074 – Norwegian Oil and Gas recommended guidelines – helideck manual

Translated version

FOREWORD

These guidelines are recommended by the Norwegian Oil and Gas Aviation Forum and Operations Committee. They also approved by the director general.

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These guidelines have been prepared in cooperation with the helicopter operators on the Norwegian continental shelf – Bristow Norway AS and CHC Helikopter Service AS – and are owned by the Norwegian Oil and Gas Association.

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1 INTRODUCTION

1.1 Purpose

The purpose of these guidelines is to ensure uniform practice for work, landing and takeoff operations on the helicopter deck (helideck).

They specify responsibilities on the helideck as well as requirements for helideck crew and equipment.

The guidelines cover fixed and mobile facilities as well as offshore service vessels used in petroleum operations on the Norwegian continental shelf (NCS).

1.2 Responsibilities

The operator companies and vessel owners are responsible for establishing management systems to ensure that these guidelines are observed.

Responsibility for ensuring that the facility's helideck and refuelling plant satisfy current requirements rests with the operator of the facility

In addition, the operator companies and vessel owners are responsible for the facility's helicopter activities, such as the helideck crew, radio operator/communication officer, and radio and navigational equipment.

1.3 Definitions and abbreviations

- HLO – helicopter landing officer
- Manifest – official document which specifies the names of the passengers, their employers, the weight of the passengers and their baggage, the weight of cargo and the destination.
- NCS – Norwegian continental shelf
- Night conditions – when the sun is more than six degrees below the horizon.
- Safedeck – designed with surface drainage which prevents accumulation of fuel by allowing it to drain away, and thereby prevents it maintaining a possible fire in the enclosed piping system beneath the deck.

1.4 References

Chapter XIII, sections 73-77 of the activities regulations on emergency preparedness.

Section 70 of the facilities regulations.

Norwegian Civil Aviation Authority (CAA-N), regulations for civil aviation
- BSL D 1-7 Regulations on carriage of cargo in aircraft
- BSL D 5-1 Regulations on offshore operations to and from helidecks on vessels and on offshore installations (FOR-2007-10-26-1181)
- BSL A 1-3 Regulations on reporting obligations in case of aviation accidents and aviation incidents etc.

Norwegian Maritime Authority (NMA)
Regulations on helicopter decks on mobile offshore units, FOR-2008-01-15-72 ICAO-TI restricted articles list.

European Aviation Safety Agency (Easa) OPS commercial air transportation (helicopters).

Norwegian Oil and Gas 002 recommended guidelines for safety and emergency response training, which prescribes training requirements for helideck personnel.

2 HELIDECK MANUAL

These guidelines specify responsibilities on the helideck as well as requirements for helideck crew and equipment to ensure that operations there are conducted in a safe and secure manner.

The helideck manual is intended to help achieve safe conduct of helideck operations on the NCS by ensuring uniform standards and behaviour.

2.1 Approval of mobile and fixed facilities

Before being used on the NCS, the facility's helideck and refuelling plant must be approved by the relevant government regulators and the helicopter company concerned. The relevant regulators for fixed facilities are the Petroleum Safety Authority Norway (PSA) and the CAA-N. Where mobile units are concerned, they are the flag state or alternatively the Norwegian Maritime Authority (NMA) assisted by the CAA-N. See chapter 3 of the helideck manual.

2.2 Inspection and supervision

The operator companies and vessel owners are responsible for ensuring that maintenance as well as routine inspection of the helideck and refuelling plant are carried out.

The helicopter company conducts periodic inspections. The PSA, with technical support from the CAA-N, conducts supervision of the operator's system/facility on its own initiative.

2.3 Maintenance programme

A maintenance programme for the helideck with equipment and refuelling plant must be established and implemented.

3 HELIDECK CREW – TRAINING AND DUTIES

3.1 Training of helideck crew

Helideck crew must have received the training prescribed in Norwegian Oil and Gas 02 recommended guidelines for safety and emergency response training.

Training provided pursuant to these guidelines must be viewed in relation to the training and drills conducted by the operator or employer. The detailed requirements for implementing the training and drills build on section 23 of the activity regulations.

Training materials for helideck personnel are available on the Norwegian Oil and Gas website.

3.2 Experience

The table below presents the courses and work experience required to qualify as trainee, heliguard, fireguard and HLO.

Role	Courses required	Experience required	Comments
Heliguard/ fireguard	Valid HLO basic or refresher course (see guideline 002)	Must have participated in at least 20 helicopter landings and takeoffs under the guidance of an experienced HLO before becoming fully qualified for independent duty.	Personnel with such training but who have not served in these posts over the past two years must be given a practical review of the relevant helideck and refuelling plant under the guidance of an experienced HLO.
HLO	Valid HLO basic or refresher course (see guideline 002)	Served regularly as a qualified heliguard/ fireguard for at least one year.	Personnel with such training but who have not served in these posts over the past two years must be given a practical review of the relevant helideck and refuelling plant under the guidance of an experienced HLO.
Trainee	Valid HLO basic or refresher course (see guideline 002)	No requirement.	On certain facilities and vessels involved in petroleum operations, both the number of crew on board and the frequency of helicopter landings and takeoffs will be so low that it would be impossible in practice to achieve a sufficient number of landings/takeoffs over a reasonable period (one year) to qualify a complete helideck crew. Where such facilities/conditions are concerned, it will be acceptable that the third member of the helideck crew serves as a trainee – providing the person concerned, after completing an HLO course, takes a one-day practical course in landing/takeoff at a heliport under professional guidance.

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3.3 Physical suitability

Helideck crew must be able to respond immediately to a possible helicopter accident until dedicated response personnel are in place. Responsibility for seeing to it that helideck crew are physically and mentally suited for this role rests with the operator company. Members of the helideck crew must have documented knowledge of using smoke diving equipment.

3.4 Special responsibilities and duties of the HLO

The HLO is responsible for day-to-day leadership of work on the helideck during helicopter arrivals/departures, and for keeping the offshore installation manager (OIM) informed in writing at regular intervals about the status of the helideck as well as its equipment and services. That includes insuring that:

- necessary measures are taken to prevent unauthorised people being on the helideck before takeoffs/landings
- the deck is kept clear of loose objects, snow and ice, flammable substances, etc
- necessary personnel are in place and in readiness
- the helideck crew is briefed on special conditions ahead of a helicopter arrival, particularly those involving unfamiliar helicopter types or special operations
- all equipment and instruments are in place and in full working order
- all crane operations in the vicinity of the landing area have ceased and the cranes are correctly positioned in relation to the unobstructed approach and departure sectors
- the passengers are kept in the safe zone during landing/takeoff and are given guidance during disembarkation and boarding – see appendix C on helicopter danger zones, which describes the safe zone for the various helicopter types
- the passengers have put their survival suits on correctly
- the passengers have fastened their safety belts.

Before landing, the HLO will maintain contact with the helicopter pilot and inform them whether the deck is cleared for landing. See appendix E on phraseology.

The HLO must report all nonconformities on the helideck immediately to their immediate superior/the OIM, and ensure that the helicopter operator is informed of the position. They are responsible for handover to the next shift.

The HLO must position themselves so that they can observe landing/takeoff as well as possible and closely monitor these operations. They must immediately inform the pilot by radio or visual signals if any abnormal conditions are noted. The threshold for radio use should be low and without requirements for possible phraseology or language. All the same, warnings should primarily be given in English if this can be done without loss of time.

3.5 Clothing and personal protective equipment for helideck crew

Every individual forming part of the helideck crew during takeoff and landing must have direct access to a set of gear which conforms with the following European norms (EN).

EN 469	Protective clothing for firefighting
EN 659	Protective gloves for firefighting
EN 443	Helmets for firefighting
EN 15090	Boots for firemen (alternatively EN 354 or EN 345)
EN 14116	Balaclava helmet (alternatively EN 11612 or EN 533)
EN 137	Smoke diving equipment (minimum of two (2) sets for distribution)

When this gear is not in use, it must be stored in a dedicated locker, ready to be donned rapidly, in the immediate vicinity of the helideck.

This locker must be coloured red and labelled: “Brannbeskyttelse” and “Fire protection”.

In addition to the necessary number of fire protection sets, the locket must contain:

- at least two lifelines with a minimum length of 30 metres
- two sets of fire blankets.

The helideck crew member stationed by the foam monitor must wear all the fire protection gear listed above with the exception of the smoke diving equipment.

Fire protection gear must be worn by all members of the helideck crew during takeoff and landing when a possible hazard is considered likely to arise.

Coveralls to be worn while working on the helideck must meet the fire safety requirements specified by EN 11612 (alternatively EN 531).

The HLO must be labelled front and back with the letters ”HLO” or by an armband so that they can readily be identified by the helicopter crew.

3.6 Staffing the helideck

The helideck must be staffed by at least three people:

- **HLO**
- **heliguard**
- **fireguard.**

The HLO is the superior of the heliguard and fireguard.

The fireguard operates the fire extinguishing equipment on the helideck and works with the heliguard during unloading and loading of the helicopter’s passengers and cargo.

The heliguard is responsible for unloading and loading of the helicopter’s passengers and cargo and also supports the fireguard and HLO during emergencies.

These personnel are collectively termed the helideck crew.

During takeoff/landing, at least one person, wearing fire protection clothing as specified in section 2.11, must be posted by the remote-control unit for the helideck’s fire extinguishing system/foam monitor or by the most appropriate foam monitor on the helideck given the prevailing weather conditions.

During refuelling with the engine running, the helideck crew must comprise (see also section 6.11 and appendix K):

- **operator of the refuelling plant**
- **operator of the pistol grip nozzle**
- **fireguard.**

The HLO can be one of these three. The fireguard must be clothed as described for take-off and landing.

When required, extra personnel without a training course and/or experience can serve on the helideck. They must be briefed by the HLO and supervised by a member of the helideck crew during helicopter operations.

3.7 Helideck report

- Not later than one hour before the helicopter is due to depart from land, the facility must provide the helicopter operator with updated information on helideck status and flying conditions.
- This must be provided on the dedicated helideck report form – Norwegian Oil and Gas version 2
- The report is valid for up to six hours if the information does not change.
- The helideck report must be sent as an e-mail attachment in PDF format.
- The following must be entered in the e-mail's subject field:
  <name of facility, "helideck report" date, flight number>
  No other text must be inserted in this field.
- The flight number is only included if the fields for logistical date in the report have also been completed.
  Examples:
  "Troll A, helideck report 13.08.10"
  or "Åsgard B, helideck report 13.08.10, HKS477"

NB! For facilities with a moving helideck:

- the HLO/radio operator must be able to verify that the helicopter monitoring system (HMS) conforms with the applicable version specified in appendix L
- a screen dump of the HMS image must be submitted together with the helideck report
- the HLO/radio operator must know where data from the motion reference unit (MRU) can be read off (values for helideck motion must only be entered if the HMS is out of operation (read off directly from the MRU)).

The completed form is mailed to the relevant helicopter operation using the following e-mail addresses.

- **Bristow Norway:** helideck.norway@bristowgroup.com
- **CHC Helikopter Service**: helideck@chcheli.com

These addresses are used only for submitting helideck reports, and no response will be given to other queries.

HELIDECK REPORT					**Facility:**
					E-mail:
					Tel:
Date:		Time (UTC):			Position:
Dynamic positioning:	**YES**	**NO**			NDB: kHz
Accurate monitoring equipment:	**YES**	**NO**			VHF: mHz
LOG INFO					
Flight number:		Helifuel available: **YES** **NO**			Fuel quantity: Litres
Return load: Passengers					Baggage (incl in total): kg
Total weight: kg					Cargo (incl in total): kg
Routing:	1	2	3	4	
The helideck has been inspected in accordance with the Norwegian Oil and Gas helideck manual. Nonconformities will appear under Remarks. Remarks:					
					_____ NAME OF HLO

WEATHER OBSERVATIONS					
WIND	Height:	Distance:	Direction	Velocity:	Gusting (2 min):
Helideck:	m	m		kn	kn
Area (derrick):	m	m		kn	kn
Visibility: m			QNH: hPa	Helideck heading:	Vessel heading:
Temperature: °C		Dewpoint:	Clouds (few/sct/bcn/ovc in feet)		
Other relevant weather info (fog banks, rapid changes, etc):					
Sea spray observed over helideck: **Yes** **No**					

HELIDECK MOVEMENT 20 MIN INTERVAL				FACILITY CATEGORY:
MIX PITCH AND ROLL IN DEG WITH REF TO HORIZON				Max heave (top to bottom): m
Pitch up	Pitch down	Roll port	Roll starboard	Heave period (if available): sec
Max helideck inclination:				Significant heave rate (if available) m/s

3.7.1 Filling in the form

The form is self-explanatory, but additional information will pop up when the cursor is placed over a writable field. Further explanation on individual items is provided below.

Dynamic positioning
Check YES or NO to indicate if the vessel is dynamically positioned (DP).
If the DP system is active: YES.
If DP is inactive, moored, anchored, free-floating with or without steerage way, or fixed installation: NO.

Accurate monitoring equipment (HMS)
Check YES or NO to indicate whether the facility/vessel has an operational HMS.
If the helideck moves (ie, not a fixed/tension-leg platform) and the HMS is operative: YES.
If the HMS is not operational or the helideck is fixed (ie, a fixed/tension-leg platform): NO.

Log info
Logistical data must be entered unless local procedures mean they are reported differently.

Logistical data should be entered as fully as possible, even if the return load is not entirely clear when the form is submitted, in order to give the pilot the best possible basis for planning the flight. The information will then be updated on arrival.

Should several destinations be involved, proposed routes should be entered in the ROUTING fields along with passenger exchange (pax on/off), ie **1: XXA -8 /+9, 2: XXB -9 /+11.**

NB: Updated information on relevant weather conditions, helideck motion and log info (ie, return load) for the facility must be provided to the helicopter on initial radio contact. See also appendix I on radio communication.

Helideck nonconformities
All nonconformities on the helideck and with helideck operations must always be entered on the form.

Examples: vessels within the 500-metre zone, equipment nonconformities, temporary objects on the obstacle-free zone, nonconformities from standard helideck procedures, gas flaring, other information which could be considered significant for the pilots.

Weather observations
All weather information fields must be completed, but with some exceptions dictated by local procedures.

- If the facility is covered by the helicopter flight information service (HFIS), QNH and cloud base can be left out.
- If the facility is covered by a local Metar service, “see Metar” can be entered in the cloud base field.

Wind
Wind direction must be reported in degrees relative to magnetic north and wind speed in knots. Anemometer positions are specified as the height and distance in metres relative to the edge of the helideck.

Other relevant information
Enter other relevant information on weather conditions, such as fog banks, variable winds, rain or snow, thunder/lightning, varying visibility in different directions and so forth.

Sea spray observed over the helideck
Check YES or NO to indicate whether sea spray has been observed over the helideck in the prevailing weather conditions.

HELIDECK MOVEMENT
Max pitch UP/DOWN with reference to the horizon
The largest pitch movement up/down over the past 20 minutes measured in degrees with reference to the horizon.
Max roll starboard/port with reference to the horizon
The largest roll movement starboard/port over the past 20 minutes measured in degrees with reference to the horizon.
Max helideck inclination
The largest measured helideck inclination over the past 20 minutes measured in degrees with reference to the horizon.
Max heave (top to bottom)
Maximum heave (total vertical movement) of the helideck is the maximum top-to-bottom value in one cycle (one movement curve) over the past 20 minutes.
Heave period
The time in seconds between the tops of two waves. If measuring equipment is not available, the pilots will use a standard heave period of 10 seconds for manual calculation of the average heave rate.
Significant heave rate
Vertical movement of the helideck in metres per second.

3.8 Helideck monitoring system (HMS)

Moving helideck
The helicopter companies and the CAA-N require facilities and vessels with movable decks to carry equipment able to measure pitch, roll, inclination and heave rate at the helideck.
The definition of a moving helideck in this context is one installed on floating units such as ships, production floaters, mobile rigs, jack-ups which float/are moved and other helidecks which move. They are defined as mobile if pitch and roll exceed one degree from the horizontal plane to either side and if vertical movement exceeds two metres.
Measuring equipment for moving decks (HMS)
The helicopter companies have developed a standard which specifies the minimum requirements for the necessary measuring equipment in order to make helicopter flights to/from a moving helideck.

See appendix L: Standard helideck monitoring system.

3.9 Reporting incidents

Reporting ground incidents on the helideck
Pursuant to the CAA-N's reporting requirements, all relevant incidents on a helideck must be reported to it within 72 hours.

The form in the Norwegian Oil and Gas helideck manual (appendix M) describes types of reportable incidents, and must also be used for possible internal reporting.

The forms must be filled out as quickly as possible and sent to the operations centre for the helicopter company concerned. The company will enter the report in its reporting system and then forward it to the CAA-N.

4 HELIDECK AND EQUIPMENT

This section is informative in character and describes:

- the helideck in general
- equipment components and guidelines on helicopter safety in the regulations.

The CAA-N sets minimum standards for helidecks, equipment and personnel. These can be found in BSL D 5-1. The following sections primarily present extracts of key provisions in this BSL.

4.1 The helideck in general

4.1.1 Obstacles in the departure and approach sectors

No obstacles rising above the level of the helideck are permitted on or in the immediate vicinity of the deck in the 210° departure and approach sectors.

Exceptions are:

- the safety curb
- perimeter lighting and floodlights rising no more than 25 centimetres above the level of the helideck
- outer edge of the safety net
- individual obstacles necessary for deck operation (stairway railings, foam monitors) rising no more than 25 centimetres above the level of the helideck.

4.1.2 Friction

The helideck must have a non-skid surface which prevents the helicopter sliding.

With a rope net in place, the helideck must have a friction coefficient of at least 0.40 or higher, even when the deck is damp or wet.

Without a rope net, the friction coefficient must be at least 0.65. See sub-section 4.1.3 below.

4.1.3 Rope net

The helideck must be equipped with a rope net. Its size will be determined by the largest helicopter used.

This rope net is normally dimensioned for a large helicopter, with a minimum size of 15 by 15 metres. The net mesh must be sized to avoid snagging the helicopter's undercarriage.

The rope net must be fastened every 1.5 metres. To ensure that it is kept sufficiently taut, at least 50 per cent of the attachment points must have a tightening mechanism. The net must be so taut that it cannot be lifted more than 25 centimetres from the underlying surface.

The guy lines attaching the rope net must be included in the daily check of the helideck before helicopter operations.

A rope net is not required on facilities where the helideck surface comprises individual profiles with special friction arrangements (safedeck).

The rope net requirement can be waived on a non-moving helideck if it is suitably designed and if a system is in place to prevent helicopter skidding and to ensure a friction coefficient of at least 0.65. This waiver does not apply if snow and ice are present on the helideck.

4.1.4 Visual aids

These cover windsocks, markings and illumination of the helideck.

4.1.5 Windsock

This must be

- easily visible
- installed in a location subject to minimum turbulence from surrounding structures
- single (orange) or dual coloured: orange/white, red/white or black/white
- conically shaped and sufficiently large (standard size: inner diameter 60 centimetres, outer diameter 30 centimetres, length 2.4 metres)
- illuminated for night flying.

4.1.6 Identification

The helideck must be marked with the name of the facility, clearly visible from all approaches above the level of the helideck.

4.1.7 Lighting

Helidecks to be used for night flying and/or in conditions of reduced visibility must meet the following requirements.

- Have satisfactorily shielded floodlighting to prevent pilots being blinding in the approach and landing phase. The floodlights are used at the pilot's request.
- Be marked with perimeter lighting comprising green lights equally spaced at intervals not exceeding three metres.
- Perimeter lighting must not be visible below the level of the helideck. Lights must not rise more than 25 centimetres above the deck level. Floodlighting and perimeter lighting must be connected to the facility's emergency power supply and switchover time in the event of a failure of mains power must not exceed 10 seconds.
- The highest point on the derrick, crane booms/cabins or other obstacles which represent a hazard for flying must carry red warning lights which are visible from all position. Alternatively, the obstacle can be floodlit.
- Derrick and booms must also be fitted with red lights positioned at levels corresponding to each third of their total length/height measured from their highest point.
- At least one light at each level must be visible from all directions.

4.1.8 Operating equipment

The helideck must at all times possess all the equipment required for its operation, such as:

- chocks for placing before and after the main wheels on both sides of the helicopter
- ropes for securing a parked helicopter
- scales for weighing baggage/cargo (must be available on the facility)
- de-icing and snow clearing equipment.

4.1.9 Rescue equipment

The following rescue equipment must be available in the immediate vicinity of the helideck:

- two fire axes
- three stainless steel knives (for cutting seat belts)
- two hand torches/flashlights (explosion-proof)
- one crowbar
- one wire cutter
- one hacksaw with spare blades
- one hammer
- one cutting chisel
- one set of sheet metal shears
- one bolt cutter
- one jack with a minimum lift of 0.5 tonnes.

This equipment must be stored in an easily accessible manner, visible and in a safe place, preferably a sealed locker or chest. If the locker or chest can be locked, the key must be placed behind a breakable window. The locker or chest must be coloured red and labelled “Nødutstyr” and “Emergency equipment”.

The following must be kept in a suitable place close to the emergency equipment locker/chest:

- one metal hook with a three-metre metal shaft
- a lightweight ladder about three metres long.

4.1.10 Communication equipment

Personnel forming the helideck’s minimum staffing must be equipped with portable two-way VHF radios able to communicate with the helicopter crew and the radio room on the facility.

4.1.11 Signage

Clearly visible signs must be placed on access routes to the helideck which prohibit

- being on the deck during takeoff and landing
- moving behind helicopters parked on the helideck with their rotors engaged.
- exits from the helideck must be clearly marked EXIT. This text must be visible in the dark.

4.1.12 "Helideck closed" marker

A helicopter must not normally land before receiving a "deck cleared" message from the HLO. But this could nevertheless happen in emergencies or because of a misunderstanding. The assumption is therefore that a helideck not marked as closed can be landed on without danger to the helicopter or personnel on the ground. To safeguard against this, the helideck must be marked as closed if landing would have unacceptable consequences.

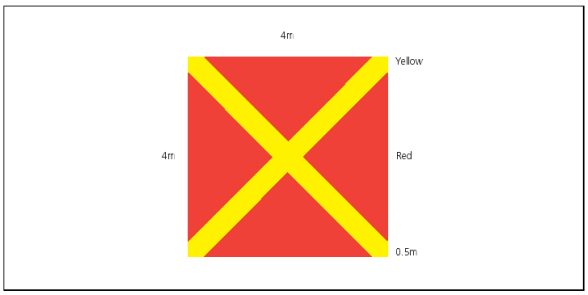
This marker must be used

- if landing on the deck would be hazardous – because of work in progress involving loose objects, structural weaknesses, obstacles like wires stretched over the landing area and so forth. NB! Does not normally apply to crane operations because the crane will be clearly visible to the pilots
- if landing would represent a hazard to personnel working or present on or close to the helideck
- if another facility with a helideck is near at hand, such as a flotel, and only one of the helidecks is to be used.

NB! The marker must not be displayed merely because the helideck is unstaffed or because of general equipment faults.

A temporarily or permanently closed helideck is marked pursuant to an internationally accepted standard, with a diagonal yellow cross on a red background. This is painted on the deck or on canvas which can be laid out and secured. The marker is positioned over the H in the centre of the helideck.

When the helideck is marked as closed, the green perimeter lights must be turned off. AMB/SAR helicopters will also not land when the helideck is marked as closed.



4.2 Safety equipment

This section provides a generalised description of safety equipment available on facilities. The type of equipment can vary from facility to facility. Specific information on the equipment found on a particular facility is provided in the local operational manuals.

4.2.1 Alarm system

It must be possible to activate the alarm system from the helideck or its immediate vicinity. The activation button for the alarm system must be clearly marked.

4.2.2 Fire and general alarms

Alarm buttons are located at the helideck's fire posts. These must be used only in emergencies, such as a fire in a helicopter or on the helideck.

4.2.3 Fire alarm boxes, FABs

FABs for activating fire pumps are located by the helideck. Throwing the switches in these boxes will start the pump(s), and notifies the control room which FAB has been activated.

4.3 Firefighting equipment

Official requirements for fire protection of the helideck can be found in regulations issued by the PSA, the NMA and the CAA-N. See section 1.5

The HLO must ensure that the firefighting equipment always complies with the regulatory requirements and is ready for use.

Any nonconformity must be reported to their immediate superior.

