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NETHERLANDS OIL AND GAS EXPLORATION AND PRODUCTION ASSOCIATION

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Helicopter Operations

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3	7 March 2022	Helideck requirements (several paragraphs) & 11.2 heat stress updated	J.v. Sligter/M. Oppentocht	WG Aviation/ OPCOM	M. Snel

This document will be controlled in accordance with the NOGEPA Industry Standard No. 80 on Standards and Document Control.

Abbreviations

ADELT	Automatically Deployable Emergency Locator Transmitter
AFFF	Aqueous Film Forming Foam
CAA	Civil Aviation Authority
CO2	Carbon Dioxide
CPI	Crash Position Indicator
dB(A)	Decibels – a measure of noise level
DIFFS	Deck Integrated Fire Fighting System
DSV	Diving Support Vessel
EASA	European Aviation Safety Agency
EBS	Emergency Breathing System
ERP	Emergency Response Plan
ERT	Emergency Response Team
ETA	Estimated Time of Arrival
FATO	Final Approach and Take-Off area
FMS	Fixed Monitoring System
GMT	Greenwich Mean Time
HD	Helicopter Directory
HDA	Helideck Assistant
HHO	Helicopter Hoist Operations
HHOP	Helicopter Hoist Operations Passenger
HLO	Helideck Landing Officer
HOFO	Helicopter Offshore Flight Operations
HSE	Health and Safety Executive
IATA	International Air Transport Association
ICAO	International Civil Aviation Organisation
IFR	Instrument Flight Rules
ILT	Inspectie Leefomgeving en Transport
IMC	Instrument Meteorological Conditions
IOGP	International Association of Oil and Gas Producers

kN	Kilonewton
LOS	Limited Obstacle Service
LVP	Locatie Verantwoordelijk Persoon (NL NUI OIM)
NUI	Normally Unattended Installation
OFS	Obstacle free sector
OIM	Offshore Installation Manager
PAI	Permanently Attended Installation
PCF	Post-crash fire
PPE	Personal Protective Equipment
QA	Quality Assurance
RFF	Rescue and Fire-fighting
RO	Radio Operator
SAR	Search and Rescue
SCE	Safety Critical Equipment
SLA	Safe Landing Area
SOV	Service Operation Vessels
TBO	Total Black Out
TLOF	Touchdown and Lift-Off area
UDP	Uniform Daylight Period
VFR	Visual Flight Rules
VHF	Very High Frequency
VMC	Visual Meteorological Conditions

Terms and definitions

µ	(Pronounced “mu”) measurement of friction
150°	Obstructed Sector of a helideck/Limited obstacle sector (LOS)
180°	Vertical Obstacle free Sector of a helideck –falling gradient
210°	Obstacle free Sector of a helideck (OFS)
Aircraft Operator	Owner operating helicopters

"D"	The largest overall dimensions of the helicopter when rotors are turning. This dimension will normally be measured from the most forward position of the main rotor tip path plane to the most rearward position of the tail tip path plane.
Circle/H lighting	The lighting is positioned on a circle defined by the mean diameter of the Touchdown Zone/Positioning Marker or Touchdown/Lift-off area which is a yellow painted circle. Within the circle is the lighted H.
Combined Operations	Operating with combined installations and vessels, complex arrangements.
Helicopter Hoist Operations	The transfer of trained personnel and small equipment. Transfers are conducted using an electric or hydraulic hoist fitted to the side of the helicopter, with appropriate redundancy and operated by qualified aircrew (helicopter hoist operator HO).
Helideck	A FATO (final approach and take off area) located on a floating or fixed offshore structure. The term 'helideck' includes take-off and landing operations on ships and vessels and covers shipboard FATOs.
Inbound Flight	Flight from offshore to onshore.
Installation	Oil production platform, rig or wind turbine.
Personal Carrying Device System	The PCDS is a system that has the structural capability and features needed to transport occupants external to the rotorcraft during HEC (Human External Cargo) operations. A PCDS includes, but is not limited to, life safety harnesses (Including if applicable quick release and strop with connector ring), rigid baskets and cages that are either attached to a hoist or cargo hook or mounted to the rotorcraft frame.
Offshore location	A location or destination on a fixed or floating offshore structure or vessel, and includes helidecks, helicopter hoist operations areas and operating sites.
Offshore operations	Operations which routinely have a substantial proportion of the flight conducted over sea areas to or from an offshore locations. (EASA.HOFO)
Outbound flight	Flight from onshore to offshore.
Rig	Drilling rig
TD/PM Circle	Touchdown/Positioning Marking Circle. The TD/PM Circle is the aiming point for a normal touchdown (landing) so located that when the pilot's seat is over the marking, the whole of the undercarriage will be within the landing area and all parts of the helicopter will be clear of any obstacles by a safe margin.
UPS	Uninterruptable Power Supply
Wind Farm	A group of wind turbines in the same location used to produce electricity.

Wind Turbine	A turbine having a large vaned wheel rotated by the wind to generate electricity.
Zulu	Time scale. In the context of Universal Time Coordinated (UTC), Z stands for "zero hours", meaning the offset from Greenwich Mean Time (GMT) is zero.

Legal Requirements

Arbo Decree	Article 2.14, section 3
Dutch Aviation Act	
Regulation of the Minister of Transport, Public Works and Water Management	Article 14a, Regulation on safe use of airports and other sites (Regeling veilig gebruik luchthavens en andere terreinen)
Dutch Mining Decree	Article 51
EASA	Regulation (EU) No 965/2012
EASA	Subpart K, GM1 – SPA – HOFO , Helicopter Offshore Flight Operations
EASA	CAT.POL.H.420
EASA	European Aviation Safety Plan 2014-2017
EASA AMC 27/29.865	Human External Cargo for Operations in Europe – Airworthiness Approval
IATA	Dangerous Goods Regulations, 60th edition, January 2019
ICAO	Annex 10, Volume 2, Communication Procedures
ICAO	Annex 14, Volume II , Doc 9261 Heliport Manual
ICAO	Annex 18, The Safe Transport of Dangerous Goods by Air

Related Standards

NOGEPA Standard 80	Standards and Document Control, latest version
NOGEPA Standard 001	Training for the Offshore Oil and Gas Industry, latest version
NOGEPA Standard 004	Competency of personnel, latest version

Industry Guidance and Studies

NWEA	'Offshore Work Outside of the Gondola – Access Heli', Feb 2016
IATA	Guidance Material for Sustainable Aviation Fuel Management, 2nd edition, 2015
ORE Catapult	O&M Case Study – Helicopter Crew Transfers at Westermost Rough, April 2017
UK CAA	CAP 437, Standards for Offshore Landing Areas, Edition 8, Amdt 1, September 2018
ORAG	'Offshore Renewables Aviation Guidance' – Good Practice Guidelines for Offshore Renewable Energy Developments, June 2016

Important Nomenclature used in this Standard

In the context of this Standard and when so used to describe a method or practice:	
'shall'	Such method or practice reflects a mandatory provision of law (in Dutch: *dwingend recht*). Such method or practice is mandatory for those who are the addressees of such provision (mostly the operators). A 'Standard' can describe or quote, but not amend, mandatory provisions. When an operator in exceptional cases for technical, operational or HSE reasons cannot comply, exceptions shall be documented and reported, and risks mitigated. Please note that this does not release the operator from the obligation to comply with the law. *
'should'	Such method or practice reflects a 'Good Operating Practice'. An operator is generally expected to apply such method or practice, but a specific situation may require a specific alternative. In other words: the operator complies or explains, and documents the explanation. *
'could'	Such method or practice is of an advisory nature or mentioned by way of example. An operator is not obliged to comply and is not obliged to explain if he does not comply.
* Please refer to paragraph 2.3 of Standard 80 (Standards and Document Control), for further explanation on an exception of a 'shall' provision, or on a comply-or-explain of a 'should' provision.	

1. Executive Summary

The NOGEPA Industry Standards aim to provide guidance and clarity on a range of topics relevant for onshore and offshore oil and gas operations in the Netherlands and on part of the continental shelf. The Standards are agreed upon by member companies of NOGEPA and cover a wide variety of topics, many of them related to health, safety, environment as well as operational matters.

This Standard 'Helicopter Operations', provides a summary of legal requirements as well as good operating practices which are included as recommendations regarding the use of helicopters on offshore installations, promoting a high level of standardization. It is recommended that Oil and Gas Operators use this guidance to develop appropriate procedures for offshore operations.

The following provides a summary of the information in this Standard:

Section 3, Helideck Management, describes the roles and responsibilities for offshore installations using helicopter support.

Section 4, Helideck Configuration, Inspection and Approval, contains the requirements for the helideck structure, markings, lighting, and inspection and approval requirements.

Section 5, Normally Unmanned Installation Operations, describes the necessary precautions which are unique to operating near or on normally unmanned installations.

Section 6, Combined Operations, details the requirements during temporary operations where a mobile vessel or facility is operated in close proximity to an offshore helideck.

Section 7, Renewable Energy Operations is yet to be developed, pending upcoming changes to European aviation legislation.

Section 8, Helideck Flight Operations, describes the common hazards and necessary controls associated with helicopters operating on or near offshore helidecks.

Section 9, Helideck Emergency Response, provides guidance on responding to an offshore helideck emergency.

Section 10, Communication, describes the communication procedures for offshore helicopter operations.

Section 11, Helicopter Loading and Passenger Handling, details the requirements for the handling of passengers, baggage and cargo.

Section 12, Transportation of Dangerous Goods, describes the special requirements necessary for the safe transport of dangerous goods in offshore air transport.

Section 13, Helicopter Fuel Systems and Refuelling, outlines the requirements for aviation fuel quality, equipment testing and provides a sample Refueling procedure to assist operators.

Additional information such as supporting technical information, example forms and checklists are located in Appendices which are standalone documents on the NOGEPA website.

2. Purpose and scope

2.1 Purpose

The purpose of this standard is to establish standards of safety across the Dutch North Sea by providing offshore operators with a clear understanding of the legal requirements and accepted industry good practice associated with helicopter offshore operations. The primary emphasis is on the interface between the helicopter and installations such as offshore oil and gas helidecks, and hoisting platforms on renewable energy platforms. The application of a common approach may assist operators in managing risks as well as promoting efficiency. Although legislation and good operating practice in helicopter offshore support activities is based upon recognized risks, it is not possible to include every specific risk for all situations within this standard. The application of this standard does not replace the need for each party or operator to conduct their own risk assessments in order to manage risk. The responsibility for the safety of people, assets and the environment remains with the operator.

2.2 Scope

This standard contains the legal requirements and guidance for companies providing operational helicopter support in the Dutch North Sea. It includes helicopter operations to and from offshore installations such as oil and gas helidecks, heli-rigs, and wind farm installations. It is applicable to those personnel involved in managing and maintaining offshore installations which utilize helicopter support.

The operation of the helicopter is outside the scope of this standard.

3. Helideck Management

This section describes the personnel, roles, responsibilities and training requirements for the safe management of helidecks. The subsequent sections of this manual provide the technical information required to carry out specific tasks.

3.1 Roles, Responsibilities and Tasks

OIM	**Accountable**
	Appoint competent HLO/ensure adequate manning for each helideck
	Ensure helideck team have completed appropriate training
	Authorise, reschedule or cancel flights
	Review and confirm daily flight programme
	Approve controls for mitigating hazards or downgraded systems
	Communicate with Helicopter Operator – helideck status
	Ensure emergency plans are established and drills conducted regularly
	Ensure helideck is equipped with adequate firefighting capability
	Manage risk associated with Combined and Simultaneous operations
	Ensure helidecks are maintained and inspections carried out
	Monitor and review accumulation of guano on NUIs
	Ensure fuel system is maintained and ensure continuous fuel quality
HLO	**Responsibilities**
	Safe execution of all helideck activities
	Directing all personnel on helideck
	Firefighting and rescue activities
	Key Tasks
	Maintain helideck Carry out daily, weekly and monthly checks of helideck and related systems
	Identify and Mitigate hazards • Consider planned activities which could affect the safety of helicopter operations • Review established operational limitations • Check helideck prior to helicopter arrival • Ensure HDAs are aware of duties – emergency response
	Communicate During Helicopter Operations OIM, Radio Room, Pilot, HDA, Crane, Standby Vessel, Emergency Response Team, Refuelling crew as applicable

HLO	Provide Passenger Briefing Ensure all passengers receive safety briefing prior to flight
	Prepare and Verify Flight Documentation • Check accuracy and legibility of flight manifest and sign • Submit manifest to relevant base installation • Ensure passenger, baggage and freight weights are recorded Verify packaging of freight is acceptable for air transport and dangerous goods are identified and properly transported
	Ensure NUI helideck readiness • Demanning/Manning Maintenance Team Visits
	Supervise Handling of Passengers, Baggage and Freight • Ensure baggage and cargo is correctly loaded • Direct passengers at all times on helideck including embarking/disembarking helicopter Ensure dangerous goods are properly loaded
	Conduct Helicopter Refuelling (as applicable) • Ensure passengers do not embark/disembark and no baggage or cargo is loaded/unloaded during refuelling Ensure refuelling team wears appropriate fire protective clothing and no other persons are present on helideck during refuelling
	Maintain Records Retain records of helideck inspections, training and drills conducted, fuel sampling, fuel inspections, incident reports.
HDA	Assist with regular inspections of helidecks and related systems
	Handle Cargo and Freight
	Act as a member of the Emergency Response Team
	Assist with Helicopter Refuelling
	Act under the supervision of the HLO
RO	Flight watch

3.2 Personnel Required

On every offshore installation during helicopter operations there shall be a minimum of 2 competent personnel on the helideck; refuel activities require a minimum of 3.

Note: Personnel required is dependent upon the helideck activity being conducted, e.g. aircraft landing only, number of personnel embarking/disembarking, refuelling or adverse weather conditions.

3.3 Competency and Training

3.3.1 Competence Assessment for Appointment of HLO and HDA

Companies should have a process to assess the competence of the HLO which includes offshore helideck experience requirements, and any specific helideck related tasks.

For the appointment of helideck team members, the OIM should base selection upon the following criteria:

Training:

- Initial or Further Helideck Emergency Response Team Leader (UK HERTL, NL NOGEPA Course 1.1)
- Dangerous Goods by Air Awareness (DGbA) as per IATA regulations
- Helicopter Refueling (where applicable) is provided before the HDA is appointed to the role.

