Guidelines for the Management of Helideck Operations

Guideline

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List of Abbreviations

Abbreviations	Definitions
AAIB	Air Accidents Investigation Branch (UK)
ACOP	Approved Code of Practice
AFFF	Aqueous Film Forming Foam
AGL	Above Ground Level
ALARP	As Low as Reasonably Practicable
AMS	Aerospace Material Standard
ANO	Air Navigation Order (UK)
AOC	Air Operator’s Certificate
ATC	Air Traffic Control
AToN	Aid to Navigation
ATEX	Atmosphères Explosibles
BA	Breathing Apparatus
BARS	Basic Aviation Risk Standard
BARSOHO	Basic Aviation Risk Standard Offshore Helicopter Operations
BOSIET	Basic Offshore Safety Induction and Emergency Training
BS	British Standards
BVLOS	Beyond Visual Line of Sight
CAA	Civil Aviation Authority (UK)
CB	Cumulous Nimbus
CAP	Civil Aviation Publication
CCR	Central Control Room
CCTV	Close Circuit TV
CFD	Computational Fluid Dynamics
CMMS	Computerised Maintenance Management System
CO2	Carbon Dioxide
COP	Cessation of Production
COSHH	Control of Substances Hazardous to Health (UK)
CRO	Control Room Operator
CWO	Corrective Work Order
D	Overall length of Helicopter
DCR	Design and Construction Regulations (UK)

Abbreviations	Definitions
DCS	Distributed Control System
DfT	Department for Transport
DG	Dangerous Goods
DIFFS	Deck Integrated Fire Fighting System
DNV	Det Norsk Veritas (Norwegian)
DP	Dynamic Positioning
DfT	Department for Transport (UK)
DSV	Diving Support Vessel
EASA	European Aviation Safety Agency
ECITB	Engineering Construction Industry Training Board
EEMUA	Engineering Equipment and Materials Users Association
EI	Energy Institute
EN	European Norm
EPOL	Emergency Preparedness Offshore Liaison Group
ERP	Emergency Response Plan
ERRV	Emergency Response & Rescue Vessel
ERT	Emergency Response Team
ESD	Emergency Shutdown
ETA	Estimated Time of Arrival
EU	European Union
EVLOS	Extended Visual Line of Sight
F&G	Fire and Gas
FAT	Factory Acceptance Test
FDM	Flight Data Monitoring
FOD	Foreign Object Damage
FOET	Further Offshore Emergency Training
FNPT	Flight Navigation and Procedure Trainer
FPM	Flight Path Management
FPSO	Floating Production, Storage and Offloading
FRC	Fast Rescue Craft
FSF	Flight Safety Foundation
GMDSS	Global Maritime Distress and Safety System

Abbreviations	Definitions
GPS	Global Positioning System
GWO	Global Wind Organisation
HAZID	Hazard Identification
HAZOP	Hazard and Operability Study
HCA	Helideck Certification Agency (UK)
HDA	Helideck Assistant
HERTL	Helideck Emergency Response Team Leader
HERTM	Helideck Emergency Response Team Member
HHA	Human Hazard Analysis
HIR	Helideck Inspection Report
HLAC	Helicopter Landing Area Certificate
HLL	Helideck Limitations List
HLO	Helicopter Landing Officer
HLV	Heavy Lift Vessel
HMRI	Helicopter Main Routes Indicators
HMS	Helideck Monitoring System
HSWA	Health and Safety at Work etc Act 1974 (UK)
HSE	Health and Safety Executive
HS&E	Health Safety and Environmental (Duty Holder)
HSEI	Health, Safety and Employment Issues (Policy Group of Oil & Gas UK)
HUMS	Health and Usage Monitoring System
IADC	International Association of Drilling Contractors – North Sea Chapter (UK)
IAS	Indicated Airspeed
IATA	International Air Transport Association
IBC	Intermediate Bulk Container
ICAO	International Civil Aviation Organization
IMCA	International Marine Contractors Association
ICP	Independent Competent Person (Verifier)
ICSS	Integrated Control and Safety System
IEC	International Electro-Technical Commission
IOGP	International Association of Oil and Gas Producers
ISO	International Organization for Standardization

Abbreviations	Definitions
IT	Information Technology
IMO	International Maritime Organisation
ISO	International Standards Organisation
ISSOW	Integrated Safe System of Work
IVB	Independent Verification Body
JIG	Joint Inspection Group
KHz	Kilohertz
kJ	Kilojoules
KPI	Key Performance Indicator
LED	Light Emitting Diode
LOS	Limited Obstacle Sector
MAH	Major Accident Hazard
MAIB	Marine Accident Investigation Branch
MAR	Management and Administration Regulations (UK)
MCA	Maritime and Coastguard Agency (UK)
METAR	Meteorological Aerodrome Report
MHz	Megahertz
MIL	Military Standard
MIST	Minimum Industry Safety Training
MMHEL	Master Minimum Helideck Equipment List
MoC	Management of Change
MoU	Memorandum of Understanding
MODU	Mobile Offshore Drilling Unit
MSDS	Material Safety Data Sheet
MSI	Motion Severity Index
NATO	North Atlantic Treaty Organisation
NATS	National Air Traffic Service (UK)
NFPA	National Fire Protection Association
NDB	Non-Directional Beacon
NM	Nautical Mile
NOTAM	Notice To Airmen
NPAI	Not Permanently Attended Installation

Abbreviations	Definitions
NUI	Normally Unattended Installation
OEM	Original Equipment Manufacturer
OFCOM	Office of Communications
OFS	Obstacle Free Sector
OGUK	Oil & Gas UK (Now OEUK)
OHIR	Offshore Helideck Inspection Report (see also HIR)
OHRP	Offshore Helicopter Recommended Practice
OHWN	Offshore Helicopter Weather Network
OIAC	Offshore Industry Advisory Committee (UK)
OIM	Offshore Installation Manager
OPITO	Offshore Petroleum Industry Training Organisation
OPRED	Offshore Petroleum Regulator for Environment & Decommissioning
ORA	Operational Risk Assessment
PA	Public Address
PAGA	Public Address General Alarm
PAX	Passenger
PC	Personal Computer
PED	Pressure Equipment Directive
PED	Portable Electronic Device
PED	Personal Electronic Device
PFEER	Prevention of Fire and Explosion, and Emergency Response (UK)
PFOA	Perfluorooctanoic Acid
PFOS	Perfluorooctane Sulfonate
PLB	Personal Locator Beacon
PLC	Programmable Logic Controller
PO	Purchase Order
POB	Persons on Board
POPM	Platform Operating Procedures Manual
PMED	Personal Medical Electronic Devices
PMR	Planned Maintenance Routine
PPE	Personal Protection Equipment
PPEWR	Personal Protective Equipment at Work Regulations (UK)

Abbreviations	Definitions
PTFE	Polytetrafluoroethylene
PTT	Push To Talk
PTW	Permit to Work
PTZ	Pan, Tilt, Zoom
PVC	Polyvinyl Chloride
QFE	Pressure setting at the landing area
QNH	Pressure setting at Mean Sea-Level
QRA	Quantitative Risk Assessment
QSY	Change of Transmission Frequency
RCA	Root Cause Analysis
RFF	Rescue and Firefighting
RFFF	Rescue and Firefighting Facilities
ROCC-OCS	Radio Operator Certificate of Competence – Offshore Communication Service
RTB	Return to Base
RX	Receiver
SAE	Society of Automobile Engineers
SAF	Sustainable Aviation Fuel
SAR	Search and Rescue
SARG	Safety & Airspace Regulation Group's
SAT	Site Acceptance Test
SBT	Small Bore Tubing
SCADA	Supervisory Control and Data Acquisition
SCR	Safety Case Regulations (UK)
SCTW	Standards of Training, Certification and Watchkeeping
SECE	Safety and Environmentally Critical Element
SFFF	Synthetic Fluorine Free Foam
SIS	Safety Instrumented System
SLA	Safe Landing Area
SME	Subject Matter Expert
SME	Small to Medium Sized Enterprise
SMS	Safety Management System
SN	Safety Notice (HSE)

Abbreviations	Definitions
SOP	Standard Operating procedure
SPA HOFO	Specific Approval for Helicopter Offshore Operations
SWAP	Severe Weather Action Plan
TDA	Temporary Danger Area
TDPM	Touch Down Perimeter Marking
TLN	Temporary Limitation Notice
TOR	Time on Route
TX	Transmit
UAS	Unmanned Aircraft System (Drone, RPAS, UAV)
UKAS	United Kingdom Accreditation Service
USB	Universal Serial Bus
UKCA	United Kingdom Conformity Assessed
UKCS	United Kingdom Continental Shelf
UPS	Uninterruptable Power Supply
UTC	Coordinated Universal Time
UV	Ultra-Violet
VLOS	Visual Line of Sight
VHF	Very High Frequency
WinReP	Wind Farm Recommended Practice
WSI	Wind Severity Index
WT	Wireless Telegraphy
XBR	Extra Broad

Introduction

OEUK has produced this document to provide additional supporting guidance to those with responsibilities for offshore energy aviation support operations.

The Standards for offshore helicopter landing areas are laid out in the UK CAA's publication CAP 437 which includes the criteria and minimum standards for helicopter landing areas, along with other information that should enable helicopter and helideck operators to comply with their legal obligations.

Operators of helidecks in the UKCS or vessels entering the UKCS are reminded that the responsibility for regulating UK offshore health and safety and aviation operational safety lies with the Health and Safety Executive (HSE) and the CAA respectively. A Memorandum of Understanding (MoU) has been established between the two regulators which establishes an effective coordination of policy issues, enforcement activity and investigation in terms of the interfaces of CAA/SARG and HSE responsibilities for safety of aircraft and systems.

The Memorandum of Understanding between the UK CAA and The UK HSE can be found here:

CAP1484: CAA/HSE/HSENI Memorandum of Understanding guidance | Civil Aviation Authority

A UK-registered helicopter, therefore, shall not operate in an offshore helicopter landing area unless the operator has satisfied that the helicopter landing area is suitable for the purpose and that it is accurately described in the Helicopter Operator's Operations Manual.

CAP 437 gives guidance on standards for the arrangements that the CAA expects an operator to have in place. As the CAA has no statutory duty to license offshore helidecks as they are classified as unlicensed airfields, this role has been discharged to the Helideck Certification Agency (HCA). This procedure is established through a memorandum of understanding between HCA and all the UK offshore Helicopter Operators to include the withdrawal of the helicopter landing area certificate on behalf of the offshore Helicopter Operators, to enable each operator to discharge its responsibilities under the ANO and to comply with SPA.HOFO.115.

The CAA procedure for authorising helidecks in the UKCS can be found here:

20230331CAP 437Appendix F- Accountable Manager Letter - March 2023.pdf (helidecks.org)

AMC1 SPA.HOFO.115 Use of offshore locations (caa.co.uk)

It is strongly recommended that Helideck owners conduct a review of their operations to ensure complete accountability and management for aviation operations. In most Duty Holders / Vessel owners, aviation contracts are managed by Supply Chain and Logistics Focal points, however, this also requires technical and legislative management that may reside under a different department within the organisation or specialist consultancies. Therefore, clear roles and responsibilities should be defined to ensure no areas are exposed in this critical operation.

Some organisations have produced standards and guidance for offshore aviation operations, however, these are aimed at a worldwide application and not always suited to the UKCS. It is strongly recommended, that an appointed Duty Holder / Vessel Operator's Aviation Adviser or if required an independent specialist is engaged to ensure that they are suitable to the UKCS.

Disclaimer

The guidelines in this document set out what is regarded in the UK offshore industry as good practice. They are not mandatory and those responsible for the management of aviation, offshore helicopter operations and helidecks may adopt different standards in a particular situation where to do so would maintain an equivalent level of safety.

Whilst every effort has been made to ensure the data given in this document is correct and current at the time of publication, the sponsors, participating groups, and the author will not accept any liability for any erroneous, incorrect, or incomplete information published in this document.

Should there be issues relating to this document then these should be forwarded to aviation.adviser@oeuk.org.uk

Source: Nick Lunn (OHS) & CNOOC.

1 Useful Websites

The websites listed below provide access to information which supports UKCS aviation operations. Organisations such as The Helideck Certification Agency, HeliOffshore, The CAA and The IOGP allow access to resources which are available to download.

Air Accidents Investigation Branch	www.aaib.gov.uk/about_us/index.cfm
British Helicopter Association	www.britishhelicopterassociation.org
British Standards Institute	BSI (bsigroup.com)
CAA – Safety & Airspace Regulation Group	www.caa.co.uk
EPOL - Emergency Preparedness Offshore Liaison Group	www.epolgroup.co.uk/
Flight Safety Foundation	https://flightsafety.org/
Helideck Certification Agency	www.helidecks.org
HeliOffshore	www.helioffshore.org/
Health & Safety Executive	www.hse.gov.uk/offshore/index.htm
IATA	www.iata.org
ICAO	www.icao.int
International Association of Oil & Gas Producers (IOGP)	www.iogp.org/
International Chamber of Shipping	www.ics-shipping.org/
International Maritime Organization	International Maritime Organization (imo.org)
Maritime and Coastguard Agency	Maritime and Coastguard Agency
National Fire Protection Association	NFPA
ISO Standards	www.iso.org/standards.html
NATS Aeronautical Information Service	www.nats-uk.ead-it.com
OEUK	www.oeuk.org.uk/
OPITO	www.opito.com
Step Change in Safety	www.stepchangeinsafety.net

2 Objective

The objective of these guidelines is to provide supporting guidance for managing offshore helicopter operations and providing suitable helideck arrangements operating in the United Kingdom Continental Shelf (UKCS). These guidelines intend to assure helideck availability during both normal and emergencies by providing the following:

- Assistance to onshore management personnel (e.g., Technical, logistics, HS&E etc) who are responsible for providing offshore helicopter/helideck services, setting the standards and monitoring the safety and efficiency of operations.
- Assistance with the implementation of good industry practices by offshore personnel (e.g., Offshore Installation Managers and Helicopter Landing Officers who are responsible offshore for assuring the safe and efficient conduct of offshore helideck operations
- Advice to Verifiers (ICP) who undertake offshore helideck and facilities Performance Standard inspections, with examples of good industry practice and acceptable Performance Standards that should be achieved.
- Information on the preparation of safety cases and risk assessments for offshore installations and vessels, meeting the requirement to provide 'fit for purpose' helideck arrangements that will assure good availability under both normal and emergency operating conditions.
- Assistance to maintenance personnel who develop, write, manage, and execute planned and corrective maintenance scopes.

3 Responsibilities and Relationships

3.1 Responsibility for UK Helicopter Safety

Responsibility for assuring the safety of United Kingdom (UK) offshore helicopter operations involves several organisations and individuals including the workforce, travelling as passengers. It is therefore important to establish how they all fit together and to put the individual roles and responsibilities into the proper perspective.

Helideck matters including changes/additions to CAP 437 and helideck limitations are jointly discussed and agreed upon at the Helideck Technical Committee (HTC) attended by CAA, HCA, HSE and the helicopter operators. Governance of the HTC is provided by the Helideck Steering Committee attended by CAA, BHA and HCA.

Since there is the potential for regulatory overlap, CAA and HSE have established an MoU and meet twice a year to discuss helideck and related issues. MCA and HCA also participate in these meetings.

The MOU between the CAA and HSE guidance (CAP 1484) can be found here:

CAP1484: CAA/HSE/HSENI Memorandum of Understanding guidance | Civil Aviation Authority

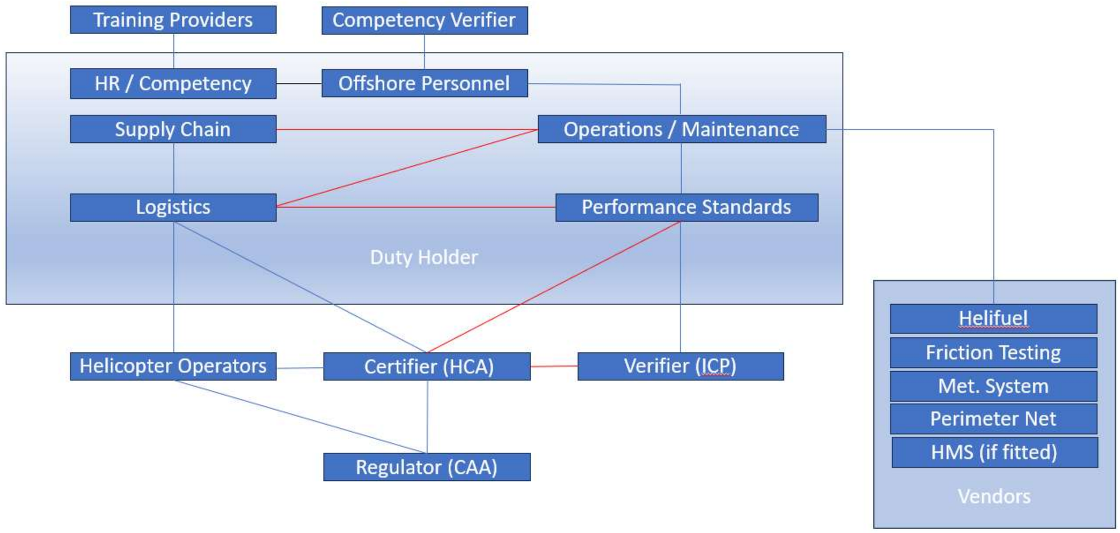
3.2 Offshore Installation Duty Holders, MODU and Vessel Owners

In the UK, offshore installation Duty Holders, MODU and vessel owners have an overriding legal responsibility to comply with the Health and Safety at Work etc Act (HSWA) 1974. They also carry most, if not all, of the responsibilities and liabilities for providing a safe place of work.

The Helideck Operator is responsible for the safety of the Helideck and Helideck operations. They are required to ensure that the helideck operating environment is such that Helicopter Operators can discharge their duties. Installation and vessel operators have control over the physical characteristics of the helideck, the levels and manning of the rescue and fire-fighting facilities and communications. They are required to ensure that competent personnel are assigned to all activities on the helideck during helicopter operations. They should also have a weather policy in place for passenger safety on the helideck and passenger survival and rescue in the event of an incident occurring.

Figure 1 shows an overview of a typical Duty Holder and the interaction between various departments including external organisations. The areas with red lines indicate where lines of communication are weak and should be reinforced to ensure there are no risks associated with a lack of communication.

Figure 1: Duty Holder Inter-departmental interaction



Source: OEUK

3.3 Helicopter Operator

The Helicopter Operator have duties under the Air Navigation Order (ANO) are required to obtain an AOC (Air Operator Certificate) before commencing flight operations. The AOC is required to be understood and met on aircraft, facilities, people, policies and procedures.

For the Operator to keep an AOC means continued compliance with aviation laws and the many operating and airworthiness requirements that are specified in the operations manual, along with any additional requirements that emerge from time to time.

A Safety Management System is required by the Helicopter Operator, and details on the SMS can be found here:

CAP 795: Safety Management Systems - Guidance to Organisations | Civil Aviation Authority (caa.co.uk)

In addition to an AOC, the Helicopter Operator is required to have a SPA HOFO - specific approval for helicopter offshore operations also from the CAA.

The CAA have published a list of AOC holders which can be checked, and information to SPA HOFO. The links can be found here:

Air operator certificates | Civil Aviation Authority (caa.co.uk)

SPA HOFO - specific approval for helicopter offshore operations | Civil Aviation Authority (caa.co.uk)

The AOC holder will cooperate with the installation operator, MODU or vessel owner to provide a safe Helicopter Landing Area offshore by CAP 437. If the structure, operating environment, and facilities related to helicopter operations do not meet the standards specified, the AOC holder is within his legal rights to refuse to land helicopters on any installation, MODU or vessel. To keep commercial interests out of this equation, the HCA perform the task of inspecting and issuing helideck approvals in the UKCS. Although the HCA performs these tasks on behalf of the Helicopter Operators, it is the responsibility of the Helicopter Operators to determine appropriate operational limitations and restrictions based on an evaluation of non-compliances highlighted in the HCA Helideck Inspection Report (HIR).

3.3.1 Helideck Certification Agency

The HCA, on behalf of all UK Offshore Helicopter Operators, is responsible for inspecting and certifying all offshore helidecks operating in the UKCS under CAP 437, ensuring helideck landing sites are safe and their operators are competent.

The HCA assess the design, and performance of helidecks and conducts surveys of offshore helicopter landing sites, along with the competence of helideck crews, to ensure full compliance with CAP 437 and covers international regulations as they apply to UK Regulations.

Where appropriate the HCA applies operational limitations or restrictions to helidecks, and these are published in the Helideck Limitation Lists (HLL) which are available on the HCA website:

https://www.helidecks.org/.

3.4 Regulators

3.4.1 UK Civil Aviation Authority

The Civil Aviation Authority is the UK's independent specialist aviation regulator and its delivery as a regulator is overseen by the Aviation Directorate in the Department for Transport (DfT). CAA activities include economic regulation, airspace policy, safety regulation and consumer protection.

The CAA has the responsibility to ensure the safety of the helicopter and the competence of the offshore Helicopter Operators, enabling them to meet requirements for the safe transportation of passengers. This responsibility covers all regulatory aspects of the areas concerning the airworthiness of the aircraft and the safety of flight operations.

The CAA produces and publishes CAP 437 which is recognised as best practice by the helicopter operators and HSE. In particular, the helicopter operators charge HCA with applying CAP 437 on their behalf and the HSE accepts adherence to CAP 437 for addressing aviation risks in offshore installation Safety Cases. Furthermore, the status of CAP 437 is to be raised by incorporating it into the Air Operating Regulations and becoming UK law.

The CAA also produces other instructions and guidance on many aspects of aviation. The instructions and guidance given in these Civil Aviation Publications (generally issued as CAPs) are required by the CAA to be accounted for in the helicopter company's Operating Manuals. Standards for offshore helicopter landing areas are addressed in CAP 437.

The CAA sets the competencies for Offshore Radio Operators and Offshore Meteorological Observers/reporters. CAA-approved training providers issue the Radio Operator Certificate of Competence (ROCC) the requirement for operating aeronautical radio equipment. This requires the candidate to pass practical and written examinations acceptable to the CAA Air Traffic Control (ATC) Policy and Standards Departments.

CAA-approved training providers, provide initial and refresher training courses for offshore meteorological observers/reporters.

3.4.2 UK Health and Safety Executive

The Health and Safety Executive regulates the safety of offshore installations and related activities.

This includes regulating the systems for providing suitable arrangements to ensure a safe operating environment on, or in the vicinity of, installations and arrangements for dealing with emergencies.

The HSE has published guidance for their Inspectors which is available here for reference:

Offshore Inspection Guide - Aviation Helideck Operations (hse.gov.uk)

The HSE also issue annual reports on offshore statistics and regulatory compliance. The latest report can be found here:

Offshore Statistics and Regulatory Activity Report 2022 (hse.gov.uk)

Within this report can be seen several inspection topics which have sections in this guidance document.

3.4.3 Maritime Coastguard Agency

The Maritime and Coastguard Agency (MCA) is an executive agency of the UK Department for Transport (DfT) and its main activities in support of offshore operations are to:

- Provide Search and Rescue (SAR) facilities and assets.
- Act in a coordinating role during offshore incidents when SAR assets are deployed.

MCA is also the UK marine industry enforcement authority for vessels operating on the UKCS. This includes vessels operating in support of offshore oil and gas exploration and production activities.

The MCA produce legislation and guidance and provides certification to ships and seafarers. Through their survey and inspection regime, they enforce standards for ship safety, security, pollution prevention and seafarer health, safety, and welfare. The MCA promote maritime standards, encourages economic growth, and minimises the maritime sector’s environmental impact.

In this role, the MCA responsibility extends to the helidecks and management of helicopter operations involving offshore support vessels which do not come under the regulatory regime and jurisdiction of the HSE as offshore installations.

The MCA have a Memorandum of Understanding in place with the HSE and MAIB which can be found here:

HSE MCA MAIB MOU 2021 (publishing.service.gov.uk)

3.5 Accident Investigators

3.5.1 The Air Accidents Investigation Branch

The Air Accidents Investigation Branch (AAIB) is a UK government organisation that investigates civil aircraft accidents and serious incidents within the UK, its overseas territories, and Crown Dependencies.

The appointed AAIB Inspector works independently but in conjunction with the helicopter and installation operators, CAA and the HSE during accident and incident investigations that occur offshore. The HSE will conduct its own punitive investigations aside from AAIB with the distinction that AAIB does not seek to apportion any blame, while HSE has powers to prosecute duty-holders or to take other regulatory action in accordance with its own suite of regulations.

The AAIB publishes reports on its investigations, which are available on its website.

3.5.2 The Marine Accidents Investigation Branch

The Marine Accident Investigation Branch (MAIB) is a UK government organisation, authorised to investigate all maritime accidents in UK waters and accidents involving UK-registered ships worldwide.

Investigations are limited to establishing the cause, promoting awareness of risks, and preventing recurrence.

MAIB works with the Department for Transport.

3.6 Industry Organisations

Industry organisations are involved with promoting offshore helicopter safety in the UK. They have wide-ranging interests and involvement and provide support to the aviation and oil industry in numerous ways. The main organisations and their responsibilities are:

3.6.1 Flight Safety Foundation

The Flight Safety Foundation (FSF) is an independent, international, and impartial non-profit that exists to champion the cause of aviation safety. The FSF Basic Aviation Risk Standard (BARS) program is designed to provide organisations that engage contracted aircraft operators with a standard to assist in the risk-based management of aviation activities. In 2015 BARSOHO was published as a contractible offshore helicopter operations standard. BARSOHO is aligned with the HeliOffshore Safety Performance Model.

https://flightsafety.org/basic-aviation-risk-standard/

3.6.2 HeliOffshore

HeliOffshore is a global, safety-focused association for the offshore helicopter industry. Through collaboration amongst its members, HeliOffshore is delivering an industry-wide safety programme to enhance helicopter safety worldwide.

HeliOffshore has delivered several important safety enhancements for helicopter passengers and crew and developed several best practice documents for offshore aviation. Including:

- Health and Usage Monitoring System (HUMS): ensuring that the processes supporting the use of HUMS are not only fully compliant with the OEM and Regulatory requirements but they also benefit from the many years of frontline deployment of this technology.
- Flight Data Monitoring (FDM): working with other operators to best define stabilised approach profiles and to share ideas on other potential areas of risk that FDM can help identify.
- Human Hazard Analysis (HHA): working with the aircraft OEM to provide feedback from frontline engineers on what tasks may be less well understood or harder to complete than would otherwise be known by the OEM, allowing formal changes to be made and risk to be reduced.
- Flight Path Management (FPM) provides standardised operating guidance for offshore helicopters. There is a specific focus on the importance of stabilised approaches, standardised departures and effective use of aircraft automation.
- Line Training System (LTS) This resource shares critical insights into all aspects of Line Training, including recommended competencies for an LTC, suggested content for Line Training programmes and provides specific guidance about Night Offshore Helideck Training.
- Wind Farm Recommended Practice (WinReP) This document identifies recommended practices to enable safe and efficient helicopter operations in support of offshore wind farms.

Resources can be downloaded from here:

https://www.helioffshore.org/resources

3.6.3 ICAO

The International Civil Aviation Organization (ICAO) is a United Nations agency, established to help countries share their skies to their mutual benefit.

ICAO assists the 193 Contracting States to the Chicago Convention as they cooperate here to adopt standards, practices, and policies for international civilian flight. Industry and civil society groups, in addition to relevant multilateral organisations, contribute importantly to these ICAO outcomes as ‘Invited Organisations’.

The ICAO Secretariat is funded and directed by States to provide technical, legal, and administrative support for their air transport cooperation. It also develops programmes, guidance materials, and tightly integrated auditing, training, and implementation support initiatives to help countries benefit and prosper from their improved compliance with global norms.

The result of these combined multilateral efforts by States and ICAO is the worldwide alignment of air regulations and procedures, and a truly global aviation network to connect and unite the world.

3.6.4 International Association of Oil and Gas Producers (IOGP)

The International Association of Oil and Gas Producers (IOGP) represents member organisations at an international level.

The International Association of Oil & Gas Producers, (IOGP), Aviation Sub-Committee (ASC) has produced a series of aviation-related documents. For Offshore Helicopter Operations, IOGP Report 690 (R690), Offshore Helicopter Recommended Practices, (OHRP) has been specifically developed. It contains five modules, which provide Recommended Practices on Safety Management Systems, Aircraft Operations, Support Operations, Helicopters and Equipment, and Engineering.

These recommended practices will assist in the safe, effective, and efficient management of offshore commercial helicopter transport operations. The document reflects industry feedback and was developed in collaboration between Energy Companies, HeliOffshore, and Helicopter Operators.

It is also linked to the HeliOffshore Recommended Practices which were developed by Helicopter Operators, to manage various aspects of offshore operations safely and effectively. Adopting the R690 OHRP provides a framework for effective management of a key material risk to the safety of offshore personnel.

This report and the linked HeliOffshore Recommended Practices, are freely available on the relevant websites and provide the basis for use as a contractible standard for the management of offshore commercial helicopter transport operations. The document can also be referenced for technical specifications during the tendering stage, and then be used in the execution of ongoing operational management.

The 690 Series of documents are available here:

Three aviation recommended practices published | IOGP

3.6.5 International Maritime Organization

The International Maritime Organization (IMO) is the United Nations (UN) specialised agency and the global standard-setting authority for the safety and environmental performance of international shipping. Its key role is to create a regulatory framework for the shipping industry that is fair and effective and universally adopted, implemented, and evaluated.

As an IMO Member State and IMO Council Member, the United Kingdom of Great Britain, and Northern Ireland (UK) is committed to enhancing maritime safety and protecting the maritime environment through effective implementation and enforcement of the IMO Conventions. Further information can be found here:

United Kingdom National Maritime Strategy for the IMO Instruments Implementation Code - GOV.UK (www.gov.uk)

3.6.6 OEUK

Formerly UKOOA, and OGUK, OEUK is the leading representative body for the UK offshore energy industries. It is a not-for-profit organisation based in London and Aberdeen. Membership is open to all companies active in the UK continental shelf, from the largest producers and contractors to SMEs working in low-carbon energy.

OEUK aims to ensure that the UK continental shelf remains an attractive place for energy producers, so their supply chains to do business. OEUK is:

- The representative body that champions the whole sector.
- The definitive source of information about the UK upstream.
- The gateway to industry networks and expertise.

3.6.7 OPITO

OPITO is an industry-owned, not-for-profit, employer-led organisation committed to working together to develop a safe and skilled energy workforce, now and in the future, by:

- Creating workforce development solutions by working with employers to identify and agree action on workforce issues that matter to them and are affecting their business.
- Driving global standards and qualifications to build and sustain the supply of relevantly qualified people into the energy sector.
- Providing an effective link between the industry and those who can provide the best learning and training across the UK to meet the needs identified by employers.
- Leading dialogue with industries and governments.

The OPITO Board of Management comprises Government, Industry and Trades Union representatives and its business includes:

- Development and maintenance of Industry Standards.
- Approval of training and assessment delivery (230 global training centres in over 50 countries).
- Open Learning.
- Workforce Competence.
- Global Qualifications.
- Management of the Upstream Modern Apprenticeship Scheme.
- Energy Industry Workforce Skills Development (data gathering and analysis; design and implementation of skills interventions).

In conjunction with OEUK, OPITO led the development of competency-based personnel training requirements and standards for the energy industry.

These published standards for the UK offshore energy industry are relevant to offshore helicopter operations because they include the Offshore Helicopter Landing Officer (HLO), Helideck Emergency

Response Team leader (HERTL), Helideck Emergency Response Team Member (HERTM), Helideck Assistants (HDA) Helicopter Administrators and Helicopter Refuellers.

OPITO is also the owner of the HLO Handbook and Helicopter Refuelling Handbook. Both documents form part of the approved training courses.

OPITO does not set competencies for the UK radio operator or meteorological observer/reporter. This is undertaken by the CAA.

3.6.8 Step Change in Safety

Step Change in Safety is a member-led organisation which works to positively influence the offshore energy industry's safety culture through active leadership, member collaboration and workforce engagement.

The organisation produces a wide range of publications and provides resources and is constantly collaborating, gathering knowledge, and sharing best practices to promote a positive, unified safety message across the onshore and offshore workforces.

4 Design and Verification

4.1 Helideck Design

When designing a new helideck, it is important to ensure that an engineering process is applied to determine the latest standards and requirements of the design meet all required regulations and standards. In addition to this, each Duty Holder and vessel owner will have Engineering Standards which stipulate further requirements. Some of these designs may not be suitable for the UKCS and require additional engineering processes to demonstrate the design is fit for purpose.

At an early stage, the engineering company should engage a suitable consultancy to ensure the aviation requirement is added to the design team if this does not exist already in-house.

Significant and expensive restrictions to helicopter operations may result if the location of the helideck and surrounding structures are not considered at the earliest possible stage of the installation/vessel design. A major issue is frequently insufficient consideration of the helideck environmental issues which can affect helicopter operations.

If the helideck is to be used on a fixed installation, when this is positioned offshore this will become a permanent feature that will require any future works to be completed on-site. Therefore, material selection along with future maintenance requirements should be considered. Vessels and MODUs have specific marine requirements that differ from those of installations.

It is necessary to consider maintenance requirements when designing a helideck. Consideration should be given to e.g., pipework that runs under or through the structure and how it could be inspected and if required replaced.

Drainage from the helideck should be considered, this allows any discharged firewater with foam or spills to be routed to an appropriate drain system rather than overboard which could have environmental implications.

Where repairs are required one of the factors which slow down the resolution process is the lack of a complete set of detailed drawings of the construction, general arrangement, and structural calculations.

In addition to CAP437, some guidance documents are available and should be consulted, these are available here:

Offshore helideck design considerations - 5/2011 (hse.gov.uk)

CAA Paper 2008/03: Helideck Design Considerations - Environmental Effects | Civil Aviation Authority

Slide 1 (icao.int)

SOLAS Chapter II-2 - GOV.UK (www.gov.uk)

2009 MODU Code - Code for the Construction and Equipment of Mobile Offshore Drilling Units, 2009 – Resolution A.1023(26) (imorules.com)

The IOGP Issued “Offshore helidecks and facilities” Report 697 in November 2023, this provides additional guidance when designing a helideck. It is available here:

Library

In the UKCS, there are regulations and processes in place that require to be complied with in addition to any aviation-specific regulations and standards. This section covers critical areas that require to be considered especially if adding new equipment or systems to support aviation operations offshore. It should be highlighted that vessels are not classed as installations that are required to comply with IMO/MCA requirements. The Helideck and aviation systems on vessels, do however come under the same arrangement for installations.

The Offshore Installations and Wells (Design and Construction, etc.) Regulations 1996 (DCR), which has a dedicated section for the Helicopter Landing Area (Regulation 11). The regulation can be found here:

The Offshore Installations and Wells (Design and Construction, etc.) Regulations 1996 (legislation.gov.uk)

For vessels:

https://ww2.eagle.org/content/dam/eagle/rules-and-guides/current/other/213_classnotation_helidk_helidksrf/Helicopter_Decks_Guide_e-Oct15.pdf

https://www.imorules.com/GUID-36D8ADD6-0BEB-4976-83AE-6D4D2E24A297.html

Often, activities are carried out offshore and on vessels with little thought to the helideck or aviation operations. Therefore, it should be emphasised that some engineering changes be they temporary or permanent should consider the impact on a helideck. Such changes can include:

- Removal or installation of new modules.
- Installation/removal of rigless intervention systems.
- Installation and use of temporary cranes.
- Changes to aviation fuel delivery or storage.
- Addition or removal of power generation or compressor exhausts and vents.
- Assurance and Verification.
- Changes to the derrick such as cladding addition or removal.
- Installation of anything on the helideck structure including supports.
- Changes to the blowdown / Flaring / Venting design.
- Addition of warning lights for process upsets that could be visible from the helideck.
- External scaffolding activities including habitats and weather shielding.
- Replacement of Meteorological sensors and/or locations.
- Modification/replacement of any UPS system.

Caution should be taken on purchasing any aviation-approved systems, these may still require an element of engineering by the Duty Holder / Vessel Owner to ensure they meet all the Design and Verification requirements.

Any work performed on or around the helideck as part of the process should notify the HCA or it may invalidate the HLAC.

4.2 Safety Case Regulations

It is important to understand how Helidecks and dependant systems are demonstrated as being fit-for-purpose in the UKCS. For Installations, there will be a verification scheme which is required by Offshore Installations (Offshore Safety Directive) (Safety Case etc.) Regulations 2015 (SCR). The Safety Case legislation can be found here:

https://www.legislation.gov.uk/uksi/2015/398/contents/made

The Safety Case includes a demonstration of how the Duty Holder assures legislative compliance with regards to the identification of Major Accident Hazards (MAHs), and the evaluation of the risks and provisions to manage these. A description of the 'Verification Scheme' is required to be included within the Safety Case.

Step Change in Safety produced a useful guide "Assurance and Verification Practitioners' Guidance" which can be found here:

https://www.stepchangeinsafety.net/resources/assurance-and-verification-practitioners-guide-2018/

For MODUs, The IADC has produced guidance which can be found here:

Issue-3.6-MODU-HSE-Case-Guidelines-Appendices.pdf (iadc.org)

A Major Accident Hazard is a source of danger that has the potential to cause a major incident, whether that involves multiple fatalities and/or considerable damage to plant, equipment, or the environment.