NB! The helideck's fire extinguishing system must not be activated before the helicopter has landed. Its pilots could otherwise lose their deck reference.

4.3.1 Fire water system

A fire water system must be installed.

4.3.1.1 Purpose and effects

Water can be used to control and/or extinguish a fire in the following ways:

- acts as a dilutor when vaporised in the fire zone
- vapour reduces the oxygen content in the air current mixture by one-third.
- absorbs heat when vaporising
- can be used to cool adjacent areas to prevent the spread of flames or improve access to the fire area.

4.3.1.2 Application

Water is the best extinguishing agent for fires in woodwork, paper or waste, and good for further damping down where hand-held extinguishers have been used.

4.3.1.3 Equipment

A 1.5-inch hose is standard with equipment for firewater/hosing down.

Alternatively, the foam equipment can be used to apply water only.

4.3.1.4 Use

- Water should be applied to oil fires in the form of a fine spray.
- It must never be applied to electrical fires until the power supply has been disconnected.
- Water must be applied as a fire spray when used for cooling down.
- With most fires, the water jet must be directed at the base of the flames.

4.3.2 Foam systems

4.3.2.1 Purpose and effects

Foam can control and/or extinguish a fire in one or more of the following ways:

- serving as a smothering agent
- if applied in sufficient quantities, reducing the oxygen supply to prevent air influx
- acting as a dilutor
- when driven into a fire zone, vaporises and in certain circumstances reduces the oxygen content in the air current mixture by a third
- absorbing heat through the vaporisation process
- if applied sufficiently thickly, protecting potentially explosive substances exposed to a fire by absorbing heat and insulating.

Fires involve flammable liquids can be extinguished by laying down a thick foam carpet. This must have the right consistency and thickness, and be maintained for long enough.

4.3.2.2 Application

Foam should be applied in the largest possible quantities in order to cover the whole fire surface.

Foam is appropriate for all types of fires, except electrical ones.

4.3.2.3 Equipment

A helideck normally has three foam monitors and three hose reels. The exceptions are certain older models which only have two monitors and two reels (only two fire posts). On newer helidecks with pop-up systems, a possible solution is also to have only reels and dual-agent skids – in other words, no monitors.

Foam is produced by combining these three components in a turbulent condition:

- water
- air
- foam concentrate.

This is normally achieved by injecting the concentrate under pressure in the water stream.

Foam production normally begins 20 seconds after the equipment is turned on.

4.3.2.4 Use

The fixed foam system is operated from permanently installed release cabinets for firefighting. After use, the foam piping must be thoroughly flushed with water to remove remaining foam solution.

Note that using excessive water will break down the foam.

4.3.3 Dry powder system

4.3.3.1 Purpose and effect

The effect of using very fine dry powder is to halt the fire's chain reaction by introducing a large quantity of fine powder particles into the atmosphere.

NB! When fighting a fire with dry powder, vaporisation through the powder could permit re-ignition from hot metal, smouldering insulation and so forth.

4.3.3.2 Application

Dry powder is effective against most types of fires, particularly electrical ones, since it is non-conductive.

When used to extinguish a petrochemical fire, re-ignition is highly likely to occur unless possible ignition sources are removed.

Foam must be used to prevent re-ignition.

4.3.3.3 Equipment

The equipment involves a gas cartridge propellant, with the powder driven out by internal overpressure. This overpressure is created by discharging a CO_2 cartridge inside the extinguisher.

4.3.3.4 Use

The powder will normally start discharging within 15 seconds of activating the fixed equipment. The units should be directed at the base of the flames and, if possible, in the direction of the wind.

All hoses must be cleaned of powder residues immediately after use in order to remove powder/lumps which could later block the hose/piping.

4.3.4 Maintenance

All rescue and safety equipment must be maintained in good working order and be ready for use at all times. Maintenance, periodical testing and inspection must be conducted in accordance with established procedures.

5 OPERATIONS

This part of the manual describes operational restrictions and the helideck crew's routine duties during helicopter operations.

The duties of each helideck crew member are presented step by step in appendix G for take-off and landing and in appendix H on stopping/starting the rotor/engines.

Operations related to the refuelling plant and refuelling are described in chapter 6 on aviation fuel and appendix K on the procedure for refuelling a helicopter with the rotor running.

See also section 7.4 on refuelling in strong winds.

5.1 Operation of the helideck

5.1.1 Using anti-collision lights as signals to the helideck crew

Anti-collision lights are powerful rotating beacons installed top and bottom on the helicopter.

Once the helicopter has landed and is ready to be unloaded, its anti-collision lights are switched off. This signals that the helideck crew can approach in order to do their work. See appendix C for danger zones.

Immediately before departure or when conditions require it, the pilot will turn on the anti-collision lights. This signals that the helideck crew must leave the helideck immediately. The HLO gives the thumbs-up signal when all personnel have left and all objects are removed.

5.1.2 Using the chocks

This procedure applies to all helicopters with a wheeled undercarriage during operations on fixed facilities, mobile rigs and vessels.

Standard hand signals must be used. See appendix A.

Exemptions from this procedure include helicopters in shuttle traffic with both pilots in the cockpit. Chocks can then be used at the pilot's discretion.

Standard procedure:

- The chocks must be put in place as soon as the anti-collision lights are switched off.
- They are placed in front of and behind both main wheels.
- Both pilots must remain in the cockpit until the chocks are in place.
- The chocks are removed when both pilots are in their respective seats and the pilot has signalled "chocks away".

5.2 Cargo in the helicopter

5.2.1 General

The restrictions described in this section apply to all types of helicopters and supplement official requirements (Easa OPS).

Passenger baggage must not exceed 10 kilograms per item. Cargo sent by helicopter should not exceed 15 kilograms per package. Heavier items must be split up if possible. Exceptions may be made for priority consignments. These must then be specially labelled (as heavy cargo, with the weight listed on each package) and the facility/destination notified.

5.2.2 Passenger/cargo manifest

When passengers, baggage and/or cargo are to carried by helicopter, a passenger/cargo manifest must always be completed and accompany the helicopter.

The completed passenger/cargo manifest is to be considered an official document which may be subject to inspection.

The standard weight per passenger, including survival suit, is 211 pounds (96 kilograms) for men and 174 pounds (79 kilograms) for women.

The weight of cargo/baggage comes in addition.

The manifest must contain the following information:

- full names of passengers
- their employer(s)
- weight of passengers
- weight of baggage (per person)
- weight of cargo/baggage
- description of the contents of each package of goods
- destination.

When cargo is to be sent ashore from a facility, the HLO is responsible for checking the cargo manifest and ensuring that it accompanies the consignment.
The HLO is responsible for checking that the number of people on board corresponds with the passenger manifest and for delivering the manifest to the helicopter crew.
When loading a Super Puma, the pilot must be told the total weight in cargo compartment 3.

5.2.3 Placing both cargo and passengers in the helicopter cabin

The general rule when transporting passengers is that cargo must not be placed in the cabin.

Exemptions include:

- priority consignments only
- cargo must not be placed in front of (blocking) the cabin door(s)
- cargo must not block the main emergency exits in that part of the cabin where passengers are seated
- cargo must not be placed in such a way that passengers lack direct access to alternative escape routes (push-out windows). Passengers cannot be placed in a seat where the adjacent push-out window is blocked or where cargo prevents free access to the nearest push-out window
- cargo cannot be placed in the centre aisle, except piping up to 10 centimetres in diameter
- cargo must not obstruct access to emergency equipment
- cargo must be secured in accordance with the strictest official requirements
- as a primary rule, cargo must be placed in front of passengers in the cabin.

5.2.4 Baggage-free cabin

Passengers are not allowed to bring hand baggage into the cabin. All forms of bags, briefcases, portfolios and so forth are regarded as hand baggage. Magazines, newspapers and paperbacks are exempted.

5.2.5 Transporting cargo in passenger seats

The following restrictions apply if baggage must be placed in a passenger seat:

- no more than one package weighing a maximum of 80 kilograms per seat (NB! single packages weighing up to 15 kilograms can be placed in a sack with a total weight of 80 kilograms)
- external dimensions must be smaller than the height and width of the seat
- in addition to the seat belt, the cargo must always be secured with a strap, cargo net or other approved method
- cargo must not be placed in seats adjacent to the helicopter's main emergency exits.

5.2.6 Transport of passengers and cargo

Pursuant to Easa Part OPS Helicopter ORO.GEN.110(j) and Easa AMC1 SPA.DG.105 (a) and (f), transport of passengers and goods by helicopter requires that the personnel involved in the operation have the necessary awareness training with dangerous goods. This is intended to ensure that personnel are able to spot dangerous goods in passenger baggage and to identify/spot unlabelled cargo which could be dangerous goods.

Training requirements
Personnel categories requiring awareness training with dangerous goods are:
the person checking in passengers, baggage and cargo and who also compiles the passenger/cargo manifesto for the flight

- helideck personnel involved in loading/unloading passengers and cargo from the helicopter offshore.

This course must be repeated every 24 months and requires a separate test. It forms part of the Norwegian Oil and Gas basic and refresher courses for HLOs.

The following courses are also required for transport of dangerous goods.
If a facility/vessel may send dangerous goods by helicopter, IATA regulations require that a dedicated person responsible for reception, packing and documentation has taken an IATA dangerous goods course. This course must be repeated every 24 months to retain its validity. Similarly, test results from the course must be available on the facility/vessel at all times.

If dangerous goods are to be transported by helicopter from an offshore facility/vessel, the following must be available on the facility/vessel:

- dedicated person (shipper/packer)
- latest version of the Iata dangerous goods regulations (DRG)
- shipper's declaration forms
- check lists – radioactive and non-radioactive
- nature of transaction code (Notoc) forms
- UN specification packages
- inner packages which match the UN specification markings
- absorbent and cushioning material
- dangerous goods labelling
- stock of spill kits.

5.2.7 Transport of fish

To avoid corrosion and/or damage to baggage, the following restrictions apply to fish transport:

- fish must be packed in water-tight containers
- they must be frozen and packed in sufficient plastic or the like to prevent damage in the event of possible thawing.

5.2.8 Personal locator beacon (PLB)

Where PLBs issued to passengers are to be left behind in the helicopter, the HLO is responsible for checking that departing passengers do not take their beacon with them.

If PLBs are left behind on the facility, the heliport responsible for their day-to-day supervision must be informed.

5.3 Communication

This part of the manual presents procedures and guidelines for communication between the helideck crew and the helicopter pilots. See also the guidance in appendix I.

5.3.1 Language

All communication in the aviation sector normally takes place in English. It could be appropriate to communicate in Norwegian if English-language skills are limited and both sides speak Norwegian.

5.3.2 Responsibilities

The HLO must report that the helideck is cleared for landing as well as providing safety-related information, such as the deck being out of use owing to an alarm, undercarriage not lowered, loose objects which might have hit the rotor, oil or fuel leaks or helicopter faults (loose covers and so forth).

The HLO cannot assume control of the airspace or exercise control of helicopter traffic.

5.3.3 Establishing radio communication

Before radio communication is established, the following must be done:

- check that the correct frequency is being used
- listen first to ensure than existing communication is not interrupted
- clarify what is to communicated.

A radio station which hears a call without identifying the call sign of the station being called must not respond until the call sign is repeated and understood.

If a station is called without catching the caller's call sign, the following phrase must be used:

"Station calling, this is Statfjord B HLO, say again your call sign".

5.3.4 Helicopter's call sign

The helicopter's call sign can be the relevant flight number (eg, Helibus 012) or its registration letters, normally abbreviated to the first and two last letters (eg, LN-OMN = LMN).

5.3.5 Radio failure

Although modern radio equipment is reliable, the possibility of a failure in radio communication between helicopter and helideck cannot be excluded.

In practice, radio failure will be suspected if the helicopter fails to respond when called or if the frequency falls silent.

If radio failure is suspected, contact must be made with another member of the helideck crew or the radio operator to ensure that the helicopter pilot receives the information.

In exceptional circumstances, hand signals can be used to indicate that the helideck is cleared for landing.

5.3.6 Phraseology

Specific words and expressions – known as standard phraseology – are used in radio communication between helicopter and ground station in order to help understanding. Making the greatest possible use of standard phraseology is recommended.

Appendix E on phraseology provides a list of standard English expressions and their Norwegian equivalent.

5.3.7 Frequencies

The information frequency for the helicopter service is used for:

- deck clearance
- wind direction and strength
- other possible information which could be significant for flight safety.

Where two frequencies are used, all communication will take place on the **logistics frequency** (on a different radio).

6 AVIATION FUEL – GENERAL

These guidelines cover the minimum requirements for using equipment to supply fuel to the helicopter. It is important that the helideck crew are well acquainted with these guidelines and the associated safety requirements.

6.1 Purpose

This chapter presents guidelines for operations with as well as checks and handling of Jet A-1 aviation fuel.

6.1.1 Personnel duties

Each facility is responsible for having a preventive maintenance programme covering the plant in safety and environmental terms, and for ensuring that the measures adopted comply with applicable regulations. The most important duties for personnel using the plant are to deliver the right fuel quality at all times, to keep the product free of water and polluting solids, and to refuel in a safe, secure and efficient manner

Day-to-day supervision of refuelling operations rests with the HLO. They must see to it that all work is done safely and in accordance with applicable procedures and instructions. All checks relating to operations must be logged.

6.2 Sampling and checking

6.2.1 General

Jet A-1 must be subject to quality assurance from refinery to consumer, with traceability at every stage pursuant to relevant guidelines.

Samples must be taken by competent personnel with the correct procedures and equipment. It is important that colour-blind people do not do water-detector tests. All sampling must be logged.

6.2.2 Water

Water can occur in fuel in two forms:

- as fine/small droplets which have precipitated from the fuel and which can be removed in the filter separator, with any remaining water absorbed in the filter monitor
- as molecules loosely attached to the fuel molecules.

Water attached to fuel molecules cannot be removed by these methods.

But it is nevertheless not insignificant for the fuel, despite occurring only in minute quantities. Such fine dispersal can arise during the passage of the water and fuel through a pump or microfilter. Visual inspection will normally reveal finely dispersed water. But experience shows that the turbine fuels used by aircraft may present borderline cases which defeat the human eye. The Shell water detector has been developed to deal with these. It comprises an unbreakable five-millilitre injection syringe and a plastic detector capsule containing water-sensitive paper. The test provides a positive indication of finely dispersed water at a concentrations of 30 parts per million (30ppm). The capsules may also change appearance slightly at concentrations as low as five parts per million (5ppm).

6.2.3 Visual inspection

For the fuel sample to be accepted, it must be the correct colour, visually clear and transparent, and free of particles and dispersed water at normal temperatures. The colour of Jet A-1 varies from watery white to straw yellow. See also the section on visual check.

Undissolved water will appear as droplets on the inside wall of the sampling container or as water at its bottom. It may also fog the sample/render it opaque. Particles and other visual pollution generally comprises rust, sand or dust, either suspended in the fuel or as sediment at the bottom of the container.

When using the permanently installed sampling containers, discharging the fuel sample to the outer container rim will automatically create a cyclone motion which causes particles and large water droplets to accumulate at the bottom of the container. It is therefore important that samples taken from the portable tanks are vigorously rotated to create a cyclone effect of this kind.

Satisfactory result
When none of the above-mentioned signs are visible, and the sample is clear without sediment.

Unsatisfactory result
The sample is not clear and transparent, showing that water or pollution is present.

If the sample contains sediment and/or free water

- further samples are taken until the fuel is clear and free of water (clear and bright)
- if a sample contains finely dispersed water, a settling time of one hour per metre of tank depth is allowed before conducting a new purity test
- this process will continue until the sample is completely free of water or sediment (clear and bright, satisfactory test result).

6.3 Tests and inspections

Use Shell's water detector to check samples taken from Jet A-1 helicopter fuel. If a detector changes colour, it is extremely important that the procedure described below is followed to remove pollutant(s) from the fuel. The detector comprises the following components:

- an unbreakable five-millilitre injection syringe
- a plastic detector capsule containing water-sensitive paper.

6.3.1 Storing Shell water detectors

The capsule lid should be screwed on as soon as possible after removal from the container to avoid the risk that the paper might be discoloured by air humidity. As a consequence, capsules should not be left lying around loose or kept in the pockets of clothing.

Maximum storage time for a detector capsule is nine (9) months from the production date.

- the expiry date will be stamped on one side of the storage box
- it will also be stamped on each capsule, and must be strictly observed.

Unused capsules must be stored dry indoors in their container until they are to be used.

6.3.2 Procedure for a water detector test

- Check that the capsules have not passed their expiry date (shown on box/container).
- Have a sample of at least 3.5 litres ready in a clean and clear container.
- The sample must be rotated vigorously until a cyclone effect arises in the container, causing particles to accumulate in the bottom of the container and possible water particles to be dissolved into the fuel. This happens automatically in the sealed sampling containers.
- Attach the capsule to the syringe and immediately immerse both in the sample
- The plunger is withdrawn until fuel reaches the five-millilitre mark.
- Take care that the plunger is not withdrawn until the syringe is immersed in the liquid, otherwise air humidity will create an indication in the detector capsule and lead to a faulty reading.
- Possible water droplets in the fuel will be absorbed by the paper fibres, releasing and spreading the colouring and thereby creating a distinct colour change.
- If this colour change occurs, the fuel is contaminated with water and must therefore not be used. The part of the paper protected by the plastic remains unaffected. A possible colour change between the outer and inner (wet) or measured areas provides a positive indication that finely dispersed water is present.
- A generally light pastel colour over the whole central part of the capsule or no colour at all can be accepted. A light yellow pastel colour with dark specks or spots indicates that some water droplets remain suspended in the fuel and may be above the maximum permitted concentration of 30ppm.
- Further precipitation, emptying and separation are needed to remove this water so that the concentration falls below 30ppm. Large and dark specks or generally darker colour in the centre of the capsule naturally mean even more water in the fuel, which must be removed before the fuel can be safely used in a helicopter.
- When testing just before and after refuelling, allow the pilot to wet the detector after the test to see that the colour changes to green as a check that the capsule is not defective.

On occasions other than refuelling:

  - wet the detector even after the test to confirm a colour change
  - a capsule must be used only once and then discarded.

6.3.3 Draining, sampling and checking

Drainage and product sampling – routines at the plant.
Drainage samples must be taken regularly to check that storage tanks and delivery equipment are free of particles and water.

The sample is taken directly from the lowest point in the tank or filter housing.

The equipment must be drained to remove water and particles at the following intervals:

- daily from storage tank, filter separator and filter monitor before the day's first delivery
- before and after each delivery
- after heavy rain and storms.

Drainage must be conducted with full liquid flow from the tank sump, filter water separator, and the inlet side of the filter monitor. Liquid must be drained to clean, clear glass containers with a minimum capacity of 3.5 litres for a visual check. If this gives an unsatisfactory result, new samples must be taken by drainage until a satisfactory visual check is achieved. Should unusually large quantities of free water or particles be found, or no satisfactory visual check can be obtained, the system must be taken out of service and an immediate investigation launched to identify the cause of the pollution.

6.3.4 Visual check

The following points provide guidance for conducting a visual check of fuel samples.

- Colour: jet fuel can vary from completely clear (like water) to straw yellow.
- Water: free water will normally reveal itself as droplets on the wall or in the bottom of the sample container (free floating), and can also occur as a misty cloud in the fuel (emulsified).
- Particles: largely comprise small specks of rust, sand, dust or scale from hoses and equipment, and settle at the bottom of the sample container.
- Clear and bright: this term is independent of the natural fuel colour. “Clear” indicates that no sediment or emulsion is present. “Bright” refers to the clear, bright appearance of the fuel when completely clean. If particles or water are found, new samples must be taken until the sample is clear and bright.
- Control check: this check comprises a visual check plus fuel density and is carried out to be certain that the quality is correct and that the fuel has not deteriorated or become polluted during storage. The result of this sample is compared with the values on the certificate. When the actual weight has been corrected to the standard value (15°C), the variation must be no more than 0.003 kilograms per litre. If it is bigger, the product must be quarantined and withheld from delivery until the reason for the variation has been established and a new approval given.

If nonconformities in the form of technical problems with the plant are discovered, competent personnel must be summoned.

6.3.5 Sampling and inspection

Daily (every morning), conducted by the HLO

- Take a 3.5-litre sample from the filter separator and monitor with the system pressurised.
- Take a 3.5-litre sample from the tank currently in use.
- All samples are checked with the Shell water detector.
- The accepted 3.5-litre sample from the storage tank must be retained for 24 hours. It must not be exposed to sunlight. If two tanks are used in one day, the samples from both must be retained for 24 hours. The samples must be labelled.
- Conduct a visual inspection of the equipment for damage and leaks.
- When transferring fuel, read off and note the monitor’s pressure difference in the helicopter refuelling log.
- Earth cables: daily check for good mechanical contact with the unit and possible damage.
- All sampling and inspections must be logged.

Weekly, conducted by the HLO

- If the system is out of operation for more than a week, take a 3.5-litre sample from the pistol grip nozzle in addition to the other sampling.
- Alternating the pump used on a weekly basis is recommended in order to spread wear and tear between pumps A and B.
- Take a 3.5-litre sample (until the sample is acceptable) from portable tanks in storage.
- Drain the air-separator collector glass.
- When pumping fuel, read off the differential pressure and note the result in the weekly pressure difference log for the separator and monitor (see appendix). If the maximum pressure difference for the filter separator, and possibly the monitor, is exceeded, the filter elements must be replaced (only step 1 for the filter). The maximum pressure difference is 15 psi for the separator and 22 psi for the monitor.
- Inspect all earth cables (for portable tanks, supply cabinet and pistol grip nozzle). In the event of actual or suspected faults, maintenance personnel must be summoned. The refuelling plant must not be used if faults are found or suspected in its earthing system.
- Once a week, differential pressures for the separator and monitor must be read off while pumping at the selected delivery volume. The result must be logged.

Monthly, conducted by the HLO

- Check the delivery hose for damage and log the result, see section 6.6 plus appendix.
- Function-test the piston-type differential pressure manometer to check that it operates correctly. This is done by opening the three-way valve connected to the meter. It is only necessary to check that the piston moves freely throughout its length, and visually ensure that it resets correctly. Log the inspection (see appendix).
- Check the filter strainers in the pressure hose connectors and pistol grip nozzles. In each monthly inspection of the filter strainer, the relevant hose must be pressurised for at least one minute.
- Inspections at longer intervals than the above form part of each facility's own maintenance system.

6.3.6 Returning product to the plant

Clean and water-free product accumulated during draining and sampling can be returned to a slop tank, where it is allowed to settle and drained free of water and particles before being returned to a product tank.

6.3.7 Sampling during delivery to the helicopter

- A 3.5-litre sample must be taken from the filter monitor or pistol grip nozzle before delivery and checked visually, including water-detector testing. Possible water must be drained off and a new sample taken until a satisfactory water detection test is achieved.

- A 3.5-litre sample must be taken from the pistol grip nozzle or the intake side of the filter monitor immediately after the delivery is completed in order to confirm quality and to conduct a visual water-detector check.

If more than a hint of water is found, or the water detector shows a clear colour change, a new sample must be taken. The pilots and the helicopter company must be informed immediately. No more fuel must be supplied until the cause has been identified and corrected.

6.4 Specific gravity (density) measurement

The specification for Jet A-1 places its specific gravity (density) in the 0.775- 0.840kg/l range. This must be checked on reception offshore. Specific gravity is measured with a hydrometer and a thermometer (which could be incorporated in the hydrometer). Testing must be conducted in a well-lit area protected from rain and wind. The hydrometer is inserted slowly and carefully into the fuel in order to avoid it breaking or getting wetted above the flotation level. Check that no air bubbles attach to the submerged surface. The hydrometer must be allowed to float freely.

Allow the hydrometer to float for three-four minutes so that its temperature and motion stabilise. Then push the hydrometer carefully down two marks on the scale and release it. Once the hydrometer has restabilised, read off the specific gravity.

Since the fuel will creep a little up along the thermometer, the level shown on the scale will be above the actual value. Look along the surface of the fuel and read off the lowest level shown. Read off to the nearest 0.001kg/l and log the product's specific gravity. Shake the hydrometer and take two-three further readings to confirm the result.