Work experience:

Where new in role as HLO or HDA on a specified installation(s) or vessel(s), the OIM should ensure that candidate HLOs and HDA have completed the following on the specified facilities as part of the pre-determined clusters of helidecks.

- 5 helideck evolutions as supernumerary HLO or HDA, as appropriate to role
- 2 helideck team exercises
- 3 refuelling evolutions, where such equipment is installed.

A logbook could be used to record the above activities which will also indicate crew who rotate between multiple companies and may not be based on a particular installation.

3.3.2 Helideck Training requirements

See NOGEPA Industry Standard 001 'Training for Oil and Gas Industry' for a complete list of delegate and training provider requirements.

3.3.3 Hoist Operations Training Requirements – Personnel engaged in hoist operations

Awaiting EASA regulations on requirements for personnel being hoisted onto an offshore installation (oil and gas platform, wind turbine, offshore wind substation), the training requirements for hoist operations are set by the helicopter operator with consent of the ILT (Inspectie Leefomgeving & Transport).

3.4 Identification of Helideck Personnel

The Helicopter Landing Officer and the Helideck Assistant shall be easily identified and recognisable, HLO or HDA on front and back, while working on the helideck.

4. Helideck Configuration, Inspection and Approval

This section provides a summary of legal requirements and guidance for the physical configuration of the helideck which includes the helideck markings, obstacle free zones, lighting and other equipment. It also states the requirements for the inspection of the helideck and necessary approval. All helidecks in the Dutch sector of the North Sea shall meet legal requirements. The operator shall only use offshore locations that are suitable in relation to size and mass of the type of helicopter and to the operations concerned.[i]

ICAO Annex 14, EASA AMC1 SPA.HOFO.115, and "Regeling veilig gebruik luchthavens en andere terreinen" are the primary reference for legal requirements.

Note: Recognised industry standards such as IOGP and CAP 437 are sources for recommended good practice.

4.1 Configuration

Size, obstacle restrictions, markings, lighting and equipment for helidecks.

4.1.1 Size and Weight Limitations

For any particular type of single main rotor helicopter, the helideck should be sufficiently large to contain a circle of diameter 'D' equal to the largest dimension of the helicopter when the rotors are turning. Due to the actual shape of most offshore helidecks, the D-circle will be imaginary but the helideck shape should be capable of accommodating such a circle within its physical boundaries.

Legacy Helidecks

Helicopters may be operated on helidecks of a smaller 'D' value upon completion of a risk assessment and receiving approval from ILT.

4.1.1.1 The application of 'D' value

The maximum size (overall length) of the helicopter authorised to use the landing area is expressed as 'D' value.

See figure 4.3

4.1.1.2 The application of 't' value

The maximum allowable take-off mass (MTOM) of the helicopter for which that area is being authorised with regard to its structural limitations is expressed as a 't' value. This 't' value is based upon an estimated landing weight (e.g. a 'force') rather than a mass. Therefore, it is not an absolute value and in terms of planning and designing a platform it is based upon a common type of aircraft which is likely to use the platform. Factors such as dynamic loading (normal or emergency landing) are taken into account as well as loading on the FATO due to snow, etc. The 'mass' unit (MTOM) is used as the defining limitation because it can be measured.

Where criteria cannot be met in full for a particular type of helicopter it may be necessary to promulgate operational restrictions in order to compensate for deviations from these criteria. The helicopter operators are notified of any restrictions through the Helideck Limitations List (HLL).

4.1.2 Markings on the helideck

The recommended font style for markings on the helideck is Clearview Hwy-5W.

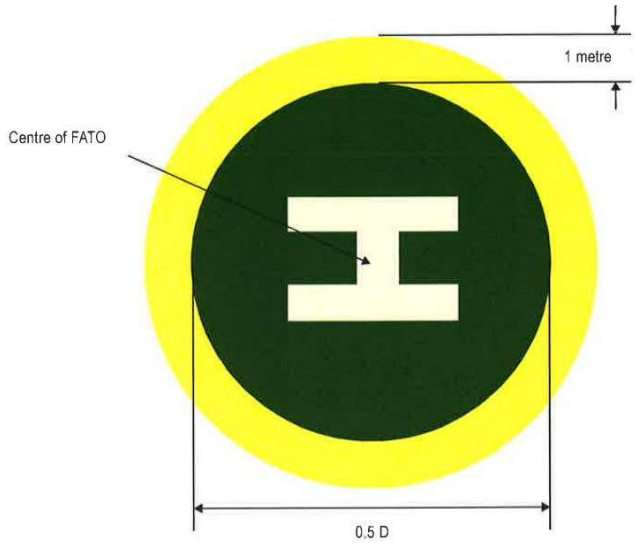


Figure 4.1 Recommended style and size of H and yellow circle marking

The position of the 't' value marking on the helideck is preferable below right or left of the helideck name.

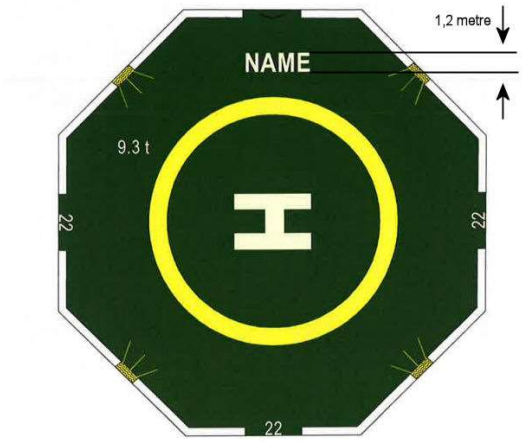


Figure 4.2 Recommended position of the name and 't' value

4.1.3 Obstacles with respect to the landing area

The obstacle-protected surfaces include:

- the minimum 210° obstacle-free sector (OFS) above helideck level;
- the 150° limited-obstacle sector (LOS) above helideck level; and
- The minimum 180° falling '5:1' gradient with respect to significant obstacles below helideck level.

See Figure 4.3

4.1.3.1 Helideck Obstacle Free Sector (OFS)

The purpose of the OFS is to provide an unobstructed departure path appropriate for the helicopter.

From any point on the periphery of the D-circle, an obstacle-free approach and take-off sector should be provided which totally encompasses the landing area (and D-circle) and extends over a sector of at least 210°.

The horizontal extent of this distance from the helideck is based upon the one-engine inoperative performance of the helicopter type to be used. Only the following items essential for safe helideck operations may exceed the height of the landing area, but should not do so by more than 25 cm.

Essential items include:

- guttering;
- lighting
- foam monitors
- handrails and other items (e.g. EXIT sign) associated with the landing area which are incapable of complete retraction or lowering for helicopter operations

Note: New Build Helidecks as of 10 November 2018:
For new build helidecks completed on or after 10 November 2018 the height of essential items around the helideck should not exceed 15 cm for any helideck where the D-value is greater than 16.01 m. For helidecks, where the D-value is 16.00 m or less the height of essential items around the helideck should not exceed 5 cm.[ii]

The origin of the 210° OFS for approach and take-off should be marked on the helideck by a black 'chevron', each leg being 79 cm long and 10 cm wide forming the angle. On minimum sized helidecks where there is no room to place the chevron where indicated, the chevron marking, but not the point of origin, may be displaced towards the D-circle centre.

Where the OFS is swung, this should be reflected in the alignment of the chevron.

The purpose of the chevron is to provide visual guidance to the HLO so that he can ensure that the 210° OFS is clear of obstructions before giving a helicopter clearance to land. The black chevron may be painted on top of the (continuous) white perimeter line to achieve maximum

clarity for the helideck crew.

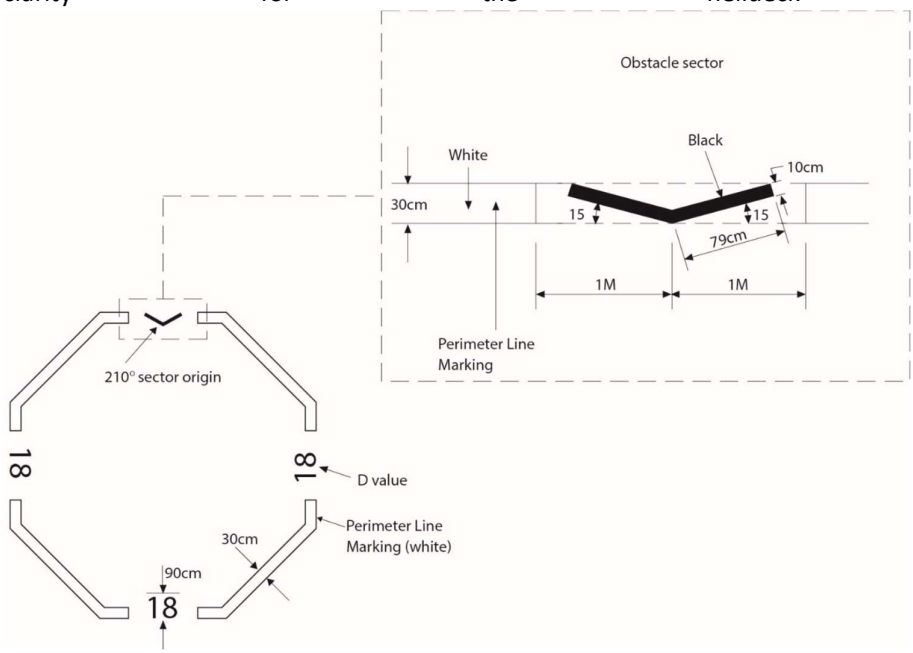


Figure 4.3 'D' value and Obstacle Free Sector

Objects (such as lighting or nets) whose function requires them to be located within the white perimeter lines of the TLOF (Touchdown and Lift-Off area) shall not exceed a height of 2.5 cm. Such objects shall only be present if they do not represent a hazard to helicopters.[iii]

For any TLOF designed for use by helicopters having a D-value of 16.0 m or less, and any TLOF having dimensions of less than 1 D, objects installed in the obstacle-free sector whose function requires them to be located on the edge of the TLOF, shall not exceed a height of 5 cm.[iv]

4.1.3.2 Helideck Limited Obstacle Sector (LOS)

The LOS is the 150 degree sector within which obstacles are permitted but the height of these obstacles is limited.

Out to a distance of 0.62 "D" measured from the centre of the helideck, objects shall not exceed a height of 0,05 D above the plane of the helideck.

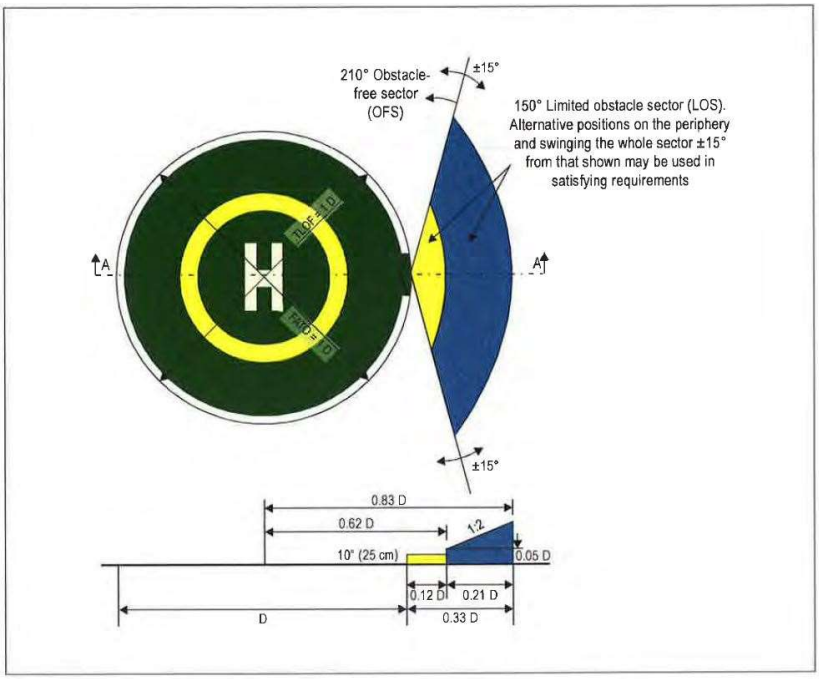
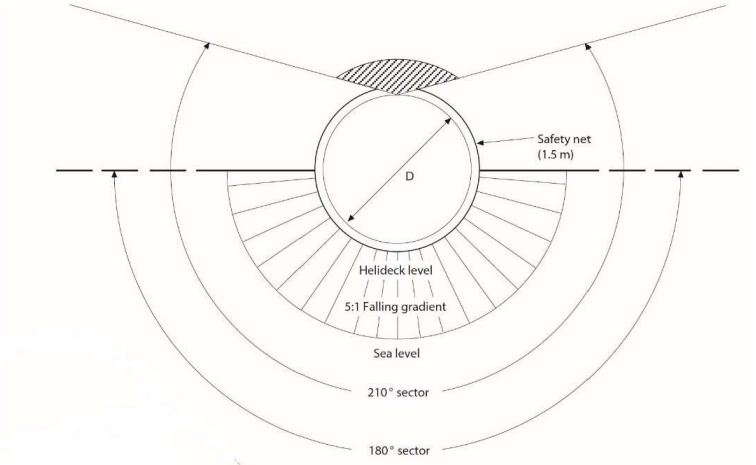


Figure 4.4 Limited Obstacle Sector (LOS)

4.1.3.3 Obstacle free area below the helideck level

This area shall extend over an arc of at least 180° with the origin at the centre of the TLOF, with a descending gradient at a ratio of one unit horizontally to five units vertically (5:1) from the edge of the TLOF within that 180° sector. See diagram below.



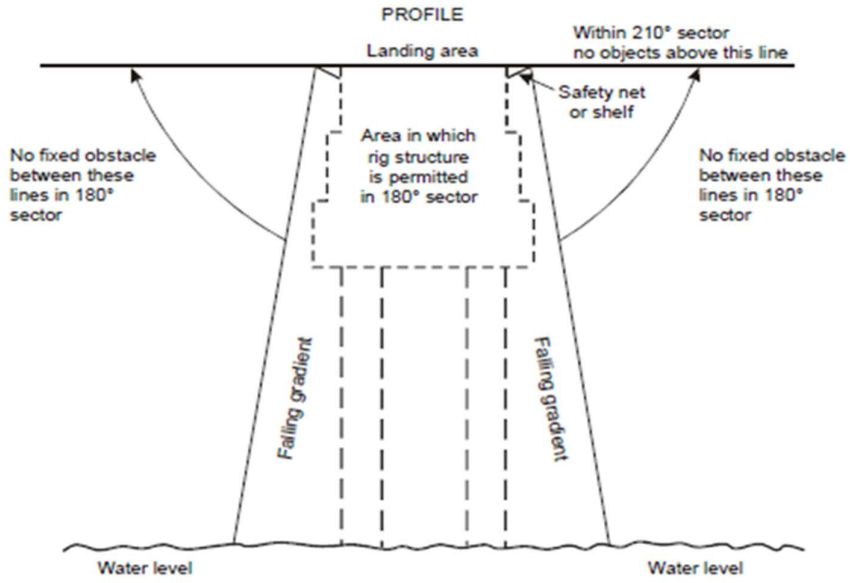


Figure 4.5 Obstacle Free Sector

4.2 Lighting during hours of darkness/operations at night

During the hours of darkness (outside UDP), and if the visibility is 1500 m or less, helideck and obstruction lighting shall be provided and switched on.

