



International  
Association  
of Oil & Gas  
Producers

## IOGP REPORT 690-4 Engineering



# 1. Basic principles

## 1A. Purpose

Ensuring aircraft are airworthy and reliable.

## 1B. Expectations

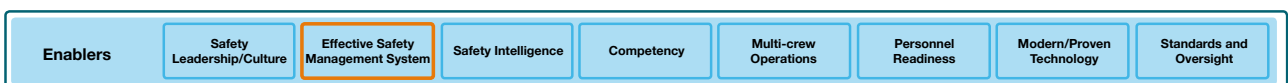
The Aircraft Operator provides airworthy aircraft and demonstrates that continuing airworthiness activities and aircraft maintenance are performed in accordance with its approved Maintenance Control Manual (MCM).

## 1C. Processes and practices

- 1C.1 All appropriate organizational approvals and certificates as required by the National Aviation Authority (NAA) are in place.
- 1C.2 A competent manager (Post-holder, Department Manager, or equivalent), is accountable for the aircraft operator’s management of continuing airworthiness and maintenance, or any contracted continuing airworthiness or maintenance organizations. Where applicable they are approved by the NAA.
- 1C.3 The aircraft operator has an internal Aircraft Maintenance Organization (AMO) or a contract with an external AMO to perform maintenance activities for the aircraft operator. This details the scope of contracted activity and the interfaces between the operator and the contracted party.
- 1C.4 The aircraft operator’s continuing airworthiness management has a process to communicate requirements, such as formal work orders, to the internal or contracted AMO, clearly describing what maintenance is required, when it has to be performed and to what standard, based on manufacturers’ recommendations or the Approved Maintenance Programme (AMP).
- 1C.5 The aircraft operator has a MCM or equivalent document which meets the requirements of ICAO Annex 6 Part III Chapter 6.2.

## Guidance documents

- ICAO Annex 6
- ICAO Doc 10086
- HeliOffshore Safety Performance Model



**CONTINUING AIRWORTHINESS**

## 2. Continuing airworthiness - management

### 2A. Purpose

Ensuring aircraft are airworthy and reliable.

### 2B. Expectations

The Aircraft Operator is responsible for the continuing airworthiness of its aircraft.

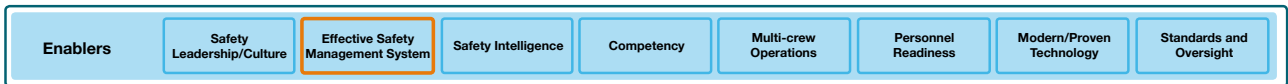
### 2C. Processes and practices

- 2C.1 An AMP is developed and reviewed in accordance with applicable regulations and approved by the NAA.
- 2C.2 All airworthiness data and instructions are reviewed and managed, including any Airworthiness Directives (ADs) from the applicable NAA and Service Bulletins (SBs) from the Original Equipment Manufacturer (OEM) or Supplemental Type Certificate (STC) holder.
- 2C.3 Any operational directives or other measures mandated by the governing airworthiness authority in response to a safety issue or an issue reported by a relevant authority are implemented.
- 2C.4 All defects or damage affecting safe operation, are rectified in accordance with applicable regulations or managed in accordance with the approved Minimum Equipment List (MEL), or contract Minimum Departure Standard (MDS).
- 2C.5 Maintenance data is retained (see Section 5.2.3 Maintenance Data).
- 2C.6 All maintenance is planned in accordance with the AMP.
- 2C.7 All maintenance is controlled and it has been executed by an AMO to the required standard and in adherence to applicable regulations and maintenance data.
- 2C.8 Modifications are accomplished using data approved by the governing NAA.
- 2C.9 All continuing airworthiness records (e.g., airframe/ engine logbooks, life limited parts and log cards), including the aircraft operator technical log are properly managed in accordance with the aircraft operator's procedures.
- 2C.10 The aircraft configuration is monitored and it reflects the current status of the aircraft in accordance with the Type Certificate (TC).
- 2C.11 Procedures are developed to be included in a manual approved by the NAA, to identify the numbers, duties and responsibilities, qualifications and competence of the staff employed to accomplish the above tasks; and how airworthiness related activities, including those described above, will be accomplished.

## CONTINUING AIRWORTHINESS

### Guidance documents

- ICAO Annex 6
- BARSOHO BIG 2.4
- HeliOffshore Safety Performance Model



## CONTINUING AIRWORTHINESS

### 3. Continuing airworthiness – approved maintenance programme

#### 3A. Purpose

Ensuring aircraft are airworthy and reliable.

#### 3B. Expectations

The Aircraft Operator manages an AMP for each aircraft type operated.

#### 3C. Processes and practices

3C.1 The AMP complies with the following:

3C.1.1 Instructions issued by the NAA

3C.1.2 Instructions for continuing airworthiness issued by the OEM and holders of type certificates and supplemental type certificates

3C.1.3 Instructions for continuing airworthiness issued by approved design organizations for modifications and repairs

3C.1.4 Additional instructions proposed by the aircraft operator and approved by the OEM/STC holder and NAA

3C.2 The aircraft is only maintained according to one AMP.

3C.3 The AMP is approved by the NAA and is reviewed at least annually, considering the environmental conditions and aircraft utilization, to:

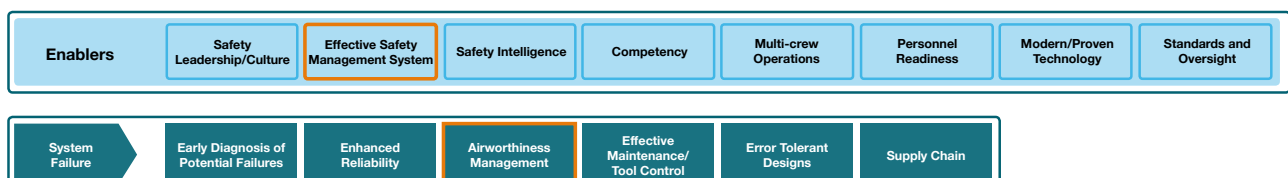
3C.3.1 Ensure compliance with new and/or modified maintenance instructions included in the documents affecting the programme basis (e.g., from the OEM or Maintenance Review Board (MRB))

3C.3.2 Evaluate the AMP effectiveness by monitoring systems, equipment and component reliability, aiming to reduce repetitive defects, malfunctions and damage to a minimal level

3C.3.3 Adherence to scheduling of inspection and maintenance tasks; the source of such scheduling includes internal or external organizations, MRBs, OEM instructions or directives from the governing airworthiness authority

#### Guidance documents

- ICAO Doc 9760
- HeliOffshore Safety Performance Model



**CONTINUING AIRWORTHINESS**

# 4. Continuing airworthiness – maintenance data

**4A. Purpose**

Ensuring maintenance is conducted to the approved maintenance programme and standards.

**4B. Expectations**

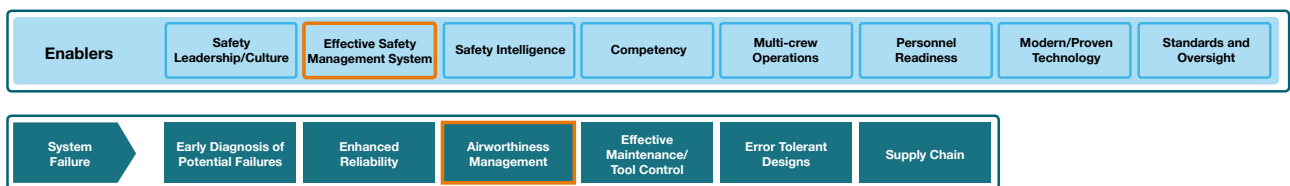
The Aircraft Operator manages the appropriate maintenance data (any applicable requirement, AD, SB, or information issued by the OEM/STC holder and/or NAA).