Thereafter read off the temperature. Note both temperature and specific gravity as direct readings from the hydrometer. Use these data to correct the specific gravity to 15°C using the density conversion table (ASTM-IP table 53) or the conversion unit for fuel density (the Aristo 60 208 circular plastic slide calculator from Germany). Note the specific gravity corrected to 15°C. NB! A slide calculator will get worn over time and thereby give false readings. If one is used, it must be inspected regularly for possible wear and tear. Specific gravity corrected to 15°C must be within +/- 0.003kg/l of the specific gravity corrected to 15°C documented in the upper part of the transport certificate for the aviation fuel.

If an electronic density meter is utilised, the manufacturer's user manual and calibration instructions must be observed. If the specific gravity is not within the specified limits, the guidelines for faulty fuel must followed and the fuel possibly returned.

6.5 Basic requirements for lab samples

Samples to be certified by a laboratory must be taken from an outlet which provides direct access to the space where the liquid is stored.
Before sampling, the equipment must be thoroughly rinsed and containers washed at least three times in the product being sampled. The containers must be thoroughly dried before use.
A container must not be filled completely. About five per cent of its volume must remain so that the liquid can expand. Approved containers must be used, and should be labelled and preferably sealed. Containers must be sealed and labelled immediately after filling, with the following information:

- date and time
- sample taken by (signature)
- facility/vessel
- tank number
- batch number.

Documentation for all samples must be logged. Attach a copy of the transport certificate for the relevant product.

6.5.1 Containers

Containers for lab samples
Glass, metal or approved plastic containers for lab or duplicate samples must be new or approved by the lab, and completely clean. See ASTM D 4306 for suitable products.
Metal containers must be approved and preferably lined internally with epoxy. All containers, even if new, must be rinsed at least three times in the product to be sampled.

Containers for visual samples
Clean, transparent containers must be used, with a minimum capacity of 3.5 litres and a wide opening which accepts a threaded lid. If a bucket is used for drainage, it must be made of stainless steel or possibly coated internally with white enamel and have approved earthing.

6.6 Hoses for aviation fuel – approval and inspection

Each hose must have a permanent identification number as well as a log of inspections and checks. This must specify the dates and years of manufacture and of entering service as well as information on inspection findings and maintenance

Maximum storage life is two years. Hoses have a maximum life of eight years if pressure-tested and inspected annually in accordance with API 1529/BS-EN 1361. Both these periods must be calculated from the date of manufacture. In the absence of annual pressure testing, the hose has a maximum service life of two years.

Before being used, new hoses must be flushed in accordance with API 1529/BS-EN 1361 and then pressure tested. The product used for flushing must be returned to a slop tank in the process of being filled or settling.

All supply hoses must undergo routine inspection and checks.

Hoses must be kept under observation during refuelling. Should weaknesses or faults be detected, delivery must be halted and the hose replaced.

Hoses can be inspected/checked as follows. Pull the hose all the way out and apply full pump or operational pressure with the delivery connector shut. When the hose is under pressure, check for exterior damage, leaks or other signs of weakness. When inspecting a long hose (under full pressure), the recommended approach is to form a vertical loop and then roll this slowly along the full length of the hose. Special attention must be paid to any signs which indicate that the hose connections are beginning to loosen. With the hose fully extended, release the pressure and inspect for soft spots. Special attention must be paid to that part of the hose about 45 centimetres from the connectors, since it is particularly liable to weaken. This section must be checked for faults by applying pressure around the area to identify soft spots, bubbles and so forth.

6.7 Pressure filling connectors

During refuelling, all connectors must be checked for leaks. Leaking connectors must be taken out of service. Repairs and adjustments must be logged and carried out by authorised personnel.

6.8 Pistol grip nozzles

Pistol grip nozzles must be subject to general inspection for each delivery. If leaks are identified during use, the nozzle must be taken out of service. Repairs and adjustments must be logged.

6.9 Reception of fuel and reception checks

Tanks must be inspected and approved before being filled on land, and an inspection certificate issued by the fuel distributor. The HLO must check that labelling and traceability of the tank agree with the documents.

Check that the transport certificate for aviation fuel specifies the following: type, quantity, batch number, date, tank serial number, specific gravity, verified free of solid particles and water, inspector's signature.

On receipt of fuel:

- check that the seals on the manhole, inspection hatch(es) and outlet are unbroken, and that all dust covers are in place and intact
- check that the tank cradle/tank have their respective approvals, which can be read from the tank's data plate
- check for damage to hatches and valves, particularly protective hatches and packing rings
- check that seals are intact and the tank type is labelled
- check whether the fuel tank ID number on the seals matches the inspection certificate.

6.9.1 Settling time

Once a tank has been positioned stably, the fuel must be given sufficient time to settle before sampling begins. Settling time is three hours per metre of fuel depth.

If the sample contains sediment or free water, new 3.5-litre samples must be taken until they no longer contain sediment or free water. The following tests must be conducted:

- rotation test (rotate the sample strongly before making a visual check
- clear and bright test (visual check)
- Shell water detector.

Criteria for accepting a sample are that it:

- passes the clear and bright test
- is free of water
- is free of pollutants.

If one or more of these criteria are not met, a further settling time of one hour per metre of fuel depth is allowed. All the specified tests must then be repeated.

The process will continue until satisfactory results are achieved. Should no satisfactory result be obtained after the fourth settling period, the fuel must be rejected as "non-approved".

Note the final test results (from the final settling time) and sign the recipient's copy of the transport certificate.

Both fuel reception and the test results must be noted on the aviation fuel transport certificate.

Helicopter fuel must not be used until the above-mentioned procedures have been conducted and satisfactory test results obtained.

6.9.2 Non-approved fuel

Before returning fuel which fails to meet the requirements for purity, specific density or water detection, allow it a further settling time before sampling and testing at least three more times.

Check the equipment/instruments (try a new set if available) and ensure that the tests are being conducted in accordance with the procedures.

If the test results remain uncertain, let another person conduct the tests on their own. If this confirms the unsatisfactory/uncertain results, a superior must be informed.

When the fuel and/or tank cradle fail to meet the specified standard, note the following at the foot of the aviation fuel transport certificate:

- details of the fuel and/or deficiencies with the tank cradle
- name of the facility
- date
- signature of reporter.

Return the completed original certificate to the cartridge on the tank cradle.

Label the transport tank as specified below and enter the following in the cargo manifest:

- non-approved fuel
- from: (name of facility)
- to: (fill out).

6.9.3 Using fuel directly from a transport or storage tank

Depending on plant design on the various facilities, fuel received can either be transferred from the transport tank to fixed (stationary) storage tanks or stored in the actual transport tank by connecting this to the fuel system.

6.9.4 Fuel in the transport tank

If the transport tank is used for storage, an earth cable must be attached to the tank cradle. This must also be attached during the transfer of the tank contents to permanent (stationary) storage tanks. The tank is connected to the pump's manifold system with the aid of a pliable/flexible hose (corrugated steel pipe) which connects to the coupling on the transport tank. Only one tank at a time must be connected to the pump's manifold system.

6.9.5 Transferring fuel between transport and storage tanks

The following tests must be conducted to verify fuel quality when transferring it from the transport tank frame to the storage tank and/or between different storage tanks, including transfer from the recirculation/sample tank:

- visual check
- water-detector test of a 3.5-litre sample taken from the tank frame/tank's drain point.

Make sure that the tank to receive the fuel has sufficient volume to accept it. When transferring from the tank frame

- connect an earth cable to the transport tank
- connect to the transfer hose and open the tank valve
- start transferring fuel, which must be led in and not allowed to fall freely into the tank
- when the transfer is complete, disconnect the dry connection (hose) and earth cable.

Procedures after the fuel has been transferred:

- make a visual check
- allow a settling time of one hour per metre of fuel depth in the tank
- then take a 3.5-litre sample from the tank's drain point and conduct a water-detector test
- if the sample contains sediment and/or free water, new samples must be taken until they show no sediment/free water
- this process must be repeated until satisfactory results are achieved
- if the samples remain unsatisfactory after the fourth settling time, investigations/ corrective measures must be adopted.

6.9.6 Labelling and replacing tanks

To avoid confusion over which tanks are in use, they must be labelled to show their status. The following texts must be used:

- tank has been received and stored since _____ (date)
- tank in use
- tank settling
- tank empty.

NB! Also applies to transport tanks used for storage/supply.

6.10 Old fuel stocks

As far as possible, surplus fuel stocks should not be stored offshore. They should be run down if the period between replenishments is expected to be lengthy.

If fuel has been stored for six months from the filling date, a 3.5-litre drainage sample must be taken in a special container. This is sent to an approved lab for quality control. Should the sample show that the fuel meets the required specifications for use, the fuel can be used in the normal manner. Using old fuel is prohibited until the sample results are available and approval has been received from the fuel supplier/lab.

If the results are satisfactory, the stocks can be used but must be re-tested every three months.

Fuel whose samples are not approved must be returned to land as "non-approved", see section 6.9.2

6.10.1 Returning transport tanks

Tank outlets must be sealed before being returned to land. Check that the protective cover has been placed over the hose connector.

6.11 Fuel delivery/refuelling

6.11.1 Refuelling personnel

Refuelling must be carried out by competent personnel who are well trained in the procedures for and operation of the refuelling system. Sufficient crew must be deployed to ensure safe operation and to act correctly in the event of an emergency. They must be familiar with the location and functioning of the emergency stop buttons. Requirements for personnel competence are specified in Norwegian Oil and Gas guideline 0002.

Appendix K outlines the duties of each member of the helideck crew, step by step, when refuelling.

6.11.2 Earthing between helicopter and refuelling equipment

The helicopter, supply cabinet, pistol grip nozzle/pressure filling connectors must be connected throughout the refuelling operation in order to conduct electricity so that no electrical potential (voltage difference) can arise between them.

Earthing between the helicopter and supply cabinet must be in place before any hose is connected to the helicopter or the fuel tank cover is opened. Earthing must remain in place until all hoses have been disconnected and the tank cover is replaced.

NB! Only authorised earthing connection points on the helicopter are to be used.

7 SPECIAL PROCEDURES AND OPERATIONS

This chapter covers special procedures/operations utilised on specific facilities and helicopter types, under special conditions and so forth. They are therefore not covered elsewhere in the manual.

7.1 Emergencies

Action taken must accord with emergency procedures for the facility.

7.1.1 Basic principles

Teamwork
Helideck crew must work together as a team when tackling emergencies. Discuss how various emergencies on the helideck will be tackled and conduct drills on responding to these in order to identify rapid countermeasures, forms of collaboration and effective action.

Reactions in emergencies
Use common sense when reacting to emergencies.

Normal response sequence:
- assessing the extent of the emergency and securing personal escape route
- calling for help/sounding the alarm.

Respond to the emergency by
- locating its source
- extinguishing/eliminating
- rescuing personnel/reducing risk
- preventing further spread.

Maintain a fire watch to prevent re-ignition/repetition.

7.1.2 Fire in helicopter/on helideck

Initial response
- if refuelling is under way, halt it immediately
- activate fixed firefighting equipment
- sound the alarm
- don fire protection equipment (the fireguard will already be wearing this)
- determine the fire source(s).

Responsibilities

HLO	Sounds the alarm/notifies. Confers with pilot and coordinates response. If permitted by the type of fire, confer with the pilot before starting to use firefighting equipment.
Heliguard	Works with the fireguard and the HLO to extinguish the fire and reduce the danger.
Fireguard	Operates the fire-extinguishing equipment.

Fire team

If the blaze is extensive, the facility's fire team will be involved in extinguishing it and will take over responsibility from the helideck crew.

Rescue

In some cases, the helicopter crew/passengers can be rescued before the fire gets too big.

If a rescue operation appears possible, it should be attempted. However, the fire-extinguishing equipment must be used to cover personnel making this effort.

Should the helicopter cabin have to be entered to rescue people, crew must:

- use smoke diving equipment
- keep as low as possible on entering
- keep below smoke and fumes, where the largest oxygen supplies will be found.

Fire watch

When the fire is extinguished, crew should maintain a fire watch at the site to prevent re-ignition. The foam carpet must be maintained to the extent required.

7.1.3 Crashing on the helideck

Distinctive features of a helicopter crash

Because the helicopter has no wings, the engine(s) and fuel tanks are located in the immediate vicinity of the cabin.

In the event of a crash, this means that:

- rotor blade components may be flung around
- the helicopter is less like to remain standing (in a vertical position)
- it is earlier to drag hoses around a helicopter, and sheltered areas under the fuselage are considerably smaller
- the proximity of secondary extinguishing equipment increases the advantage/ effect, which could be crucial because the cabin, engine(s) and fuel tanks are so close together.

Should a helicopter crash on the helideck, the fireguard must:

- activate the fire pumps/sound the alarm
- cover the helideck with foam
- extinguish possible fire(s)
- ensure the fire watch is maintained, particularly with regard to fuel spills which could run down to lower decks on the facility.

Rescue
The design of helicopter doors and hatches is relatively simple and they are unlikely to jam. If jamming does occur, they must be forced open.

If more forcible methods are needed to enter the helicopter, cutting must be confined to specific points – such as emergency exits and windows.

Use the rescue equipment listed in chapter 3.

If the helicopter is lying on its side, those on board must be supported when their seat belts are released.

NB! Helideck crew must have detailed knowledge of the helicopter types as described in the illustrations in appendix F.

Choke/turn off the engines when
- the helicopter is in a normal position and
- the pilots have been put out of action and
- the engine(s) and rotor are still running
- turn off the engine(s) with the helicopter's emergency stop handle.
- remember that the rotor blades move closer to the deck as their rotational speed drops. This can pose a major hazard for personnel on the deck.
- do not allow people to leave the helicopter until the rotor has stopped.

7.1.4 Crashing into the sea

Alerting
Ensure that the radio operator/control room are notified.

The radio operator/control room will handle further notification in accordance with the facility's internal procedures.

Helideck crew will respond in accordance with the facility's emergency response plan.

7.1.5 Forewarned emergency landing

Preparations
If the helicopter has warned that it has problems and needs to make an emergency landing on the helideck, preparations must be made for tackling this.

Ensure that the radio operator/control room are informed, and that the correct alarms have been activated.

The emergency response team must be mobilised in accordance with the facility's internal procedures.

All members of the helideck crew must don fire protection gear and smoke diving equipment.

Dry powder equipment
Prepare the fixed powder extinguishing hose for immediate use. See chapter 3. Stand in a sheltered area with this equipment at the ready.

7.2 Safedeck helideck

7.2.1 General description

A Safedeck is designed with surface drainage which prevents accumulation of fuel by allowing it to drain away, and thereby prevents it maintaining a possible fire in the enclosed piping system beneath the deck.

7.3 Boarding/disembarking in high winds

7.3.1 General

The upper limit for regular passenger transport is 60 knots including gusts.

The wind on the helideck may deviate from the stated wind measurements.

The helideck's surroundings may give rise to lee and/or funnel effects as well as turbulence, which can radically alter the wind field.

These local conditions will differ on the various facilities and also vary with the wind direction.

7.3.2 Risk-reducing measures

When winds in excess of 50 knots are forecast, each facility will seek to reduce wind exposure for the passengers.

Relevant measures could include:

- careful evaluation in selecting the exit/access least exposed to the wind
- the heliguard and fireguard will help passengers to and from the helicopter
- passengers carry only one item of baggage to leave a hand free
- the heliguard and fireguard will handle all baggage on the helideck.

Reinforcing staffing on the helideck can be relevant in such circumstances. The HLO will continuously assess conditions on the deck and, in consultation with the helicopter pilot, determine how best to ensure passenger safety.

If the HLO determines that passenger safety can no longer be maintained in a fully acceptable manner, they can halt helicopter operations on their facility. The OIM or equivalent must be informed.

7.4 Refuelling in high winds

In special circumstances/emergencies, it could be necessary to refuel a helicopter in winds stronger than 60 knots. Special precautions must then be taken.

The pilot will brief the helideck passengers about any special procedures to be followed or precautions to be taken.

The HLO should summon a qualified person to reinforce the helideck crew.

7.5 Flights to normally unmanned facilities

7.5.1 General

In this context, an unmanned facility is one with an operational helideck which accords with the regulations but with no personnel on board when the helicopter lands/takes off.

Flying to unmanned facilities should be kept to a minimum and conducted in daylight.

No transit passengers must be on board the helicopter.

Should there be personnel on the facility, staffing and operation will be as for a manned facility. The exception is if the helicopter is returning empty to collect a group which has previously been put down on the same facility.

When flying to an unmanned facility, the helideck crew must comprise at least two qualified heliguards. One of these is the HLO, while the other is designated the fireguard. Both must have documented knowledge of the facility's helideck and equipment.

This pair (the HLO and fireguard) must wear approved survival suits during transit to/from the unmanned facility. The fireguard must don a fire helmet and gloves at the latest just before the helicopter approaches the helideck. He and the HLO leave the helicopter before the other passengers and staff the helideck.

As on manned facilities, inspection forms and maintenance routines must be in place.

Where mobile facilities are concerned, motion data (pitch, roll and heave) must be available on the parent facility in accordance with the HMS standard.

Landing/takeoff must be observed from the parent facility or a standby ship, visually or via video monitoring of the helideck.

Helideck crew and the helicopter must be in radio contact with the parent facility or standby vessel throughout the helicopter operation.

Should there be a risk of gas on the facility, gas detectors with warning lights must be in operation. A light should be positioned in the helideck's 150° sector and be easily visible at approach and from the helideck.

During night flying, the helideck's perimeter lighting, red obstacle lights and general facility lights must be on.

8 APPENDICES

APPENDIX A REVISION HISTORY

Summary

074 recommended guidelines for helideck personnel haves been amended and replaced with the helideck manual. The new guideline is 074 recommended guidelines – helideck manual.

The competence requirements for the HLO presented in the first version of the 074 guidelines are now described in 002 Norwegian Oil and Gas recommended guidelines for safety and emergency response training.

Changes made to the helideck manual on transfer to the guidelines
These guidelines have been converted to the Norwegian Oil and Gas guideline template, which has meant changes to chapter numbering and the merger of some chapters. The English translation has been fully revised.

Chapter 1.3 Definitions and abbreviations (previously chapter 1.6 Definitions) where abbreviations are first explained in the guidelines have been moved to the chapter where they are described. “Winching area” has been removed since this is not defined on the NCS.

Chapter 2.2 Inspection and supervision (previously chapters 2.3 Inspection and 2.4 Supervision) is now one chapter. Added that vessel owners are also responsible for maintenance and inspections. Text revised to improve readability.

Chapter 3.1 Training of helideck crew (previously chapter 2.7) refers to 002 Norwegian Oil and Gas recommended guidelines for safety and emergency response training and to section 23 of the activities regulations on training and drills.

Chapter 3.2 Experience (previously chapter 2.8) has been tabulated to improve readability.

Chapter 3.4 Special responsibilities and duties of the HLO (previously chapter 2. 10.) Reference to appendix B is added in the seventh bullet point. The sentence: “They are responsible for handover to the next shift” has been added to the second sentence after the bullet points.

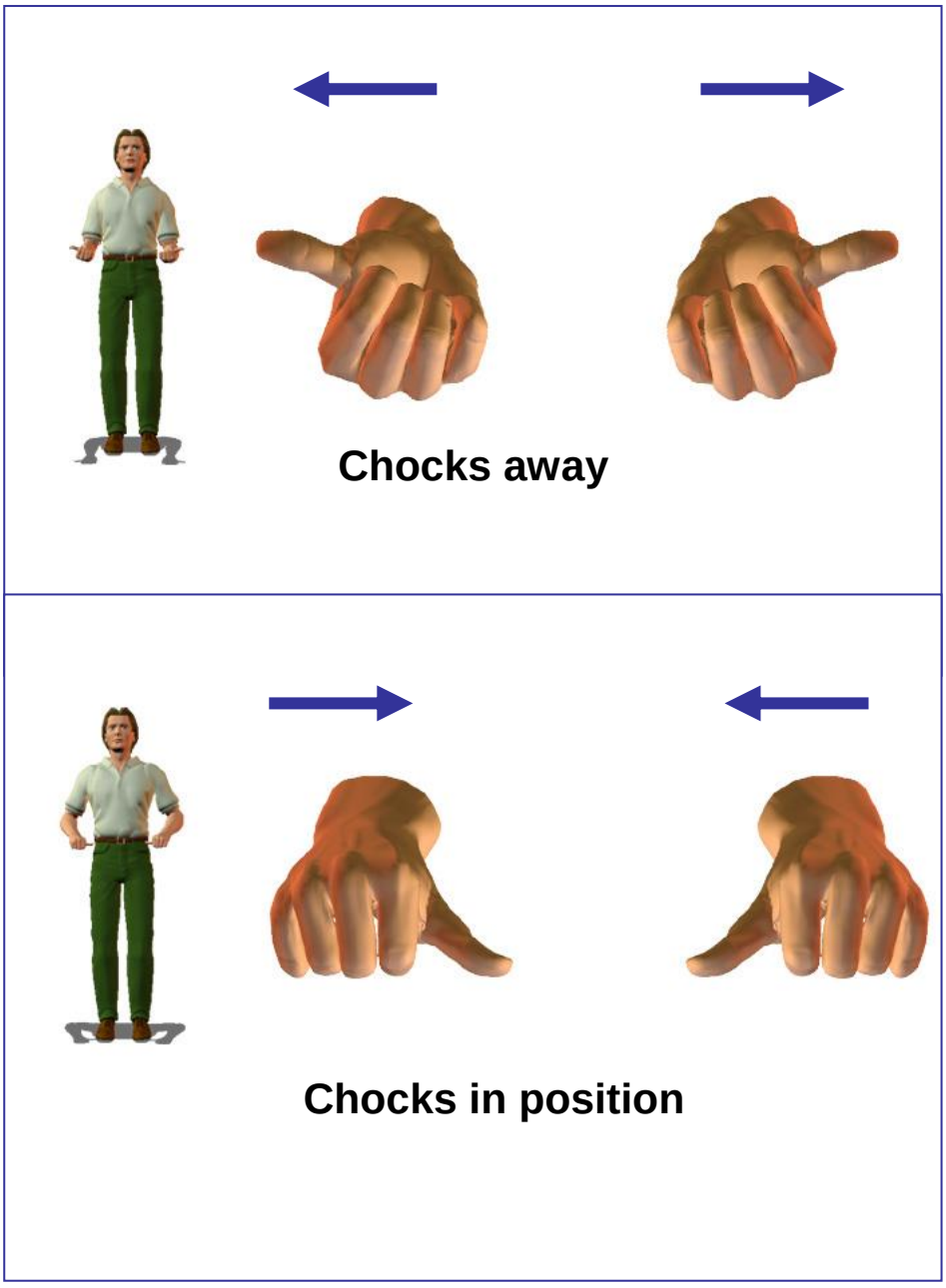
Chapter. 3.6 Staffing of the helideck, explanatory text on helideck crew added.

Chapter 3.7.1 Filling in the form. Final entry changed from max heave rate to significant heave rate.