Note: Limitations which result in non-compliance with the above may require an annotation to the HD, indicating 'daylight operations only'.

4.2.1 Circle and H lighting and the use of surface flood lights

The landing area shall have non-dazzling surface lighting (Flood Lights) or circle and H lights. They shall allow the pilot to see the deck markings, not blind him. The floodlights should be capable of being switched on and off and these controls should be accessible to the HLO or Radio Operator.

If circle and H lights are operational, the floodlights should be turned off with the exception of a floodlight required to illuminate the name of the platform. Floodlights may be used for helideck tasks such as passenger handling and refuelling, however, the floodlights should be extinguished prior to any helicopter movements.[v]

4.2.2 Perimeter lighting

The perimeter of the landing area should be delineated by green omni directional lights, spaced at intervals of not more than three (3) meters around the perimeter of that landing area. A deviation of +/- 50 cm is allowed.

4.2.3 Obstruction lighting

Omnidirectional low intensity steady red obstruction lights, with a minimum intensity of 10 candelas for angles of elevation between 0 degrees and 30 degrees should be fitted at suitable locations, including all high structures such as the jibs of cranes, to show the pilots the proximity and height of objects which are higher than the landing area, are close to it or to the LOS boundary.

This applies in particular, to all crane booms on the installation or vessel. Objects which are more than 15 metres higher than the landing area should be fitted with intermediate low intensity steady red obstruction lights of the same intensity spaced at 10-metre intervals down to the level of the landing area (except where such lights would be obscured by other objects). It is often preferable for some structures such as flare booms and towers to be illuminated by floodlights as an alternative to fitting intermediate steady red lights, provided that the lights are arranged such that they will illuminate the whole of the structure and not dazzle the helicopter pilot. Such arrangements should be discussed with the helicopter operator.[vi]

At a heliport intended for use at night, obstacles shall be floodlighted if it is not possible to display obstacle lights on them.[vii]

4.2.4 Status Lights

A visual warning system shall be installed if a condition can exist on an installation which may be hazardous for the helicopter or its occupants. The status lights should be flashing red[viii] and visible to the pilot from any direction of approach and on any post-landing heading.

Note: The aeronautical meaning of a flashing red light is either "do not land, aerodrome not available for landing" or "move clear of landing area". The system should be automatically initiated at the appropriate hazard level (e.g. gas release) as well as being capable of manual activation by the HLO. It should be visible at a range in excess of the distance at which the helicopter may be endangered or may be commencing a visual approach.

4.2.5 Lighting with Helideck Unavailable for Landing

All helicopter landing areas which are determined to be 'unavailable' should display the relevant landing prohibited marker by day while, by day and night, the perimeter lights should be displayed but all other helideck lighting systems (circle/H lighting and/or helideck floodlights) should be extinguished. See para 8.2 for landing prohibited marker and use.

4.2.6 Uninterrupted Power Supply

Installation/vessel emergency power supply design should include the entire landing area lighting system. Any failures or outages should be reported immediately to the helicopter operator. The lighting should be fed from an Uninterruptable Power Supply (UPS) system.[ix]

4.3 Helideck Surface

4.3.1 Friction requirements

There shall be an adequate friction coefficient in both wet and dry conditions to allow the helicopter to remain in one place on the deck without slipping. It shall have friction coefficient of at least $\mu = 0.65$.

4.3.1.1 Insufficient friction and helideck nets

For the area that encompasses the TD/PM Circle only, a helideck net could be used to mitigate for insufficient friction. The net should have the following properties:

- the net should be installed and tensioned in accordance with the manufacturer's instructions;
- the mesh size should be such as to present an area of between 400 and 900 cm^2;
- the net should be secured at intervals approximately 1.5 metres between the lashing points around the landing area perimeter;
- the breaking strain of the rope/webbing from which the net is constructed and the load capacity of the net anchoring points should be at least 10 kN;
- the size of the net should such as to ensure coverage of the TD/PM Circle area but should not cover the helideck identification marking (name) or 't' value markings.

4.4 Helicopter tie-down points

Tie-down points should be provided for securing the maximum sized helicopter for which the helideck is designed. They should be located and be of such strength and construction to secure the helicopter when subjected to weather conditions pertinent to the installation design considerations. They should also take into account, where significant, the inertial forces resulting from the movement of floating units.

The maximum bar diameter of the tie-down point should be 22 mm in order to match the strop hook dimension of typical tie-down strops. Advice on recommended safe working load requirements for strop/ring arrangements for specific helicopter types can be obtained from the helicopter operator.

The tie-down configuration should be based on the centre of the TD/PM Circle.

See Figure 4.6 below for recommended configuration of tie-down points.

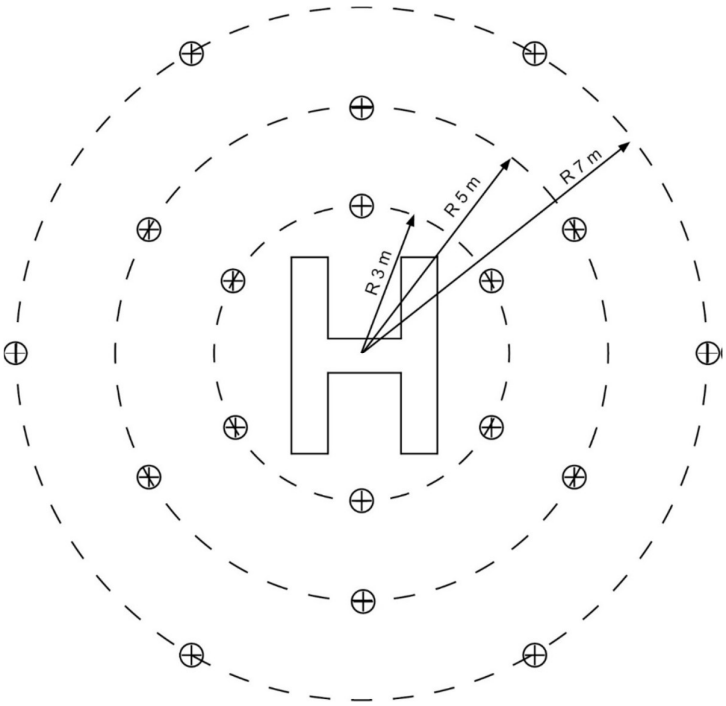


Figure 4.6 Helicopter tie-down configuration

4.5 Clear landing area

The landing area should have a non-slip surface for helicopter operations. The installation operator should ensure that the helideck is kept free from oil, grease, ice, snow, excessive surface water or any other contaminant (particularly guano) that could degrade the surface

friction. Assurance should be provided to the helicopter operator that procedures are in place for elimination and removal of contaminants prior to helicopter movements.[x]

4.6 Personnel Protection and Access to Helideck

4.6.1 Perimeter safety net

Safety nets for personnel protection should be installed around the landing area except where adequate structural protection against a fall exists. The netting used should be of a flexible nature, with the inboard edge fastened just below the edge of the helicopter landing deck. The net itself should extend at least 1.5 metres, but no more than 2.0 metres, in the horizontal plane and be arranged so that the outboard edge does not exceed the level of the landing area and angled so that it has an upward and outward slope of approximately 10°. [xi]

4.7 Access to the helideck

Due to necessary helicopter positioning due to wind conditions, the helideck should be accessible from at least two points, positioned as far as practically possible from each other.

The HLO shall determine the appropriate access point to use on the helideck depending upon wind conditions and operating conditions and ensure second access is closed by means of frangible chain to prevent passenger to enter tail rotor area.

4.8 Meteorological equipment

4.8.1 Weather instruments

Permanently manned offshore installations shall be equipped with calibrated instruments to measure the current weather conditions in order to be able to inform the pilot. The instruments shall have the capability to measure:

- wind
- pressure
- air temperature
- dew point temperature, and
- equipment recording and displaying mean wind (10-min wind) and gusts[xii].

4.8.1.1 Wind Sock

A serviceable windsock shall be installed to give an indication of the direction and condition of the wind over the landing area.

A wind direction indicator shall be located so as to indicate the wind conditions over the FATO and TLOF (yellow circle) and in such a way as to be free from the effects of airflow disturbances caused by nearby objects or rotor downwash. It shall be visible from a helicopter in flight, in a hover or on the movement area.

Where a TLOF and/or FATO may be subject to a disturbed airflow, then additional wind direction indicators located close to the area should be provided to indicate the surface wind on the area.

For night operations the windsock shall be clearly illuminated.[xiii]

Note: Consideration may be given for a hinged windsock pole that can be collapsed in adverse weather conditions to protect the 'sock from risk of damage.[xiv]

4.9 Operational equipment

Offshore installations shall have available, in the immediate vicinity of the helideck, all the equipment that will be needed for use in connection with helicopter operations including:

- Rope,
- Chocks or sand bags (min. 4);
- A scale for weighing the baggage and cargo;

4.10 Passenger safe areas

A poster indicating the safe areas that passengers shall use when leaving or approaching the helicopter should be placed in a prominent position on the installation.

4.11 Fire-fighting – Equipment and Maintenance

The following firefighting and rescue equipment shall be readily available for immediate use in the event of an accident and shall be regularly tested. All equipment should be located at points having immediate access to the landing area. The location of the storage facilities should be clearly indicated.

4.11.1 Fire Suppression

The operational objective of the firefighting system should be to ensure that a helideck fire associated with a crashed helicopter is brought under control within 30 seconds, measured from the time the system is producing foam at the required application rate, for the range of weather conditions prevalent for the Dutch sector of the North Sea.

Delivery of firefighting media to the landing area at the appropriate application rate should be achieved in the quickest possible time. It is strongly recommended that a delay of less than 15 seconds, measured from the time the system is activated to actual production at the required application rate, should be the objective.

Note: A fire is deemed to be 'under control' at the point when it becomes possible for the occupants of the helicopter to be effectively rescued by trained fire-fighters.

Foam-making equipment should be of adequate performance and be suitably located to ensure an effective application of foam to any part of the landing area irrespective of the wind strength/direction or accident location.

Adverse Conditions: For a Fixed Monitor System (FMS), consideration should also be given to the loss of a downwind foam monitor either due to limiting weather conditions or a crash situation occurring. The design specification for an FMS should ensure remaining monitors are

capable of delivering foam to the landing area at or above the minimum application rate. For areas of the helideck or its appendages which, for any reason, may be otherwise inaccessible to an FMS, it is necessary to provide additional hand-controlled foam branches as described in paragraph 4.11.7.

4.11.2 Weather Effects on Firefighting Equipment

Consideration should be given to the effects of the weather on static equipment. All equipment forming part of the facility should be designed to withstand protracted exposure to the elements or be protected from them. Where protection is the chosen option, it should not prevent the equipment being brought into use quickly and effectively. The effects of condensation on stored equipment should be considered.

4.11.3 Foam Application Rates: Performance Level B Foams

It is recommended that foam concentrates compatible with seawater and meeting at least performance level 'B' are used. For fires involving aviation kerosene, ICAO has produced a performance test which assesses and categorises the foam concentrate. Most foam concentrate manufacturers will be able to advise on the performance of their concentrate against this test.

Level B foams should be applied at a minimum application rate of 6.0 litres per square metre per minute.

Example of calculation: For a D-value 22.2 metre helideck using Level B foam:

Application rate = 6.0 x π x r^2 (6.0 x 3.142 x 11.1 x 11.1) = 2322 litres per minute.

4.11.4 Foam Application Rates: Performance Level C Foams

Performance level C foams are proven to be more efficient in their extinguishing ability than level B foams.

It is established that the application rate for foam meeting performance level C may be reduced to 3.75 litres per square metre per minute and, where level C foams are selected for new systems, 3.75 may be used in the calculation in lieu of 6.0 litres.

Example of calculation: For a D-value 22.2 metre helideck using Level C foam:

Application rate = 3.75 x π x r^2 (3.75 x 3.142 x 11.1 x 11.1) = 1452 litres per minute.

Note: Compatibility of Level C foam when using seawater should be confirmed with the manufacturer.

4.11.5 Minimum Stocks to be held

Given the remote location of helidecks the overall capacity of the foam system should exceed that necessary for initial extinction of any fire. Five minutes' discharge capability is generally considered to be reasonable.

Calculation of Minimum Operational Stocks

Using the 22.2 metre example as shown in paragraphs 4.10.3 and 4.10.4, a 1% foam solution discharged over five minutes at the minimum application rate will require:

2322 x 1% x 5 = 116 litres of foam concentrate.

Likewise, a 3% foam solution discharged over five minutes at the minimum application rate will require:

2322 x 3% x 5 = 348 litres of foam concentrate.

NOTE: Sufficient reserve foam stocks to allow for replenishment as a result of operation of the system during an incident, or following training or testing, will also need to be held.

4.11.6 Application of Aspirated and Unaspirated foam concentrates

Unaspirated foam may provide a quick knockdown of any fuel fire. However, aspiration, i.e. induction of air into the foam solution by monitor or by hand-controlled foam branch, gives enhanced protection after the fire has been extinguished.

Therefore, wherever non-aspirated foam equipment is selected during design, additional equipment capable of producing aspirated foam for post-fire security/control should be provided.

4.11.7 Requirement for Supplementary Foam Delivery Systems

Not all fires are capable of being accessed by monitors and on some occasions the use of monitors may endanger passengers. Therefore, in addition to a fixed foam system monitor, there should be the ability to deploy at least two deliveries with hand-controlled foam branches for the application of aspirated foam at a minimum rate of 225 litres/min through each hose line.

