than 45 m, or
(ii) t is of skeletal type with either a vertical or a horizontal dimension greater than 1.5 m;

(b) the bands should be perpendicular to the largest dimension and have a width approximately one seventh of the longest dimension;

(c) the colours of the bands should contrast with the background against which they will be seen; orange and white should be used, except where such colours are not conspicuous against the background;

(d) the bands on the extremities of the structure should be of the darker colour; and

(e) a structure should be of a single conspicuous colour if its projection on any vertical plane has both horizontal and vertical dimensions of less than 1.5 m; orange or red should be used, except where such colours merge with the background.

(6) Where night marking is needed, the Aviation Group may specify that structures close to the boundary of the limited-obstacle area or the obstacle-free area should:

(a) clearly indicate the obstacle surface by means of surface floodlights, of an intensity such that the surface illumination does not cause excessive glare to the Pilot-in-Command, the recommended level of floodlighting illumination being 30 lux; and

(b) be equipped at or near the top, with omni-directional red hazard lights having average illumination intensity of 20 to 25 candelas.

Helicopter Landing Aids

7 (1) A wind-direction indicator showing wind conditions over the helicopter deck should:

(a) be located in a non-hazardous position adjacent to the takeoff and landing area, so as to be visible from all directions to the helicopter Pilot-in-Command.

(b) be located as clear as possible of wind turbulence so as to accurately indicate wind direction; where turbulence cannot be completely avoided, an additional smaller indicator may be needed;

(c) be illuminated for night operations and have a colour, or colours, clearly contrasting with the ship's colour scheme, so as to be visible to the Pilot-in-Command from a height of at least 200 m; and

(d) be in the form of a truncated cone having a minimum size 1.2 m long, with a frontal opening of 0.3 m and a rear opening of 0.15 m.

(2) Where a helicopter beacon is fitted for ship-identification purposes, it should show white flashes transmitting the International Morse Code letter H (i.e. dot, dot, dot, dot).

(3) The frequency of total flashes should be from 12 to 30 per minute and preferably not less than 20 per minute.

(4) The light from the beacon should show at all angles of azimuth; the vertical light distribution should be such that no light shows below the horizontal and the following minimum effective illumination intensifies be provided for the white flash.

ANGLE ABOVE HORIZONTAL	1°	5°	10°	15°
EFFECTIVE INTENSITY (1000 cd white)	2.5	5	2.5	1

(5) Brilliancy control or shielding should be provided when necessary to ensure that a helicopter beacon does not dazzle the Pilot-in-Command at short range.

Helicopter Deck Markings

8 (1) The markings painted on the helicopter deck should be easily visible from the approaching helicopter and be of a colour prescribed to contrast clearly with the deck colour scheme.

(2) Except where otherwise prescribed in this Guideline, letters and numerals should be 80 cm high with lines 10 cm wide.

(3) Markings to indicate safe loads and dimensions should be in thousands of pounds and feet, respectively, since helicopter pilots' manuals use these measures.

(4) Except as prescribed in subsection (6), the helicopter deck should be identified by a white capital letter "H", 3 m high with the lines 40 cm wide.

(5) The letter "H" prescribed in subsection (4) should be so oriented that the verticals are parallel to the fore and aft axis of the ship, as follows:

(a) for a ship with a bow or stern helicopter deck, the letter should be at the centre of the helicopter deck (Fig. No.1);

(b) for a ship with a side helicopter deck, the letter should be at the centre of the circular clearance-indicator line prescribed in paragraph (7)(b) (Fig. No.2); and

(c) for a ship with an amidship helicopter deck, the letter should be at the centre of the helicopter deck (Fig. No.3).

(6) For a ship, including a mobile unit, engaged in oil or gas exploration or production, the helicopter deck should be identified by a yellow aiming circle, 6 m in inside diameter and 40 cm in width, at the centre of the helicopter deck (Fig Nos.4 and 5).

(7) To ensure that a helicopter Pilot-in-Command has visual indication of correct positioning, a yellow clearance indicator line should be painted on the helicopter deck, as follows:

(a) for a ship with a bow or stern helicopter deck the marking should be an athwartship solid line 6 m long and 40 cm wide (Fig.No.1); and

(i) be disposed equally on each side of the centre line of the takeoff and landing area;

(ii) be accompanied by an indication of the overall length of the design helicopter and

(iii) be located so that the Pilot-in-Command position in the design helicopter is directly over the line and the rotor is clear of the limited-obstacle area;

(b) for a ship with a side helicopter deck, the marking should be a circular line 40 cm wide (Fig. No.2.); and

(i) be interrupted at 120° intervals by indications of the overall length of the design helicopter, and

(ii) be of such diameter and so centred that the Pilot-in-Command position in the design helicopter is directly over the line and the rotor is clear of the limited-obstacle area; and

(c) for a ship with an amidship helicopter deck the marking should be two solid lines port and starboard, each 6 m long and 40 cm wide, running fore and aft, (Fig. No.3), and each line;

(i) be disposed equally on each side of the centre line of the helicopter deck;

(ii) be accompanied by an indication of the overall length of the design helicopter; and

(iii) be located so that the Pilot-in-Command position in the design helicopter is directly over the line and the rotor is clear of the limited-obstacle area.

(8) The perimeter of the helicopter deck should be indicated by a solid yellow line 40 cm wide.

(9) The boundary of the limited-obstacle area should be indicated by a broken yellow line 40 cm wide and consisting of alternate painted and clear portions 3 m long.

(10) The helicopter deck should be marked adjacent to the perimeter to indicate in thousands of pounds the maximum safe loaded weight of the design helicopter that the deck is designed to withstand.

Helicopter Deck Communication Systems

9. (1) The helicopter deck area should be fitted with telephone equipment suitable for communication with the bridge and, where applicable, with the aviation-fuel pump room and the accommodation for the Helicopter Operations officer.

Additional Facilities

10. (1) Consideration should be given to accommodating immobilized helicopters on deck; depending upon the need for further helicopter operations, such accommodation may be an approved parking area, a hangar facility outside the required landing area, or a means of suitably securing the helicopter on the landing area pending removal by a cranage facility.

(2) For ships requiring uninterrupted helicopter operations, consideration should be given to the installation of:

(a) safe and independent helicopter engine-starting facilities;

(b) cranage capable of servicing the helicopter deck and suitable for transferring the design helicopter to and from the ship;

(c) a helicopter-servicing facility staffed with trained personnel; and

(d) suitable shipboard accommodation for helicopter operational and servicing personnel.