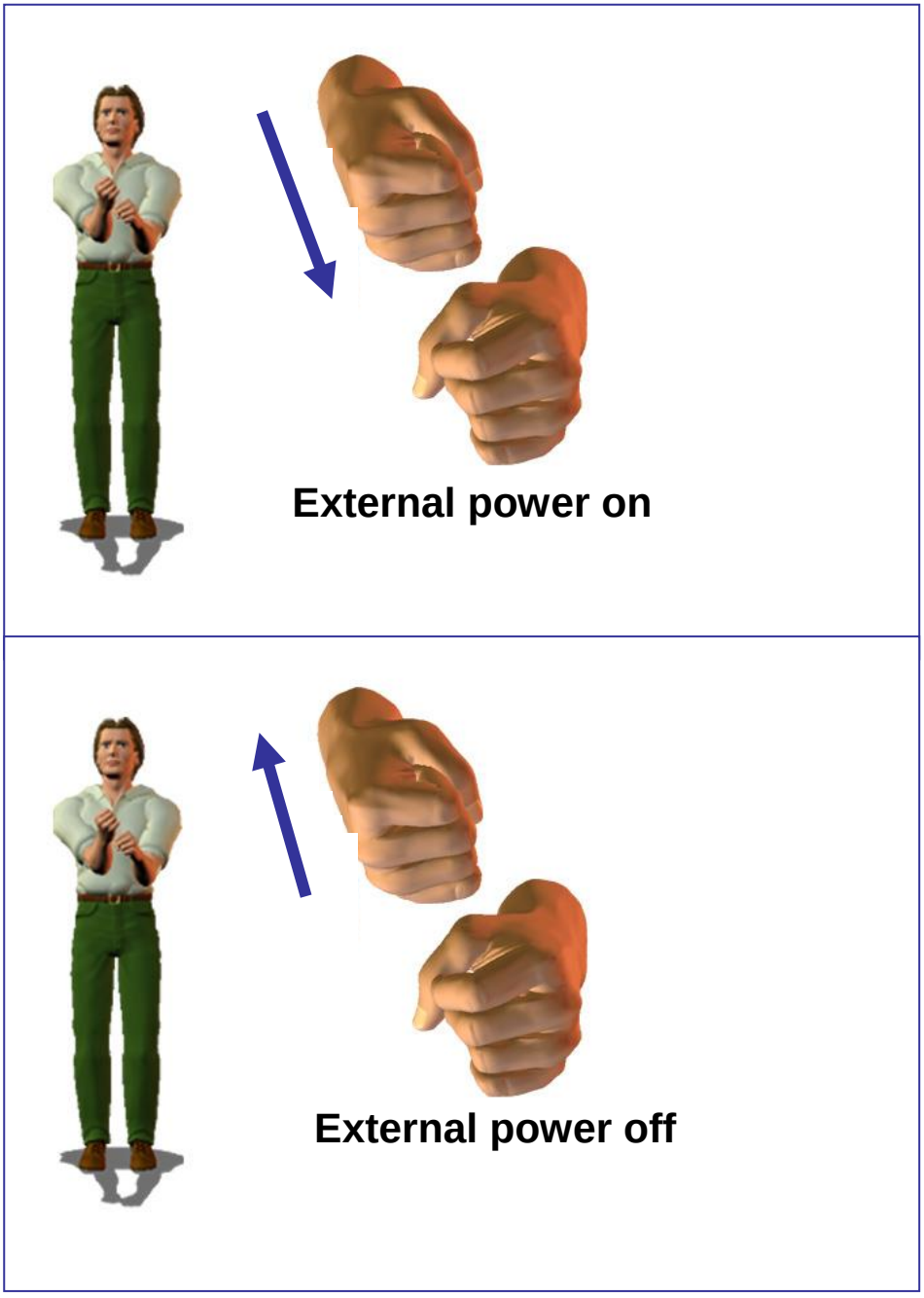
Chapter 6.9.1 settling (previously chapter 5.11.1). Examples of tanks and settling times replaced with the following text: “Settling time is three hours per metre of fuel depth”.

Appendix E Emergency training has been posted to the Norwegian Oil and Gas website and thereby removed from the guidelines.

HAND SIGNALS 1



HAND SIGNALS 2



HAND SIGNALS 3

Start engine no 1

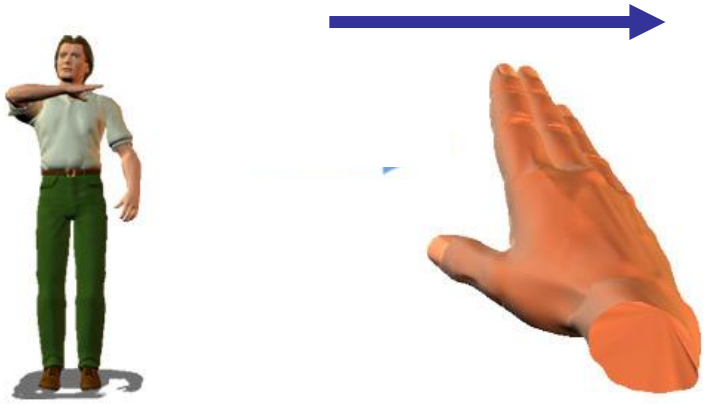
Start engine no 2

HAND SIGNALS 4

Start rotor

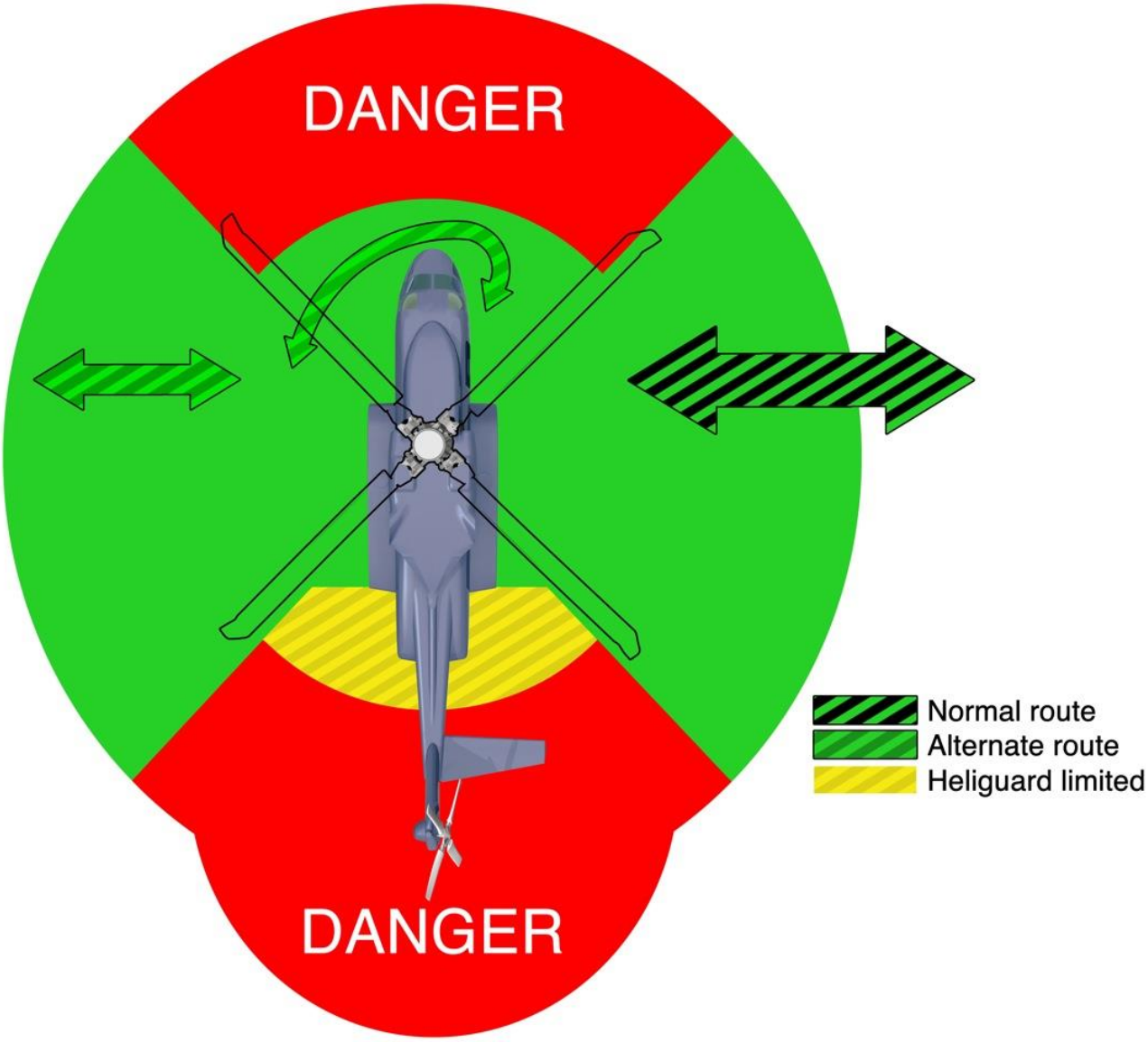
OK

HAND SIGNAL 5



Shut down, or stop refuelling

SIKORSKY S-92

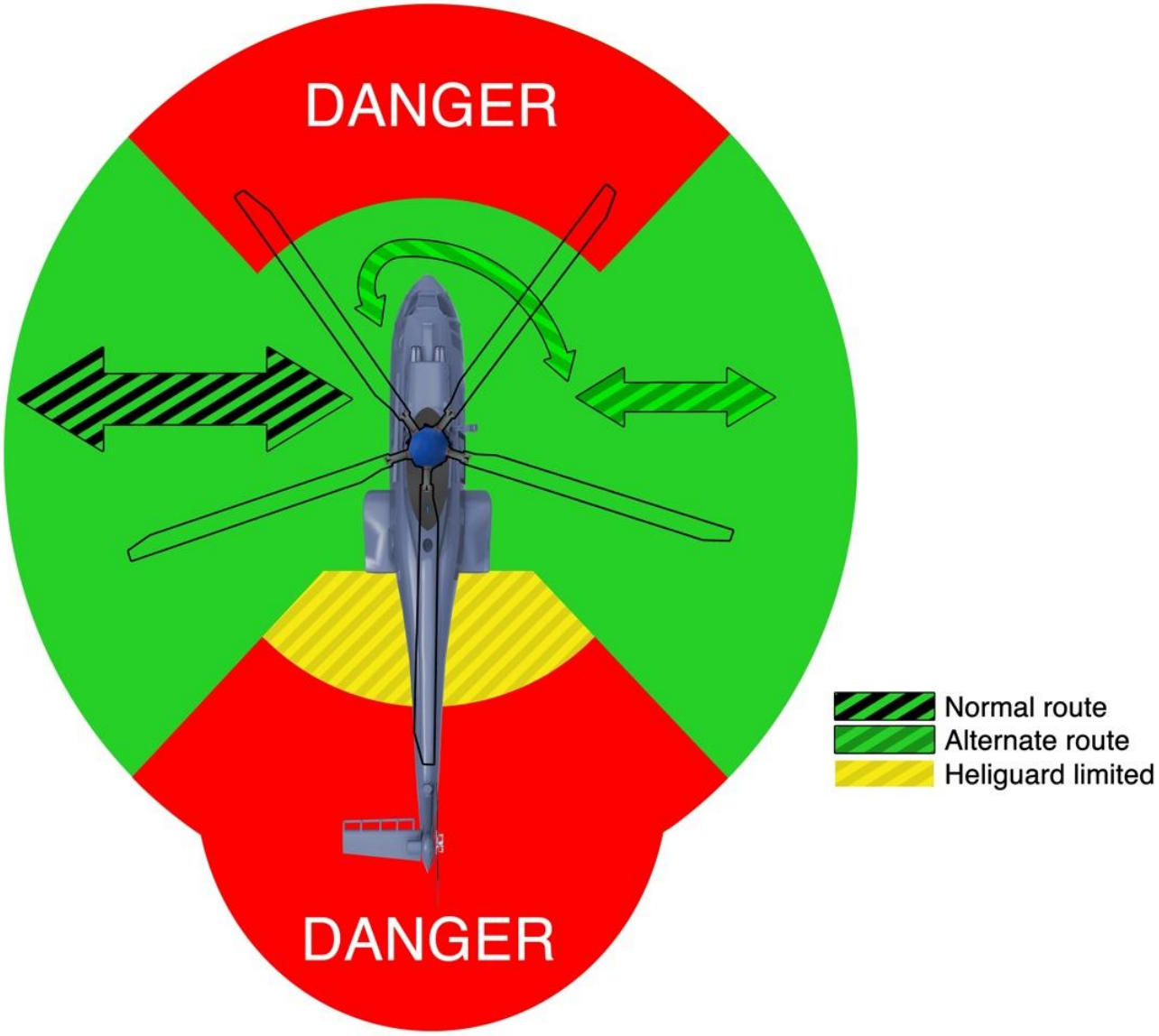


Alternate route to be used only under HLO supervision.

See alternative access in appendix G for procedures.

APPENDIX C – HELICOPTER DANGER ZONES

Airbus Super Puma

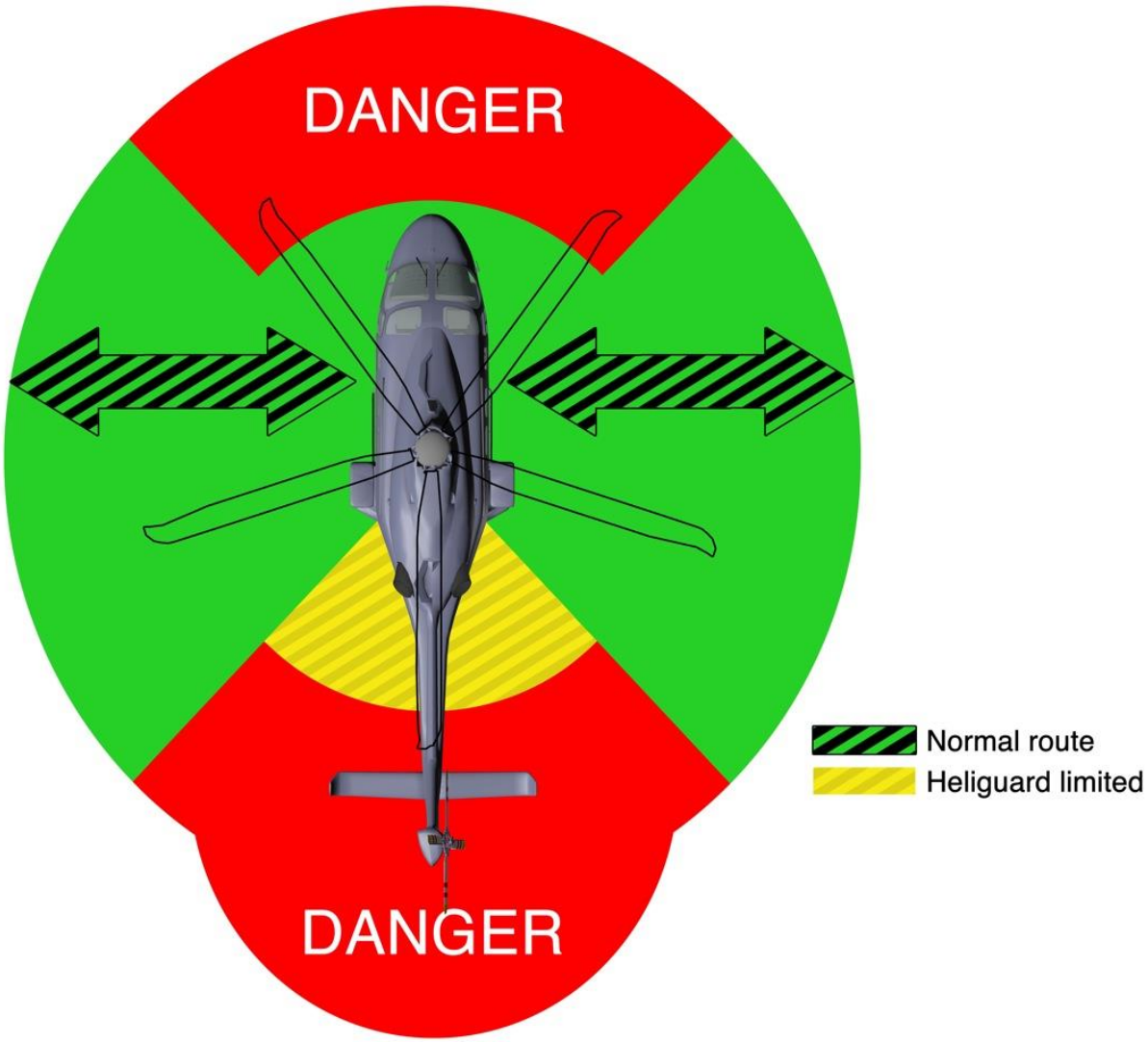


Alternate route to be used only under HLO supervision.

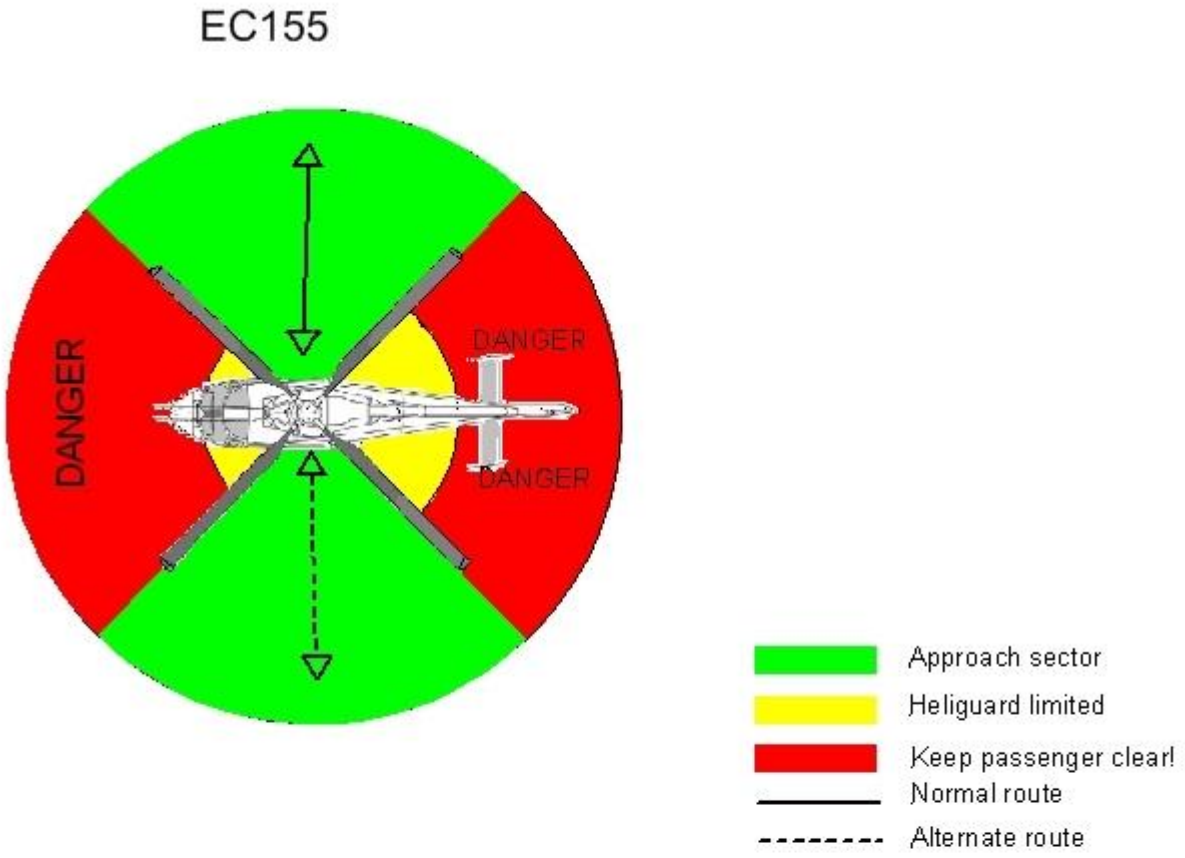
See alternative access in appendix G for procedures.

APPENDIX C – HELICOPTER DANGER ZONES

AgustaWestland AW139



APPENDIX C – HELICOPTER DANGER ZONES



Cross the helideck in front of helicopter (at a safe distance from the main rotor) only with permission from the helicopter crew.

FILTER WATER SEPARATOR/FILTER MONITOR FOLLOW-UP LOG

Facility:_____ Year:_____

Name/type, filter water separator _____

Elements type 1 Number _____ Date installed _____

Elements type 2 Number _____ Date installed _____

Name/type, filter monitor _____

Elements Number _____ Date installed _____

Functional test differential pressure	
Monitor	Separator
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	

Psi Bar

Max monitor 22

Max separator 15

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
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APPENDIX D – FORMS FOR HELICOPTER FUEL

Helicopter fuelling log

Rig/facility: Recipient of the form

Date	Flight no	Helicopter company	Registr letters (call sign)	Litres filled	Water sample		Pilot's signature	Daily inspection						Total sampled volume per day	HLO sign
					Before filling	After filling		Water/purity test			Diff pressure filters		Inspection hoses, connectors, nozzles, earth cables		
								Tank OK	Separator OK	Monitor OK	Monitor daily	Separator weekly*			

Hose inspection and test journal

Manufacturer:_____ Hose identification no:_____

Hose type:_____ Length:_____

Production date: _____ Diameter:_____

Hose with connector: Factory installed □ Locally installed □ (check one)

Date in service from:_____ Location:_____

Test date	Inspection interval		Test result	Signature
	Monthly	Annually		

Use one sheet for each hose in service or in storage.

APPENDIX D – FORMS FOR HELICOPTER FUEL

Inspection and cleaning log – fuel tank Jet A-1

Facility:_____

Tank no:_____ Capacity:_____

Stainless steel/type of interior surface treatment:_____

Date of inspection:_____

Inspection point	Signature of inspector
Approximate volume supplied since last inspection/cleaning	
Describe the condition at the last inspection: water or pollution, condition of the bottom plates and possible surface coating	
Describe the work done during cleaning	
Describe work or modifications carried out. Take account of changes in inclination or drain point	

Transport log helicopter fuel Jet A-1

Facility/vessel										**Year**			
Receipt of transport tank										**Return of transport tank**			
Date	Transport certificate no	Tank no	Seals OK?	Drainage samples			Volume received		Sign	Date	Returned fuel volume	Sealed	Sign
				Free of water		Particles	From certificate	Measured					
				Visual	Detector								

APPENDIX E - PHRASEOLOGY

PHRASEOLOGY

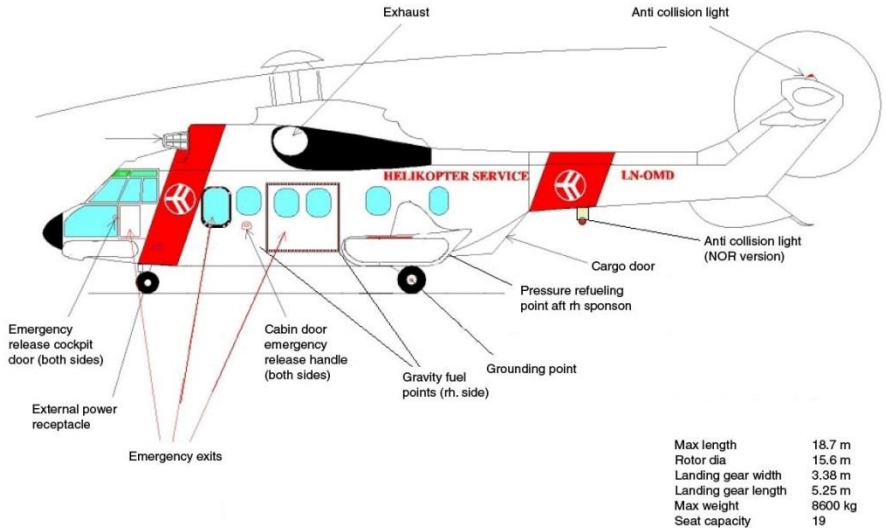
Specific words and phrases – known as standard phraseology – are used for radio communication in the aviation sector to achieve easier understanding. Making the greatest possible use of this phraseology is recommended. A list of standard English expressions with an explanation in Norwegian is provided below.

ABORT ldg /to	Avbryt landing eller avgang. Gjentas 3 ganger dersom en farlig situasjon oppdages.
ACKNOWLEDGE	Bekreft at min melding er mottatt og forstått
AFFIRM	Ja, eller tillatt
APPROVED	Godkjent
BREAK	Indikerer skille mellom meldinger
CANCEL	Annuller siste utsendte klarering
CONFIRM	Bekreft
CORRECTION	Rettelse, jeg har sagt noe feil….
DECK IS CLEAR	Dekket er klart for landing
DISREGARD	Glem, se bort fra
GO AHEAD	Begynn
HOW DO YOU READ	Hvordan hører du meg
I SAY AGAIN	Jeg gjentar
MONITOR	Lytt på frekvensen
NEGATIVE	Nei, ikke tillatt, feil
PASS YOUR MESSAGE	Kom med din melding
READ BACK	Repeter alt eller deler av sendingen
ROGER	Jeg har mottatt meldingen (ikke som svar)
SAY AGAIN	Gjenta alt eller deler av sendingen
SPEAK SLOWER	Snakk langsommere
STANDBY	Vent
VERIFY	Undersøk og bekreft
WILCO	Jeg har forstått og vil handle deretter

AIRBUS SUPER PUMA L/L1

Super Puma AS 332 L/L1

SUPER PUMA AS 332 L/L1

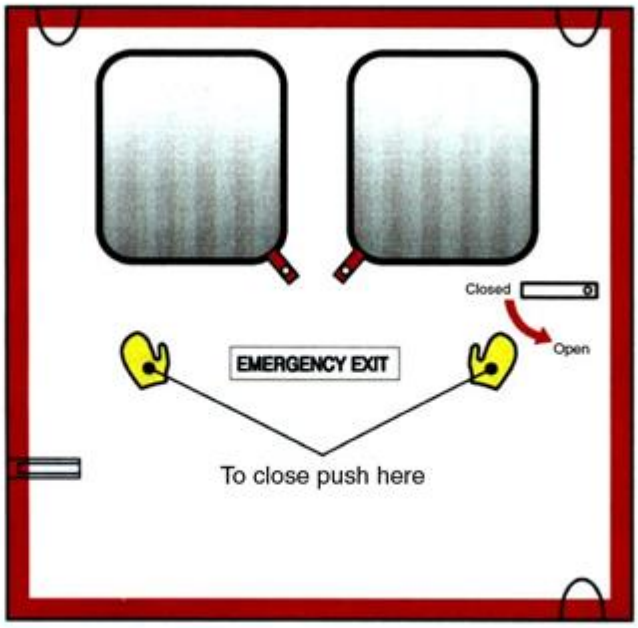


Max length	18.7 m
Rotor dia	15.6 m
Landing gear width	3.38 m
Landing gear length	5.25 m
Max weight	8600 kg
Seat capacity	19

OPERATION OF CABIN DOORS

Super Puma

Procedure for opening and closing of cabin doors



Open cabin door:

Pull the handle out and turn down to open position.
The door shall be fully released from the door frame.
Move the door forward to be "locked in open position".