Note: A single hose line, capable of delivering aspirated foam at a minimum application rate of 225 litres/min, may be acceptable where it is demonstrated that the hose line is of sufficient length, and the hydrant system of sufficient operating pressure, to ensure the effective application of foam to any part of the landing area irrespective of wind strength or direction. The hose line(s) provided should be capable of being fitted with a branch pipe capable of applying water in the form of a jet or spray pattern for cooling, or for specific firefighting tactics.

Where a Deck Integrated Firefighting System (DIFFS) capable of delivering foam and/or seawater in a spray pattern to the whole of the landing area is selected in lieu of an FMS, the provision of additional hand-controlled foam branches may not be necessary to address any residual fire situation. Instead any residual fire may be tackled with the use of hand-held extinguishers.

4.11.8 Deck Integrated Firefighting System (DIFFS)

As an effective alternative to an FMS, offshore Oil and Gas Operators are strongly encouraged to consider the provision of DIFFS.

A DIFFS should be capable of supplying performance level B or level C foam solution to bring under control a fire associated with a crashed helicopter within the time constraints stated in paragraph 4.10.1, achieving an average (theoretical) application rate over the entire landing area (based on the D-circle) of 6.0 litres per square metre per minute for level B foams or 3.75 litres per square metre per minute for level C foams, for a minimum duration of 5 minutes.

4.11.8.1 Number and Location of DIFFS Nozzles

The number and layout of nozzles should be sufficient to provide an effective spray distribution of foam over the entire landing area with a suitable overlap of the horizontal element of the spray pattern from each nozzle assuming calm wind conditions.

The performance specification for a DIFFS needs to consider the likelihood that one or more of the popup nozzles may be rendered ineffective by the impact of a helicopter on the helideck. Therefore, any local damage to the helideck, nozzles and distribution system caused by a helicopter crash should not unduly hinder the system's ability to deal effectively with a fire situation.

All equipment should be located at points having immediate access to the landing area. The location of the storage facilities should be clearly indicated.

4.11.9 Use and Maintenance of Foam Equipment

All parts of the foam production system, including the finished foam, should be tested by a competent person:

- on commissioning and
- annually thereafter

Tests should be conducted using the original design expectations while ensuring compliance with any relevant pollution regulations.

4.11.10 Complementary Media

While foam is considered the principal medium for dealing with fires involving fuel spillages, the wide variety of fire incidents likely to be encountered during helicopter operations – e.g. engine, avionic bays, transmission areas, hydraulics – may require the provision of more than one type of complementary agent.

Agents selected should comply with the appropriate specifications of the ISO. Systems should be capable of delivering the agents through equipment which will ensure effective application.

4.11.10.1 Dry Powder

Dry powder shall be the primary complementary agent. The minimum total capacity shall be 45 kg delivered from one or two extinguishers. The dry powder system should have the capacity to deliver the agent anywhere on the landing area.

Additional foam (more than the minimum 45kg) may be required in order to provide a continuous application of foam, depending on weather conditions, size of the helideck, etc. Containers should be available for this purpose.

4.11.10.2 Gaseous Agent

Gaseous agents are recommended in addition to the use of dry powder as the primary complementary agent. Therefore, in addition to dry powder specified at paragraph above, there should be a quantity of gaseous agent provided with a suitable applicator for use on engine fires. The appropriate minimum quantity delivered from one or two extinguishers is 18 kg. The discharge rate of the agent should be selected for optimum effectiveness of the agent. Due regard should be paid to the requirement to deliver gaseous agents to base of the fire at the recommended discharge rate.

Note: Because of the weather conditions prevalent offshore, all complementary agents could be adversely affected during application and training exercises should take this into account.

4.11.10.3 Complementary media as part of a Fire Extinguishing system

All offshore helicopters have integral engine fire protection systems (predominantly Halon) and it is therefore considered that provision of foam as the principal agent plus suitable water/foam branch lines plus sufficient levels of dry powder with a quantity of secondary gaseous agent will form the core of the fire extinguishing system. It should be borne in mind that none of the complementary agents listed will offer any post-fire security/control.

4.11.10.4 Other considerations when using Complementary Media

- All applicators are to be fitted with a mechanism which allows them to be hand controlled.
- Dry chemical powder should be of the 'foam compatible' type.
- The complementary agents should be sited so that they are readily available at all times.
- Reserve stocks of complementary media should be held to allow for replenishment as a result of activation of the system during an incident or following training or testing.
- Complementary agents should be subject to annual visual inspection by a competent person and pressure testing in accordance with manufacturers' recommendations.

4.11.11 The management of extinguishing agent stocks

- Consignments of extinguishing media should be used in delivery order to prevent deterioration in quality by prolonged storage.
- The mixing of different types of foam concentrate may cause serious sludging and possible malfunctioning of foam production systems. Unless evidence to the contrary is available it should be assumed that different types are incompatible. In these circumstances it is essential that the tank(s), pipework and pump (if fitted) are

thoroughly cleaned and flushed using fresh water prior to the new concentrate being introduced.

- Consideration should be given to the provision of reserve stocks for use in training, testing and recovery from emergency use.

4.11.12 Rescue equipment

The following equipment should be provided as a minimum.[xv] Sizes of equipment are not detailed but should be appropriate for the types of helicopter expected to use the facility.

Helicopter RFF category	H1/H2
Adjustable wrench	1
Rescue axe, large (non wedge or aircraft type)	1
Cutters, bolt	1
Crowbar, large	1
Hook, grab or salving	1
Hacksaw (heavy duty) and six spare blades	1
Blanket, fire resistant	1
Ladder (two-piece)*	1
Life line (5 mm circumference x 15 m in length) plus rescue harness	1
Pliers, side cutting (tin snips)	1
Set of assorted screwdrivers	1
Harness knife and sheath or harness cutters**	**
Gloves, fire resistant**	**
A1 filter masks	**

Helicopter Category H1 - overall length up to but not including 15m.
Helicopter Category H2- overall length from 15m up to, but not including, 24m.
* For access to casualties in an aircraft on its side
** This equipment is required for each helideck crew member.

Note: A Category H3 helicopter with an overall length from 24m up to but not including 35m requires the addition of a power cutting tool.

4.11.13 Maintenance and Inspection of fire-fighting equipment

A responsible person should be appointed to ensure that the rescue equipment is checked and maintained regularly. Rescue equipment should be stored in clearly marked and secure watertight cabinets or chests. An inventory checklist of equipment should be held inside each equipment cabinet/chest.

4.11.14 Personal Protective Equipment (PPE)

All responding rescue and fire-fighting personnel should be provided with appropriate PPE to allow them to carry out their duties in an effective manner.

- Sufficient Helideck Emergency Response Trained personnel to operate the RFF equipment effectively should be dressed in protective clothing prior to helicopter movements taking place.

- PPE shall be suitable and safe for intended use, maintained in a safe condition and (where appropriate) inspected to ensure it remains fit for purpose. In addition, equipment should only be used by personnel who have received adequate information, instruction and training. PPE should be accompanied by suitable safety measures (e.g. protective devices, markings and warnings). Appropriate PPE shall be defined by the company and should be determined through a process of risk assessment.

- A responsible person(s) should be appointed to ensure that all PPE is installed, stored in sufficiently sized storage with drying facilities, used, checked and maintained in accordance with the manufacturer's instructions.

4.12 Notice boards

Notice boards should be prominently placed in the passenger briefing areas and near the access points to the helideck and written in the languages that are normally spoken on the platform.

Safety Notice Boards should mention at least the following:

- No smoking
- Beware of the tail rotor
- Use the safe approach routes
- Do not approach the helicopter while the anti-collision lights are flashing
- No hard hats without chinstraps secured.
- No loose headgear
- Prohibition of dangerous goods

Figure 4.7 Example Safety Notice Board

4.13 Maintenance

The company should have a helideck maintenance programme in place which includes the helideck surface and associated structures, and all equipment including Refuelling equipment. An approved fuel facility maintenance contractor should carry out all maintenance on the fuel systems.

The helideck maintenance programme should include the following:

- Helideck related Safety Critical Elements (SCE), as defined in the facility/vessel HSE case, in the facility/vessel planned maintenance system, and subject them to routine Quality Assurance (QA) checks.
- Regular check and correction of any deterioration of helideck markings and installation side identification panels that render them illegible from the air.
- Maintenance of the friction properties of the helideck surface to the level required if a helideck landing net is not fitted. (Refer to para 4.3.1)
- Commissioning the annual certification of;
    - The helideck firefighting foam production system if fitted, including a laboratory certified produced foam test;
    - The helideck perimeter safety net in accordance with the Oil & Gas UK "Guidelines for the Management of Aviation Operations";
    - Meteorological observation system sensors in accordance with manufacturer's instructions, if a system is fitted; and
    - Other calibrated instruments having the potential to affect aircraft performance

4.14 Helideck Inspection

4.14.1 Initial Inspection

The Owner shall arrange for an initial inspection of the helideck and include Inspectors acceptable to the Regulator.

4.14.2 Routine Inspection

The Owner shall arrange for an annual inspection for all helidecks under their control and should liaise with the OIM of each installation for resulting corrective actions.

The HLO should conduct a 6-monthly inspection of the helideck or at the first opportunity for infrequently visited NUIs.

4.14.3 Minimum competency requirements for Helideck Inspectors

The helideck inspectors responsible for initial and or routine inspections shall meet the following requirements in terms of training, skills and knowledge:

Certificates:

- Offshore medical examination
- Offshore Safety Introduction and Emergency Response Training (NOGEPA 0.5)
- VCA or equivalent
- HLO (NOGEPA training 1.1 including 2.6 or 2.9) incl. Dangerous goods by Air Awareness
- Recommended: Weather/Meteorological Observer
- Recommended: MARCOM B/basic VHF radio

Knowledge of:

- Offshore installation protocols and procedures
- NOGEPA Standard 100
- National regulatory requirements (RVGLT/AIP)
- ICAO Annex 14 Vol. II/ICAO Heliports Manual / CAP 437
- Helideck equipment

Skills:

- English language, spoken and written
- Basic auditing and inspection techniques
- High degree of awareness of offshore and aviation safety

Specific training received in:

- Equipment requirements
- Helideck Awareness by HCA, or equivalent
- Helideck inspections, with an experienced inspector (a minimum of 2 practical training inspections).

4.14.4 Documentation

It is recommended that each installation equipped with a helideck, documentation (digital or hardcopy) is maintained which should include aviation and safety policies, passenger briefings and procedures covering all aspects of routine and emergency helicopter operations and passenger handling.

4.15 Certification

The Inspectie Leefomgeving and Transport (ILT) is the party who issues the helideck certificate with a maximum validity of 3 years.[xvi] The Owner of the helideck shall ensure a process is in place for the certification of helidecks.

4.16 Provisions for Normally Unmanned Installations (NUIs)

4.16.1 Lighting

For night operations, NUI helideck lighting, including windsock illumination shall remain permanently on or be controlled by a light sensitive switch with a manual override facility operable locally and/or from an appropriate manned installation or shore base.

NUIs should have an automatic status light system to indicate the presence of hazardous conditions and should be capable of being operated from a remote location.

However, an alternative method of warning the pilots of a hazardous condition is the use of two way communication when available.

4.16.2 Firefighting equipment

4.16.2.1 General Requirements - Legacy NUIs

NUI locations built before 1 January 2013 FFE shall comply with table 6-2 of ICAO Annex 14, Volume II: Heliport Manual

Minimum usable amounts of extinguishing agents for helidecks

Reference: ICAO Annex 14 Volume 2 Table 6 - 2

Foam meeting performance level B			Complementary agents				
Category	Water (L)	Discharge rate foam solution (L/min)	Dry chemical powders (kg)	Or	Halons (kg)	Or	CO_2 (Kg)
H1	500	250	23		23		45
H2	1000	500	45		45		90
H3	1600	800	90		90		180

4.16.2.2 General requirements - New-build NUIs

In the case of new–build NUIs, the selection and provision of foam should be assumed as the principal agent. For a NUI, where helideck Rescue and Fire Fighting (RFF) equipment will be unattended during certain helicopter movements, the pressurised discharge of foam through a manually operated fixed monitor system is not recommended. For installations which are at times unattended the effective delivery of foam to the whole of the landing area is best achieved by means of a DIFFS.

A ‘combination of solutions’ may be considered where these can be demonstrated to be effective in dealing with a running fuel fire. This may permit, for example, the selection of a seawater-only DIFFS used in tandem with a passive fire-retarding system demonstrated to be capable of removing significant quantities of unburned fuel from the surface of the helideck in the event of a fuel spill from a ruptured aircraft tank.

DIFFS on NUIs should be integrated with platform safety systems such that pop-up nozzles are activated automatically in the event of an impact of a helicopter on the helideck where a Post-Crash Fire (PCF) is the outcome. The overall design of a DIFFS should incorporate a method of fire detection and be configured to avoid spurious activation. It should be capable of manual over-ride by the HLO and from the mother installation or from an onshore control room. Similar to a DIFFS provided for a Permanently Attended Installation (PAI) or vessel, a DIFFS provided on a NUI needs to consider the eventuality that one or more nozzles may be rendered ineffective by, for example, a crash.

5.0 Normally Unmanned Installation Operations

This section describes recommended good practice specific to NUIs. It outlines the necessary checks to ensure the NUI helideck is ready for use at all times. This section also includes specific tasks to ensure safe transfer of personnel and firefighting arrangements.

5.1 NUI Helideck Maintenance

Routine maintenance should be carried out on NUI helidecks to ensure asset integrity. This may be conducted by transporting a maintenance team by helicopter or Marine vessel. Key elements of NUI helideck maintenance is the maintenance of safety critical equipment and the monitoring and removal of guano.

The OIM should notify the Aircraft Operator and SAR when a helideck is temporarily closed due to maintenance.

It is essential that whenever a NUI is accessed for maintenance or use other than helicopter landing, the helideck is left in a condition of readiness. Companies should have a process to check the condition of the helideck for obstacles and verify the helideck has been returned to a state of readiness for helicopter operations. This verification should include:

- No obstacles on the helideck (tools, emergency equipment, etc.)
- Handrails in the stowed/landing (flat) position
- Helideck surface is clean and free of debris
- Crane has been stowed
- No obstacles impeding the drop off zone (scaffolds)

5.2 Transport of persons

When persons are transported to or be present on an unmanned mining installation, at least 2 persons shall be familiar with and trained in the use of the firefighting equipment and rescue means present on or near the helideck.