**4C. Processes and practices**

- 4C.1 All airworthiness data and instructions including any ADs from the applicable NAA, are tracked.
- 4C.2 All ADs and SBs are evaluated using a documented assessment procedure.
- 4C.3 All mandatory SBs are embodied, and there is an embodiment policy regarding OEM/STC holder recommended/optional SBs and any applicable bulletins are applied to both aircraft and stored components.
- 4C.4 The maintenance of a list of compliance by airframe, engine, and STC installed appliance and developing a method to clearly demonstrate the status of compliance for each airframe and currently installed components.
- 4C.5 All applicable maintenance data, including manuals, is current and readily available for use by the continuing airworthiness and AMO staff.
- 4C.6 The current revision status, including temporary revision, of all applicable maintenance data and documentation within the organization (e.g., maintenance manuals, parts catalogues and bulletins) is tracked and checked against the source documents of the OEM. This includes all master copies and copies distributed to the AMO, out-stations, or contractors.

**Guidance documents**

- ICAO Doc 9760
- HeliOffshore Safety Performance Model



**CONTINUING AIRWORTHINESS**

## 5. Continuing airworthiness - minimum equipment list/minimum departure standard

**5A. Purpose**

Ensuring aircraft are airworthy and reliable.

**5B. Expectations**

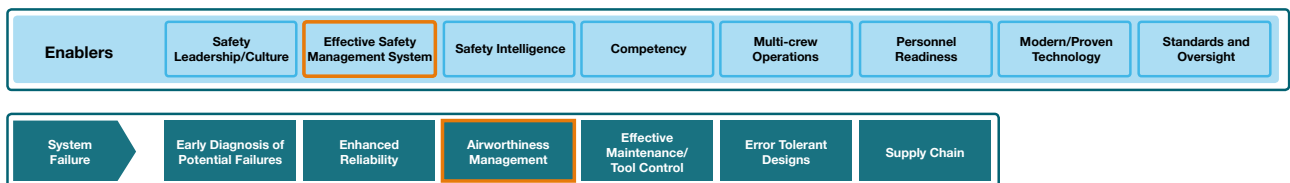
The Aircraft Operator has a Minimum Equipment List (MEL)/Minimum Departure Standard (MDS) for each aircraft in the fleet.

**5C. Processes and practices**

- 5C.1 The MEL is developed by the aircraft operator and based on, but is no less restrictive than, the OEM Master Minimum Equipment List (MMEL) and is approved by the NAA.
- 5C.2 Where permitted by local regulations, Non-essential Equipment and Furnishings (NEF) are incorporated into the MEL or a supplement to the MEL.
- 5C.3 The MEL/MDS are readily available to flight crews and maintenance personnel for reference.
- 5C.4 Required equipment as detailed in contract requirements, in addition to the MEL requirements, are controlled by an MDS, or equivalent.
- 5C.5 Notify the Pilot-in-Command (PIC) of all deferred defects that affect, or may affect, the safe operation of the aircraft so that the PIC retains the final decision on acceptance of an aircraft with deferred defects.

**Guidance documents**

- ICAO Annex 6 Part
- ICAO Doc 9760
- HeliOffshore Safety Performance Model



## CONTINUING AIRWORTHINESS

# 6. Continuing airworthiness – aircraft maintenance records

### 6A. Purpose

Ensuring maintenance is conducted to the approved maintenance programme and standards.

### 6B. Expectations

The Aircraft Operator maintains proper maintenance and flight records.

### 6C. Processes and practices

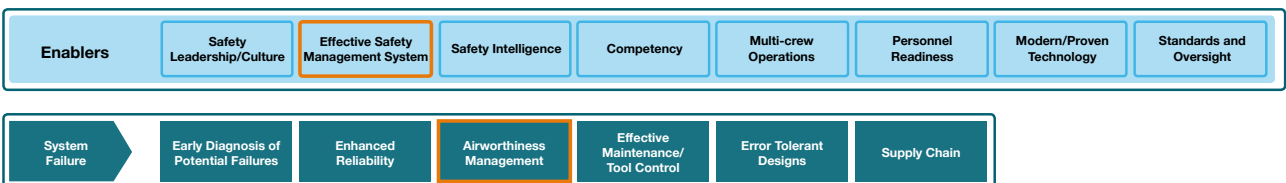
- 6C.1 Maintenance and flight records are maintained as required by applicable national regulations.
- 6C.2 Document an aircraft records process which, as a minimum, consists of the following documents:
  - 6C.2.1 The airframe logbook
  - 6C.2.2 The engine logbook(s) and related components log cards
  - 6C.2.3 The Auxiliary Power Unit (APU) logbook(s) (if applicable)
  - 6C.2.4 Log cards for any Service Life Limit (SLL) and Time Between Overhaul (TBO) component
  - 6C.2.5 The Aircraft Technical Log (ATL)
- 6C.3 The above aircraft records contain complete and current:
  - 6C.3.1 ADs, SBs, or information issued by the OEM/STC holder and NAA
  - 6C.3.2 Status of modifications and repairs
  - 6C.3.3 Status of compliance with the AMP
  - 6C.3.4 Status of SLL components
  - 6C.3.5 Mass and balance report
  - 6C.3.6 List of deferred defects
- 6C.4 An ATL is used that meets local NAA requirements and:
  - 6C.4.1 Details of the ATL content requirements are documented
  - 6C.4.2 All defects are immediately recorded in the ATL post-flight
  - 6C.4.3 There is provision for the PIC to sign and date such entries including, where appropriate, a nil defect state post-flight
- 6C.5 All the above-mentioned continuing airworthiness records are managed by means of a reliable aviation maintenance software programme, or equivalent, capable of managing:
  - 6C.5.1 Component tracking, including any condition-based penalties cycles from operational flight data (e.g., increased gross weight, start/stop engine cycles, One Engine Inoperative (OEI) events, etc.)

**CONTINUING AIRWORTHINESS**

- 6C.5.2 Flight time tracking
- 6C.5.3 Logbook tracking
- 6C.5.4 Compliance tracking for all issued ADs and SBs
- 6C.5.5 Work Order management, including:
  - 6C.5.5.1 The requirements of the approved AMP for each aircraft type
  - 6C.5.5.2 Control of the forecasting and recording of aircraft and component maintenance as detailed within the appropriate AMP
  - 6C.5.5.3 Details of the required maintenance “due lists” in terms of flying hours, cycles, landings or calendar intervals
- 6C.5.6 Inventory control
- 6C.5.7 Deferred defect tracking
- 6C.6 All maintenance records of work carried out on its aircraft are maintained to demonstrate that the work has been executed to the required standard.
- 6C.7 The records are stored in a secure manner that ensures protection from damage, alteration, and theft.
- 6C.8 Electronic records have a backup system which is updated at least every 24 hours.

**Guidance documents**

- ICAO Annex 6
- HeliOffshore Safety Performance Model



**CONTINUING AIRWORTHINESS**

# 7. Continuing airworthiness – reliability programme

**7A. Purpose**

Ensuring aircraft are airworthy and reliable.

**7B. Expectations**

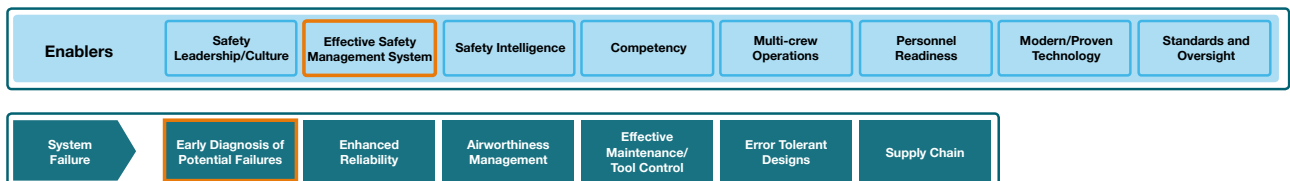
The Aircraft Operator has a reliability programme in place appropriate to the size and complexity of the operation.

**7C. Processes and practices**

- 7C.1 The aircraft operator has a reliability programme that monitors the effectiveness of the maintenance programme by recording, as a minimum:
  - 7C.1.1 Component Low Mean Time Before Unscheduled Removals (MTBUR) by aircraft type
  - 7C.1.2 Flight hour trends of non-serialized parts usage by aircraft type
  - 7C.1.3 Flight hour model trends of MEL/MDS usage by system by aircraft type
  - 7C.1.4 Flight hour pilot reported discrepancy trends by aircraft type
- 7C.2 There is a procedure in place to alert the OEM/TC/STC holder to any design feature that increases the risk of a critical error where practical.
- 7C.3 There is a procedure in place to regularly communicate reliability data with the OEM/TC/STC holder with a focus on improving low performing systems and extending inspection intervals (human error risk reductions) on repeated “no defect noted” inspections of non-flight critical systems where practical.