Close cabin door:

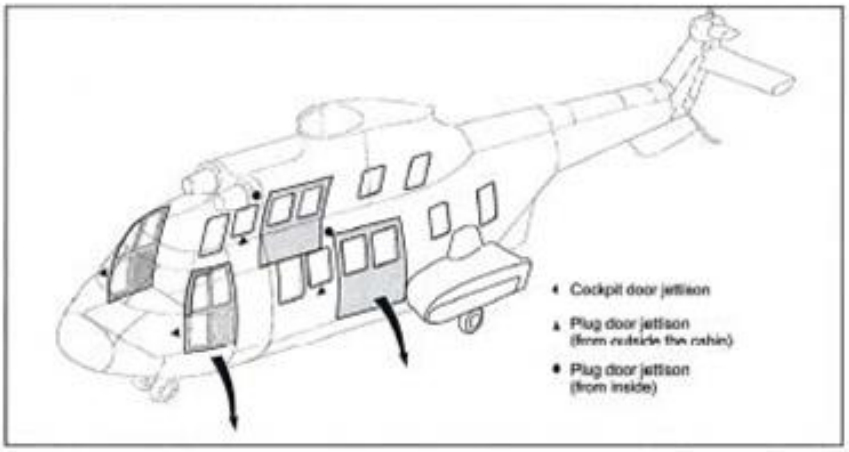
Rotate the door handle downwards and the door will release from "locked in open position".
Lead the door to stop in aft position.
Push the door into the door frame and the door handle automatically moves to mid position.
Rotate the door handle to closed position.

Lights in the cockpit indicates if the cabin doors are open.

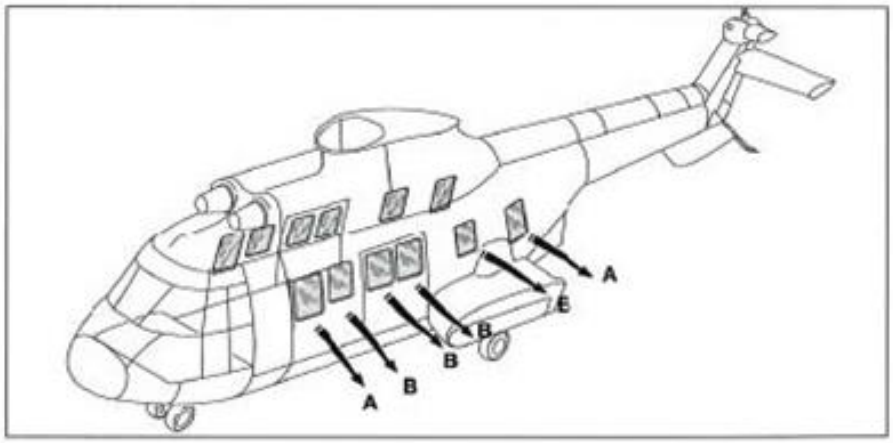
EMERGENCY EXITS

Opening the cockpit emergency exit: Turn the emergency release handle **in front** of the cockpit door downwards until the door releases from the hinges and falls free. (see fig.)

Opening the cabin emergency exit: Pull the handle in front of the cabin door until the door releases from the hinge tracks and falls free. (see fig)



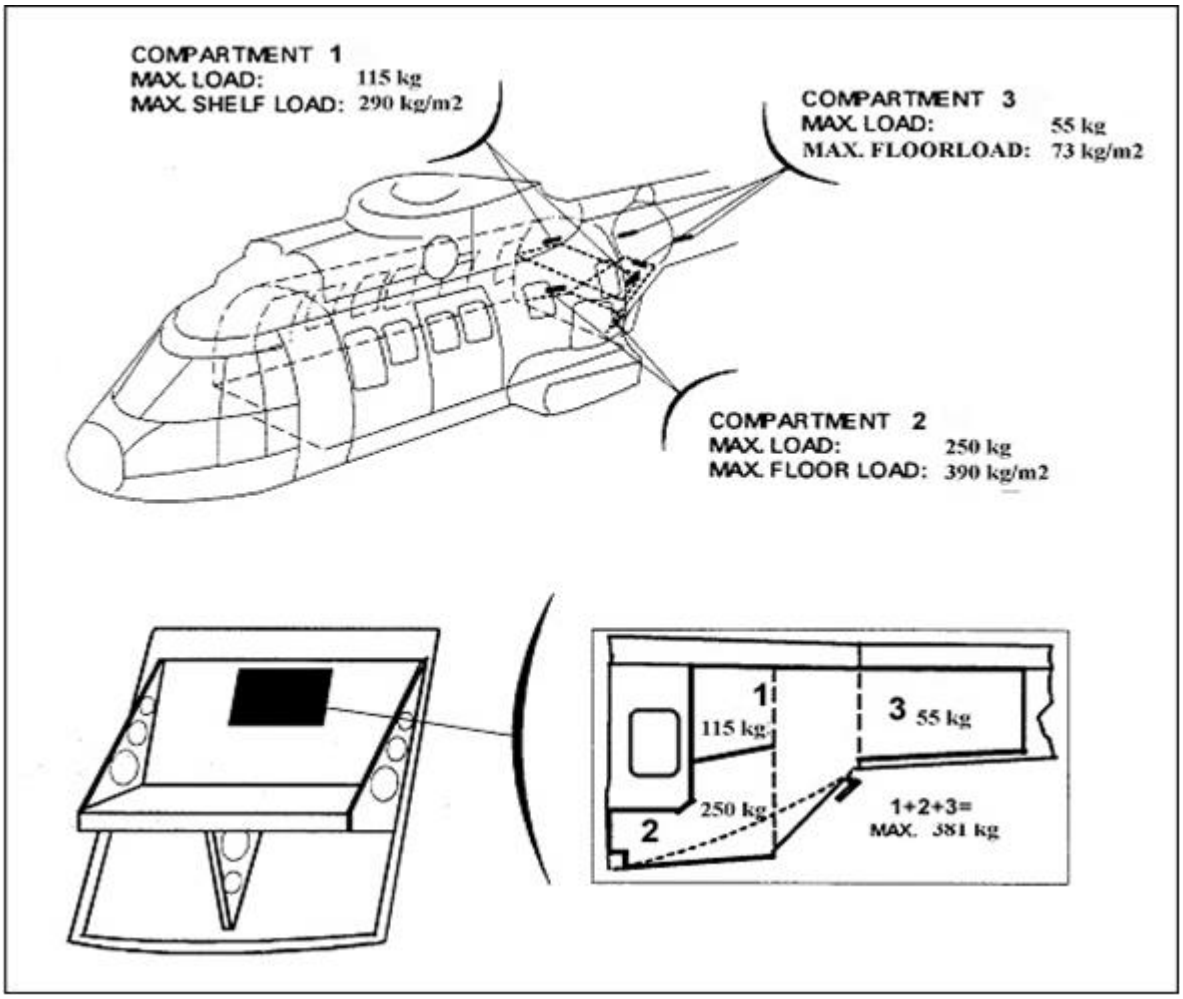
Main emergency exit doors



A: 4 x "type 4" emergency exits
B: 8 x normal windows

Window jettison

CARGO COMPARTMENT



APPENDIX F2 – SIKORSKY S-92

SIKORSKY S-92A- ALL VERSIONS

S-92A overview

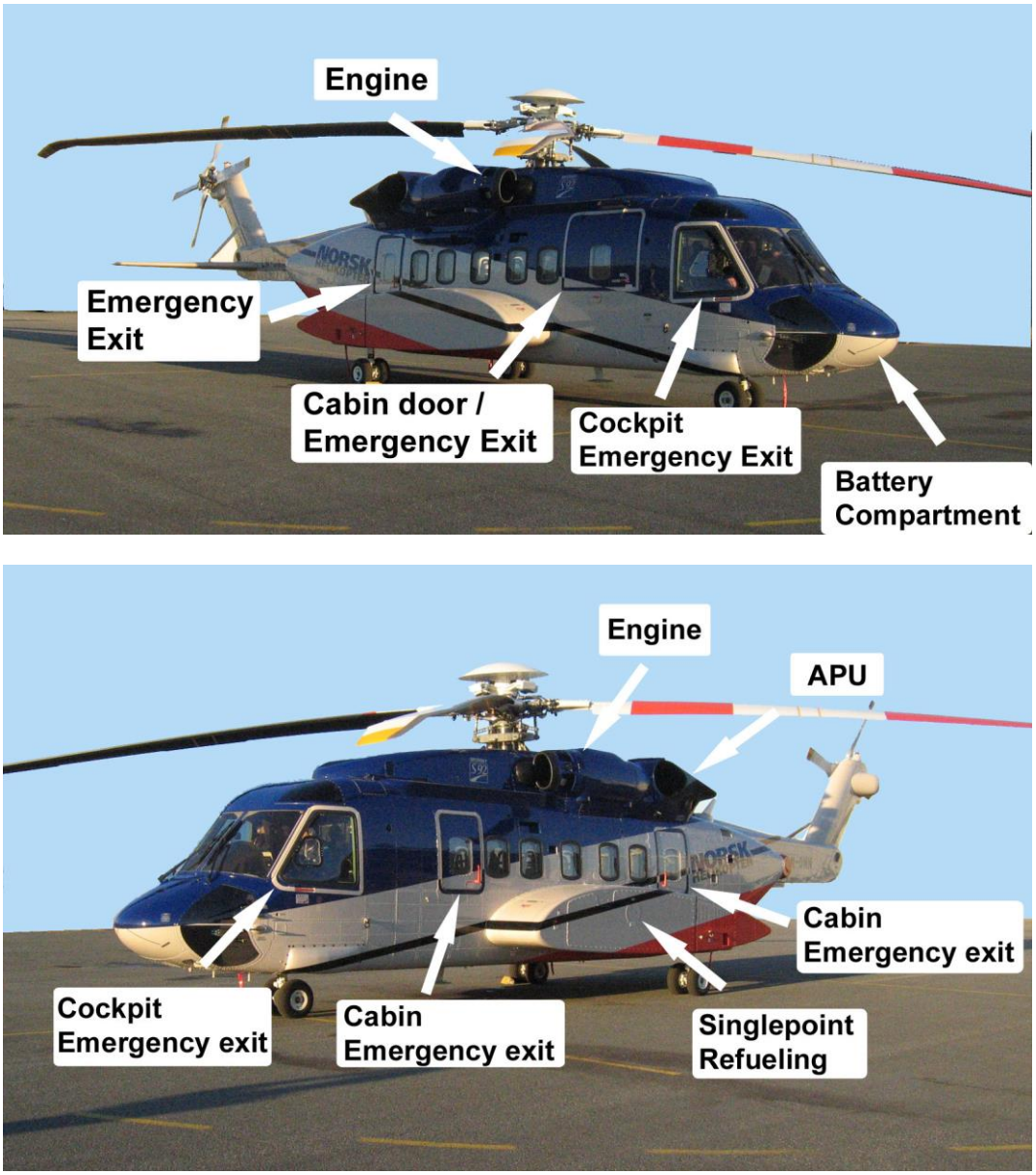


Fig. S-92A overview

General:

The S-92A is a twin turbine engine helicopter with a main rotor and a tail rotor. The cabin has 19 passenger seats and positions for two pilots in the cockpit. Entrance to the cabin is on the right-hand side of the fuselage via a door in front of the sponson. The cockpit is accessed from the cabin.

Access to the cargo compartment is via a ramp door facing aft under the tail section, and has no opening to the cabin.

The two engines and a turbine auxiliary power unit (APU) are located on the upper part of the helicopter. A battery is located in the nose section.

The aircraft has four cabin and two cockpit emergency exits. All exits can be opened from the outside.

CABIN DOORS

Cabin door

The cabin has one access door which consists of one upper and one lower part. The upper door comes in two variants: a clamshell door which opens upwards and a sliding door which opens by sliding aft. The lower door opens downwards and functions as a stair to the cabin when opened (airstair door).

Upper cabin door – clamshell

To open the clamshell door:
Rotate handle from locked to open position and pull door open. Opening will be aided by gas struts.
Secure the door in the fully open position by operating the locking levers on the gas struts.

To close the clamshell door

NB! The lower airstair door must be closed first, before the upper clamshell door.

- Unlock both upper door struts by depressing the locking levers.
- Pull the door down and keep the door handle in the open position while firmly closing the upper door.
- Turn the handle to the lock position and ensure the lock pins are engaged.

Fig. Upper cabin door – clamshell

APPENDIX F2 – SIKORSKY S-92

Upper cabin door – Sliding

To open the sliding door

- Rotate handle from locked to open position until the door releases.
- Grasp the forward edge of the door and slide aft until it locks in the fully open position.

NB! Do not use the handle to slide the door.

Fig. Upper cabin door – sliding

To close the sliding door

NB! The lower airstair door must be closed first, before the upper sliding door is locked.

- Release the open lock for the upper sliding door by pulling the red toggle located in the forward lower edge of the door. See fig.
- Take hold of the forward edge of the door and slide the door forward with the handle in the OPEN position.
- When the door is approximately half closed, check that the exterior handle is still in the OPEN position, place two hands on the door on either side of the window and push the door firmly forward and inward into the closed position.
- Check that the door is fully closed at the forward and aft edges, and turn the handle clockwise to the LOCK position.

  NB! Do not use the exterior handle to pull the door and do not move the handle from the OPEN position until the door is fully closed.

Fig. Locking toggle sliding door

Lower cabin door – Airstair door

NB! The upper door MUST be open before opening and closing the lower door. The door opens downwards and dampers will help to restrict door movement.

To open the lower cabin door

- Ensure the upper door is open.
- Rotate handle from locked to open position and lower the door.

To close the lower cabin door

- Ensure the upper door is open.
- Check that the internal operating handle in the edge of the door is in the stowed position and that the lock bolts at the forward and rearward edges of the door are fully retracted.
- Take hold of the lower edge of the door and raise it until the forward suspension cable is folded down against the door (the door will be approximately horizontal) and press the cable into the retention clip on the inside of the door panel.
- The handrail will be stowed automatically as the door is closed.
- Raise the door to the vertical position and check that the exterior handle is in the OPEN position.
- Hold the door by the upper edge with two hands placed at the forward and aft edges and push the door firmly into the closed position. Rotate handle to locked position.

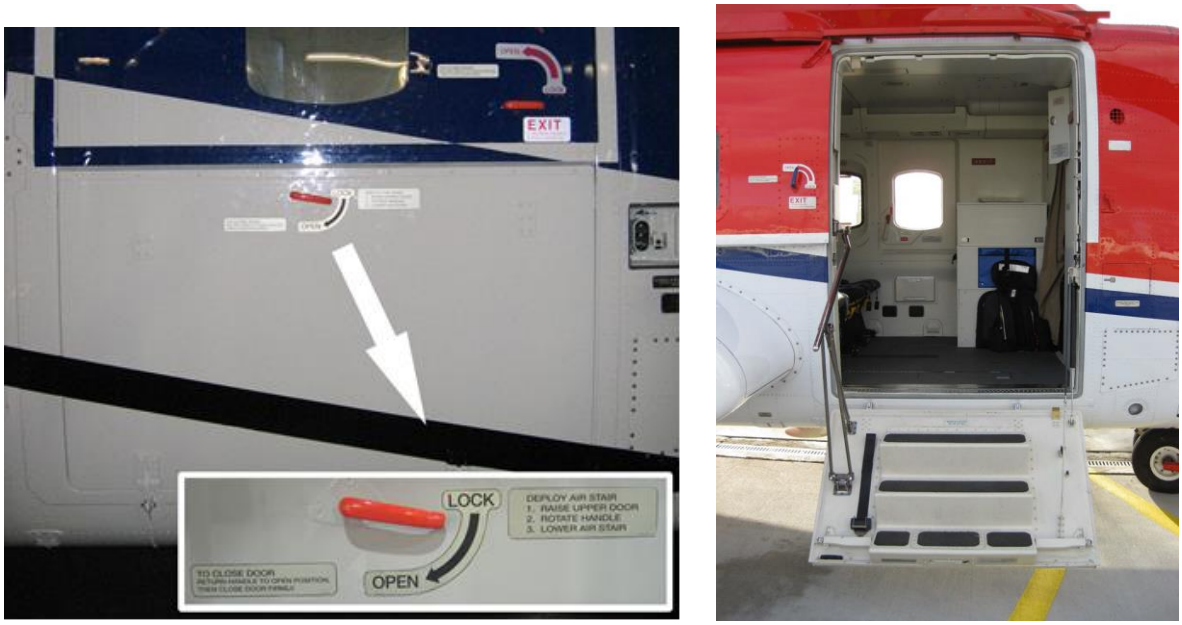


Fig. Lower cabin door – Airstair

Emergency exits

Cabin emergency exits

The cabin has three emergency exits in addition to the normal exit. The three cabin emergency exits are not hinged to the aircraft. When operating the handle, the emergency exit will be forced out at the bottom and then slide out of the frame at the top.

WARNING

SUPPORT THE HATCH DURING THIS PROCEDURE. FAILURE TO DO SO COULD CAUSE HATCH TO FALL AND CAUSE INJURY TO PEOPLE AND DAMAGE TO EQUIPMENT.

To open the emergency exit

- Rotate handle towards the open position and remove the emergency exit.

Fig. cabin emergency exit

Cockpit emergency exits

The two cockpit emergency exits are not hinged to the aircraft. When operating the handle, the emergency exit will be forced out at the bottom and then slide out of the frame at the top.

WARNING

SUPPORT THE HATCH DURING THIS PROCEDURE. FAILURE TO DO SO COULD CAUSE HATCH TO FALL AND CAUSE INJURY TO PEOPLE AND DAMAGE TO EQUIPMENT.

To open the emergency exit

- Push red button to release handle.
- Rotate handle towards open position and remove the emergency exit.

Fig. Cockpit emergency exit

Push-out cabin windows
The cabin windows in the fuselage are of a push-out type. They are not designed to be opened from the outside.

Grounding points

The helicopter must be electrically connected to earth during refuelling. Only approved connectors must be used in the dedicated ground receptacles in the fuselage.

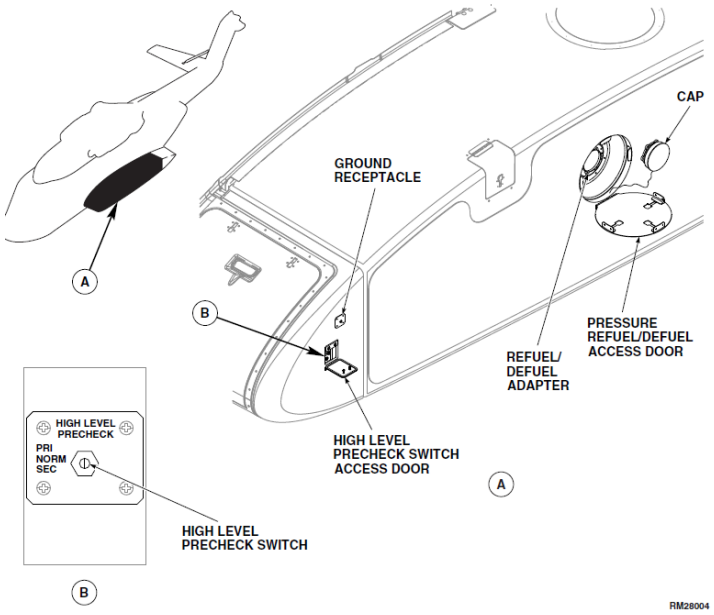


Fig. Ground receptacle point

ENGINE AND APU FIREFIGHTING

The engine and APU compartments are protected through the onboard fire extinguishing system.

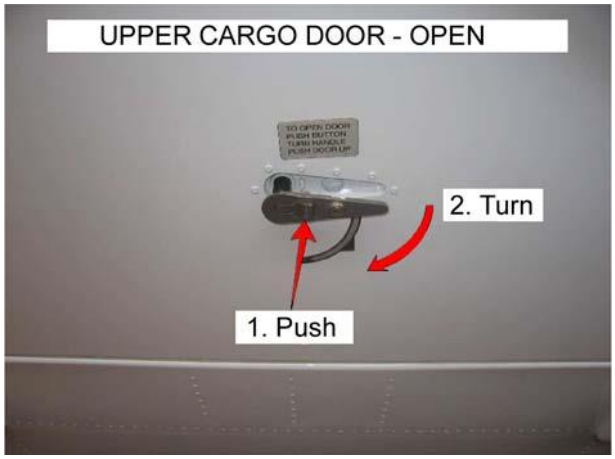
CARGO COMPARTMENT

The cargo area of the Sikorsky S-92A is located in the aft section of the helicopter fuselage. Access to the area is made through an upper cargo door and a cargo ramp. The upper door has to be opened/closed manually, while lowering/raising the ramp is hydraulic and controlled by a toggle switch on the ramp control panel, which is located on the right hand inside wall of the cargo compartment. The control panel also holds switches for interior and exterior lighting and a receptacle to connect to the helicopters intercom system.

Upper cargo door is opened in the following steps

- Push the door handle centre button to release the handle from its recessed position.
- Turn the handle clockwise and leave it in the open position.
- Push and hold the door in upper position.
- Turn handle counter clockwise to locked position.
- Push handle into the recess by pushing the handle ends.

WARNING: A protruding handle may cause injuries to personnel during loading and unloading of the cargo area.



UPPER CARGO DOOR

Cargo ramp is lowered in the following step

WARNING: The cargo ramp should not be lowered all the way to the surface as this might cause resonance in the helicopter.

- Toggle and hold the switch marked [RAMP] on the [RAMP CONTROL PANEL] from centre position and downwards to [LOWER] position until the ramp is approx. 4 - 8 inches above the surface, then release.

RAMP CONTROL PANEL

Cargo area lighting is turned ON in the following steps

- Toggle the switch labelled [BAGGAGE] on the [RAMP CONTROL PANEL] upwards to [ON] position to light up the internal cargo area.
- Toggle the switch labelled [CARGO] on the [RAMP CONTROL PANEL] upwards to [ON] position to light up the external cargo area.

Closing the cargo area
After loading the cargo, perform the following steps

- Close cargo net snap latches and tighten cargo net.
- Verify that the weight is within limits.

Closing the cargo area is a two-step process. First, the cargo ramp must be raised, and then the upper cargo door has to be closed.

Cargo ramp is raised in the following steps
WARNING: Check that no foreign objects or personnel are interfering with ramp closure.

- Toggle and hold switch labelled [RAMP] on the [RAMP CONTROL PANEL] upwards to [RAISE] position until the ramp is fully closed, then release.

Cargo area lighting is turned OFF in the following steps

- Toggle the switch labelled [BAGGAGE] on the [RAMP CONTROL PANEL] downwards to [OFF] position to turn off the internal cargo area light.
- Toggle the switch labelled [CARGO] on the [RAMP CONTROL PANEL] downwards to [OFF] position to turn off the external cargo area light.

Upper cargo door is closed in the following steps:

- Push the door handle centre button to release the handle form its recessed position.
- Support the door and turn the handle clockwise and leave handle in open position.