Before a helicopter will land on a NUI, confirmation is required from the responsible operational centre on whether or not there is the presence of unburned hydrocarbons to the extent that there is a danger of explosion.

5.3 Operating NUI with limitations

NUI platforms shall be compliant with ICAO Annex 14 and EASA SPA HOFO. If there is a situation where a platform is not compliant the helicopter operator needs to have permission from the NL CAA to land on such location. In the situation when an “operating status lights and black decks” situation occurs, the protocol in Appendix C should be followed.

6.0 Combined Operations – Jack-ups, Vessels and Walk to Work

This section applies to temporary operations where a mobile vessel or facility is operated in close proximity to an installation capable of carrying out helicopter operations.

6.1 Infringement during Combined Operations

Vessels and installation superstructures positioned in close proximity to the helideck, may infringe the obstacle free zones above and below the landing surface, which may impede the helicopter in its approach, landing and take-off, or in the event of a flyaway manoeuvre after an engine failure on departure.

If these sectors/surfaces are infringed, even on a temporary basis, and/or if an adjacent installation or vessel infringes the obstacle-protected surfaces related to the landing area:

- The Owner shall timely inform the Operator of a known infringement.
- The HLO shall inform the pilot of any infringement identified.
- The Operator shall conduct an assessment to determine whether it is necessary to impose operating limitations and/or restrictions to mitigate any non-compliance with the criteria.

(Refer to para 4.1.2.1 for a detailed explanation of Obstacle Free zones and Appendix B for the Daily Inspection checklist)

6.2 Departure by Vessel

In case a crew leaves the installation by vessel (walk to work vessel or crew tender) instead of a helicopter, the crew should visually inspect the helicopter landing area on being free of obstacles and damage before departure, and report any anomalies to the Owner.

6.3 Effects of Combined Operations on Aircraft Performance

In the event that a rig or jack-up is located adjacent to a platform or offshore location, aircraft performance may be affected by turbulence generated from the introduction of new structures or the temporary combination of structures.

Adjacent installations may need to be included in the environmental assessment to include:

- foreign-object debris (FOD);
- an assessment of physical turbulence generators;
- bird control measures;
- air flow degradation due to gas turbine exhaust emissions (turbulence and thermal effects), flares (thermal effects) or cold gas vents (unburned flammable gas)[xvii]

The Operator shall communicate any restrictions or limitations as a result of this assessment to the Owner.

The Aircraft Operator shall complete an assessment of the helideck and determine its availability to use as an offshore location.

If the helideck is deemed unavailable, a landing prohibited marker shall be placed over the "H" on the center of the helideck. See para 8.2.

7.0 Renewable Energy Operations

(Placeholder pending EASA regulations)

8.0 Helideck Flight Operations

This section describes the common hazards associated with helideck flight operations and the appropriate measures to ensure the safety and integrity of personnel, aircraft and the installation.

8.1 Helicopter Pre-Arrival and Local hazards

When preparing for helicopter operations, the HLO shall check:

- any other facility activity that would affect helideck operations such as flaring, gas venting, crane operations, vessels in 180 degree falling gradient sector or within 500 metres of facility, work activity or temporary obstructions near helideck, drilling operations, or perforating operations;
- Flaring status; HLO shall check the status of the gas flare; if not lit, check that gas is not being vented and advise the Pilot of the status.
- On drilling rigs during drilling operations where wind conditions may cause drilling mud or other liquids to blow over the helideck, advise the Drilling Supervisor that helicopter operations are about to take place.
- Check use of lasers (bird scaring activities) on NUI helideck and advise Pilot of status.

8.2 Helicopter Landing Prohibited

For operational or technical reasons an installation may have to prohibit helicopter operations. Where the helideck cannot be used, the 'closed' state of the helideck should be indicated by use of the signal shown below. This signal is the standard 'landing prohibited' signal given in the Rules of the Air and Air Traffic Control Regulations, except that it has been altered in size to just cover the letter 'H' inside the yellow circle (TD/PM or TLOF).[xviii]

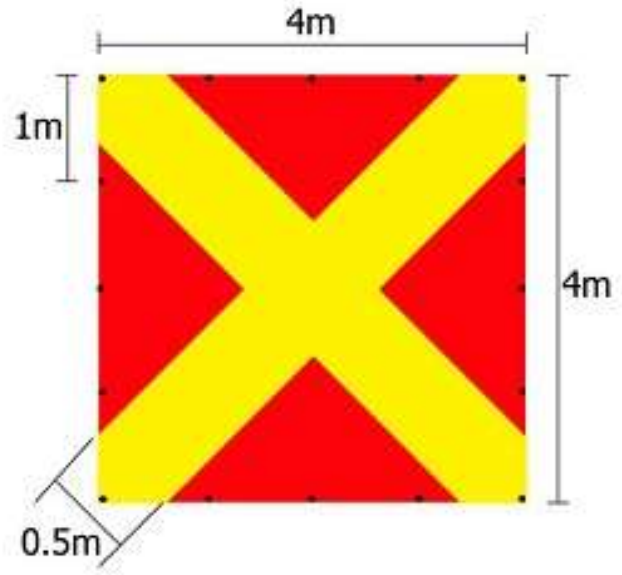


Figure 8.1 Landing Prohibited Marker

8.3 Approaching the aircraft

Personnel should only approach the helicopter when the "Anti-collision Light(s)" have been switched "Off" and the pilot has confirmed this with the 'Thumb Up' hand signal. This will indicate that the pilot is satisfied that it is safe to approach the helicopter via the designated approach areas.

8.4 High wind conditions

Special care shall be taken when moving passengers or handling cargo on the helideck during periods of high wind. Installations should conduct a risk assessment for high winds/adverse weather conditions and develop the appropriate mitigations.

8.5 Loose articles and aircraft downwash

The downdraft produced by rotors can dislodge loose headgear and move other items caught in the air flow with the potential for personal injury or damage to the airframe and engines of the aircraft.

- Rotor downdraft forces, combined with prevailing wind speeds, can generate winds equivalent to a Category 1 Hurricane over distances of 25m from the aircraft;
- Very heavy objects within the downdraft zone can become airborne if not restrained;
- Unsecured/unlocked locker doors in the vicinity of helidecks have been found to be a hazard due to high winds and helicopter operations;
- Loose items should be secured or removed from the helideck and in the vicinity of the helideck before the arrival or departure of a helicopter.

- Objects such as wooden crates, although they may appear heavy are known to have moved during helicopter landing and take-off and should be secured.

8.6 Tail rotor

Tail rotor blades are almost invisible when rotating at normal speed on the helideck. Personnel walking into the arc of a turning tail rotor will suffer severe injury or death as a result. All movements across the helideck shall be conducted under the direction of the HLO or HDA.

8.7 Engine air intakes and exhausts

Personnel should stay well clear of the engine air intakes and exhausts at all times.

8.8 Flotation gear

Passengers should stay clear of the flotation gear where possible.

8.9 Operation of cabin doors

Cabin doors on the different aircraft all have their specific techniques for operating. The HLO should receive operating instructions for the types of helicopters landing on his installation. If not familiar the HLO should ask instructions from the pilot. Excessive force should never be applied to the cabin doors.

8.10 Static electricity

Correct bonding procedures shall be used at all times during helicopter Refueling.

8.11 Firefighting equipment - readiness

Helideck firefighting equipment shall be ready for use at all times during helicopter operations. It is the responsibility of the HLO to ensure that the periodic tests have been carried out and are in date.

8.12 Prepare for Helicopter Departure

Conduct visual checks of helicopter prior to departure – leaks, landing gear clear of net, etc. Notify the helicopter crew of any unusual or abnormal conditions.

8.13 Recommended daily checks for the HLO

The following checks are recommended as a general guide for the HLO, to assist him in the daily duties concerning the helicopter operations to and from the, installation, or vessel. The HLO normally carries out most of the checks, but some checks may be carried out by other personnel under his direct control.

The helicopter deck and landing area shall be checked each and every day. The following is a list of the items that are to be checked on a routine basis:

- General condition of the landing area; to include checking obstacle free sectors
- Condition and tension of the landing net;
- Condition of visual aids, marking, lights, and illuminated windsock;

- Condition of perimeter safety nets;
- Deck (operational) equipment including helicopter starting equipment;
- Emergency equipment;
- Egress and Access points on helideck remain clear of obstacles
- Refuelling facilities (if appropriate);
- Availability of fire-fighting equipment;
- Safety notices and notice board (See para 4.12)
- Effect of bird droppings

See Appendix B for the relevant checklist. Any deficiencies should be corrected or reported in the maintenance system and to the helicopter operator.

9 Helideck Emergency Response

The helideck emergency response capability for each installation/vessel is determined by the Owner's safety case and the installation emergency response plan includes helicopter emergencies. It is recommended that companies extract the emergency procedures from the relevant Safety Case and make these accessible for helideck team members.

9.1 Potential Emergency Response Scenarios

Manned helideck equipped facility/vessel Emergency Response Plans and Procedures should address the following scenarios:

- Helicopter accident on the facility/vessel;
- Helicopter fire on the helideck;
- Helicopter ditching in rescue range of the facility or vessel;
- Helicopter ditching beyond local rescue range, overdue aircraft, and loss of contact with an aircraft;
- Fuel or oil spillage on the helideck; and
- Other Credible Scenarios identified in the Emergency Response Review involving helideck/helicopter operations, which may include:
    - Handling and transportation of sick and injured personnel
    - Emergencies in other parts of the installation/vessel
    - Evacuation of installation
    - Actions in the event of a damaged or obstructed helideck
    - Man overboard during helicopter operations

9.2 Emergency Response Plans and Procedures

Manned helideck equipped facility/vessel Emergency Response Plans and Procedures should include:

- The helideck team in the list of emergency response personnel;
- Action lists for emergency scenarios that involve helicopters and communicated to:
    - offshore incident command staff,
    - helideck team (HLO/HDAs/Fire watch),
    - radio operator,
    - rescue and fire-fighting teams, and
    - control room personnel (where applicable).

  Additionally, action lists are recommended for bridge personnel on mobile facilities and vessels;
- Communications procedures to alert approaching aircraft of unsafe conditions at the facility;
- The coordination required with other internal and external agencies; and
- Requirements for emergency exercises.

9.3 Plan of action

It is important to have a plan of action ready for emergency situations; such a plan should include items such as:

- Briefing and alerting of personnel;
- Positioning of equipment;
- Communication;
- Consult the emergency response plan of the responsible oil Owner.

9.4 Examples of potential emergency conditions

- Fire during the Refuelling operation;
- Engine fire during start up;
- Obstructed or damaged helideck;
- Helicopter heavy landing developing into a fire situation;
- Helicopter ditching near your installation;
- Fire alarm on another part of the installation during helicopter operations;
- Man overboard alarm during helicopter Operations;
- Evacuation of the installation;
- Evacuation of an installation close to a nearby one;
- Transport of sick or injured personnel;
- Accepting survivors from another installation or vessel;
- Fire in helicopter cabin;
- SAR duties and contingencies;
- Attempted “wheels up” landing.

9.5 Control of helideck emergencies – sample procedure

See Appendix D

10 Communication

10.1 Communication responsibilities of the HLO

Before and during the helicopter operations the HLO should maintain good communications by either one of the following methods:

1. Radio messages;
2. Light signals;
3. Hand signals.

With possibly one or more of the following person(s):

1. Helicopter pilot;
2. Helicopter crew when on the helideck;
3. Radio operator;
4. Crane operators;
5. Standby vessel;
6. Fire and rescue crew;
7. Passengers;
8. Refuelling crew;
9. OIM or Ships captain

10.2 Communication radio telephone

The HLO should be equipped with a portable transceiver set, operating on the same VHF frequency as the pilot of the visiting helicopter and the Radio Operator.

The HLO may only act in advisory capacity e.g. "Deck clear" or "Crane up, but stationary". The preference is that the HLO will give the deck availability (“Deck clear”) by radio to the helicopter crew.

Note:

1. Radio operators and HLO’s shall not assume the authority of air traffic control, but shall only act in an advisory capacity.
2. Radio contact will always be in the English language.
3. Correct handover procedures between the Radio Operator and the HLO shall be followed at all times, e.g. post helicopter departure.
4. In practice the Radio Operator should be in contact with the pilot, starting 5 minutes before ETA. The HLO has a headset with which he can communicate with the pilot about practical issues relating to the helicopter on deck.
5. The HLO should not use his radio during refuel operations.

Radio Phraseology and Communications

Phonetic Alphabet

When transmitting a helicopter call sign or spelling words the 'Phonetic alphabet' shall be used at all times. The syllables to be emphasized are in **BOLD**.

A: Alfa	**AL** FAH	J: Juliet	**JEW** LEE **ETT**	S: Sierra	SEE **AIR** RAH
B: Bravo	**BRA** VOH	K: Kilo	**KEY** LOH	T: Tango	**TANG** GO
C: Charlie	**CHAR** LEE	L: Lima	**LEE** MAH	U: Uniform	**YOU** NEE FORM
D: Delta	**DELL** TAH	M: Mike	MIKE	V: Victor	**VIK** TAR
E. Echo	**ECK** OH	N: November	NO **VEM** BER	W: Whiskey	**WISS** KEY
F. Foxtrot	**FOKS** TROT	O: Oscar	**OSS** CAH	X: X ray	**ECKS** RAY
G. Golf	GOLF	P: Papa	PAH **PAH**	Y: Yankee	**YANG** KEY
H: Hotel	HOH **TELL**	Q: Quebec	KEH **BECK**	Z: Zulu	**ZOO** LOO
I: India	**IN** DEE AH	R: Romeo	**ROW** ME OH		

Phonetic Numbers

0: **ZE-RO**	1: **WUN**	2: **TOO**	3: **TREE**
4: **FOW**-er	5: **FIFE**	6: **SIX**	7: **SEV**-en
8: **AIT**	9: **NIN**-er		
Decimal	**DAY-SEE-MAL**		
Hundred	**HUN**-dred		
Thousand	**TOUS-AND**		

Note: The syllables printed in **BOLD** in the above list are to be stressed; for example, the two syllables in **ZE**-**RO** are given equal emphasis, whereas the first syllable of **FOW**-er is given primary emphasis.