Offshore installations operating within the UK Continental Shelf (UKCS) are required to have a Safety Case which has been accepted by the HSE. The Safety Case includes a series of formal assessments which demonstrate:

- All major accident risks have been evaluated and their likelihood and consequences have been assessed
- The means to control major accident risks effectively is defined, implemented, and maintained
- The design of the offshore facility and its management systems are consistent with the requirement for safe and responsible operation which includes risks to personnel and the environment are As Low as Reasonably Practicable (ALARP) and arrangements are in place to protect personnel from hazardous events and protect the environment from significant adverse effects

Regulation 23(1) of the Offshore Installations (Offshore Safety Directive) (Safety Case etc) Regulations 2015 (SCR2015) requires Duty Holders to thoroughly review their safety cases and submit a summary to the competent authority no more than five years after the date on which the safety case was first accepted, or the date of the last thorough review. Guidance on this can be found here:

Thorough Reviews - Offshore Major Accident Regulator (OMAR) (hse.gov.uk)

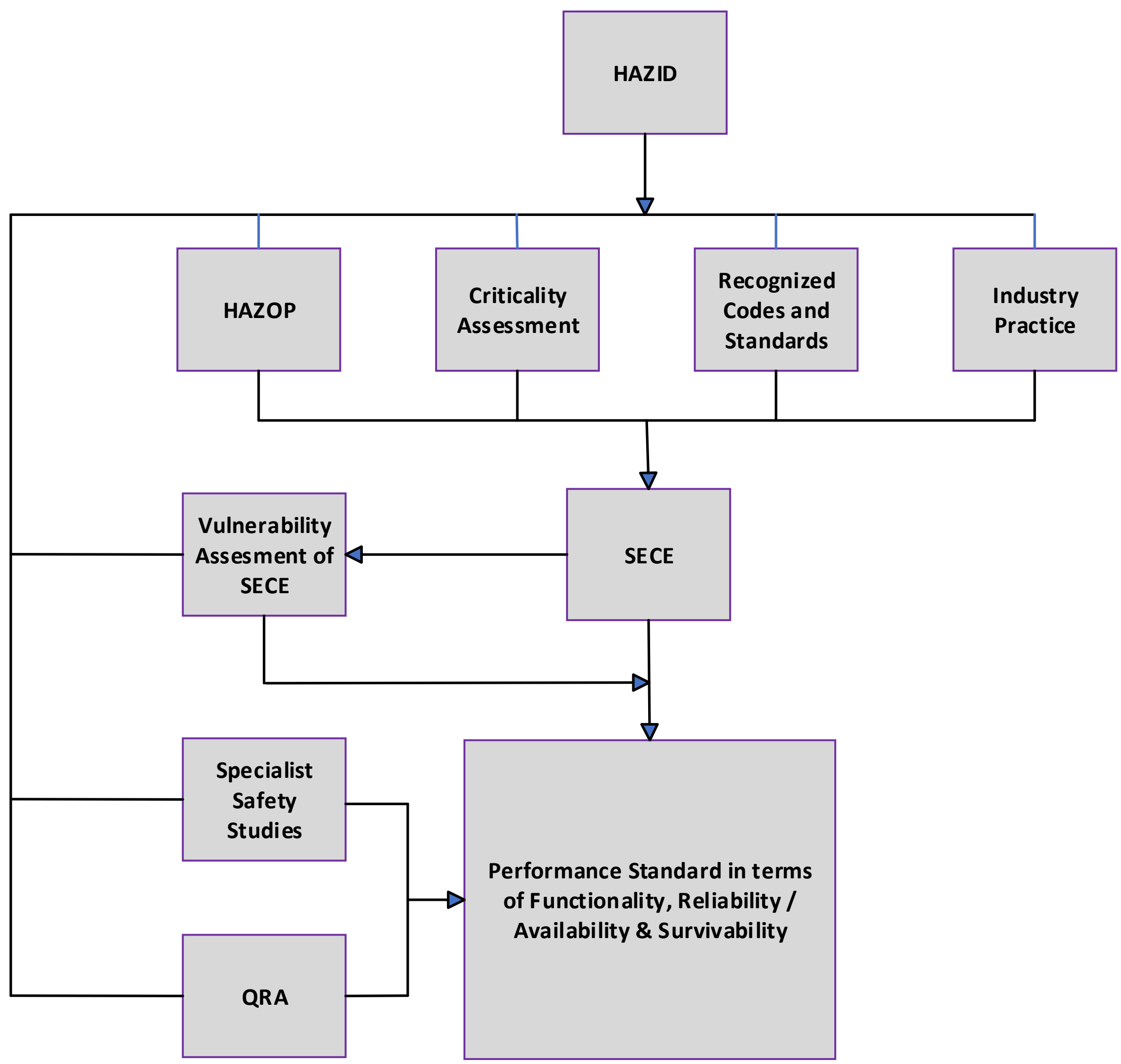
The Safety Case Regulations require the definition of Safety & Environmental Critical Elements (SECEs) and specified plant; this is the equipment, plant or software which prevents, controls, or mitigates against the effects of Major Accident Hazards (MAHs), including the result of a subsequent Major Environmental Incidents.

Performance Standards and SECEs require an owner, typically the owner is a SME, the Technical Authority(TA) within the organisation or can be outsourced to a specialist consultant. Section 5.2 covers the requirements of TAs in more detail.

4.2.1 SECE Identification

The process for identifying SECEs is summarised in Figure 2. SECEs should be regularly reviewed to ensure they remain valid and complete.

Figure 2: SECE evolution



Source: OEUK

4.2.2 Performance Standards

A Performance Standard (PS) describes the essential requirements that should be maintained or provided on demand throughout an installation's life. The PS is defined in terms of its functionality, availability, reliability, survivability, and interdependency.

Performance Standards are required to be defined for each SECE, initially at the design stage, and revised and updated as necessary throughout the installation's lifecycle, i.e., from design, through construction, operations, modifications, decommissioning, and abandonment.

A Performance Standard sets out the following:

- The purpose of the SECE, i.e., the objective or goal of the SECE.
- The scope of the SECE, i.e., a definition of the equipment included within the SECE and its boundary.
- The functional requirements of the equipment included within this SECE, i.e., the individual performance requirements for the equipment to fulfil its role.
- The required availability of the equipment included within this SECE, i.e., what proportion of time the equipment needs to be available.
- The required reliability of the equipment included within this SECE, i.e., any requirement for the equipment to function on demand.
- The required survivability of the equipment included within this SECE, i.e., any requirements for the equipment to be able to function during an ongoing major accident.
- Any dependencies for the equipment included within this SECE, i.e., what other SECEs depend on this equipment for its function, or what other SECEs are required for this equipment to function.
- Any interactions between equipment included within this SECE and other SECEs.

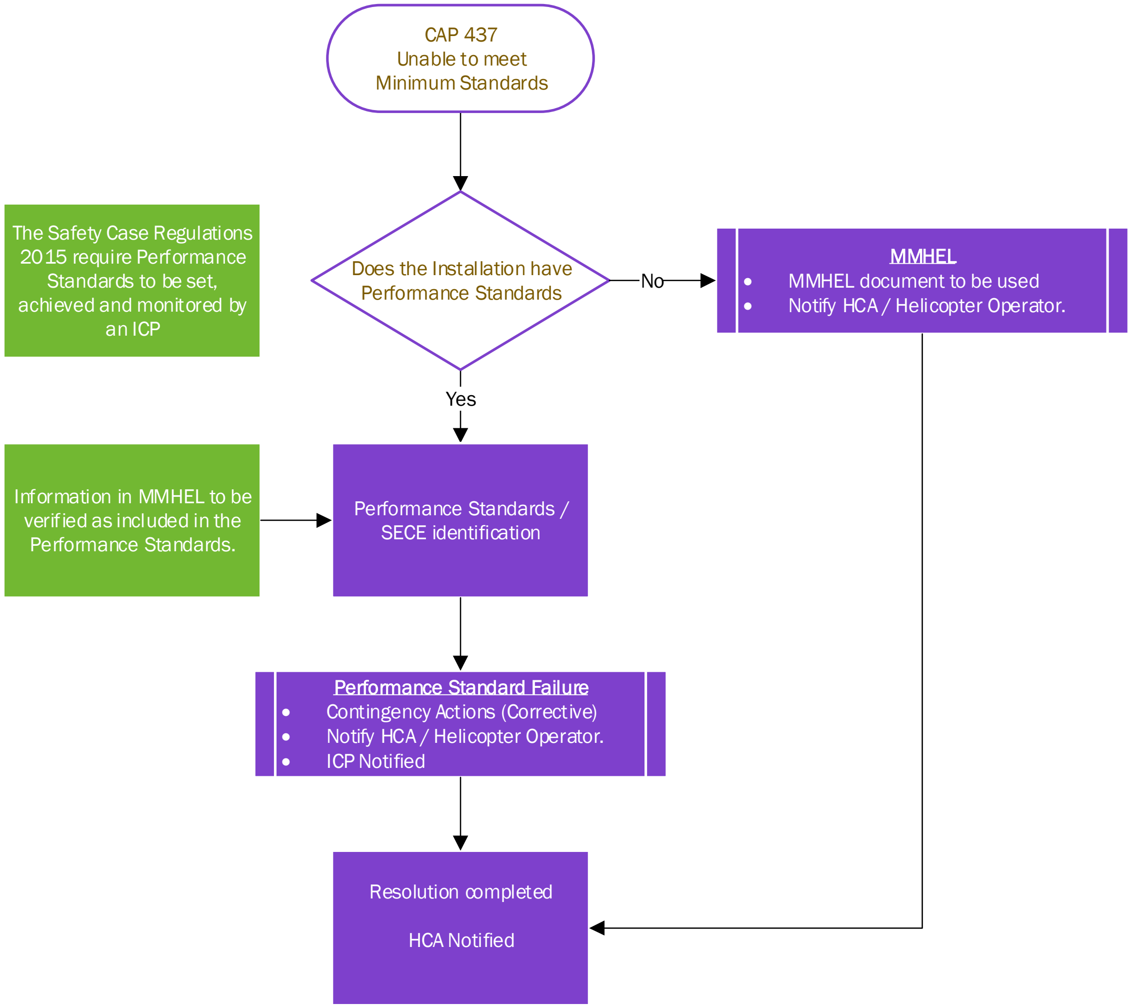
Typically, for helicopter operations on an offshore installation, one or more SECEs are defined which includes the following equipment:

> *CAP 437 plant/equipment, helideck (including access to, egress from, drainage, lighting, obstacles, surface and markings), portable crash rescue and fire equipment, helideck crew PPE, hazard lights (e.g., crane, drilling derricks, etc), helideck foam monitors, helifuel skid deluge, non-directional beacon; helifuel system.*

Examples of other Performance Standards with dependencies or interactions could be a dependency on the Firewater Pumps SECE for helideck firefighting, and if the helideck had EX equipment there could be an interaction with the Ignition Prevention SECE.

The UK CAA is developing an MMHEL for guidance. Each helideck would have its own MMHEL as equipment will vary. The information in the MMHEL is a good reference check that the content of the Duty Holder's Performance Standards aligns with that of the MMHEL.

Figure 3: Use of MMHEL



Source: OEUK

4.2.3 Assurance Activities and Verification Scheme

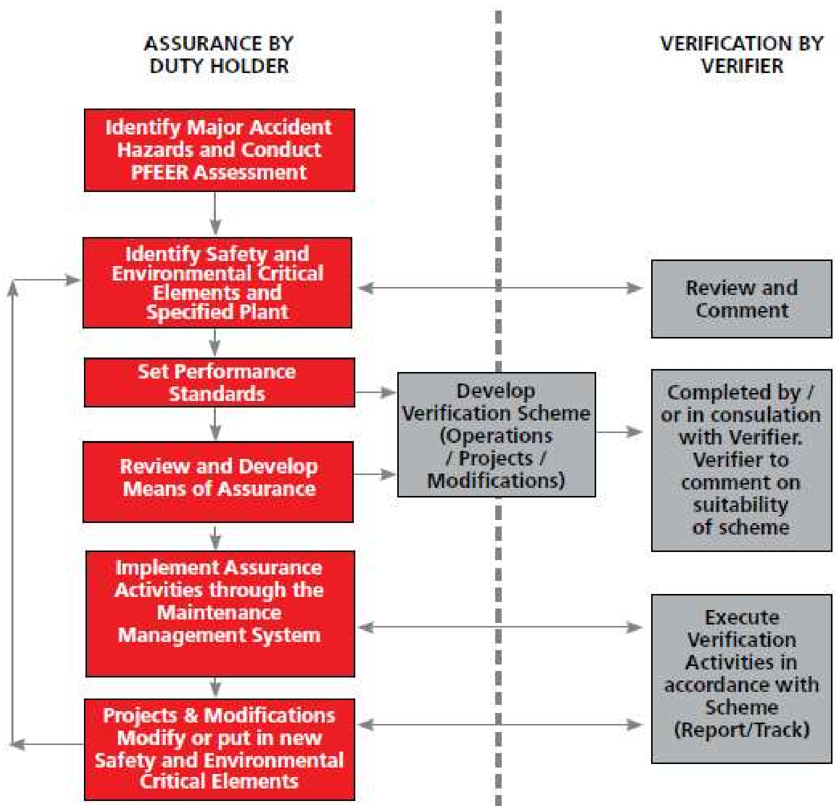
To make sure that the SECEs are meeting their Performance Standards, a Duty Holder is required to undertake inspection, testing and maintenance activities. These assurance activities are intended to make sure that the SECEs and associated equipment continue to function adequately, and that any defect is identified for rectification.

The Safety Case Regulations 2015 (Regulation 9) require that Duty Holders appoint a Verifier to act as an independent check that the Performance Standards are being met. It is important to note that the Verifier is not the primary means of determining the continued compliance with the Performance Standards, rather it is the Duty Holder, via the assurance activities, which has the responsibility for identifying and rectifying defects.

The Verifier may also be termed the Independent and Competent Person (ICP). The Verifier role should not be confused with other guidance documents which use the term ICP which is aimed at an Independent Subject Matter Expert (SME) as a specialist.

A Verification Scheme should be drawn up by or in consultation with, the Verifier. The Verification Scheme is intended to verify that the SECEs are suitable and remain in good repair and condition, and it sets out the actions to be undertaken by the Verifier to verify that the Performance Standards are being met. This includes the nature and frequency of examination and testing. Following any examination and testing by the Verifier, the Verifier will make recommendations for remedial action where necessary, which are required to be appropriately addressed by the Duty Holder.

Figure 4: Verification Scheme Process (for which the Duty Holder is accountable)



Source: Step Change in Safety

4.2.4 Independent Verification Body

Although not a specific role mentioned in the Safety Case Regulations 2015. Most Duty Holders engage the services of a company to act as the verifier. These companies are known as an Independent Verification Body, or IVB for short.

4.3 CMMS

The helideck operator's Computerised Maintenance Management System (CMMS) will have Planned Maintenance Routines (PMR) that capture required activities to demonstrate that the SECE is effective, and the Performance Standard is being met.

Planned Maintenance Routines can be paper-based and scanned into the CMMS on completion, or using tablets the work is carried out and recorded before uploading the information the the CMMS. PMRs should carry sufficient detail and instructions that will detail exactly what is required to be carried out and what is recorded.

The CMMS information can be made available to the Verifier, who may request to review that the maintenance has been carried out. Where anomalies have been identified, the organisation has followed the appropriate requirements including Corrective Work Orders that have been raised to resolve the anomaly.

Where a PMR identifies an anomaly, this could indicate that a Performance Standard is not being met and could be classed as a Performance Standard failure. When this occurs, the failure is required to be fixed immediately, or a Corrective Work Order (CWO) is raised to capture the failure which will start a process to address the issue. The process will include:

- Notify the Technical Authority (System owner).
- The PMR / CWO has been populated with the relevant information.
- Notification to appropriate parties e.g., Helicopter Operator(s) and the HCA.
- Carry out an Operational Risk Assessment (ORA) and controls.
- Mobilisation of appropriate specialist Vendors and/or spare parts.
- Root Cause Analysis (RCA) / 5-Why process to investigate the issue.
- Reassessment of maintenance Routine Frequency and/or content, spare parts review.

When a change is required to any maintenance, a formal process for submitting a change request is approved by the Technical Authority / Performance Standard owner. The change should follow a defined process which is required to be auditable.

Performance Standards require updates when the MAH / Lifecycle is changing. For example, when in the Cessation of Production into the Decommissioning phase. The Safety Case will require submission to the HSE for approval for each of the phases—for example, the retirement and removal of the helifuel system before cold stack or heavy lift.

The Helideck Operator should be aware that the internal processes used to manage a Performance Standard failure will require the Helicopter Operator(s) and the HCA to be notified of the issue and the resolution timescale. The HCA may enforce a limitation resulting in the reissue or withdrawal of the helideck certification and changes to the information plate.

The Helideck Operator should understand that the internal processes used to defer maintenance out with the compliance dates will also require the Helicopter Operators and HCA to be involved in the ORA and Deferment. This can arise from delayed vendor mobilisation / non-availability to Operational Reasons on the Installation / Vessel.

Examples of deferments which require Helicopter Operator and HCA involvement are:

- Helifuel System Certificate of Conformance expiring before maintenance is carried out.
- Helideck Certification visits are overdue.
- Helideck Perimeter Net Inspection / Testing overdue.
- Foam System Analysis overdue.
- Friction Test overdue.
- Communication Issues.
- Meteorological System / Handheld Instruments out of calibration date.
- Down manning through operational issues

As a reminder, note 3 (highlighted below) on the HCA-issued Helideck Certificate issued for each Helideck states:

This certificate shall cease to be valid if:

- *Changes of ownership or name of installation/vessel are made without notification to the HCA.*
- ***Changes to the helideck, its environs and/or related equipment are made without prior agreement of the HCA.***
- *Levels of Helideck crew qualifications/competency are not maintained to the levels described in the OEUK Guidelines for Management of Aviation Operations or suitable alternative standards.*

4.4 Cyber Security

A threat that has been emerging due to the advancements in technology and applications is that of cybersecurity. Cyber security, when not applied leaves the Duty Holder / Vessel Owners vulnerable to cyber threats that can compromise the functionality and more importantly the safety of personnel.

The HSE have recognised the threat of cyber security and have published guidance, initially for their inspectors but have made it available to the industry. The document can be found here:

https://www.hse.gov.uk/eci/cyber-security.htm

OG86 is designed to guide Duty Holders within organisations and HSE inspectors with the implementation of robust industrial networks, systems, and data security along with functional safety.

IEC 62443 is an international series of standards that address cybersecurity for operational technology in automation and control systems. The standard is divided into different sections and describes both technical and process-related aspects of automation and control systems cybersecurity.

Duty Holders are now starting to state as a contractual requirement that suppliers of services are certified against ISO/IEC 27001 - Information Security Management Systems (ISMS). ISO/IEC 27001 promotes a holistic approach to information security: vetting people, policies and technology. An information security management system implemented according to this standard is a tool for risk management, cyber-resilience and operational excellence.

Duty Holders and Vessel Owners IT and Engineering Departments should already have implemented cyber security policies, management procedures, and disaster recovery. It is therefore important that when equipment is being supplied offshore. Cyber Security policies determine how access to these systems is established both locally and remotely. Such policies often require that USB ports on devices are locked off, password complexity, and that systems are only accessible to authorised persons.

The Helideck Operator's IT department will have Network Drawings and an inventory of machines on the network allowing regular checks to ensure there have been no changes that may create a weakness in the system that can make the network vulnerable to attack.

Some Duty Holders in the UKCS have already suffered cyber-attacks resulting in a huge impact on the business. Other Duty Holders have reported regular attempts to access their networks have been stopped due to having strict cyber policies.

One major finding when dealing with programmable systems is where Operating Systems such as Microsoft Windows are used. Operating Systems have various versions, and often cease supporting certain releases which in turn means that future security software patches are no longer released making the systems vulnerable. The system software should be part of ongoing reviews undertaken by the system support company selected to maintain the system.

4.5 Programmable Systems

Any programmable systems that are used in helideck systems should be managed in the same method as other systems on the installation or vessel. Typically, any software change be it a version upgrade, operating system or patch will require to be treated as an engineering change under the MoC process. Programmable systems typically have a Software Control Procedure in place to have an approval process in place which requires to be managed. Changes to a system are required to be controlled, and a process is employed to assess, validate, and demonstrate the functionality of the system change. This may be in the form of a Factory Acceptance Test and a Site Acceptance Test.

The HSE has published guidance on electronic systems that can be found here:

Control systems (hse.gov.uk)

Many Duty Holders have Software Packages to manage the control software and hardware configurations for electronic systems. These packages also allow backup control, and auditing of changes, and an approval process has been completed for every change.

A disaster recovery procedure includes the location and means of reinstating a system should the system suffer a failure resulting in the loss of the application software or configuration. Software backups should be held on-site in a fireproof safe and checked during service visits by the specialist contractor. An example of this is when the latest software configuration was not left offshore, and the engineer lost the laptop with the original configuration. When a fault developed, the only copy of the configuration available was an outdated one.

Helideck systems are required to also be managed under the same strict criteria as those used on Control and Safety Systems. Helideck systems interfacing for monitoring or control, such as F&G, ESD, DCS, SCADA or ICSS systems are also required to comply. Aviation systems that would be required to ensure that Cyber Security is managed are:

- Circle and H Lighting Systems.
- Helideck Monitoring Systems.
- Refuelling Systems / Fuel monitoring systems.
- CCTV Systems.
- Wave Off Lights.
- Bird Deterrent Systems.
- Helideck Lighting Systems.
- Telecommunication Systems (Radios, NDBs).
- Meteorological Systems.
- Windsocks (noting there are types available that are programmable).

4.6 Functional Safety

Safety Instrumented Systems (SIS) that provide a significant level of risk reduction against MAHs are required to be engineered, installed, and maintained.

Functional safety is a specific aspect of safety management that relates to a particular system or piece of equipment operating correctly. It looks at the potential dangers arising from the malfunctioning of a system or piece of equipment. It then involves putting in place backup safety measures to overcome the malfunction. The HSE has published guidance on Functional Safety:

https://www.hse.gov.uk/eci/functional.htm

Helideck systems are required to have Functional Safety processes applied. As part of the Engineering process of Safety Instrumented Systems, calculations are carried out to determine the SIL classification. The SIL value will determine various courses of action to be considered. This can range from adding layers or redundancy, ensuring signals are failsafe and the frequency of maintenance and testing required. This is especially the case where aviation systems are interfaced with F&G, ESD, DCS, SCADA or ICSS systems.

It is required that any systems already offshore or planned to be installed offshore have Functional Safety considered as part of the MoC and verification processes.

Helideck systems that typically would require Functional Safety Assessments either directly or as part of an existing safety system are:

- HMS System
- Lighting systems and controls
- DIFFS
- Firefighting systems

4.7 Alarm Management

When systems are installed to support aviation operations, there is often a requirement to have these tied to control or safety systems which provide information in permanently manned control rooms.

Alarms on installations and vessels should comply with EEMUA 191 Edition 3 or BS EN 62682:2015 where the alarm has been assessed and a suitable priority given.

An alarm is a condition that requires attention within a set time, the response is determined by an Alarm Response Manual. If the Control Room Operator has no time to react to an alarm, then it should not be an alarm and an automatic response would be required.

The HSE has provided guidance on Alarms:

Human factors/ergonomics – Alarm management (hse.gov.uk)

Each Duty Holder is required to undertake an Alarm Rationalisation Study. This reviews each individual alarm and determines a priority based on their Alarm Management Standard. In the standard will be alarm determination factors such as the time to event, operator response time, failure to respond and the consequence. The urgency and priority can then be set.

Examples of alarms that a control room would receive are:

- Fault on a UPS System that would affect aviation operations (Radios, lighting).
- Fault on switchgear for helicopter refuelling systems.
- Faults on control systems for helideck lighting.
- Faults on HMS / Meteorological Systems.
- NDB Faults.

Within the Alarm Response Manual would be the requirement to investigate the alarm, and where required alert the HLO / Radio Operator as to the condition.

4.8 Hazardous Areas

Helidecks in use offshore may fit into two main categories, (i) Safe Area, and (ii) Hazardous area.

If the helideck has been designated a hazardous area, the equipment installed on and around the helidecks is required to comply with The Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations. These regulations exist in both Electrical and Mechanical equipment.

Every Oil and Gas Installation will have Hazardous Area Drawings. Examples of these are shown in Figure 5. These drawings show that the Helideck for this installation is classed as a safe area and that Hazardous Area certified equipment may not be required. The methods of protection depending on the certification may not be suitable for use on a helideck due to environmental exposure.

Some helidecks, such as those on Flotels, Survey vessels, or decommissioned installations will not have hazardous areas, although getting equipment for use in a Safe Area may require the purchase of Hazardous Area equipment.

Only personnel with valid COMPEX certification can install and maintain the equipment. Where required, COMPEX-competent personnel can replace like-for-like OEM components on the certified system(s). This also includes the glanding of cables and termination of the cables.

Under no circumstances should these systems be modified. These can only be done by the OEM or a delegated organisation from the OEM.

Modifications will invalidate the Hazardous Area Certification.

With the departure of the United Kingdom from the European Union, any products or systems placed on the market in the UK that would previously have been declared in conformity with the ATEX Directive will need to meet the UKEX Regulations - The Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations 2016.

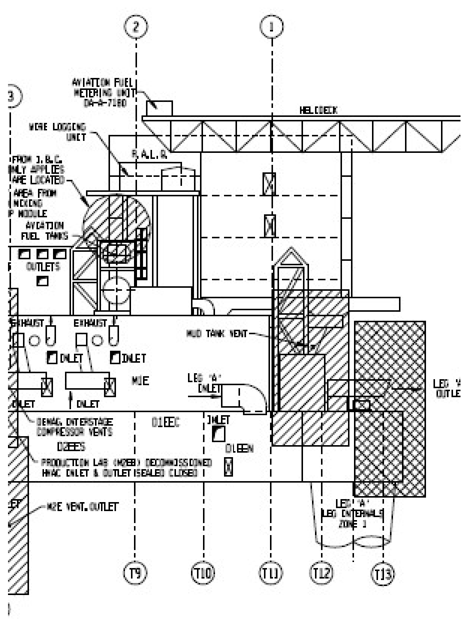
Further information on the regulation can be found here:

Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations 2016: Great Britain - GOV.UK (www.gov.uk)

Initially, the technical requirements of the UKEX Regulations will be identical to those of the ATEX Directive. However, for new equipment for the UK, the CE marking will be recognised in the UK until the 30th of June 2025. After this time, the product is required to carry a UKCA mark, this will apply to all products in the UK (although the product may still carry the CE marking for sales overseas). The methods of demonstrating conformity to the UK Regulations and EU Directive will remain broadly similar.

The Regulations apply to any product that is placed on the UK market or brought into service and is intended for use in a potentially explosive atmosphere.

Figure 5: Hazardous Area Drawing examples



Source: Cabro Aviation Ltd

4.9 Management of Change

Many incidents occur offshore when changes are made to procedures, equipment, activity, or approved practice without re-evaluation of potential impacts concerning established procedures. To address such weaknesses, every Duty Holder/ Vessel owner will have a Management of Change (MoC) Process which defines the organisation's processes from concept through to execution of the change before handing over to Operations / System owners.

If a component is changed out that is identical to what was there before, then this is classed as maintenance. If the component is an upgrade, equivalent type, or addition of new equipment then the MoC process should be used to manage the activity.

The MoC Process is an engineering function that goes through stages of review to assess the impact on existing systems, and how it can be selected, built, tested, and commissioned with each part of the process delivering an auditable trail. The MoC process is one of the barriers used to prevent a MAH.

Where the UK CAA has approved, or the HCA has accepted a system from the aviation perspective it will still require the Duty Holder / Vessel Operator to ensure that elements such as Functional Safety, Cyber Security, etc will require to be implemented as part of the MoC process.

Step Change in Safety has published some information for MoC awareness that can be found here:

https://www.stepchangeinsafety.net/workgroups/major-accident-hazard/management-of-change/

One of the main drivers for an engineering change is the reliability and availability of data from the CMMS system. Often if the equipment is not performing well, it may be the specification is not suitable and therefore has to be replaced. The exposure to the elements on a helideck often requires equipment to be of a higher specification or increased maintenance.

Every change offshore will require an Engineering Process to be applied. Purchasing an approved or accepted system for aviation for a specific role does not bypass or override the need for MoC Engineering processes and controls to be carried out.

The UK CAA will have approved the system from the aviation perspective, but the Duty Holder / Vessel Operator will have to ensure that elements such as Functional Safety, Cyber Security, etc will be required to be implemented as part of the MoC process.

All equipment supplied under an MoC will have been subjected to a witnessed Factory Acceptance Test (FAT) and when Offshore a Site Acceptance Test (SAT). On occasions, the Duty Holder’s verifier may attend if there are any impacts to SECEs.

Where a FAT is not possible, then a desktop review may suffice to establish the impact and how the change will be tested and accepted.

In some cases, the addition or removal of equipment will require an update to the Safety Case as it is classed as a material change requiring the HSE to review it which can take several months. OEUK has guidance which can be found here:

OGUK_Technical Notes (oeuk.org.uk)

4.10 Control Panels

Equipment that requires the use of Control Panels will be required to comply with relevant standards in construction, and where appropriate comply with other requirements such as Functional Safety, Cyber Security, or Software Control.

With the introduction of the Circle and H Lighting, systems were accepted for use in the UKCS by the CAA. An observation at one OEM acceptance test was that the Control Panel did not comply with any standards or regulations as the approval was for the lighting element only. During testing, anomalies were found in the software which highlighted the lack of software control. It was also found that the Functional Safety element has not been applied as the system could fail to a point where it could not be operated without having to intrusively reset the software. This prompted a comment to be added in CAP437 section C.57 to be added to remind Duty Holders that the design of the control panel should comply with the appropriate industry standards, guidance, and regulations.

Figure 6 & 7: Safe and Hazardous Area Control panels

Source: Cabro Aviation Ltd

A sample list and selection of standards/regulations are detailed below for information. Any new equipment or modifications will require to follow a Management of Change (MoC) process required by the Safety Case Regulations. **An acceptance or approval for aviation use does not override the need for engineering standards.**

- Appropriate Design Standards and regulations - IEC 60204-1 & IEC 61439.
- Degrees of protection provided by enclosures - IEC 60529.
- BS EN 62381 Automation systems in the process industry. Factory acceptance test (FAT), site acceptance test (SAT), and site integration test (SIT)

Control panels can exist on:

- Circle and H lighting / Lighting Control Systems
- Wave off Lights (via F&G / ESD Systems)
- Helideck Monitoring Systems
- Helideck Firefighting Systems
- CCTV
- Refuelling Systems
- NDBs
- Ground Power Unit (Helistart)
- Bird Deterrent Systems
- Helideck Monitoring Systems

Table 1: Work through check

Check	Action	Remarks
1	Ensure all control panels are detailed in the CMMS with associated Planned Maintenance Routines.	Including specialist Vendor requirements
2	Ensure Performance Standard exists (if the Panel is a SECE) and a PS failure contingency action detailed	
3	Is the panel fed from a UPS which is also a Performance Standard?	Ensure the UPS does not trip on a process upset and can only be manually tripped from an Emergency Control Location.
4	Are all lamps, switches, and indicators identified and legible on the panel?	
5	Do the panels have site-specific operator instructions	POPMs / SOPs etc
6	Are the panels part of a daily check by the HLO including function test if required	Visual Inspection, lamp test etc
7	Are there any Electronic Control Systems within the panel which has software?	Ensure the disaster recovery process is in place with backup software on-site
8	Are there any Windows-based systems within or connected to the panels from control or maintenance?	Ensure service packs and security patches are installed in line with Microsoft guidelines.
9	Do the panels connect to a network or communicate to a remote location	Ensure Cyber Security Policies are in place
10	Are spare parts required	CMMS to list spare parts available on-site

4.11 FOD

Foreign Object Debris (FOD) on helidecks includes any object found in an inappropriate location that, because of being in that location, can damage equipment or injure personnel. FOD includes a wide range of materials, including loose hardware, leftover parts from maintenance or objects dropped by personnel. When a helicopter lands or takes off, downwash from the rotor blades can cause FOD to be blown about and in turn, ingested by the aircraft engines or strike the main or tail rotors causing damage that would require the aircraft to be shut down and inspected by an engineer who may have to be flown offshore.

Signs should be placed around the helideck and walkways which warn about the dangers of FOD. Signs should also warn not to leave loose objects in the vicinity that could be displaced by rotor downwash that could injure personnel and/or become dropped objects

Step Change in Safety produced guidance on FOD which can be found here:

Step Change in Safety | Helideck events - foreign object debris...

FOD can be a result of a poorly designed helideck where over time, parts of the helideck break up due to corrosion or damage. It is therefore important to ensure that the helideck integrity is checked for security and condition to avoid becoming FOD.

FOD can also include lightweight materials that personnel carry onto the helideck, e.g., newspapers or small books. When moving on and off a helideck all loose items are required to be secured.

All FOD findings should be reported using the helideck operator's safety observation or incident reporting systems, so that the root cause can be identified, and controls applied to avoid any repetition.

4.12 Dropped Objects

A dropped Object can be defined as any object that falls from its previous static position under its weight. The rotor wash of a helicopter can cause objects to fall around the helideck creating a hazard to the aircraft or decks below.

A dropped object calculator provides a common benchmark in the classification of the potential consequences of a dropped object. The mass of a dropped object against the distance it falls to determine its consequences. The Calculator assumes that full PPE is being worn and that the object is blunt, if there are sharp edges then the injury may be more severe.

The calculator applies Mass(m) x Height(h) x Gravitational Acceleration (g = 9.82m/s). The Joule is a unit of energy equal to the work done by the force of one Newton acting through one meter. In terms of dropped objects, it is recognised that any object achieving 40 Joules, or more is likely to result in a recordable (MINOR) incident or worse on impact with a human body. For example, a 200g Bolt falling 27m = 53 Joules (0.2 x 27 x 9.82 = 53 Joules).

4.13 HLO Daily Checks

To ensure the Helideck is suitable for aviation operations, either planned or unplanned, the HLO should carry out daily checks at the start of any shift regardless of whether there are flights or not as the helideck should always be available. These checks should be formalised into a checklist that is completed and recorded into an appropriate system specific to that helideck. The checks should consist of:

- Ensure OFS and vessel movement in proximity to the helideck is clear.
- Helideck surface intact, clear of FOD, Guano, Ice etc.
- Helideck Net tension checks (if fitted).
- Helicopter tiedown points are clear.
- Drainage for the helideck is clear and can free flow.
- The refuelling system checks and is available and check stock.
- Ensure the fuel water detector test kit is available.
- Circle and H, perimeter and repeater lighting operational.
- Function test of Status Light (if possible).
- Lamp test associated panels and ensure all lamps illuminate.
- Perimeter netting integrity and security.
- Collapsible handrails are stowed.
- Obstruction Lighting Operational on cranes, flares, masts etc.
- Windsock integrity and operational.
- PPE kit.
- Crash Box complete.
- Spill Kit Complete.
- Tiedown strops are available.
- Helistart Unit is available.
- Foam Stocks are sufficient and available.
- PPE is available and dry (Fire Suit, boots, helmet, gloves, etc).
- NDB (if fitted) Operational.
- Meteorological systems and Handheld sensors are available and operational.
- Ceilometer cleaned.
- HMS System Operational (if fitted)
- Radios on correct frequency and function tested through radio check.
- Baggage and passenger scales are operational and within the calibration date
- The CCTV camera screen is clean and controllable.
- Safety Briefing video available for the appropriate helicopters.

Checks of the refuelling system have daily and weekly requirements detailed in CAP437, Section 8.

4.14 Aviation Manual

Every Helideck should have an associated Aviation Operations Manual / Helicopter Operations Manual. The manual will provide a level of detail that guarantees operational efficiency.

The manual should cross-reference other documents that are used for regulatory compliance with PFEER, Safety Case Regulations etc. The document may also carry information that would be found in POPMs which give procedural instructions on how to operate equipment etc.

The manual should not stipulate any conditions that the Helicopter Operator is in complete control of, such as aircraft maintenance, flight crew training etc. This is managed by the Helicopter Operator in line with Aviation regulations such as the ANO and under their AOC.

Typically, the manual will detail:

- The purpose of the manual
- Applicable regulations, guidelines, and standards
- The review cycle period of the document
- Roles and responsibilities
- Adverse Weather Policy
- Passenger Safety (Clothing policy, Immersions Suit, Breathing Systems, XBR etc)
- PPE Policy
- UAS operations
- Auditing processes (Roles, frequency, scope, reporting etc)
- Passenger Handling (Check-in, Security Screening, boarding)
- Baggage Policy
- No Show / Refused boarding process.
- Medivac & down manning
- Handover processes e.g., HLO, Radio Operator
- Helideck Certification
- Platform Operations (Cold Flaring, Blowdown etc)
- Helideck Lighting
- Helideck Stricture (including Perimeter Netting)
- Helideck Crew Competency
- Helicopter Types
- Prohibited Items

5 Competence

Competence can be described as the combination of training, skills, experience, and knowledge that a person has and their ability to apply them to perform a task safely. Other factors, such as attitude and physical ability, can also affect someone's competence.

A very important point to consider as part of the Offshore Helideck Competence is listed in the HCA-issued Helideck certificate. Note 3 advises that "This certificate shall cease to be valid if Levels of Helideck crew qualifications/competency are not maintained to the levels described in the OEUK Guidelines for Management of Aviation Operations or suitable alternative standards.". Section 5.1 of this document details the required competencies and workplace assessments for offshore personnel.

All Installation/Vessel Personnel with a role in helideck operations should have a competency matrix maintained by the Duty Holder or Vessel Owner to ensure that the HCA and regulatory requirements are met through having competent personnel.

Competence does not just apply to Onshore or Offshore personnel connected with running the operation, it also applies to suppliers & specialist vendors supporting aviation operations.

Some of the core competency courses have validity periods. When certificates are issued, validity dates should be entered into the competency matrix to ensure sufficient time for refresher training is in place for continuity. From a vessel or installation manning point of view, sufficient cover should be available to cover absences, holidays, and crew changes to ensure that no risk exists through the lack of competent helideck team members.

Where roles such as the HLO and Heli Admin are crew changing, a defined handover process should be detailed to ensure the required tasks are met without there being any period where the role is not covered. i.e., there is always an HLO on Helideck duties during aviation operations. The handover will also cover a summary of any equipment issues. It is good practice to consider the contingency of personnel being unavailable from their regular offshore rota and how the role can be backfilled by other trained personnel.

The HSE and OPITO have produced guidance, Although the HSE one only in part relates to Helideck Competence. The guidance can be found here:

Offshore Inspection Guide - Aviation Helideck Operations (hse.gov.uk)

OPITO has published reference material that should be held offshore to be used by Helideck Team members. These titles are:

- Helicopter Landing Officers Handbook
- Helicopter Refuelling Handbook

An initiative called Connected Competence commands a base level of technical competence assurance for personnel across the engineering and construction industry. Standardising a common approach to base technical competence so that craft and technician trades are all working to the same, transparent standard. Personnel sit Technical Tests based on their trade which are compiled into a portfolio that demonstrates their competence.

5.1 Offshore Competence

In maintaining a Competency Matrix, the Duty Holder / Vessel operator lists all the mandatory training and workplace assessments required for them to carry out their roles and responsibilities. This ensures that sufficiently trained personnel are always available. Typical courses that are pre-requisite, mandatory, and recommended for competency are shown in Table 2.

It is important to consider that competency courses may have medical requirements as a pre-requisite and that the courses require to be renewed or refreshed in line with OPITO guidance.

Table 2: Competency Requirements Matrix

TRAINING REQUIREMENTS	VALIDITY (YEARS)	HELICOPTER LANDING OFFICER / HELIDECK TEAM LEADER	HELI DECK ASSISTANT / HELIDECK TEAM MEMBER	HELI ADMIN	RADIO OPERATOR	MATERIAL / STORES
IATA Transportation of Dangerous Goods by Air Awareness - pre requisite for HLO/HDA	2	✓	✓	✓		✓
Emergency Response- Certificate of Fitness - pre requisite for HLO/HDA		✓	✓			
Aerobic Capacity Assessment - pre requisite for HLO/HDA		✓	✓			
Helideck Operations Initial Training Standard (HLO and HDA Initial Training) (OPITO 7040) - Pre requisite for HLO/HDA		✓	✓			
Helideck Emergency Response Team Member - HERTM (OPITO 7041)	2	✓	✓			
Helideck Emergency Response Team Member - HERTM Further Training (OPITO 7541)	2		✓			
HERTM Workplace Competency Assesment (OPITO 7043)			✓			
Helicopter Refuelling Training (OPITO 9255)	2	✓	✓			
Helicopter Refuelling Workplace Competency Assesment (OPITO 9256)		✓	✓			
HLO Workplace Competence Assesment (OPITO 7046)	2	✓				
HERTL Workplace Competence Assesment (OPITO 7044)	2	✓				
Helideck Assistant (HDA) Workplace Competence Assessment Standard (OPITO 7045)	2		✓			
Helideck Emergency Response Team Leader Training -HERTL (OPITO 7042)	2	✓				
Helideck Emergency Response Team Leader Further (incl HERTM further practical exercises) Training (OPITO 7541)	2	✓				
CAA Aeronautical VHF Certification (ROCC-OCS)		✓		✓	✓	
CAA - Offshore Meteorological Observing	2	✓		✓		
Helicopter Administrator Training (OPITO 7055)				✓		
Helicopter Administrator Workplace Assesment				✓		
CAP437 Helideck Awareness Training (Recommended)		✓		✓	✓	
Helideck Perimeter Netting Instection / Awareness Training (Recommended)		✓				
POB System (Recommended)				✓		
HLO for NUIs - Initial Training (OPITO 7048)	2	✓				
HLO for NUIs - Further Training (OPITO 7049)		✓				
Helideck Assistant, HDA/HERTM, Workplace Competency Assesment for NUIs (OPITO 7050)			✓			
Helicopter Landing officer, HERTL (HLO/HERTL) Workplace Competency Assessemnt for NUIs (OPITO 7051)		✓				

Source: OEUK

All OPITO Standards can be checked here:

opito.com/standards-and-qualifications/industry-standards-library

CAUTION: When foreign vessels, flotels, HLVs, MODUs etc are to work in the UKCS, the helideck is required to comply with the requirements for operating in the UKCS which includes the required helideck team training requirements.