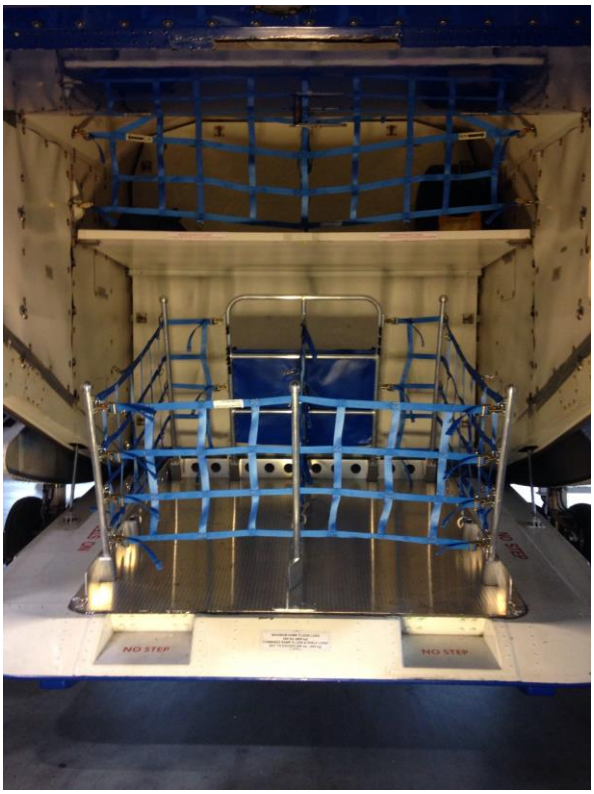
NOTE: The upper cargo door is equipped with dampers to reduce door closing speed.

- Pull upper door to rest on the ramp and turn handle counter clockwise to closed position.
- Push handle into the recess by pushing the handle ends.
- Check area and notify the crew that loading is complete and that the area is clear.

TWO TYPES OF CARGO STORAGE ARRANGEMENT ARE IN USE

TYPE 1. COMPARTMENT WITH ONE SHELF AND ONE BIN

The cargo compartment is equipped with one shelf on the cabin bulkhead and a storage bin on the ramp. Each is divided in two compartments by a cargo net.



The following limitations apply, and must under no circumstances be exceeded:

Shelf (Room 1 + 2):	136 kg (300 lbs)
Bin (Room 3 + 4):	404 kg (890 lbs)
Shelf + Bin	**404 kg (890 lbs)**

Total weight of cargo in the bin and on the shelf <u>combined</u> must not exceed 404 kg (890 lbs)

The baggage volume must not exceed the height of the ”fence” on the ramp to avoid crushing when the ramp is moved to the upper position, see dotted line in picture.

APPENDIX F2 – SIKORSKY S-92

TYPE 2. COMPARTMENT WITH TWO SHELVES

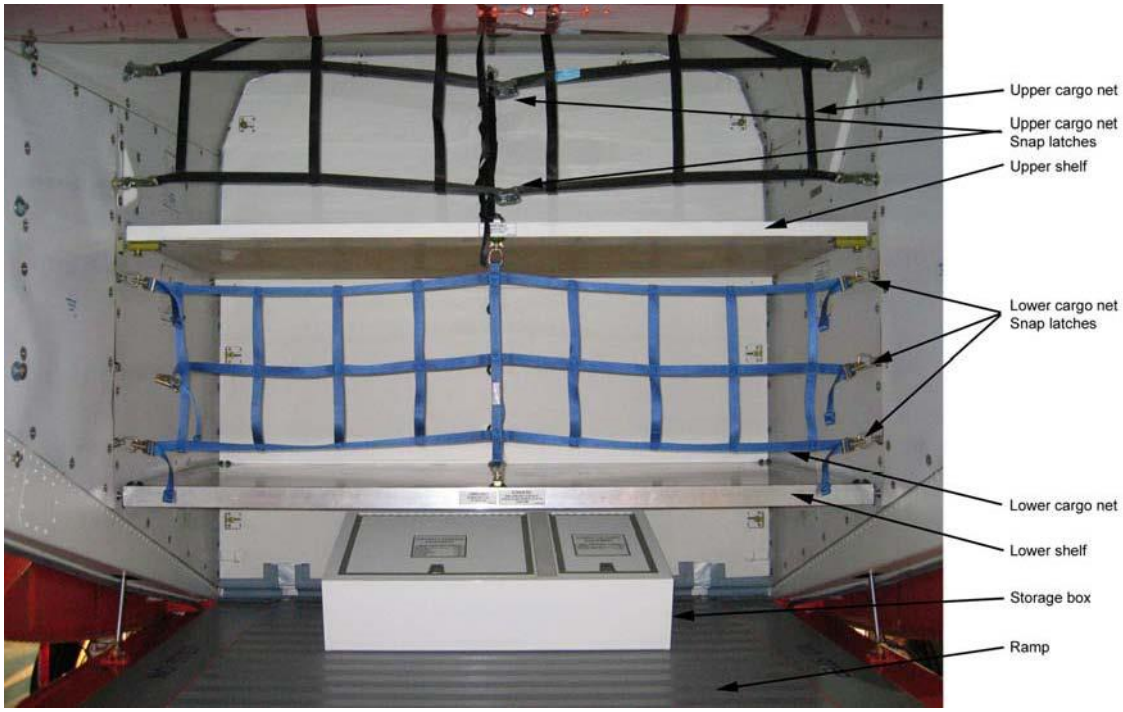
This type of cargo arrangement consists of two shelves, one upper and one lower. Each shelf is divided into two compartments by a cargo net with snap latches. The compartments are named 1, 2, 3, and 4.

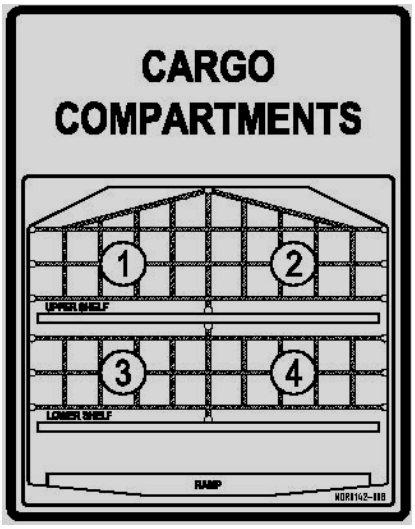
In addition to the shelves, a cargo storage box is installed on the ramp. This box is divided into two compartments. One is for the aircraft parking and mooring equipment and the other for cargo-related equipment, such as cargo attachment rings and jack straps. Each of these compartments is labelled with a decal describing the compartment contents.

The storage box must always be installed when the lower shelf is installed.

When cargo is loaded directly onto the ramp, the lower shelf and storage box must be removed and the cargo secured to the ramp.

Decals are also installed on the shelves and above the ramp control panel. These decals describe the cargo compartment areas and weight limitations.





CARGO COMPARTMENT DECAL

The following weight limitations apply and must in no circumstance be exceeded:

Upper shelf total (Areas 1 + 2):	136 kg (300 lbs)
Lower shelf total (Areas 3 + 4):	317 kg (700 lbs)
Cargo ramp:	453 kg (1 000 lbs)
1+2+3+4+ramp <u>combined</u>	**453 kg (1 000 lbs)**

Total weight loaded on the ramp plus upper and lower shelves <u>combined</u> must not exceed 453 kg (1000 lbs)!

CAUTION

Please note that the Sikorsky S-92A rotor downwash is very strong! Comparable to hurricane-force winds.

During take-off and landing it is very important that loose items located on or in close proximity to the helicopter deck is secured in a proper way. Baggage and cargo stored in trolleys must be secured with cargo nets.

Personnel should also be aware of residual strong downwash when boarding and disembarking from the helicopter. A pair of glasses and other loose items might come loose in these conditions if not secured properly.

Please contact the crew if additional information is required.

EUROCOPTER AC155

APPENDIX F3 – EUROCOPTER AC155

DanCopter EC 155 B1

The EC 155 helicopter can be handled from either side, as there are baggage compartment doors on both sides. Handling of passengers and cargo on the platforms should therefore be performed from the most convenient side for the helideck crew unless otherwise agreed. If the helideck crew has never received any instructions about how to operate the doors, please inform the pilots and ask for assistance. One of the pilots will demonstrate how to operate the doors.

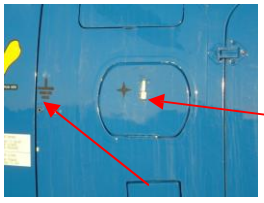
When opening the baggage compartment door, the light switches automatically on and vice versa.

The first step is to unload all baggage to the helideck. Close the baggage compartment door before the cabin door is opened. The passengers will leave their PLB in the aircraft, take their baggage, follow the directions of the helideck crew and leave the helideck as directed. When embarking passengers, the procedure is reversed.

When refuelling, all passengers will normally have to leave the helicopter and all doors must be closed. This gravity refuelling servicing is performed entirely on the left-hand side. Initially, the helicopter must be grounded with a grounding wire at the main wheel as illustrated below. Second, the grounding wire from the pistol handle must be grounded to the grounding point just left of the fuel caps as also illustrated. Remove fuel cap(s) and distribute the fuel in the rear or forward tank as agreed with the pilots. When refuelling is completed, close and secure the fuel caps, remove the pistol handle grounding and wind up the fuel hose. Finally remove the grounding wire from the main wheel and the passengers can board the helicopter again.

The battery is positioned on the left-hand side of the helicopter just forward of the pilot pedals, as illustrated.

Ground the helicopter to this grounding point with the grounding wire.



Grounding point for the pistol.

Opening the fuel caps.

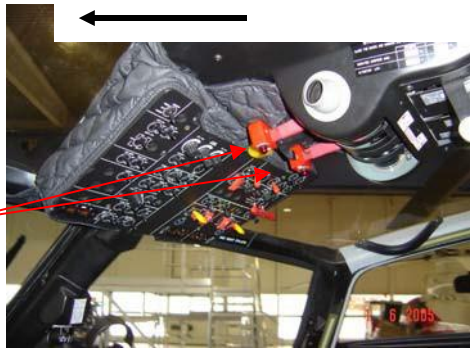
The battery is positioned on the left-hand side of the helicopter just forward of the pilot pedals behind this shield.

DanCopter A/S	DanCopter Allé 2,	DK – 6705 Esbjerg

Crash chart EC 155 B1

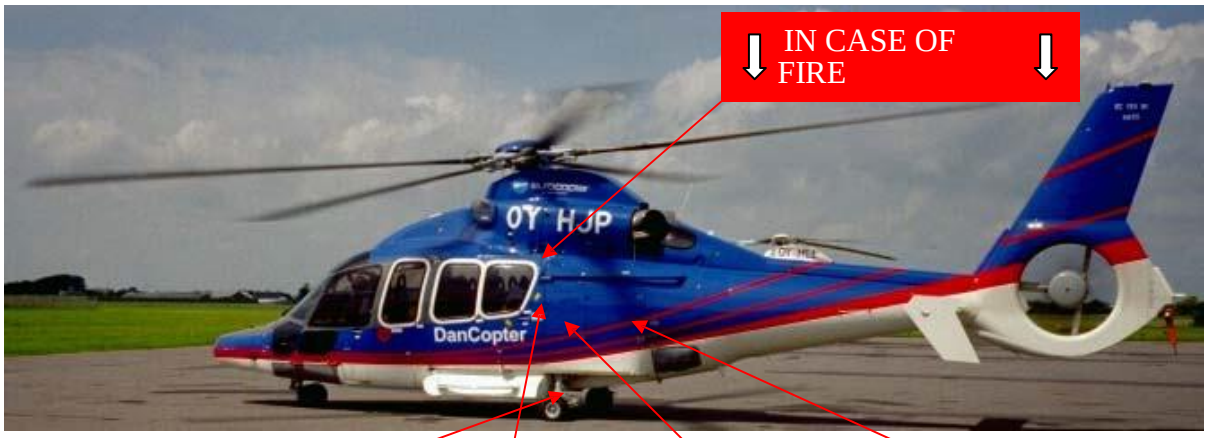
1. Access to cockpit
   Pull locking handle

2. Emergency cut-off handles will cut off engines and close fuel valves. Both handles must be pulled rearwards (overhead panel)



3. Access to cabin
   Pull locking handle

EC 155B1
FIRE ACCESS PANEL
SAME ON THE OTHER SIDE

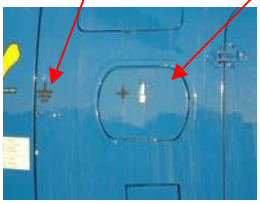


Grounding point for ground wire.

Grounding point for fuel hose.

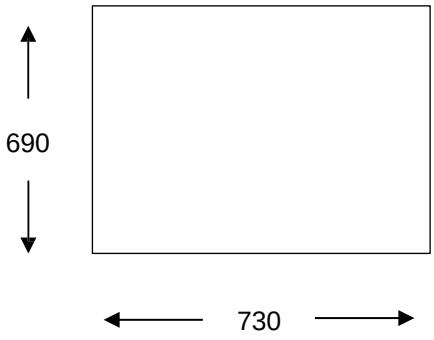
Fuel caps positioned only left hand side.

Baggage compartment.

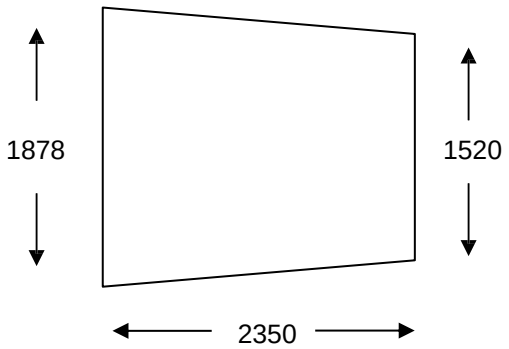


Baggage compartment

Size of the door in mm



Size of the floor



AGUSTAWESTLAND AW139

AW139 IN THE OFFSHORE CONFIGURATION

ACCESS

The cabin is accessed via sliding doors on both sides

OPERATOR

Blueway Offshore Norge AS – Bygdøy allé 2 – P O Box 573 Sentrum – NO-0101 Oslo – Norge
Tel: +47 6712 5400 – Fax: +47 6712 5401 – E-mail: info@bluewayoffshore.no - Reg enterprise no: 994 104 586

CARGO

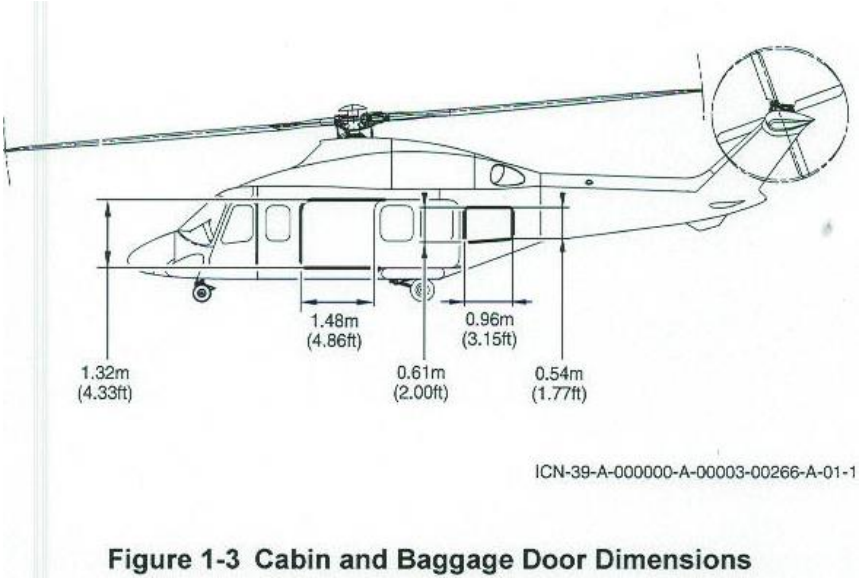
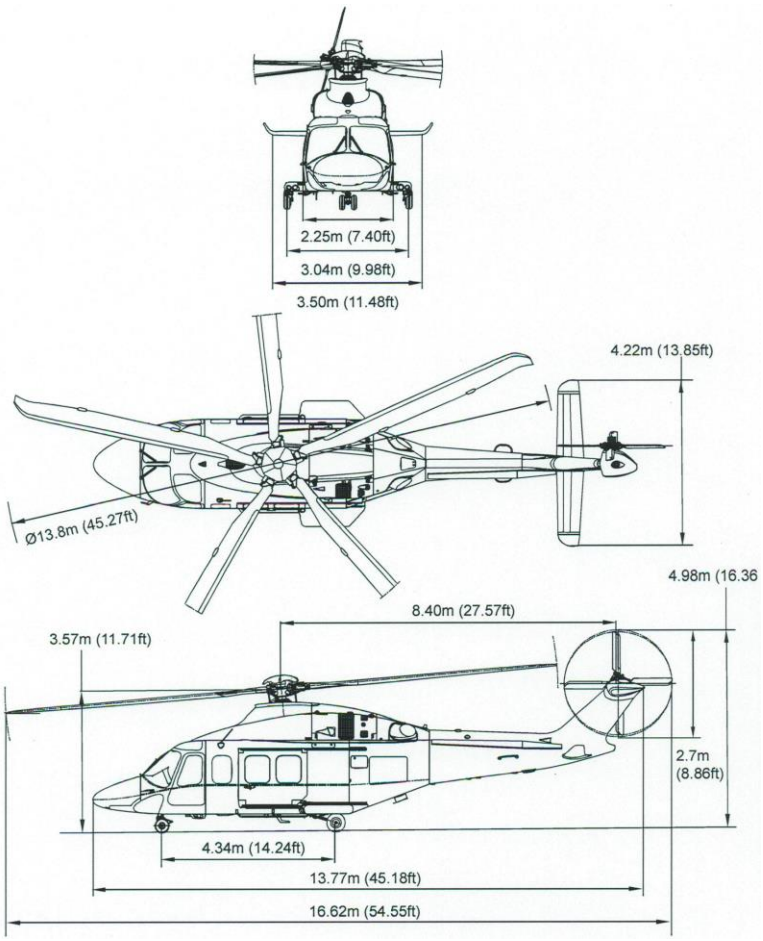


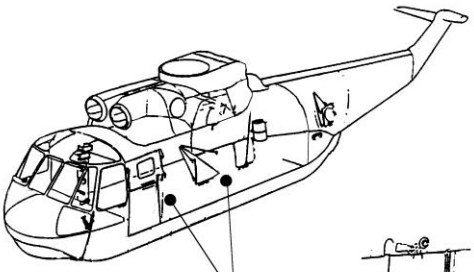
Figure 1-3 Cabin and Baggage Door Dimensions

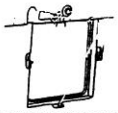
The cargo compartment has access via one door on each side of the fuselage.

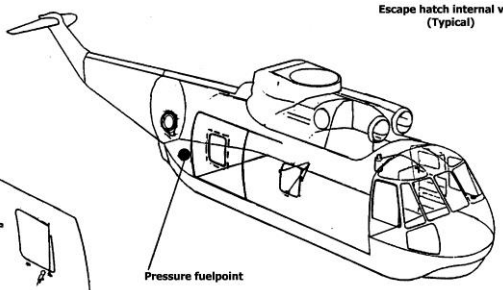
DIMENSIONS

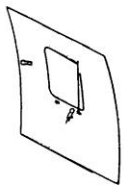


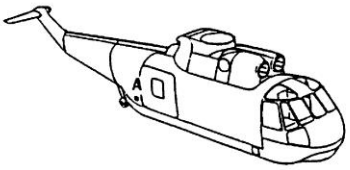
WESTLAND SEA KING

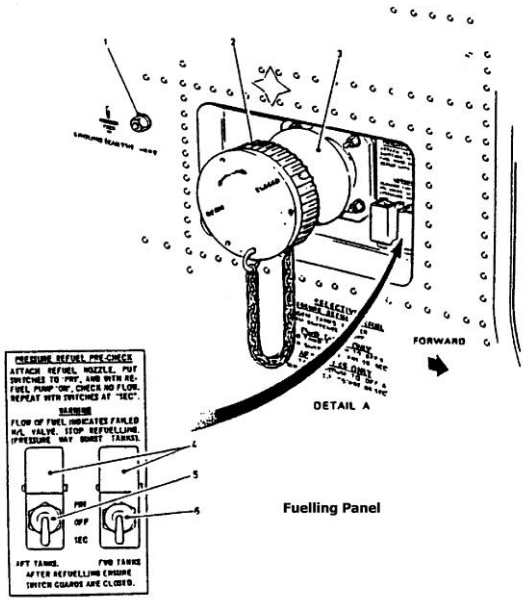








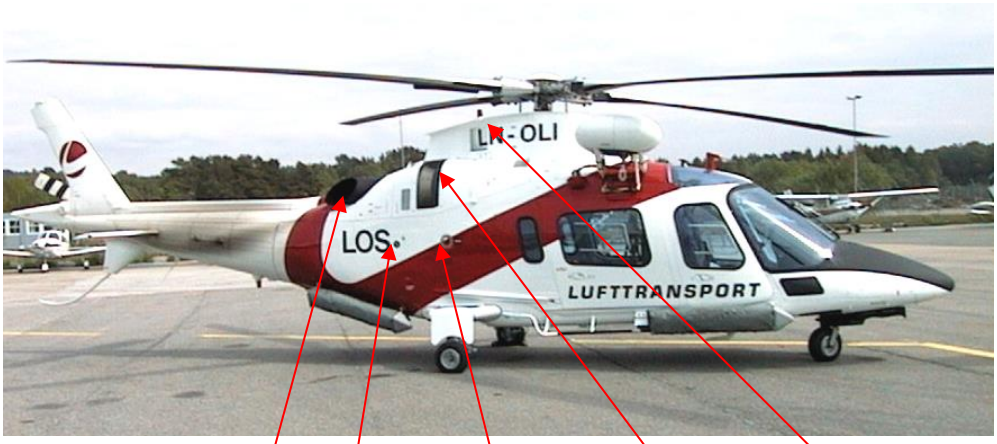




Fuelling Panel

APPENDIX F6 – AUGUSTA A109E

AGUSTA A109E



EXHAUST

GROUND HERE

GRAVITY FUELLING

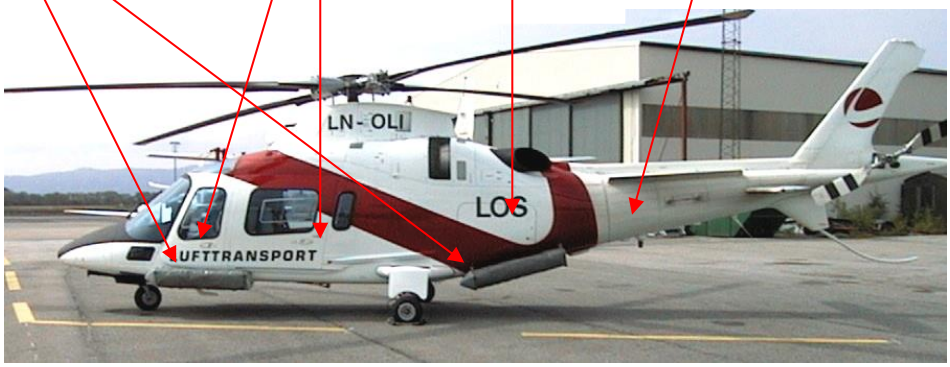
AIR INTAKE

ANTI-COLLISION LIGHTS

DOOR HANDLE - both sides

BAGGAGE COMPARTMENT

FLOATATION



Maximum length	13.04m
Rotor diameter	11.00m
Undercarriage width	2.15m
Undercarriage length	3.54m
Height under flat rotor	3.10m

Max total weight	2 850 kg
No of seats in cabin (offshore)	5
Max cargo in cargo compartment	150 kg

Crash chart of Agusta A109E

Emergency shut-off: Lift plastic covers and press buttons

To open passenger door either side of helicopter: lift latch and slide rearwards

To open pilot door either side of helicopter: lift latch and open

Agusta A109E :

- D-value .....13.04 metres
- Height under level rotor.....3.10 metres
- Rotor diameter..... 11.00 meters

APPENDIX G – TAKEOFF AND LANDING

HANDLING THE HELICOPTER DURING TAKEOFF AND LANDING

This appendix provides a step-by-step description of the commonest operations on the helideck for a crew of three:

- helicopter landing officer (HLO)
- heliguard
- fireguard.

The HLO is in charge of the heliguard and fireguard. The division of duties between heliguard and fireguard is tailored to local conditions in order to ensure safe and efficient operation. Other duties may be assigned as and when required.