Readability Scale

Readability Scale	Meaning
1	Unreadable
2	Readable now and then
3	Readable but with difficulty
4	Readable
5	Perfectly readable

Standard Words and Phrases

Word or Phrase	=	Meaning
Acknowledge	=	Let me know that you have received and understood the message
Affirm	=	Yes
Approved	=	Permission for proposed action granted
Break	=	Indicates the separation between messages to different stations
Cancel	=	Annul the previously transmitted message
Check	=	Examine a system or procedure
Cleared	=	Authorised to proceed under the conditions specified
Confirm	=	Have I correctly received the message, or did you receive the message correctly?
Contact	=	Establish contact with
Correct	=	That is correct
Correction	=	An error has been made in this transmission, the correct version is
Disregard	=	Consider the transmission as not sent
How do you read	=	What is the readability of my transmission?
I Say Again	=	I repeat for clarity or emphasis
Monitor	=	Listen out on (frequency)
Negative	=	No, or permission not granted, or that is not correct
Over	=	My transmission is ended, and I expect a response from you
Out	=	This exchange of transmissions is ended and no response is expected

Pass Your Message	=	Proceed with your message
Go Ahead	=	Proceed with your message
Read Back	=	Repeat all, or specific part, of the message
Report	=	Pass requested information
Request	=	I would like to know, or I wish to obtain
Roger	=	I have received all of your last transmission
Say Again	=	Repeat all after, give the last received word
Speak Slower	=	Reduce rate of speech
Standby	=	Wait I will call you (no onward clearance to be assumed)
Verify	=	Check and confirm
Wilco	=	I understand and will comply

10.3 Frequencies used in the Dutch area of the North Sea

VHF:

North of 53° North, but with the exception of blocks K18, L16 and L17.

Frequency = 125.175 MHz.

South of 53° North, but with blocks K18, L16 and L17 included.

Frequency = 122.950 MHz.

10.4 Helicopter call signs

The helicopter call sign will be the phonetic pronunciation of the registration letters of the helicopter, or a specific Owner call sign.

Once communication has been established the registration may be abbreviated to:

E.g. Maple 1, 2, 5, 7, etc.

If your station is called but you are uncertain as to the identity of the station calling, transmit the following:

“Station calling (platform name) say again”.

10.5 Message content

All messages should be short and to the point.

10.6 Time

Times used should be in UTC (Universal Time Coordinated) but in some areas of the North Sea when local time is used this shall be explicitly mentioned, but always using the 24-hour clock.

10.7 Departure message

If the next destination of the helicopter is an onshore airfield, the installation Radio Operator passes a "departure message" to operations on the airfield, giving the following information:

a. Helicopter call sign;
b. Destination and estimated time of arrival (ETA);
c. Persons on board (POB); (e.g. 7 PAX+2 crew)

Under certain conditions the helicopter pilot may request a “radio watch” until radio contact has been made with the Flight Information Region (FIR) or another offshore station.

10.8 Distress and urgency communications

(MAYDAY)

Distress and urgency traffic shall receive absolute priority over all other transmissions. A distress message should first be passed on the frequency in use. All stations that will hear the distress message shall immediately cease all other transmissions that are likely to interfere with the distress traffic. Always acknowledge a distress message, and try to collect as much information as possible including:

a. Aircraft call sign or name of ship;
b. Nature of the distress;
c. Present position;
d. Height (aircraft);
e. Heading;
f. Speed;
g. Number of persons on board (POB);
h. Captains intentions;
i. Endurance;
j. Any other information that may help in the rescue.

All subsequent messages concerning the distress should be preceded by the word MAYDAY. The station that takes control of the Mayday should impose silence on all other stations using that frequency (or the distress frequency) by making the following transmission:

”All stations this is (platform name), silence mayday.”

If and when the Mayday is over the "radio silence" should be cancelled by:

“All stations this is (platform name), silence fini.”[xix]

10.9 Weather information

When the helicopter is approaching your platform, the pilot may request a “weather up-date” for specific items of the weather conditions. The platform shall inform the helicopter in case of last-minute weather change to include the following items:

a. Wind direction
b. Wind speed
c. Any last-minute changes.
d. Visibility (best guess)
e. Cloud base (best guess)
f. Precipitation

11. Helicopter Loading and Passenger Handling

The HLO is responsible for all personnel engaged in operations on or near the helicopter landing area, including those engaged in loading and unloading duties.

11.1 General

The HLO has a role to understand the correct loading and a role to assist in loading, but the helicopter crew is ultimately responsible and has the final authority.

11.1.1 Control of Passengers

The HLO shall provide instructions to passengers and control their movement on or near the helideck during embarkation, disembarkation and the transfer of baggage.

11.1.1.1 First Time and or Infrequent Fliers

Prior to arriving at the heliport, all first-time travellers should be identified by the Oil and Gas Operator and employing companies (e.g. contractors, vendors and visitors). Ideally, this information should be readily available on the flight booking system at the heliport check-in desk. In addition, attention should be drawn to the requirement that it is the individual's responsibility to notify the check-in desk if they are a first-time or infrequent traveller. A green armband may be issued to those passengers as an indication to fellow passengers and HLO's the person may not be familiar with routing and offshore facility specifics.

11.1.1.2 Passenger Size - XBR

All passengers travelling offshore by helicopter are required to sit in a seat where the nearest push-out emergency exit is compatible with their body size.

Passengers who are Extra Broad (XBR) will be required to sit in the seats or rows which are indicated suitable for XBR passengers.

11.2 Helicopter Transfer Suits and Additional Clothing

Well-fitting membrane suits ('Helicopter Transfer Suits') shall be worn by all passengers during all offshore helicopter flights. These are intended to protect individuals from hypothermia until rescue in the event of a helicopter ditch at sea. Additional layers are worn underneath the Helicopter Transfer Suit according to summer or winter sea temperatures.

Winter: 1 October – 31 May

- Three layers of clothing (torso only) shall be worn under the suit, of which one layer with long sleeves.
- Suggested combination of long sleeved shirt, t-shirt, jumper.
- Long trousers.
- In winter, a thermal layer will be added to the helicopter transfer suit by the suit supplier.

Summer: 1 June - 30 September

- Two layers of clothing (torso only) shall be worn under the suit.
- Suggested combination of t-shirt, jumper.
- Long trousers.

Hoodies or high collared shirts may not be worn as this can interfere with the neck seal on the suit.

The summer and winter dates have been taken from average sea temperature data for the Dutch North Sea area, being reliably > 10 degrees Celsius from 1 June.

Exceptional seawater temperature:

If in exceptional years the sea temperature is colder or warmer than the standard summer/winter definition (temperature measured at the Euro platform, as provided on the website of Rijkswaterstaat: https://waterinfo.rws.nl/#!/kaart/watertemperatuur/, is below 10 degrees Celsius between 1 June and 30 September or above 10 degrees between 1 October and 31 May), NOGEPA can decide to change the start of the winter/summer dates.

Thereto, the NOGEPA secretariat shall monitor the seawater temperature and notify the HSECOM chairperson on expected exceptional seawater temperature. The decision to change the start of the winter/summer dates shall then be made by the HSECOM chairperson, and relayed to Den Helder Airport, the airport agents and the helicopter operators to implement immediately on behalf of all operators.

11.2.1 Temporary measures to prevent heat stress

Wearing a Helicopter Transfer Suit with clothing underneath during extremely hot air temperatures may introduce the additional risk of heat stress. Therefore the helicopter operators and the airport should have a heat protocol in place. The protocol shall further at what air temperature and/or other circumstances the protocol becomes applicable, and which party initiates and controls the measures.

The protocol entails the following measures as a minimum:

- Passengers shall wait in the airport terminal departure area until their flight is ready to depart.
- Zippers of the suits may be kept open while waiting in the departure area, but must be zipped upon leaving the terminal building for the helicopter.
- Sufficient drinking water shall be provided by the helicopter operator.
- Helicopter operators shall ensure that passengers do not spend any unnecessary time in a closed helicopter without ventilation before departure.
- If, however, passengers do have to wait for departure in the helicopter, the helicopter doors must always be kept open.
- Forward a 'heat notification' to the NOGEPA secretariat by e-mail (for NOGEPA to monitor the situation and take control of additional flight related measures, if the situation requires this) .

11.2.2 Donning of Helicopter Transfer Suits

Donning of the suits shall be done below helideck or in any other designated area. The HLO shall have control of the passengers donning of helicopter transfer suits, correct wearing of the life jackets, and shall ensure that all seat belts are secured.

11.3 Emergency Breathing System (EBS)

Passengers on all offshore installations should be provided with a CA-EBS. A Compressed Air Emergency Breathing System (CA-EBS) shall be capable of rapid underwater deployment.

The helicopter operator shall ensure that the CA-EBS will not interfere with the correct operation of the certified survival suits, life jackets or crew duties. It should meet the either Category 'A' of the specification detailed in prEN 4856 or an equivalent specification for EBS.

11.4 Manifest

The HLO shall sign and make available a legible and accurate manifest which records;

- destination of passengers, baggage and cargo.
- weights of passengers, baggage and cargo.

It is permitted to use a manifest produced via a computer at your installation. However, it is mandatory that the information recorded on the official manifest is identical to the computer version.

The HLO shall always check the incoming manifest, to ensure that the correct number of passengers, baggage & freight have in fact disembarked from the helicopter.

11.5 Passenger Safety brief

The passenger Safety briefing shall be provided before each flight, unless a flight is conducted with the same aircraft type and the same passengers within 24 hours.

The person signing the manifest shall ensure that the passengers have been properly briefed by the pilots or a Safety briefing video.

11.6 Baggage

Due to the limited payload and baggage capacity available in most types of helicopters, it is advisable to reduce personal baggage as much as possible, both in weight and volume. Baggage (only soft bags) can be carried in the cabin when approved by a company and helicopter operator. The (soft) baggage shall be fastened in chairs without blocking an emergency escape which is hindering the evacuation after a ditching.

11.6.1 Weight of baggage, passengers and cargo

To insure that the available payload is efficiently used and the maximum "take-off weight" of the helicopter is not exceeded, all cargo, baggage and passengers shall be accurately weighted prior to being transported by air. It is unacceptable to estimate the weight of passengers, baggage or cargo.

11.7 Cargo handling

Cargo shall only loaded into the baggage compartment of the helicopter. (Not in the cabin!)

Care shall be taken when loading baggage and cargo to ensure that the helicopter is not damaged in any way.

All cargo shall be recorded on the manifest.

All cargo should be checked prior to loading to ensure it is packaged appropriately for air transport offshore. Packaging material must be secure, loose items contained in a secure container. Light boxes are subject to the effects of wind and helicopter downwash and may become airborne. Companies should review risk assessments for cargo packaging/loading and unloading in an offshore environment and ensure mitigations are in place.

11.8 Identification of Dangerous Goods

The HLO shall ensure that dangerous goods are identified and not loaded onto the aircraft. All personnel involved with identifying dangerous goods shall complete the IATA 'Transport of Dangerous Goods Awareness' course.

12. Transportation of Special Loads

12.1 Dangerous Goods

Dangerous goods shall not be shipped by helicopter unless this shipment has been authorized by a certified dispatcher. Dangerous cargo may only be transported in accordance with ICAO's/IATA's regulations. Dangerous goods may only be sent when accompanied by the form "Shippers Declaration for Dangerous Goods".

When the HLO doubts whether a freight or baggage item should be classified as a Dangerous Good, then he shall ask for advice from the helicopter operator or freight agent.

The categories of dangerous goods are:

Class 1.	Explosives
Class 2.	Gases (Compressed, liquefied, dissolved under pressure or deeply refrigerated)
Class 3.	Flammable liquids
Class 4.	Flammable solids (4.1)
	Substances liable to spontaneous combustion (4.2)
	Dangerous when wet, will emit flammable gases (4.3)
Class 5.	Oxidizing substances (5.1)
	Organic peroxides (5.2)
Class 6.	Poisonous toxic substances (6.1)
	Infectious substance (6.2)
Class 7.	Radioactive materials
Class 8.	Corrosives
Class 9.	Miscellaneous dangerous goods, including Lithium metal and Lithium ion batteries and magnetic materials

Figure 12.1 Dangerous Goods Declaration Form

SHIPPER'S DECLARATION FOR DANGEROUS GOODS

Shipper	Air Waybill No Page of Shipper's Reference Number *(Optional)*
Consignee	
Two completed and signed copies of this Declaration must be handed to the operator.	WARNING Failure to comply in all respects with the applicable Dangerous Goods Regulations may be in breach of the applicable law, subject to legal penalties. This Declaration must not, in any circumstances, be completed and/or signed by a consolidator, a forwarder or an IATA cargo agent.
TRANSPORT DETAILS This shipment is within the limitations prescribed for: *(delete non-applicable)* PASSENGER AND CARGO AIRCRAFT / CARGO AIRCRAFT ONLY	Airport of Departure:
Airport of Destination:	Shipment type *(delete non-applicable)*: NON-RADIOACTIVE / RADIOACTIVE

NATURE AND QUANTITY OF DANGEROUS GOODS

Dangerous Goods Identification						
Proper Shipping Name	Class or Division	UN or ID No	Subsidiary Risk	Quantity and type of packing	Packing Inst	Authorisation

Additional Handling Information

I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labelled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.	Name/Title of Signatory Place and Date Signature *(see warning above)*

13. Helicopter Fuel Systems and Refuelling

13.1 General

This section describes the typical offshore installation fuel system, fuel quality requirements, maintenance and helicopter refuelling. It applies to fixed offshore installations, Mobile Offshore Units and vessels.

13.2 Product Identification

It is essential to ensure at all times that aviation fuel delivered to helicopters from offshore installations and vessels is of the highest quality. Therefore, all system components and pipelines should provide clear and distinct product identification indicating the fuel type (e.g. Jet A-1). The standard aviation convention for markings dedicated to aviation fuel (EI Standard 1542) should be used. The correct identification markings should initially be applied during system manufacture and routinely checked for clarity during subsequent maintenance inspections.

13.3 Fuelling system description

The basic elements of all offshore fuelling systems are the same and generally fall into two categories:

Transportable Tank System consisting of:

- transit tanks,
- a fuel delivery pumping system, and
- a dispensing system.

Static Storage Tank System consisting of:

- static storage facilities and, if installed, a sample reclaim tank (see note),
- fuel delivery and fuel transfer pumping systems or a combined delivery and transfer pumping system,
- a dispensing system, and
- transit tanks.

Note: On existing (legacy) Transportable Tank Systems where built-in static storage tanks are not provided, delivery of fuel is direct to the aircraft from transit tanks. In this case, sample reclaim tanks should not be used in order to prevent un-quantified mixing of fuel batches within transit tanks; where fuel relative density requires to be tightly controlled.