The contracting operator should refer to the *Guidelines for Mutual Recognition of Specialised Safety and Emergency Response Training for North Sea Operations* Revision 8 to check if training from overseas is acceptable in the UKCS.

The Offshore Installations and Pipeline Works (Management and Administration) Regulations 1995, Regulation 13 requires the Duty Holder to ensure that “a competent person appointed to be in control of helideck operations on the offshore installation (in these Regulations referred to as “the helicopter landing officer”) is present on the installation”.

The guidelines are primarily intended for use in the North Sea offshore oil and gas industry covered by the signatory national trade associations. The guideline addresses the training provided to all offshore workers regularly assigned to specialised emergency response roles within offshore installation emergency response functions.

It is important to stress that given the location-specific competence required of many ER roles, Operators should exercise good judgment and ensure the competence and readiness of the individual before he or she is assigned to an offshore ER function.

Information can be found here:

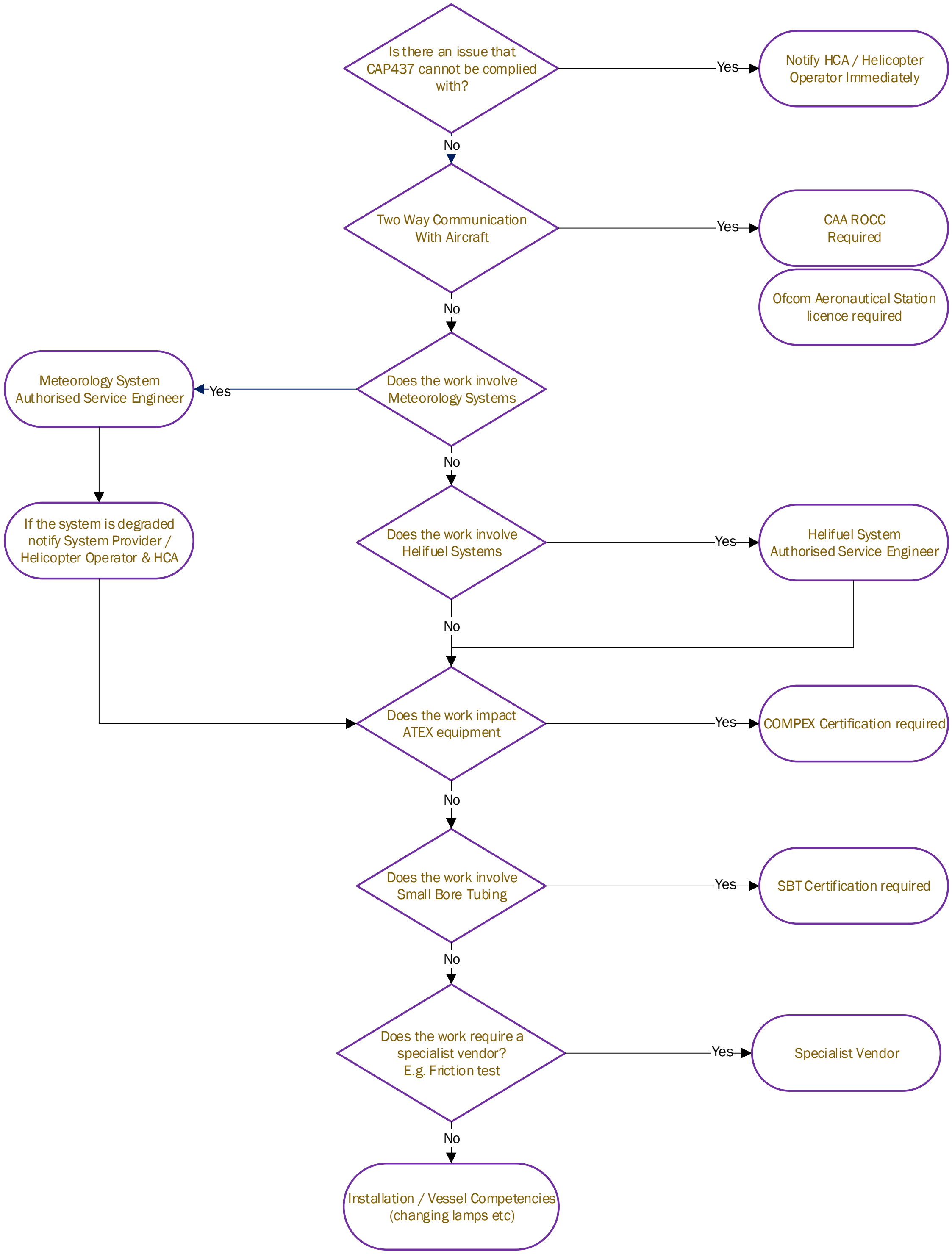
Mutual Recognition - Offshore Energies UK (OEUK)

Vessels from other countries may only have the Standards of Training, Certification and Watchkeeping (STCW) certification, which is aimed at seafarers. This is not an acceptable substitution for any formal helideck competence requirements due to the lack of helideck/helicopter firefighting content in the syllabus.

In addition to the helideck teams, other specific roles should be assessed for each helideck, e.g., the Radio Operator may also be Heli-admin and will require the appropriate training.

A flowchart is shown in Figure 8 to give guidance on additional competency requirements for offshore personnel engaged in technically supporting aviation operations.

Figure 8: Competency requirements



Source: OEUK

5.2 Onshore Competence

OEUK has published a guidance Document "The provision of competent technical advice" guidance document which can be found here https://oeuk.org.uk/wp-content/uploads/2021/06/OGUK-Provision-of-Competent-Technical-Advice.pdf

The appointment of competent persons is part of the Duty Holder's demonstration of compliance with Regulation 7 of the Management of Health and Safety at Work Regulations 1999 (MHSWR) which begins:

"(1) Every employer shall […] appoint one or more competent persons to assist him in undertaking the measures he needs to take to comply with the requirements and prohibitions imposed upon him by or under the relevant statutory provisions".

Every Helideck Operator in the UKCS is required to have a process for establishing the competency of personnel. There is a regulatory requirement to provide "competent technical advice" throughout the lifecycle of an asset.

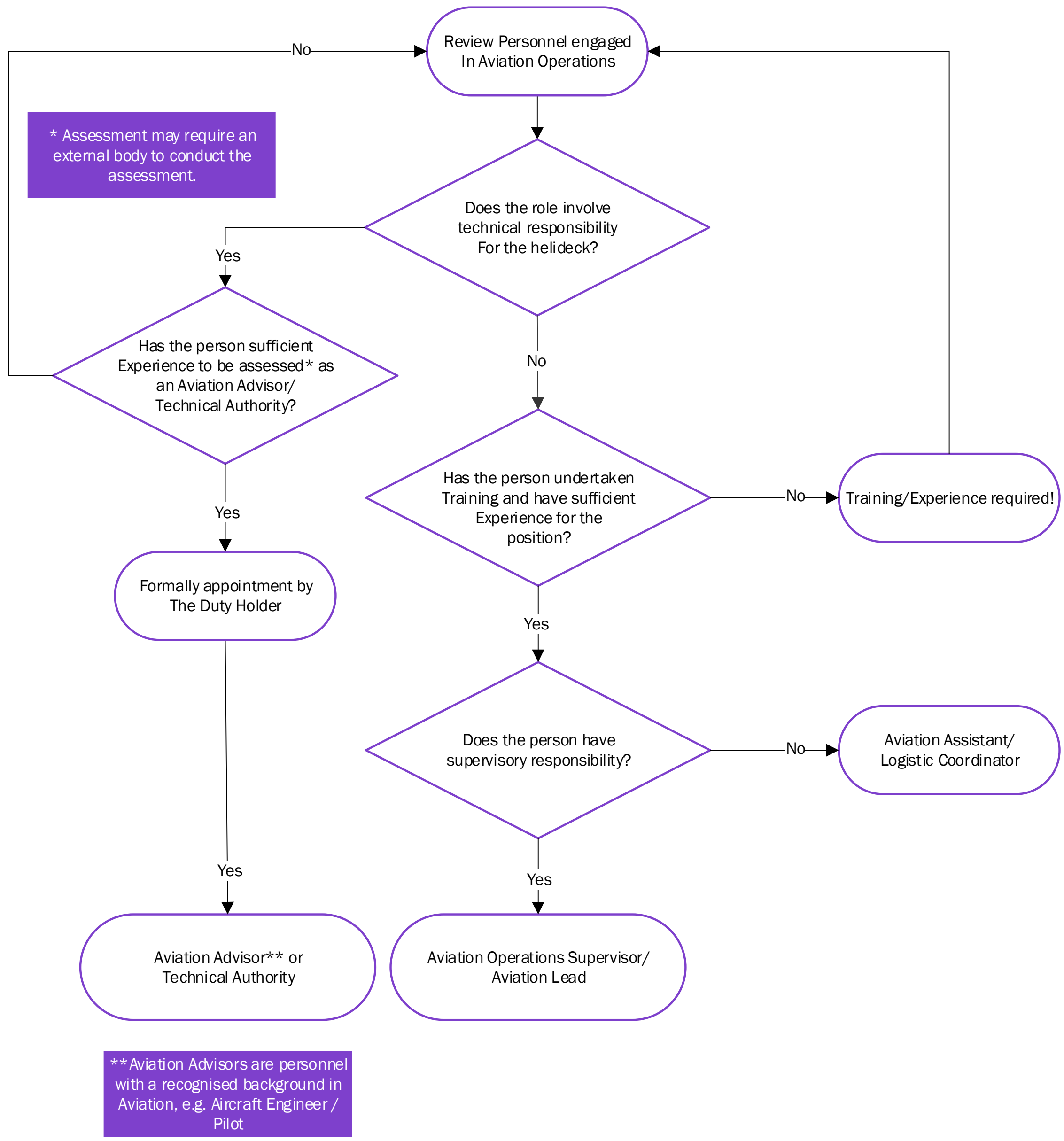
Each Duty Holder / Vessel Operator should determine the most appropriate way to meet this requirement, there is no "one size fits all" model. A range of role titles is frequently used for people involved in providing competent technical advice with one of the most common roles being that of a "Technical Authority". Whilst the term is widely used in the industry, both in guidance documents and individual organisations, there is no specific requirement to use this terminology and there is no consistent definition of this term within the industry. Where it is used, some organisations may define an individual as a Technical Authority for a specific discipline or topic area, while other organisations may assign the job title Technical Authority within each discipline to many people, potentially differentiated by levels of seniority.

While Technical Authority is one of the most used terms, a wide range of other titles may be used about people providing competent technical advice, such as Senior Discipline Engineer, Operations Support Engineer, Lead Engineer, Principal Engineer, or Subject Matter Expert (SME). Irrespective of the terminology and job titles used, the underlying requirement is to provide competent technical advice throughout the lifecycle of an asset. If the organisation does not have in-house competent technical advice, this can be outsourced to an external organisation. Figure 9 is a flowchart based on the IOGP Key Elements of Aviation Management.

One item detailed in the HSE Report (KP3) Key Programme 3 - Asset Integrity (hse.gov.uk) is that one area of demonstrating workforce engagement is *"Technical authorities visit the platform and discuss asset integrity issues*". Therefore, it is recommended that a formally Appointed Technical Authority visits the installation/Vessel regularly, the visit should include a walkthrough of all the systems under their control, along with any audits required to ensure personnel, processing, and issues are safe and complying with standards, guidelines, and regulations.

Those providing technical advice should be able to do so without being unduly pressurised by production or operational factors. This may lead to a need to maintain the independence of those providing technical advice from operations. This should be balanced with the requirement to have a suitable degree of involvement in day-to-day operations and familiarity with the operation, the installation, and management arrangements, to allow them to provide relevant, timely input. Typically, the logistics department should focus on the mobilisation of people and freight, and the technical aspects of the operation dealt with by a suitable competent person.

Figure 9: Onshore Helideck Responsibility Process



Source: OEUK

6 Supply Chain

6.1 Audit of Services

Offshore aviation cannot function without the support of the helideck operators from third-party companies. Suppliers may be contracted to provide specialist parts or services or for outsourcing due to not having in-house departments to manage helideck critical systems.

The helideck operator may satisfy themselves that any contracted third party is safe, efficient, and fit for purpose. These companies can often be CAA-approved and/or HCA-accepted to demonstrate they have been assessed as being suitable. An audit of the service supplier to ensure that they operate in the best interests of the helideck operator should be carried out. The audit would normally be carried out, as a minimum by the following people, one of which would be the Lead Auditor who is responsible for planning, coordinating the audit, and reporting the findings to the supplier:

HS&E Adviser.

Supply Chain Contracts Specialist / Engineer.

System Owner / Technical Authority.

Additional personnel from Logistics, Maintenance, or Operations as required.

Any member of an Audit Team (including the SME) should be independent and have no conflict of interest whether contractual or financial. This also includes holding shares as any kind of personal investment.

CVs of personnel engaged in technical activities offshore should be verified as being competent based on the contract scope.

Other audits such as Performance, Safety, or Competency may be directly carried out on the Helicopter Operator, and it is envisaged this would be done by the Duty Holders Aviation Adviser, or a 3rd party Subject Matter Expert in conjunction with the required team members from the Duty Holder.

An audit may be done before issuing an order to a supplier, i.e., it may form part of the supplier selection and award process – propose to change this to “The audit will be structured around the products and/or services the supplier provides and the scope of work it has been contracted for”. The audit will review compliance for each section and note any findings with an agreed timeline to resolve.

6.1.1 Audit Purposes

There are three different reasons to conduct supplier audits:

New Suppliers

As part of the requirements of the onboarding process of new suppliers, an audit should be conducted to assess the Supplier's capabilities and compliance with requirements. This is often needed for all suppliers of critical products and services.

Monitoring:

Suppliers should be monitored continuously throughout the lifetime of the relationship, to confirm the services and/or products delivered are aligned with the contracts and KPIs. An audit should be conducted as part of the supplier performance monitoring process. Audit frequency should be determined by the auditor and form part of an audit schedule.

Performance Issue:

Any time there is a serious service quality issue, a performance audit should be conducted to ensure requirements and standards are being followed.

6.1.2 Audit Process

6.1.2.1 Before the Audit

The auditor should inform the supplier in advance of the scope of the audit and resource requirements.

6.1.2.2 During the Audit:

The auditor should start the audit with an opening meeting to present the audit team, the scope, and the criteria of the audit.

Auditors will cover their respective areas - documentation reviews, personnel interviews, sampling, and facility observation tours.

The auditor(s) should record enough data to describe clearly what is being audited when reported as Audit findings.

The auditor(s) should provide a record of evidence associated with the Audit findings.

6.1.2.3 At the end of the Audit

A closure meeting should be convened with the auditors and auditees to discuss the findings.

During a closure meeting, the auditor should report the conclusions of the audit to the auditee.

The auditee should be provided with an opportunity to explain any information that may have been misunderstood by the auditor and/or to provide further evidence on why the finding is not valid or should be re-phrased to improve accuracy.

6.1.2.4 Audit Reports

The audit report should be issued to the auditee with actions and mitigation plans agreed upon and reviewed regularly between both parties.

6.2 KPIs

Supply Chain / Logistics professionals are encouraged to ensure aviation-related KPIs are mutually agreed upon and included as part of the day-to-day operations involving aviation. This would typically be done by the contact focal point for logistics monthly and an annual report for the calendar year.

The data recorded in KPIs can allow organisations to analyse performance and safety in offshore aviation operations.

KPIs should include.

- Number of flights carried out.
- Aircraft Type.
- Flight time in hours (outbound and inbound).
- The number of passengers carried.
- Weight of Baggage carried.
- Weight of freight carried.
- Incidents / Events.
- Delays and reasons.

Other KPIs that have commercially sensitive information should be undertaken to include:

- Payment on time
- Budget Status
- Over / Underspend

From a technical perspective

- Performance Standard Failures
- Unplanned events requiring:

OEUK has published information that can be found here:

https://oeuk.org.uk/supply_chain_principles/

The guidance is aimed at supporting sustainable procurement and contracting practices – including optimising auditing (principle 5) and competency (principle 3).

6.3 Walk Through Check

Table 3: Supply Chain Check

Check	Action	Remarks
1	Check that all existing contracts relating to aviation have been reviewed and fit for purpose.	
2	Identify an audit schedule of each current service provider and who the audit team will consist of.	
3	Check contract expiry dates and a forward plan on renewal/retendering.	
4	Ensure the operator’s Supply Chain process for contract selection is adhered to.	
5	Confirm that Supply Chain have appropriate documents e.g., Scope of Supply, Request for Quotation etc	
6	Ensure any mandatory accreditation required from the supplier is met, e.g., CAA approval, HCA acceptance etc.	
7	Verify each contract has been tendered and awarded. Where Single Sourcing has been raised, a sound justification has been given agreed by all departments.	Single sourcing may be used where the OEM is the only viable option, or no other organisations undertake the scope requirements. Contracts should not be renewed without following a defined process of retendering etc.
8	Where elements of the contract have not performed as expected, non-conformance reports should be raised to capture the issues and resolutions.	
9	All contracts should provide reports on an agreed frequency to detail performance etc.	

7 Helideck Certification

The HCA, on behalf of all UK Offshore Helicopter Operators, is responsible for inspecting and certifying all offshore helidecks operating in the UKCS, ensuring helideck landing sites are safe and their operators are competent. The HCA typically inspect and certifies helideck on a two-yearly basis. A certificate will be issued along with a Helideck Information Plate, with limitations based on the inspection visit.

In some instances, a time limit will be imposed to allow an issue to be rectified before a further inspection is carried out for the reissue of a certificate.

Typical examples of findings of non-compliance are:

- The proximity of equipment to helideck of OFS e.g., Antennas.
- Equipment Height above deck level above the recommended height
- Status Light not fitted.
- Windsock location (may require a second windsock based on wind directions).
- Windsock condition (including illumination issues).
- Meteorological system functionality or poorly sited sensors.
- No UPS e.g., Radio Systems, obstruction lighting.
- Poor Illumination of flare structure.
- TD/PM & H Lights (not functioning or part failure).
- HMS Repeater lights not fitted or inoperative.
- HMS System inoperative.
- Crane booms when in rest position or changes to cranes where whip extensions are fitted.
- Metal strips on the deck surface periodically become loose.
- No evidence of communication licences or ANO approvals.
- Fuel System issues.
- Foam System issues (no evidence of foam testing).
- Structural concerns

Also listed are observations examples of these are:

- No Helicopter Starter Unit.
- No refuelling System.
- HMS fitted.
- Netting, Circle & H lighting installed.
- Offset TDPM.

To ensure accurate information is available for the Helideck Information Plate, the Duty Holder / Vessel Operator should make recent images of the Helideck available to the HCA.

These image requirements are detailed in Appendix A and apply to fixed installations only. Each photograph should be from the direction of the compass point e.g. north will be from the north. Section A.9 of CAP437 "*Photographs of the offshore location showing the helicopter landing area from the four main compass quadrants (N, S, E, W) at a range of 0.25 to 0.5 NM and a height above the helideck of approximately 200 ft*;". These photographs can be taken from a helicopter or UAS (See section 25). Vessels and floating facilities should still provide images of the helideck.

The Helideck Information plate shown in Figure 10, in addition to the installation or vessel name, has an ICAO designator, for example, the Alba Northern's ICAO designator is EGAG which is shown in the same box as the Installation name. ICAO designators will be used in the Nav Databases rather than the asset name. This is down to the regular occurrence of asset names changing through new ownership. The ICAO designator once issued will never change.

The certificate also shows a P/R/H Category, which is the Pitch, Heave and Roll category. If the letter is "F" then this is fixed, typically for an installation fixed to the seabed. If it is a vessel, MODU, FPSO, etc then this is classed as a moving helideck and the category definition is detailed in the HCA document which can be found here:

HLL-Part-C-P-R-H-Tables-Feb-2023.pdf (helidecks.org)

Figure 10: HCA issued information Plate.

HCA HELIDECK CERTIFICATION AGENCY

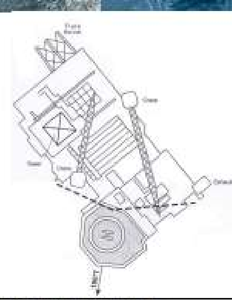
HELIDECK INFORMATION PLATE

Certificate Expiry Date: 07 May 2024

HELIDECK	VAR	POSITION	EGAG
Elev **217 ft**	**0**	**N58 03.47 E001 04.78**	**Alba Northern**

		VHF	NDB	Issue Date
HEIGHT OF INSTALLATION:	**381**	**Traf 123.555**	**340**	**04 Mar 2024**
HIGHEST OBSTACLE WITHIN 5NM:	**Top of Rig**	**Log 126.405**	**ARN**	

		Operating Company	Issued By
FUELLING INSTALLATION:	**Yes**		
STARTING EQUIPMENT:	**Yes**		
HELIDECK D value:	**22.8**	**Ithaca Energy**	**Helideck Certification Agency**
P/R/H Category:	**F**		
Max Weight:	**15.0t**		
Circle & H Lights:	**Yes**		



Wind (T°)	Kts	Limitation /Comment
		Platform
• 350-030	• 0-24	• No restriction
• 350-030	• 25-34	• Table 2
• 350-030	• 35 plus	• No landings
		• Table 1(T) if overflight of South West foam monitor platform unavoidable
		Non-Compliance
	150°	Refuelling hose guide adjacent to refuelling cabinet marginally over height.
	5:1	SW foam monitor platform.
	Misc	Windsock indication may be affected by derrick. Second windsock fitted on west side of derrick.

Source: The Helideck Certification Agency

The HCA have information available that Helideck Operators should undertake with trained personnel every six months to establish the operation of their helideck. Information for the fitness checks for the appropriate installation can be found here:

https://www.helidecks.org/information/downloads-links/

Trained personnel for undertaking routine helideck checks will typically have attended formal CAP437 Helideck Awareness Training. Offshore, this is likely to be the HLO/HDAs. It is good practice to also have the onshore system owners of the Helideck attend such training to gain an understanding of the requirements.

When the certificate is issued it should be reviewed in detail to ensure any information on the certificate is understood and where appropriate, acted upon. Note 3 on the HCA certificate is important, and worded as follows:

This certificate shall cease to be valid if:

- *Changes of ownership or name of installation/vessel are made without notification to the HCA.*
- *Changes to the helideck, its environs and/or related equipment are made without the prior agreement of the HCA.*
- *Levels of Helideck crew qualifications/competency are not maintained to the levels described in the OEUK Guidelines for Management of Aviation Operations or suitable alternative standards.*

An example of limitations is listed on the HCA-issued Helideck Certificate. As seen in Figure 11, the wind direction and speed are critical to flight operations based on the flares that are in use. This information is also on the Information Plate that the flight crew use to plan the flight, landing, and take-off.

Figure 11: Limitations listed on an HCA-issued information plate.

The helideck has been found suitable for helicopter operations subject to:

1. Such non-compliances and restrictions as may be listed below; and,
2. Authorization by the helicopter operator.

Wind (T°)	**Kts**	**Limitation /Comment**
		Platform
305 - 015T	> 20Kts	• If both Flares on full output - No Landings
305 - 345T	> 20Kts	• Only eastern flare on full output
346 - 015T	> 20Kts	• Only western flare on full output
320 - 360T	=> 30Kts	• Table 2
		• Table 1 (T) if overflight of 5:1 infringements are unavoidable
		• Approved friction surface - no net

	Non-Compliance
5:1	Tropo-dish (west side) - Generator intakes (east side)
Misc.	3% of H Lights unavailable

Valid for helicopters with: Maximum 'D' value:	**'D' = 22.2m**
Maximum take-off weight:	**'t' = 12.6t**
This certification shall remain in force until (unless previously revoked or suspended)	**11 October 2023**

Source: The Helideck Certification Agency

7.1 Helideck Limitations List

The Helideck Limitations List (HLL) is issued by HCA. It is the only official document that is currently in place in the UKCS to publish details of offshore helidecks with non-compliances that require operational limitations to be applied. These non-compliances include limitations related to vessel motions, and physical infringements in the obstacle-free sector and turbulent sectors.

Non-compliance will originate from three sources.

- At the helideck design/construction acceptance stage when HCA has been advised or has identified shortfalls in the layout and/or system's design (e.g., arising from CFD or wind tunnel data) that will require them to apply appropriate operational limitations.
- From flight crew reports that focus on operational helideck/ installation performance (e.g., turbulence problems), rather than physical obstructions.
- Failure to undertake maintenance on the affected systems resulted at the time of inspection that the equipment not performing as per design which could be a Performance Standard failure.

When first starting operations to a new offshore installation or following significant structural modifications of existing installations, flight crews are required to submit turbulence report forms through the Chief Pilot to HCA for review by a technical committee. These reports allow an operational assessment of the installation to be made to validate initial limitations that may have already been applied. They also allow limitations to be modified based on ongoing experience.

Refining flight operating limitations can take from a couple of weeks to several months. The time taken is dependent upon the frequency of weather patterns encountered and obtaining sufficient Pilot reports.

Having received guidance through the technical committee, HCA will advise all the Helicopter Operators of any potential problems via a system of 'hot news' (interim updates of HLL).

Where the Helideck is an existing structure, a notification to the HCA, a report from the Helicopter Operator or a finding during helideck certification has raised concerns, these are reviewed and where required the HCA will update the Helideck Certificate and if required the Approach Plates.

It is the responsibility of the Helideck Operator at the earliest opportunity to notify the HCA and the Helicopter Operator of any situation that can compromise the safety or efficiency of helicopter flights.

As the helideck is certified by the HCA, should an issue arise with the helideck or supporting system the helideck owner <u>should not</u> conduct ORAs or introduce temporary operating procedures to work around anomalies unless specifically agreed in advance or before implementation by the HCA. This may invalidate the certification of the helideck and may result in the cessation of all flying activities until resolved.

7.2 Temporary Limitation Notice (TLN)

When carrying out assurance activities such as daily checks, planned maintenance or specialist vendor visits. The Helideck operator will be required to ensure a process is put in place should an anomaly be identified.

Treating the finding as a Performance Standard failure, in the first instance the HCA should be informed of the nature of the issue which may prompt a review of the helideck certificate or have limitations imposed. The helideck Operator is required to inform the Helicopter Operator(s) also on the issue and that the HCA have been notified.

The HCA will issue a Temporary Limitation Notice (TLN) on the anomaly. If the Helideck operation is impacted by the arrival of another vessel alongside, The HCA will require a detailed plan drawing of the final setup including directions. The HCA will then liaise with the Helicopter Operator on any possible limitations for helicopter activity to both or one or the helidecks. HCA will produce the final TLN issue it on its website and cross-refer to the Certificate and Plate.

A list of Helidecks with limitations can be found here:

https://www.helidecks.org/information/helideck-landing-limitations/

A NOTAM is a notice containing information concerning the establishment, condition or changes in any aeronautical facility, service, procedure or hazard, the timely knowledge of which is essential to personnel concerned with flight operations. NOTAMS are typically not used with offshore helidecks in the UKCS, but they may be used when BVLOS UAS activity (see Section 25) is being carried out between the mainland and offshore installations / Vessels. With such an operation a Temporary Danger Area (TDA) would also be made active

On resolution of the issue, the HCA are required to be satisfied that the anomaly has been resolved, and where appropriate a formal record of the resolution is provided for review. When this has been accepted by the HCA, flying may resume under the original limitations of the helideck.

8 Helicopter operations support equipment.

Listed in CAP437 Sections 6.35 to 6.37 is the need for specific equipment for supporting aviation needs offshore. This section gives guidance on the equipment and points to consider.

8.1 Aircraft Chocks

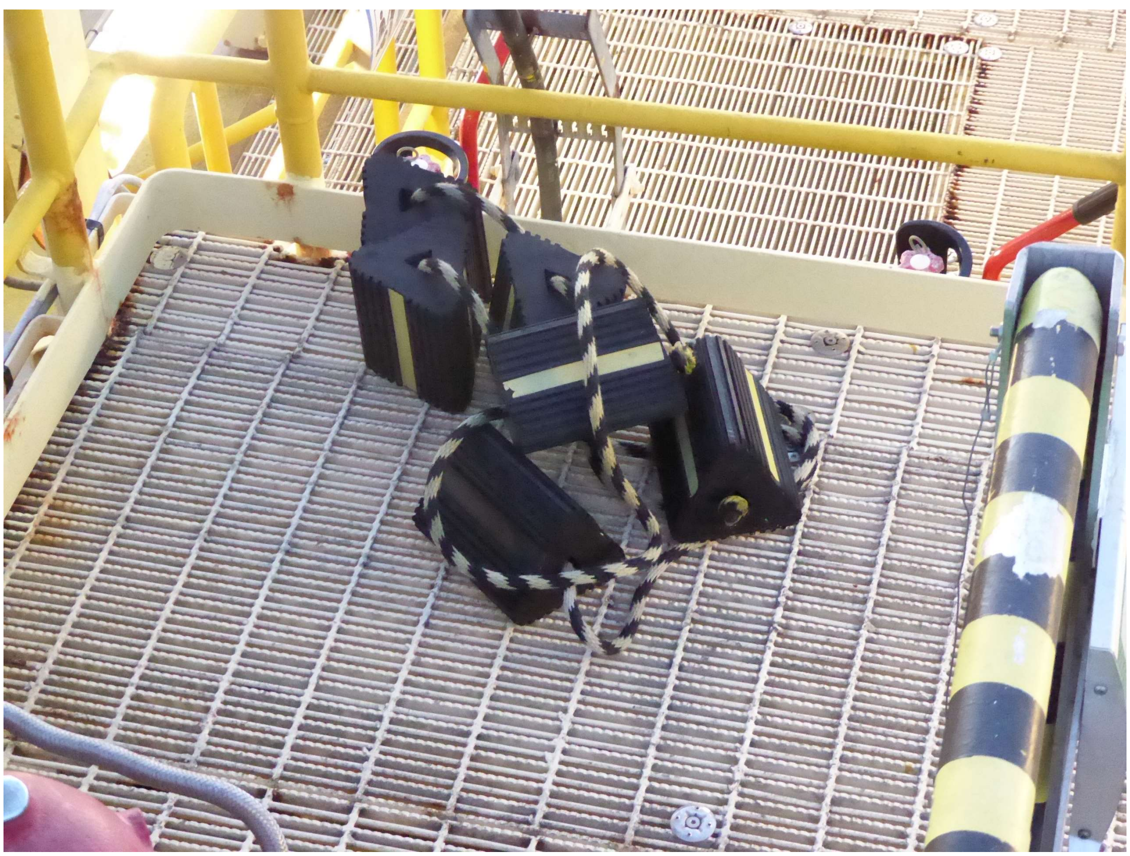
Chocks are required to prevent a helicopter from rolling whilst on the helideck. The type of helideck will determine the chocks required. The chocks are required to be compatible with the undercarriage and wheel configurations of the helicopter.

The 'rubber triangular' chock is only effective on decks without nets. These are normally supplied in pairs and the size and rope length should be compatible with the aircraft type If different sizes of chocks are required, then these should be marked with the aircraft type e.g., "S92".

The chocks should have a Hi-Viz yellow stripe on them for greater visual awareness.

Chocks should also be of a construction that will not damage the surface of the helideck e.g., metal chocks would be unsuitable. SAE International standard AIR4905A or MIL-PRF-320058 on Chocks can be referenced for more technical information if required.

Figure 12: Aircraft Chocks



Source: Uncredited

The most effective chock is the 'NATO sandbag' type Consists of two sandbag chock components that are connected by a polypropylene rope.

Figure 13: NATO Type sandbag type chocks

Source: Uncredited

8.2 Helicopter tie-down straps/strops.

The purpose of the tie-down point is to secure an aircraft that has been shut down on the helideck. Information on Helideck tiedown points can be found in CAP437 sections 3.47 to 3.49 and 6.37.

These straps/strops should not be confused with the blade tiedown straps which every aircraft operating in the UKCS will carry. For securing helicopters to the helideck, it is recommended that adjustable tie-down strops are used in preference to ropes. Specifications for tie-downs should be agreed with the Helicopter Operator(s).

The tie-down points installed into the helideck should be checked to ensure the strap/strops can be connected to them securely. This is to avoid finding that when required the hooks in the strap/strops are too large.

When an aircraft is required to be tied down, it is required to be done under the supervision of the flight crew using suitable straps and tiedown points. The method and location of the tiedown and, the angle of the strops should be agreed upon with the Helicopter Operator and the flight crew, especially the blade tiedown.

The straps should be a ratchet-type tension device with double J hooks complying with BS EN 12195-2:2001. The hooks should be suitable for the tiedown points and should fit securely. The colour of the webbing on the straps should be yellow or orange for visibility and should be marked "Aviation use only".

Due to the environment offshore, straps should be kept in a dry location and regularly inspected for corrosion. The Ratchet should be tested to ensure it can apply and also release tension.

Figure 14: Ratchet type tension straps

Source: Uncredited

Figure 15 & 16: Tiedown points on the helideck.

Source: Uncredited

The Helideck operator should keep tiedown straps available for the types of aircraft that are used on the Helideck. The straps should be marked “Helideck use only”. The rating of the strap and the number of straps is aircraft dependent, so identification, storage and control are required. The straps should be checked to ensure they are compatible with the tiedown points.

Helideck operators should consider adding tiedown points and straps as part of the Lifting Equipment register, which includes a colour coding. Under this program, all lifting, rigging and hoisting equipment should be inspected. maintained periodically. These inspections should have colour coding through tags or paint to indicate that it is fit for use. If a colour-coded strap is out of date, a reference check of the installation colour code in use would indicate this.

In line with the HCA guidance on tie-down straps, this Technical Recommended Practice should be reviewed.

HCA-RP-003-Rev-01-Provision-Rating-and-Use-of-Helicopter-Tie-Down-Straps.pdf (helidecks.org)

8.3 Heli-Start Units / Ground Power Unit

When a helicopter shuts down on a helideck, there may be a requirement to supply additional power to the aircraft and to aid engine starts.

Units can be fixed or portable, as a cable is required to plug into the helicopter to allow external power to assist with a start when required.

Figures 17 & 18:Portable Helistart units

Source: Uncredited

The Cable length is critical for fixed units, if too short it may not reach the helicopter requiring the helicopter to be manually moved to allow the cable to be inserted.

Petrol or Diesel power units should not be used offshore.

8.4 Weighing Scales

The requirement on Heli-Admin is to ensure that the weight figures of aircraft leaving the installation/vessel have accurate weights as on occasions the arrival weight of the passenger and baggage may differ from when they leave. CAP437 Appendix K.16 details that passengers, baggage, and freight are required to be weighed. This requires that calibrated scales are provided, and a process is in place for recalibration at set intervals. The HCA recommend a six-monthly calibration check although an operation with minimum flights, subject to CAP437 approval may have a longer calibration frequency.

For all aircraft, accurate payload information assists the flight crew in determining any fuel uplift or the requirement to remove personnel and/or freight off the flight to remain within limits for the maximum take-off weight and centre of gravity of the aircraft.

A printed manifest for the flight crew is required to be printed out by the person checking passengers and baggage onto the flight. It is recommended that the printer for this is directly connected to the computer rather than using a network printer to reduce the risk of network issues causing printer issues. A spare network printer should be available in the event of the local printer developing an issue.

It is recommended that Helideck Operators consider adding the baggage scales to a suitable Performance Standard (Helicopter Systems) to ensure that it is captured or given a mandatory activity in a CMMS with fixed compliance dates. It may be more practical to change out scales and return for recertification to a calibration facility instead of undertaking the work offshore.

The scales should have a valid calibration date label identifying the expiry date. If the date has expired, the HCA are required to be contacted where a dispensation may be given if suitable mitigation is carried out and circumstances are acceptable.

Figures 19 & 20:Weighing Scales display showing calibrated sticker.

Source: Uncredited

Guidance and a template for establishing calibration accuracy can be found here:

HCA-RP-Calibration-of-Offshore-Passenger-RP.pdf (helidecks.org)

HCA-FRM-070-Rev-01-Offshore-Scale-Calibration-Chart.xlsx (live.com)

8.5 Helicopter Baggage / Freight

The basic requirement for manual handling requires that any mechanical means be used before considering manual lifting. Therefore, the maximum baggage weight should not exceed 11 kg/25 lbs.

Carts can be used to be taken to the helicopter with bags to be unloaded and loaded. There are some considerations to be taken if using this option:

- How the cart is taken on and off the helideck.
- The maximum load the cart is certified for.
- Any deck loading structural limitations of the helideck.
- Suitable wheels, so as not to cause damage to the helideck surface and installed components.
- Means of brakes as not to get moved by wind or rotor wash, or if it is a moving helideck.
- Inspection regime of the cart as “lifting equipment”.
- Suitable storage area off the helideck for the cart.

Occasionally there is a requirement for helicopter freight offshore, this is normally done in a dedicated aircraft where in some cases seats will have been removed.

The Helideck operator will be required to plan how heavier freight can be offloaded from a helicopter and a suitable means of transporting it off the Helideck. This should include how the helideck is cleared before the aircraft takes off. If a trolley is used, then the loading level should be flush with the helicopter cargo door threshold. Offloading freight may require the aircraft to be shut down, so this should be planned to ensure any tiedown or Helistart requirements are addressed.

8.6 Spill Response

As the surfaces of helidecks are critical to safe aviation operations, consideration should be given to how to deal with spills of fuels and fluids such as hydraulic oil from the helicopter. In the event a helicopter on deck has released a fluid which could be fuel or lubricating oil, this should be brought to the attention of the HLO who will communicate this to the flight crew. The helicopter crew will determine if operations such as refuelling or passenger boarding cease as the aircraft may have to shut down.

Spill kits should be kept in a suitably identified container that is securely fixed down to avoid movement in adverse weather or helideck operations.

The kit should include suitable PPE for dealing with spills, the required kit will be defined in the COSHH datasheets which will be held on-site. Typically, this would include:

- PPE (nitrile gloves, masks, goggles, disposable overalls)
- Chemical-resistant boots
- Absorbent pads
- Absorbent socks/pillows
- Disposal bags
- Compatible cleaning materials suitable for the helideck surface

Dealing with a spill on the helideck should be planned so that things are put in place, as soon as it becomes obvious that there is an issue. Liquids such as aviation fuel may perish seals in equipment like Circle and H lighting units. A spill response aims to prevent the spill from escalating to an environmental issue or risk to personnel through fire. Loose absorbent granules should not be used, and these may end up in the drain system creating blockages.

When clearing the helideck after a spill, the absorbent materials should be treated as hazardous waste as they may be soaked in aviation fuel.

Consideration should be given to replenishment when any contents of the spill kit are used. Therefore, spare consumables for the kit should be held offshore.

The Helicopter Operator should be contacted for details of fluids in addition to aviation fuel present in helicopters when determining the requirements for the spill kit.

Figures 21 & 22:Sample Spill Kit and storage

Source: Uncredited

8.7 Snow and Ice

On occasions, snow and ice accumulations can accumulate on offshore helidecks. Dealing with this will require careful planning:

- How to avoid helideck surface damaged.
- Use of de-icer should be suited to aviation use and where equipment is fitted (DIFFS, TDPM lighting, etc), will not deteriorate through seals perishing, etc.
- De-icer is required to be non-hazardous to the environment or personnel who should use the correct PPE to deliver the de-icer based on the COSHH datasheet.
- De-icer should be used once the snow has been cleared from the surface. This will reduce the volume of water on the helideck.
- CAP437 sections 3.17,3.37, 6.35, and Appendix A A.8 Section 4 should be reviewed.