Figure 1 Helicopter Deck - Bow or Stern Facility

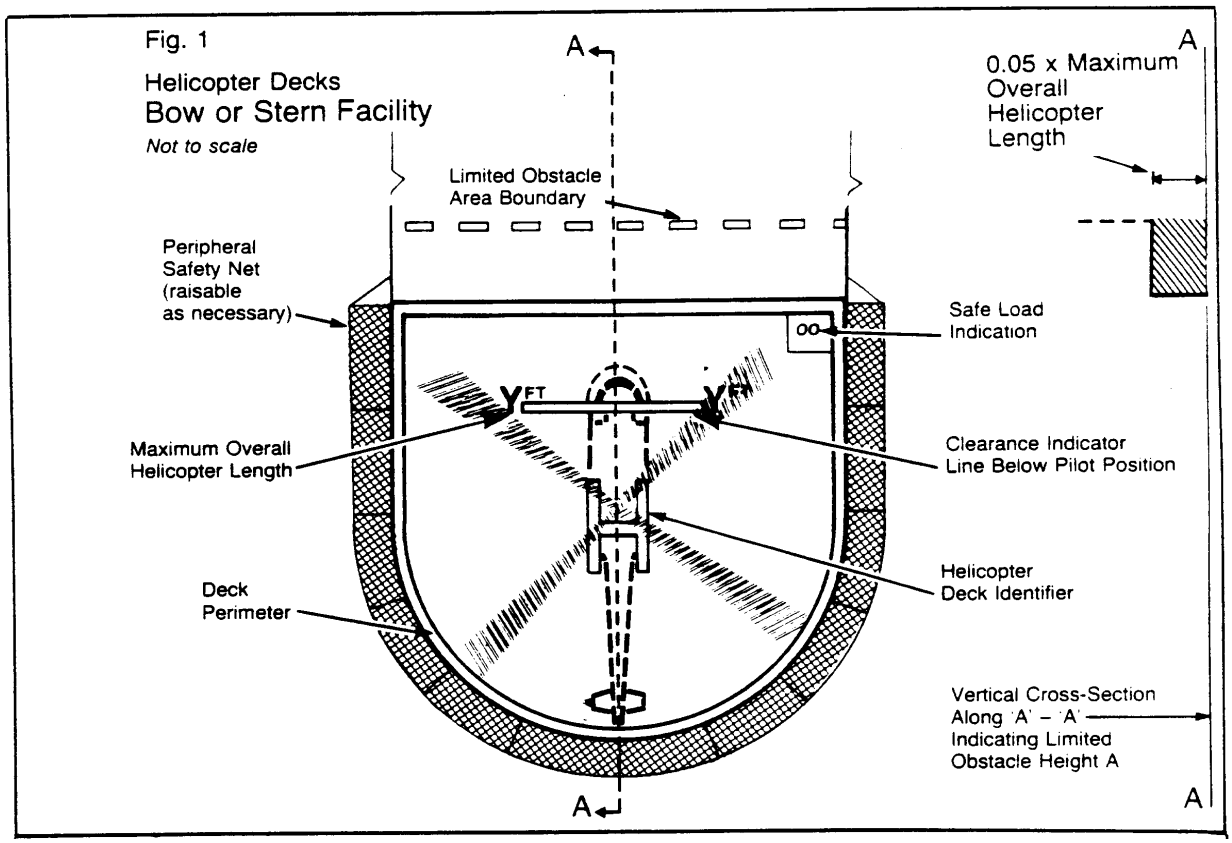


Figure 2 Helicopter Deck - Shipside Facility

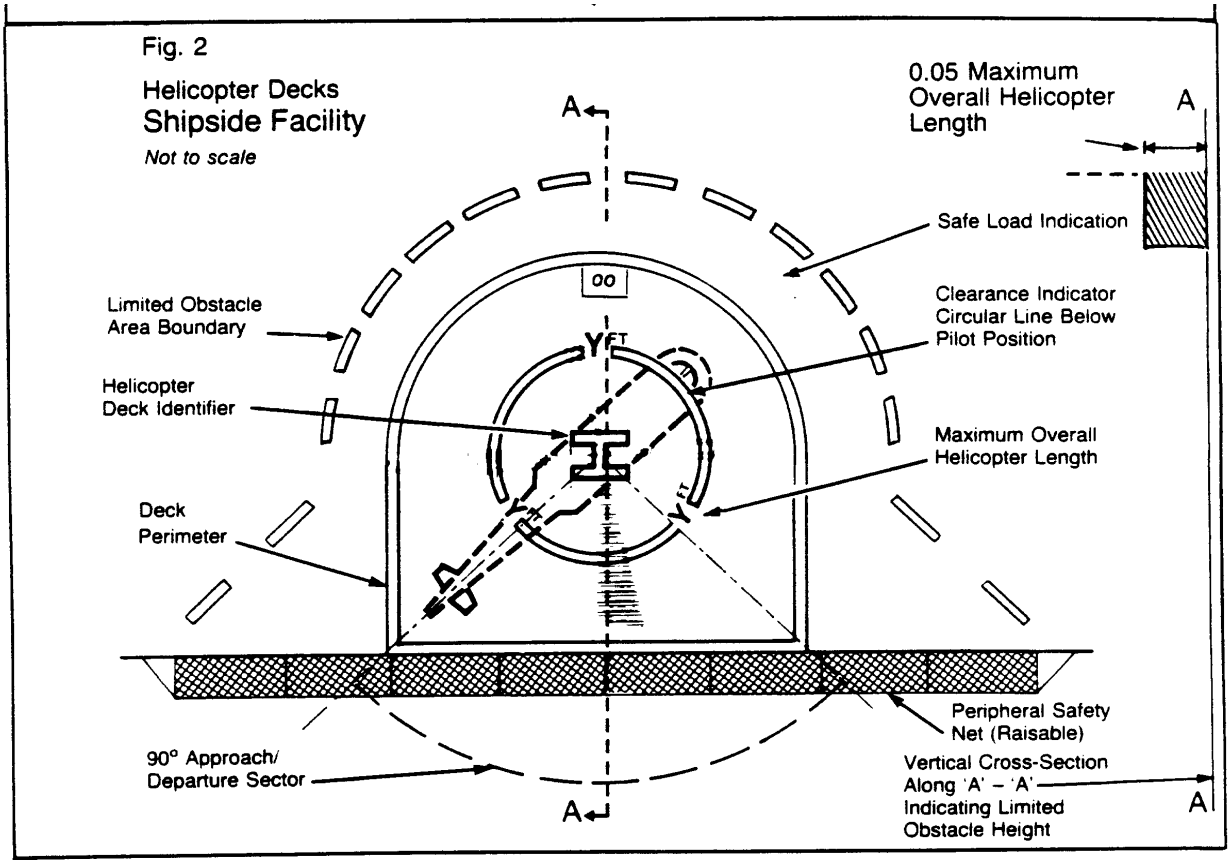
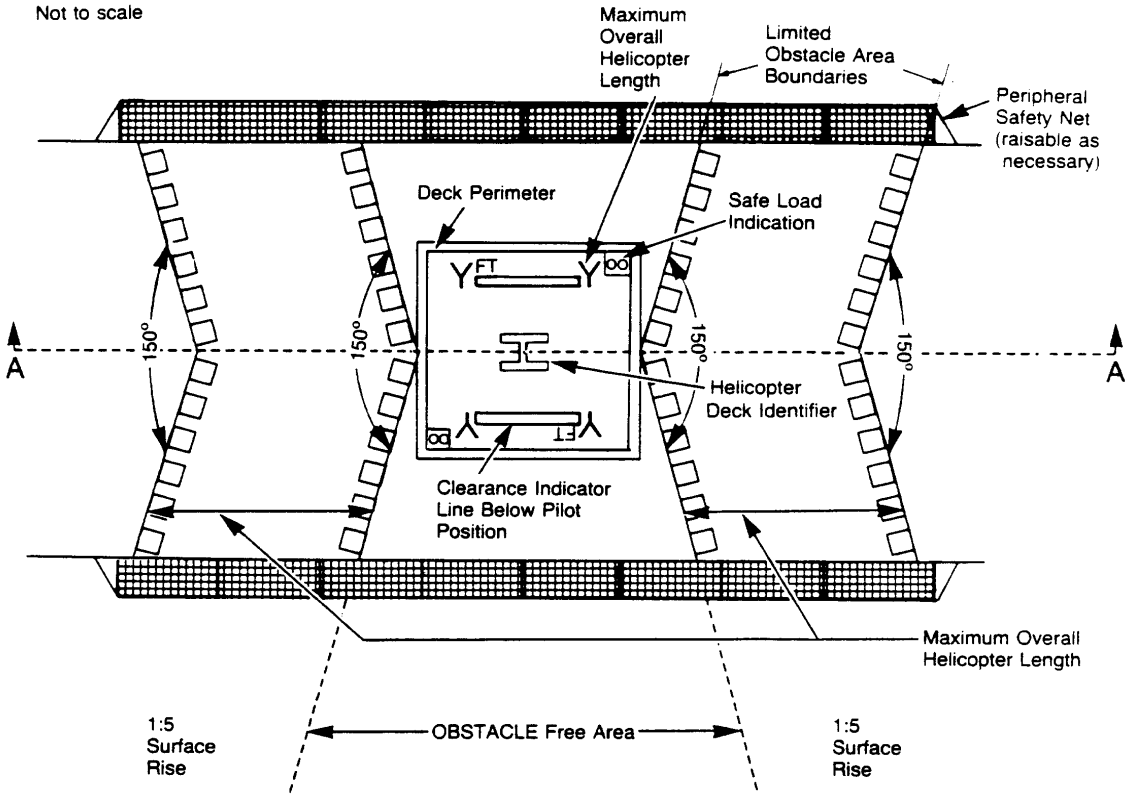


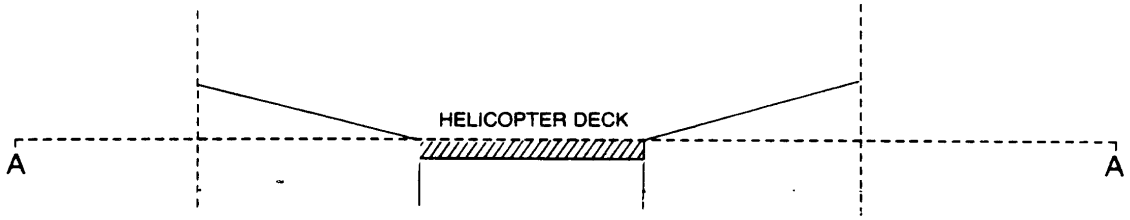
Figure 3 Helicopter Deck - Amidship Facility

Fig. 3
Helicopter Decks
Amidship Facility

Not to scale



PLAN VIEW



VERTICAL CROSS-SECTION ALONG 'A' – 'A'
INDICATING LIMITED OBSTACLE HEIGHT

Figure 4 Helicopter Deck for Ships Engaged in Oil or Gas Exploration or Production - Omnidirectional Facility

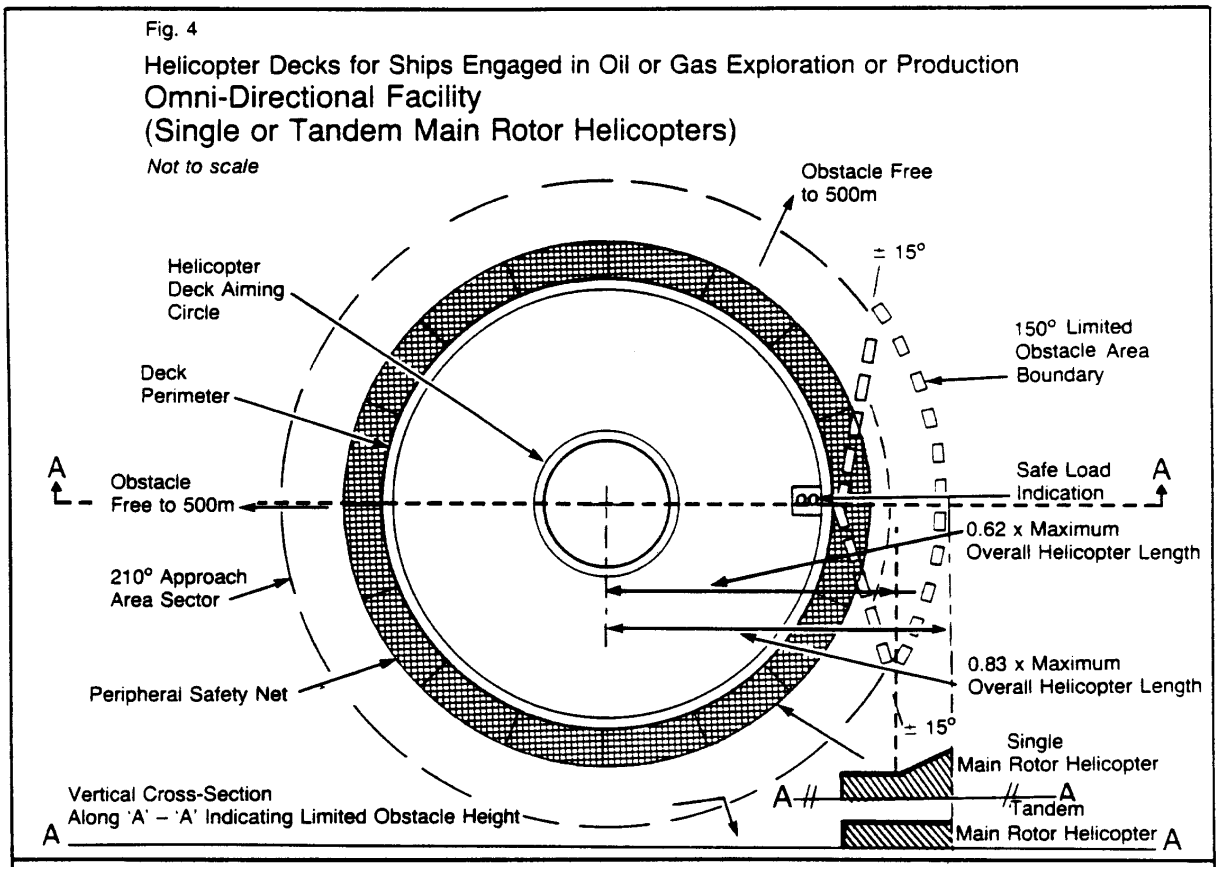


Figure 5 Helicopter Deck for Ships Engaged in Oil or Gas Exploration or Production - Bidirectional Facility