During the period the helideck is staffed (from 20 minutes before landing to 15 minutes after takeoff), the HLO must have no other duties.

Operations are described on the assumption that exit stairs from the helideck exist. On facilities where these are not available, approved alternative exit routes are used.

This procedure builds on the principle of seeking to achieve optimal safety through standardisation across the companies on the NCS and through freeing the HLO from as many assignments as possible.

The helicopter companies specify that, during helicopter operations, the HLO must have a full overview of the helideck area, be in visual contact with the pilot, and be able to manage/control the operations in such a way that potential dangers are picked up and eliminated effectively.

In addition to provisions specified in the procedures, the pilot must be informed if the HLO leaves his post.

APPENDIX H – HELICOPTER ARRIVAL AND SHUTDOWN/START-UP

Helicopter arrival

From: the HLO is informed by the radio operator/communication officer that a helicopter is expected

Until: the helicopter is standing still on the deck with the rotor in motion and the chocks in place.

Operation: in good time before the helicopter's expected arrival

HLO	HELIGUARD AND FIREGUARD DUTIES
1. Verifies helicopter time of arrival 30 minutes before the notified time. 2. Musters on the helideck at least 20 minutes before arrival. 3. Verifies that any possible standby vessel in the vicinity is informed of the helicopter's arrival, and that no vessels are within 500 metres in the 180° zone or, if higher than the helideck, the 210° zone. 4. Informs the helicopter of possible vessels within 1 000 metres. Obtains information on the arriving helicopter, including estimated time of arrival, cargo amount and location, number of passengers and possible fuel requirements. With difficult weather conditions/special cargoes, assesses the need for and requisitions extra personnel. 5. Ensures that the day's inspection of helideck and refuelling plant has been completed, and that the findings are satisfactory. 6. Furthermore, checks that the helicopter's landing area is cleared of obstacles. 7. Briefs heliguard and fireguard, and possibly allocates duties to them.	1. Muster at least 15 minutes before arrival. 2. Prepare cargo for dispatch. 3. Check and prepare firefighting equipment. 4. Possibly receive the manifest and information about the number of arriving and departing passengers. 5. Don required equipment and portable VHF.

Operation: five minutes before the helicopter's expected arrival

HLO	HELIGUARD	FIREGUARD
1. Ensures crane operators are informed. 2. Monitors radio communication between helicopter pilot and facility (possibly the helicopter flight information service (HFIS)). 3. Ensures that the passengers are ready and waiting in a secure zone without access to the helideck. Physical barriers to be used.		1. Ensures that the fire monitors are aimed and adjusted.

APPENDIX H – HELICOPTER ARRIVAL AND SHUTDOWN/START-UP

Operation: immediately before helicopter lands and during landing

HLO	HELIGUARD	FIREGUARD
1. Ensures that all the cranes have ceased operation. Peripheral crane operations are permissible, but the pilot must be informed. 2. Notifies the pilot via VHF that the helideck is cleared for landing, and warns if any sea spray has been observed on/over the deck. 3. Takes up a safe position by the most suitable stairway, preferably on the upwind side, with a view over the helideck. NB! Check that the undercarriage is down. 4. Monitors continuously, and reports possible abnormal conditions immediately.	1. Stands in a safe position in visual contact with the HLO.	1. Stands at the upwind fire post, alternatively at the remote control unit. Stays at full alert and with the alarm system switch within reach.

Operation: after landing

HLO	HELIGUARD	FIREGUARD
1. After the anti-collision lights have been switched off, signals the heliguard that entry to the helideck is now permitted. 2. Can take a set of chocks and position these on the main wheels, and can receive/deliver the manifest from/to the pilot. 3. Takes up a position within the safe rotor zone which ensures eye contact with the pilot and provides a full overview of the helideck.	1. At the HLO's signal, brings chocks, enters the helideck and positions these on the main wheels (chocks must be placed on both sides).	1. Remains at the fire post until the chocks have been put in position on both sides.

Helicopter on the helideck

From: the helicopter is standing still on the deck with the rotor in motion and the chocks in place

Until: loading the helicopter with passengers and cargo has been completed and the the helideck is cleared.

Operation: disembarking and unloading

HLO	HELIGUARD AND FIREGUARD DUTIES
1. Remains in the best position for eye contact with the pilot and for maintaining a full overview of the helideck. 2. While the helicopter has its rotor engaged, all movement by people will primarily take place at a 90° angle to the helicopter's longitudinal axis and then outside the rotor disc. See appendix C.	1. Install possible railings required at the exit. 2. Open cargo compartment hatches, unload baggage and cargo. 3. Place baggage outside the cabin door or together with cargo on the baggage trolley. 4. Open the relevant cabin door and let the passengers out. They will take their baggage with them to the exit as directed. NB! Only one cabin door is opened, so that loose objects do not blow out of the helicopter. Ensure that the passengers keep a tight hold on any light objects.

Operation: boarding of passengers and loading

HLO	HELIGUARD AND FIREGUARD DUTIES
1. Checks that the heliguard is ready to receive passengers and then gives the signal to the fireguard at passengers can enter the helideck. 2. Directs/signals the passengers to the safe boarding route (outside the rotor disc) up to the heliguard. 3. Remains in the best position for eye contact with the pilot and for maintaining a full overview of the helideck.	1. On the HLO's signal, collect boarding cards at the stairwell and point the way to the helicopter. Signal to the HLO that the numbers tally. 2. Lead the passengers safely to the helicopter and show where baggage is to be placed. NB! In high winds, take care with light bags/cargo. 3. Stow the baggage and close cargo compartment hatches. 4. Check that all the passengers have fastened their seatbelts. 5. Close the cabin door. 6. NB! Cabin cargo must be taken on board and secured before the passengers are allowed to board. When loading a Super Puma, inform the pilot of the total weight in cargo compartment 3.

Helicopter takeoff

From: heliguard clears the helideck

Until: two minutes after helicopter takeoff.

Operation: preparing for takeoff

HLO	HELIGUARD	FIREGUARD
1. Signals the heliguard to remove the chocks on the left-hand side. Removes the chocks on the right-hand side. 2. When the helideck is ready and the fireguard in position, gives a clear "thumbs up" to the pilots. 3. Monitors takeoff and radio communication, and reports possible abnormal conditions immediately. 4. Ensures that nobody leaves their post until two minutes after takeoff. Furthermore, ensures that everyone remains in readiness for another 15 minutes or until the helicopter has landed on another facility.	1. At the HLO's signal, removes the chocks on the left-hand side. 2. Stays then at their post until two minutes after takeoff, listens to the VHF in case a possible return to the facility by the helicopter is reported. 3. Then remains in readiness at the direction of the HLO.	1. Dons full fire protection gear. 2. Takes position at the upwind fire post, alternatively at the remote control unit. 3. Stays at their post until two minutes after takeoff, listens to the VHF in case a possible return to the facility by the helicopter is reported. 4. Then remains in readiness at the direction of the HLO.

Alternative access

Procedures for alternative disembarking and boarding with guidance from helideck crew

This procedure will be used if the normal procedure cannot be used because access to the helideck on the same side as the helicopter entrance is prevented.

Operation: disembarking around the nose of a S-92A/Super Puma

HLO	HELIGUARD AND FIREGUARD
1. Moves towards the nose of the helicopter from the side, retaining eye contact with the pilots and a view to each side, and takes position about one metre from the front of the nose and well inside the rotor tip. 2. Directs passengers from the heli/fireguard standing at the cabin door around the nose towards the baggage and/or the heli/fireguard standing at the edge of the helideck. See appendix C on danger zones.	1. Open the cargo compartment and place the baggage about 90° in relation to the helicopter on the opposite side from the cabin door or on the baggage trolley. 2. A heli/fireguard opens the cabin door and directs the passengers towards the HLO standing in front of the nose. 3. The other heli/fireguard takes position at the end of the line of baggage on the edge of the helideck and directs passengers to the nearest exit.

Operation: boarding around the nose of a S-92A/Super Puma

HLO	HELIGUARD AND FIREGUARD
1. Takes position about one metre from the front of the nose and well inside the rotor tip, while retaining eye contact with the pilots and a view to each side. 2. Checks that the heli/fireguard is in position alongside the cabin door, ready to receive the passengers. Then gives the all-clear to the heli/fireguard standing at the stairway to admit the passengers to the deck. 3. Directs the passengers along the safe route between themself and the helicopter nose, and towards the heli/fireguard at the cabin door. 4. Returns to their normal position on the helideck outside the rotor zone when the passengers are on board, and secures a full overview of the helideck.	1. A heli/fireguard takes position at the door to the helicopter cabin. 2. The other heli/fireguard takes position at the stairway being used. 3. When the HLO gives the signal, they collect and count boarding cards at the stairway. The heli/fireguard directs passengers towards the HLO. 4. The heli/fireguard positioned outside the cabin door points out where baggage is to be placed and directs passengers on board.

HELICOPTER SHUTDOWN/START-UP

From: helicopter on deck, passengers have left both helicopter and helideck and the anti-collision lights have been turned back on

Until: the rotor has stopped and the anti-collision lights have again been turned off.

Operation: preparations

HLO	HELIGUARD	FIREGUARD
Stands in the safe zone with a full overview of the helideck and the wind at their back.	Stands in the safe zone at the stairway.	Maintains fire watch.

Operation: shutdown

HLO	HELIGUARD	FIREGUARD
The helideck can be entered when rotor has stopped and the anti-collision lights are turned off. Secures help to tie down the rotor blades and the helicopter as required.	At the HLO's request, helps to secure the rotor blades and helicopter.	At the HLO's request, helps to secure the rotor blades and helicopter.

Helicopter start-up

From: helicopter on the helideck with pilots on board and anti-collision lights turned on

Until: helicopter has both engines running and the rotor turning, the anti-collision lights are turned off, and the helicopter is ready to receive passengers and cargo.

Operation: preparations

HLO	HELIGUARD	FIREGUARD
Maintains eye contact with the pilot and a full overview of the helideck. No passengers should be on board during start-up unless the pilot so wishes.	Stands at the stairway so that they have an overview of the helideck.	Fireguard stands at the relevant fire post/remote control unit wearing full fire protection gear.

Operation: start engines

HLO	HELIGUARD	FIREGUARD
Stands in the safe zone in front of the helicopter. Helps the fireguard when necessary.		Stands on the specified side of the helicopter with access to extinguishing agents in order to observe engine start-up. Portable powder extinguishers must be available on the helideck. (When changing position after no 1 engine has started and the rotors are turning, must walk outside the rotor disc to the next engine). In the event of fire in or under the helicopter, alerts the pilot/HLO by walkie-talkie or by giving the "shut down" signal. Starts to extinguish the fire.

Operation: final start-up stage, passenger boarding and loading/takeoff without passengers

HLO	HELIGUARD	FIREGUARD
At the pilot's signal (anti-collision lights off), starts boarding passengers and loading cargo, removes chocks. When the heliguard is ready, signals the fireguard that boarding can commence.	Takes position and signals the HLO that boarding can commence.	Goes to the stairway to await the HLO's signal to start passenger boarding.

GUIDANCE FOR RADIO OPERATORS

EXCHANGE OF LOGISTICS INFORMATION

About 20 minutes before the estimated time of arrival (ETA), the helicopter will establish contact with the radio operator/bridge to update/obtain information on:

- position, as well as heading and speed where relevant
- weather conditions
- helideck motion
- return load
- obstructions in the vicinity (within 500 metres) of the approach/ departure sectors
- fuel requirements.

The facility should have dispatched a helideck report to the heliport an hour before the planned time of departure from land. This report is carried by the helicopter crew during the flight. Only changes from the report submitted earlier therefore need to be updated.

POSITION

Position must always be stated in latitude and longitude with the following format:
N dd mm. mm E ddd mm. mm
d = degrees
m = minutes and decimals of minutes
The heading of the facility is stated in degrees (magnetic north).
Speed is stated in knots.

WEATHER CONDITIONS

If visibility is better than 10 kilometres and the cloud base higher than 1 000 feet, reference can be made to the helideck report provided earlier. Wind direction and speed as well as the QNH must always be reported. If visibility and the cloud base are below the values given above, a verbal update must be provided to the helicopter crew in the following format.

- Wind direction, in degrees
- Wind speed with gusts, in knots
- Visibility, in metres or kilometres
- Clouds/cloud base (FEW/BKN/OVC), in feet above sea level
- Relevant temperature, in degrees Celsius
- Dew point temperature (if available), in degrees Celsius
- QNH, in hectopascals
- Possible squalls or other weather phenomena of interest to the helicopter crew.

HELIDECK MOVEMENT

If deck movement is smaller than plus/minus one degree (less than one degree to any side in relation to the horizon), and vertical movements (heave) are smaller than two metres, the helideck can be considered stationary. Details do not have to be provided in such cases.

In the case of facilities with a helideck monitoring system (HMS), it should be sufficient to report “we have a GREEN deck on HMS”, unless the helicopter crew requests details.

RETURN LOAD
This is specified in the following format (about 20 minutes before landing).

For each departure
Number of passengers/passenger weight/baggage weight/weight of possible cargo/total weight

Example

Helibus 123, your return load will be:
- From Balder lifting with 14 pax/pax weight 1 359 kilograms/baggage 140 kilograms/cargo 12 kilograms/total weight 1 511 kilograms
- From Ringhorne lifting with 16 pax/pax weight 1 578 kilograms/baggage 164 kilograms/cargo eight kilograms/total weight 1 750 kilograms
- From Jotun A lifting with 18 pax/pax weight 1 795 kilograms/baggage 198 kilograms/no cargo/total weight 1 993 kilograms

OBSTRUCTIONS IN THE VICINITY (WITHIN 500 METRES) OF THE APPROACH/ DEPARTURE SECTORS
This information is exchanged for two reasons:
1. to verify that lack of obstructions is maintained pursuant to chapter V – obstacles of BSL D 5-1.
2. to give the helicopter crew a better mental picture under marginal weather conditions of what to expect when they emerge from the clouds.

FUEL REQUIREMENTS
This information is exchanged now so that the HLO can prepare for refuelling when the helicopter is on the helideck.

Example of communication

Helicopter: *Seaway Falcon*, this is Helibus/Norsk 123
Facility: Helibus/Norsk 123, this is *Seaway Falcon*
Helicopter: We are on our way to you, and have an ETA (estimated time of arrival) of 23 (minutes past the hour)
Facility: You will be here at 23. Are you ready to receive the details?
Helicopter: We are ready. Go ahead
Facility: Our position is N 59 31.35 E 006 46.55
We have a heading of 300 degrees
Our speed is five knots
Weather in the area:
Wind from 270 degrees, 25 knots, gusting 35 knots
Visibility three kilometres
We have broken (BKN) at 800 feet
Temperature eight degrees
Dew point five degrees
QNH 989 hectopascals
A shower has just passed us
The HMS shows green deck
Return load:
You will be lifting with 19 pax/pax weight 1 895 kilograms/baggage 100 kilograms/freight 10 kilograms/total weight 2 005 kilograms.
We have one trawler lying 500 metres due south of us, heading south. No other vessels in the area.
Do you require fuel on arrival?

Helicopter: All received. We copied QNH 989. Negative refuel.
Facility: We copied negative fuel. *Seaway Falcon*.

CHANGES TO WEATHER CONDITIONS
If weather conditions change, whether it be visibility, cloud base, helideck movement or any other aspect which could be of interest to the helicopter crew, this must be reported immediately over the radio.

SPECIFICATION FOR OFFSHORE REFUELLING SYSTEMS

This specification is applicable for all fixed and floating installations operating on the Norwegian shelf. Specific class requirements from the Norwegian Civil Aviation Administration (CAA-N - BSL D 5-1), the Norwegian Maritime Authority (NMA), Norwegian Petroleum Directorate (NPD), Class (BV, ABS, DNV and Lloyds) and UK regulations CAP 437 latest revision must be complied with.

This specification is based on the requirements made by the Norwegian Offshore Helicopter Operators for offshore helicopter refuelling systems and the approval of the refuelling systems will be done by them.

General information

No threaded connections are accepted in all wetted parts. Exceptions are the connection to the 30m fuel hose, nozzles, dry break coupling, gauges, air eliminators, sample valves, instruments & instrument fittings.
A complete system description and specific operation procedure shall be available to the operator.

Materials:

All pipework (Norsok AS20) and accessories shall be of stainless steel or mild steel protected internally by lining with approved epoxy material. No copper alloys, cadmium plating, galvanised steel or plastic materials is permitted. The use of copper containing materials for other components in contact with the fuel shall be minimised and no zinc or alloy materials containing more than 5% zinc or cadmium shall be used.

No flow in the process line shall exceed maximum 7 m/s.
Grade marking: All units must be marked in accordance with API requirements.

Design criteria

- Norwegian Maritime Authority (NMA).
- Norwegian Petroleum Directorate (NPD).
- Class requirements shall be followed by all vessels (except fixed installations).
- Norsok standards
- CAP 437
- Transportable tanks: DNV 2.7-1 & IMO/IMDG requirements. They shall also conform to the “dangerous goods Code Type 1 or 2”
- Storage and recycle tanks: TBK, ASME VIII and BS5500 Categories I, II, III,
- Filter water separators according to API/IP 1581 Specification and qualification procedures for aviation jet fuel separators, latest edition.
- Aviation fuel filter monitors according to API/IP 1583 Specification and qualification procedures for aviation fuel filter monitors with absorbent type elements, latest edition.
- Refuelling hose type C, grade 2, semi-conducting, meeting the latest edition of API 1529 or BS/EN 1361.
- Vessel movements, wind and explosion loads must be taken into consideration during construction of the system.

HELICOPTER REFUELLING SYSTEM

The following subsections describe the scope for these rules and regulations.

LAYDOWN AREA FOR TRANSIT TANKS

Laydown skid

The drip tray shall be sized to hold 100% of the content of one tank.

The laydown skid must be equipped with a 2" or preferably 3" drain connection.

To protect the deluge system/pump unit from damage during tank handling a guide/ buffer frame is recommended welded to the base of the skid.

Transportable tanks should be properly sea-fastened on moving vessels.

A valve shall be mounted on the Jet A-1 outlet point (skid edge).

A convoluted stainless steel suction hose with a 2.5" dry break coupling shall be used to connect the transit tanks to the pump unit. Other end should be sized to fit the pump unit inlet flange (ANSI 150lbs).
The base frame shall be bonded from two different locations.

Deluge system

A deluge system shall be installed in accordance with design criteria.
A calculation report (hydraulic calculation) for the deluge system shall be available upon the surveyor's request.
Fire detection: in accordance with class requirements or oil company's specification.

Transit tanks

Transit tanks shall be constructed to satisfy DNV 2.7-1 & IMO / IMDG requirements.
They shall also conform to the "dangerous goods Code Type 1 or 2".
Transit tanks shall have a suitable dipstick, preferably of fibreglass material.
Tanks should preferably be of stainless steel or lined with a suitable fuel resistant epoxy lining.
The tank outlet valve on the tank in operation shall be capable of remote closure from the helideck (dispenser unit). Operation preferably by pneumatic operated tank valve or alternatively by remote closure by wire.
In order to allow 4L sample containers to be used, the sample point should be designed with sufficient access (250mm), space and height to accommodate the standard 4L sample container. The sample line from tanks shall be minimum 3/4"
The outlet/fill connection shall be flanged with a 3" internal valve terminating to a 2.5" self-sealing coupler with dust cap. The tank outlet shall be at least 150mm higher than the lowest point of the tank.
The drain connection shall be equipped with minimum 1.5" internal valve terminating in a plugged ball valve preferably 1". The plug shall be installed on the end to prevent the ingress of dirt and moisture.
The stainless 2.5" emergency pressure/vacuum relief valve should be fitted with weatherproof anti-flash cowl.

Tanks not in use

Tank shall only be located in defined safe area during settling and transfer to the static tank. The selected tank shall only be connected during the transfer of Jet A-1.

Tanks installed on the laydown skid

Tanks in use shall have protective deluge system in accordance with class requirements, NMD or minimum 10 l/m^2/min.
Tank in operation shall be bonded by use of the bonding clip.

Static storage tanks

Stationary tanks shall be constructed to suitable standards (eg. ASME VIII and BS5500 Categories I, II, III). The tank shall slope 1 on 30. The sump shall be fitted with a 3/4" minimum sample line which has both a ball valve and a self closing ball valve at the sample point. The outlet should either be by floating suction or from a stack pipe, which extends at least 150mm above the lowest point of the tank. If a floating suction (stainless) is embodied a bonded wire pull assembly should be fitted to the top of the tank. Floating suction is strongly recommended, and shall be used when possible.
Make sure the drain point on the stationary tanks on mobile units (e.g. rigs / FPSOs) are able to drain the tank sump varying with the vessel's movements / position.
Automatic closure valves to the delivery and suction inlet should be capable of operation from both helideck (dispenser unit) and from another point, which is at a safe distance from the tank. The tank shell must be properly bonded.
Each chamber to be equipped with 500 mm quick release hinged manhole to allow physical access. Dipstick or a sight glass/content gauge to determine the tank content.
A closed circuit sampler connected to the sample point is recommended.
A combined pressure/vacuum relief valve must be installed on each closed chamber of the tank.

Pumping module

A 60 mesh Y-strainer shall be installed in front of the fuel pumps.
The twin pump unit shall be air or electrically driven, equipped with a positive displacement vane pump or centrifugal pump with a head and flowrate suited to the particular installation. For larger helicopter types it might be advisable to use larger capacity units. The pump unit should be constructed to meet EX zone 1. The pumps shall be equipped with internal relief valves or alternatively with a common external relief valve. The relief valve outlet should be routed to the pump suction side.
The pump unit shall be connected to only one tank.
Check valves must be installed on the discharge side of each pump.
An emergency stop valve (for pneumatic driven systems) or emergency stop panel (electrically driven) shall be installed.
Block/ball valves should as a minimum be installed on the pump unit inlet and outlet flange.
A pressure gauge must be installed on the pump discharge side.
A device for automatic pump stops at a pre-set time after start and while emptying the tank shall be installed on the system.

Filter water / separator

A filter water separator according to the API/IP 1581 specification, latest edition, sized to suit the pump capacity should be installed either in the pump unit or in the dispensing unit.

The filter / water separator shall also be fitted with:

- A differential pressure gauge for monitoring the conditions of the elements
- An air eliminator which automatically vents any air entering the vessel
- A pressure relief valve
- A closed circuit sampler connected to the sample point is recommended
- A self closing valve on the ½" (minimum) drain connection

Dispensing module

The product/flowmeter
The product/flowmeter must be sized to suit the flow rate and the counter must be resettable.

Nozzles

Fuel delivery to aircraft must be available both by gravity and pressure refuelling. Both types of nozzles must be provided with bonding cables and dust caps to prevent the ingress of water and dirt.

Gravity:

The gravity nozzle shall be fitted at a minimum with a stainless 60 mesh strainer, and a bonding wire and clip. A separate short length of hose (2-3m) fitted with an adapter (to fit the pressure nozzle) and with the gravity nozzle attached is recommended

Pressure:

The pressure nozzle shall be fitted to the hose end pressure control unit. The nozzle shall be equipped with a surge controller rated to maximum 35 PSI. The nozzle must be equipped with a minimum 60 mesh stainless steel cone strainer, bonding wire and clip.

Hose reel & fuel hose

A fire safe/antistatic ball valve shall be installed in front of the hose reel. The 30m 1.5" delivery hose should be of an approved semi conducting type to API 1529 or BS EN 1361 (BS3158) type C semi conducting. Clamp type couplings must be used at hose terminations.

Fuel filter monitor

A fuel filter monitor conforming to the API/IP 1583 Specification and qualification procedures for aviation fuel filter monitors with absorbent type elements, latest edition, shall be installed. This unit is designed to absorb any water still present in the fuel and to cut off the flow of fuel once a certain amount of water has been exceeded.

The fuel filter monitor shall also be equipped with:

- A differential pressure gauge for monitoring the conditions of the elements
- An air eliminator which automatically vents any air entering the vessel
- A pressure relief valve
- A closed circuit sampler connected to the sample point
- A self closing valve on the ½" (minimum) drain connection

Bonding equipment

A ground indicator, approved for the purpose, shall be installed to restrict the pumps being operated until the ground indicator has approved the continuity. A spring loaded bonding cable reel sized for 30m cable and bonding clip shall be installed. A yellow Ex zone 2 lamp installed outside on top of the dispensing cabinet will indicate when the helicopter is properly bonded.