13.4 Design considerations

13.4.1 Containment

When preparing a layout design for aviation fuelling systems on offshore installations and vessels, it is important to make provisions for suitable segregation and bunding of the areas set aside for the tankage, pumping and dispensing systems. Facilities for containing possible

fuel leakage until waste fuel can be properly disposed of should be given full and proper consideration.

13.4.2 Preventing ignition

Although Jet A-1 is flammable, it is a relatively safe fuel having a flash point of 38˚C, and is designed to ignite in an atomised form as it is injected into an aircraft engine. It is not designed to burn in liquid form at temperatures below its flashpoint. Proximity to heat sources may necessitate consideration of heat shielding.

- Earth bonding shall be used throughout the system: tank earthing leads and clamps; system pipework and equipment bonding; nozzle ground wires and the main aircraft earth bonding lead, as the movement of fuel and system components will generate electrostatic charge.
- Protection of system components from over-pressurisation due to thermal expansion should be considered. This is especially important in sections of the system where components can be isolated from the mandatory filter water separator thermal expansion relief valve by closure of isolation valves.
- Provision of fire control should be given full and proper consideration.
- Controls should be in place to prevent damage caused by dropped objects (e.g. during crane operations) leading to an uncontrolled release of fuel under pressure.
- Any tank top openings that are easily opened should have the capability of being locked or having a frangible seal installed to verify contents have not been tampered with.

13.5 Fuel Checks and Inspections

13.5.1 Fuel Sampling Requirements

Fuel samples taken from any aviation fuelling system sample point should be the correct colour, clear, bright and free from solid matter. They should also be checked for suspended water by using a syringe and water detector capsule.

Filter vessel and hose end samples should be taken under pump pressure. Where a closed-circuit sampler is fitted to static storage tank sample points, unless the tanks are sufficiently elevated or the sampler sufficiently lowered, to provide enough head of pressure for filling the sampler at a reasonable rate. If a hand pump is fitted for lifting fuel, it should be used with sufficient force to obtain a reasonable flow of fuel into the closed-circuit sampler.

13.5.1.1 Acceptable Condition of Fuel

To be acceptable, jet A1 fuel shall be:

- "**Undyed**": the acceptable color may vary from water clear to a light straw color. The presence of any other color may indicate contamination with other fuels, which are "dyed" to aid in identifying them;

- "**Clear and bright**": The phrase is independent of the natural color of the fuel. "Clear" refers to the absence of sediment or emulsion. "Bright" refers to the sparkling appearance of fuel having no cloudiness, fogginess or haze;
- Free of any particulate matter such as small amounts of rust, dust, scale or fungus;
- Free from undissolved water.

For the Aviation Tank Filling Record procedure and template, see *Peterson Jet A-1 ATFR Procedure (latest revision)*.

13.5.1.2 Required action if sample found to be contaminated:

- If free water is present in the sample, continue to draw off further samples until all the free water has been drained off;
- If suspended water is found in the sample, allow a further settling time of 30 minutes per foot (30 cm) of fuel in the tank. At the end of this period re-sample and check if the fuel is still contaminated. Repeat the process once more. If the fuel is still contaminated seal off the tank and return it to the fuel supplier onshore;
- If dirt or sediment is present in the sample, draw off a further two samples. If these samples are still contaminated seal off the tank and return to the fuel supplier onshore.

13.5.1.3 Fuel sample containers

Fuel samples drawn from transit/static storage tanks and the fuel delivery system during daily and weekly tests should be retained in appropriate containers for specified periods. The sample containers should be kept locked in a secure, suitably constructed light-excluding store and kept away from sunlight until they are disposed of (aviation fuel is affected by UV light).

Only scrupulously clean, standard 3-litre clear glass sampling jars should be used for taking fuel samples unless using a closed circuit sampler. It is strongly recommended that they are also used for initial storage. Supplementary items such as buckets and funnels, fitted with earth cable and clamp, should be manufactured from stainless steel. To prevent sample contamination, sampling jars and all supplementary items should be scrupulously cleaned before each use using lint free cloth. In this context, lint is defined as "short, fine fibres which separate from the surface of cloth".

It is recommended that the fuel samples are no longer kept in 5-litre International Air Transport Association (IATA) lacquer-lined sample cans. This is because their design prevents scrupulous cleaning and visual confirmation of the removal of all sources of contamination (e.g. trace sediments) prior to re-use. Sediments trapped in IATA cans are likely to result in highly inaccurate representations of drawn fuel samples when submitted for laboratory analysis, in the event of an aircraft incident where fuel is a suspected causal factor.

When drawn fuel samples are requested for analysis as evidence, the appropriate samples should be decanted from glass sample jars into unused, purpose-made IATA sample cans for transportation. Sample cans should be conditioned prior to use by subjecting them to a 48

hour soak with uncontaminated fuel in order to remove pigmentation and other surface chemicals from the lacquer lining.

13.5.1.4 Fuel Sampling Process

Checking for fuel quality using a manual sample point and 3 litre glass jar should be carried out in the following manner:

- Samples should be drawn into scrupulously clean, clear glass sample jars at full flush (or as close to full flush as is reasonably practicable without causing spillage). The jar lid should be fitted as soon as possible to reduce the likelihood of airborne contamination of the sample.
- The fuel sample should be visually checked to ensure it is of the correct colour, clear, bright and free from solid matter and suspended water. (Jet A-1 may vary from colourless to straw colour.)
- Free water will appear as droplets on the sides, or bulk water on the bottom, of the sample jar. If there is any evidence of free water the sample should be rejected.
- Suspended water will appear as a cloud or haze, however, small air bubbles may also appear as a haze. Air bubbles can appear in fuel samples from filter vessels for 2 to 3 days following a filter change. If there is any sign of a haze, the sample should be left for 60 seconds to determine whether or not this indicates presence of air or water;
- Solid matter is usually made up of small amounts of dust, rust, scale etc. suspended in the fuel or settled out on the jar bottom. When testing for solid contaminants, swirl the sample to form a vortex; any dirt present will concentrate at the center of the vortex making it more readily visible. 'Trace' amounts of sediment are acceptable. If more than a 'trace' of solid matter is detected, the sample should be rejected.
- A 'trace' of solid matter in the context of sediment present in Jet A-1 Aviation Fuel samples is defined as, 2 to 3 particles of debris not exceeding 0.5 mm diameter.

How to use the 'Shell Water Detector'

Step 1 - Fit the capsule to a closed syringe;

Step 2 - Immerse the capsule and approximately half of the syringe into the fuel sample that is to be tested;

Step 3 - Withdraw the plunger until the fuel in the syringe reaches the 5 ml mark;

Step 4 - Any suspended water in the fuel will collect on the yellow paper, dissolving the dye, thus producing a distinctive color change. A test is said to be positive if there is an observable color change. The capsule should be strongly discolored with as little as 30 ppm of suspended water in the fuel;

Step 5 - The portion of the yellow paper that is protected by the plastic moulding will remain unaffected, if there is suspended water in the fuel this will help in giving a clear color comparison.

13.5.1.5 Storage life

The storage life of the water detection capsules is no longer than 9 months from manufacture. The expiry date is stamped on the side of the box. This expiration date shall be strictly observed. Do not use the capsules after the date marked on the tube.

13.5.1.6 Fuel Sampling Frequency and Retention Periods

	What	When	Retention Period
1	Transit tanks	Filling onshore	Until tank is returned onshore
2	Transit tanks	Within 24 hrs of placement and then weekly	24 hours
3	Transfer filters	Prior to fuel transfer or weekly, whichever occurs first	When an acceptable clean fuel sample has been obtained, samples may be discarded
4	Transit tanks	Prior to decanting to bulk storage tank or daily when on-line or next in-line	24 hours
5	Static storage tank	Daily – prior to system use	48 hours
6	Delivery filter water separator and filter monitor	Daily – prior to system use	When an acceptable clean fuel sample has been obtained, samples may be discarded
7	Refuelling nozzle	Daily – prior to system use	When an acceptable clean fuel sample has been obtained, samples may be discarded or retained as a pre-refuel sample
8	Refuelling nozzle (or fuel filter monitor if pressure	Before refuelling, this sample shall be checked by the pilot	When an acceptable clean sample has been obtained and the flight crew have

	refuelling with no nozzle sampler)		seen the evidence (vortex/particle check and water test) samples may be discarded
9	Refuelling nozzle (or fuel filter monitor if pressure refuelling with no nozzle sampler)	Immediately after refuelling, this sample to be checked by the pilot	24 hours. However, if the same aircraft is refuelled again on the same day, the previous sample may be discarded and the new one retained
10	Tanks and delivery system	After heavy rainfall, storms, if subject to water/foam deluge on activation of the fire protection system or after snow on tanks is thawing	When taken, these samples replace the ones taken for 4 and 5 above

Note: In the event of an aircraft incident where fuel may be considered to be a causal factor, retained fuel samples will subsequently be requested by the helicopter operator to support technical investigations. Refer to Appendix E for the 'Helicopter in flight fuelling incident report form'.

13.5.1.7 Fuel Sample Labelling

The following information should be clearly marked on the retained fuel samples:

For Transit/Static tanks:

- Tank No. / Date / Time
- Post refuel sample: A/C Reg. / Date / Time

13.5.1.8 Decanting from sample reclaim tanks

Before transfer of fuel takes place from a sample reclaim tank to bulk storage, the reclaim tank should be sampled to ensure the fuel is in good condition.

Any samples taken prior to transfer should not be returned until transfer from the sample reclaim tank to the bulk tank has been completed as this could stir up contaminants on the bottom of the vessel. After each transfer, the residue in the bottom of the vessel should be fully drained and disposed of to allow the recovery tank to be cleaned using lint free cloths.

The transfer filter vessel should also be sampled under pump pressure before the storage tank inlet valve is opened, to ensure that no contamination is present in the filter vessel. Any contaminated samples should be disposed of into a suitable container.

13.6 Delivery Systems

The offshore delivery system should normally be inspected every six months by a fuel inspection company, contracted by the offshore asset owner or Oil and Gas Operator to inspect and certify the system is fit for uplifting fuel by the helicopter operator.

Note: Inspection in this context is **not** to be confused with Auditing. It is physical intervention / trades supervision by a fully trained and competent engineer for determining condition and replacement of key system components, prior to certifying the system is fit for purpose.

The function of fuel inspection has two objectives;

- allows necessary scheduled invasive and specialist work-scopes to be carried out by an approved engineer, and
- provides system certification on completion of a successful inspection.

Note: No system should exceed four months between successive inspections and certification may be withdrawn if the system is not maintained in accordance with the requirements below.

13.6.1 Daily Checks

In addition to the fuel inspection above, the HLO should conduct daily and weekly checks to maintain satisfactory fuel quality and operability.

	Item	**Inspection**
1	Filter water separator and fuel filter monitor	Drain fuel from the sump/sample line until it is clear. The sample should be checked and retained Note: This check excludes the transfer filter which should be checked weekly or prior to use, whichever is the sooner. This can only be carried out when fuel is being transferred
2	Transit tank/storage tank	A fuel sample should be drawn from each compartment of the transit tank/storage tank (as applicable) and checked for quality
3	Floating suction	The floating suction assembly should be checked for buoyancy and freedom of movement
4	Refuelling nozzle	A sample should be drawn from the hose end and checked for quality
5	General system checks	Check for signs of leakage

		Check that all dispensing equipment is stowed inside the dispensing cabinet with the door closed for protection from the elements when not is use
6	Complete documentation	Daily checks should be recorded

13.6.2 Weekly Checks

The HLO shall carry out the following weekly checks, In addition to the daily checks specified above.

	Item	**Inspection**
1	Transit tanks	Carry out weekly tank checks as per para 13.10.3
2	Suction hose and hose coupling	*Refer to Manufacturer's instructions.*
3	Static storage tanks	Check all tank top fittings are in place, clean and all dust caps are fitted Check valves are closed and inspection hatches secure
4	Pump skid/cabinet	Check pump bearings are adequately greased *For air motor driven systems:* • Check air-line lubricators are topped up with suitable oil and drain air-line water taps *For electric motor driven systems:* • Check pump drive gearbox oil level and top up as required
5	Differential pressure gauges	*For delivery filter vessels:* • Obtain weekly differential pressure readings for each vessel during refuelling under full flow conditions. If no refuel has taken place during the week, draw off fuel into a drum at full flow to take the readings. Record the readings using the *Filtration Equipment Pressure Differential and Throughput Record* in Appendix E.

		For transfer filter vessels: • Obtain weekly differential pressure readings for each vessel during refuelling under full flow conditions. If no replenishment has taken place during the week, the readings may be taken during the next replenishment. Record readings.
6	Dispensing cabinet pressure gauge	Check correct operation of the fuel pressure gauge
7	Hose reel	Check rewind gears are adequately greased – apply grease as required Check air-line lubricators (air driven rewind motors) are topped up with suitable oil and drain air-line water traps (as appropriate)
8	Fuel delivery hose	Unwind hose onto the helideck and subject to pump pressure examine entire length for soft spots, bulges, blistering, cuts, abrasions, kinks or crushing. No white canvas should be showing through the skin of the hose. Pay particular attention to sections of hose within 45cm of couplings as they are prone to deterioration. Check hose end clams for security. Record results
9	Fuel nozzles	Check general condition, cleanliness and correct operation to ensure lock-off and no leaks. Check dust caps are present and secure **Note**: No lubrication except petroleum jelly should be applied to any of the pressure refuelling coupling or gravity nozzle parts
10	Spill container	Accumulated fuel should be drained from the spill container and disposed of
11	Earth bonding/EPU	Check general condition, security and electrical continuity (max permissible reading of 25 ohms) on the following earth bonding equipment: • Tank earth leads and clamps • Refuelling nozzle secondary bonding lead, jack plug and clips • Main aircraft bonding/EPU lead, and jack plug

		Carry out checks for correct function of the following: • Main aircraft bonding/EPU reel automatic or manual rewind mechanism
12	General system checks	Check for leaks and general appearance Visually inspect painted components for condition of paint linings. Repairs should be carried out where fuel quality and system integrity cannot be compromised Ensure good housekeeping is maintained, cleaning any blocked drains, removing any rubbish as necessary
13	Documentation	Record all checks

13.7 Receipt of transit tanks offshore

Transit tanks transported offshore are often exposed to sea spray and harsh weather conditions on supply vessels and this could potentially cause ingress of water into the fuel. It is strongly recommended that fuel sampling is carried out as soon as the appropriate settling time has elapsed or at least within 24 hours of the tank being placed into a bunded storage area on the installation or vessel. Settling times are one hour per foot depth of fuel in the tank.