**Guidance documents**

- ICAO Annex 8
- ICAO Doc 9760
- HeliOffshore Safety Performance Model



**CONTINUING AIRWORTHINESS**

## 8. Continuing airworthiness – workplace

**8A. Purpose**

Ensuring aircraft are airworthy and reliable.

**8B. Expectations**

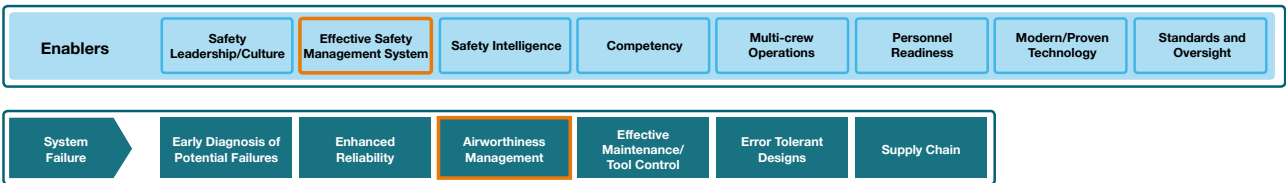
The Aircraft Operator provides suitable accommodation for continuing airworthiness staff.

**8C. Processes and practices**

- 8C.1 Continuing airworthiness staff are provided with suitable office accommodation so that they can carry out their designated duties in a manner that contributes to upholding good standards.
- 8C.2 A dedicated space for a technical library is included in the accommodation, and fireproof lockers are provided for hard copies of airworthiness records.

**Guidance documents**

- ICAO Doc 9760
- HeliOffshore Safety Performance Model



**MAINTENANCE MANAGEMENT**

# 9. Maintenance management – Aircraft Maintenance Organization procedures

**9A. Purpose**

Ensuring maintenance is conducted to the approved maintenance programme and standards.

**9B. Expectations**

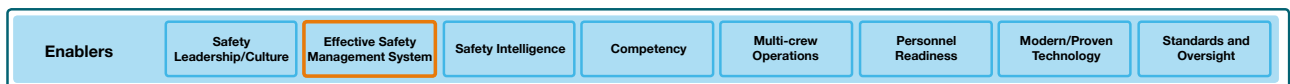
The maintenance organization has a set of documented procedures.

**9C. Processes and practices**

- 9C.1 Document procedures in a dedicated manual (e.g., Company Maintenance Manual and Maintenance Organization Exposition (MOE)) that is approved by the NAA and amended as necessary and reflects the actual organization processes in place.
- 9C.2 Document procedures for Quality Assurance (QA) or Quality Control (QC) to allow the maintenance organization to verify that all maintenance and administration is properly performed and to monitor compliance with procedures and regulatory requirements, including contracted maintenance.
- 9C.3 Ensure the supplier approval process and any contracted maintenance is appropriate for the scale and scope of work, and a list of current contracted (and sub-contracted) organisations is maintained.

**Guidance documents**

- ICAO Annex 8
- ICAO Annex 6
- HeliOffshore Safety Performance Model



**MAINTENANCE MANAGEMENT**

# 10. Maintenance management - maintenance planning

**10A. Purpose**

Ensuring maintenance is conducted to the approved AMP and standards.

**10B. Expectations**

An effective process for scheduling of maintenance is in place.

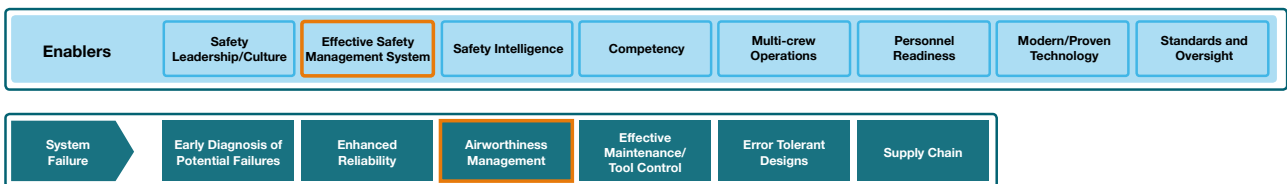
**10C. Processes and practices**

10C.1 The planning of maintenance, in accordance with the AMP, is executed by using reliable software, or equivalent which allows for traceability.

10C.2 Formal work orders, or similar, listing each scheduled maintenance inspection/check/repair/modification required, are issued by the Continuing Airworthiness Management and performed by the AMO.

**Guidance documents**

- ICAO Annex 8
- HeliOffshore Safety Performance Model



**MAINTENANCE MANAGEMENT**

# 11. Maintenance management - maintenance records

**11A. Purpose**

Ensuring maintenance is conducted to the approved AMP and standards.

**11B. Expectations**

The maintenance organization keeps detailed maintenance records, allowing the airworthiness status and history of the aircraft to be clearly established.

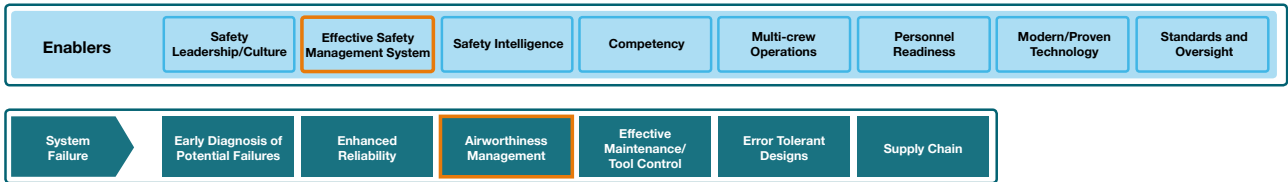
**11C. Processes and practices**

- 11C.1 Detail accomplishment of each maintenance task in a work card or worksheet system (or electronic equivalent), which contains detailed records of the work carried out.
- 11C.2 Any parts utilized in the performance of said tasks are determined through the paper or electronic system.
- 11C.3 Maintenance records are neat, legible, and complete in accordance with aircraft operator procedures and local regulation.
- 11C.4 Staged Work Sheets (SWS) or computerized task cards are in place for complex tasks that require the use of multiple OEM maintenance manuals or reference materials, (e.g., engine changes) or are likely to be handed over between shifts.
  - 11C.4.1 SWS are in place for tasks where the aircraft operator is required to record information and has elected to utilize forms for the process.
  - 11C.4.2 SWS are part of a revision process to ensure engineers are using the correct revision of the technical publications.
  - 11C.4.3 Design the SWS to reduce the likelihood that steps within a complex task are inadvertently missed and to specifically identify the point(s) at which independent inspections are required as part of the task, or prior to it being hidden during subsequent work.
- 11C.5 Any duplicate/independent inspection requirement is clearly identified and signed off.
- 11C.6 Identifying stamps or electronic signatures are detailed in the aircraft operator procedures and are listed in the organization's documented processes against the names of the authorized personnel.
- 11C.7 The work cards or work sheets are collected into a work package which contains maintenance records in a structured manner.
- 11C.8 Maintenance records refer to the revision status of the maintenance data used.
- 11C.9 All maintenance records are checked for completeness and compliance as detailed in the aircraft operator procedures.

## MAINTENANCE MANAGEMENT

### Guidance documents

- ICAO Annex 6
- HeliOffshore Safety Performance Model



**MAINTENANCE MANAGEMENT**

# 12. Maintenance management - Foreign Object Debris checks

**12A. Purpose**

Ensuring maintenance is conducted to the approved AMP and standards.

**12B. Expectations**

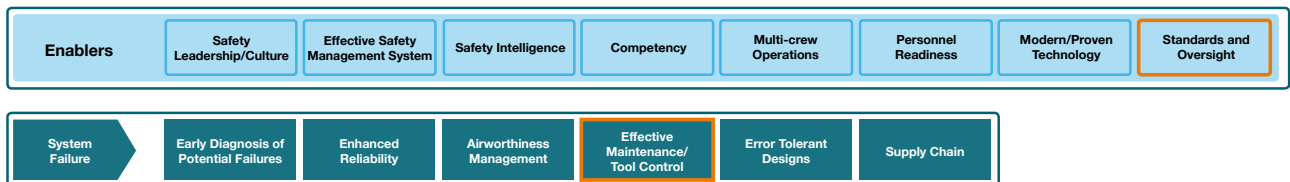
The AMO has a process for a post-maintenance verification check for damage, security, tools, and equipment.

**12C. Processes and practices**

- 12C.1 On completion of each maintenance task, a verification check is carried out to ensure the aircraft or component is clear of all tools, equipment, cleaning materials, such as rags, and any other extraneous parts and material, and that all access panels removed have been refitted correctly.
- 12C.2 The verification check is recorded on the maintenance work card system.
- 12C.3 Implement a process to prevent Foreign Object Debris (FOD) on aircraft and components under maintenance.
- 12C.4 Procedures are in place to conduct leak checks when any maintenance has been performed which compromises the integrity of the fuel, oil, hydraulic or pitot static systems.
- 12C.5 Prevent FOD in areas used for maintenance activities, engine ground running and flight line activities.

**Guidance documents**

- HeliOffshore Safety Performance Model



## MAINTENANCE MANAGEMENT

# 13. Maintenance management - independent inspections (Note1)

### 13A. Purpose

Ensuring design and continuing airworthiness practices minimize the probability and consequence of human error in maintenance.

### 13B. Expectations

There is a procedure to clearly identify and document Critical Maintenance Tasks (CMT).

### 13C. Processes and practices

- 13C.1 CMTs are subject to an independent inspection, carried out firstly by an engineer holding a "Certificate of Release to Service (CRS)" authorization, who assumes full responsibility for the satisfactory completion of the work, then a second person not involved in the original task, or similar system (e.g. other engine), who confirms that no deficiencies have been found and that the work has been satisfactorily completed.
- 13C.2 The training, competence and authorization requirements for those staff approved to perform independent inspections on the aircraft or components are documented.
- 13C.3 CMT procedures are detailed for independent inspections during complex or lengthy tasks using staged worksheets (e.g., an engine or gearbox replacement, where independent inspections are performed at key stages of the overall task to ensure the current work is properly inspected and certified, before it is covered by further assembly).
- 13C.4 There is a procedure to alert the Type Certificate (TC) Holder or STC Holder to any design features or maintenance requirements that increase the risk of critical error if/when identified.
- 13C.5 CMTs are also identified as part of the aircraft operator's Safety Management System (SMS). These may include simple, repetitive tasks, which have been identified as being prone to error (engine cowling closure, oil caps) are subject to a secondary inspections and procedures are in place for these tasks.
- 13C.7 Other CMTs may include emergency safety equipment as directed by the company.
- 13C.8 Single engineer independent inspection processes or procedures are prohibited.

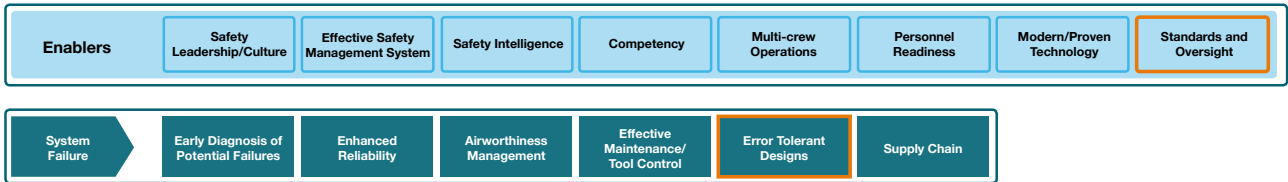
Note 1:

- The principle of additional inspections on critical aircraft systems is well understood and accepted.
- National Aviation Authorities (NAA) have given these additional inspections different titles: Duplicate Inspections by the UK CAA; Independent Inspections by CASA and EASA; Required Inspection Items (RII) by the FAA; and Dual Inspection or Independent Check by Transport Canada.

## MAINTENANCE MANAGEMENT

### Guidance documents

- UKCAA CAA PAPER 2002/06
- HeliOffshore Safety Performance Model



## MAINTENANCE MANAGEMENT

# 14. Maintenance management – release to service

### 14A. Purpose

Ensuring maintenance is conducted to the approved AMP and standards.

### 14B. Expectations

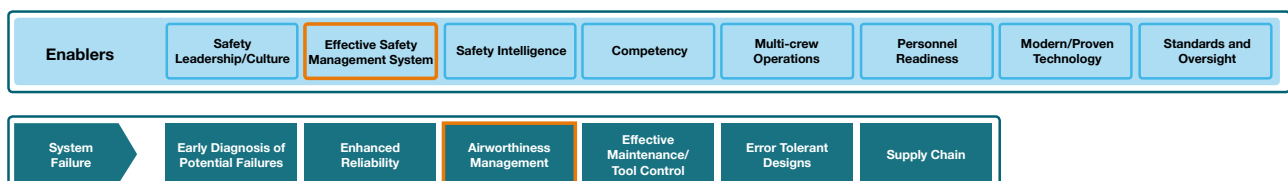
The aircraft operator has a documented system of maintenance control and release to service of all aircraft.

### 14C. Processes and practices

- 14C.1 The aircraft operator will not operate an aircraft unless it is maintained and released to service by an AMO.
- 14C.2 Document a system of 'maintenance release to service' for all aircraft, whether the AMO is in-house or a contracted organization, that demonstrates the work specified in the work order is carried out in accordance with the applicable rules and an appropriately authorized engineer considers the aircraft/component ready for service.
- 14C.3 A Certificate of Release to Service (CRS) is then issued by appropriately authorised engineers, as authorized by the AMO, where it verifies that all maintenance, as required by the work order, has been properly carried out.
- 14C.4 Elementary work or servicing (e.g., oil changes and light bulb replacement) is performed under the supervision of an appropriately authorised engineer.
- 14C.5 Develop and document remote location procedures to manage any aircraft unserviceability at a location where maintenance support is not routinely provided.

### Guidance documents

- ICAO Annex 6
- HeliOffshore Safety Performance Model



## MAINTENANCE MANAGEMENT

# 15. Maintenance observation programme

### 15A. Purpose

Ensuring SMSs are effective at gathering and analysing safety information, managing risk, providing assurance and ensuring continuous improvement.

### 15B. Expectations

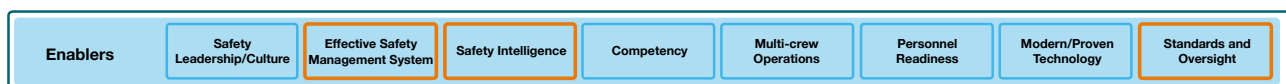
The Aircraft Operator has a structured Maintenance Observation Programme (MOP) in place.

### 15C. Processes and practices

- 15C.1 Identify, understand and rectify weaknesses or errors within the organization via a structured MOP, which the operator or AMO has in place.
- 15C.2 Monitor maintenance practices at regular intervals using formal documented observations of maintenance activity and supporting processes at each operational location.
- 15C.3 Track and analyse the MOP data and implement appropriate action plans.
- 15C.4 Monitor the overall performance of the MOP programme in the QA/Compliance programme.

### Guidance documents

- BARSOHO - 1.2: Effective Safety Management System – MOP
- HeliOffshore Safety Performance Model



## MAINTENANCE MANAGEMENT

# 16. Quality (Compliance Monitoring) System

### 16A. Purpose

Ensuring SMSs are effective at gathering and analysing safety information, managing risk, providing assurance, and ensuring continuous improvement.

### 16B. Expectations

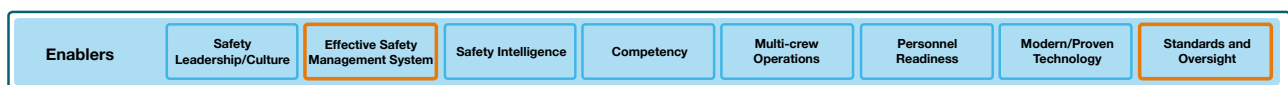
The Aircraft Operator and AMO has an independent Quality System (Compliance Monitoring), or QA System.