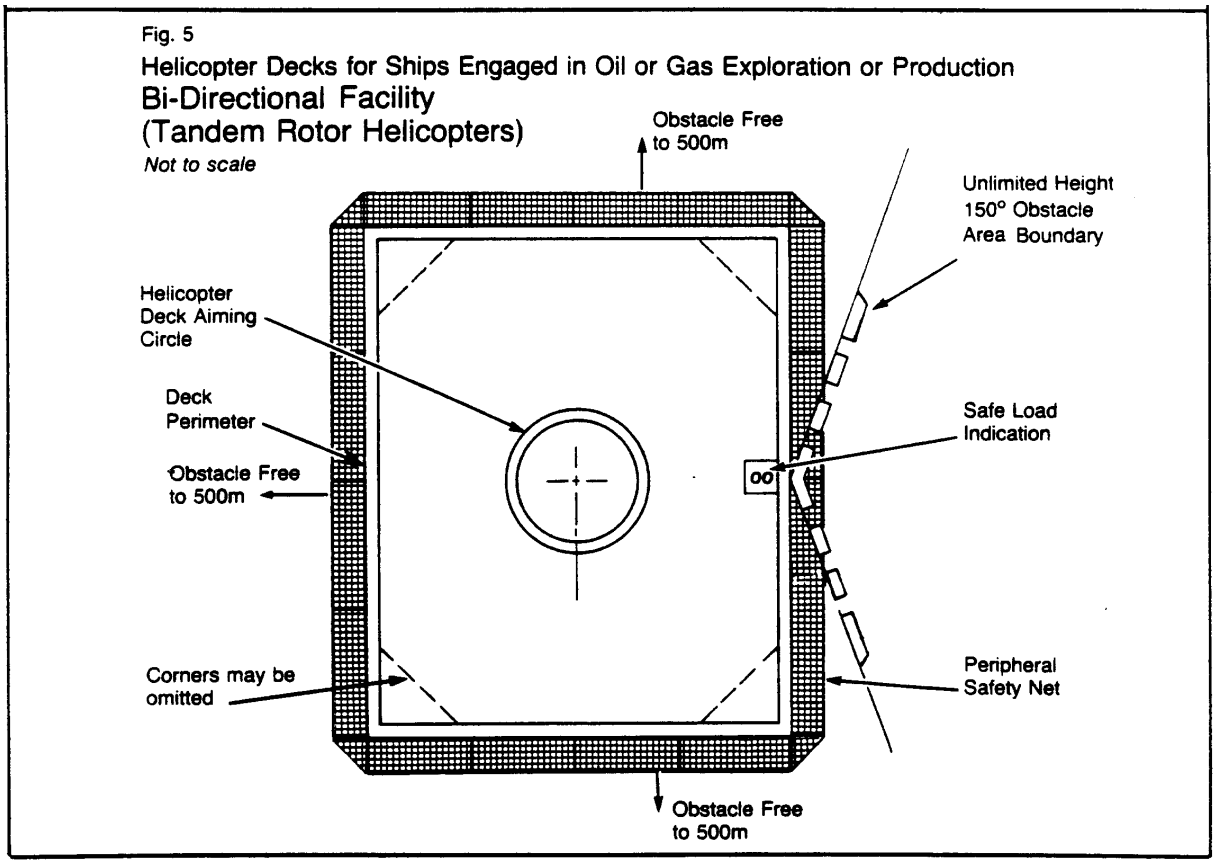


Figure 6 Helicopter Decks for Ships Engaged in Oil or Gas Exploration or Production - Structural Gradient Below Deck

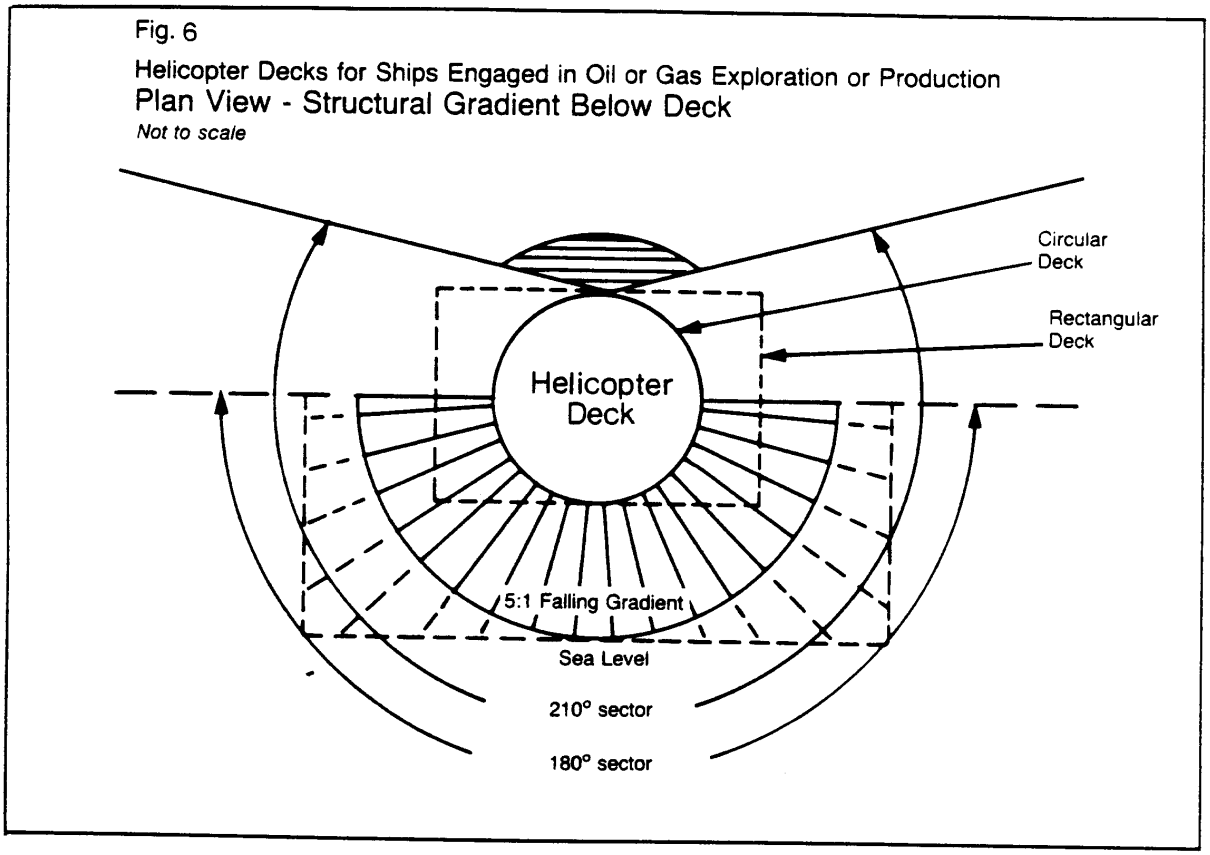
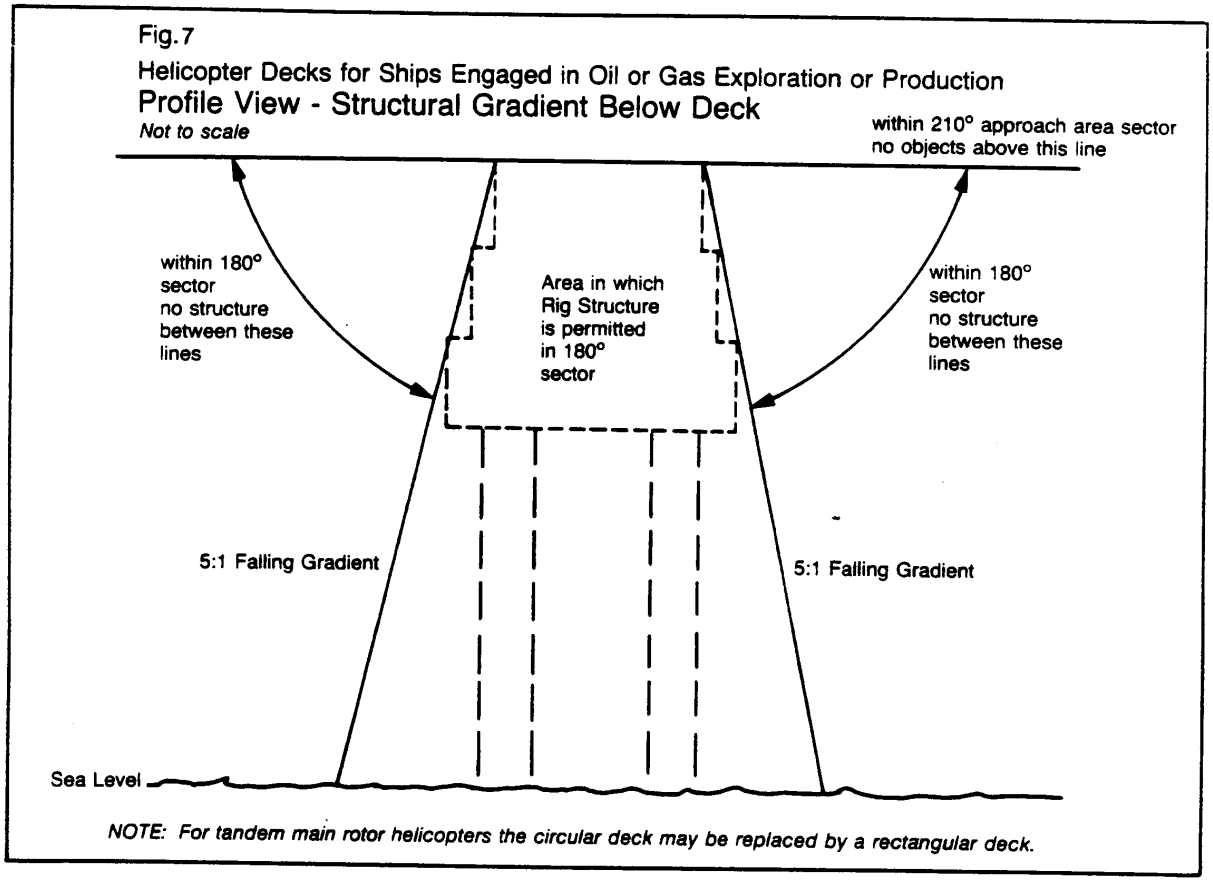


Figure 7 Helicopter Decks for ships Engaged in Oil or Gas Exploration or Production - Structural Gradient Below Deck



Winching Area

General

11 (1) All helicopter operations to and from a ship should normally involve landing on a deck; however, where operations are infrequent or the configuration of the ship precludes installation of a helicopter deck, then facilities for winching may be provided.

(2) The location of the winching area should take into account ship motion, turbulent wind conditions owing to superstructures, funnel exhaust gases and any restrictions and obstacles to approach areas.

(3) Winching operations may be carried out above cargo areas on oil tankers, chemical tankers and gas carriers, provided the ship's tanks beneath the winching area are inerted and tested to confirm that their atmospheres are below the explosive limit.

(4) Winching operations should not be carried out above cargo areas of ships in which dangerous goods are stored, as defined in the Transportation of Dangerous Goods Regulations.

Deck area

(5) A circular area of clear deck should be provided for winching operations and be:

(a) not less than 4.5 m in diameter;

(b) painted yellow with the surrounding deck painted a contrasting colour; and

(c) free of all obstacles (Fig. No.8).

(6) The clear deck area for winching operations should be located as close to the ship side as practicable.

(7) The clear deck for winching operations should have:

(a) at least two means of access located as far as practicable from one another, and

(b) a fire-retardant, non-skid surface.

Obstacle Limitations

(8) A circular limited-obstacle area for winching operations should be provided and:

(a) be not less than 30 m in diameter;

(b) need not be marked; and

(c) contain no obstacles higher than 3 m (Fig. No.8).

(9) Cargo derricks, crane booms, running rigging, radio antennae and similar movable obstacles in the helicopter approach, winching and departure areas should be lowered during helicopter operations.

Grounding Facilities

(10) Grounding facilities should be provided between the helicopter and the ship's deck for the removal and control of electrostatic accumulations; such facilities should be capable of automatic detachment without hazard to the helicopter.

Safety Notice

(11) The following notice should be prominently displayed in permanent lettering in areas adjacent to the winching-operations area:

<u>During Helicopters Operations</u>

No unauthorized persons allowed

Secure all loose objects

No naked lights - No smoking

Lighting

(12) A clear deck area for winching operations should be equipped with such floodlighting arrangements as do not interfere with the Pilot's vision.

(13) Where needed for helicopter safety, red omnidirectional lights having average illumination intensity of between 20 and 25 candelas should be mounted on obstacles close to the limited-obstacle area.

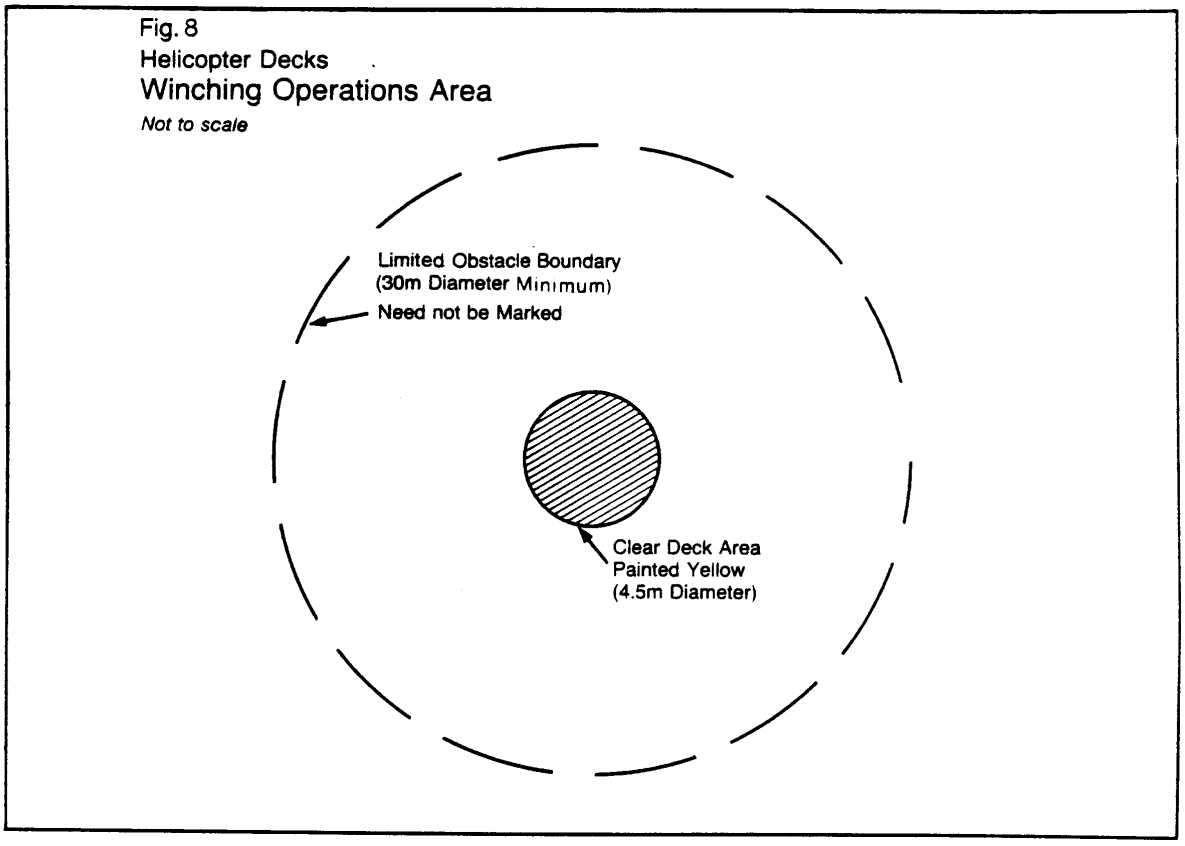
Direction Indicator

(14) A wind-direction indicator showing wind conditions over the winching operations area should be fitted in accordance with subsection 7 (1).

Communication

(15) The winching-operations area should be fitted with telephone equipment suitable for communication with the bridge.

Figure 8 Helicopter Decks Winching Operations Area



Part III

Helicopter Fuelling and Servicing Facilities

Helicopter Fuelling Systems

12 (1) (a) Permanent aviation-fuel facilities, including hull structural and permanent non-hull structural tanks, should be designed, constructed and located in accordance with approved plans:

(b) Portable aviation-fuel facilities, including portable tanks, should;

(i) be designed, constructed and located aboard a ship in accordance with approved plans,

(ii) be secured to the ship to the satisfaction of an Inspector and the Master or where no Master is carried, the Person having Command, and

(iii) meet the requirements of the Dangerous Goods Shipping Regulations covering shipping arrangements for the particular type of aviation fuel carried.

(2) Where helicopter fuelling systems are fitted aboard ship, an information manual covering all aspects of aviation fuel bunkering, storing and helicopter refuelling should be available on the ship for the use of all personnel, particularly those directly involved in the handling of the fuel and the manual should clearly state;

(a) all hazardous characteristics of, and potential problems related to, the particular fuel being used, and

(b) prevention and control arrangements for accidents such as fuel spillage and clothing soaking.

(3) In addition to periodic inspections by an Inspector in accordance with Ship Safety Branch Regulations, a ship's engineer, or other person whose responsibilities include fuel-transfer operations, and a representative of the Helicopter Operations Officer should, for fuel quality control purposes, jointly inspect and approve aviation-fuel systems whenever such systems are opened for cleaning or periodic inspection.

(4) The bunkering of aviation fuel to be stored in a ship's permanent tanks, and the resetting of valves in the system for fuel-dispensing operations, should be carried out under the direction of the ship's Chief Engineer, or other Person-in-Charge whose responsibilities include oil transfer operations.

(5) Dispensing of aviation fuel to a helicopter should be carried out under the direction of the Helicopter operations officer and approval of the fuel's suitability for use should be the responsibility of the helicopter Pilot-in-Command.

(6) Before aviation fuel is bunkered, both a ship's officer, as prescribed in subsection (4), and a Helicopter operations officer should approve the type of fuel in respect of safety and suitability for storage aboard a ship and for use in helicopters.

(7) Subject to subsection (8) aviation fuel for dispensing to a helicopter aboard a ship should have a flashpoint not less than 38°C; signs on the fuel-dispenser door and any portable tank should prominently indicate the type of fuel contained (e.g. Jet A-1).

(8) Jet B wide-cut type aviation turbine fuel may be used aboard ship in those geographical areas where, due to low ambient temperatures, helicopter operational manuals preclude the use of fuel having a flashpoint in excess of 38°C.

(9) Before a ship's officer, as prescribed in subsection (4), and a Helicopter Operations officer accept aviation fuel aboard a ship, the vendor should provide both with certificate showing:

(a) the Canadian General Standards Board specification number of the fuel, or equivalent;

(b) where possible, the approved closed-cup test flashpoint point of the fuel;

(c) the name of the vendor; and

(d) the oil producer certifying the fuel.

(10) The ship's officer, as prescribed in subsection (4), should,

(a) where fuel is received in portable tanks or drums, ensure that the containers have unbroken Oil Company seals and are readily identifiable from accompanying documentation; or,

(b) where fuel is delivered in bulk to a ship's permanent tanks, have a 4L sample taken for testing purposes or for retention until all the fuel has been consumed; the sample should be stored in a sealed clean container meeting the requirements of ASTM Std. D4306-84, "Sampling Aviation Fuel for Tests Affected by Trace Contamination" and the container clearly labelled with the information that the sample has been taken from the supplied fuel.

(11) In the design of a ship's aviation-fuel system, the following fuel characteristics should be taken into account:

(a) flashpoint;

(b) initial boiling point;

(c) kinematic viscosity, at relevant low temperatures if operations are to be in cold climatic conditions;

(d) Reid vapour pressure, particularly if it may expose the tank to explosive vapour/air mixtures;

(e) flame-spread and burning rates;

(f) electrostatic-spark discharge properties, particularly where agitation of the fuel may occur, as for example, in flow through pipes and sloshing in tanks; and

(g) purity for safe operation of helicopters.

(12) Except where otherwise prescribed in these Guidelines, aviation-fuel systems should conform to relevant sections of the Marine Machinery and Electrical Equipment Regulations, particularly those covering unfired pressure vessels, pipes, valves and similar components for fuel systems.

(13) All components, piping, tanks, cofferdams, and compartments connected with aviation-fuel systems should be light in colour; at suitable points the piping should be coded with concentric black stripes upon which, where practicable, are white arrows indicating direction of fuel flow.

(14) Material used for the containment and transfer of aviation fuel should:

(a) not affect the purity of the fuel supply to the helicopter;

(b) be steel, or an equivalent fire-resistant material, suitable for use in the marine environment; and

(c) where subjected to stress at low temperatures, be proven to be resistant to failure owing to such low temperatures.

(15) Short flexible pipe fittings should be metal-reinforced; short flexible pipe fittings, aviation-fuel hoses and fuel nozzles should be certified by a pertinent authority as suitable for aviation fuel service, with gravity type fuel nozzles being designed to shut off fuel flow when not held open by the refuelling attendant.

(16) The aviation-fuel system, including pumping arrangements, should be located clear of ignition sources and damage hazards and as far as practicable from accommodation spaces, escape routes, embarkation stations, all ventilation openings and Category A machinery spaces; piping should be left exposed to detect defects and leakage; where such exposure is impracticable, the piping should be installed within a gastight tunnel or larger pipe.

(17) Helicopter engines should be shut off before refuelling operations begin and remain so until refuelling, including removal of any spilled fuel, is complete, except where the Master and the helicopter Pilot-in-Command consider that stopping the controlled rotor motion would endanger the helicopter and the ship, as, for example, in high wind conditions.

(18) Provision should be made for preventing overpressure in any part of the fuel pumping system, with relief-valve discharges leading back to the suction sides of pumps or to suitable tanks.

(19) Provision should be made for the safe containment and later disposal of substandard fuel rejected for use in a helicopter and of fuel removed from a helicopter.

(20) Facilities should be provided for containing any fuel spillage during ship-bunkering and helicopter-refuelling operations; three bags of fuel absorbent material, each of approximately 20 kg weight and stored in moisture proof bags, should be made available adjacent to the refuelling area.

(21) Shovels, brushes and other equipment used for removing fuel-soaked absorbent material after a fuel spill should be of non-sparking material.

(22) Equipment from which fuel may leak or drip, such as pumps and filters, should be fitted with drip trays; where such equipment is located in enclosed spaces, drains should lead to an enclosed aviation fuel sump tank, which is suitably vented through a flame-screened vent pipe terminating in a safe location on the open deck at a height prescribed in Ship Safety Branch regulations for fuels with a similar flashpoint.

(23) Fuel tanks, piping and all attached components should be securely bonded together by metal contact and grounded to prevent electrostatic sparking; such bonding should include connection to the helicopter during refuelling, but, during bunkering of a ship's tanks, electrical continuity between the ship and the shore should be broken by means of an insulating flange or single length of non-conducting hose.

(24) When a funnel is used to fill a fuel tank, the funnel should be securely bonded by metal contact to the tank and the hose nozzle.

(25) Aviation-fuel systems should comply with regulations respecting the discharge overboard of harmful substances.

Aviation-Fuel Tanks

13 (1) Subject to subsection (17) aviation fuel should be stored in hull structural, permanent non-hull structural or portable tanks designed, constructed and secured in accordance with subsections 12(1) and(2).

(2) Aviation fuel tanks should be located clear of ignition sources and damage hazards and as far as practicable from accommodation spaces, escape routes, embarkation stations, ventilation openings and Category A machinery spaces;

(3) Aviation fuel in structural tanks should be protected from contamination with other fluids, including sea water, by means of a cofferdam.

(4) Aviation fuel tanks should be so constructed as to minimize agitation of the liquid surface.

(5) Every pipe that, if damaged, would allow fuel to escape from a fuel tank should be fitted on the tank with a valve capable of being closed, as follows:

(a) in the case of tanks within the ship's structure, from a remote, safe and accessible location; and

(b) in the case of tanks located on an open deck, from an easily accessible location.

(6) The open end of the fuel-tank filling pipe should be located at the lower part of the tank; where the suction pipe is separate from the filling pipe its open end should be at a height not lower than the open end of the filling pipe so that in service conditions splash filling will not occur.

(7) The open end section of a fuel-tank suction pipe on a ship subject only to low amplitudes of oscillation, such as an offshore structure, may be float-controlled within the tank with a sparkproof mechanism and means to check the correctness of the float action.

(8) Where a filling pipe enters the top of the tank, the distance between the open end of the pipe and the bottom of the tank should not be greater than "2D" and not less than "D", where "D" is the diameter of the pipe.

(9) For contaminant drainage, a drain pipe with a self closing valve, should be fitted at the lowest part of the tank and lead to an aviation-fuel sump tank.

(10) The coupling to be used for connecting the filling pipe of an aviation-fuel tank at a bunkering station to the shore-side filling hose should be so designed as to preclude inadvertent connection to pipes or hoses carrying other fluids.

(11) Tank-sounding arrangements should be spark-proof, preferably of the gastight hydraulic-pressure depth-gauge type, with an alarm set at 90% of the tank capacity and arranged to sound at the fuel-bunkering station; where a sounding pipe is used, it should be fitted with a gastight cap.

(12) Tank vents should be fitted with flame-screened pressure-vacuum relief devices located in an area free from ignition sources, contaminating dirt and water the relief devices:

(a) for portable and permanent tanks located on the open deck, may be fitted directly to the tank, and

(b) for tanks located within the ship's structure, should be located on the open deck at a height prescribed in Ship Safety Branch regulations for fuels with a similar flashpoint.

(13) Where a ship is to operate in low ambient temperatures, the flame-screened pressure-vacuum devices should be protected from coating and blockage by snow or freezing spray.

(14) Tank vent pipes should be so arranged as t-o be self-draining when the ship is upright and on an even keel and also when trimming by the stern.

(15) Subject to paragraph (16)(d), fuel-tank vent outlets should be such that:

(a) the total cross-sectional area of the outlets is not less than 1.25 x the cross-sectional area of the corresponding filling lines; and

(b) fuel spillage is conducted to safe containment or disposal locations.

(16) For those ships storing and dispensing Jet-B wide-cut type aviation turbine fuel in accordance with subsection 12(8), the following additional guidelines apply:

(a) fuel tanks should normally be located on the open deck, clear of ignition sources and damage hazards and as far as practicable from accommodation spaces, escape routes, embarkation stations, ventilation openings and Category A machinery spaces;

(b) fuel tanks, other than hull structural tanks, should be designed and constructed in accordance with requirements for a Type-1 pressure tank as prescribed in the International Maritimes Dangerous Goods Code except that permanent tanks need only have closure valves in accordance with subsection 13(5);

(c) fuel tanks to be subjected to ambient temperatures below -30°C should be designed, constructed and tested in compliance with an approved Code for operations in such temperatures;

(d) flame-screened pressure-vacuum relief devices for fuel tanks should have;

(i) flow capacities as prescribed in the International Maritimes Dangerous Goods Code or paragraph 13(15)(a) whichever is the greater, and

(ii) vent openings not less than 3 m from any ignition source

(e) Cradles and framing for portable fuel tanks should be as prescribed in the International Maritimes Dangerous Goods Code;

(f) fuel tanks located on the open deck should be installed in receptacles such that, in the event of tank failure, the total fuel content will be contained at a liquid level not less than 50 mm from the top of the receptacle wall; such receptacles may be open-topped;

(g) firefighting foam should be readily available for spraying the surface of any fuel leaked into the receptacle prescribed in paragraph (f);

(h) receptacle design should be such that:

(i) tank valves and other fittings are readily accessible for maintenance and operation; and

(ii) external tank surfaces are accessible for inspection

(i) receptacle drainage facilities should be such that they cannot be inadvertently left open;

(j) holding and disposing arrangements for contaminated or other unacceptable fuel should be secure from ignition sources, damage hazards and transference or leakage into or from other shipboard areas and

(k) hull structural fuel tanks and independent fuel tanks not intended for location on an open deck should be completely surrounded by a gastight cofferdam or located in a gastight compartment with the Board giving special consideration to the design, construction, testing and installation of such tanks, in particular;

(i) maximum safe pressure strength attainable for hull structural tanks, and the requirements of the International Maritimes Dangerous Goods Code;

(ii) location and means of access,

(iii) practicability of maintaining a safe atmosphere in the tank and associated systems,

(iv) assurance of safe fuel over-flow arrangements during bunkering; and

(v) safe venting and adequacy of capacity of the flame screened pressure-vacuum relief device, in compliance with either the International Maritimes Dangerous Goods Code or paragraph 13(15)(a) which-ever is the most stringent.

(17) For emergencies, a ship with a helicopter deck but no fuel storage facilities may store a maximum of 615 L of fuel, having a minimum flashpoint of 38°C, in portable containers; such containers should be stowed in a non-hazardous location.

Aviation-Fuel Pump Room and Tank Cofferdam or Compartment

14 (1) An aviation-fuel pump room may be located within a ship's structure or on the open deck; where the pump room is located on the open deck, it may also contain the dispensing equipment prescribed in subsection 15(1).

(2) An aviation-fuel pump room should be gastight, except for approved ventilation, with entrance through a lockable gastight door or hatch normally located on the open deck, except that for rooms in which Jet B fuel is handled the entrance should be directly from the open deck; in no case should the entrance be directly from Category A machinery spaces or accommodation spaces.

(3) A ship should have:

(a) an approved portable breathing apparatus stowed in the immediate vicinity of the fuel pump room; and

(b) (i) an approved gas detector and alarm fitted in the fuel pump room, with an indicator and alarm fitted immediately outside the space, or

(ii) an approved portable gas detector available to ascertain whether atmosphere of the fuel pump room is safe to enter.

(4) All electrical equipment, including portable items and their outlets, should be certified safe and explosion proof.

(5) Pumps and filters and other components subject to periodic opening should incorporate drainage arrangements such that fuel may be safely drained to the aviation-fuel sump tank before any such opening.

(6) All power-driven pumps located in the fuel pump room should be fitted with local controls and an emergency stop switch at a remote, safe, accessible location, preferably adjacent to the helicopter deck but not in the immediate vicinity of the fuel dispenser controls.

(7) A fuel pump room should be fitted with certified safe and explosion-proof telephone equipment suitable for communication with both the bridge and, where necessary, the helicopter deck.

(8) Pump-room ventilation should be independent of a ship's other ventilation systems, have the intake at a safe location where the risk of drawing in sparks is low and the exhaust leading from the lowest part of the pump room to a safe location on the open deck.

(9) Ventilation as prescribed in subsection (8):

(a) may, for pump rooms located on the open deck, be of natural form; and

(b) should, for pump rooms located within a ship's structure, be of the mechanical-extraction form to provide at least 20 air changes per hour, and maintain air at a lower pressure than that of adjacent spaces except where such a space is the cofferdam of the aviation-fuel tank.

(10) Pump-room drainage should be independent of a ship's bilge-pumping system, lead to the aviation-fuel sump tank and, where necessary, be fitted with an emergency overboard connection.

(11) The following warning notice should be prominently displayed in permanent lettering at the pump-room entrance:

Aviation Fuel Pump Room

No unauthorized persons allowed

No naked lights - No smoking

Check for safe atmosphere

(12) Subject to paragraph 13(16)(k) the cofferdam bulkheads for a hull structural fuel tank within a ship's structure should be gastight with access only through an opening having a bolted cover.

(13) Subject to paragraph 13(16)(k) the compartment bulkheads for an independent fuel tank within a ship's structure should be gastight with access only through a lockable self-closing gastight door or hatch normally located on the open deck; in no case should the entrance be directly from Category A machinery spaces or accommodation spaces.

(14) A fuel-tank cofferdam or compartment should normally be sufficiently large to allow easy access to all parts.

(15) For fuel tank cofferdams or compartments, ventilation of the mechanical-extraction form should be fitted to provide at least 8 air changes per hour and maintain air at a lower pressure than that of adjacent spaces except where such a space is the aviation-fuel pump room.

(16) The ventilation prescribed in subsection (15) should be independent of a ship's other ventilation systems, have the air intake at a safe location where the risk of drawing in sparks or gases is low and the outlet at a safe location on the open deck.

(17) Drainage for the fuel-tank cofferdam or compartment should be independent of a ship's bilge-pumping system, lead to the aviation-fuel sump tank and, where necessary, be fitted with an emergency overboard connection.

Safety Notice

(18) The following warning notice should be prominently displayed in permanent lettering on a fuel tank cofferdam access cover or compartment door or hatch:

Aviation Fuel Tank Cofferdam (Compartment)

No unauthorized persons allowed

No naked lights - No smoking

Check for safe atmosphere

Aviation-Fuel Dispensing System

15 (1) An aviation-fuel dispenser should be located adjacent to the helicopter deck and may be located within the pump room if the pump room is on the open deck adjacent to the helicopter deck.

(2) If separate, a fuel dispenser should be lockable and prominently display in permanent lettering a sign conveying the following warning:

Aviation Fuel Dispenser

No unauthorized operation

No naked lights - No smoking

(3) Fuel to be dispensed to a helicopter should conform to the fuel specification approved by the helicopter manufacturer and the helicopter-engine manufacturer.

(4) Before being loaded into the helicopter, fuel should be tested by an approved water-detection apparatus in the presence of the helicopter Pilot and the Pilot should certify in writing that the test results are acceptable.

(5) Necessary filtering equipment for water and solid contaminants should include “no-go” monitoring arrangements in the dispensing system to ensure that substandard fuel is not loaded into the helicopter.