For clearing snow, brushes are effective with minimum potential for damaging the deck surface. Shovels and scrapers are not recommended.

Some helidecks may be designed with trace heating or hot water systems. However, these are rare in the UKCS but do allow a level of mitigation against ice forming. These systems should only be employed if the design of the helideck caters to this option.

A suitable de-icer should meet the SAE International standard AMS 1435D. The AMS 1435 specification covers de-icing and anti-icing runways, taxiways, and helipads in the form of a liquid. As a chemical, it will require to have an MSDS, COSHH, and appropriate PPE in place before use.

9 Unserviceable Helicopters on Helidecks

There may be times when a helicopter is declared unserviceable on an offshore helideck which requires be shut down, on rare occasions the aircraft may have to shut down where the destination and diversion locations are unavailable. The same process applies to each.

To complete aircraft repairs in a reasonable timeframe, a 'recovery helicopter', operating a non-revenue flight with an engineer(s) and spare parts on board may be flown onto the installation. For vessels, it may be a consideration to return to port.

Where a designated parking area is available it should only require the unserviceable aircraft to be moved onto the parking area to clear the Landing Area bounded by the perimeter marking so that the inbound helicopter can execute a normal landing by reference to the touchdown/positioning marking.

Where there is NO designated parking area available, the flying task requires full and proper consideration to ensure that it can be done by the Helicopter Operator Operations Manual. This type of 'recovery' flight requires special authorisation by the Helicopter Operator and the task also should be done safely from an offshore installation viewpoint.

A blocked helideck will significantly impact operational flexibility. Therefore, this section is intended to provide owners of helidecks without a designated parking area, advice to make suitable preparations in advance of a helideck being blocked by an unserviceable helicopter. This will include the need for a lifting plan and means of getting the helicopter prepared to be crane lifted off the helideck, onto a laydown area then onto a boat for return onshore.

Duty Holders should also be aware that in the event of an emergency when helicopters may be required for personnel evacuation, a blocked helideck could severely compromise the installation emergency response plan. However, in an emergency, the OIM may be authorised to clear the helideck by any practicable means.

When a helicopter is shut down on a helideck and secured, access to the aircraft is required to be controlled.

Access to the helideck will require barriers to be placed across access points and personnel made aware. Should access be required to the helideck and the shutdown aircraft, this is required to be cleared with the flight crew.

10 Rescue Kit

CAP437 details the need for a minimum list of rescue equipment, sections 5.44 to 5.47 should be referred to. PFEER Regulation 7 also requires equipment to be adequate, identifiable and accessible for rapid deployment on the helideck. deal with Helicopter Accidents.

The storage box contents and storage required to be easily accessible and should be marked as “Rescue Equipment”, or “Crash Kit”. A means of locking the storage box should be considered with a panic lock that can be used to keep the content secure yet provide easy access to the equipment. The box should be watertight to avoid water ingress pooling in the bottom of the box potentially causing damage to equipment stored within it.

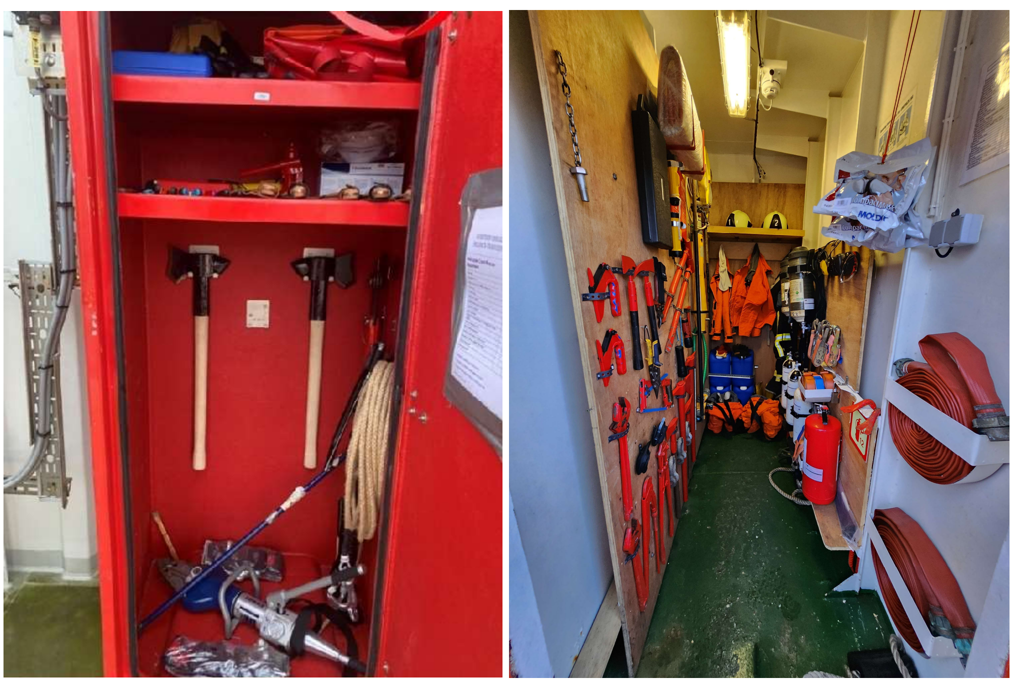
The quality of the equipment should be considered, the offshore environment is harsh as materials can corrode quickly so consideration should be given to equipment material selection. Aluminium ladders when in friction contact with mild steel are an ignition source in a hazardous area. Therefore, ladders should be marked as “Helideck use only”.

As the Rescue Kit is classed as a SECE, a performance Standard will exist, and an appropriate maintenance frequency assigned to demonstrate verification assurance.

An inventory should be positioned in the box and consideration given to how a check can identify missing items. A mounted silhouette board shows what is missing based on the outline of the item.

Figure 23 is a typical Crash Box, however, the hydraulic tools are not a requirement under CAP437 and require specialist training to operate.

Figures 24 & 25:Helicopter Crash Kit box/storage



Source: Uncredited

11 Firefighting Equipment

A fire on an offshore installation, MODU or vessel carries great risk. Any incident is required to be able to be managed through the Emergency Response requirements which is a requirement under the Offshore Installations (Prevention of Fire and Explosion, and Emergency Response) Regulations 1995. Regulation 7 - Equipment for helicopter emergencies in the PFEER Regulations should be referred to. The PFEER Regulations can be found here:

Prevention of fire and explosion, and emergency response on offshore installations. Offshore Installations (Prevention of Fire and Explosion, and Emergency Response) Regulations 1995. Approved Code of Practice and Guidance L65 (hse.gov.uk)

If at any point maintenance is being carried out on any firefighting system that reduces cover on the helideck, then no aviation activities should take place until the system has been reinstated and tested.

In support of any firefighting equipment, trained and well-equipped personnel in emergency response and firefighting are mandatory. Any fire on a helideck requires to be dealt with immediately as the speed a fire can take hold of an aircraft very quickly.

The Duty Holder / Vessel owner should have regular drills with scenarios to allow the helideck crew to execute their emergency response roles. These scenarios should have wash-up meetings to identify what worked well and what requires some improvement.

11.1 Firewater

Firewater is used to supply monitors, deluges, hydrants, and sprinkler systems. The main issue with the firewater is that it is seawater taken straight from the sea which can be untreated. There is a risk that over time, will result in Internal marine growth in the firewater system which will limit or cease the performance of the equipment affected. Marine growth can consist of algae, aquatic weeds, marine invertebrates, and other small organisms that can be drawn into the system. If the system is not regularly used, then crustaceans can exist and grow within it.

On fixed installations, caissons with inlet screens are used to house firewater pumps that pump the water into the firewater ring main. The caisson inlets are located at a suitable depth to reduce the potential of marine life. On vessels and floating installations, the intakes may be in a sea chest and as such more at risk of marine life.

Some seawater and firewater systems employ coarse filtering, biocide treatment, or the use of electrodes to electrolyze seawater to try and stem the impact of marine growth. If a firewater supply is susceptible to such issues, then consideration should be given to methods to ensure pipes, tanks, and firefighting equipment are tested and inspected more frequently.

Firewater ring mains are normally kept pressurised through small jockey or make-up pumps. When a fire demand is initiated through a fire detection system event such as a manual alarm call point activation or flow switch to a monitor/hydrant activating, a fire pump is started automatically by the system.

Larger installations may have more than one fire pump for redundancy and may run two at any one time.

Smaller locations or vessels may run a single fire pump before any aviation activity so the firefighting system is available then shut the system down once the helicopter is clear of the location.

Another firewater source may be from a storage tank, however, the volume of water required to meet CAP437 section 5.13, and 5.15 minimum requirements gives rise to structural, space, and pumping issues.

Any kind of filtration on firewater runs the risk of generating flow restrictions when blockages start to occur. It is therefore important to monitor the performance of filtration, especially differential pressure across filters to ensure they are operating efficiently.

Figure 26: Marine growth within pipework

Source: Falck Formco A/S

As part of any engineering on either new or replacement systems, consideration should be given to pipework materials, internal coatings for the pipe and components such as valves selected for seawater service.

11.2 AFFF

The primary firefighting method in the UKCS is Aqueous Film-Forming Foam (AFFF). AFFF foam works by suppressing flammable liquid vapour, effectively suffocating the fire hazard. The foam component further suppresses fires by keeping hot fuel from reigniting.

The chemicals in AFFF create the foam's film-forming property. The film is what allows the foam to spread rapidly over the fuel surface. It also blocks the supply of air and suppresses any flammable vapours, which helps extinguish the fire faster.

The foam used offshore typically meets the requirement for ICAO Level B AFFF with a 1% foam concentration. Other concentrates are available such as 3 & 6%, but it is down to the Duty Holder / Vessel Operator to determine the most suitable ICAO Level B AFFF concentrate.

The minimum operational stock level of foam should also be considered, section 5.15 of CAP437 should be referred to. This is to ensure that after any testing or demand for AFFF, there is sufficient stock on board to replenish stocks.

It has been identified that components within AFFF. such as Perfluoro-octane sulfonic Acid (PFOS) and Perfloro-octanoic Acid (PFOA) can be hazardous to human health as well as that of the environment. There is a drive to now use Fluorine-Free Foams (Synthetic Fluorine Free Foam - SFFF) such as Jetfoam ICAO-B. Information is available which gives guidance, is available here:

Microsoft Word - Foam MOC (master) (api.org)

FOAM-UPDATE-0923-V4E.pdf (firefightingfoam.com)

When replacing AFFF it is strongly recommended to get a specialist Firefighting organisation to carry out a site visit to establish that the change of media e.g. AFFF to SFFF with the delivery equipment still functions as per design for optimum firefighting capabilities.

A standard exists for guidance, BS EN 1568-3:2018 Fire extinguishing media - foam concentrates. Specification for low expansion foam concentrates for surface application to water-immiscible liquids.

Foam monitors on helidecks have a minimum required application rate that is required to be met. This is detailed in CAA CAP437, Chapter 5, 5.11 to 5.13. To ensure the application rate is correct some information is needed that will be detailed in the Performance Standard and to which the equipment should be tested:

To calculate the Application rate using a foam monitor, ensure you know the D-value means the largest dimension of the helicopter used for assessment of the helideck when its rotors are turning. It establishes the required area of foam application. The D-value can be checked on the Helideck certificate issued by the HCA. You will also need to know the AFFF concentrate e.g., The ICAO level of foam being used, e.g., level B 1%

An example of the foam application for a Sikorsky S92 Helicopter with a D value of 20.88(radius of 10.44) and a delivery requirement of firefighting media of 5.5 Litres per square meter per minute (ICAO Level B Foam at 1%)

The application rate is worked out as 5.5 x π x r2 (5.5 x 3.142 x 10.44 x 10.44) = 1883 litres per minute, a minimum duration of 5 minutes will deliver 9415 litres. using 1% foam (1883 x 0.01) for 5 minutes will require 94.15 litres of foam concentrate.

The application rate calculation required is detailed in CAP437 section 5.13. This will give a flow rate in litres per minute. Using The flow rate can be measured using a portable ultrasonic flow meter. It is important that when using the flowmeter, a suitable section of piping is selected and marked for future testing for consistency. The settings of the flowmeter should be recorded, again to ensure consistency as often the flowmeter is used for other tasks on the installation/vessel.

Other methods include installing a pressure test gauge onto the monitor using a port that is normally plugged in normal service but removed to allow the gauge to be fitted. The pressure indicated is to be confirmed against a graph provided by the monitor supplier that shows the flow rate.

Figures 27 & 28:Flowrate testing

Source: Oryx Aviation Services L.L.C

Inline flowmeters to supply pipework are not recommended, as at some point for calibration they will be required to be calibrated. This would involve intrusive removal and isolation of the system. If there is not a replacement flowmeter installed, then a spool piece will be required to reinstate the integrity of the supply. The better option is a portable ultrasonic flowmeter, for repeatability the same meter, sensor and mounting locations should be used. Figure 26 shows a portable ultrasonic meter and sensors.

Results from the flow rate test (recording the flow rate and the foam mix) should be recorded in a suitable Planned maintenance Routine (PMR). The data recorded should have the as-found / as-left settings to highlight any drop in performance since the last test. If it is found that the frequency between maintenance routines requires repairs or adjustments to be carried out, then the frequency of the routine should be increased to mitigate incorrect performance. Performance can be influenced by pressure and the condition of pipework, particularly if using untreated seawater as firewater.

Not all fires are capable of being accessed by monitors and in some scenarios, their use may endanger passengers. Therefore, in addition to the Foam Monitors CAP437 section 5.17 states:

"there should be the ability to deploy at least two deliveries with hand-controlled foam branch pipes for the application of aspirated foam at a minimum rate of 225-250 litres/minute through each hose line. A single hose line, capable of delivering aspirated foam at a minimum application rate of 225-250 litres/minute, 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 able to apply water in the form of a jet or spray pattern for cooling, or for specific fire-fighting tactics"

.A hydrant flow meter can be used for testing to ensure the application flow rate is met.

The data recorded should have the as-found / as-left settings to highlight any drop in performance since the last test. If it is found that the frequency between maintenance routines requires repairs or adjustments to be conducted.

Figure 29: Flowrate tester for hydrants

Source: Uncredited

11.3 Firefighting methods

Firefighting on offshore and vessel helidecks may have several types of Firefighting Equipment onboard. These could consist of:

- Fixed Fire Monitors / Manual and Oscillating
- DIFFS
- Conventional Firehose/branch and portable firefighting equipment.
- Portable extinguisher.

On demand of a fire monitor or fire hose, the firewater ringmain pressure drops and a flow switch on the monitor will start a fire pump and in turn, initiate a General Alarm on the installation or Vessel. When a water flow is developed a foam proportioner or inductor is used to mix the firefighting water with foam to develop an effective fire suppression mix.

The location of fire monitors is exposed, and frequent testing should take place to ensure that the equipment is fully functional. Especially the oscillating functions on monitors. It is good practice to have covers on monitors that are easily fitted and removed to reduce environmental exposure to them.

DIFFS systems are installed on new helidecks, DIFFS systems use firewater pressure or have an electric pump to start to deliver the firefighting medium. It should be considered as part of the design of a backup should the system part or fully fail to function. It is rare to have DIFFS systems retrofitted onto existing helidecks due to the structural and piping requirements and associated engineering. It may be that the helideck is replaced, in which case the opportunity arises for a DIFFS system to be installed.

Where Foam concentrate is being used, the internals of any inline components such as valves should be inspected periodically as these tend to perform poorly due to the residue forming causing a drop in performance and/or functionality.

11.4 Fire Monitors

There are two types of fire monitors used on Offshore Helidecks. Conventional manual monitors, remote control / oscillating monitors.

Oscillating monitors using water Pressure drive gearing that allows the monitor to continuously sweep in a predefined arc across the helideck. They can be turned on remotely via a water valve allowing the user to remain at a safe distance These systems can be problematic if the quality of the water or pipework causes the oscillation function to develop issues.

Manual monitors are used by the helideck crew, but remote-control options are available where they can be remotely operated from a panel located either at the helideck or nearby but will not oscillate.

Monitors, based on their location often require a high level of maintenance. Step Change in Safety issued an alert on monitors:

Step Change in Safety | Helideck Fire Monitors

The monitor configuration covering any helideck is required to cover the landing area should demand arise. A poorly performing monitor may not reach the helicopter requiring an immediate response to deploy another firefighting system in support.

Figures 30 & 31:Foam Monitors (Oscillating)

Source: Oryx Aviation Services L.L.C

11.5 DIFFS

The foam DIFFS system typically consists of an operated deluge valve, spray nozzles, remote manual stations, a deluge valve release panel, a foam storage tank and a foam proportioner. Firewater can be supplied from a ring main or pumped from a storage tank.

DIFFS Nozzles are installed in an array in the helideck surface which provides an effective spray distribution covering the whole deck surface for a range of weather conditions. The nozzles can be either ‘pop-up’ or flush type depending on the design requirements.

The precise number and layout of nozzles are dependent on the specific helideck type, the “D” value of the deck, the flow rate of the nozzle and its coverage. As required by the standard there will be sufficient overlap of the horizontal flow components when all the nozzles are discharging during the system operation. When discharging, this allows rescue personnel to work on the helideck rather than stand behind a foam monitor.

There are numerous replacement DIFF nozzles available on the market, should the nozzle require to be replaced, then it should be with an identical nozzle. The flow and pressure ratings are indicated by what is known as a K-factor. This value can determine flow at any given pressure or vice versa. This information is illustrated on the flow curve which is normally applied at the design stage or when a nozzle is replaced, part of the certification requirements for a new nozzle is that verified as being the correct specification. A test should be undertaken to ensure the spray pattern is consistent when any nozzles are changed out.

Figure 32: DIFFS testing

Source: Oryx Aviation Services

The DIFFS unit is capable of being activated either automatically by a Fire Detection System / Fire & Gas System (flame detection) or manually by way of the remote manual stations. Upon detection of a fire, the DIFFS system is initiated and, firewater with foam will be released through the deluge valve-foam inductor unit, through the firewater piping network and to the spray nozzles. When the helideck has passive fire protection holes on it, this combination can extinguish a pool fire very quickly and efficiently.

When using flame detection to initiate a DIFFS System, it should be based on a flame detector voting E.g., two out of the three flame detectors must detect a fire before initiating the DIFFS. If the system detects a fault in a flame detector circuit, two out of three voting will be degraded to a one of of two system. The Flame detectors used for this should be of a type that is “Solar Blind”, which ignores the effects of the sun and reduces false alarms.

To establish that the flame detectors have been located correctly, F&G mapping should be carried out which uses specialist software to ensure detectors are in appropriate locations to achieve the best possible detection coverage.

The signal from the F&G system to the DIFFS system should be considered. Circuits can be “failsafe” where e.g. a voltage holds a solenoid valve on, a demand from the F&G system will cause the power to be dropped from the solenoid and in turn, fires the DIFFS. A damaged cable or the F&G system failing would also have the same effect. Consideration should be given to the risk of a spurious release and ways to mitigate it in the design.

If the nozzle is a non-pop-up type, if there is a blocked flow (due to a heavy object resting on top of the nozzle); then the foam will continue to flow out from the side orifices of the nozzle.

The triggering of a DIFFS system through automatic methods, such as Flame detection should consider spurious trips and the need to include a voting system on more than one detector, for example, two out of three detectors in alarm would initiate the DIFFS.

Chapter 5 and Appendix D of CAP437 should be referenced.

Figure 33: DIFFS Nozzle mounted into a helideck.

Source: Uncredited

On NUIs, DIFFS can be employed with a Compressed Air Foam System (CAFS). This is a standalone system with CAFS technology, where compressed air is inserted into the inductor foam proportioner to generate a powerful fire-attacking and suppression foam solution. This gives very effective firefighting capabilities and enables a reduced water capacity requirement of over 30 % compared to a standard DIFFS System.

11.6 Portable Extinguishers

There may be a requirement for additional portable extinguishers such as CO2 or Powder. These extinguishers are normally portable and should be easily accessible on the helideck. These units' depending on the size may have wheels to aid movement. Typically, if helicopters are shut down on the helideck, a CO2 extinguisher with a 2.2-meter-long lance is required for helicopter engine fires on start-up. The lance must not be raised, as a rotor may strike it on start-up. The CO2 should not be deployed unless the helicopter crew indicate the need for it.

Portable extinguishers are recorded in the CMMS, as these require inspection in line with the manufacturer's recommendations, normally annually. In most cases, is it cheaper to replace the extinguisher with a new unit rather than send units back, arrange temporary replacements for the period they are away for maintenance then replace it once the unit returns?

The need and size of the extinguishers require to be reviewed based on the expected hazards. Information is in CAP 437 sections 5.29 to 5.37.

Figures 34 & 35:Portable Extinguishers

Source: Uncredited

11.7 Hydrant/hose reels

In addition to fixed firefighting and portable extinguishers, there should be an additional means of delivering AFFF. as detailed in CAP437 section 5.17. The equipment should be readily available and accessible without creating additional access or tripping hazards.

When used, these systems should be flushed through to reduce the risk of AFFF residue causing reduced performance when it is used again.

As these systems require hoses, the integrity and condition of the hoses should be inspected regularly. Hoses can be damaged when deployed when scraped across areas and connectors can also wear or become damaged. Hoses should be properly stored and drained if required. Hoses should also be listed on a hose register and tagged accordingly for future replacement information.

Figure 36: Hosereel

Source: Uncredited

11.8 Dual Agent Unit

Dual Agent Units are manually operated units, discharging dry chemical powder and water/foam. Both dry chemical and AFFF nozzles are equipped with ball shut-off valves for individual or simultaneous operation.

Figure 37: Dual Agent Unit

Source: Uncredited

11.9 PPE

CAP437 states the requirements for PPE in sections 5.50 to 5.55. This PPE requirement is aimed at the Helideck Crew. HLO/HDA fire suits should be marked with their role, so the HLO is identifiable by the helicopter crew. The identification can be through badging on the suit which is typically Fire retardant and Anti-static. Hi-Viz vests could be used and should also be flame retardant and anti-static. Some Hi-Viz vests are not anti-static and/or fire retardant which can compromise safety in the event the person wearing it has to deal with a fire.

Hearing and eye protection should be of a standard specified by the Duty Holder's PPE policy. Safety spectacles should be on a lanyard and hearing protection should be a single headset type, not foam earplugs. If radios are being used these will also have a cable to the headset which should be coiled type so the cable is as short as possible.

The Installation or vessel will have an Emergency Response Team (ERT) that would be mustered in an incident that can assist the helideck crew. The Helideck crew's primary role is firefighting, by having ERT members in Breathing Apparatus (BA) they are available for casualty recovery and firefighting media replenishment.

It is possible burning fuel may spread to other parts of the installation/vessel, so the ERT team should be available to deal with this leaving the Helideck Crew on the helideck.

The storage facility for Helideck team PPE should be of sufficient size so helmets, suits, gloves, and boots can be stored, and it is good practice that the lockers are heated to aid the drying of suits after use. These lockers would be in an area where the helideck team can don the suits easily with sufficient space before any aviation operations.

Figure 38: Helideck PPE

Source: Uncredited

12 Foam Testing

Foam systems require to be tested regularly to ensure that the system is in full working order and the finished foam is effective as a firefighting product. Foam testing is often a Planned Maintenance activity scheduled by the CMMS. Regular testing has a downside where finished foam can end up in the sea and pollute the environment. Therefore, the methodology for testing foam and equipment performance should be carried out to minimise the potential for pollution to occur.

The HSE have produced guidance on foam testing in HSE Offshore Information Sheet No. 6/2011, which can be found here:

https://www.hse.gov.uk/offshore/infosheets/is6-2011.htm

CAP437 Chapter 5 should also be referenced.

When storing and testing foam, it should not be co-mingled with other foams of a different manufacturer or composition. In the event, that different OEM foam concentrates arrive offshore the foam storage and delivery systems should be cleaned and flushed. The new foam can then be introduced and sampled.

Routine periodic testing of performance in the offshore environment should be achieved by operating the equipment initially using water only and subsequently confirming the production of a limited amount of finished foam captured for testing. Annex D in NFPA 11 - Standard for Low-, Medium-, and High-Expansion Foam details the use of a collection board, along with a foam collection cylinder. NFPA 11 can be found here:

NFPA 11: Standard for Low-, Medium-, and High-Expansion Foam

Foam from the monitor should be directed to a foam target or collection board, where the finished foam is allowed to drain into a sample container. This will be the sample that will be sent to the laboratory for sampling. A collection board is shown in Figure 38.

Figure 39: Finished foam testing board.

Source: Oil Technics (Fire Fighting Products) Ltd

Testing of this finished foam and a sample of the foam concentrate should be conducted by an accredited foam test house against the applicable laboratory standard (e.g., BS 5306-0:2020, NFPA11:2021). The sample should be a minimum of one litre. These should be shipped onshore in suitable sterile containers. Containers should identify:

Type of foam concentrate: e.g. 6% AFFF

Name of company/ Helideck:

Date of the sample taken:

Sample location point: e.g. Helideck – West Monitor

Although portable foam testing kits are available, these could be used by the operator to establish the foam makeup, but this is not a replacement for regular laboratory sample analysis and certification.

Refractometers can be used to check the refractive index. In general, a foam used at a lower concentration has a higher refractive index. For example, a 1% AFFF will have a higher refractive index than a 3% AFFF and a 3% AFFF will have a higher refractive index than a 6% AFFF.

The Refractive Index value can be obtained from the datasheet for the AFFF which the refractometer is used to confirm that the value is correct. A typical Refractive index can be 1.36000. Water typically has a refractive index of 1.33300.

Refractometers can be manual optical devices or digital. If using digital refractometers, the calibration requirement should be considered and this is not a replacement for laboratory analysis and the issue of a test report.

Operators should carry sufficient foam stocks of the same OEM / composition to replenish the system after testing and consider the quantity should the system be set off accidentally. Refer to sections CAP437, sections 5.41 – 5.43.

13 Helicopter Refuelling Facilities

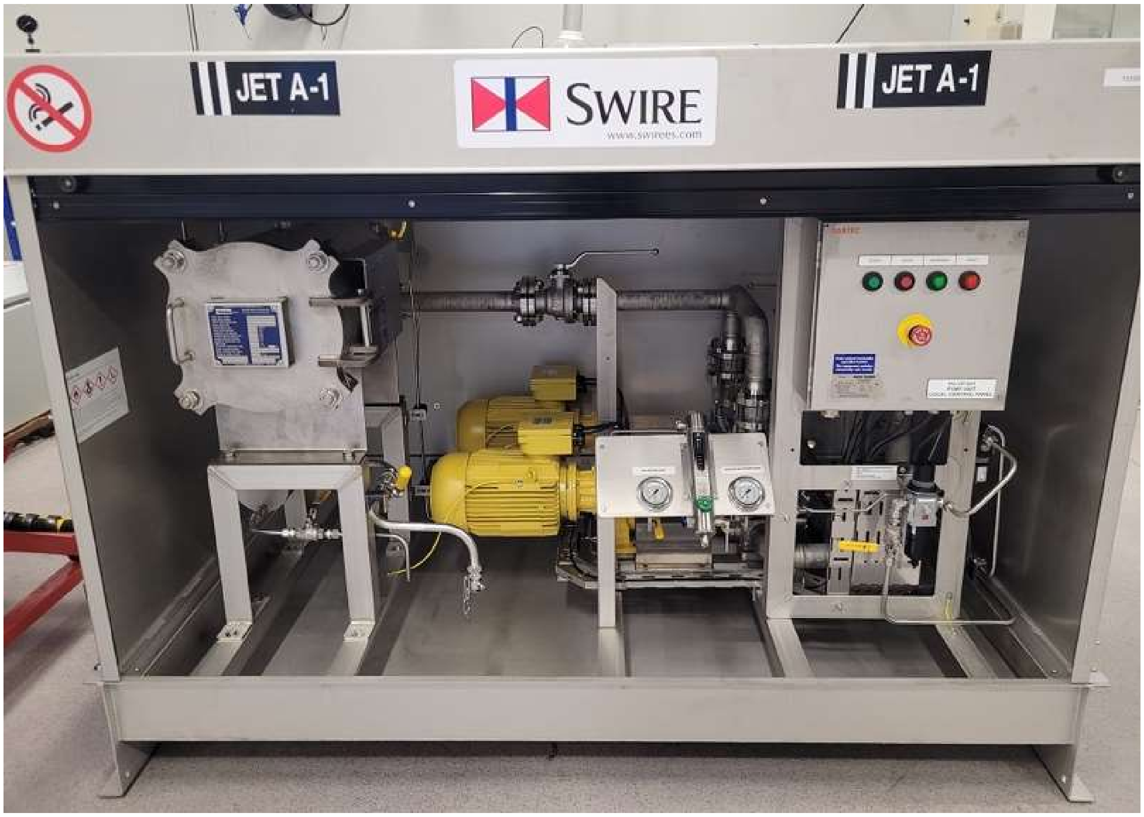
Where a helicopter refuelling system is installed, there are very strict controls in place to ensure the quality of the fuel delivered is of a very high standard and free from water and contaminants. Chapters 7 and 8 of CAP437 should be referred to.

Section 8.32 states that the only people who can work on the system is an "*Authorised Service Engineer on behalf of a Refuelling System Service Provider, contracted by the offshore asset owner or Duty Holder to inspect and certify the system is fit for uplifting fuel by the Helicopter Operator.*"

Under no circumstances should anybody other than the Authorised Service Engineer break the integrity of aviation fuel pipework or equipment due to the risk of introducing contaminants and air into the system.

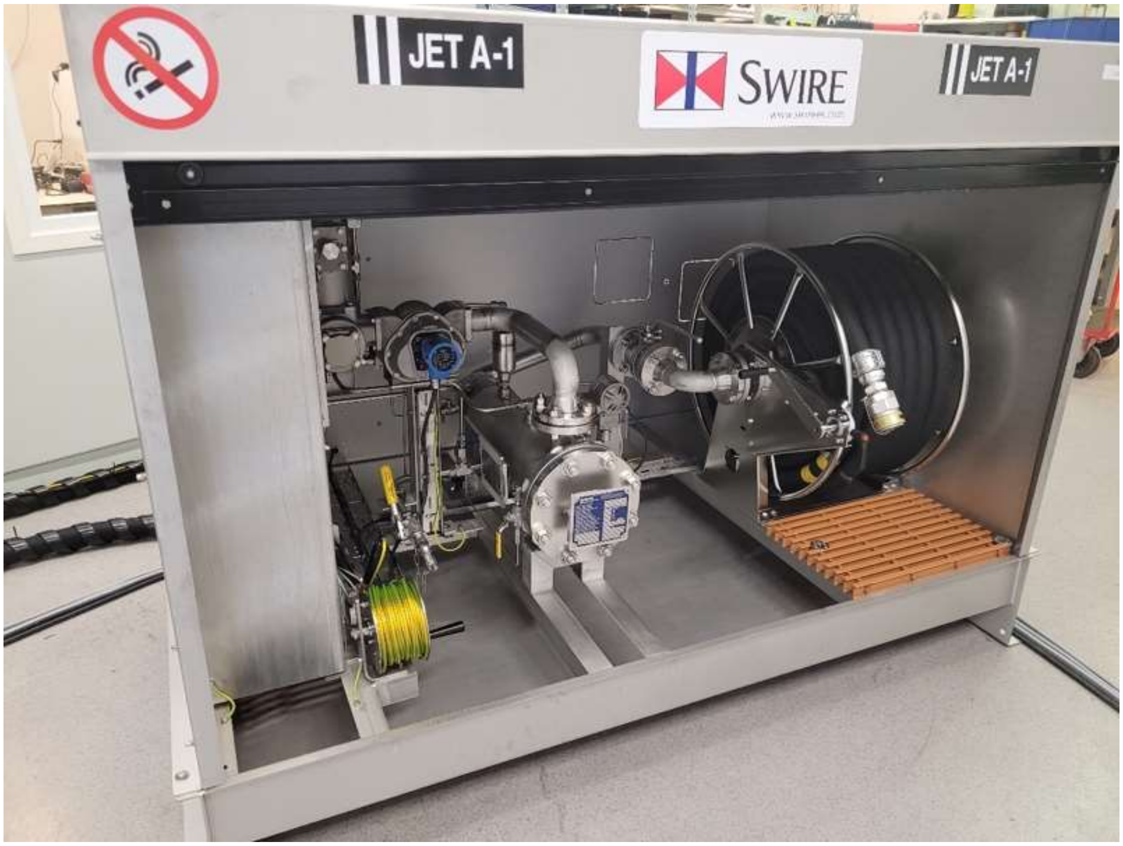
Some fuel skids are single combined units, other units consist of two separate packaged skids consisting of a Fuel Pumping Unit and a Dispenser Unit as shown in Figures 39 & 40.

Figure 40: Helifuel Pump Unit



Source: Swire Energy Services

Figure 41: Helifuel Dispenser Unit



Source: Swire Energy Services

13.1 Helifuel Storage Tanks

The supply of aviation fuel can be from transit tanks which are directly connected to the refuelling system or connected to larger fixed storage tanks for gravity transfer. Transit tanks can come in various sizes and have a typical capacity of between 2700 and 6000 litres which is dependent on the supplier and certification. Tanks may have the option for stacking if designed to do so and can be vertical or horizontal in construction. CAP 437 sections 8.46 & 8.47 should be referenced.

Tanks can be sold or rented to the helideck operator. however, it should be highlighted that there is a requirement to inspect and recertify the units regularly which is required to be managed in whichever option is engaged.

Tanks should always be stored in a bunded area with appropriate connections to a suitable drain with the capacity to deal with the inventory of the tank should it leak. Suitable fire detection should exist and appropriate firefighting equipment. Jet A-1 samples should not be returned to them, once Jet A-1 is taken from the tank for whatever reason it should be disposed of accordingly.

Intermediate Bulk Containers (IBCs) should never be used for the transportation or disposal of aviation fuel.

13.2 Jet A-1

Jet A-1 Fuel, also known as Aviation Turbine Fuel. Because the exact composition of jet fuel varies widely based on petroleum source, it is impossible to define jet fuel as a ratio of specific hydrocarbons. Jet fuel is therefore defined as a performance specification rather than a chemical compound.

The storage of Jet A-1 fuel on both vessels and offshore installations should be reviewed to ensure:

- The MSDS is available for COSHH requirements.
- The storage area has suitable mechanical protection from dropped objects.
- Suitable Earthing arrangements are in place for transit tanks etc.
- The transfer of fuel between transit tanks and the fixed system is suitable.

13.2.1 Product Identification

Pipework or equipment that contains or carries Jet A-1 should be identified with a suitable marking as defined in EI Standard 1542. The identification for Jet A-1 is in Figure 42.

Figure 42: Jet A-1 Marking

Source: Uncredited

The standard is available from:

EI 1542 Identification markings for dedicated aviation fuel manufacturing and distribution facilities, airport storage and mobile fuelling equipment | EI - Publishing (energyinst.org)

13.2.2 Sustainable Aviation Fuel

Sustainable Aviation Fuel (SAF) made from renewable biomass and waste resources has the potential to deliver the performance of petroleum-based jet fuel but with a fraction of its carbon footprint, giving aviation users a reduction in environmental impact. This is an evolving product and will be more prominent when further testing and analysis is completed.

13.2 Fuel System Integrity

The use of Polytetrafluoroethylene (PTFE) tape should not be used on any components of the refuelling system, a suitable thread compound should be used.

The Helifuel system will also come under the Pressure Equipment Directive (PED) 2014/68/EU.

The authorised Service Engineer, in addition to the employing company's own training and competency program, will be expected to have industry-recognised competence certifications such as:

COMPEX certification for working with Hazardous Area Equipment which may be part of the refuelling System. If the system has no ATEX equipment, then this is not required.

ECITB-approved competency training in Small Bore Tubing. The Installation / Vessel may have an SBT procedure which manages the breaking, re-making, and testing of SBT connections, the engineer will have to comply with this.

The Duty Holder / Vessel owner should satisfy themselves that the engineer being mobilised is suitably competent.

13.3 Suction and Delivery Hoses

The Helifuel system will use several hoses as part of a refuelling package. A Suction hose will be used to connect Fuel transit tanks to the pumping system. A hose then connects the delivery unit to the Helicopter for use during refuelling. CAP437 sections 7.15.1 and 7.15.12 should be referred to for the specification of the hoses.

Hoses on the Helifuel system should come under the remit of the Helifuel System vendor for maintenance, and this should be reflected in the Asset Hose register which will exist for all hoses on the installation. The hoses will be tagged/labelled with pertinent details relating to use, date of last test, and tracking reference so they can be identified in the Hose Register. Hose replacements should be supplied and fitted by the helifuel system vendor.

An important consideration is that of where the refuelling hose is left around the helideck, Step Change in Safety has published this alert:

Step Change in Safety | Refuelling Hoses left out on the Helideck

13.4 Fuel Water Detectors

A fuel water detector can be used in jet fuel to find out if there is any water that cannot be seen with the naked eye. The Water Detector is a device for determining the presence in jet fuels of finely dispersed un-dissolved water in concentrations lower than those normally detectable by visual examination. Water dispersions of this type can result from the emulsification of a water/fuel mixture during pumping, or from the precipitation of dissolved water due to a fall in fuel temperature.

These detectors are a small capsule that is attached to a syringe which indicates the presence of water in aviation fuel when a sample of 5ml is drawn. If the capsule changes from yellow to green, then water is present, and fuelling should not be carried out. Further sampling should be carried out concerning CAP437 Chapter 8, sections 8.11 to 8.14. The detectors have a product expiry date and should not be used if the date has passed. Each detector should only be used once and then disposed of.

Figure 43: Jet A-1 Water Detector Kit.

Source: Uncredited

Test kits are available and consist of a carry case, 500ml Glass sample jar, 500ml Tin Storage can, PVC gloves, hydrometer jar, hydrometer 0.775 to 0.825, thermometer, nylon syringe, Water Detector capsules and instructions for use.

13.5 Fuel Monitor Systems

This system allows you to monitor the presence of water continuously throughout the whole refuelling operation. Although this technology is new to the aviation industry, it has been used in hydrocarbon production analysis it will reduce the handling and exposure to aviation fuel. The water monitoring system will keep the fuel system operative through ongoing regulatory changes. The retrofit package has been made in close cooperation with the aviation fuelling industry and is made with JIG Bulletin 110 06/2018 (www.jig.org) in mind– with necessary amendments to suit each refuelling environment. With the installation of this innovative technology, you will reduce the chance of human errors and you will be able to keep on refuelling helicopters even when monitor filter elements are discontinued.

The JIG Bulletin 110 can be found here:

JIG-Bulletin-110-Use-of-Electronic-Water-Sensors.pdf (haneflex.com)

13.5.1 Remote Monitoring

On Some Fuel Systems, remote access to the fuel filtration system PLCs etc can be carried out from Onshore. Any remote connection to the system should comply with the operator's Cyber Security Policies.

13.6 Fuel Samples

It is important to ensure that the facility has suitable storage for fuel samples as detailed in CAP437 Section 8.

When taking samples, the appropriate PPE is worn as detailed in the aviation Fuel MSDS. This is the minimum which may also have additional PPE requirements by the Duty Holder.

Samples should be taken into three-litre glass jars which allow sufficient access for cleaning and lacquer-lined sample cans are **not** used due to the limitations on how these can be cleaned from contamination.

Fuel sample containers should be placed in a light-excluding store and kept away from direct sunlight since aviation fuel is affected by UV light.

Cleaning of sample jars should be done using lint-free cloths and rinsed at least three times with aviation fuel before a sample is taken into the jar.

Any metal components used in sampling (funnels, buckets) should be stainless steel and have a suitable earth bonding connection for discharging static electricity safely.

When a sample is taken, the sample should be identified with reference information such as the tank number, date, time and if applicable the aircraft registration to post refuel samples. The requirements for the samples and retention period are detailed in CAP 437 Section 8.17

Disposal of aviation fuel on the facility should be considered. In agreement with operations, this could be into the hazardous drains system, or in a slops tank for returning onshore for disposal.

14 UPS Systems

Uninterruptible Power Supplies are a type of continual power system that provides automated backup electric power to a load when the input power source or mains power fails.

A UPS differs from a traditional auxiliary/emergency power system or standby generator in that it will provide near-instantaneous protection from input power interruptions by using energy stored in battery packs. Almost all UPSs also contain integrated surge protection to shield the output appliances from voltage spikes. Larger offshore installations typically have redundant UPS systems that run in parallel to ensure safety systems are fully operational.

UPS systems are charged by the installation or Vessel power generation systems. If they fail, normally a backup emergency generator starts up. If neither is available, then the power is taken from the UPS batteries which will not be charging until conventional power is restored.

UPS systems are critical to supporting aviation operations offshore, as several of the systems have a dependency on UPS power when the installation is in an abnormal state through a F&G detection, Process shutdown or a fault.

Aviation Systems that typically are fed from UPS systems are:

- Radio Communications Equipment
- Helideck and obstruction lighting
- Monitoring systems – Weather / HMS
- Fire & Gas Detection / DIFFS Panels
- Meteorological Systems

CAP437 refers to UPS requirements in sections 4.28,4.36,5.25,6.12 and 6.41. It states in section 4.28 that the minimum duration of the Online UPS battery capacity time should be sufficient to cover an approach, landing, and take-off, including on-deck turn-around time; a minimum duration of 30 minutes is recommended.

The longer the duration required for systems on a UPS means the larger the battery requirements.

In some cases, space and hazards associated with batteries mean that only the minimum recommended duration is achieved. The use of aviation systems when on UPS power should be considered. For example, if the flight is over an hour away then lighting could be turned off until the flight has made first contact with the installation.

The sizing of UPS systems is critical, as these come under Performance Standards and are therefore a SECE, any changes to the load of a UPS (e.g., the addition of additional lighting, and radio systems) etc can reduce the endurance. Performance Standards require that the load and endurance of a UPS be tested regularly.

The use of an Emergency Generator is not classed as a UPS, as it takes time to start up and go online with the potential that it does not start or fails after starting.

15 Radio Communications

Personnel involved in communication with aircraft on an installation, MODU or vessel are required to hold a Civil Aviation Authority Radio Operator Certificate of Competency – Offshore Communications Service (ROCC-OCS). OCS radio station operators provide messages to helicopters operating in the vicinity of offshore oil rigs, platforms, and vessels using aeronautical radio stations. CAP437 covers the requirement in section 6.39. regulation 12 of The Offshore Installations and Pipeline Works (Management and Administration) Regulations 1995 should be referred to.

Holding the competency certificate demonstrates they have been trained and undertaken a theoretical and practical assessment. Information can be found here for the ROCC-OCS:

https://www.caa.co.uk/commercial-industry/airspace/air-traffic-management-and-air-navigational-services/licences/radio-operators-certificate-of-competence/

Two CAA documents should be referenced for Radiotelephony:

CAP413 – Radiotelephony Manual

CAP 413: Radiotelephony Manual | Civil Aviation Authority (caa.co.uk)

CAP452 - Aeronautical Radio Station Operator's Guide

CAP 452: Aeronautical Radio Station Operator's Guide | Civil Aviation Authority (caa.co.uk)

A Safety notice was issued by the CAA that personnel who operate aeronautical radios should be aware of. The Safety Notice is titled "ROCC 'Flight Safety Messages' Requirement". The Safety Notice can be found here:

SN-2024/001: ROCC 'Flight Safety Messages' Requirement | Civil Aviation Authority (caa.co.uk)

The Radio Operator, which could be a dedicated position, or the role of Heli-Admin should have a suitable area that suits the ergonomic needs. This will ensure that any communications with the aircraft will also have supporting equipment available. This should include:

- An Aeronautical radio including a spare standby unit.
- A weather display / HMS display which should be standalone (not part of the PC used for Email/POB systems).
- A telephone with a speed-dial facility and a mute facility for the ringtone.
- PAGA access (can be via telephone).
- Ability to remove background noise (sliding glass window or door).
- Ability to mute installation/vessel alarms in the area.
- Not adjacent to any panels that generate audible alarms.
- CCTV display of the helideck / Window to the helideck.
- Manual Alarm Callpoint.
- A PC for flight-related information access (Emails, POB System).
- Clock with Local and UTC (Zulu Time).
- Map of the area with nearby installations/vessels.

Figure 44: Radio Operator desk with CCTV, Weather Display and PAGA access

Source: Uncredited

15.1 Aeronautical Licences and Air Navigation Order (ANO) Approvals

Every Helideck in the UKCS is required to have an aeronautical licence and an ANO Approval. Although there are exceptions (see 15.2). Ofcom is responsible for issuing all radio licences for Aircraft and Ground Stations and the CAA is responsible for issuing the ANO approvals. The CAA Under an agreement with Ofcom and the Ministry of Defence, is the band manager of radio spectrum frequencies 117.975 – 137.000 MHz (VHF Aeronautical Communications. If an Ofcom license has expired, it is an offence to operate the equipment. It is therefore strongly recommended that before renewal, the information held by Ofcom is up to date. It is also an offence to operate the equipment without a valid ANO Approval.

https://www.caa.co.uk/commercial-industry/airspace/communication-navigation-and-surveillance/offshore-vhf-and-ndb-assignments/

As band manager, the CAA assign frequencies for UK aeronautical use in these bands and ensures that users of this band meet the safety requirements of the aeronautical sector, including the UK's international obligations under ICAO.

Ofcom administers and issues licences and the CAA administer and issues ANO Approvals. Ofcom will also collect licence fees, issue fee notices, and send out reminders if the payment date is missed. They will also contact licensees if any future policy decisions affect them.

To apply for a licence an Ofcom licence application form OfW586a is required to be filled out using the selection option on the form – B.4, C.2.i, E.1, F.1 and J being key requirements for the application.

The form can be found here:

https://www.ofcom.org.uk/__data/assets/pdf_file/0026/125369/OfW586a-Aeronautical-radio-ground-station-licence-application-form.pdf

For frequency approvals and licensing queries, the contact details are given below:

Ofcom Spectrum Licensing

Telephone: 020 7981 3131 / 0300 123 1000

Email: spectrum.licensing@ofcom.org.uk

Website: https://www.ofcom.org.uk/manage-your-licence/radiocommunication-licences/aeronautical-licensing

CAA

Email: frequency.approval@caa.co.uk

The aeronautical licence for the installation, MODU or Vessel will be issued to a nominated person within the helideck operator's organisation. It is important to keep these details updated since communications regarding license renewals and changes will be communicated to that person.

The frequency allocated is assigned by the CAA which can be based on the location if the station is a vessel or MODU. Information on frequency allocations can be found here:

https://www.aurora.nats.co.uk/htmlAIP/Publications/2018-09-13-AIRAC/html/eAIP/EG-ENR-6-en-GB.html

The frequency may also be issued to other stations within the radio range, as the frequency may not be an exclusive one issued by the CAA. This should be kept in mind and CAP413 requirements for the callsign when communication on the frequency between the aircraft / aeronautical station cannot be confused with other stations.

Copies of aeronautical licenses along with the ANO approval should be displayed on the installation/Vessel noticeboards.

15.2 Non-UK vessels

There is no obligation as far as Ofcom and the CAA are concerned, for a foreign-registered vessel to hold a UK Licence or Approval when operating in the UKCS when they hold licences from their registered state. Neither a UK Licence nor a UK Approval has any legal effect on a foreign-registered vessel, therefore, the organisation chartering the vessel should ensure that the vessel Radio Operators are familiar with the correct 'local' communications frequencies (with 8.33 kHz spacing functionality) and procedures when operating in UK waters.

Operators who have chartered overseas vessels associated with their UKCS Installations (Heavy lift, Diving, Construction, survey vessels etc), should request that those vessels hold UK Licences and Approvals for consistency.

15.3 Communication Equipment

Aeronautical radios are required to have the 8.33 kHz channel spacing capability. This is a mandatory requirement for all aviation radios operating in ICAO European regions. Both Ofcom and the CAA have produced an explanation of the spacing which can be found here:

https://www.ofcom.org.uk/__data/assets/pdf_file/0023/144590/Understanding-8.33kHz-frequencies-and-their-specific-channel-number.pdf

CAP1573: Technical information for Ground Stations - Conversion from 25 kHz to 8.33 kHz channel spacing | Civil Aviation Authority (caa.co.uk)

Several types of radio are used for aeronautical use:

- Handheld Transceivers (transmitter/receiver) – Used by the HLO.
- Handheld Receivers – Used by HDAs
- Fixed radios – Used by Radio Operators, Heli-Admin, Control Rooms. This type of radio will also be in use on Standby vessels.

The handheld units are required to be suitable for use outdoors and in poor weather, therefore waterproof cases and attachments may be required to reduce the impact of water ingress etc.

The Helideck crew should have appropriate headsets for the role to allow radios to be monitored hands-free. The HLO will be required to communicate with the helicopter and will therefore require a Push-to-Talk (PTT) facility which is easily accessible. The microphone on the HLO headset should have a foam microphone protector to aid clear communications without wind interference in the microphone. Noise-cancelling headsets can provide better audio quality but may not be able to withstand some weather conditions.

Radios should be worn using a suitable holster on a belt that can secure the radios to prevent damage or being dropped. The cable from the headset should not interfere with the duties of the helideck crew and allow the use of both hands.

Headsets and microphones should be cleaned after use with a suitable anti-bacterial wipe. If microphone protectors are used, these should be changed when a different person is using them.

Fixed radios are in areas where communication with the helicopter is required either in normal operations or emergencies. It may be depending on the location that more than one radio is used allowing the monitoring of Traffic and Log frequencies. Access to the radios should be restricted to avoid the potential of tampering or operation. Fixed radios, since they use larger well-positioned antennas can communicate with the aircraft earlier than a handheld unit. The heli-admin / Radio Operator should communicate with the aircraft on-route, if the HLO is not the first contact then at a suitable opportunity communication should be passed to the HLO to speak with the aircraft for confirmation the deck is clear.

When the handheld radios are not in use, they should be recharged so when they are used next, they are at full capacity. Handheld receivers, used by the HDAs will have a longer battery endurance compared to the HLO handheld unit which will use more power due it being able to transmit.

Radios should always be checked before aircraft operations, and the HLO / Heli-Admin/ CRO should conduct a radio check to ensure the transmission is clear and unbroken. This allows radios to be set at a suitable volume and the squelch facility set before the aircraft arrives. The HDAs with receiver-only handheld units should also check they hear speech and set the volume and squelch accordingly.

Spare radios should be kept offshore along with spare parts such as microphones, cases, batteries, headsets, and antennas. For ease, a complete spare radio should be available and ready to use.

Antennas for fixed radios require to be positioned in such a way as they offer the clearest unobstructed location to give maximum reception and transmission range. These antennas will be omnidirectional and matched with the transmitter. These also require regular maintenance checks using test equipment as the power and compatibility can cause issues and premature failure of the transmitter.

Radio repeaters should not be used in aeronautical frequencies. A radio repeater is an electronic device that combines a radio receiver and a radio transmitter to receive a signal and retransmit it over a greater distance, allowing two-way radio communications to go further.

15.4 NATS Repeaters

The distance a radio signal can be transmitted is limited, however signal coverage can be extended if a repeater system is employed. These repeater systems receive and rebroadcast radio transmissions on assigned frequencies extending the range of both the transmitting radio and the radio receiving. To extend the range of Air Traffic Control aeronautical communications, several offshore installations have equipment fitted for this purpose.

The National Air Traffic Services (NATS) is a provider of Air Traffic Control Services to fourteen UK airports. For supporting offshore helicopter operations, NATS has installed VHF TX/RX repeater units offshore on strategic platforms to maximise coverage.

There is a maximum of three repeaters per frequency, as far as possible strategically located to give good low-level VHF radio coverage where it is needed.

Some of these systems come under the responsibility of NATS / or designated third parties and should not be interfered with unless there is a specific request to investigate issues. Any such equipment should be marked as NATS equipment and a suitable contact number to call if there are issues.

If an installation is in the decommissioning phase, discussions should be held with NATS for removing the repeaters and relocation to another installation to maintain good aeronautical radio coverage in the area.

15.5 NDBs

A Non-Directional Beacon (NDB) is a system that allows an aircraft fitted with an Automatic Direction Finder (ADF) to indicate to the flight crew, the direction of the NDB relative to the aircraft. On selection of the NDB frequency, the compass card (or arrow) will indicate the heading to the station. An audible Morse Code call sign of one or more letters or numbers is used to identify the NDB being received. Details of the NDB are printed on the information plate issued by the HCA.

The NDB transmits an omnidirectional signal using an antenna that typically runs around the perimeter of a helideck through insulators, this is known as a Long Wire Antenna (see Figure 44). A whip-type antenna can also be used depending on the application.

CAP437 section 6.40 states "It should be noted, however, that the provision of an NDB on fixed installations, mobile installations, and vessels is not mandatory and use should be discussed with the provider of helicopter services to ascertain their needs.".

If an NDB is used, this requires an Ofcom-issued license to comply with the Wireless Telegraphy (WT) Act license and Air Navigation Order (ANO) approval.

Typically, NDBs have output power from 25 to 125 watts for reception up to approximately. 100 NM. The license issued by Ofcom will provide the frequency and power based on the geographical location of the helideck. NDBs would be powered from a UPS System and can be switched on or off at the request of the flight crew.

Duty Holders / Vessel owners should confirm with the Helicopter Operator(s) if they require an NDB for the helideck. If an NDB is not required, then a Management of Change process can be initiated to remove the system which will require the HCA to be notified, the update of relevant documents, cancellation of maintenance, and finally the surrender of the Ofcom Licence for the NDB.

Smaller NDB systems can also be installed in Wind Farms Offshore, which again will need an Ofcom License and an ANO approval. The need for a system should be discussed with the Helicopter Operator.

Figures 45 & 46: NDB Long wire Antenna mounted to Perimeter net frame and NDB control panel.

Source: Uncredited

Figure 47 shows the aeronautical radio frequencies as well as any NDBs with the NDB information. These require having valid Ofcom-issued licenses and ANO approvals for both aeronautical radio and the NDB. The information is critical to the flight crew to ensure and confirm they are tracking the correct NDB. The NDB frequency for MODUs, Jack-ups, and Vessels may change based on their location.

A guide to the frequency allocation can be found here along with CAA guidance:

EN-ROUTE CHARTS (nats.co.uk)

Figure 47: Communication frequencies and NDB assignment on an HCA-issued Information Plate.

HCA HELIDECK CERTIFICATION AGENCY

HELIDECK INFORMATION PLATE

Certificate Expiry Date: 07 May 2024

HELIDECK	VAR	POSITION	EGAG	
Elev **217 ft**	**0**	**N58 03.47 E001 04.78**	**Alba Northern**	

		VHF	NDB	Issue Date
HEIGHT OF INSTALLATION:	**381**	**Traf 123.555**	**340**	**04 Mar 2024**
HIGHEST OBSTACLE WITHIN 5NM:	**Top of Rig**	**Log 126.405**	**ARN**	

		Operating Company	Issued By
FUELLING INSTALLATION:	**Yes**	**Ithaca Energy**	**Helideck Certification Agency**
STARTING EQUIPMENT:	**Yes**		
HELIDECK D value:	**22.8**		
P/R/H Category:	**F**		
Max Weight:	**15.0t**		
Circle & H Lights:	**Yes**		

Source: The Helideck Certification Agency

15.6 Work Through List

Table 4: Communication Systems

Step	Description	Remarks
1	Ensure that CAP437 - Chapter 6 sections 6.38 to 6.42 and CAP413 Section 4 have been read and understood.	
2	Verify with the Helicopter Operator(s) if an NDB is required.	If not required, the system should be decommissioned.
3	Ensure the Aeronautical Station licence and ANO approvals are valid, and a check is in place for renewal. The nominated focal point to Ofcom is identified and receives correspondence from them. There are separate licences for Aeronautical Radio and NDBs (if fitted). The requirement for an NDB should be confirmed with the Helicopter Operator.	If the nominated focal point leaves the helideck operator's organisation the paperwork with Ofcom & the CAA is required to be updated with a new focal point.
4	Ensure that Performance Standards Exist and that Planned Maintenance routines provide assurance of meeting the standards. It is expected that all parts of the communication systems are defined as SECEs. The relevant Technical Authority / SME should be nominated as the System Owner.	This will require a process that if a failure occurs that cannot be resolved immediately, it is escalated, and the appropriate notifications are issued to the HCA.
5	Ensure that COPIES of the Aeronautical Licence(s) and ANO approvals are visible on the Installation/Vessel noticeboard.	
6	Ensure all personnel who operate on the assigned aeronautical frequency have CAA-issued ROCC-OCS certificates	CAP437 Section 6.39
7	Ensure the location of fixed Aeronautical Radios is controlled and cannot be interfered with.	
8	Ensure the HLO has a Transceiver and associated equipment (headset, PTT, radio harness/belt)	Spare radio/parts should be held offshore
9	Ensure HDAs have receiver units only and associated equipment (headset, radio harness/belt)	Spare radio/parts should be held offshore
10	Before the helicopter arrival a radio check should be carried out to check the transmission frequency, volume and squelch have been set.	
11	Ensure there is a method for recharging radios after use	

Source: OEUK

15.7 Radio Messages

As detailed in CAP437 section 6.20 (which references this manual, this document details radio messages between the aircraft and installation/Vessel. CAP413 defines the phraseology that is used when communicating with an aircraft, along with the use of the phonetic alphabet and pronunciation of numbers. Sections 4.155 to 4.161 should be referred to as the format of the communication for offshore stations.

The Radio Operator should have a prompt card in view detailing the Callsign of the station and the callsign of the helicopter being managed. Having such information allows consistent communication without hesitation whilst recalling the flight callsigns etc.

The aircraft should initiate the radio communication dialogue, this will fit in with the aircrew workload and they may give information that should communicated e.g., fuel required or changes to the routing.

The Radio Operator should prepare each message based on the information available from the Meteorological System and HMS (if the deck is moving). Also, information for passenger numbers, weights, fuel stocks, etc should be on hand to allow free-flowing information to be passed to the helicopter crew having to source the information.

Once a helicopter is on the installation/vessel frequency, the Radio Operator should not leave the radio unattended until the service is terminated through a change of frequency to another service or installation/vessel by the helicopter crew.

To encourage standard radio transmissions from installations, MODUs, and vessels, the following message lists compiled by HCA provide a preferred order for operational information to be routinely transmitted to flight crews.

15.8 Normal Radio Operations Procedures

It should be noted that the term Radio Operator refers to the person operating the radio which could be Heli admin rather than a dedicated position.

When an installation (fixed or mobile) is expected to receive a helicopter, the Radio Operator should send a weather status report to the Helicopter Operator to arrive no later than one hour before the scheduled take-off time.

For all offshore flights between manned installations and vessels, the Radio Operator at the helicopter point of departure should establish positive contact with the destination installation/vessel immediately following departure of the helicopter conveying the relevant flight details such as persons onboard and estimated time of arrival. However, in cases where in-field shuttle sectors have short flight times, radio contact with the destination installation should be established just before helicopter departure and be maintained until touchdown on the next helideck.

Nearer to the estimated time of arrival (ETA) of the helicopter, the Radio Operator should monitor the appropriate radio frequency and have available, in expectation of a request from the incoming helicopter, the current weather in the helideck vicinity and details of any routings and load requirements.

When communications are established between the helicopter and the installation, the ETA should be noted, and the helideck crew placed on standby to receive the helicopter at the stated ETA.

Once advised that the flight watch is now placed with the installation or vessel, the Radio Operator will be responsible for passing information on all other aircraft known to be operating in the area (e.g., any aircraft that is using the same aeronautical frequency). The Radio Operator will also be responsible for providing an alerting service until the helicopter flight crew advises two-way communications have been established with another agency that has taken over the flight watch. Having accepted the flight watch, the Radio Operator should:

- Ensure two-way communications with the helicopter flight crew are always maintained during flight and helideck operations.
- Effect communications handover to the Helicopter Landing Officer (HLO) in sufficient time before the helicopter makes an approach to land (e.g., at least 5 minutes) and maintain a listening watch.
- On final approach, the helicopter flight crew should call the HLO to obtain deck clearance (i.e., approximately 5 minutes before ETA or any revised ETA). In the event, the HLO fails to respond to the flight crew, the Radio Operator should intervene and contact the HLO requesting him to contact the helicopter.
- The HLO should inform the helicopter flight crew that the 'deck is clear for landing'.

If the helicopter does not land within 5 minutes of the ETA, and two-way communication is lost such that the aircraft's position cannot be established, then alerting action will be initiated by their organisation's 'emergency procedures'.

Once the helicopter has landed at the installation, an arrival message should immediately be entered in Vantage.

Before take-off, the flight plan and load details will be passed on by the helicopter flight crew and should be copied and read back for confirmation.

Note: The flight plan details will form the basis of the departure The load details are required to be recorded and retained for 28 days.

On take-off, the 'lifting call' by the flight crew should be acknowledged by the Radio Operator and thereafter an alerting service will be provided until the helicopter flight crew advises two-way communications with another agency, and that flight watch has been transferred to that agency.

Immediately after the helicopter takes off, the departure time is required to be entered in Vantage.

16 Helideck Lighting

16.1 Helideck Perimeter Lights

CAA CAP437 Section 4.19 and Appendix C detail the requirement for perimeter lights.

The use of perimeter lights requires that the height, intensity, and crew viewing angle are suitable for use. The height permitted for the lights is dependent on the size of the helideck. For any helideck where the D-value is greater than 16.00 m the perimeter lights should not exceed a height of 15 cm above the surface of the helideck. Where a helideck has a D-value of 16.00 m or less the perimeter lights should not exceed a height of 5 cm above the surface of the helideck.

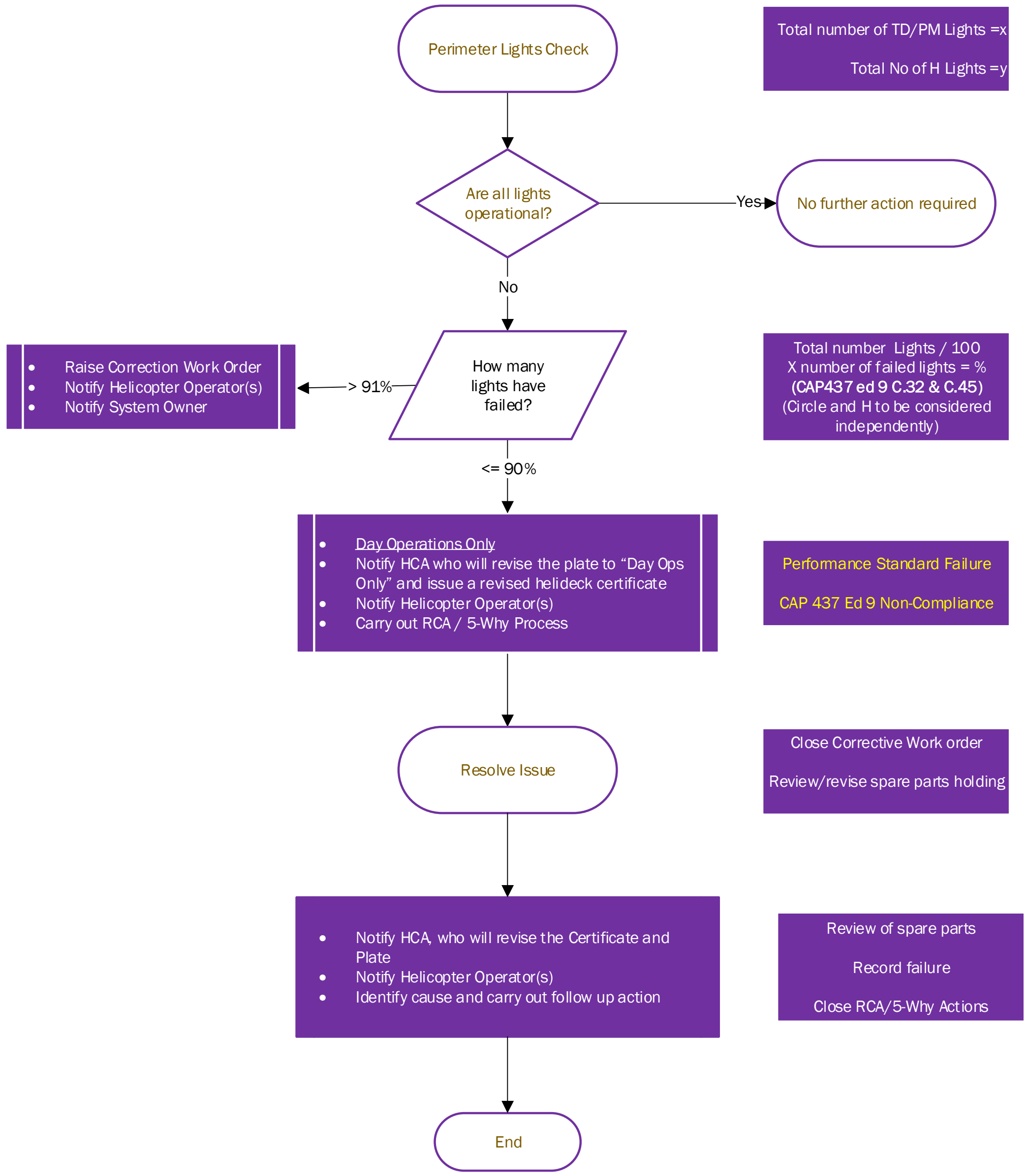
Figure 48: Helideck Perimeter Lights

Source: Uncredited

The intensity of the perimeter lights should comply with Appendix C parts C.17 and C.18

One key point about the perimeter lighting is at night when a helideck is not in use, and to mitigate the possibility of a 'wrong helideck landing' on an unsafe helideck, the lit touchdown/ positioning marking should be extinguished. However, green perimeter lights may remain 'on' so that, in an emergency, the outline of the helideck can be distinguished from the air.

Figure 49: Perimeter Lighting Check



Source: OEUK

16.2 Circle / H Lighting

In 2018, under a CAA Safety Directive. Illuminated TD/PM & H mandatory for all-night deck landings. This new lighting scheme required that the TD/PM Circle and H themselves be lit. This new lighting scheme eliminates the 'black hole effect' and glare from previous lighting solutions such as floodlights. It is much easier for pilots to perform safe touchdowns in poor visibility conditions.

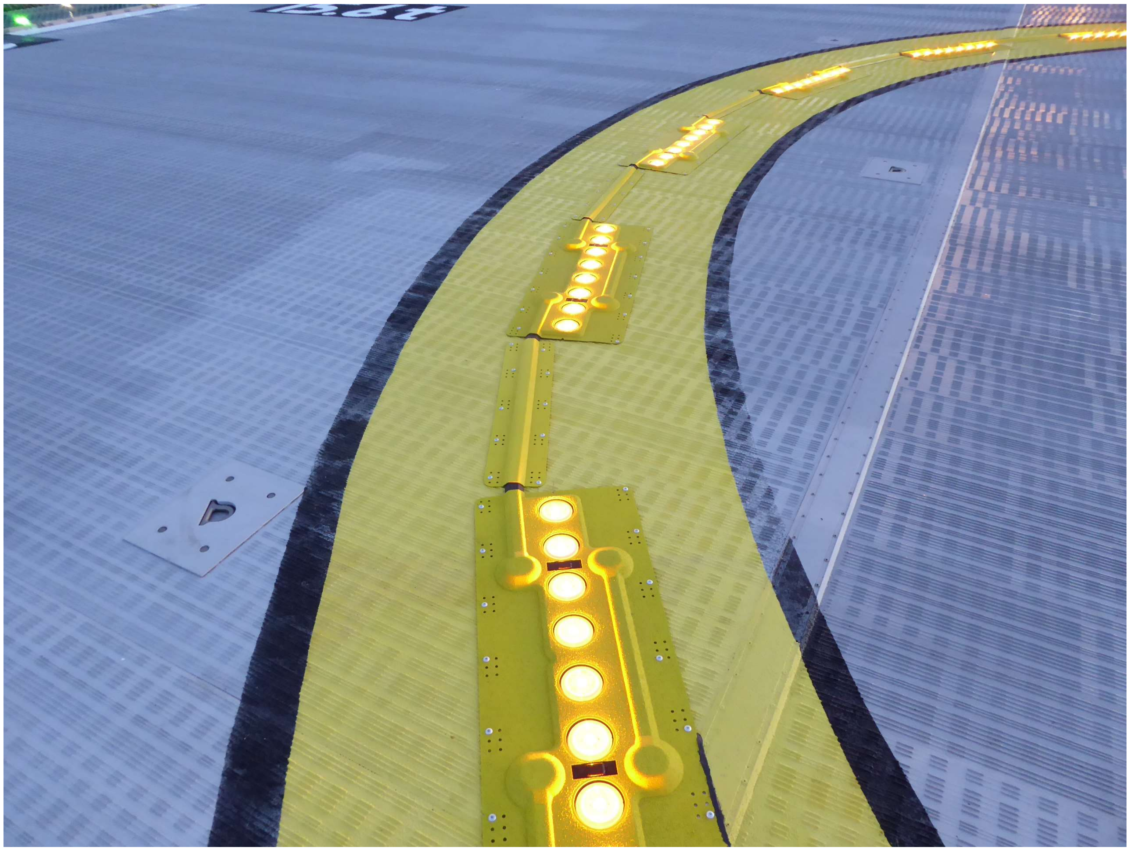
The location of these lights means direct exposure to the elements and firefighting equipment testing. It is recommended that the frequency of maintenance is increased rather than defaulting to perhaps Ex inspection frequency which can be a minimum of every two years. Several Duty Holders have reported issues with the lighting due to exposure that may have been caught earlier had they been inspected more frequently.

It is strongly recommended that spare lighting units and materials required to facilitate a replacement of failed units are held.

Figure 50: Circle and H Lighting at night

Source: Pharos Marine Automatic Power Ltd

Figure 51: Circle lights installed on the helideck.



Source: Uncredited

Any lighting system being installed is required to be CAA-approved and HCA-accepted. Information from the CAA can be found here:

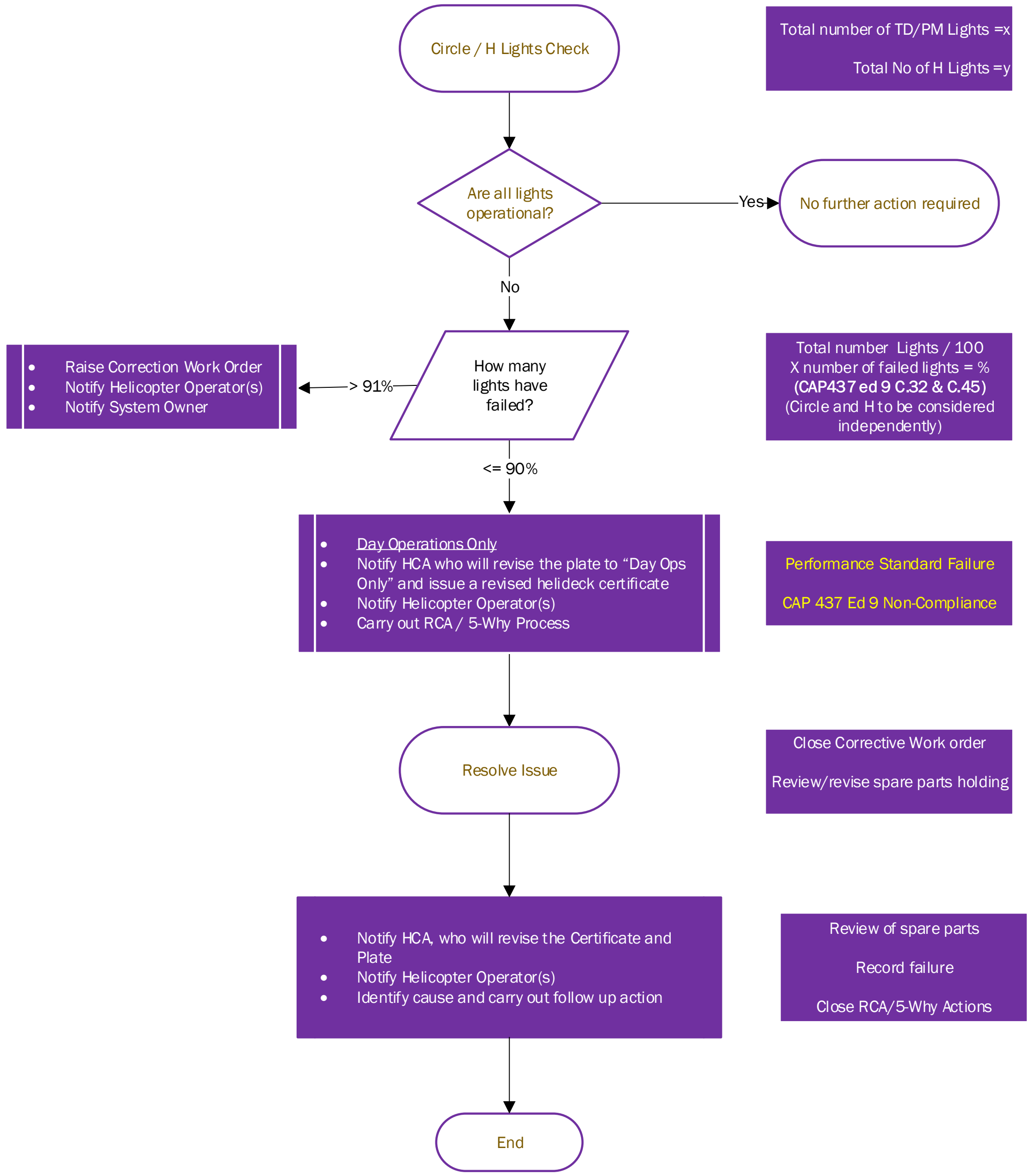
Helipads and Helidecks | Design Reviews, Technical Advice (caainternational.com)

The lighting system can take two forms:

- Direct installation onto the helideck
- Use of netting with lighting installed on the netting.

Lighting installed in netting requires to be inspected on Installation, and after 6 months then annually thereafter to check things like tolerances for movement around the helideck. The annual check should be prior to the start of the night flying season, i.e. within 3 months prior to 31 October.

Figure 52: Circle and H Lighting Check



Source: OEUK

16.3 Helideck Status Light

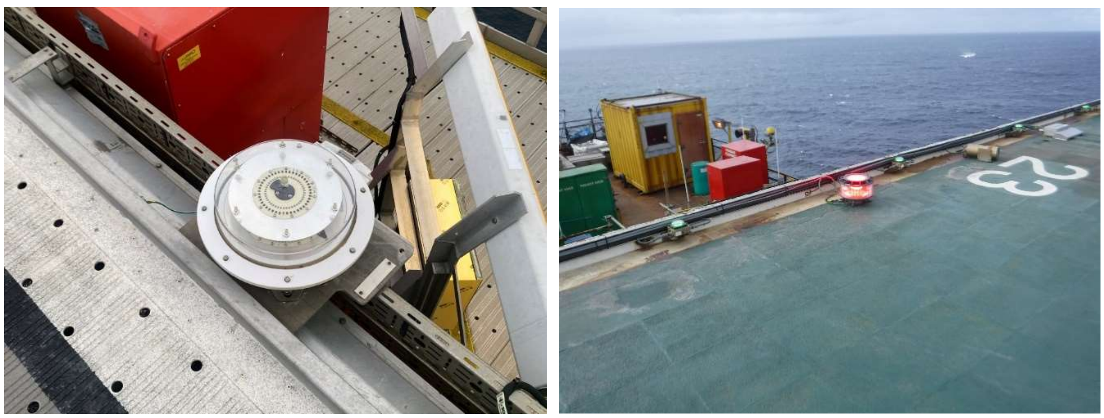
CAA CAP437 details the requirements for a Helideck Status Light in Appendix J. Installations, MODUs, and vessels (when appropriate to the type of operations being undertaken) should be equipped with a Helideck status light system.

The CAA has produced a specification for a status light which can be found here:

CAA Paper 2008/01: Specification for an Offshore Helideck Status Light System | Civil Aviation Authority

The purpose of this system is to provide a high-intensity '**international red**' warning signal (**flashing** red light) to flight crews when conditions on the installation, MODU or vessel helideck are unsafe for making an approach to land. The best course of action may be for the helicopter to depart. The decision is the responsibility of the helicopter commander.

Figures 53 & 54:Helideck Status lights installed on the Helideck.



Source: Uncredited

The location of a Status Light requires to be carefully considered as under the PFEER Regulations a flashing beacon indicates the presence of Toxic Gas. On installations and MODUs this is also a red flashing light. The PFEER Regulations state *"139 In addition, Duty Holders should ensure that there is no conflict or possibility of confusion between such lights and those provided in compliance with regulation 11(2)(a) for general platform, prepare to abandon and toxic gas alerts."*

The Helideck Status light may be operated from a safety system such as an Emergency Shutdown System, Fire and Gas System or ICSS system. The Duty Holder should ensure the design is considered in any functional safety design which will include how these are initiated (manually and automatically), tested and if required overridden. CAP 437 3.38 also suggests that if a laser bird deterrent is employed, then the status light should be operated when the laser is in use.

CAP 437 Appendix I covers operations to a Normally Unmanned Platform (NUI) in an abnormal state, in an alarm state, or having been in an alarm state.

The Duty Holder and The Helicopter Operator are required to submit a form (In Appendix I) to the HCA when an abnormal state is encountered. The flowchart in this section should be followed to determine if a flight is safe to undertake.

16.4 Helideck Obstruction Lighting

CAA CAP437 Sections 4.31-4.36 detail the requirements for Obstruction lighting. Section 10.32 should also be considered.

Obstruction lights are required to be installed on the highest point of the derrick, crane boom, crane cabin and other fixed obstacles on the installation, which may represent a hazard to flying, and are required to be marked with red LED warning lights. The lights are required to be visible from all directions.