### 16C. Processes and practices

- 16C.1 There is a system in place to review human errors in maintenance and quality through a Just Culture mechanism with the focus on improving company procedures and enhancing the barriers to prevent maintenance errors. Data is analysed to identify trends by aircraft type/model and causal factors and appropriate action is put in place to address identified issues.
- 16C.2 For more details on quality assurance and compliance monitoring, see 690-1 Safety Management Systems, Section 11, Continuous Improvement - Assurance

### Guidance documents

- ICAO Annex 8
- IOGP Report 690-1 – *Safety Management Systems*
- HeliOffshore Safety Performance Model



## MAINTENANCE MANAGEMENT

# 17. Occurrence reporting system

### 17A. Purpose

Ensuring a collaborative approach to sharing safety information to directly benefit the entire industry and all stakeholders.

### 17B. Expectations

The Aircraft Operator and the AMO both have occurrence reporting systems in place.

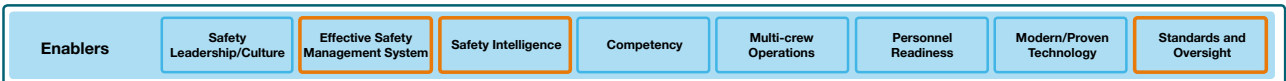
### 17C. Processes and practices

17C.1 A structured occurrence reporting system is in place that is integral to the AMO's SMS.

17C.2 For more details on occurrence reporting, see Report 690-1, Safety Management Systems, Section 8, Incident reporting, investigation, and learning.

### Guidance documents

- ICAO Annex 19 Chapter 5
- HeliOffshore Safety Performance Model



## MAINTENANCE MANAGEMENT

# 18. Maintenance Check Flights

### 18A. Purpose

Ensuring aircraft are airworthy.

### 18B. Expectations

The Aircraft Operator has documented procedures for Maintenance Check Flights (MCF).

### 18C. Processes and practices

18C.1 MCFs are carried out as required by:

18C.1.1 The Aircraft Maintenance Manual (AMM)

18C.1.2 The aircraft operator's continuing airworthiness management after maintenance

18C.1.3 For verification of a successful defect rectification or to assist with fault isolation or troubleshooting

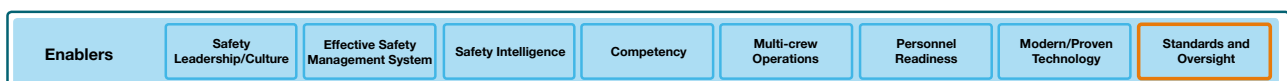
18C.2 The aircraft operator develops a specific training program for complex Maintenance Check Flights (MCF), appropriate for the complexity of the aircraft and the level of the MCF required. If required, the aircraft operator assigns this MCF training program to a specific selection of flight crew and as required, engineers. See 690-2 Aircraft Operations, Section 41, Flight Crew Training – Recurrent training and Maintenance Check Flights.

18C.3 The flight crew and engineers perform a risk assessment and safety brief prior to any MCF which considers the risks associated with the flight.

18C.4 Only essential personnel are on board the aircraft during any MCF.

### Guidance documents

- European Safety Promotion Network - Rotorcraft Team Operations and SMS. Risk Assessment Maintenance Check Flight
- UK CAA CAP 1038 – Check Flight Handbook
- BARSOHO BIG – Section 2.4 Airworthiness Management
- HeliOffshore Safety Performance Model



## MAINTENANCE FACILITIES AND STORES

# 19. Maintenance facilities - general

### 19A. Purpose

Ensuring maintenance is conducted to the approved AMP and standards.

### 19B. Expectations

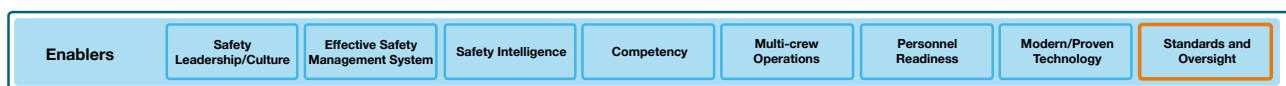
Maintenance facilities are adequate for the task.

### 19C. Processes and practices

- 19C.1 Maintenance facilities are capable of enclosing the largest aircraft for which the AMO or aircraft operator is rated.
- 19C.2 Specialised workshops are segregated to ensure that environmental or work area contamination is unlikely to occur.
- 19C.3 Adequate office facilities are available for personnel and particularly those engaged in the management of quality, planning, and technical records.
- 19C.4 Maintenance facilities have lighting suitable for the task and provide protection from adverse weather conditions.
- 19C.5 A FOD prevention programme is in place in the maintenance facilities.

### Guidance documents

- ICAO Annex 8
- ICAO Doc 9760 Chapter 10.6
- HeliOffshore Safety Performance Model



## MAINTENANCE FACILITIES AND STORES

# 20. Maintenance facilities - working conditions

### 20A. Purpose

Ensuring maintenance is conducted to the approved AMP and Standards.

### 20B. Expectations

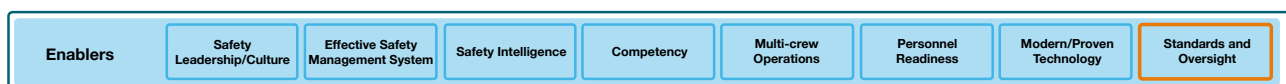
The AMO ensures that personnel work safely in appropriate conditions.

### 20C. Processes and practices

- 20C.1 Personnel are equipped with appropriate clothing and hearing protection for work in the prevailing environmental conditions.
- 20C.2 Personnel are equipped with appropriate PPE and provided with adequate instructions for its use.
- 20C.3 A "Working at Height" policy has been established and appropriate equipment (PPE, access equipment, stands, lifts, harnesses etc.) is provided.
- 20C.4 For line station maintenance of aircraft, hangars are not essential, but a hangar or other shelter is used during inclement weather (e.g., outside air temperatures lower than 5°C or higher than 40°C, during snowfall, heavy rain, hail, or sandstorms).
- 20C.5 The maintenance working environment is such that the particular maintenance or inspection tasks can be carried out without environmentally caused hazards or distraction to the work process or maintenance personnel.

### Guidance documents

- ICAO Annex 8
- ICAO Doc 9760 Chapter 10.6.
- HeliOffshore Safety Performance Model



**MAINTENANCE FACILITIES AND STORES**

## 21. Aircraft components/material management – equipment and tools

### 21A. Purpose

Ensuring maintenance is conducted to the approved AMP and standards.

### 21B. Expectations

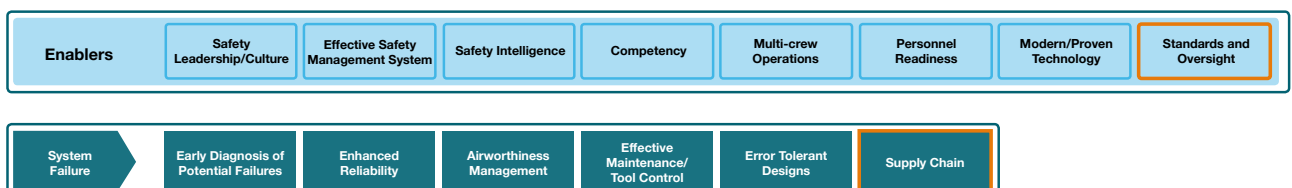
The AMO has a process for the control of tools and equipment.

### 21C. Processes and practices

- 21C.1 All tools and equipment are made available during the execution of maintenance as specified in the OEM’s maintenance data. Such tools and equipment are supplied by the organization conducting the maintenance and are not privately owned.
- 21C.2 All tools and equipment are subject to a documented control process to identify the user, the item’s whereabouts and the aircraft concerned; the process includes a reconciliation, daily or prior to an aircraft’s release for service, whichever comes first. This process also includes any subcontractors working on the premises.
- 21C.3 All tools are secured when not in use. They are contained in locked tool kits, or a controlled tool store, and the system in use for tracking items, also tracks those that are issued from a tool store, including the contents of each item that is issued from the store as a kit, e.g., rigging kits, or similar kits that contain individual tools, assemblies and parts of tools.
- 21C.4 A process is in place to track tools and equipment that require inspection, or service or calibration, and a system of labelling all such tools and equipment is established to give information on when the next inspection, service or calibration is due, and/or if the item is unserviceable for any other reason. Inspection, calibration, or servicing procedures for all such tools and equipment comply with manufacturers’ instructions, regulatory requirements and/or applicable industry standards.
- 21C.5 Tools and tool kits are subject to a regular QA or QC inspection for serviceability and contents.
- 21C.6 When a remote outstation is set up, all necessary equipment and supplies are available on site according to the authorized level of maintenance.

### Guidance documents

- HeliOffshore Safety Performance Model



**MAINTENANCE FACILITIES AND STORES**

## 22. Aircraft components/material management – bonded, quarantine, and inflammables storage areas

**22A. Purpose**

Ensuring maintenance is conducted to the approved AMP and standards.

**22B. Expectations**

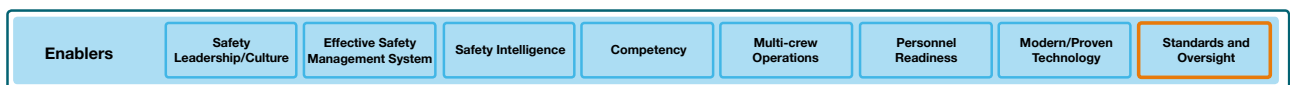
The AMO has suitable aircraft parts, quarantine and inflammables/explosive storage areas.

**22C. Processes and practices**

- 22C.1 Storage facilities for serviceable aircraft components are clean, well-ventilated, and maintained at a constant dry temperature to minimize the effects of condensation.
- 22C.2 Unauthorized access to serviceable parts is prevented.
- 22C.3 Manufacturer’s storage recommendations are followed, when available. Instructions are available for items requiring special handling.
- 22C.4 Dedicated and clearly identified areas are provided to properly segregate incoming, unserviceable and serviceable material.
- 22C.5 Parts certified as fit to be used on or fitted to an aircraft are labelled (tagged) ‘Serviceable’ and held in a bonded store awaiting allocation to an aircraft.
- 22C.6 Parts not yet certified or parts that have failed certification, have reached their life limited expiry date or have been damaged are held in a quarantine store until they are disposed of in an appropriate manner (e.g., returned to supplier, recertified, repaired, scrapped).
- 22C.7 Inflammable and explosive materials, such as paints and lubricants (including some chemicals) are stored in a properly constructed fireproof storage compartment which is built and equipped to meet the local fire regulations.
- 22C.8 There is a programme to control parts limited by shelf life.
- 22C.9 There is a process for the identification and disposal of unserviceable parts, materials, tools, and equipment.

**Guidance documents**

- ICAO Annex 8
- HeliOffshore Safety Performance Model



**MAINTENANCE FACILITES AND STORES**

## 23. Aircraft components/material management – responsibilities of stores personnel

**23A. Purpose**

Ensuring maintenance is conducted to the approved AMP and standards.

**23B. Expectations**

The AMO has defined the responsibilities of stores personnel.

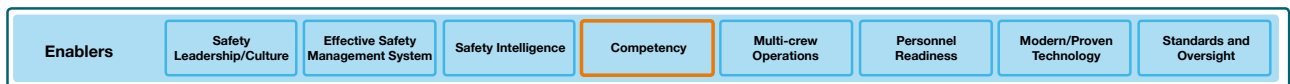
**23C. Processes and practices**

23C.1 Stores personnel are trained and competent.

23C.2 Incoming components/material are inspected to ensure compliance with company procedures to include shipping damage and proper certification. Components with a time interval or life limit have paperwork quality reviewed and are processed per company procedures. Acceptance into supply or movement to quarantine will be permanently recorded by name or company identifier electronically.

**Guidance documents**

- ICAO Annex 8
- HeliOffshore Safety Performance Model



**MAINTENANCE FACILITES AND STORES**

## 24. Maintenance - aircraft fuel checks

### 24A. Purpose

Ensuring the quality of fuel dispensed to aircraft is acceptable.

### 24B. Expectations

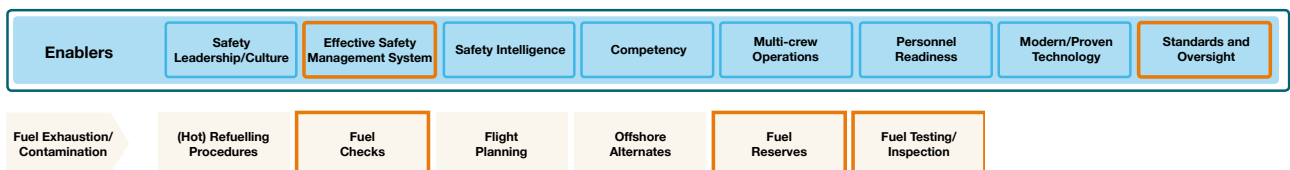
Aircraft fuel is checked for quality.

### 24C. Processes and practices

- 24C.1 Document the fuel quality control policies, processes and procedures to ensure fuel quality prior to delivery to the aircraft are verified as adequate in the logistics chain immediately prior to the point at which fuel is received (and, by default, the point at which the aircraft operator becomes the owner or custodian of that fuel).
- 24C.2 Aircraft fuel checks are carried out daily, or as specified by the airframe manufacturer.
  - 24C.2.1 For all helicopters
  - 24C.2.2 For all aeroplanes under 5,700kg MTOW
  - 24C.2.3 For all aircraft re-fuelled at remote locations, for example, desert/jungle landing strips or aerodromes and offshore locations
- 24C.3 Water in suspension tests are carried out using a recognized process and samples are retained for 24 hours or until the next sample is taken, whichever is later:
  - 24C.3.1 Inspect and test fuel samples for contaminants and water visually and using water detecting capsule kits or equivalent detection aids.
- 24C.4 Samples that are a minimum of 0.5 litre are taken, unless specified otherwise by the aircraft manufacturer.
- 24C.5 Sample jars are clearly labelled such that the aircraft and sump drain or tank group from which the sample was taken can be clearly identified.

### Guidance documents

- CAP 748
- HeliOffshore Safety Performance Model



## MAINTENANCE PERSONNEL

# 25. Maintenance personnel general requirements – fatigue prevention

### 25A. Purpose

Ensuring maintenance personnel are alert and fit for work.

### 25B. Expectations

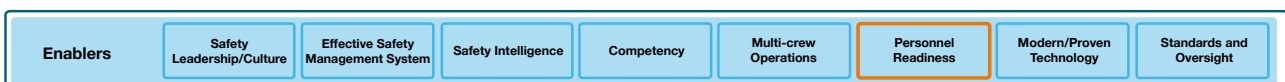
A fatigue management programme is in place for maintenance personnel.

### 25C. Processes and practices

- 25C.1 The fatigue management programme complies with national legislation.
- 25C.2 The following minimum standard is applied to all engineering staff unless national legislation is more restrictive:
- 25C.2.1 Total work periods do not exceed 12 hours in any 24-hour period. Where it is essential that the working period is extended, the Head of Maintenance approves it on a case-by-case basis. This approval is documented along with any required mitigations.
- 25C.2.1.1 In no case may an approved work period authorized under the above process exceed 16 hours.
- 25C.2.2 Each full working shift is followed by a minimum 10-hour rest period.
- 25C.2.3 When working a split shift operation, at least 6 hours uninterrupted rest is provided excluding travel.
- 25C.3 There is a minimum of seven days off per month of which at least four are in a minimum of two-day periods. When the location or climate is arduous, the rest period is increased to minimize fatigue.
- 25C.4 Engineering staff on rotating assignments that arrive following prolonged or overnight travel or travel exceeding four time zone changes, are not rostered for duties until the minimum 10 hours rest period is met.
- 25C.5 A process is in place which defines the required man hours for each maintenance task, and links this to maintenance planning and forecasting.
- 25C.6 Engineers working hours are recorded.

### Guidance documents

- CAP 716 Aviation Maintenance Human Factors
- HeliOffshore Safety Performance Model



**MAINTENANCE PERSONNEL**

## 26. Maintenance personnel – qualifications and experience

**26A. Purpose**

Ensuring personnel are competent to fulfil their duties by having appropriate training, qualifications, knowledge, skills, and experience.

**26B. Expectations**

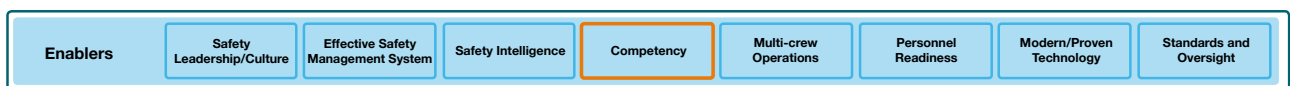
Maintenance management and personnel are appropriately qualified, experienced, and competent for the task.

**26C. Processes and practices**

- 26C.1 An accountable person is appointed to manage all maintenance activities performed by the Continuing Airworthiness Management Organization (CAMO) or AMO, whether these are performed in-house or by a contracted organization.
- 26C.2 Competence and experience requirements for these appointments and other supervisory, licensed, and authorized staff are documented.
- 26C.3 Personnel carrying out aircraft maintenance hold appropriate licences and endorsements.
- 26C.4 In addition, a system of local approvals exists whereby the aircraft operator or maintenance organization approves the individual to exercise the privileges granted by the licence and/or endorsements held on the range of equipment operated or maintained by that organization and includes expiry and renewal dates for the authorisations granted.
- 26C.5 Such approvals are granted following formal type training and/or local on-the-job training/evaluation and tracked in an appropriate process.
- 26C.6 Training and authorisation records are maintained for all certifying personnel in the Continuing Airworthiness functions and the AMO.

**Guidance documents**

- ICAO Annex 8
- HeliOffshore Safety Performance Model



**MAINTENANCE PERSONNEL**

## 27. Maintenance personnel – competence and training

### 27A. Purpose

Ensuring personnel are competent to fulfil their duties by having appropriate training, qualifications, knowledge, skill and experience.

### 27B. Expectations

There is an appropriate training programme for continuing airworthiness and maintenance personnel.

### 27C. Processes and practices

- 27C.1 Establish a training programme, which provides all responsible personnel, including management, with appropriate initial induction, relevant type and continuation training as defined by their roles and responsibilities and includes details of the accepted training providers, training syllabi and persons/organisations responsible for training.
- 27C.2 Maintain training records for all personnel and track them in an appropriate process.
- 27C.3 Establish and document a formal training process for maintenance personnel, who have aircraft certification authorisations, to receive and have OEM, or equivalent level training, on the type of aircraft to be used.
- 27C.4 Provide Aircraft Type Engineers (where applicable) with OEM, or equivalent level training, on the aircraft type for which they are responsible.
- 27C.5 Conduct continuation/recurrent training at least every two years for maintenance personnel, with aircraft certification authorisations, and include as a minimum:
  - 27C.5.1 Type-specific training
  - 27C.5.2 Changes in relevant regulatory requirements
  - 27C.5.3 Change in company organizational procedures
  - 27C.5.4 Human factors
  - 27C.5.5 Issues identified from any internal or external analyses of incidents
  - 27C.5.6 Information on relevant AD/SBs or similar documents issued since the last training session
  - 27C.5.7 Changes in the aircraft operator's SMS
- 27C.6 Document and perform competence assessments on maintenance and support personnel, who have certification authorization, at least every two years.
- 27C.7 Provide a training programme that addresses initial, on-going training and competency for maintenance support personnel performing the continuing airworthiness function, including maintenance planning and technical records staff.

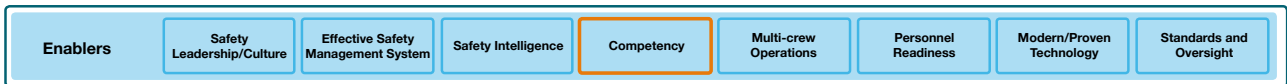
## MAINTENANCE PERSONNEL

27C.8 Provide continuation training, including human factors, training to all other maintenance support personnel, on a two-yearly basis.

27C.9 Prior to promotion to a more senior position or supervisory roles, personnel receive formal instruction in company procedures and responsibilities applicable to the new position and management training appropriate to their level in the company.

### Guidance documents

- ICAO Annex 8
- HeliOffshore Safety Performance Model



**MAINTENANCE PERSONNEL**

## 28. Reserved

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**MAINTENANCE PERSONNEL**

## 29. Reserved

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**MAINTENANCE PERSONNEL**

# 30. Supervision of unlicensed and recently licensed maintenance personnel

## 30A. Purpose

Ensuring personnel are competent to fulfil their duties by having appropriate training, qualifications, knowledge, skills, and experience.

## 30B. Expectations

There is adequate supervision of maintenance work and Certificates of Release to Service (CRS).

## 30C. Processes and practices

30C.1 Where organizations employ a mix of licensed, unlicensed, or recently licensed personnel, the proportion of those having CRS privileges to others is sufficiently high to ensure adequate supervision of work is provided at all times.

## Guidance documents

- ICAO Annex 8
- HeliOffshore Safety Performance Model



**HUMS**

# 31. HUMS - Equipment

**31A. Purpose**

Ensuring the early detection of impending critical failures to facilitate timely corrective action.

**31B. Expectations**

Helicopters are fitted with an approved Health and Usage Monitoring System (HUMS).

**31C. Processes and practices**

31C.1 The HUMS is capable of monitoring the rotor and rotor drive systems. For detailed specification, see 690-5 - *Helicopter and Equipment*, Section 10.

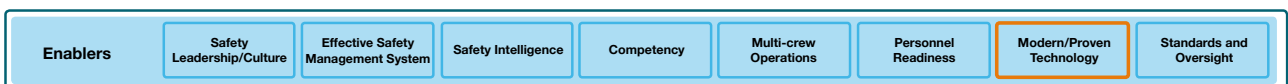
31C.2 The HUMS is certified to CS-29.1465.

31C.3 The HUMS is OEM supported.

31C.4 HUMS procedures are documented, to provide an auditable record of the actions and decisions taken and include references to maintenance work cards, where relevant.

**Guidance documents**

- HeliOffshore HUMS Recommended Practice
- HeliOffshore Safety Performance Model



**HUMS**

## 32. HUMS – download and primary analysis

**32A. Purpose**

Ensuring the early detection of impending critical failures to facilitate timely corrective action.

**32B. Expectations**

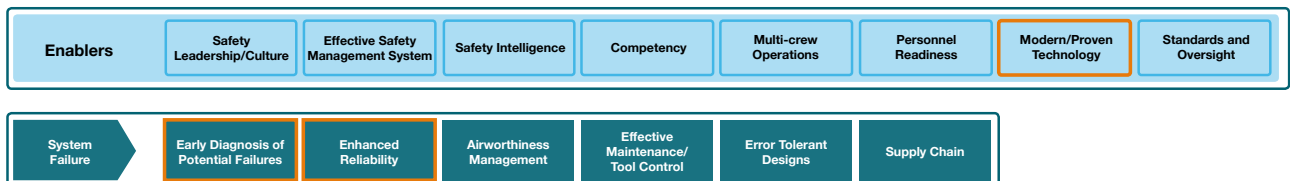
The periodicity for the download and initial analysis is clearly defined.

**32C. Processes and practices**

- 32C.1 The HUMS download and initial analysis result are recorded and certified in the aircraft technical log or similar document prior to the aircraft departing on its next flight.
- 32C.2 The aircraft dispatch procedure for flight following the download and initial analysis details and includes the following requirements for action.
  - 32C.2.1 Where there are no HUMS exceedances – the aircraft is clear for dispatch with no further action.
  - 32C.2.2 With a yellow, amber, or intermediate HUMS exceedance: the dispatch of an aircraft with an existing alert is subject to either a maintenance action which is recorded and certified, or to control process within the aircraft operator’s continued airworthiness organization, a record of which is in the aircraft approved documentation.
  - 32C.2.3 With a red or high HUMS exceedance: the aircraft is not dispatched until a full analysis and, where necessary, maintenance investigation has been completed and any subsequent defect rectification certified, and the aircraft released to service.