Recycle module (not a requirement)

The recycle tank shall have a slope of minimum 1 on 30. The tank shall be equipped with an inspection hatch in order to clean the tank properly. The tank shall be designed according to TBK, ASME, BS or other appropriate code. The same rules apply for this unit as for the pump and dispensing unit. If a pump is included, it shall be of a flanged, positive displacement vane type pump or centrifugal pump.

Revisions

Revisions of this document are done on an “as necessary basis”. Proposals for revisions must be forwarded to Norwegian Oil and Gas and the Norwegian Offshore Helicopter Operators for comments and advice.

PROCEDURE FOR HELICOPTER REFUELLING WITH ROTOR RUNNING

Refuelling with passengers on board can be agreed between pilot and HLO, and must comply with the requirements specified in section 6.11 and the standard procedures. See this appendix.

HLO	HELIGUARD	FIREGUARD
1. Remains in position with an overview of the whole helideck. When the fireguard has connected the earth cable and is in position (beside the HLO), they take over the job of securing the helideck. 2. Goes with the pilot to the refuelling cabinet to check the fuel sample. 3. Verifies that the earthing light is on, the counter is set to zero and that the fuel hose is connected to the helicopter. 4. When the fireguard signals, pushes the button to start refuelling.	1. Waits until the helideck is free of passengers and pulls out the fuel hose. When the fireguard has connected the earth cable, earths and connects the fuel hose to the helicopter before opening the connector valve. 2. Remains in position at the helicopter refuelling point.	1. Pulls out the earth cable and earths the helicopter. 2. Takes position beside the HLO in front of the helicopter, with a clear view of the pilot, heliguard and fuel cabinet. Portable powder extinguisher must be available on the helideck. 3. Takes over the job of securing the helideck. 4. On signal from pilot, signals the HLO that refuelling can begin.

Completion of refuelling

HLO	HELIGUARD	FIREGUARD
1. On signal from fireguard, halts refuelling from the cabinet. 2. Takes new fuel sample. This is checked by the pilot, who signs the fuel log. 3. Goes up to the helideck, stands beside the fireguard and takes over security of the helideck from them. 4. When the heliguard is ready, signals to the fireguard that boarding can begin.	1. On signal from the fireguard to halt refuelling, closes the connector valve on the fuel hose. 2. The fuel hose with earthing is disconnected, and the hose is rolled up on the reel.	1. On signal from the pilot to halt refuelling, signals this immediately to the HLO and heliguard 2. Remains in position until the HLO is in place to take over deck security. 3. Disconnects the earth cable and rolls it onto its reel.

NB! Some helicopter types use their own automatic shut-off system for fuel.

Standard Measuring Equipment

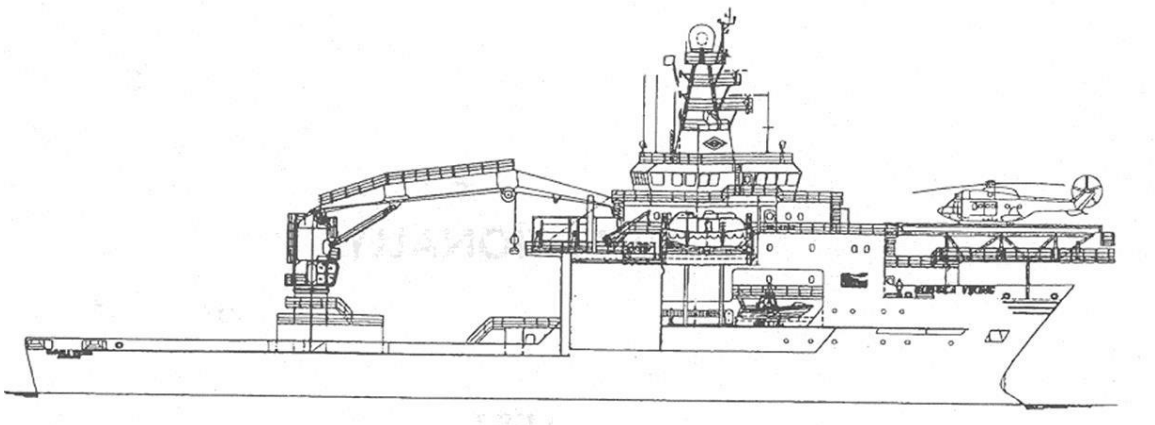
for

Helideck Monitoring System (HMS)

and

Weather Data

Norwegian Oil and Gas
Bristow Helicopters Norway
CHC Helikopter Service
Norsk Helikopter Service
Blueway Offshore Norge



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REVISION

Name	Date	Changes
Rev 9.1.No	10 March 2015	- Introduction of Significant Heave Rate method
Rev 9.2.No	01 May 2017	- Clarification of Significant Heave Rate calculation to include hysteresis and deck status - System accuracy and verification - General update of all chapters

1. PURPOSE AND INTENTIONS

The purpose of this document is to ensure uniformity of readings/registration of helideck movement and weather conditions.

These standards are valid on NCS as mandated by the Norwegian Oil and Gas helideck manual managed in agreement between Norwegian Oil and Gas and the helicopter operators.

Further intentions are to establish national and international standards based on contents of this document.

2. DEFINITIONS

Moving helidecks

A helideck mounted on a floating unit such as a Vessel, Floating Production Unit, Semi-Submersible Rig, floating Jack Up Rig, and other helidecks shall be considered to be an unstable/moving landing area if:

- the pitch or roll exceed 1 degree, and;
- the heave amplitude of the helideck exceeds 2 meters, and/or;
- the heave rate exceed 0.3 m/ second.

Pitch and Roll (P/R)

Pitch and Roll angels relative to absolute horizon. The roll axes is parallel with the helideck heading.

Helideck inclination (Inc)

Is the angle between the absolute horizon and the plane of the helideck.

Heave amplitude (HA)

The vertical movement of the helideck.

Significant HEAVE RATe (SHR)

The average of the one-third highest values of instantaneous heave rate recorded the previous 20 minute monitoring period. This can more conveniently be calculated by:
SHR (m/sec) = 2 x rms (root mean square) of the instantaneous heave rate.

3. CLASSIFICATION OF HELIDECKS

There is no official classification method available for this purpose. The proposed classification contains three categories based on the actual floating unit's size, configuration and motion characteristics. Limitations are defined by helideck pitch, roll and inclination and by helideck heave rate. A prime requirement is that the installations have measuring and monitoring equipment installed, and functional, in accordance with this document. Those installations which would normally fall into Category 1 or 2, but which either do not have the appropriate measuring or monitoring equipment installed, or whose equipment is inoperative, are automatically downgraded by one category (e.g. a Category 1 deck with inoperative equipment becomes a Category 2 deck). The category will be entered on the individual vessel/rig information plate in the North Sea airway manual or rig plate and the company helideck limitation list(HLL).

Category 1

Semi-submersibles including floating jack ups and all large vessels including FPSOs and tankers.

Category 2

Small vessels, e.g. DSVs and seismic vessels, with a helideck that offers good visual cues. This would normally be a stern or amidships deck offering a view of the structure of the vessel through at least 90° (assuming the vessel is seaming approximately into wind).

Category 3

Small vessels with poor visual cues, such as a bow deck or a deck mounted above the bridge superstructure with the landing direction facing forwards (bow deck) or abeam (high deck).

> *Note: Small vessels will be categorized 2 or 3 on inspection and their helideck documentation will reflect this (except that small vessels with amidships decks will always be Category 2).*

In addition, aircraft are divided into two types – heavy and medium. The heavy types are the AS332 series, EC225, AW189 and S92. The medium types are the EC155, EC175, AW139, S76 series, and Bell 525.

> *Note: This does not constitute a helideck approval for a specific helicopter type on a specific helideck.*

4. OPERATIONAL LIMITATIONS

The classification is defined in this table:

AIRCRAFT CATEGORY		HELIDECK CATEGORY											
		1				2				3			
		P/R	INC	HR	HA	P/R	INC	HR	HA	P/R	INC	HR	HA
HEAVY	DAY	±3	3.5	1.3	5.0	±2	2.5	1.0	3.0	±2	2.5	1.0	3.0
	NT	±2 *	2,5 *	1.0	4.0	±2	2.5	0.5	1.5	±1	1.5	0.5	1.5
MEDIUM	DAY	±4	4.5	1.3	5.0	±3	3.5	1.0	3.0	±3	3.5	1.0	3.0
	NT	±3	3.5	1.0	4.0	±2	2.5	0.5	1.5	±1.5	2.0	0.5	1.5

P/R = Pitch and Roll (deg);
INC = Helideck Inclination (deg);
HR = Significant Heave Rate (m/s);
HA = Heave Amplitude (m)
(*) Semi Submersibles Category 1 helidecks is at night limited to P/R: +/- 3.0º and inclination: +/-3.5º.

Notes:

a) Category 3 vessels (Bow mounted helideck) operating with the helideck downwind are automatically upgraded to Category 2.
b) Category 2 vessels (Stern helideck) operating with the helideck upwind are automatically downgraded to Category3.
c) Vessels with Midships helidecks are normally Category 2.
d) Where Heave rate is available and within limits, HA is for information only, and is not part of the calculations regarding helideck availability.
e) The table above is not applicable for operations to and from single point mooring buoys (SPMs). These are considered fixed installations. Limitations are given on Helideck Information Plate.
f) Night landing on Category 2 and 3 helidecks that are moving position (for example seismic or towing) should be avoided. If night landings are unavoidable the following applies:
   - Minimum weather requirement is visibility of 5000 meter.
   - The ship shall be manoeuvred out of wind by 30 degrees to improve visual cues in the landing.

- Further risk mitigation may be imposed by the helicopter operator.

5. PRINCIPLES

Basic requirements are contained in:

- Norwegian Requirements in BSL D5-1.8.2.
- ISO 19901-1: 2015 Petroleum and natural gas industries -- Specific requirements for offshore structures -- Part 1: Metocean design and operating considerations
- NORSOK C-004 Helicopter deck on offshore installations
- NORSOK T-100 Telecom subsystems

The measuring equipment shall provide sufficient information to the operator to complete all sections of the standard "Helideck Report", provided for by the helicopter operators. The last page of the helideck manual contains the helideck report template.

Measuring equipment sensors for helideck movement, wind and weather data shall be located in optimum positions in order to provide relevant information relating to the helideck.
Helideck heave data shall be representative for the centre of the helideck. It is recommended to locate the motion sensor within 4 meters from helideck centre for new designs in order to meet a possible future requirement for measurement of Motion Severity Index (MSI).

All information shall be numerically displayed in relevant locations on the vessel or rig for easy communication with helicopters in flight and the helicopter land base operations. The system shall facilitate transmittal of electronic data to the helicopter land base operation, which in turn can eliminate the need for a separate Helideck Report to be submitted.

6. ACCURACY OF MEASUREMENT

The HMS shall at all times comply with the system accuracy requirements given below. The system shall be properly maintained and a record of all certificates, verification reports and maintenance history shall be available to appointed Helideck Inspectors on request.

System accuracy

The dynamic accuracy of the data produced by the Helideck Monitoring System concerning motion shall be:

Pitch / Roll / Inclination: <± 0.1° RMS (Root Mean Square) in the range 0 to 3,5° and
Heave Rate: < ± 0.1 m/s RMS (Root Mean Square) in the range 0 to 1.3 m/s

The accuracy concerning the meteorological data shall be in compliance with:

- ISO 19901-1: 2015 Petroleum and natural gas industries -- Specific requirements for offshore structures -- Part 1: Metocean design and operating considerations

Any temporary deviation from above, due to performance degradation or equipment failure shall be reported to the helicopter operator with a plan for corrective actions.

Verification

The HMS should undergo initial and periodic in field verifications in accordance with the system manufacturer's procedures and recommended intervals.

The complete HMS (sensors and programs) shall be checked and verified. A qualified field service engineer, trained and certified, shall perform the system verification.
All test instruments, including the Motion Measurement Verification Equipment located at the centre of the helideck during the test, shall have traceable calibration certificates with details included in the verification report.

Recommendations from the motion sensor manufacturer should be incorporated in the system test procedures. Motion measurement verification intervals should be in accordance with the sensor's manufacturer's procedure, but at least every 3 years.

The motion range measured during the verification tests shall be relevant to the typical operational conditions for the installation and a minimum of 5 test periods of minimum 20 minutes duration shall be conducted.

A verification report documenting the correctness of the system shall be issued to the owner of the installation and to the helicopter operators. This should be done after initial installation, replacement of motion sensor, and after each periodic control. The results should be displayed in an unambiguous way (graphical or other visual display) to allow easy interpretation.

The owner/ operator of the installation shall ensure storage of the verification data for a minimum of 3 years, to enable traceability.

Maintenance
All parts of the HMS shall undergo periodic inspections and preventive maintenance as defined by the HMS manufacturer, including sensor swap out with factory overhauled or calibrated units. Periodic maintenance shall only be conducted by trained personnel.

7. MEASURING HELIDECK MOTION
All helideck motion parameters shall be reported to one decimal place.

Maximum Pitch
The equipment shall be capable of measuring helideck pitch in degrees up and down from zero, with zero being the absolute horizontal level. It shall be possible to read the historic maximum angles over the past 20 minutes, direct and, if possible, graphically. The graphical presentation shall cover 20 minutes of data and alternatively 3 hours for trend determination. The graph and the associatedmaximum value over the last 20 minutes shall be updated at least at 1-minute intervals. In maritime terms maximum pitch consists of trim + pitch.

Maximum Roll
The equipment shall be capable of measuring helideck roll in degrees right/starboard and left/port, with zero being the absolute horizontal level. It shall be possible to read the historic maximum angles over the past 20 minutes, direct and, if possible, graphically. The graphical presentation shall cover 20 minutes of data and include 3 hours for trend determination. The graph and the associated maximum value over the last 20 minutes shall be updated at least at 1-minute intervals. In maritime terms maximum roll consists of list +roll.

Maximum Helideck Inclination
The equipment shall be capable of measuring the maximum helideck inclination in degrees to the absolute horizon over the past 20 minutes, direct and, if possible, graphically. The graphical presentation shall cover 20 minutes of data and alternatively

3 hours for trend determination. The graph and the associated maximum value over the last 20 minutes shall be updated at least at 1-minute intervals.

Maximum Heave Amplitude

The equipment shall be capable of measuring vertical helideck movement from top to bottom, with readings in meters. The maximum heave (total vertical movement) of the helideck is the maximum top to bottom value in one cycle (one movement curve) over the past 20 minutes.
It shall be possible to read the historic maximum value over the past 20 minutes direct and graphically. The graphical presentation shall cover 20 minutes of data and alternatively3 hours for trend determination. The graph and the associated maximum value over the last 20 minutes shall be updated at least at 1-minute intervals.

Heave Period

The equipment shall be capable of measuring the time between helideck movement summits in seconds (i.e. based on a wave curve the measurement starts and ends in the zero up crossing point). The graphical presentation shall cover 20 minutes of data and alternatively 3 hours for trend determination. The graph and the associated maximum value over the last 20 minutes shall be updated at least at 1-minute intervals.

Significant Heave Rate (SHR)

The equipment shall be capable of measuring the vertical movement rate of the helideck in meters per second.
The significant heave rate shall be updated at least at 1-minute intervals, using a moving 20-minute window. The SHR value is calculated directly from the instantaneous heave velocities sampled at 2Hz intervals or more in accordance with the following formula:

2 x RMS (Root Mean Square) of the instantaneous heave rate

It shall be possible to read the historic maximum value for the past 20 minutes direct and graphically. The graphical presentation shall cover 20 minutes of data and alternatively 3 hours for trend determination. The graph and the associated maximum value over the last 20 minutes shall be updated at least at 1 minute intervals.

8. HEADING AND POSITION DATA

The heading of the helideck and the vessel shall be stated in degrees relative to magnetic North. Vessel position shall be reported in WGS84 coordinates on the following format: “deg° min’ sec” N/S/E/W”. The HMS shall be connected to a gyro and a position monitoring system if the parameters are a variable. Manual setting of magnetic declination are possible, but shall be checked after vessel/rig movement.

9. WEATHER DATA

Data for this section may be assessed by the use of other equipment than the HMS system, but must be of a standard that has a possibility to deliver data to the HMS system (Ref. Chap. 6, Norsok standards N-002 and C-004).

Wind Direction

Wind direction shall be stated in degrees relative to magnetic North.
Displayed wind direction shall have the options to show real time wind direction, 2-minute mean wind direction and 10-minute mean wind direction.

Wind Speed
Wind speed shall be stated in knots.
Displayed wind shall be easily selectable to show real time wind, 2-minute mean wind with gusts exceeding ten knots of the mean wind, and 10-minute mean wind with gusts exceeding 10 knots for 3 seconds or more of the mean 10 minute wind.

Visibility
Horizontal visibility shall be stated in meters.

Temperature/Dewpoint
Temperature/dew point temperature shall be stated in degrees Celsius.

Air Pressure
Air pressure shall be stated in hPa as QNH, meaning; altitude adjusted for height and temperature relative to Mean Sea Level.

Cloud
Cloud shall be stated as few/scattered/broken/overcast (FEW/SCT/BKN/OVC) in feet above the sea surface.

Logging system
The system should be able to log all data for 30 days. The historic data should be available by configuring the date and time to the period of interest.

10. HELIDECK MOVEMENT AND WEATHER DATA DISPLAY
Data Display layouts shall be approved by the Helicopter Operators. The display must indicate which HMS standard the complete system is compliant to (e.g. HMS Rev 9.2.No).
The user of the display must be able to control the setting of the following configuration parameters: night/day, large/medium aircraft and helideck category 1/2/3 (for those with variable classification).
It is important to use the notification SHR for all HR data on the display to avoid ambiguity with historic calculation methods.

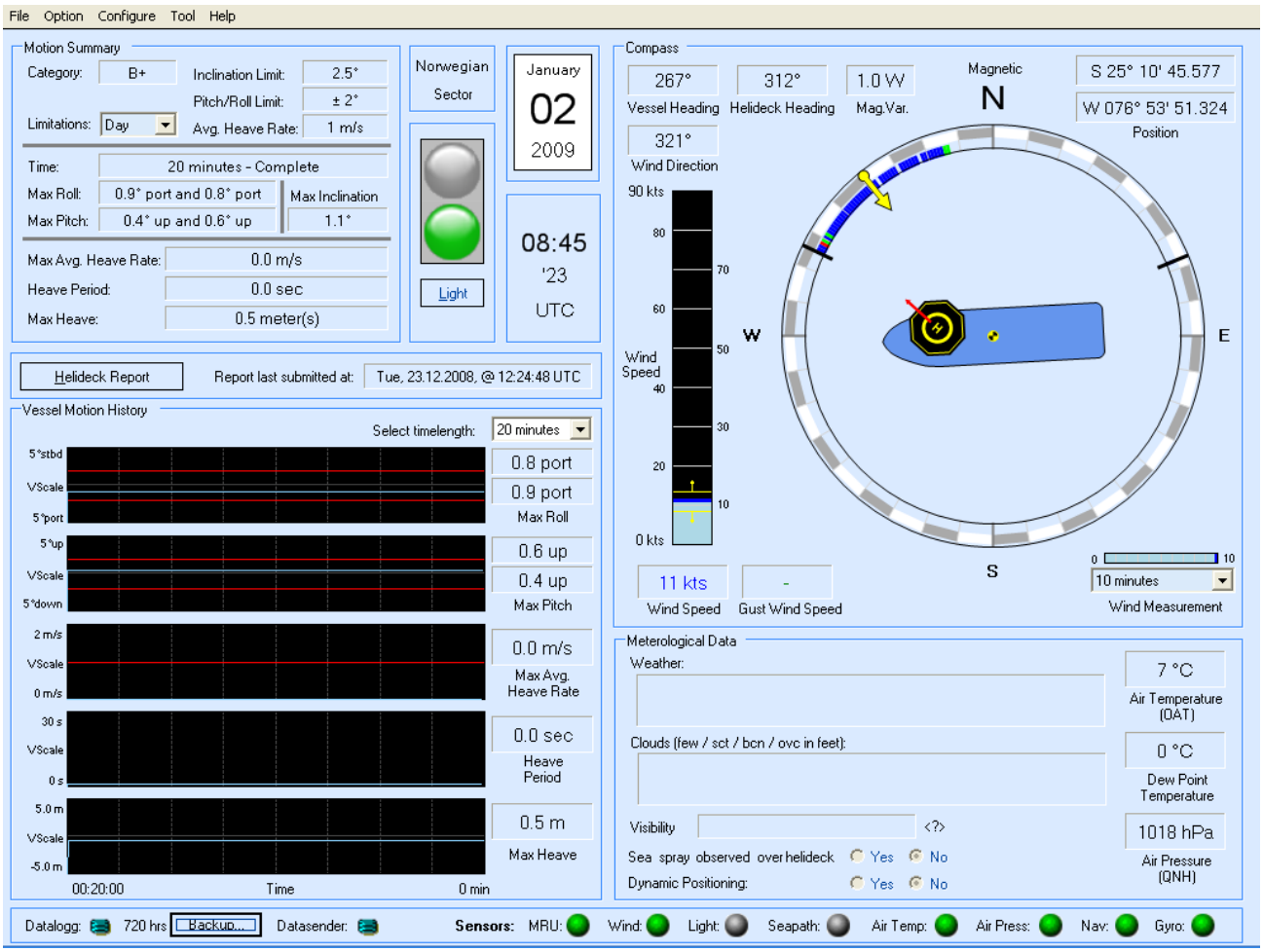
Traffic light on display
The “traffic light” on the display indicates when one of the following parameters have reached a threshold: Roll, Pitch, Inclination, or SHR. As long as all the measured parameters are within or on limits it should show a green light, and when a limit is exceeded it should show a red light.

Due to the nature of the SHR signal, the following trigger logic should be applied to the SHR input to the helideck motion status:

- The helideck motion status becomes RED if:
    - The HR limit is exceeded; and
    - all of the records in the previous 2 minutes have also exceeded the HR limit (or equivalently, the minimum SHR in the previous 2 minutes exceeds the HR limit).

- Once the deck motion status is RED, it becomes GREEN again only if:
    - The SHR falls below 95% of the HR limit, and
    - the mean of the records in the previous 10 minutes is below the HR limit.

Typical layout:



11. LOGISTICS INFORMATION DISPLAY

Data Display layouts shall be approved by the Helicopter Operators. The layout shall as a minimum include all data from the *Standard Helideck report* used on the NCS that is not already covered by the *Helideck Movement and Weather data display.*

Bristow REPORTING FORM GROUND INCIDENTS CHC

Place: Date: Time:

Incident categories	
Operation of the aircraft	Check off category
Collision between aircraft and other object on the helideck	☐
Security	
Attack on aircraft, such as bomb threat or hijacking	☐
Difficulties in handling intoxicated, violent or unruly passengers	☐
Discovery of a stowaway	☐
Incorrect procedures on the helideck, unauthorised people/passengers on the helideck	☐
Systems	
Leak of hydraulic fluids, fuel, oil or other liquids which present a fire risk or possible hazardous pollution of the aircraft, its systems or equipment, or pose a threat to people on board	☐
Helideck	
Helideck blocked by aircraft, vehicle, birds or other objects which represent a hazard or potential hazard	☐
Errors or defects in marking obstacles or hazards in the helideck's manoeuvring area which create a hazard	☐
Errors, substantial functional error or deficiency in the helideck lighting	☐
Substantial fuel spill during refuelling	☐
Refuelling error which could seriously affect the aircraft's range, performance, centre of gravity or structural strength	☐
Handling of passengers, baggage and cargo	
Substantial pollution of the aircraft, its systems and equipment from baggage or cargo	☐
Erroneous loading of passengers, baggage or cargo which may have a substantial effect on the aircraft's weight and/or balance	☐
Erroneous loading of baggage or cargo (including carry-on baggage) which may pose a hazard for the aircraft, its equipment or people on board, or which may obstruct emergency evacuation	☐
Erroneous loading of cargo containers or other substantial cargo units	☐
Carriage or attempted carriage of dangerous goods in violation of the regulations, including incorrect labelling and packing of dangerous goods	☐
Ground handling and service on the aircraft	
Supplying the wrong type of fuel or other important liquids (including oxygen and drinking water)	☐
Discovery of open inspection panels/doors, missing fuel cap and so forth	☐

Course of events	
Name:	Position: