**DES Ships Boats – Proposed text for Small Craft inclusion in BR 2000(95)**

7.2 Inspection Versus Examination

Examination: A set routine whereby a thorough observation of FHA and audit of FHR is conducted by a MOD contractor, or by Ship’s Staff in the case of submarines **and Small Craft under 24m (excluding LCU Mk10 and LCVP Mk5)**, as defined by this BR in accordance with hose category examination criteria.

8.3 Small Craft FHA Additional Guidance

**FHA Management Policy**

Royal Navy, Royal Marine, Ministry of Defence Police and Army Units that operate Small Craft are governed by JSP848: MoD Small Craft Policy and all small craft supported by DES Ships Boats require a Flexible Hose Register (FHR). The format of the FHR will be determined by DES Ships Boats and will account for Users and Small Craft complexity.

For larger and more complex Small Craft, the MEO or locally nominated Engineer shall hold and maintain the FHR. This is applicable to the following Small Craft classes:

* Archer Class P2000;
* Army Workboat (AWB);
* Cutlass Class Royal Navy Patrol Launch (RNPL);
* Sea Class Vahana Workboats (including HMS MAGPIE);
* Survey, Reconnaissance and Patrol Boat (SRPB).

Each Small Craft shall hold an FHR managed centrally by the Operating Unit (OU) or Squadron designated marine engineer.

DES Ships Boats contract a repair organisation for all small craft depending on class and location of the Small Craft. This MoD approved contractor shall undertake the requisite Examinations in accordance with the FHA Categorisation (detailed in Sections 9.17-31 *FHA Categories & Classifications*), as part of the normal planned maintenance scope. Examinations shall be scheduled in UMMS, JAMES or other Planned Maintenance System and programmed to fit with the Small Craft’s planned maintenance programme.

For craft that do not undertake contracted planned maintenance annually, the User (MEO or locally nominated Engineer) shall be allowed to conduct the Examination at Annual Examination periods outside of the contracted planned maintenance schedule. Users can only conduct FHA Examinations with strict instruction and permission granted by DES Ships Boats ChfEng. If User’s do not hold written evidence of this, approval should be obtained. If permission is not granted, FHA Examinations should be tasked through WRF.

In-service FHA failures shall be reported and rectified via Operational Defect (OPDEF) reporting process. The Operating Unit (OU), Squadron or User may also raise S2022 for DES Ships Boats address, where design and/or material issues are considered to be a contributing factor to the failure.

DES Ships Boats are accountable for this FHA Management Policy. It is the responsibility of the OU to implement this policy.

**Examinations**

All small craft are required to undertake a series on ongoing examinations. This is to be done by the MoD approved contractor (or User if permission has been granted), planned accordingly, and completed in accordance with the craft’s FHA Categorisation.

Regular inspections shall also be carried out by Users in accordance with Standard Operating Procedures (SOP) and Planned Maintenance Systems (PMS).

The examination will be carried out in accordance with The Energy Institute Guidelines for the Management of Flexible Hoses Feb 2011 and SAE J517 (Society of Automotive Engineers - Hydraulic Hose Specification).

The various types of examinations are as follows and are aligned with the FHA Lifing Policy:

* Baseline Examination of all Category A, B, C, D and E FHA. These will be conducted when a Small Craft comes into service. This examination provides the Small Craft with a baseline to enable the FHA management regime to move from a 5 annual/10 annual FHA lifing structure to a 5 annual/10 annual/15 annual FHA lifing structure. An FHR is created by the contractor, depending on the Small Craft class, and copies shall be forwarded to the responsible OU.
* Annual Examination of Category A, B, C and D FHA. Required to carry out the examination in accordance with the periodicity laid out by the examination cycle. The FHR is updated following completion of this examination.

**FHA Below Deck**

Where FHA are routed below a removal deck, the deck is to be removed every five or six years (depending on planned maintenance cycle) during refit. During this time, all below deck FHA shall be examined in their entirety or replaced depending on their examination cycle. If an FHA is due to expire before the deck removal opportunity, then it must be replaced, or a concession must be raised to extend its service life depending on condition. The service life must not be extended beyond the next deck removal opportunity.

**Certification**

For all FHA on small craft, a Certificate of Conformity (CoC) is required. For all FHA with a swaged end on small craft, a Certificate of Conformity (CoC) and Pressure Test Certificate (PTC) are required.

PTCs are retained with the FHR, whether electronic (recommended) or hard copy. The PTCs that are retained with the FHR are held onboard for immediate access or held by the OU or Squadron designated marine engineer.

**FHA Material and End Fitting Standards**

All fuel hoses within a permanently installed fuel system must be fire resistant and conform to ISO 7840, using ISO 10088 to assess classification.

All fuel hoses within a portable fuel system must be fire resistant and conform to ISO 7840, using ISO 10088 to assess classification. With the exception of hoses that are entirely within the splash well at the stern of the craft connected directly to an outboard engine, which may conform to ISO 8469.