The following procedure should then be followed:

1. Check transit tank seals are still intact.
2. Check transit tank fuel grade markings match the fuel grade stated on the fuel release certificate.
3. Check tank shell for damage, particularly around welded seams.
4. Check fuel release certificate for the following:
    - correct grade,
    - quantity,
    - batch number.
    - date filled
    - certified free from solid contaminants and water; and
    - signed by authorised product inspector.
5. Take fuel samples from the transit tank and discard until the samples appear free from water.

13.8 Decanting from transit tanks to static storage

Before commencing any transfer of fuel it is necessary to check the static storage tank fuel level using a dipstick, dip tape or level gauge to ensure that the contents of the transit tank can be accommodated.

The transit tank should have had sufficient time to settle once positioned correctly for the transfer operation. Settling times are one hour per foot depth of fuel in the tank.

Static storage tanks equipped with a floating suction device need at least one hour for settling time and tanks without floating suction should be left for a period in hours approximately equal to the depth of fuel in feet.

The following procedure should then be followed:

1. Connect an earth bonding lead to the transit tank.

2. Carry out checks for fuel quality as described in paragraph 8.12.

3. Once a satisfactory sample has been obtained, the suction hose should be connected to the transit tank discharge point and the tank foot valve should be opened.

4. With the system valves set up to supply fuel from the transit tank to the transfer pump and on to the transfer filter vessel, the transfer pump should be run in order to obtain a sample from the transfer filter vessel under full flow conditions until a satisfactory result is obtained. Stop the pump between samples.

5. Re-start the transfer pump and open the static storage tank inlet valve to start the fuel flow. Once fuel transfer has commenced check the coupling connections for any signs of leakage and continue to monitor the fuel flow whilst transfer is taking place.

6. When sufficient fuel has been transferred, shut off the valves and stop the transfer pump.

7. Disconnect the transfer hose followed by the earth bonding lead and replace any dust caps that were removed at the commencement of the operation.

13.9 Helicopter Refuelling Procedure

The following could be used as an example for developing refuelling procedures for refuelling a helicopter on a helideck. OIM's shall ensure that there is a documented procedure covering fueling operations on their installation. The helicopter operator will determine if passengers will remain on board during refuel. In any case, passengers shall not be on board during refuel after the helicopter is shut down.

13.9.1 Rotors Running Refuelling - Without Passengers board

Refuelling shall not take place:

- During local thunderstorms when lightning (cloud to surface) is sighted within 8Km or 5 NM from the installation
- When the helicopter is not connected with the main and hose-end bonding leads
- When the installation is at hazard status*
- Whilst the aircraft's anti-collision strobe lights are switched on

* Note: When at hazard status, refuelling may only take place, or continue, at the OIM's discretion

When conducting helicopter refuelling:

- Ensure that prior to refuelling the aircraft, HDAs are briefed about specific aircraft refuelling requirements and practices*

- Ensure that all pipework and major components, pumps, meters, filters etc. are effectively bonded to clean unpainted metal parts
- Do not wear helicopter immersion suits while engaged in refuelling operations due to static electricity
- External power shall not be used during fuelling when the aircraft is shutdown, unless specifically requested by the aircrew. If external power is required, it shall not be connected or disconnected, or switched ON/OFF whilst refuelling is in progress.
- Helideck team members under training or yet to be assessed, cannot be counted upon to meet the minimum on board Helideck Team requirement
- The carriage and/or use of cell phones is prohibited in the vicinity of fuelling activities

* Note: refuelling procedures for specific types are contained in the appropriate flight manual. This is carried by the helicopter crew. Alternatively, details can be obtained from the helicopter operator, or from the helideck crew briefing tapes.

13.9.2 Rotors Running Refuelling with Passengers On Board

- The passengers are to be briefed by the helicopter crew about actions to take in the event of an incident occurring during refuelling; the HLO shall supervise the operation at all times
- Constant communication shall be maintained between flight crew, HLO and refuelling team; HLO shall have full view of helicopter refuelling point, Pilot and person operating fuelling installation
- All cabin doors opposite the refuelling point shall be open and unobstructed and a competent HDA positioned ready to supervise passenger disembarkation in the event of an emergency;

Passenger seat belts shall be unfastened throughout the refuelling operation to assist with speedy evacuation in the event of a fuel spillage or fire. This shall apply whether the aircraft is shut down or not.

13.9.2.1 Safe Approach Paths

Safe approach paths are published on the notice boards for passengers which equally apply to helideck crew as well.

13.10 The Refuelling Team and Duties

During refuelling operations, the refuelling teams should consist of at least 1 HLO + 2 HDA's.

13.11.1 Duties of the HLO during refuelling

- The HLO is in charge of all helicopter refuelling operations. He should position himself where he can see the pilot, the refuelling system operator and the refueller;
- During the refuelling he ensures that the operation is carried out in a safe and efficient manner, checking items such as correct bonding and the use of "safe routes";
- Takes a hose end sample to confirm the quality of the fuel loaded;

- Completes the "Daily fuel quality check and delivery coupon". Records the amount of fuel loaded, signs the daily log sheet and presents it to a member of the helicopter crew for signature;
- After a member of the helicopter crew has signed the coupon, checks that all refuelling equipment has been cleared from the helideck and confirm fuel cap is closed.

13.11.2 Duties of the HDA no 1 – the refueller

- On instructions from the HLO, connects the bonding cable to the designated earthing point on the helicopter;
- Immediately before refuelling, takes a hose end sample;
- After the "hose end sample" has been taken, runs the refuelling hose out to the helicopter, connects the nozzle bonding wire to the correct point on the helicopter, opens the tank cap and places the nozzle in the tank;
- On the signal from the HLO commences the refuelling;
- On a signal from the HLO, stops refuelling; when refuelling is complete, the pump should be shut down first before the nozzle handle is released to prevent pressure build up.
- Removes the refuelling nozzle, closes the tank cap, removes the nozzle bonding lead and rewinds the hose;
- On instructions from the HLO, he disconnects the main bonding cable and rewinds it.

13.11.3 Duties of the HDA no 2 – the refuelling system operator

- Starts and stops the refuelling pump on a signal from the HLO;
- Monitors the differential pressures across the filters during refuelling, and records them on the "daily fuel quality checks and delivery coupon";
- In the event of any sudden changes in differential pressure, stops refuelling;
- Stands by to shut down the system, if so required.
- Ready to respond to an emergency condition.

13.11.4 Duties of the fire and rescue team

Depending on the equipment or layout of the helideck it may be necessary to have extra personnel to man the fire-fighting equipment during refuelling operations to ensure that delay

time is minimized in the event of a fire.

13.12 Example Task sheet: Refuel Helicopter (Aircraft shutdown on deck)

This paragraph describes the task to refuel a helicopter on a helideck. This is a generic procedure and may differ slightly between installations and operators. However, OIMs may use it as a basis for documenting their own procedure for refuelling. It may also be used for training purposes and when creating a quick reference card for HLOs and refuellers.

Read **WARNINGS** and **CAUTIONS** prior to commencing refuelling operations

REFUEL HELICOPTER

Note 1: Minimum manning level of HLO plus 2 HDAs required during normal refuelling operations

Note 2: The HLO shall be in overall charge of refuelling operation.

Note 3: The HLO shall be visible at all times to:

- The Pilot
- HDA manning the refuel dispensing cabinet
- HDA manning the refuelling hose/nozzle

1.	**Conduct pre-refuelling checks**	**Notes/Control & Safety Points**
1.1	Ensure that correct PPE is worn by Helideck team	As appropriate: Safety glasses / Safety boots / Ear defenders Hi-vis / Coverall / Gloves Bump cap
1.2	Ensure that the daily quantity/quality control checks have been carried out on the tanks and refuelling system	Refer to para 13.9.1
1.3	Ensure that all necessary documentation has been completed prior to aircraft arrival	
1.4	Determine quantity and grade required for fuel transfer	

1.5	Check that the portable tank on line holds sufficient fuel for aircraft's requirements.	If not, advise pilot that a tank change may be necessary during refuelling operation
1.6	Check bonding lead is connected to bonding pin on tank frame	
1.7	Check flexible suction hose is connected to transportable tank	
1.8	Check appropriate tank valves are open	
1.9	Check that the air isolation valve on the air monitor in use is open	
1.10	Check that the valves on the suction and discharge sides of the pump in use are open	
1.11	Check valves on standby pump are closed	
1.12	Check and record helideck dispenser totaliser meter reading. Zero the meter.	
1.13	Check appropriate refuelling nozzle is fitted to the hose-end	
2	**Sample fuel**	
2.1	Confirm aircraft ready to refuel	
2.2	Collect fuel from filter monitor sample point. Check quality	
2.3	Show sample to Pilot	
3	**Conduct refuel**	
3.1	Pilot signals aircraft ready to receive fuel	 Fore-finger pointed horizontally and rotated clockwise

3.2	HLO signals to HDAs to commence fuelling	 Fore-finger pointed horizontally and rotated clockwise
3.3	Bond aircraft to helideck dispensing unit using main bonding lead	Lead shall be attached to bonding point on same side and in sight of aircraft refuelling point in use
3.4	Run out hose to aircraft. Connect hose-end bonding lead to aircraft bonding point	
3.5	Confirm that grade identity plate specifies Jet A1 as required fuel	Located next to filling point on aircraft
3.6	Remove aircraft tank filler cap and pressure coupling or gravity nozzle cap	
3.7	Connect and lock coupling or insert gravity nozzle in tank inlet (see **CAUTION**)	**CAUTION** When gravity refuelling, nozzle must be in contact with tank inlet (to prevent build-up of static electricity)
3.8	Open air valve or depress START button on cabinet to commence refuelling	HDA 2 stands by ready to shut down system if required
3.9	Monitor differential pressure across filters during refuelling	**CAUTION** If there is a sudden change in differential pressure, stop fuelling and investigate
3.10	Record water separator and filter monitor pressure readings	'Filtration Equipment Pressure Differential and Throughput Record'
3.11	For gravity refuelling: Reduce flow rate and trickle feed fuel if tank is nearly full	**CAUTION** Possibility of 'blowback' if nozzle flow rate is high

4 Terminate fuelling

4.1	Pilot gives signal to stop fuelling	 Hand horizontal, palm facing down. Hand waved side to side
4.2	HLO gives signal to stop fuelling	 Hand horizontal, palm facing down. Hand waved side to side
4.3	Close air valve on cabinet/release button on electrical system	
4.4	Withdraw nozzle from tank inlet	
4.5	Replace tank and gravity nozzle cap	
4.6	Disconnect hose-end bonding lead	
4.7	Rewind hose and stow neatly on drum	
4.8	Remove main bonding lead from aircraft. Show lead to Pilot	Indicates that aircraft is no longer connected to equipment
4.9	Reel in main bonding lead	

5 Conduct fuel record-keeping

5.1	Record quantity of fuel delivered on 'Fuelling System Tank Log Sheet'	Record kept of every aircraft refuel.
5.2	Ensure fuel sampling records are completed	Fuel Sampling Record Part 1 Fuel Sampling Record Part 2

5.3 Ensure Filtration equipment Pressure Differential and Throughput record is completed

13.13 Fuel spills

In the event of a fuel spill, whether on the airport ramp or an offshore installation, each spill will have to be treated as an individual case because of such variables as size of the spill, type of liquid involved, wind and weather conditions, aircraft occupancy, equipment and personnel available.

Within the confines of every fuel spill, there is an area where fuel and air may form an explosive mixture. The only element necessary to produce ignition is a spark.

Every spill, no matter how small, shall be treated as a potential fire source.

13.13.1 Fuel spills less than 0.5 meter in any direction

Usually fuel spills of this nature are considered minor. They can be spread and left to evaporate or can be cleaned up with absorbent cleaning agents, depending on the particular situation.

Try to avoid sparks or sources of ignition within 15 meters until the fuel is evaporated or cleaned up.

13.13.2 Spills over 0.5 meter but under 3 meter in any direction and not continuous flowing

If the fuel spill is within 15 meters of an aircraft, or in an area of high hazard, post a fireguard up-wind of the spill with adequate fire extinguishing equipment at hand.

One 45 kg dry powder extinguisher is the minimum required. Avoid sparks or sources of ignition within 15 meters until the spilled fuel is made safe for cleaning up. The fuel spill should be cleaned up with absorbent cleaning agents.

13.13.3 Spills over 3 meter in any direction or continuous direction

If the spill is within 15 meters of an aircraft, evacuate the passengers and crew. Post a fireguard up-wind of the spill with adequate fire extinguishing equipment on hand (45 kg dry powder). Neither an idling aircraft, nor any idling automotive, electrical, nor spark producing equipment in the area shall be started before the spilled fuel is removed. The fuel spill can be cleaned up with absorbent cleaning agents.

A good safety practice is to not to activate any electrical switches unless absolutely necessary.

Fuel soaked absorbents should be placed in a closed metal container and then removed to a safe area. Local regulations will determine the final disposition of these absorbents.

The following appendices are located on the NOGEPA website:

Appendix A **EXAMPLE Helideck Inspection checklist**

Appendix B **EXAMPLE Helideck Daily and Weekly Inspection checklist**

Appendix C **NUI Blackout Protocol**

Appendix D **EXAMPLE Emergency Response checklists**

Appendix E **Fuel Records and Forms**

Appendix F **RECOMMENDED Fuel System Inspection Schedules**

Appendix G **EXAMPLE 6-monthly Helideck Inspection report**

Footnotes

[i] EASA SPA.HOFO.115

[ii] CAP 437 para 3.23

[iii] ICAO Annex 14 Vol II para 3.3.14

[iv] ICAO Annex 14 Vol II para 3.3.13

[v] CAP 437 para 4.22

[vi] CAP 437 para 4.33

[vii] ICAO Annex 14 Vol II para 5.3.13.1

[viii] EASA SPA HOFO 115

[ix] CAP 437 para 4.30

[x] CAP 437 para 3.37

[xi] CAP 437 para 3.50

[xii] SPA HOFO 115
[xiii] ICAO Annex 14 Vol II para 5.1.1

[xiv] CAP 437 para 4.5

[xv] CAP 437 para 5.55

[xvi] Mining Regulations, Article 51

[xvii] EASA AMC 1 SPA HOFO.115

[xviii] CAP 437 para 4.17

[xix] ICAO Annex 10 Communications, para 5.3.2.3