Figure 55: Obstructions lights on a crane and boom

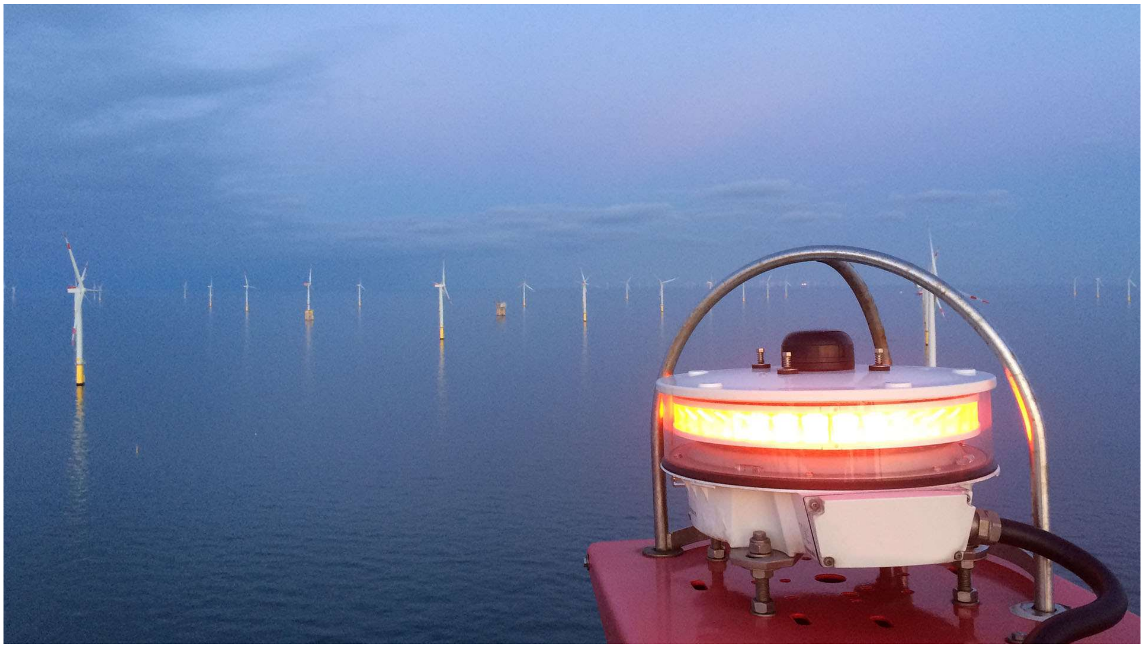
Source: Uncredited

Consideration should be given to the location of the lights and how these can be maintained. It is good practice to have enclosures with a high IP rating and lighting such as LEDs which give a long service life. Some products are available with two separate lighting circuits for redundancy.

The flare stack may require to be floodlit, as obstruction lighting on flares is limited to the Hazardous Area Certification conditions, as radiated heat from the flare may invalidate the EX-certification.

Any options for illuminating a flare should be agreed between the helicopter and the HCA.

Figure 56: Obstruction light on a wind turbine



Source: SABIK

Where the drilling derrick or flare stack requires lighting. Consideration should be given to access for maintenance, in some cases, it may be an option to install a twin light system which may reduce the need for immediate intervention if one of the lamp units fail.

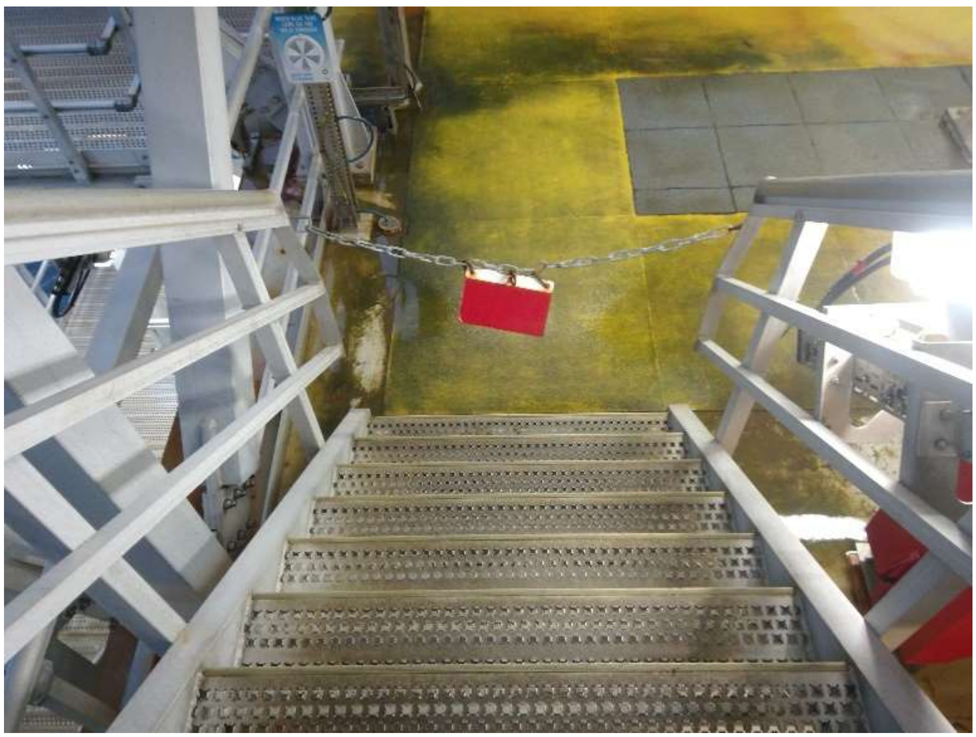
17 Helideck Control

Access to the helideck is required to be controlled at all times. To restrict unauthorised entry to the helideck, each access stair should have either frangible "no access" chains or removable barriers fitted with a suitable warning notice

The chain should be red and white or Yellow and of Black plastic construction. This allows the chain to be broken easily in an emergency. If any other materials or methods are employed, then ease of access/egress in an emergency should be considered.

The safety chains also are used during helicopter operations to prevent access to the helideck on unused access routes if the helideck has multiple access points.

Figure 57: Helideck Access Safety Chain



Source: Uncredited

18 Helideck Surface

The surface of helidecks varies based on the age of the installation vessel, newer helidecks can be made from aluminium and have a passive fire-retarding system which works by allowing burning fuel to pass through holes in the decking at a rapid rate, immediately retarding and extinguishing the fire using the thermal properties of aluminium.

A full-perimeter drainage system ensures that liquids are channelled, sub-surface, from Heli-decking to a suitable drain. Spilt fuel is quickly and safely drained away unburned and any remaining vapour burn-off can be extinguished in seconds with minimal water spray.

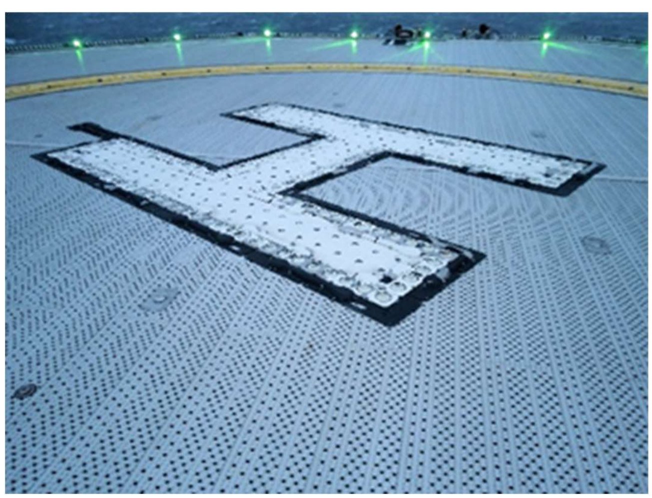
The surface of the helideck and structure should be always protected, if the helideck is used for a purpose, other than for aircraft take-off/landing, then in the first instance the HCA should be notified before any work is undertaken.

Typically with HCA input, there will be a requirement for undertaking a structural inspection. Examples of work activities where a structural inspection is required before flying activities resume are:

- MODU, Jack up, FSU etc is in port/drydock for maintenance and the helideck has been used for additional deck cargo space or office/welfare containers.
- Use of the helideck when conducting operations such as flare stack replacement using a helicopter. The helideck is often used for preparing the lift which requires that the flare be dropped to the helideck having arrived by vessel or has been carried out as an underslung load and landed on the helideck.
- Use of the helideck on FPSO/FSU/Vessels where a Walk to Work vessel gangway uses the helideck as a landing point.
- Crane maintenance where the boom has been lowered onto the helideck.

On completion of the task, results from the structural inspection should be sent to the HCA. The helideck may not be used until the HCA has approved its return to flying activities.

Figure 58: Helideck surface with passive fire retarding holes



Source: Uncredited

Older helidecks tend to be steel plates coated in either a suitable friction paint or tiles. Where the friction surface is poor or the deck has motion, helideck netting is required to be installed (see section 17.2)

Figure 59: Conventional metal plate deck with friction surface applied.

Source: Uncredited

18.1 Helideck Markings

Helidecks in the UKCS are required to be marked in accordance with CAP437, sections 4.7-4.18 should be referred to.

This is especially the case if the helideck is on a vessel which is entering the UKCS from overseas where the markings may not be suitable for helicopter operations. Before being brought into service, the HCA will conduct an inspection, and if acceptable will issue a certificate either in full or with limitations.

The markings give the flight crew visual cues for landing on the deck, the main being the helideck/vessel name as there have been occurrences in the past of helicopters landing on the wrong installation. The markings show the TDPM area, the obstacle-free sector (OFS) of 210 Degrees, the maximum weight and D value.

Keeping the helideck in good condition can be a challenge with the effects of bird guano and the ageing of the helideck surface. A regular inspection regime should be set up and any areas of coating degradation addressed. Repair of these surfaces requires careful planning. The friction of the surface is required to be within limits meaning that repairs to the helideck typically come under fabric maintenance campaigns using approved materials such as paint and tiles.

18.2 Helideck Netting

CAP CAP437 section 3.45

A helideck net may be used where there is insufficient surface friction provided that an average surface friction of at least 0.5 is achieved across the area inside the TD/PM and outside the TD/PM. This also applies to the paint markings unless TD/PM circle and 'H' lighting are installed. Netting may incorporate a Circle and 'H' Lighting system. Where this is the case, net position reports should be submitted by the helideck operator on the installation of the net, then 6 months after installation and then annually prior to the start of the night flying season.

If the system is installed in the netting, then a Net Position report is required to be submitted by the helideck operator at least once per year to the netting OEM on installation and after 6 months. If the netting is lifted for a friction test, then the report is required to be resubmitted as this is technically a re-installation.

The tolerance of netting, when installed, should factor in the position of helideck items such as TDPM lighting and tie-down points.

The net is required not to obscure any markings on the helideck such as the Installation name, t value etc and not exceed 25mm in height. The net tiedown points should not be the same tiedown points used to secure aircraft shutdown on the helideck.

Landing nets should not be fitted on a solid plate helideck where a deck-integrated fire-fighting system (DIFFS) is installed which is detailed in CAP437 section 5.19.

The net requires to be tensioned regularly. The helideck operator should consider how this is initiated and findings recorded, typically in a Planned Maintenance Routine.

18.3 Friction Testing

Friction testing measures a friction coefficient. The fiction coefficient (µ) is a measure of the grip between the wheels of the helicopter landing gear and the surface of the helideck. The coefficient of friction refers to the ratio of the frictional force (F) resisting the motion of two surfaces that are in contact with the normal force (N) that is pressing the two surfaces together. The frictional force and the motion of the object are in opposite directions.

The coefficient of friction is represented as $\mu = F/N$. The coefficient of friction is dimensionless because both F and N are measured in units of force (e.g., newtons or pounds).

CAP 437 Section 3.40 details that Helidecks are divided into the following two types:

- Flat helidecks
- Profiled helidecks

The test regime is different for each type, CAP437 section 3.37-3.45 and Appendix G should be referred to. Friction is tested using a specialised friction tester unit that comes with user software for analysing friction surfaces. The unit is normally shipped out by the company undertaking the work and the calibration date of the tester should be well within the calibration expiry date. The unit is normally shipped out by airfreight, so when this is required, a check should be undertaken that the battery MSDS is available and that it complies with procedures for shipping equipment with batteries.

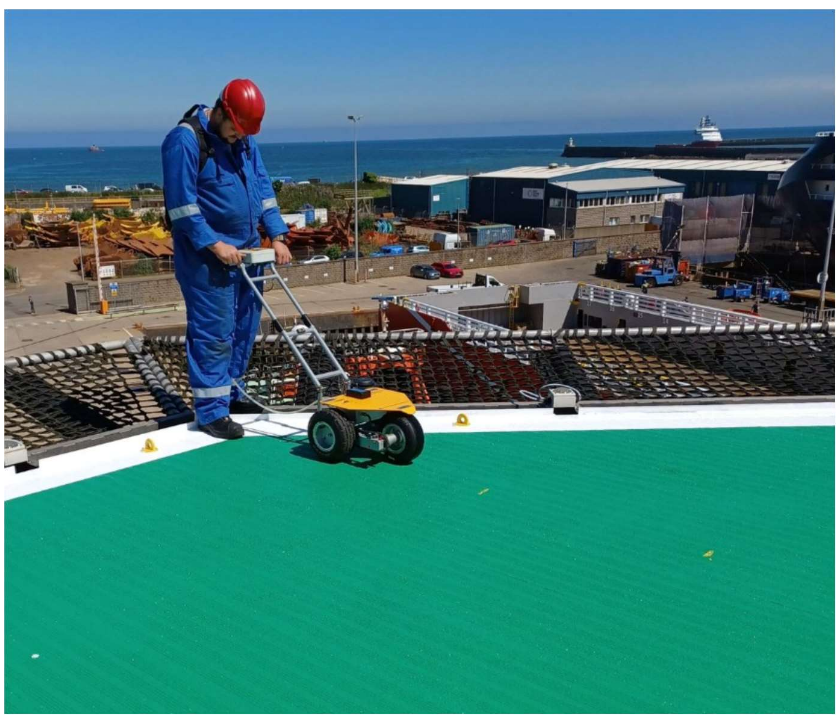
Training and Competency in using the equipment requires not only the user to be trained and experienced with the equipment but also the method for testing the different types to be understood and applied. Some decks should only be tested in one direction, therefore before any testing takes place a full method statement for undertaking the work should be developed and checked. Often failures on friction tests can be attributed to the user not understanding the equipment or helideck testing requirements.

Scaling factors will need to be applied when testing profiled helidecks. Scaling factors are provided by the helideck manufacturer, and if not available, CAP 437 section 3.42 suggests contacting the CAA and/or the HCA.

The minimum average surface friction value that should be achieved, the limiting value is related to the threshold at which a helicopter would be expected to slide on a helideck. From CAP 437 section 3.39, the acceptable friction factors are detailed in Figure 62.

When testing is carried out, the helideck should be marked with chalk to provide the 1-metre test lines for the tester for reference (visible in Figure 60). From there, a report will be generated which shows graphically the results of the test once completed. The results should be interpreted based on the report which would be overlayed onto a helideck general arrangement to identify the areas that require attention. CAP437 section 3.37 – 3.46 should be referred to. Parking areas (if available) should also be tested.

Figure 60: Testing the friction of a helideck



Source: Swire Energy Services

As part of the helideck certification process, the HCA may request information relating to the friction test to ensure the results and details of the tester can be checked.

IMPORTANT NOTE: Untreated Aluminium helidecks have a different requirement. An untreated aluminium helideck receives a one-off approval where no further in-service monitoring or testing is required providing this has been accepted by the HCA. This is due to a helideck sample having been tested using an actual helicopter wheel and tyre, measurements are taken during the test which simulates reality as closely as possible. The test is shown in Figure 61. These tests typically result in lower friction values than using a grip tester measurement. A treated deck will have a layer of suitable non-slip paint or be grit blasted to aid friction. These helidecks require testing annually.

Figure 61: Testing the friction coefficient on a sample of a helideck surface.

Source: NLR – Royal Netherlands Aerospace Centre

Untreated helidecks should not be painted, or the surface stripped without consultation of the Helideck OEM and the HCA. The render's original measurements which permitted the one-off approval to be invalid will require to be retested and then annual tests in line with treated helidecks.

Helideck Operators can prepare for friction testing in the following ways:

- Consider the time of year the testing is carried out.
- Ensure the deck is clean and guano etc has been cleaned off.

The pass/fail criteria are determined by CAP437 3.41 which details "*NOTE 1: No two adjacent (side-to-side; corner to corner is acceptable) 1 m squares should achieve less than the average surface friction value specified in paragraph 3.39 above, except within the TD/PM circle where TD/PM circle and 'H' lighting is installed.*"

If one-metre areas that have reduced friction are in contact diagonally, this is not a failure. If the areas are in contact along any side, then it is a failure. Refer to Figures 63 & 64 as an example.

The friction test company will produce a report of the test with any recommendations included. As part of the Helideck certification process, the HCA may require a copy of the report.

Figure 62: CAP437 Friction requirements

Table 3: Friction requirements

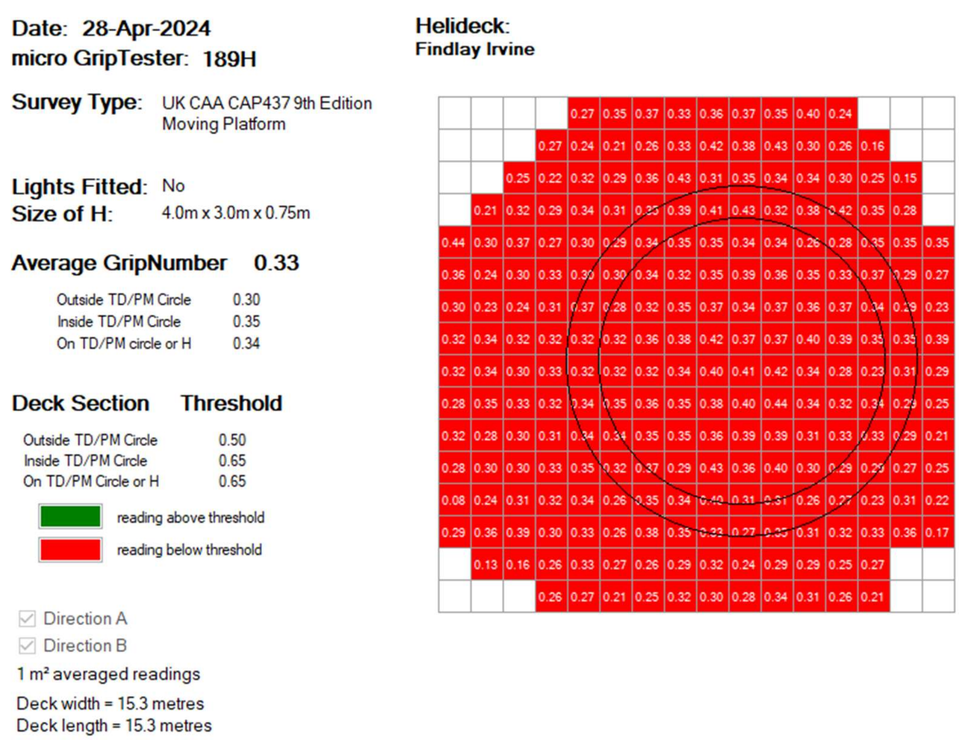
Section of helideck	Fixed helideck	Moving helideck
Inside TD/PM circle	0.6	0.65
TD/PM circle and H painted markings	0.6	0.65
Outside TD/PM circle and parking areas	0.5	0.5

NOTE: Unless fixed to the sea bed (e.g. a jack-up on station), the helideck on any installation requiring a helideck monitoring system (see paragraph 6.7) should be regarded as a moving helideck.

Source: CAA

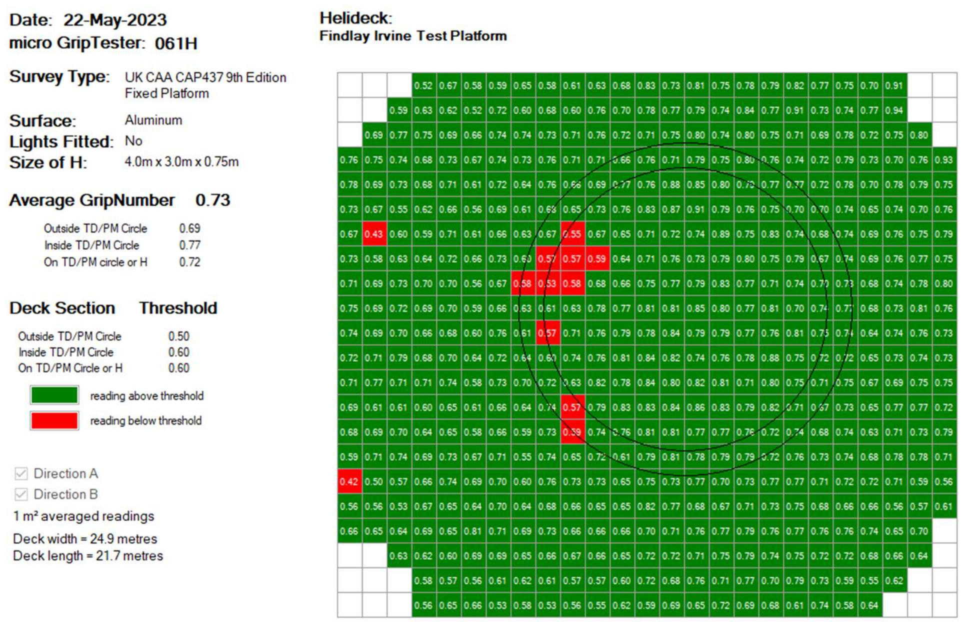
The results from the friction test software are colour-coded to indicate the friction values. The colour coding is shown in Figures 63 & 64 along with the test results. Typically, only red and green colours are used.

Figure 63: Results from a friction test – Fail



Source: Findlay Irvine

Figure 64: Results from a friction test – attention required.



Source: Findlay Irvine

19 Helideck Perimeter Safety Net Design, Fabrication, inspection, and Testing

The perimeter safety net around a helideck is to contain personnel falling into it. It should be constructed in such a way that when personnel fall into it they do not suffer injury. CAP437 sections 3.50 to 3.51 should be referred to.

A key point to highlight is that in CAP437 it states "***NOTE 1:*** *It is not within the scope or purpose of CAP437 to provide detailed advice for the design, fabrication, and testing of helideck perimeter nets. Given the responsibility rests with the Duty Holder to ensure the net is fit for purpose and is subjected to a satisfactory inspection and testing regime".*

The Perimeter Netting is not always classed as a SECE. The role of the netting is to prevent a single individual from falling off the helideck, which does not meet the requirements of a MAH. It should be considered that helideck perimeter netting and supporting steelwork are part of the helideck structure. Therefore, it should be part of the Performance Standard for the helideck structure. Having an appropriate Performance Standard applied ensures that the netting requires Safety Critical Maintenance undertaken. A failure of a SECE will require a defined contingency action to be initiated.

The design of helideck perimeter safety nets on offshore installations and vessels covers a wide range of different supporting structures, net support frame arrangements, netting materials, and fixing methods. The selection of materials should be considered to ensure that any replacements or retrofitting of new netting systems do not fail due to material incompatibilities or compromise any net flammability requirements. The Duty Holder/Vessel owner should engage in engineering processes, which will utilise structural expertise and standards as part of the process. In addition to this, the HCA should also be included in the design review process.

Figure 65: Perimeter net with NDB Long wire Antenna underneath

Source: Uncredited

There is no specific Helideck Perimeter Net standard, in the absence of this, BS EN 1263-1 and 2 have been used as a basis for perimeter nets. This Standard is for Safety Nets.

Any repair and/or modification of existing helideck perimeter safety net arrangements should follow the design requirements that all new offshore helideck designs are built against. Should there be missing or damage to the netting system which requires repair, the HCA has issued guidance on how to address this along with limitations which can be found here:

HCA-RP-004-Rev-01-Damaged-or-Missing-Helideck-Perimeter-Net.pdf (helidecks.org)

Some helidecks in place of netting have a solid surface, this arrangement would not be suitable due to the inability to flex like netting which creates a hammock effect in the net to arrest movement. The mesh net can also be gripped by a person falling onto it which would not be possible with a solid surface. Some other helidecks may have netting sitting above the solid surface which would require to be checked and inspected as being fit for purpose and acceptable to the certification organisation.

It has also been identified that several helidecks in the UKCS have no perimeter netting and instead have a perimeter walkway below and around the helideck. This should not be the norm and such designs are treated on a case-by-case basis. These designs originated from the overseas Duty Holder's own Engineering Specifications and standards. To use these designs in the UK, additional processes are required to be accepted using a risk assessment to justify the deviation away from accepted UKCS requirements. The risk assessment should be revisited through various stages of the design and lifecycle to ensure that this type of design remains fit for purpose. The HCA should be contacted at the earliest opportunity to ensure that when certification is sought, there is no delay due to insufficient design information.

19.1.1 Netting System

It is important to understand that once a netting system has been installed, there is a requirement to inspect and test the netting including the support steelwork periodically. Visual inspections alone are not sufficient as a test. Consideration should be given to ensuring the weakest part of the netting system (e.g. clips for connecting the netting to the panel) are also included in the inspections and tests.

Once installed, current perimeter safety net designs are often difficult to maintain and may be inaccessible for testing. This alone makes them vulnerable to failure through difficulty to access. Ideally, a perimeter safety net system should be designed so that it is divided into manageable sections that can be easily retracted or lifted inboard (hinged or removable) to permit maintenance and/or panel replacement from the helideck surface, without requiring external access (e.g., scaffolding or Working at Height Technicians).

Experience has clearly shown that any netting system employed in the offshore marine environment should have a finite life applied to ensure that it retains its capability to arrest and restrain a falling person without breaking and without causing injury. Designers should therefore consider OEM data for the operational life of the netting assembly that is consistent with the materials used. The recommended component 'life' should be validated using OEM or vendor test data, subject to specified periodic visual condition inspection for deterioration due to physical or other damage (e.g., corrosion).

For existing netting systems on offshore installations, at the first opportunity Duty Holders should consider the above criteria and apply an "interim" component life having carried out a thorough physical condition inspection and obtained suitable data (e.g., representative net sample testing) to verify the findings. The age and specification of existing netting systems should be taken fully into account when concluding that an "interim" life can safely be applied.

19.1.2 Materials Selection

19.1.2.1 Support Structures and Fixings

A safety net support assembly and its fixings to the helideck primary structure should be designed to withstand the static load of the whole support structure, the netting system, and any attached appendages (e.g., NDB antenna) plus a 100 kg load imposed on any section of the netting system (equivalent to a body falling onto the net from helideck level).

Applying BS EN 1263, safety nets are required to absorb a minimum of 2.3 kJ of energy. Energy can be related to the mass of an object and the height that it is dropped from via the formula PE grav. = mhg.

Where:

- PE grav. = Gravitational Potential Energy
- m = Mass of the object
- h = Height
- g = Gravitational field strength action upon the object (9.81 m/s^2)

As an example, if a mass of 100 kg is dropped from a height of 1.18 m, the drop energy would be 1.16 kJ. Applying a safety factor of two, the drop energy would then be 1.16 x 2 = 2.3 kJ.

Although the above example references a mass of 100 kg, Duty Holders should consider their own criteria and set their energy requirement accordingly. For example, if the mass of a person is instead 125 kg (which may be based on an industry or operator's requirement), then re-calculating the drop energy with the same 1.18 m fall height and safety factor of two results in an increased energy requirement of 2.9 kJ.

The selection of material type and the sections used for supporting structures and fixings remains the choice of the structural designer but should be compatible with the netting and framing systems employed.

Netting materials should be purchased and tested against recognised industry standards such as BS EN 1263-1 & 2. The standard provides useful information for testing Helideck Perimeter netting.

19.1.2.2 Netting

Any netting or mesh material (e.g., nylon or polypropylene fibre, steel cable, plastic-coated steel, or stainless-steel mesh) may be considered suitable providing it retains sufficient strength and elasticity to withstand the imposed loads.

Netting systems should also be selected for their suitability for extended operations in a marine environment and should take full account of chemical compositions that may cause deterioration when exposed to ultraviolet (UV) light, firefighting foam compounds (e.g., AFFF) and bird guano.

It is recommended that a single material netting is used so that only one material is tested annually. It is not good practice to have multiple materials and/or designs on a perimeter netting system.

Methods of net construction should include a proven system (e.g., mesh crossings, edge attachments, restraining ferrules, etc.). If a securing cable is damaged it may be able to be easily replaced without replacing the entire net panel. A break in a chain link net will render the entire net panel unserviceable.

Methods of net attachment to the framing system should ensure the continued security of the netting and, in the event of damage to a portion of the attachment system, the net panel remains fit for purpose.

The net manufacturer may state that the net has a warranty of 5 or 10 years. What isn't taken into consideration is that influencing factors such as poor installation or movement through wind/rotor wash of the netting cause premature wear and failure. BS EN 1263 states annual inspections of netting.

It is recommended that any net installation is carried out by a specialist vendor or a trained and competent team. Following the installation of new netting, the HCA is required to be informed and may require additional paperwork from the installation.

Figure 66: Steel Wire helideck Perimeter Safety Net

Source: Dropsafe

19.1.3 Inspection

Periodic formal Inspections should be undertaken by an appropriately trained, competent, and independent inspector. The perimeter netting should be part of the daily HLO checks, where the HLO will have awareness training on the inspection of perimeter netting. The frequency of inspections would be defined using OEM information and applying the appropriate maintenance strategy from the CMMS and the guidance in BS EN 1263 which states annually.

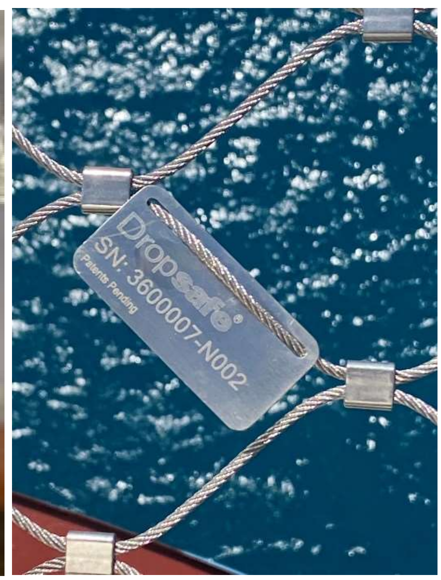
All panels should be given a unique, tamper-proof, weather-resistant security tag or plate, as shown in Figures 67 & 68. The latest test certificate should be available and kept at the helideck location. This aids in the identification of when the next annual inspection is due. This inspection should be undertaken by the specialist netting vendor or a trained and competent person. The net should be issued with a CMMS tag number recorded on the net for historical tracking and Planned Maintenance Routine (PMR) activities.

The inspection should check the netting systems for corrosion, loose bolts on stretcher bars, untidy & dangerously protruding edge knuckles and barbs of chain link nets, cuts, abrasions, fraying and broken stitching on tape and rope nets, UV & bird guano degradation.

The netting security and condition of the support frame, and any visible signs of corrosion will need to be investigated further and resolved if required. This should be able to be done safely with details on the PMR including a pass/failure criterion.

The visual condition of the supporting frame may show signs of corrosion but equally could be structurally sound. It is important, therefore, to ensure that there is a process in place to have structural inspections carried out periodically by a suitable specialist.

Figures 67 & 68: Perimeter Netting Inspection Tag / Serial Number Tag

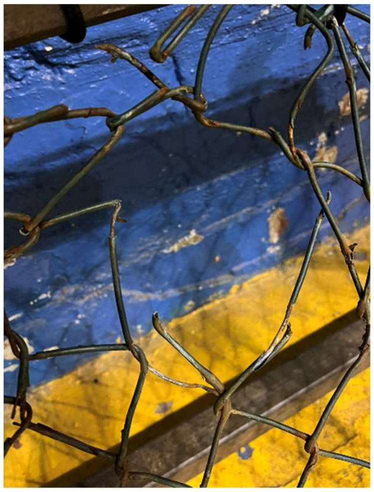


Source: Allied Perimeter Safety Netting Ltd / Dropsafe

Should a panel be required to be taken out of service, it should be considered that the panel may be custom made so a replacement option may not be immediately available. A procedure on how to do this including an appropriate risk assessment to avoid exposing the person undertaking the repair and helideck users to the risk of falling from height will require to be undertaken.

Infrequently visited NUI helidecks mean that periodic inspections could be unachievable. In this case, Duty Holders should arrange to visually inspect the condition at the start of each visit and, if manned for an extended period, weekly thereafter.

Figures 69, 70 & 71: Examples of netting requiring resolution or further investigation/monitoring.



Source: Allied Perimeter Safety Netting Ltd

19.1.4 Testing

There are three types of testing employed in Helideck Perimeter Netting.

- Drop Testing – Using a set load/mass dropped from a specified height.
- Tensile Testing (Proof Test) – Using calibrated test equipment.
- Tensile Testing (Ultimate Tensile Test) – Using calibrated test equipment.

It is important to highlight that the tensile testing methods of testing rely on testing sacrificial panels and strips which are in the same area as the main perimeter net assembly. This provides a representative sample of conditions where exposure to UV, Bird guano etc has occurred. It is not acceptable to send in test strips and samples from unused panels that have been kept in a store.

Tensile testing only tests the net sample strips, the entire netting system along with the structural framework and net fixings still requires having a suitable inspection program to ensure it is capable of withstanding the designed load.

Drop testing requirements will typically be in kJ, and Tensile testing will be in kN. It is important that the test methods and ant certificates that are issued capture the correct testing engineering unit. It may also be down to the helideck operator to state the minimum acceptable test figures that are required to be achieved. This data may come from the company's internal standards along with net OEM information.

Figure 72 & 73: Perimeter Netting showing Test Strips (kits) used for testing.

Source: Frictape Net Ltd / Dropsafe

In the event, that no sacrificial panels exist, and the panels are tested onshore, then a replacement panel is required to be fitted to allow the removed panel to be returned to the OEM / Test facility for testing without compromising the operation helideck.

If the netting has no sacrificial strips, then the netting should be replaced to ensure there are sufficient strips for the lifecycle of the netting to allow annual testing to take place.

Figure 70 shows a net which has failed due to wind causing excessive wear causing part of the net to fail that testing the sample strips alone would not have revealed.

19.1.4.1 Drop testing

Drop Testing is not the favoured option for testing the netting. If an in-service test is carried out and the panel fails, this may render the helideck unusable. The test should also be witnessed by an independent inspector. The manual handling element requirement to position the weight and test equipment on the helideck should also be considered.

Drop Testing does not provide any information about the actual strength of the netting, i.e. the safety buffer between the minimum requirement and current strength, so this method of testing cannot be used to estimate the remaining lifespan of the netting. It only gives a simple pass / fail result for that moment in time.

19.1.4.2 Tensile testing (Proof Testing)

Proof loading or proof test is an industry term for a destructive test to validate that a net can withstand the minimum load expected during service. Testing the netting should be conducted by an approved onshore testing facility. A description of the material specification, testing protocol and qualification should accompany the results of each series of tests that have been performed.

Sample strips are fitted to a net panel, and a strip is removed annually and sent to the OEM or testing facility so that a tensile test can be carried out to assess performance. This test involves fixing a test strip to a calibrated tester and then applying a force to ensure it meets the minimum requirement.

The test should be carried out on the testing samples to ensure that they meet a minimum recommended load set by the OEM. Test equipment for the test will be calibrated in kN, as a reference, a load of 2.45 kN would be equivalent to the force applied by a 250 kg mass.

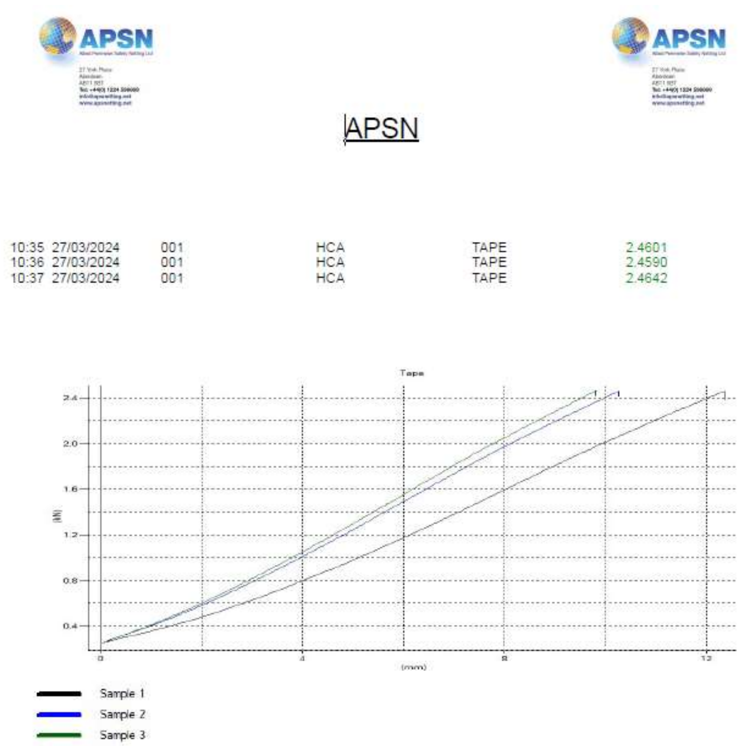
A test report (Figure 74) will be generated from the test that is retained as evidence of testing.

19.1.4.3 Tensile testing (Ultimate Tensile Test)

Ultimate tensile test (UTS) is an industry term for a destructive test to determine the maximum load that a component can withstand before failure. This requires a larger force to be developed by the testing facility machine to see when the net test strip breaks. Using this information, it is used to determine the interim life of the net.

This test requires that a test strip sample and attaching method/components be supplied from the installed perimeter netting to determine its break point. When annually testing each test strip to its break point, the OEM can assess if the reduction in force year on year is consistent with observed material accelerated ageing tests. A significant reduction in force may warrant further inspection and testing of the perimeter safety nets to identify and prevent accelerated corrosion or degradation which may result in a material failure before the OEM stated operational life.

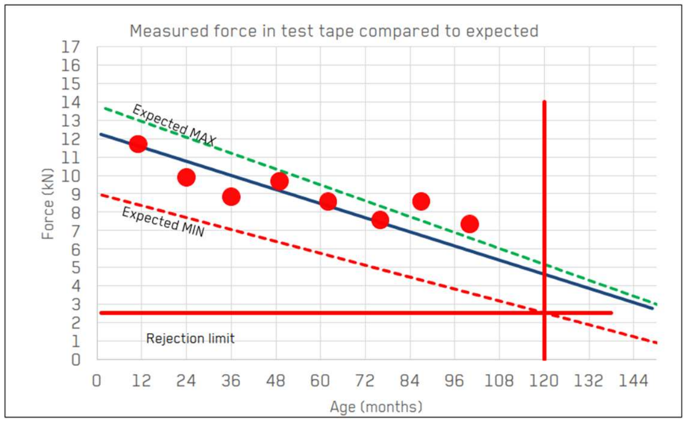
Figure 74: Tensile test of Helideck Perimeter netting Pass and Fail test results.



Source: Allied Perimeter Safety Netting Ltd

Figure 75: Tensile test of Helideck Perimeter netting showing remaining net life.

>> Maximum measured force 7,34 kN



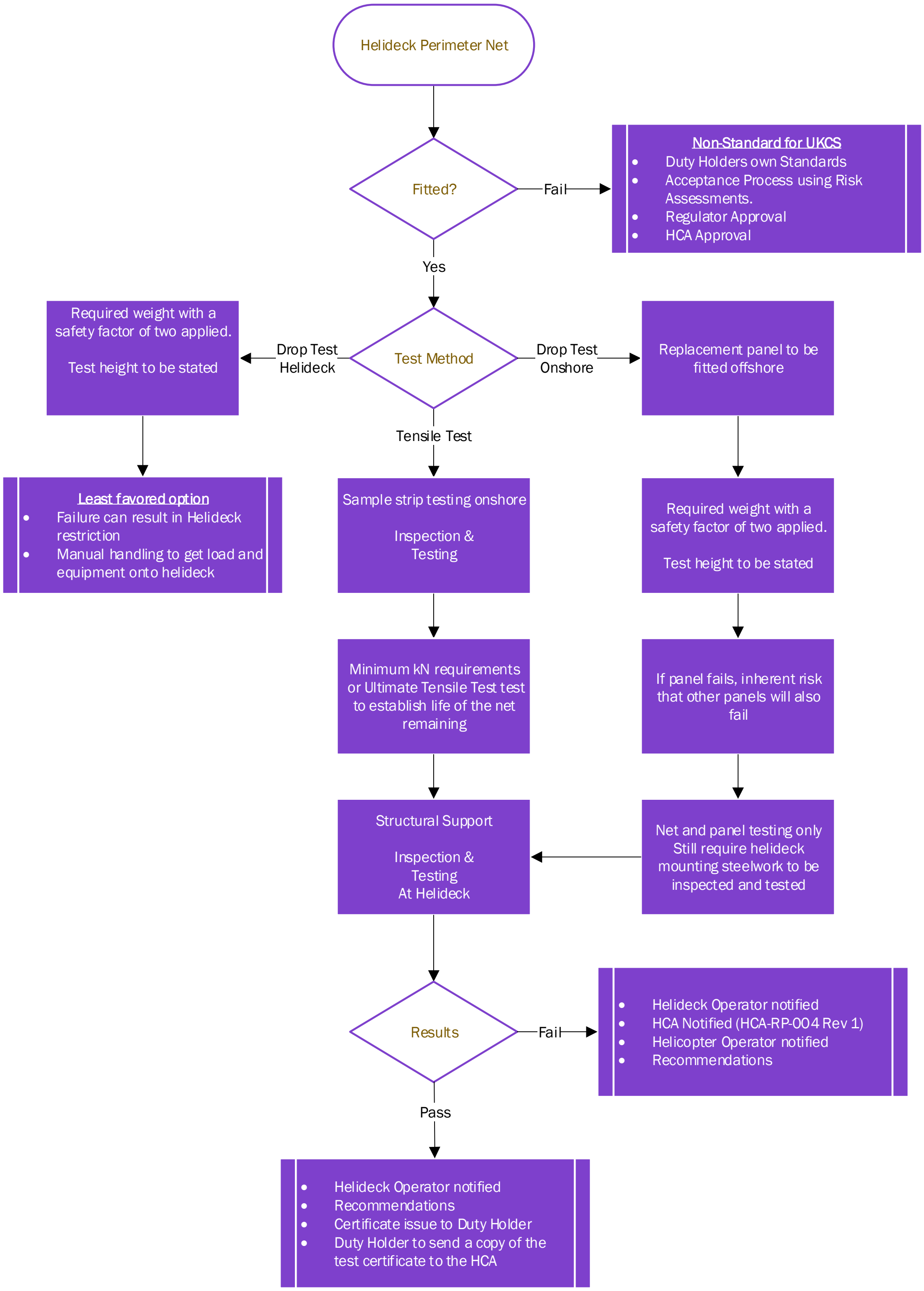
Notes from results:

Latest tensile strength result is on the high side of the expected and a clear PASS. Certified lifetime for the nets is 10 years. Currently estimated remaining lifetime about one and a half years.

Source: Frictape Net Ltd

19.2 Perimeter Net Testing Flowchart

Figure 76: Testing Guidance flowchart



Source: OEUK

20 Bird Control and Issues

20.1.1 Introduction

Helidecks offshore provide the ideal location for bird accumulations. Flocks of birds can gather in a single area where they find safety and have an abundance of food around the installation/vessel.

NUIs are particularly vulnerable to bird accumulations due to the level of inactivity on a day-to-day basis compared to manned installations where the helideck may be used daily.

Birds cause two main areas of concern:

(1) Increased likelihood of Bird strikes to the aircraft causing damage and the ingestion into the engines. This could result in the loss of the aircraft. In extreme cases, it may require the aircraft to return to base (RTB) / divert where a safe landing due to bird activity is not possible.

(2) Guano, shell, and fish FOD also obliterates deck markings, reduces friction, and creates a health and safety hazard for personnel. Guano can contain potential diseases such as E.coli, salmonella, botulism, and campylobacter which can be spread into accommodation areas through footwear.

Figure 77: Guano on a helideck requires frequent cleaning.

Source: Uncredited

Helidecks that are heavily contaminated in guano could result in the transfer of guano-borne diseases and bacteria being brought into accommodation areas on footwear and bags. Avian bird flu can also be a risk to personnel should dead birds be found offshore.

Bird infestation problems are routinely encountered on installations in some areas on the United Kingdom Continental Shelf (UKCS), It requires frequent cleaning using chemicals that can impact the surface or components on the helideck such as lighting.

20.1.2 Methods of bird control

Numerous methods have been tried to deter birds on Helidecks, which initially can work to a point however birds soon become acclimatised to the deterrent being deployed.

The consideration on how to best deal with bird control also needs to consider what would be mounted onto the helideck. Additional hardware, which is in a hazardous area adds more weight to the deck and can introduce more problems by adding more components to a deck. The use of lasers can introduce hazards for personnel and aircrews if not used correctly.

- Acoustic systems aimed at scaring. These can be simple repetitive audio or detection and scaring systems that are triggered by bird activity.
- Lasers (fixed and portable units)
- Decoy prey – e.g., plastic owls
- Cartridge Scarers e.g., a gun-fired projectile creating noise and flashes of light (which on a hydrocarbon platform is a risk)
- Scarecrow (Scaretech)
- Deployment of Fire monitors regularly.

The use of CCTV should be used on NUIs to monitor activity and guano on helidecks to determine if an action plan is required. The problem of bird accumulations is greater on NUIs and Cold stacked installations where there is relative safety for birds due to inactivity.

It is suggested the Helideck Operator engage a specialist Environmental Company to engage an Aviation Safety Ornithologist to undertake a review and propose deterrent solutions depending on the number and breeds of birds involved.

20.1.3 Nesting Birds.

Birds found nesting depending on the species and time of year are protected. Guidance on this can be found here:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/963036/Protection_of_Wild_Birds_Offshore.pdf#:~:text=The%20protection%20of%20wild%20birds%2C%20their%20eggs%20and,may%20be%20present%20and%2For%20in%20the%20geographical%20area%29

If birds are found nesting offshore, the OPRED Environmental Manager should be contacted at BST@beis.gov.uk

20.1.4 Helideck Condition Monitoring

Any surface deterioration due to guano infestations will be reported by flight crews and are likely to incur flight restrictions, thus limiting operational helideck availability. This is a measure of the importance attached by Helicopter Operators for properly managing the problems caused by bird/guano infestation.

The problems range from obscured helideck markings causing wrong deck landings or misrepresentation of markings (e.g., prohibited landing heading sector marking is covered over by guano deposits), cancelled or aborted flights to bird strikes or near misses etc. Routinely, flight crews are therefore required to complete and file helideck condition reports that indicate the condition of the helideck surface, whether a helideck net is fitted, helideck lighting, the windsock and windsock illumination. Helideck Condition Reports should be forwarded to the HCA.

20.1.5 Mitigating Measures

Problems caused by the presence of seabirds and guano infestation on and around an installation helideck should be thoroughly investigated and documented. Following the production of a risk analysis/safety case and consultation with the HCA best available solutions should be implemented to mitigate the adverse effects.

However, finding permanent solutions to the guano and bird problem is very difficult due to the forces of nature. It should be recognised that the ‘bird’ problem has persisted for many years in general aviation as well as offshore, yet to date, the optimum solution has so far eluded the aviation industry.

Active measures taken to discourage seabirds from roosting on helidecks may include an automatic bird deterrent system that creates a ‘hostile’ environment for the birds in each area of an installation. The use of such systems should consider:

- The long-term acceptance (habituation) by the birds of a ‘deterrent’ system. This may require a sophisticated design that provides random changes to the ‘distress call’ outputs etc.
- The value of remote-controlled startup and shutdown of the deterrent system to coincide with the commencement of helicopter operations.
- Using an exclusion system that is only activated by bird movements, with automatic and random changes to the bird distress calls.
- The potential for the deterrent system to cause birds to flock onto adjacent Installations (or to migrate to other parts of the same Installation) and interfere with helicopter operations at a new roosting site.
- The value of using a database that provides local observation and recording of the bird species involved. This can provide useful input for determining the best solution to employ.

20.1.6 Exclusion Measures

Installing specialised equipment onto NUIs is a requirement to combat the problem of seabirds on helidecks. When equipment is fitted, it also needs to be maintained.

21 Meteorology

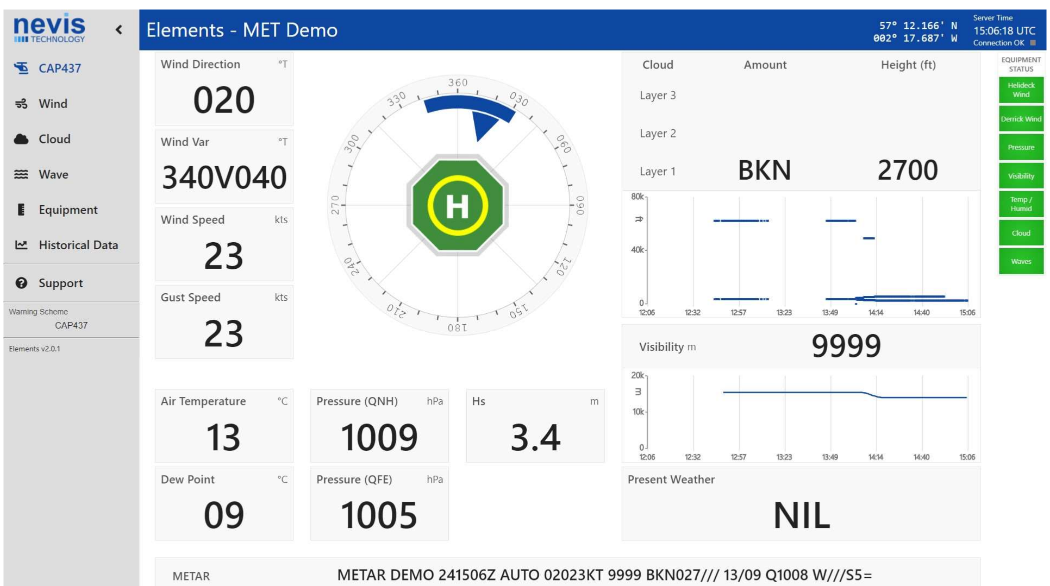
All offshore helidecks require to have an Automated Meteorological System capable of giving real-time weather data for aviation operations. Depending on the application, the sensor may require to be certified for use in a hazardous area (See 4.7).

Offshore meteorology systems display weather obtained from automatic sensors for the location. Weather information is passed to the helicopter crew so that they can work out the approach and departures from the helideck. Automated meteorological information from these systems can also be passed to an online portal called The Offshore Helicopter Weather Network (also known as Helimet). Cybersecurity requirements should also be considered when the system is connected to a network.

The Offshore Installations and Pipeline Works (Management and Administration) Regulations 1995 (MAR) (SI 1995/738), Regulation 14 requires that "The duty holder shall make arrangements for the collection and keeping of—(a)such meteorological and oceanographic information.

The Information set in as a weather report in a CAP437 format is detailed in section E.21 of CAP437.

Figure 78: Meteorological Helideck display



Source: Nevis Technology Ltd

It is important to ensure that the meteorological System supplier has the contact details for a focal point for the Helideck Operator for both Operational and Maintenance issues. When a sensor fails, this can be highlighted in the system identifying issues.

The meteorological system can also provide data to remote indication systems such as displays in cranes and interfacing to control systems on the installation/vessel. This can be done wirelessly or through a network connection.

These systems require registration and often a cost. The systems should be considered within the Duty / Holder and Vessel owner's requirements.

In addition to the Offshore Helicopter Weather Network. The installation, MODU and vessel owners normally subscribe to a weather forecasting service. This is unrelated to the automated weather stations offshore and is used for planning purposes based on weather forecasts through regular emails to subscribers or direct access to a forecaster.

Maintenance requirements are outlined in E.72 to E.74 of CAP437 where the system is required to be maintained and calibrated according to the requirements. As part of the maintenance check, the suitability to meet CAP 437 requirements should be met and if not the helideck operator notified.

When a sensor for the system, or indeed the system fails, this is required to be communicated to the organisation that holds the contract for the system as they will update the system with the issues which highlight it to Helicopter Operators and other users. E.20 in CAP437 details how it is reported if the information is missing or unavailable.

In the event of a failure of automated monitoring equipment, note 1 in section 6.16 of CAP437 details that if another attended installation is within 10 NM of the installation which measures cloud height, visibility, and present weather with the issue data from that system could be used providing a trained meteorological observer verifies the actual weather.

The location of sensors for the system should be mounted in the optimum position to give an accurate uninterrupted indication of conditions at the helideck. Where the Helideck is on a vessel or floating installation, the HMS uses additional sensors to determine conditions. Section 6 of CAP437 should be referenced along with Appendices E & J.

21.1 Sensors

21.1.1 Anemometers

Anemometers are used to determine the windspeed, and where fitted a sensor for the wind direction. The favoured anemometer type for offshore use is an ultrasonic type which gives wind speed and direction with no moving parts. On occasions, adverse weather has caused the traditional cup and vane-type units to overspeed causing them to fail. The result is inaccurate windspeed and direction indications to the meteorological system. On occasions, parts have fallen off causing a requirement for a dropped object incident report.

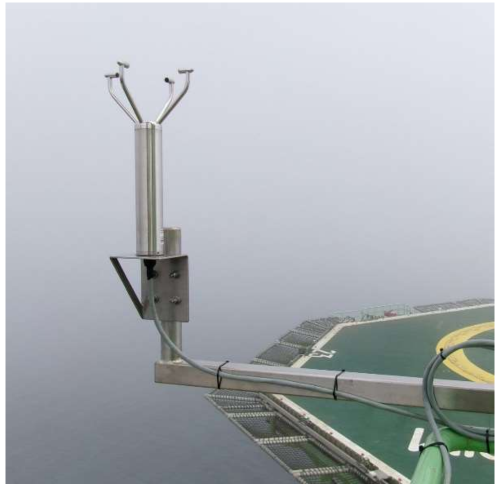
The ultrasonic type of anemometer has a marking on the body that should be orientated north. Anemometers in on some installations are located on top of the drilling derrick, the problem with this is if a fault arises then access could be limited due to drilling operations. A secondary location or second anemometer should be considered for such instances. A second anemometer may be required if the location is impacted by the installation structure in any way.

If anemometers are positioned at a high point, where it can get an uninterrupted airflow. They do run the risk of being struck by lightning, a spare anemometer should be carried.

The Standard Helideck Monitor Systems - HMC 9C specifies that for wind, this is required to be sampled at a minimum of 4 Hz (four cycles per second) to ensure sudden variations in wind are captured.

CAA CAP437 section E.25-34 should be referred to.

Figure 79: Ultrasonic type anemometer



Source: Nevis Technology Ltd

21.1.2 Cloud Height

These operate by emitting a laser or light beam vertically into the sky and measuring the time taken for it to be reflected from a cloud or other object. The time taken for the reflection is then converted into a height measurement. As these contain a laser, the unit should be sited away from where personnel can be exposed to it. The unit is required to be marked that it contains a laser.

These devices require regular cleaning to remain accurate. They should be kept away from areas that can introduce fouling of the optics.

CAA CAP437 section E.65-E71 should be referred to.

Figure 80: Laser Ceilometer

Source: Nevis Technology Ltd

21.1.3 Pressure

A barometric pressure sensor is used to measure the air pressure of the location. Pressure in aviation has two references QNH and QFE, both use Hectopascals (hPa) as the unit of measurement. Air pressures are used by the flight crew who set the altimeter in the aircraft to either QFE or QNH based on information passed to them.

QNH – Atmospheric pressure at the helideck level corrected to mean sea level.

QFE – Atmospheric pressure at helideck level. If set on an altimeter when an aircraft is on the helideck, the altimeter will read zero.

To give an example of an error. If a QNH measurement is incorrectly set in an aircraft altimeter by ten hPa too high then the helicopter could be three hundred feet too low, set too low and the helicopter is 300 feet too high.

CAP 437 E.40 should be considered as it states "*No observing system that determines pressure automatically should be dependent upon a single sensor for pressure measurement. A minimum of two co-located sensors should be used. The pressure sensors should be accurate to within 0.5 hectopascals of each other.*"

CAA CAP437 section E.39-E52 should be referred to.

Figure 81: Pressure sensors within a Stevenson Screen

Source: Nevis Technology Ltd

NATS also have QNH pressure sensors on several UKCS installations, these allow the barometric pressure to be relayed back to Air Traffic Controllers to allow more accurate information to be available to flight crews who will set the altimeter accordingly.

21.1.4 Temperature Dewpoint and Humidity.

Temperature and humidity sensors should be installed in a Stevenson's screen which is used to shield instruments from precipitation and direct heat radiation from outside sources. The screen allows air to circulate freely and provides a uniform environment for the air outside.

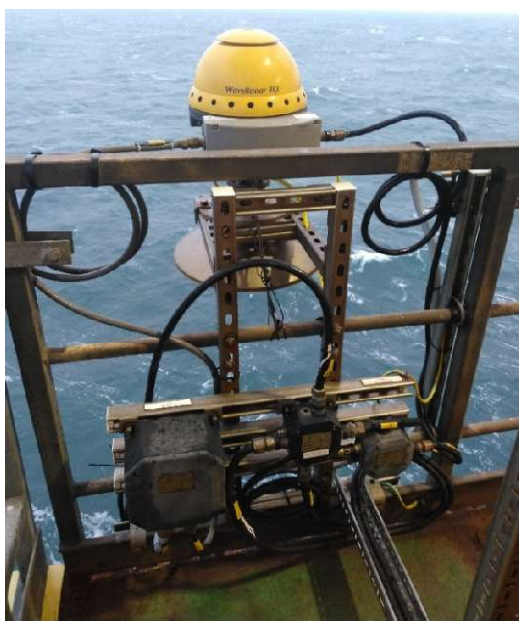
CAA CAP437 section E.35-E38 should be referred to.

21.1.4.1 Wave Height

The sea height and in turn waves can be measured using a radar or ultrasonic-based transmitter. These sensors are mounted at the side of the installation and signals reflect the height of the sea. The meteorological system processes the data from the transmitter to calculate wave heights and wave frequencies. The meteorological system can then undertake calculations to give accurate data on the sea state. The location of this transmitter should consider any overboard dump lines or vessel handling which could influence the signal.

CAA CAP437 section E.16 should be referred to.

Figure 82: Wave height sensor



Source: Nevis Technology Ltd

21.1.5 Visibility

Visibility sensors measure the meteorological optical range which is defined as the length of the atmosphere over which a beam of light travels before its luminous flux is reduced to 5% of its original value. The range of these sensors for offshore use should be 15 km for aviation. When selecting a location, this will be where there are minimal potential pollutants that could interfere with measurements (gas turbine exhaust, Galley/workshop HVAC extracts etc). Some visibility sensors also have a Present Weather Sensors functionality.

CAA CAP437 section E.53-58 should be referred to.

Figure 83: Present Weather and Visibility Sensor

Source: Nevis Technology Ltd

21.1.6 Present Weather System

Present weather sensors use a laser-based technology to measure the size and velocity of water droplets in the air to determine visibility, measure precipitation rate, and identify precipitation types such as drizzle, rain, snow, and hail.

CAA CAP437 section E.58-64 should be referred to.

21.1.7 All-in-One Sensors

Some Meteorological systems have combined Wind Speed, direction, precipitation, pressure temperate and relative humidity sensors. Consideration should be given to the failure of the system would result in several weather parameters being lost.

Figure 84: Combined sensor

Source: Viasala

21.1.8 Handheld Equipment

Sections E.32,44,57 & 63 of CAP437 recommend contingencies should automated information not be available. In some cases, hand-held equipment can be used by a meteorological observer. This equipment is also subject to calibration checks which may require it to be returned onshore for this work, during this period rental equipment should be brought in.

Figure 85: Handheld Anemometer

Source: Nevis Technologies Ltd

Hand-held equipment should be stored securely and checked regularly, especially if it is battery-powered and may need batteries replaced or recharged.

21.2 Triggered Lightning

The vast majority of helicopter-triggered lightning (aircraft-induced lightning) strike phenomena for the North Sea area feature north-westerly airflows in which unstable polar air is advected over relatively warm sea water in the period October to April.

Triggered lightning causes flight delays if the area of weather cannot be routed around. If the area can be flown around, it may result in a reduced payload due to the requirement to carry more fuel.

Helicopter Operators will determine if flights can take place safely based on weather reports or weather reports from offshore locations on the Offshore Helicopter Weather Network.

The resulting convection usually remains below 15,000ft and the top temperatures of the clouds typically linger between -10°C and -15°C. Note that other, less frequent synoptic patterns can also inhibit shallow wintry convection which can also produce triggered lightning. Triggered lightning grounds flights and causes interruptions to the flying schedule every year.

It has been found that helicopters acquire a strong negative charge when they fly through the air because of static charging. This is normally discharged once back in contact with the Earth's surface, but if a helicopter comes close to a positively charged region in a thunderstorm cell, then there is potential for a lightning strike to be triggered to and through the helicopter. It is calculated that triggered lightning strikes may occur when a helicopter flies:

- into a positively charged base of a Cumulonimbus (Cb) cloud
- under the positively charged anvil of a Cb cloud
- from a positively charged region of the cloud to a negatively charged one.

A Cb cloud is a dense, towering vertical cloud typically forming from water vapour condensing in the lower troposphere that builds upward carried by powerful buoyant air currents.

Above the lower portions of the cumulonimbus, the water vapour becomes ice crystals, such as snow and graupel, the interaction of which can lead to hail and lightning formation, respectively.

The Met Office provides information on Cb clouds here:

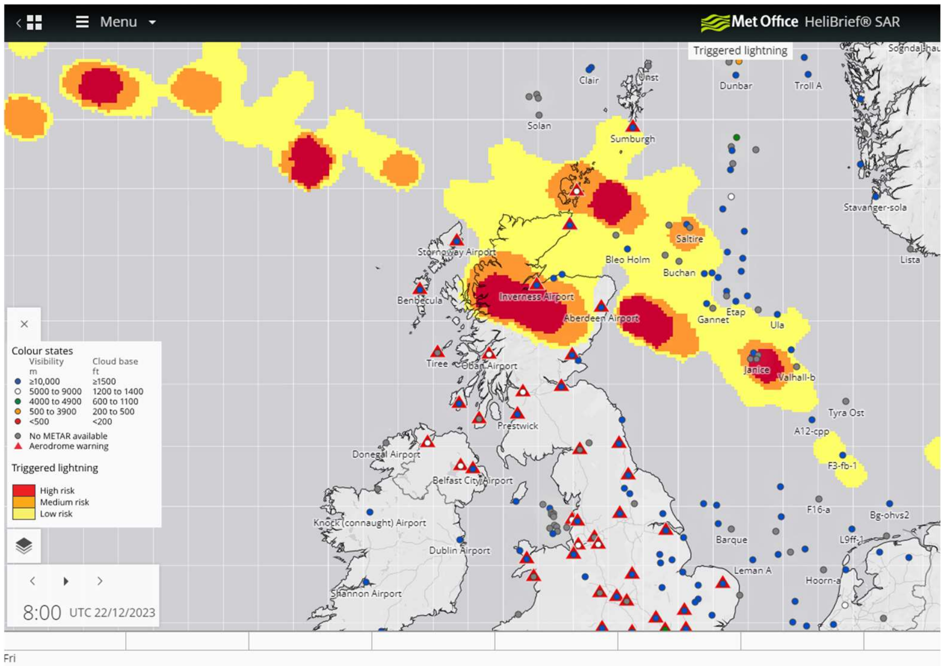
https://www.metoffice.gov.uk/weather/learn-about/weather/types-of-weather/clouds/low-level-clouds/cumulonimbus

It has been found that most, but not all, triggered strikes on helicopters are positively charged, and it is noted that positively charged regions of a Cb cloud are located close to the freezing level where the rate of change from the frozen to liquid moisture state, which leads to the separation of electrical charges, is at its greatest.

A subscription service offered by the Met Office called *HeliBrief* is used to indicate the possible presence of triggered lightning, information can be found here:

HeliBrief® Offshore - Met Office

Figure 86: HeliBrief Triggered Lightning display



Source: The Met Office

21.3 METARS

The aviation weather reporting system can generate automatic METARS. METARS (Meteorological Aerodrome Report) give detailed information about the weather. The Met Office is one resource for decoding METARS which can be found here:

Abbreviations used in aviation forecasts and warnings - Met Office

CAP437 section 6.22 should be referred to for a list of installations that provide Auto METARS

An Example of a METAR format is shown below:

METAR: EGPD 241220Z AUTO 33011KT 9999 BKN044 18/08 Q1024

When deciphered it reads:

EGPD – Aberdeen International Airport

241220Z – 24th 12:20UTC (ZULU time)

AUTO – Automatically Generated

33011KT – Wind 330 Degrees at 11 Knots

9999 – Visibility 10km or greater

BKN044 – Broken Clouds at 4,400 Feet

18/08 – Temperature and Dewpoint in Degrees Centigrade

Q1024 – Air Pressure in Hectopascals (hPa)

Zulu Time is used in aviation because it is unaffected by geography or traditional time zones. It is a 24-hour timekeeping system that is always the same worldwide and is used to coordinate schedules, weather forecasts, and trip planning across the aviation industry.

all time zones are referenced off a Universal Time Zone which is defined as the local solar noon in Greenwich, London, England. In the UK, Zulu time can be the same or offset by one hour depending on when the clocks change twice per year for BST.

CAP437 section 6.22 should be referred to for a list of installations that provide Auto METARS

21.4 Adverse Weather Policy

Operators of installations and vessels in the UKCS should have an Adverse Weather Policy. This will detail the limitations based on weather conditions which will impact operations. Often the limitations are set based on the conditions that the stand-by vessel can launch rescue craft or conduct the rescue of personnel in the water.

OEUK have published Emergency Response & Rescue Vessel Management Guidelines which can be found here:

OEUK Publications

Adverse weather is the likeliest, but not the only circumstance of an event leading to the inability of the ERRV to provide effective rescue and recovery arrangements. OEUK has published a technical note to give guidance on this scenario, the document can be found here:

Oil and Gas UK Word Template (oeuk.org.uk)

When submitting a weather report for aviation operations in the format detailed in E.21 of CAP437, particular attention should be given to the "Rescue and Recovery" part which has a Yes / No option. What this does not detail is what method of Rescue and Recovery is available, it may be that for example, a Daycon Scoop is only available rather than Fast Rescue Craft or Daughter Craft. In this case, it is recommended to add in the "Remarks" box of the forecast what is available.

The impact may require personnel to remain within the accommodation or make areas of the installation/vessel out of bounds based on the wind direction.

Helidecks can be closed when events like high winds, high wave height or reduced visibility are present. Following such weather, a check of the installation and particularly the Helideck should be carried out for damage to it and associated systems. On occasions cladding from e.g., the drilling derrick may be loose, and the helideck is at risk of being damaged should a panel fall.

The helifuel systems should be checked to ensure that water has not been driven into the system or contaminated fuel in storage tanks.

21.5 Severe Weather Action Plan

The assessment of the risk of structural damage or collapse of offshore jacket structures due to in-deck wave-loading during a 10,000-year weather event is required for all offshore installations and will be referenced within the safety case.

Where a safety case includes a Severe Weather Action Plan (SWAP) utilising helicopters as the means of evacuation the SWAP should involve the contracted Helicopter Operator in its development and any exercises to ensure that the SWAP is, and remains, achievable.

22 Windsocks

Windsocks are one of the most important visual cues for pilots on any landing facility be it an airport or helideck. Windsocks are used to indicate the wind direction and based on the angle of the sock, the windspeed and if it is gusting.

Windsocks are available in different colours depending on the application and environment in which they are used. They are produced according to ICAO guidelines and are calibrated to be fully inflated at wind speeds of 15 knots or more. The stripes on a windsock indicate which wind speed is in effect.

The windsock is also a good indicator of turbulent air. The following sections of CAP437 should be referenced:

Chapter 4: Visual Aids Section 4.5

Chapter 6: Assessment of wind speed and direction, 6.16

Appendix H: Risk Assessment, Table 5 - Section 2

Additional information can also be found in ICAO Doc 9361 – Heliport Manual.

Windsocks should be illuminated for night operations. The illumination may be in a hazardous area and will need to be EX-certified. Depending on the location, it may require an aviation obstruction light may be required on the top of the windsock mounting pole.

The illumination should be internal to the windsock, where external sources such as lighting on extension arms are used, these can bind the flight crew at a critical stage of the landing or take-off.

The Windsock and aviation obstruction light should have separate electrical circuits fed from a UPS system.

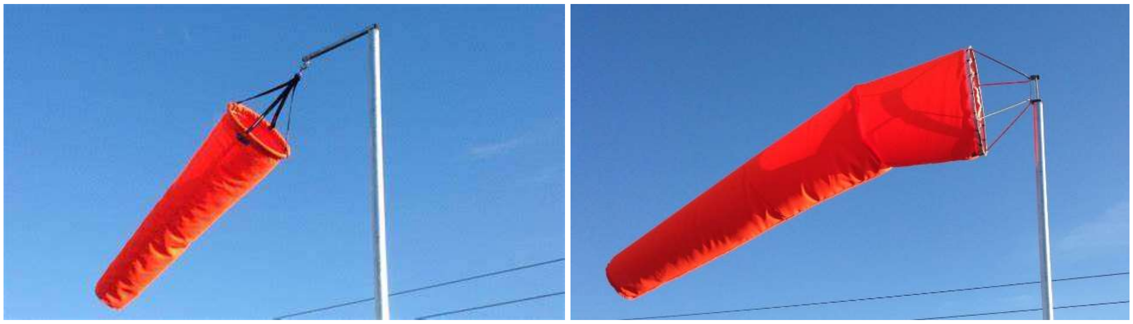
Some systems on the market have a programmable interface, and the intensity of the lighting can be set by software within the windsock assembly. This should be set during the commissioning of the new assembly.

The windsock should be mounted to a sock frame, this allows lace-up multiple eyelets to secure the windsock to the frame. Windsocks with lines to a single connection point should be avoided due to the risk of single-point failure causing the complete windsock to detach. This is shown in Figure 85. The mounting of windsocks is critical, and the ability to lower the windsock pole using a hinge is recommended to allow for reducing the potential for damage or loss in adverse weather. This also aids in the changing out of the windsock or swivel bearings without the need for access such as scaffolding or access platforms.

Step Change in Safety has issued an alert about the operation of a Windsock mast failure which can be found here:

Step Change in Safety | Head Injury Due to Windsock Mast Failure

Figure 87 & 88: Windsocks, preferred type is on the right.



Source: Uncredited

The mounting pole should be constructed of a suitable material for the environment (e.g., Stainless Steel), and the windsock allowed to rotate using swivel systems.

Figure 89 & 90: Collapsible windsock mounting.

Source: Uncredited

The purpose of the windsock swivel system is to hold the windsock away from its mast to avoid snagging or damage whilst allowing free rotation around 360 degrees for accurate wind information. The assembly should have suitable bearings installed for minimum maintenance and ease of replacement.

Additional windsocks can be installed at another location if required, however, the Helideck operators should keep a spare windsock as an immediate replacement. When a windsock is damaged the degradation can be rapid which will require immediate intervention. Other windsocks are often mounted on crane 'A' frames.

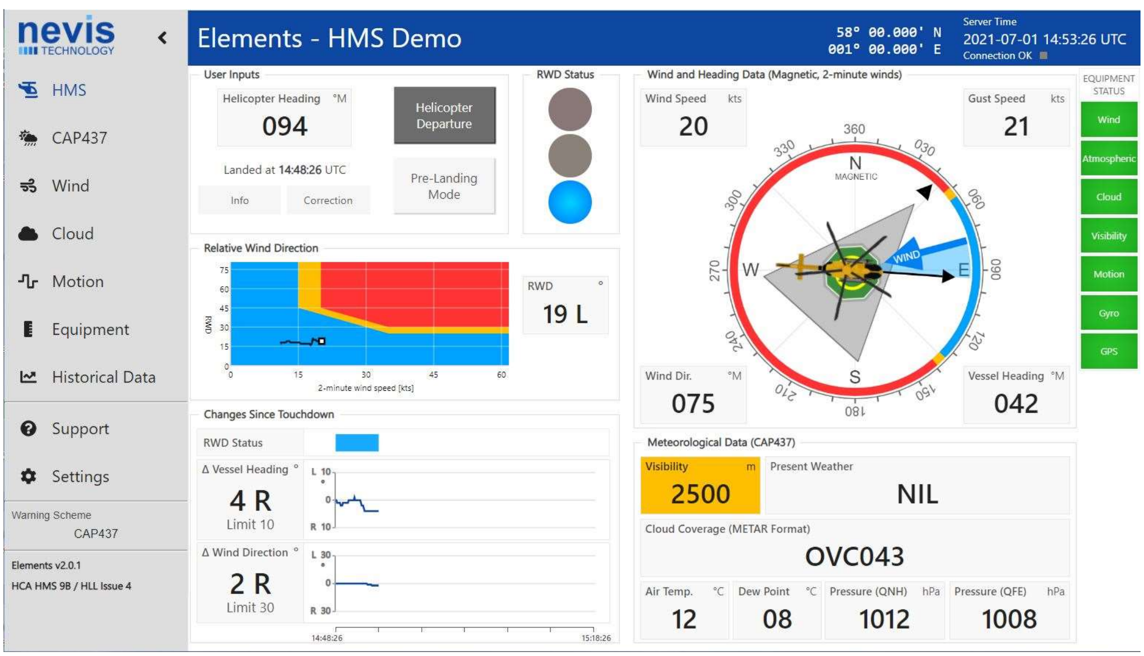
23 Helideck Monitoring System

In addition to the Meteorological System, a Helideck Monitoring System (HMS) is required where motion is present on the helideck, e.g. floating production and storage vessels (FPSO) and vessels. The HMS will calculate and present the Motion Severity Index (MSI) and Wind Severity Index (WSI) data together with significant heave rate (SHR), inclination, roll and pitch of the helideck in real-time. A typical HMS will use the following inputs, some signals may come from the Meteorological system.

- MRU Motion Reference Unit
- Wind Speed & Direction
- Air Pressure Sensor (with two sources)
- Temperature and Humidity sensor
- Ceilometer
- Visibility & Present Weather
- Gyro Compass
- GPS

The data from the helideck is calculated in a control system that processes helideck motion data together with MSI and WSI figures to determine whether the helideck movement is unsuitable for helicopter operations. Repeater lights are used to indicate the status of the helideck and if it is safe to land.

Figure 91: HMS Display



Source: Nevis Technology Ltd

The HCA has produced limitations for operations on moving helidecks which can be found here:

HLL-Part-C-P-R-H-Tables-Feb-2023.pdf (helidecks.org)

The specifications for an HMS can be found here:

https://www.helidecks.org/wp-content/uploads/2023/06/Standard-Helideck-Monitoring-Systems-Rev-9c-2023-06-02.pdf

CAA-approved systems can be found here:

Helipads and Helidecks | Design Reviews, Technical Advice (caainternational.com)

The reference point for the calculations is required to be at the helideck. Since some sensors may not be located exactly at the helideck, a factor may be applied to the software to correct the reference point.

Some systems allow the system to be connected to a network for remote viewing, as such these systems should consider cybersecurity and the guidance referenced in Section 4.2 of this document.

Some vessels also have Dynamic Positioning Systems, the IMO has produced a guide which applies to systems that are installed onboard vessels, offshore installations, and facilities. It applies to new constructions. Vessels that have Dynamic Positioning Systems provide greater stability through positioning. Information on the classification of vessels can be found here:

Guide for Dynamic Positioning Systems 2021 (eagle.org)

If there are issues with the HMS, the HCA should be notified. This may result in the helideck only being operable in 'stable' conditions until the issue is resolved.

23.1 Helideck Repeater Lights

CAA CAP437 Appendix J details the requirements for "*A repeater light system indicating the helideck operational status is required on moving helidecks to provide information directly to the helideck crew and helicopter flight crew. The operational status annunciated by the repeater lights shall be identical to that displayed on the Helideck Monitoring System (HMS) display and should comprise blue, amber, and red lights*".

CAP 437 J.37 requires that the repeater light system to effectively 'fail-safe'. Rev.9c of the HMS standard requires:

- a repeater light test function to be provided,
- an interlock with the status lights (if fitted) to be provided

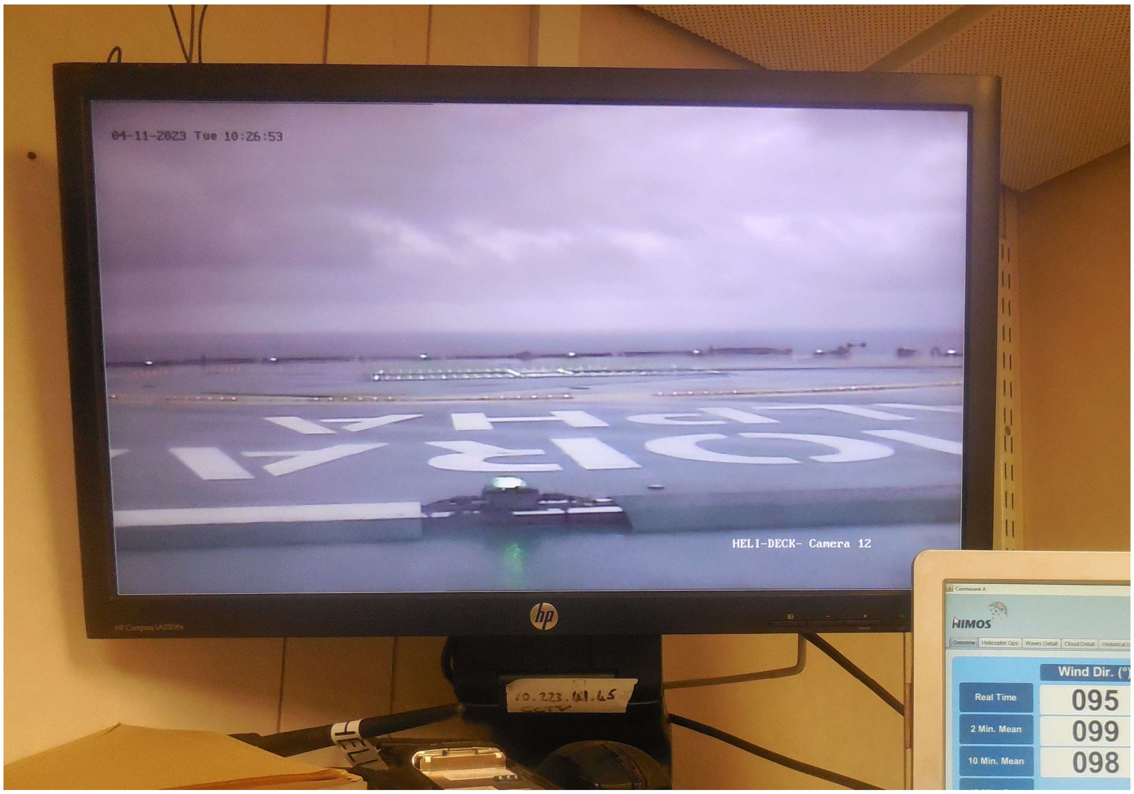
When installing the lights, The HCA should be contacted before breaching the 15 cm height rule in order to avoid the risk of the helideck certificate being withdrawn.

If the lighting system is not commissioned or defective, only "stable deck" operations are permitted. A stable deck is defined as helideck pitch and/or roll of 1° or less, and a heave rate of 0.4 m/s or less. In most cases, this would be a highly penalising limitation for vessels to conduct routine offshore helicopter operations.

24 CCTV

The use of CCTV has great value when used on helidecks. A remotely operated television system is highly recommended for all NUIs and Normally manned installations, to provide continuous monitoring of the helideck before and during helicopter operations.

Figure 92: CCTV Display



Source: Uncredited

Several considerations should be given in the siting and operation of CCTV cameras. When incidents have occurred, the use of recorded footage can help understand the event as part of an incident investigation. In the event of an incident, any footage is investigation evidence that should be protected from unauthorised release. Events where CCTV can aid operations are:

- Failure to refit fuel filler cap on an aircraft after refuelling confirmed by CCTV.
- Footage of a shutdown aircraft on deck during adverse weather suffering damage.
- Aircraft developing a fault and the events unfolding.
- Helideck Condition before arrival (NUIs).
- Establishing deck surface for landing (guano, bird accumulations etc).
- Monitoring of the helideck during adverse weather.

Cameras can be fixed, or have Pan, Tilt and Zoom (PTZ) functionality which can be operated remotely. Typically control stations can be found in control zooms, Heli-Admin, Vessel bridge or Emergency Control Centres. Cameras, depending on the Hazardous Area certification may have heating elements internally to avoid the severe cold. The resolution should be at least four megapixels and be capable of storing images internally should the archiving system fail.

The camera should be fitted with a wash/wiper system as a wet deck will cause spray over the lens which will require cleaning when a helicopter is on deck. These camera systems will typically have a separate wash tank for holding the cleaning solution.

Figure 93: CCTV

Source: Nevis Technology Ltd

The Ingress Protection (IP) rating ensures the location can withstand environmental conditions. If the unit is for Hazardous Areas, the certification may not permit additional methods of waterproofing (e.g., Denso-tape). It is recommended that a PTZ CCTV be installed on a structure overlooking the helideck if possible.

The location of the camera should not be positioned where it will not become an obstacle or be affected by spray during fire monitor testing. The camera should not have any kind of floodlighting fitted. Before setting a camera, the HCA should be consulted to confirm the location is acceptable.

The feed from a camera and archived video should be secure and access to it restricted and should be backed up regularly to a secure location. If it is stored on removable media, then these should be sent onshore to a secure storage facility.

The camera should not be operated whilst an aircraft is on the deck due to distracting the crew through movement or sunlight reflection.

Some systems carry additional information on video feeds such as weather conditions. Should this facility exist, it should have an option to be removed from the screen to aid viewing clarity.

25 Combined Helideck Operations

Combined operations can take several different forms. They are situations offshore where there are two or more installations, mobile offshore drilling units (MODUs) or vessels working alongside each other. With growing numbers of offshore installations utilising “Walk to work” vessels, there can be an increase in vessel activity throughout the day.

Where a combined operation is taking place, this will mean that, to some extent, the operational clearances and aerodynamics of the helidecks on each of the installations/vessels may be impeded in some way by positioning the additional structures alongside. In turn, this means that specific considerations should be factored into account during helicopter operations.

The Offshore Installations and Wells (Design and Construction, etc.) Regulations 1996, regulation 11 states that the Helicopter landing area be “large enough, and has sufficient clear approach and departure paths, to enable any helicopter intended to use the landing area safely to land thereon and to take off therefrom in any wind and weather conditions permitting helicopter operations”

Figure 94: Multiple helidecks in proximity

Source: Jamie Baikie / Equinor

The obstacle-free sector is defined as the 210° safe approach and take-off sector for helicopters with an unobstructed flight path. For helicopters that are operated in performance class (PC) 1 or 2, the horizontal extent of this distance from the edge of the FATO will be based on the one-engine-inoperative capability of the type to be used.

Any vessel or obstruction within this area requires to be addressed by undertaking a safety review and risk assessment before any helicopter activity takes place. In Figure 92, the Flotel is in the OFS of the fixed platform, so flights would use the Flotel's helideck. The jack-up on the far side may have a free OFS and could be used.

Section 6.28 of CAA CAP437 should detail the need for a consultation with the Helicopter Operator when two helidecks adjacent to each other. This will also require the HCA to be contacted for a review of the operational and TLN requirements applied.

As the activity where a vessel is required to be close to the Installation would be planned, the SIMOPS document would detail and outline the requirements for notifying the Helicopter Operator, if required the HCA. It is good practice in the development of the SIMOPS document to include aviation as one of the key areas where a clear plan is developed.

As an additional step, on first contact with the Installation by the helicopter crew, the Radio Operator is required to notify the crew of vessels operating within the 500M zone. This will allow the flight crew to assess if the landing can take place safely.

Supply vessels that were being worked for cargo operations would be expected to pull off out of the 500M zone, as the cranes would be stowed/positioned for helicopter operations. Diving or construction vessels may be close in and not easily relocated when a helicopter is due are the exception and will require the Helicopter Operator to assess if the flight can be conducted safely.

If diving operations are taking place, the fire pumps may be in manual and not capable of starting on demand due to the risk to divers. The firefighting capabilities should then be assessed as to whether safe aviation operations can take place or not.

25.1 Safety and Risk Assessment

Where two or more fixed structures are permanently bridged together or are near another installation(s), the safety and risk assessments developed during the initial design (or if later modified) should reflect all aspects of the combined facilities that will have potential impacts on helicopter operations and flight safety.

Where it is intended that an additional permanent structure will be installed, the full effects on the helicopter flying environment around the combined facilities should be re-assessed fully (whether both structures have helidecks).

The information in the safety and risk assessment should also be passed to the HCA for an assessment of the extent and introduction of any operating restrictions or limitations that should be applied. During flight planning, the flight crews will use this information to ensure they can manage the flight safely.

25.2 Temporary Arrangements

Where fixed installations, floating structures (e.g., Floating, Production, Storage and Offtake Units (FPSOs) and MODUs), jack-up rigs and vessels are temporarily bridged together, linked by an offloading system (or other such mechanism) or are near each other, a safety and risk assessment is required to address changes to onboard processes and the management of these operations.

The assessment should reflect all physical aspects of the combined facilities including interim layout changes (e.g., helidecks out of use, vessel relocations/movements, obstructions), its operations, management organisation and responsibilities and any procedural changes that will have potential impacts on helicopter operations (e.g., a bridge linked flotel that has temporarily moved away from an installation on its anchors / DP, due to sea state).

This information should be passed to the Helicopter Operator and copied to HCA so that an assessment can be made through the Technical Committee for appropriate operational restrictions and limitations. During flight planning, the flight crews will use this information to ensure they can manage the flight safely.

25.3 Management of Combined Operations Helidecks

During combined operations, more than one helideck may be available. However, some helidecks on the combined installation may be unusable because of the physical layout of the different units or the activities taking place on them.

The field operator in conjunction with other Duty Holder(s) and the Helicopter Operator should:

Initially decide which helideck(s) will be designated active or inactive.

- If one or more helidecks will remain available, introduce a combined helideck management organisation to appoint the Offshore Installation Manager (OIM), Helicopter Landing Officer (HLO) and Radio Operator who should act as co-ordinator for the combined operations helicopter activities.
- Agree on changes to normal operating procedures and, where appropriate, develop helideck management and emergency procedures that will properly accommodate safe helicopter operations during the temporary works. Ensure that adequate communications procedures, meteorology, adverse weather procedures and daily reporting are properly implemented.

Note: Before flights take place when a bridged flotel or rig is pulling off from an installation on its anchors and the destination helideck is on the flotel/rig, the Radio Operator or HLO should notify the Helicopter Operator/flight crew that the vessel repositioning is taking place or has taken place. Coordinates for the revised location of the flotel/rig should be communicated to the flight crew.

- Make provisions for the correct marking of inactive helideck(s).
- Where appropriate, undertake a full assessment of any potential effects from combined operations on the helicopter flying environment (e.g., adverse aerodynamic and thermal effects on flight paths, obstructions, crane operations, vessel movements, fugitive gas emissions, etc).
- Consider the possible effects on helideck management from increased helicopter movements and make suitable provisions to mitigate these effects. There may be an increase in passenger and freight flows through the designated Heli-admin and an increased number of refuels requiring greater fuel stocks to be held onboard, etc.

26 Decommissioning

At a given time and following the submission of a Decommissioning Programme, the installation will go through phases of the lifecycle. These are summarised below:

Warm Stack – where the installation is still manned but not producing.

COP – Cessation of Production, where all hydrocarbon extraction has ceased, and commercial production no longer takes place. It may still have hydrocarbons onboard through pipelines that use the installation as an "up and over" service, or within-process equipment that still requires cleaning and flushing. It should be noted that the flare may still vent gas, and nitrogen but will be unlit.

Make-Safe and Handover – The Duty Holder will prepare the installation for disposal through complete single lift removal, removal in pieces or on a modular basis. All hydrocarbons and hazardous materials that exist will be removed or managed. The flare, which would normally be lit may be used for cold venting and may require obstruction lighting added.

NUI Mode – Depending on the requirements of the decommissioning project, the installation may go from a normally manned installation to a Normally Unattended Installation mode. This gives the option of reboarding to undertake maintenance or repairs. This can also be known as Lighthouse Mode.

Cold Stack – The installation will be Installation unmanned with no further planned re-boarding. Any navigational aids are self-powered (Solar / wind).

Removal – of the topsides and if possible, recovery of the jacket / concrete Gravity base or moorings.

At the earliest opportunity, the Duty Holder should engage the HCA to determine the impact of Helideck operations during the decommissioning project. The engagement of the Helicopter Operators will be part of this process. This will ensure that any aviation manuals, operational procedures, and risk assessments are covered.

As part of the HCA process, the Helicopter Operator should also be involved with any requirements post-cold-stack requirements to reboard or conduct visual inspections of the installation.

The HCA-issued Helideck Information Plate for the installation will require to be updated in line with the milestones as they are reached.

The Safety Case Regulations 2015 also requires revisions to the Safety Case in line with the installation moving from late life production to COP, to Cold Stack then removal.

Milestones through decommissioning can be defined as:

- Reclassification of normally manned to NUI status / Warm Stack status
- Retirement of Refuelling Facilities
- Retirement of helicopter starter unit
- Reduction/retirement in Firefighting equipment (retirement of fire pumps and requirement for portable large-capacity trollies)
- Retirement of power supplies for lighting and telecommunications
- Last flight / Flight watch

- Disposal of handheld VHF radios / Sat. phones by HLO/HDA/OIM before the last flight into the secure box so these are not carried onto the aircraft unless they have been processed and packed as Dangerous Goods and manifested accordingly.
- Cancellation of OFCOM licences
- Cancellation of Meteorological Service subscriptions and removal from the System (if used)
- Use of Helideck
- Helicopter deployable AtoN
- Use of Solar powered Navaids located normally on the Helideck (AtoNs - AIS, Racon, Marine Lanterns etc)
- Use of Helideck post-Cold Stack which requires Notification of withdrawal of the HCA certificate and removal of the installation helideck from the HLL (and HIP).

Figure 95: Helideck used for Navigational Aids/power generation.

Source: Pharos Marine Automatic Power Ltd

26.1 Walk through checks.

Table 5: Decommissioning Check

Check	Action	Remarks
1	COP initiated by Duty Holder	HCA to be notified
2	Engage HCA to review the timeline for the retirement of key safety Systems e.g., Firepumps, Refuelling Systems etc	HCA will review and update the Approach Plates and Certification as required.
3	Engage Helicopter Operator as to timeline and risk assess any changes to the mode of operation	
4	At each stage of Decommissioning ensure the Safety Case updates are captured	
5	Plan "Last Flight" activities	Plan deck markings, carriage of radios (Dangerous Goods) or disposal.
6	Establish any inspection requirements and reboarding whilst awaiting the Heavy Lift Vessel	
7	Cancel Ofcom licences and ANO Approvals.	
8	Notify the HCA / Helicopter Operators of any AtoNs installed on the helideck. If the AtoN requires to be replaced, this is typically done by a helicopter with lifting capabilities. Consideration should be given to developing a procedure.	The AtoN would be maintained by a specialist contractor. Until removed, the AtoN may require helicopter fly-bys for visual verification of the system.

27 Wind Turbines / Windfarms

Offshore wind turbines and wind farms have seen significant growth off the coast of the UK, the size and location of wind farms may result in numerous wind turbines and platforms for cable management.

Wind farms are normally serviced by vessels, but some are designed to use helicopters in winching operations, and platforms equipped with a Helideck are used to support renewable energy operations.

The CAA has produced guidance on windfarms which can be found here:

https://www.caa.co.uk/our-work/publications/documents/content/cap-764/

Figure 96: Winching operation on a Wind Turbine

Source: Uni-Fly

Helidecks on wind farm installations are required to comply with CAP437 in line with Oil & Gas extraction helidecks. However, as no hydrocarbons are present, the need for Hazardous Area Equipment is removed. Hazardous area-certified equipment may be used, but this introduces the question of the need for COMPEX-trained technicians and maintenance regimes.

Wind turbines, where winching operations are carried out require to comply with CAP437 Chapter 10, and sections J.38-J.50. This outlines the requirement for winching operations using a helicopter.

The Global Offshore Wind Organisation (GWO) industry has produced good practice guidelines for helicopter Operations which can be found here:

Section-A-G-safe-helicopter-operations-in-support-of-the-global-offshore-wind-industry.pdf (gplusoffshorewind.com)

Section-B-G-safe-helicopter-operations-in-support-of-the-global-offshore-wind-industry.pdf (gplusoffshorewind.com)

The CAA has issued a policy statement for the Policy Statement Lighting of Onshore Wind Turbine Generators in the United Kingdom with a maximum blade tip height at or over 150m Above Ground Level. The policy can be found here:

16178 (caa.co.uk)

Other information can be found in the Offshore Renewables Aviation Guidelines (ORAG) Report. The report can be found here:

Offshore Renewables Aviation Guidelines (ORAG) Report - RenewableUK

Similar to working offshore in Oil & gas, The Global Offshore Wind Organisation (GWO) also has minimum training requirements for working on offshore wind facilities. So in addition to aviation competencies in section 5.1, there are additional training requirements that should be considered for Helideck personnel.

Further information can be found here:-

Basic Safety Training Standard (globalwindsafety.org)

28 Passenger Information

This section is basic guidance that Helideck Operators will already be following and so serves as a reminder.

Any helicopter operation aims to ensure that the flight can be conducted safely and efficiently since crew changes are done offshore with the rotors running and delays increase the amount of fuel used.

Helideck operators should establish an efficient crew change method such as determining where lifejackets etc can be swapped over between crews, unused lifejackets transferred to/from the aircraft, and during operations like refuelling the management of the additional personnel from the crew change awaiting boarding. This could be in a corridor or a dedicated lounge. It is not good practice to undertake changeovers outdoors in the vicinity of the helideck.

It may also be a requirement that the flight crew require a comfort break and the provision of food/drinks which will be transferred to the aircraft in a box that is secure to avoid hot liquid spills etc. The contents should then be taken out of the box by the flight crew for placing in the cockpit.

Unless instructed, passengers should not make their way to the helideck until the crew instructs this and they are received by the helideck crew to board the aircraft.

28.1.1 Minimum requirements for travel

All personnel mobilising offshore on the UKCS are required to meet the following minimum requirements:

- Basic Offshore Safety Induction and Emergency Training (BOSIET)
- Minimum Industry Training Safety Training (MIST)
- For offshore wind facilities, GWO training
- A Valid OEUK Medical Certificate
- Vantage card (new and replacement Vantage cards can be issued at the heliport check-in)
- A valid Passport minimum of 3 months remaining to the expiry date.

Note if your passport has been sent for renewal, a photocopy* can be accepted with the PEX number provided at the time of your application. Passengers should also present another form of government photographic ID (Driving Licence etc)

*If Norway is being used as an alternate, passengers are required to have a valid passport. The passport will be required to comply with current requirements for validity, or they will not be able to travel and will be removed from the flight.

28.1.2 Clothing policy

There is a clothing policy enforced for travelling on helicopters offshore, this details what is acceptable and what is required for travel during the summer and winter with applicable dates.

Figure 97: Clothing policy for travelling offshore.

Source: Step Change in Safety

28.1.3 Baggage

Passengers mobilising are requested to prioritise their baggage, each passenger will be allowed to travel with two priority bags, the following should be applied:

- The baggage weight for each bag should not exceed 11kg/25lb.
- Soft shell type bag preferred (Holdall).
- Bags should only contain personal effects (no freight).
- Refer to the PED section for guidance on electric equipment.
- Identify Passenger's names.
- Passengers carry fragile items at their own risk.

28.1.4 Drugs & Alcohol/Medication/Supplements

The Duty Holder / Vessel owner will have an Alcohol and Substance Misuse Policy, every passenger's employer is required to advise on this policy. For checking in for a flight:

- The Duty Holder / Vessel operator may conduct random testing.
- Alcohol: Zero (a breath sample reading which is equal to or less than 0.09mg/l).
- Prescribed and over-the-counter medication is required to be declared to Security at check-in and should be in its original unopened packaging (blister pack or packaged by the dispensing chemist with the name of the person carrying it on the label etc). Medication should not be carried for other people. If there is a requirement to ship medication, this will be arranged by the offshore medic and the freight forwarding company following the company's policies.

- Passengers are not permitted to carry pill boxes.
- Vitamins and food supplements (protein powders etc should be unopened and in their original containers.

Some medications may require a review by a suitable medical authority engaged by the Duty Holder / Vessel operator to establish if the person is fit to travel offshore. If the installation is a NUI with no medic present, the type of medication may not permit travel to the installation.

The HSE has published guidance on drugs offshore, which can be found here:

HSE Offshore: Operations Notice 64 - The Misuse of Drugs Regulations 2001

28.1.5 Prohibited items.

The CAA has published CAP 1402 for prohibited articles in the form of a poster. These are for passenger aircraft but require to be more restrictive for helicopters and transport to/from offshore.

CAP1402: Beware! poster - items not allowed in checked or cabin baggage | Civil Aviation Authority (caa.co.uk)

The individual Helicopter Operator has the legal right to determine what items can and cannot be carried on their aircraft therefore there may be inconsistencies between Helicopter Operators.

For flying offshore, a clear list should be defined by the Duty Holder / Vessel operator detailing clearly what is prohibited on the installation or vessel.

If any passenger does not declare prohibited items that are found in their baggage or on their person, they will be required to be removed from the flight and the Duty Holder / Vessel owner informed for an investigation to be undertaken.

Everything that is carried in baggage should be for personal use only, personal laptops/tablets are acceptable, although they could have a work purpose. Knives along with work items such as spare parts, test equipment or information folders should go as airfreight following the Duty Holder/Vessel operator's policy.

A list of prohibited items should be issued to the passenger as part of any mobilisation guidance documents/inductions. This should detail what is permitted and what is not based on company policies.

29 PEDs

The CAA and other aviation regulatory bodies class lithium-based batteries as dangerous goods as they are deemed to pose a hazard to passengers and aircraft.

Aviation Operators, installation Duty Holders and national and international trade associations are working collaboratively to manage the hazards associated with the carriage of these dangerous goods to reach a common set of rules. These rules are aimed at balancing the risks whilst also acknowledging that PEDs have become an established part of normal life. Until this issue has been resolved passengers should check the aviation operator's rules before mobilising and should take action to minimise the number of PEDs they travel with.

29.1 Definition and terminology

The term PED or Personal Electronic Device is a generic term for a device that carries batteries. The main concern under the category is battery-powered equipment containing lithium batteries and the carriage of spare batteries.

The CAA as well as other aviation regulators worldwide consider the carriage of PEDs as one of the biggest risks to aviation safety, a PED incident has the potential to compromise the safety of personnel and the aircraft.

29.2 Hazards

Lithium-ion batteries used in PEDs have the potential to catch fire. These fires pose a greater risk during rotary aviation operations due to the increased consequence of fire whilst in flight. Commercial fixed-wing aviation has numerous control measures in place to limit the effect of any incident. Offshore helicopter flights cannot adopt all the mitigating measures and therefore more stringent rules around (PEDs) are required to limit the likelihood and consequences of an escalating fire incident.

29.3 Lithium Batteries

Lithium batteries can be separated into two broad groups:

- Lithium metal batteries contain metallic lithium as a component of the battery, typically the anode. In general terms, lithium metal batteries are non-rechargeable and are the types found in devices such as watches, car remote control fobs, emergency locator beacons and defibrillators

- Lithium-ion batteries contain no metallic lithium and instead, the lithium exists in an ionic form. Lithium-ion batteries are rechargeable and used in consumer devices such as mobile phones, tablets and laptops; larger lithium-ion batteries are used in e-bikes and electric vehicles.

Poorly manufactured, faulty and misused lithium batteries and those which have not been protected against short-circuiting can experience an event called ‘thermal runaway’. This results in them getting so hot that they can catch fire, explode and ignite other nearby batteries.

Guidance can be found here on Batteries:

https://www.iata.org/contentassets/6fea26dd84d24b26a7a1fd5788561d6e/passenger-lithium-battery.pdf

https://www.caa.co.uk/batteries

29.4 Alkaline Batteries

Alkaline batteries have the potential to be hazardous, as they can catch fire if they are not handled or stored correctly. Although the main concern is with lithium, some Duty Holders are treating these the same as lithium batteries. The decision for the carriage of any battery lies with the helicopter Operator.

29.5 Non-Personal Electronic Equipment

Equipment such as UAS Systems (Drones), multi-meters, battery drills and other electronic test equipment and tools are deemed Portable Electronic Devices for professional use. Such items should be treated as freight with the appropriate MSDS following the Dangerous Goods Process, which may require the equipment to go by sea.

29.6 Duty Holder Action

Under the UK Aviation Regulations, this is the responsibility of the helicopter operator to determine what can and cannot be carried in the aircraft. The Duty Holder should agree with the helicopter operator on the policy for PEDs.

29.7 Passenger Check

- Before mobilisation check the Helicopter Operator rule for PED carriage
- Plan your PEDs to ensure that where possible the number taken by a passenger is as low as possible.
- Ensure the type of battery for each device is understood.
- Ensure the PED is free from defects and physical damage.
- The PED has a protective case or has custom wrapping (i.e., not wrapped in clothing).
- Devices with flight-safe mode are required to be placed in this before being powered down.
- All equipment with Batteries are required to be switched off and in a protective case and cannot be switched on accidentally.
- Replacement batteries are by the original equipment manufacturer.
- Battery equipment is for personal use and not for undertaking work (except for Laptops etc).

WARNING: Some devices can be powered on by opening the unit for use. If the equipment does then, it has an OEM-designed case/sleeve that prevents the unit from opening / switched on, or the unit should be shipped by sea freight.

29.8 Safety Check (Offshore)

CAP 437, Appendix K, contains details on Portable Electronic Devices and recommendations on baggage checks from flights originating offshore installations, which should be adhered to.

A helicopter operator-approved procedure should be documented for baggage checks to ensure no prohibited items are travelling undeclared, or PEDs not switched off. Additionally, details of the bag searches should be recorded. These should be evidenced on request. The procedure should also detail the requirements for the finding of any non-compliance and a process for reporting this through the organisation to prevent reoccurrence.

On onshore arrival, the operators reserve the right to conduct ad hoc bag searches and non-compliant items will be reported and recorded.

30 UAS Operations

30.1 Introduction

Although a subject within itself, this section gives some basic guidance for UKCS UAS (Drone) operations offshore.

UASs are commonly known as drones and come in various sizes and camera configurations, UASs carry lithium batteries normally which carry risk in the event of a fault developing that causes the UAV to crash.

The Air Navigation Order (ANO) also covers UAS operations and forms the basis of prosecutions when UASs are flown irresponsibly. The ANO can be found here:

https://www.legislation.gov.uk/uksi/2017/1112/contents/made

The HSE inspectors have a guide for offshore aviation, Appendix 7 should be reviewed for information. The information can be found here:

https://www.hse.gov.uk/offshore/assets/docs/aviation-helideck-operations-inspection-guide.pdf

UASs have multiple uses offshore, these include:

- Inspection (Images, video, Thermal imaging, Lidar)
- Images / Video for public relations. media purposes
- Emergency Response

To operate in UK airspace, there are three categories of operations:

- Open Category – Low risk, no CAA approval.
- Specific Category – Medium to high risk, CAA Approval required.
- Certified Category – Medium to high risk, CAA Approval required.

30.1.1 CAA Approved Categories

Any offshore operations involving UASs will require to be conducted by UAS operators within the Specific or Certified Category. Both these approvals are issued by the UK CAA and require an Operations Manual. The Open Category is not a category that the CAA issues approvals for and allows the UAS operator to operate in low-risk operations. Private use of drones offshore should be forbidden due to the lack of an Operations Manual, Liability Insurance, and UAS pilot competency process.

Therefore, a UAS should not be flown in the Open Category offshore or as a personal operation using a lightweight UAS, these are aimed at a low-risk level of operations.

Information about the categories and specific UAS requirements can be found in CAP722:

https://publicapps.caa.co.uk/modalapplication.aspx?appid=11&mode=detail&id=415)

30.1.2 VLOS

All UAS operations are limited to flying Visual Line of Sight (VLOS) with a maximum height of four hundred feet AGL, offshore this would be Above Mean Sea Level (AMSL) and 500M laterally. A VLOS Operation is defined within UK Regulation (EU) 2019/947 as:

'*a type of UAS operation in which, the remote pilot can maintain continuous unaided visual contact with the unmanned aircraft, allowing the remote pilot to control the flight path of the unmanned aircraft in relation to other aircraft, people and obstacles for the purpose of avoiding collisions.*'

The UAS is required to be always visible to the pilot, flying it underdeck and out of sight of the pilot is not VLOS. The take-off location for the UAS pilot should be selected with this in mind.

30.1.3 EVLOS

When UASs are used with Extended Visual Line of Sight (EVLOS) these typically are flown at a height or distance greater than that stated on the VLOS requirements. To fly EVLOS, the operator will have applied to the CAA with an Operational Safety Case outlining the operational requirements. EVLOS would be used with payload carrying UASs between installations as an example.

30.1.4 BVLOS

When UASs are used Beyond Visual Line of Sight (BVLOS) these typically are flown from airfields out to the installation, vessel, wind farm, or pipeline route. These activities are planned with the local Air Traffic Control Service which may issue NOTAMS and implement Temporary Danger Areas (TDAs). The UAS is controlled remotely from the operator's equipment on the airfield or a remote location.

The CAA are undertaking a lot of work and trials on BVLOS which is continually evolving.

30.1.5 Operating range and restrictions

The approval requires that uninvolved persons and structures are a minimum distance of 30 Meters away during take-off and landing and fifty meters when the UAS is in flight. On an offshore installation, it will be communicated to all parties about the UAS task and the controls which will make everybody on the site involved. This allows the UAS to be flown closer to people.

The Specific Category is for UASs below 25kg in weight, the operator will have an Operations Manual which the CAA reviews annually. This category is for high-risk UAS tasks. The operator may have additional approvals to operate above 400 ft AGL and beyond five hundred meters, EVLOS or BVLOS through Operational Safety Cases issued by the CAA.

The Certified Category is aimed at drones heavier than 25kg and that carry out specialised tasks e.g., BVLOS operations such as pipeline monitoring or carrying payloads.

30.1.6 Task planning

Under the Specific and Certified categories, the UAS operator is required to conduct and document a site survey before each flight and conduct a risk assessment to comply with their Operations Manual. This is in addition to any permit-to-work / ISSOW requirements from the Duty Holder / Vessel owner.

The survey also requires that the weather be checked and monitored throughout the flight as each UAS has operating limits that are detailed in the UAS Operator's Operations Manual.

The UAS task will also be under a Permit-to-work (PTW) system that may impose additional controls such as no UAS operations within one hour of a helicopter's arrival.

30.1.7 CAA Registration

UASs are required to be marked with the Operator ID issued by the CAA. To check an Operator ID, the number should be supplied by the UAS operator then this can be checked with the CAA by using the following link:

Check someone's registration status | UK Civil Aviation Authority (caa.co.uk)

Pilots will also all hold Flyer IDs issued by the CAA. This is a legal requirement. These IDs will be listed in the Operations Manual written by the UAS company and approved annually by the CAA. The approval issued by the CAA will state the limitations, an example is detailed in Figure 96.

Figure 98: Operating Limitations of the UAS from the CAA Approval

4.5. **Operating heights/altitudes/levels**	a. The unmanned aircraft must be maintained within 120 metres (400ft) from the closest point of the surface of the earth. b. Obstacles taller than 105m may be overflown by a maximum of 15m provided that: (i) The person in charge of the obstacle has requested this; and, (ii) The unmanned aircraft must not be flown more than 50m horizontally from the obstruction.
4.6. **Maximum operating range**	Maximum horizontal range of 500 metres from the remote pilot, unless a lesser control link radio range has been specified by the UAS manufacturer.

Source: Cabro Aviation Ltd

When using UASs, areas with potentially flammable/explosive atmospheres (Hazardous Areas) should be considered. Any flights using UASs inside modules, cargo tanks etc do not fly in aviation airspace and therefore do not require operational approval, but for good management companies undertaking this work should hold an appropriate CAA approval as the process for flying the UAS is standardised. Exhausts and flares emit high temperatures in the plumes, and vents that may contain unburnt gas should be avoided.

30.1.8 Non-UK Operators

Vessels entering the UKCS may have drone operators onboard who may not have a UK CAA Flyer or Operator ID. The CAA guidance for non-UK operators. Such as crews onboard foreign vessels entering the UKCS that:

"If you are an unmanned aircraft operator from overseas and want to fly in the UK, then you must register as a UK operator and comply with the same requirements that would apply if you were based in the UK."

"There is some scope for valid national documents relating to operator certification, remote pilot competency or even national operational authorisations to be accepted by the CAA as part of a risk assessment. This is particularly the case where the regulatory environment in the operator's parent country is like that of the UK (e.g., EU Member States)."

Vessels entering the UKCS, typically Heavy Lift Vessels, Construction Vessels use UASs for social media/publicity of projects when contracting such vessels this requires that for any UAS operations, the organisation chartering the vessels should carry out a check that they are approved to operate in the UKCS through a CAA permission. The UAS operator, if not UK-approved should contact UAVEnquiries@caa.co.uk for guidance.

30.1.9 Use of the helideck

The obvious take-off location for a UAS is normally the helideck. If this is the case, then the UAS crew should limit the equipment taken onto the helideck and when the task is completed a sweep of the helideck is required to be undertaken to check for FOD. Any UAS flights should also take place when no helicopter operations are planned for the helideck or nearby installations.

Caution should be taken when using a UAS to obtain images whilst a helicopter is landing/taking off or on the helideck. Some UAS platforms have a RTH "return to home function" which on a communication failure or low battery will return to its point of take-off. If this was the helideck before a helicopter's arrival, then there is a risk that the UAS will collide with the helicopter on deck. As part of the task, consideration should be given to avoid putting on RTH settings Consideration should be given to setting the UAS to "Hover" if there is a communication with the UAS issue which disconnects and tries to reconnect before the battery runs out.

If planning a UAS task to capture images of a helicopter on a helideck, then this should be done in advance and in agreement with the Helicopter Operator. A clear area of operation should be defined which also requires the take-off/landing area to be an area other than the helideck. An action plan should be agreed upon before and when the UAS is launched, where it will hold until the task commences, an observer that has a ROCC-OCS with a radio will be able, on request from the flight crew or HLO, to give the location and height of the UAS. The location of the UAS area of operation should be parallel to the approach and departure headings of the helicopter and never directly ahead of a landing helicopter in case a missed approach occurs. If at any point the flight crew requested the UAS task to cease, then the UAS is required to land in an agreed location ASAP.

Figure 99: UAS operating from a helideck

Source: Air Control Entech Ltd

30.1.10 UAS Incidents

If an Incident occurs with a UAS, the process for notifying the various bodies is detailed in the UAS operators Operations Manual and details in the CAA Document CAP 722.

These are:

- The UAS company's Accountable Manager
- The AAIB
- The CAA
- Airprox (proximity of another UAS or aircraft)

The Installation or vessel may also be required to:

- Carry out an Incident Report / Near miss Report.
- Report the Loss of the UAS if in the sea noting the lithium-based battery details.

30.1.11 Aviation use for UASs.

One area for the use of a UAS is detailed in CAP437 Appendix A Section 11. "The requirement is "photographs of the offshore location showing the helicopter landing area from the four main compass quadrants (N, S, E, W) at a range of 0.25 to 0.5 NM and a height above the helideck of approximately 200 ft;"

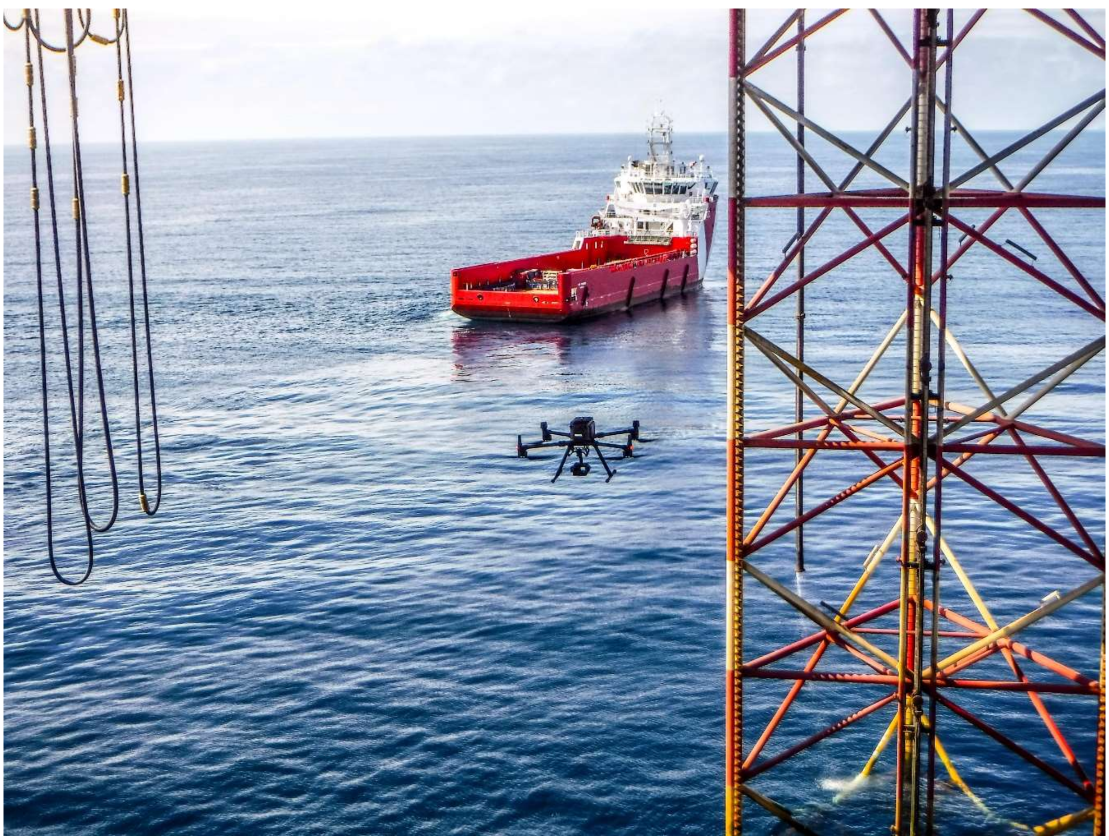
A UAS operating in the Specific Category can fly up to a maximum distance of five hundred meters and a maximum height of four hundred Feet in Visual Line of Sight (VLOS). This maximum distance is approximately 0.27 NM which is just within the requirements of CAP437 photographic requirements of a helideck. If the Operator has approval for Extended Visual Line of Sight (EVLOS) then this is not an issue. The suggested alternative is that the UAS operation takes place from a vessel allowing 0.25-0.5 NM from the Helideck being Photographed.

30.1.12 IOPG Guidance

IOGP have produced Report 696 – Remotely Piloted Aircraft Systems (RPAS) provides recommended practices that will assist in the safe and effective management of RPAS operations.

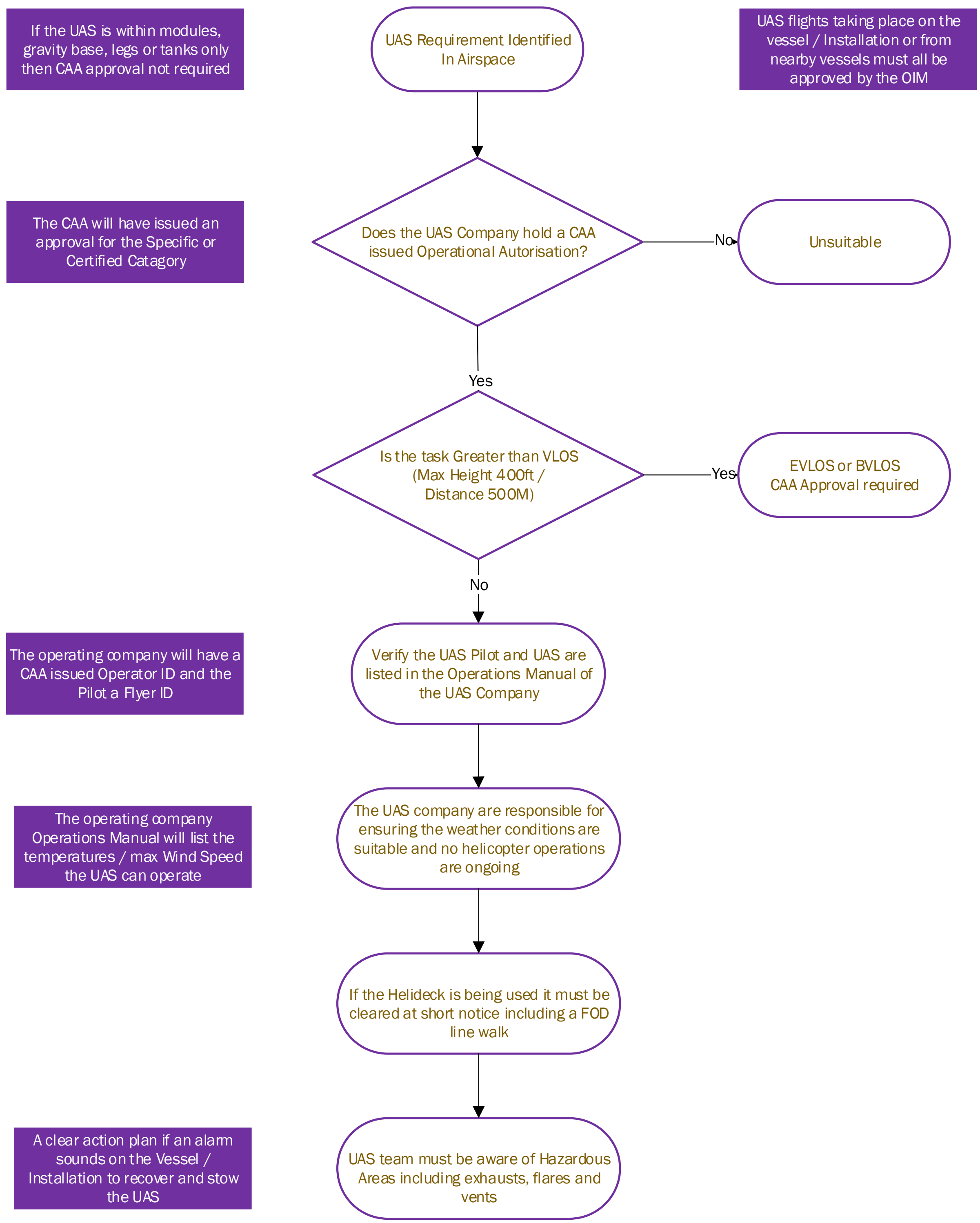
https://www.iogp.org/bookstore/product/remotely-piloted-aircraft-systems/

Figure 100: UAS operating offshore



Source: Air Control Entech Ltd

Figure 101: UAS Operator Check



Source: Cabro Aviation Ltd

OEUK.org.uk

Offshore Energies UK Guidelines
Member companies dedicate specialist resources and technical expertise in developing these guidelines with OEUK with a commitment to work together, continually reviewing and improving the performance of all offshore operations.

Guidelines are free for our members and can be purchased by non-members.

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