(6) The officer most directly involved in helicopter fuelling operations should;

(a) retain aboard the ship a record of fuel-filter inspections and changes; and

(b) ensure that all fuel samples required for proof of fuel quality are stored in a safe location until their quality assurance purpose has been served.

(7) Where fuel in drums is retained aboard ship for emergencies, the Helicopter Operations Officer should determine its suitability for use, taking into account its “shelf-life”, and in particular, the decay of the properties of its anti-static additive.

(8) Securing arrangements for fuel drums should allow for quick release in hazardous circumstances; the drums should be grounded to prevent electrostatic sparking and such bonding should include connection to the helicopter during refuelling.

(9) A fuel-dispensing system should include the following facilities and arrangements:

(a) a clear and non-kinking lead from the dispenser to the helicopter for the portable fuelling hose;

(b) safe controls for fuelling and defuelling the helicopter;

(c) a fuel quantity meter calibrated in litres;

(d) a fuel flow indicator;

(e) a test fitting for fuel sampling;

(f) stowage for the fuelling hose and nozzle with an approved drip tray; and

(g) complete electrical bonding between the fuel-storage tank or drum and the helicopter.

Helicopter Hangar and Workshop

16 (1) A helicopter hangar should be of metal construction with two means of escape and may be either fixed or retractable.

(2) In a ship fitted with a hangar, provision should be made for reasonable local passage from one side of the ship to the other without the need to cross the helicopter deck.

(3) Retracting-hangar arrangements should include provisions, where necessary for de-icing and snow-clearing of the hangar wheel tracks.

(4) Both the entrance door for the helicopter and the retracting-hangar mechanism should be capable of being secured in both open and closed positions.

(5) Recessed facilities for helicopter tie down should be provided on the helicopter hangar deck; the strength of such facilities should be sufficient to secure the design helicopter from the effects of ship motions and, in retracting hangars, wind conditions.

(6) All permanently installed electrical equipment should be certified safe and explosion-proof, including outlets for portable items in helicopter hangars.

(7) Electrical-grounding devices for the removal and control of electrostatic accumulations in helicopters should be provided in a helicopter hangar.

(8) Portable electrical equipment not certified safe may be used in helicopter hangars only when safe atmospheric conditions exist.

(9) An onboard helicopter workshop should be of metal construction and separated from the hangar by a gastight bulkhead with a self-closing gastight door.

(9) When helicopter servicing is to be carried out and risk of fire may exist, a prominent sign in permanent lettering should convey the following warning at all entrances to the hangar:

<u>Helicopter Servicing Facility</u>

No unauthorized persons allowed

No naked lights - No smoking

Check for safe atmosphere

Part IV

Fire Protection and Personnel-Rescue Facilities

Fire Protection

Helicopter Deck -and Fuel-Dispensing Facility Area

17 (1) Subject to subsection (3), an approved foam fire-extinguishing system should be installed, sufficient to cover with foam the obstacle-free area of the helicopter deck and, as applicable, the hangar, fuel dispenser and portable helicopter-fuel tank, by means of monitors or fixed pipes with nozzles; the distance from the nozzle to the furthest extremity of the deck should not be more than 0.75 x the foam throw in still air conditions.

(2) The foam should be of either the protein type or the aqueous film-forming type and be deliverable at rates not less than 6 L and 4.1 L, respectively, of foam solution per minute for each m^2 to be covered sufficient foam should be available at these rates for a discharge period of not less than five minutes.

(3) For a ship operating in extremely cold temperatures and where there is a frost hazard, the location of the water piping to the foam system should be carefully considered; if necessary, a hose system from a protected space, such as a heated hangar, will be acceptable for foam discharge in lieu of deck monitors or fixed pipes with nozzles.

(4) At least two fire hydrants should be fitted immediately adjacent to the helicopter deck, each complete with hose and dual-purpose (spray/jet) nozzle, such that two water sprays will be able to reach any part of the deck and, as applicable, the hangar, fuel-dispenser and portable helicopter-fuel tank.

(5) The fire hydrants should be located on opposite sides of the area so that at least one hydrant and hose will be operable during a localized fire.

(6) Mobile or portable dry-chemical fire extinguishers, each having a suitable applicator and a total capacity of at least 45 kg, should be fitted immediately adjacent to the helicopter deck.

(7) Portable gas-type fire extinguishers, each having a suitable applicator and a total capacity of at least 18 kg Of $C0_2$ or its equivalent, should be fitted immediately adjacent to the helicopter deck.

(8) Where a fuel dispenser is not on the same deck as the helicopter deck, an additional portable 9 kg dry-chemical fire extinguisher or its equivalent, should be located beside the dispenser.

(9) For a ship operating in extremely low temperatures and where fire extinguishers are to be exposed to such cold conditions, the low-temperature characteristics Of CO_2 should be taken into account when this gas is considered for fire extinguishing.

Helicopter Hangar and Workshop

18 (1) Where fire-extinguishing equipment for the helicopter deck is immediately available, no additional equipment is necessary for the helicopter hangar.

(2) Where problems may exist in making all or some fire-extinguishing equipment of the helicopter deck immediately available for use in the helicopter hangar, fire-extinguishing equipment to be permanently located in the hangar should meet types and quantities specially determined by the Board.

(3) At least one portable 2 kg dry-chemical (multipurpose), fire extinguisher or its equivalent, should be located in the helicopter workshop.

Winching Area

19 (1) At least two fire hydrants should be fitted on deck immediately adjacent to the winching area, each complete with hose and dual-purpose (spray/jet) nozzle such that two water jets will be able to reach any part of the area

(2) The fire hydrants should be located on opposite sides of the area so that at least one hydrant and hose will be operable during a localised fire.

(3) During winching operations, at least two of a ship's portable 4.5 kg dry-chemical (multipurpose) fire extinguishers, or their equivalents, should be available immediately adjacent to the winching area.

Aviation Fuel Pump Room

20 (1) An aviation-fuel pump room should be provided with fixed fire protection to conform with the requirements for a cargo pump room on a tanker as prescribed in the Fire Detection and Extinguishing Equipment Regulations.

Rescue Facilities

Helicopter Deck

21 The following rescue equipment should be provided and stored adjacent to the helicopter deck:

(a)
- 1- non-wedging rescue axe
- 1- pair of bolt cutters approx. 60 cm
- 1- crow bar, approx. 105 cm
- 1- grab hook
- 1- heavy-duty metal saw, complete with spare blades
- 1- fire-resistant blanket
- 1- wire-cored rope line, approx. 15 m
- 1- pair of metal shears
- 1- portable prying-and-cutting power tool
- 1- hand shovel
- 1- vee-blade knife for seat-belt cutting
- 1- hammer and miscellaneous small hand tools
- 2- sets of approved firefighters' suits, each including coat, trousers, helmet with visor, gloves and boots
- 2- sets of approved self-contained breathing apparatus.

3- battery-powered flashlights.

(b) The equipment prescribed in paragraph (a) should be additional to any similar equipment provided for other purposes aboard a ship.

Part V

Helicopter Operations

Shipboard Procedures

Landing and Takeoff

22 1) The ship's Master or, where no Master is carried, the Person having Command, is responsible for overall safety and may stop or curtail helicopter operations at any time, for the ship's safety.

(2) The helicopter Pilot-in-Command is responsible for flight safety and may decline to take off or land, for the helicopter's safety.

(3) The Aviation Group sets standards for the design, construction, equipment, inspection and operation of helicopters, including their operations over water and in low-temperature conditions.

(4) The Aviation Group licences pilots, crews and maintenance personnel for helicopters.

(5) Radio and visual communications between a ship and a helicopter should conform to communication procedures approved by the Department of Communications or Aviation Group, as applicable, and be fully understood by both vessel and helicopter personnel.

(6) An Officer-in-Charge or, where no Deck Officer is carried, a Person-in-Charge appointed by a ship's Master or Person having Command, should locally direct firefighting and rescue operations, and be readily identifiable by wearing a distinctive and highly visible vest.

(7) Subject to subsection (1), procedures for helicopter take off from and landing upon a ship should conform to Aviation Group requirements, with particular attention being given to operations in restricted visibility or bad weather.

(8) Before authorizing takeoff and landing operations, the ship's Master or Person having Command should ascertain that:

(a) an Officer-in-Charge, or Person-in-Charge and necessary crew are standing-by on the helicopter deck;

(b) a rescue craft has been readied and is capable of immediate launching in the event that the helicopter or any person lands in the water;

(c) the shipboard aids to navigation are available for use at the request of the helicopter Pilot-in-Command

(d) all safety and firefighting equipment, including pumps, is in immediate readiness, and at least one crew member, adequately trained in firefighting operations, is dressed in a prescribed firefighter's suit;

(e) artificial lighting is satisfactory to the helicopter Pilot-in-command;

(f) full radio-telephone communications have been mutually established among the ship's bridge or command position, the helicopter and the helicopter deck; and

(g) the helicopter deck and approach area

(i) are clear of all foreign objects and debris,

(ii) have all loose objects, including personnel headgear, secured, and

(iii) have, where necessary, ship side railings lowered.

Helicopter Winching Operations

23 (1) Procedures for helicopter winching operations should include requirements prescribed in subsection 22(1) to (6) and paragraphs 22(8)(a) to (f).

(2) Winching procedures of helicopters above ships should conform to Aviation Group requirements, with particular attention given to transfer-of-personnel operations in restricted visibility or bad weather.

(3) Before winching operations commence, grounding facilities from the helicopter to the ship should be provided for the removal and control of electrostatic accumulations; such facilities should be capable of automatic detachment without hazard to the helicopter.

(4) Before authorizing winching operations, the ship's Master or Person having Command should ascertain that:

(a) the deck, overdeck and approach area

(i) are clear of all foreign objects and debris, and

(ii) have all loose objects, including personnel headgear, secured;

(b) members of the deck party are wearing hardhats;

(c) the deck party includes a competent hook handler wearing insulating gloves and footwear to protect himself against inadvertent discharge of static electricity;

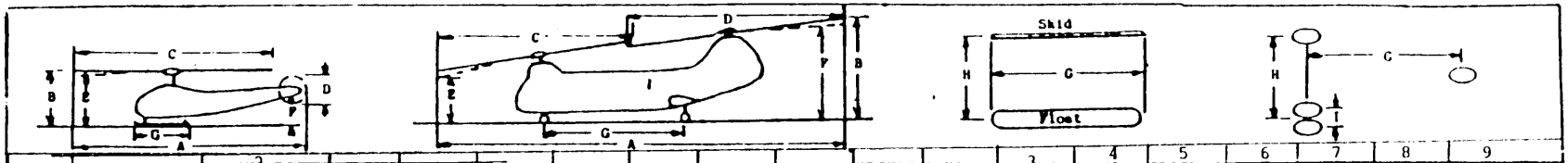
(d) for helicopter operations over oil tankers, chemical tankers and gas carriers, inerting of tanks has been carried out in accordance with subsection 11(3);

(e) all personnel to be transferred between the vessel and the helicopter have been fully briefed on winching procedures; and

(f) radio-telephone communications have been mutually established among the ship's bridge or command position, the helicopter and the deck winching area.