**Guidance documents**

- HeliOffshore HUMS Recommended Practice (Latest version of HO-HUMS-RP)
- HeliOffshore Safety Performance Model



**HUMS**

### 33. HUMS – download periodicity – Normal monitoring

**33A. Purpose**

Ensuring the early detection of impending critical failures to facilitate timely corrective action.

**33B. Expectations**

The periodicity for the download and initial analysis is clearly defined.

**33C. Processes and practices**

33C.1 The HUMS is downloaded and an initial line analysis, to review threshold alerts, is conducted at the following periodicities:

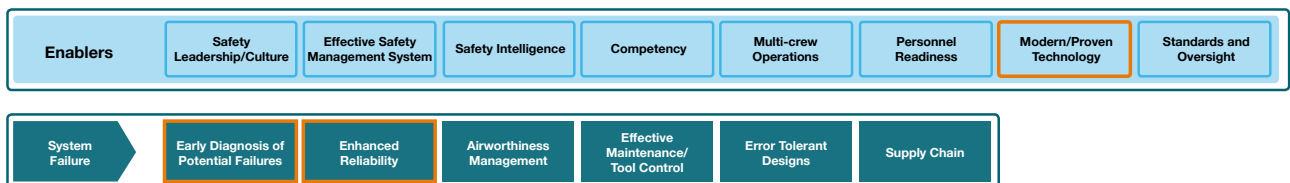
- 33C.1.1 For offshore flights – on every return to the main operating base (HeliOffshore HUMS Recommended Practice definition), whether for passenger or crew change or for shut down.
- 33C.1.2 For operations where the aircraft routinely returns to the operating base at a high frequency, due to short sector lengths, the download frequency can be extended out to a period not exceeding 10 hours of elapsed flying time.
- 33C.1.3 Where aircraft are based offshore, in remote locations, or detached to another base, arrangements are made using portable ground stations and platform internet connections to provide an equivalent capability where practicable. The total time between downloads is at a minimum daily.

33C.2 There is a secondary HUMS monitoring system using Automated Detection Tools (ADT), where one is available for the aircraft type and is supported by the OEM.

33C.3 There are procedures to record defects, warnings, out of tolerance conditions and rising trends that have been referred for detailed analysis, to either the aircraft operator’s HUMS specialists or the OEM support organization.

**Guidance documents**

- HeliOffshore HUMS Recommended Practice (Latest version of HO-HUMS-RP)
- HeliOffshore Safety Performance Model



**HUMS**

# 34. HUMS – unserviceability

**34A. Purpose**

Ensuring the early detection of impending critical failures to facilitate timely corrective action.

**34B. Expectations**

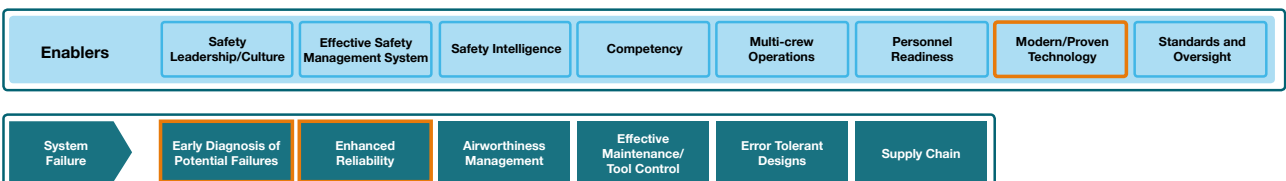
The operator has defined a MEL, MDS, or equivalent document which incorporates HUMS equipment.

**34C. Processes and practices**

- 34C.1 The MEL, MDS, or equivalent document details the HUMS equipment that can be temporarily unserviceable, and includes associated operating conditions, limitations, or procedures as applicable.
- 34C.2 System unserviceability and subsequent deferment of unserviceable channels according to the MEL is based upon the following:
  - 34C.2.1 The main system, (e.g., Data Acquisition Unit or Data Acquisition Processing Unit (DAPU), Bearing Monitor Unit (BMU) or similar), is serviceable.
  - 34C.2.2 The unserviceability or unavailability of any other single component of the system, including individual accelerometers, is:
    - 34C.2.2.1 Failure while close monitoring: zero flying hours
    - 34C.2.2.2 Failure while under normal monitoring: 15 flying hours
- 34C.3 Deferment period for individual accelerometers or components are tracked as separate defects.

**Guidance documents**

- Industry Recommended Practice - HeliOffshore HUMS Recommended Practice
- HeliOffshore Safety Performance Model



## 35. HUMS – Support processes – training and data management

### 35A. Purpose

Ensuring the early detection of impending critical failures to facilitate timely corrective action.

### 35B. Expectations

The necessary supporting processes for the effective use of HUMS are in place.

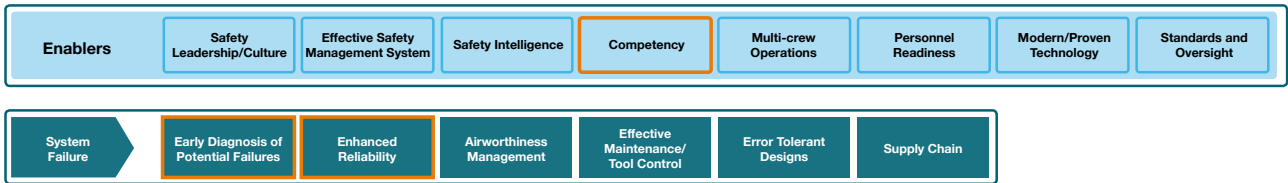
### 35C. Processes and practices

- 35C.1 Provide the necessary supporting processes for the effective use of HUMS, in particular:
  - 35C.1.1 Provide HUMS System Performance Reports – HeliOffshore HUMS Recommended Practice (HO HUMS RP) Section 8 and Annex 1 – HUMS KPI.
  - 35C.1.2 Provide initial and recurrent HUMS training for all maintenance and HUMS analysis personnel, relevant to the competency level required for their role (HO HUMS RP) Section 10.
- 35C.2 The support processes for HUMS are managed in accordance with the HeliOffshore HUMS Recommended Practice (HO-HUMS-RP), including:
  - 35C.2.1 Acronyms – typical HUMS processes, etc.
  - 35C.2.2 Definitions – including personnel typically authorized to review, analyse, and certify HUMS data.
  - 35C.2.3 Scope – clarification of terms, etc.
  - 35C.2.4 Ground station software and data management – databases, hardware processes, etc.
  - 35C.2.5 Download and primary analysis – excepting areas above where additional IOGP guidance is provided.
  - 35C.2.6 HUMS data collection.
  - 35C.2.7 Communication – internal, external, etc.
  - 35C.2.8 Automated detection tools and web portals – interconnectivity, system use, OEM instructions.
  - 35C.2.9 System performance reports – original equipment Manufacturer/overhaul facility support, defect trending reports.
  - 35C.2.10 responsibilities and process descriptions – HUMS staff responsibilities, process descriptions, etc.
  - 35C.2.11 Training – defines training for all staff.
  - 35C.2.12 Management Oversight – corporate oversight, departmental oversight, line level oversight.
  - 35C.2.13 Quality assurance – audit plan, documentation, etc.
  - 35C.2.14 Appendices – include QA checklists for HUMS.

# HUMS

## Guidance documents

- HeliOffshore HUMS Recommended Practice (Latest version of HO-HUMS-RP)
- HeliOffshore Safety Performance Model



**HUMS**

## 36. HUMS – data transfer

**36A. Purpose**

Ensuring the early detection of impending critical failures to facilitate timely corrective action.

**36B. Expectations**

Data transfer, or a similar process, which allows HUMS data to be transmitted to a base is in place, if available for the aircraft type and region.

**36C. Processes and practices**

36C.1 The system allows:

36C.1.1 Remote (wireless or other means) downloads.

36C.1.2 Inflight exceedances to be transmitted to a base, where approved and agreed with the NAA and OEM.

36C.2 Procedures and training are in place for any communication with the flight crew.

36C.3 Relevant information, if applicable, passed to the flight crew is assessed by an appropriately qualified member of staff, based on approved procedures and maintenance data.

**Guidance documents**

- HeliOffshore HUMS Recommended Practice (Latest version of HO-HUMS-RP)
- HeliOffshore Safety Performance Model