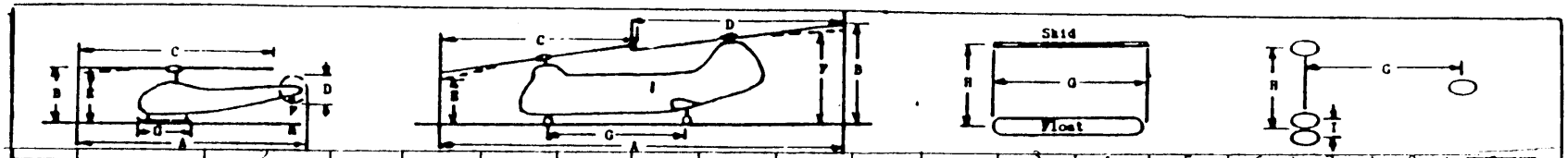
SCHEDULE “A”

HELICOPTER DIMENSIONAL DATA (METRIC)



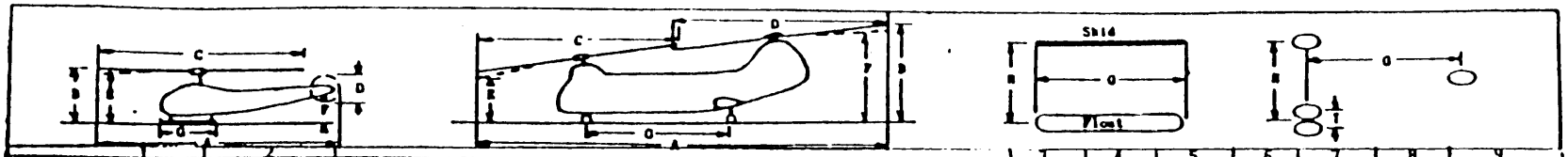
MANUFACTURER AND MODEL NO.	COMMON NAME	A (M)	B (M)	C (M)	D (M)	E (M)	F (M)	G (M)	H (M)	I (CM)	TYPE OF U/C	CONTACT AREA (CM 2)	MAX. WT. (KG)	STATIC WT. (KG)	NO TYPE ENG.	NO CREW PASS	FUEL LITRES
AEROSPATIALE																	
315-B	LAMA	12.9	3.1	11.0	1.9	:	1.0	3.3	2.4	NA	S	:	1950	975	1-TS	1 4	553
316-B	ALOUETTE	12.8	3.0	11.0	1.8	:	:	3.2	2.6	NA	T-1	:	2200	:	1-TS	1 6	573
318-C	ALOUETTE	12.1	2.7	10.2	1.9	:	:	:	2.3	NA	S	:	1656	828	1-TS	1 4	564
319-B	ALOUETTE	12.8	3.0	11.0	1.9	:	:	:	2.6	NA	T-1	:	2250	:	1-TS	1 6	575
330-G	PUMA	18.2	5.1	15.0	3.0	4.4	2.1	4.1	:	:	T-2	:	6700	:	2-TS	2 18	1551
330-J	PUMA	18.2	5.1	15.0	2.9	4.4	1.8	4.0	2.9	:	T-2	:	7400	3818	2-TS	2 17	1544
332-C	SUPER PUMA	18.7	4.6	15.6	3.05	:	:	4.5	3.0	NA	T-1	:	8350	:	2-TS	2 19	:
341-G	GAZELLE	12.0	3.2	10.5	NA	2.7	0.7	:	2.0	NA	S	:	1800	900	1-TS	1 4	454
350-B	ECUREUIL	13.0	3.0	10.7	1.86	:	0.7	2.5	2.1	NA	S	:	1950	:	1-TS	1 5	475
350-D	ASTAR	13.0	3.15	10.7	1.86	:	0.7	:	2.1	NA	S	:	1950	:	1-TS	1 5	:
355-AS	TWINSTAR	13.0	2.9	10.7	1.86	:	0.6	:	1.8	NA	S	:	2400	:	2-TS	1 5	:
360	DAUPHIN	13.4	3.5	11.5	NA	3.0	:	7.2	2.0	NA	T-4	:	2799	:	1-TS	1 9	644
365-C	DAUPHIN II	13.3	3.5	11.6	NA	:	:	7.2/3.7	1.9	NA	S/T-4	:	3400	:	2-TS	2 12	475
365-N	DAUPHIN	13.5	3.5	11.9	0.9	2.7	0.8	3.6	1.9	NA	T-3	:	4000	:	2-TS	1 6	:
(WESTLAND) AGUSTA																	
A-109 A/A II	HIRUNDO	13.1	3.3	11.0	2.0	2.1	0.68	3.5	2.3	NA	T-1	313	2600	1450	2-TS	1 7	559
AB-205	:	17.4	3.9	14.6	2.6	2.0	1.8	3.7	2.6	NA	S	:	4310	2155	1-TS	1 14	832
AB-206-B III	:	11.9	2.8	10.1	1.6	1.8	0.5	2.3	1.8	NA	S	:	1451	725	1-TS	1 4	288
AB-212	:	17.4	3.9	14.6	2.6	2.1	1.3	3.7	2.6	NA	S	:	5800	2539	2-TS	1 14	813
AB-412		17.1	3.3	14.0	2.6	:	1.3	3.7	2.6	NA	S	:	5355	2508	2-TS	1 14	821

		B'	Q-1	Q-2	T-1	T-2	T-3	T-4	T-5
:	Data not provided	—	● ●	■ ●	● ●	■ ■	■ ●	● ●	■ ●
NA	Data not available					■ ■			
TS	Turboshaft engine	—	● ●	■ ●	● ●		■ ●	● ●	■
P	Piston Engine					■ ■			
PI	Turbocharged piston engine								



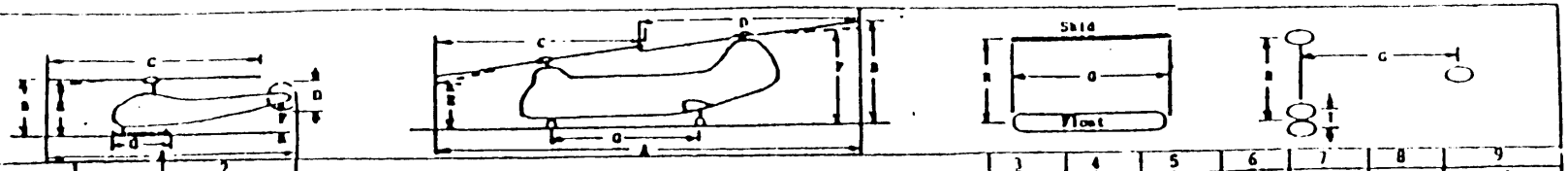
MANUFACTURER AND MODEL NO.	COMMON NAME	A (M)	B (M)	C (M)	D (M)	E (M)	F (M)	G (M)	H (M)	I (CM)	3 TYPE OF U/C	4 CONTACT AREA (CM 2)	5 MAX. WT. (KG)	6 STATIC WT. (KG)	7 NO TYPE ENG.	8 NO CREW PASS	9 FUEL LITRES
(WESTLAND) AGUSTA (Con't.)																	
AS-61N1	SILVER	22.3	5.7	18.9	3.2	2.7	2.5	7.2	4.3	33	T-5	348	9525	3876	2-TS	3 24	3484
A-129	MONGOOSE	14.29	3.3	11.9	2.24	2.57	1.41	7.03	2.04	NA	T-4	:	3700	:	2-TS	2	650
EH-101(nav.)		22.8	5.2	18.6	4.0	3.4	2.8	7.0	4.3	46	T-3	1241	13000	7500	3-TS	4 30	2857
EH-101(civ.)		22.8	5.2	18.6	4.0	3.4	2.8	7.0	4.3	46	T-3	1241	14116	7500	3-TS	3 30	2857
EH-101(util.)		22.8	5.2	18.6	4.0	3.4	2.8	7.0	4.3	46	T-3	1241	14116	7500	3-TS	3 30	2857

		S	Q-1	Q-2	T-1	T-2	T-3	T-4	T-5
- Data not provided	10								
NA Data not available	11								
TS Turboshaft engine	12								
P Piston Engine	13								
PI Turbocharged piston engine	14								



MANUFACTURER AND MODEL NO.	COMMON NAME	A (M)	B (M)	C (M)	D (M)	E (M)	F (M)	G (M)	H (M)	I (CM)	TYPE OF U/C	CONTACT AREA (CM²)	MAX. WT. (KG)	STATIC WT. (KG)	NO TYPE ENG.	NO CREW PASS	FUEL LITRES
BOEING VERTOL																	
CH-46-E	:	25.7	5.1	15.5	:	:	:	7.5	3.9	:	T2		10,569	:	2-TS	2 25	1438
CH-47-234	:	30.2	5.7	18.3	18.3	2.3	4.9	6.9	3.4	:	Q2	503	22,680	7243	2-TS	3 44	4274
107	:	24.9	5.1	14.6	:	:	:	7.5	4.2	:	T2	:	7550	:	2-TS	2 39	1438
107-11	:	25.3	5.2	15.2	15.2	3.0	5.2	7.6	3.9	32	T-2	161	10,030	3190	2-TS	3 25	1325
179	:	18.1	5.1	14.9	3.1	2.4	2.0	4.7	2.7	38	T-3	529	8482	3189	2-TS	2 19	1840
BRANTLY-HYNES																	
B2-B	:	8.5	2.1	7.2	1.3	2.1	0.9	:	1.7	NA	S	:	758	379	1-P	1 1	117
305	:	10.0	2.4	8.7	1.3	2.5	1.2	2.1	2.1	:	T-3	116	1315	438	1-P	1 4	163
ENSTROM																	
F28A/280	SHARK	11.9	2.7	7.2	1.3	2.1	0.9	:	1.7	NA	S	:	975	488	1-P	1 2	114
F28C/280C	SHARK	11.9	2.7	7.2	1.3	2.1	0.9	:	1.7	NA	S	:	998	499	1-P	1 2	15.

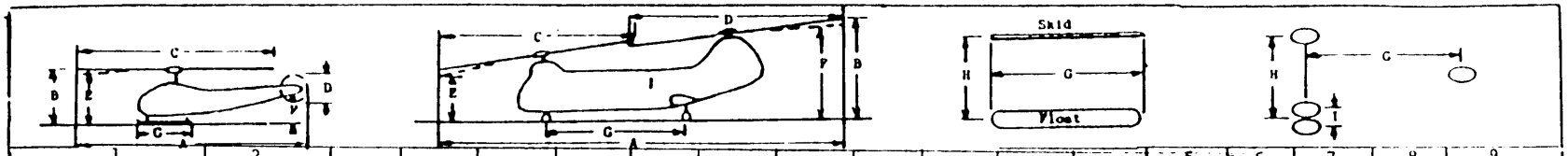
: Data not provided	10	B	Q-1	Q-2	T-1	T-2	T-3	T-4	T-5
NA Data not available	11	—	- -	■ -	- -	- ■	■ -	- -	■ -
TS Turboshaft engine	12	-				■		-	
P Piston Engine	13	—	- -	■ -	- -	- ■	- -	- -	■ -
PT Turbocharged piston engine	14								



MANUFACTURER AND MODEL NO.	COMMON NAME	A (M)	B (M)	C (M)	D (M)	E (M)	F (M)	G (M)	H (M)	I (CM)	3 TYPE OF U/C	4 CONTAC AREA (CM 2)	5 MAX. WT. (KG)	6 STATIC WT. (KG)	7 NO TYPE ENG.	8 NO CREW PASS	9 FUEL LITRES
BELL																	
47-G	:	13.2	2.8	11.2	:	:	:	2.1	:	NA	S	:	1340	:	1-P	1 2	227
47-G2	:	12.6	2.8	10.7	:	:	:	3.0	2.2	NA	S	:	1130	:	1-P	1 2	155
47G-3B-2) 47G-4A) 47G-5)	:	13.1	2.8	11.3	1.7	:	:	3.1	2.3	NA	S	:	1340	:	1-P	1 2	216
47-G-5A	:	13.3	2.8	11.6	1.8	2.9	0.9	3.0	2.3	NA	S	:	1293	646	1-P	1 2	215
47-J) 47-J2)	:	13.2	2.8	11.3	1.8	:	0.9	2.9	2.2	NA	S	:	1293	:	1-P	1 2	182
204	:	16.1	3.4	13.4	:	:	:	2.6	3.2	NA	S	:	3270	:	1-TS	1 5	625
204B	:	17.4	4.4	14.6	:	:	:	:	2.5	NA	S	:	3860	:	1-TS	1 9	625
205-A-1	:	17.4	4.4	14.7	2.6	2.1	1.8	3.7	2.7	NA	S	:	4309	2155	1-TS	1 14	513
206	JET RANGER	11.2	2.6	10.2	:	:	:	:	1.7	NA	S	:	1310	:	1-TS	1 4	288
206B	JET RANGER	11.8	2.9	10.1	1.6	1.8	0.6	2.4	1.9	NA	S	:	1452	726	1-TS	1 4	288
206L	LONG RANGER	12.9	3.6	11.3	1.6	1.9	0.6	3.0	2.3	NA	S	:	1814	907	1-TS	1 6	371
212	TWIN	17.5	4.4	14.7	2.6	2.1	1.3	3.7	2.7	NA	S	:	5080	2540	2-TS	1 14	693
214B	BIG LIFTER	18.3	4.1	15.2	2.9	2.9	1.1	3.7	2.6	NA	S	:	7258	3629	1-TS	1 15	784
214ST	:	18.9	3.8	15.8	2.9	2.1	1.8	:	2.7	NA	S	:	7936	:	2-TS	2 18	1265
222	:	14.5	3.9	12.1	2.1	:	0.9	3.6	2.7	NA	T-1	:	3470	:	2-TS	1 10	617

: Data not provided
NA Data not available
TS Turboshaft engine
P Piston Engine
PT Turbosharged piston engine

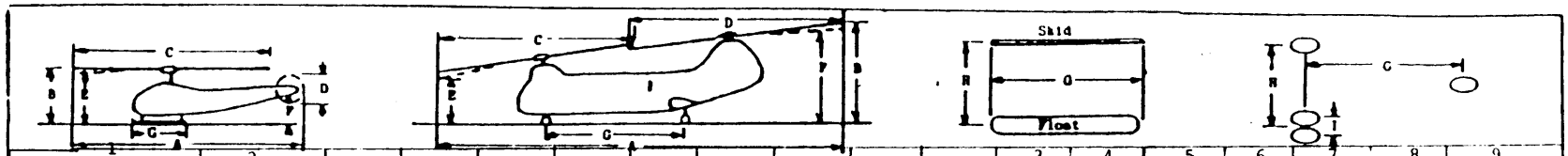
	Q-1	Q-2	T-1	T-2	T-3	T-4	T-5
B	●	■ ●	●	● ■	■ ●	● ●	■ ●
	●	■ ●	●	● ■	■ ●	●	■



1	2										3	4	5	6	7	8	9
MANUFACTURER AND MODEL NO.	COMMON NAME	A (M)	B (M)	C (M)	D (M)	E (M)	F (M)	G (M)	H (M)	I (CM)	TYPE OF U/C	CONTACT AREA (CM 2)	MAX. WT. (KG)	STATIC WT. (KG)	NO TYPE ENG.	NO CREW PASS	FUEL LITRES
HILLER																	
FH-1100	:	12.7	2.8	10.8	1.8	2.0	0.7	2.4	2.2	NA	S	:	1250	624	1-TS	1 4	257
HILLER																	
UH 12E	:	12.4	3.0	10.8	1.7	2.0	1.0	2.5	2.3	NA	S	:	1409	:	1-P	:	174
HILLER																	
UH-12-E-4	HILLER	12.4	3.0	10.6	1.7	2.0	1.0	2.5	2.3	NA	S	:	1409	1134	1-P	1 3	174
HUGHES																	
269AB	HUGHES 300	8.5	2.5	7.7	1.2	2.0	0.8	2.5	2.0	NA	S	:	768	379	1-P	1 2	114
269C	HUGHES 300C	9.4	2.7	8.2	1.3	2.1	0.8	2.5	2.0	NA	S	:	930	465	1-P	1 2	114
369HS(STD)	HUGHES 500C	9.2	2.5	8.0	1.3	2.1	0.7	2.5	2.1	NA	S	:	1158	579	1-TS	1 4	242
369HS(EXT)	HUGHES 500C	9.2	2.5	8.0	1.3	2.1	0.7	2.5	2.2	NA	S	:	1158	:	1-TS	1 4	242
369D	HUGHES 500D	9.3	2.7	8.1	1.4	2.1	0.8	2.2	2.1	NA	S	:	1362	686	1-TS	1 4	242
500	EXEC	9.2	2.5	8.0	:	:	:	:	1.8	NA	S	:	1155	:	1-TS	2 3	242

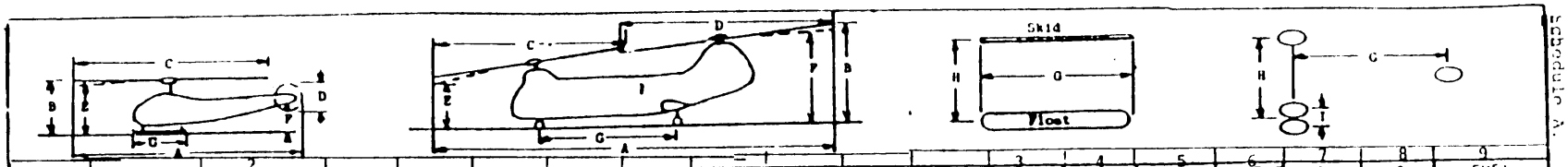
		10
.	Data not provided	
NA	Data not available	11
TS	Turboshaft engine	12
P	Piston Engine	13
PT	Turbocharged piston engine	14

B	Q-1	Q-2	T-1	T-2	T-3	T-4	T-5
—	• •	• •	• •	• •	• •	• •	• •
—	• •	• •	• •	• •	• •	• •	• •



1	2										3	4	5	6	7	8	9
MANUFACTURER AND MODEL NO.	COMMON NAME	A (M)	B (M)	C (M)	D (M)	E (M)	F (M)	G (M)	H (M)	I (CM)	TYPE OF U/C	CONTAC AREA (CM 2)	MAX. WT. (KG.)	STATIC WT. (KG.)	NO TYPE ENG.	NO CREW PASS	FUEL LITRES
MESSERSCHMITT BOLKOW																	
BO-105 LS.A2	:	11.9	3.0	9.8	1.9	:	:	2.7	2.5	NA	S	:	2400	:	2-TS	2 5	570
BO-105CB	:	11.9	3.0	9.8	1.9	:	:	2.7	2.5	NA	S	:	2500	:	2-TS	2 5	580
BO-105CBS																	
BO-117	:	13.0	3.8	11.0	1.9	:	1.9	3.2	2.5	NA	S	:	3100	:	2-TS	1 7	598
BK-117																	
ROTORWAY	SCORPION 100	8.4	2.2	7.3	1.1	2.0	0.9	2.5	1.6	NA	S	:	544	272	1-P	1 1	98

	10		S	Q-1	Q-2	T-1	T-2	T-3	T-4	T-5
- Data not provided	11									
NA Data not available	12									
TS Turboshaft engine	13									
P Piston Engine	14									
PI Turbosharged piston engine										



1 MANUFACTURER AND MODEL NO.	2 COMMON NAME	A (M)	B (M)	C (M)	D (M)	E (M)	F (M)	G (M)	H (M)	I (CM)	3 TYPE OF U/C	4 CONTACT AREA (CM 2)	5 MAX. WT. (KG.)	6 STATIC WT. (KG.)	7 NO TYPE ENG.	8 NO CREW PASS	9 FUEL LITRES
SIKORSKY																	
S-55	:	19.0	4.6	16.1	:	:	:	3.2	3.4	NA	Q1	:	3260		1-P	2 10	700
S-55A	:	18.9	4.6	16.1	:	:	:	3.2	3.4	NA	Q1	:	3400		1-P	2 10	700
S-55-T	:	19.0	4.7	16.2	2.3	2.5	2.0	3.2	3.4	NA	Q-1	258	3265		1-TS	2 10	703
S-58-T	:	20.0	4.9	17.1	2.9	3.5	2.0	8.6	4.3	NA	T-4	:	5897		2-TS	2 16	1071
S-61	:	22.1	5.1	18.9	3.1	2.7	2.6	7.1	3.9	33	T-5	:	8630		2-TS	2 25	1552
S-61-NL	:	22.3	5.7	18.9	3.2	3.7	2.5	7.2	4.3	33	T-5	348	8630		2-TS	3 28	1552
S-61-R	:	22.2	5.5	18.9	3.1	2.7	2.6	5.2	3.9	33	T-5	:	10000		2-TS	2 39	2559
S-64	SKYCRANE	27.0	7.7	22.0	4.9	4.0	2.8	7.4	6.0	NA	T-1	:	19050		2-TS	3 1	3331
S-65-C	:	26.9	7.6	22.0	4.9	3.1	2.7	8.2	4.0	43	T-2	496	19050		2-TS	3 44	2385
S-70-C	:	19.8	3.75	16.4	3.4	2.35	2.0	8.8	2.7	NA	T-4	471	9299		2-TS	2 20	1753
S-76A	:	17.5	4.4	13.4	2.4	1.8	2.0	5.0	2.4	NA	T-1	136	4763		2-TS	2 12	1063
S-76B	:	17.5	4.4	13.4	2.4	1.8	2.0	5.0	2.4	NA	T-1	135	5171		2-TS	2 12	1063

		10	9	Q-1	Q-2	T-1	T-2	T-3	T-4	T-5
	Data not provided	11								
NA	Data not available	12								
TS	Turboshaft engine	13								
P	Piston Engine	14								
PT	Turbocharged piston engine									