All hoses within the machinery space must be fire resistant and conform to ISO 15540.

All other hoses shall not contribute to the risk of fire and shall be of good quality, of a type suitable for the intended purpose. MCA Workboat Code may be addressed for further guidance.

ISO 10088 shall be referred to for all guidance regarding end fittings.

**Inflatable Small Craft**

For Inflatable Small Craft such as Inshore Raiding Craft (IRC), Medium Inflatable Boat (MIB), and W525 the FHA will need to be managed locally by the locally nominated Engineer as they do not have contracted planned maintenance they are sent away for. In this circumstance, any maintenance that is required would result in the Small Craft being transferred to Naval Stores and a new Small Craft being demanded. When this happens, the User will need to assume that the FHA have not been examined and immediately conduct a baseline FHA Survey on receipt of the new Small Craft.

**Outboard Motors**

For Small Craft that use outboard motors (OBM), the FHA attached to the OBM must be included in the FHR for that Small Craft. If the engine is removed and a new engine is fitted, the FHR must be updated with the new FHA connecting the OBM to the Small Craft unless the same connecting FHA are used. If the User has a “pool” of OBMs they use across multiple Small Craft, any connecting FHA should stay with the Small Craft and be included in its FHA Register.

**Ancillaries**

For Small Craft that use ancillary equipment (including inflation hoses) that can be removed, the FHA as part of that ancillary equipment must be included in the FHR for that Small Craft. If the ancillary equipment is removed and a new item is fitted, the FHR must be updated with the new equipment FHA. If the User has a “pool” of ancillary equipment they use across multiple Small Craft, any equipment FHA should stay with the Small Craft and be included in its FHR.

**Ministry of Defence Police Small Craft**

Small Craft that are operated by the Ministry of Defence Police will have additional guidance provided in the next update of this document.

8.7.12 All Small Craft under 24m (excluding LCU Mk10 and LCVP Mk5) with 1A Maintenance Regime

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Year 1 | Year 2 | Year 3 | Year 4 | Year 5 |
| Cat A Contractor Examination | Cat A & B Contractor Examination | Cat A, C & D Contractor Examination | Cat A & B Contractor Examination | Cat A, B, C & D Contractor Examination |
| Year 6 | Year 7 | Year 8 | Year 9 | Year 10 |
| Cat A Contractor Examination | Cat A & B Contractor Examination | Cat A, C & D Contractor Examination | Cat A & B Contractor Examination | Cat A, B, C & D Contractor Examination |

NOTE: Cat E FHA not included in FHA Examination Schedule

8.7.13 All Small Craft under 24m (excluding LCU Mk10 and LCVP Mk5) with 2A Maintenance Regime

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Year 1 | Year 2 | Year 3 | Year 4 | Year 5 |
| Cat A User Examination | Cat A & B Contractor Examination | Cat A, C & D User Examination | Cat A & B Contractor Examination | Cat A, B, C & D User Examination |
| Year 6 | Year 7 | Year 8 | Year 9 | Year 10 |
| Cat A Contractor Examination | Cat A & B User Examination | Cat A, C & D Contractor Examination | Cat A & B User Examination | Cat A, B, C & D Contractor Examination |

NOTE: User can only conduct FHA Examination with strict instruction and permission granted by DES Ships Boats ChfEng. If User’s do not hold written evidence of this, approval should be obtained. If permission is not granted, FHA Examinations should be tasked through WRF.

NOTE: Cat E FHA not included in FHA Examination Schedule

8.7.14 All Small Craft under 24m (excluding LCU Mk10 and LCVP Mk5) with 3A Maintenance Regime

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Year 1 | Year 2 | Year 3 | Year 4 | Year 5 |
| Cat A User Examination | Cat A & B User Examination | Cat A, B, C & D Contractor Examination | Cat A & B User Examination | Cat A, B, C & D User Examination |
| Year 6 | Year 7 | Year 8 | Year 9 | Year 10 |
| Cat A & B Contractor Examination | Cat A & B User Examination | Cat A, C & D User Examination | Cat A & B Contractor Examination | Cat A, B, C & D Contractor\* Examination |

\*will be tasked separately outside of contractor’s Planned Maintenance Period.

NOTE: User can only conduct FHA Examination with strict instruction and permission granted by DES Ships Boats ChfEng. If User’s do not hold written evidence of this, approval should be obtained. If permission is not granted, FHA Examinations should be tasked through WRF.

NOTE: Cat E FHA not included in FHA Examination Schedule

Section 9.17 Archer Class P2000 FHA Categories & Classifications

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **System**  | **Equipment**  | **Cat**  | **Designated**  | **Comments**  |
| **AFFF** |
| Fixed AFFF system | Main engine AFFF system | **B** | **MSB** | Any hoses on the AFFF system are to be treated as Cat B |
| **Air** |
| LP air | PressureX charging line | **A** | **CAB** | Changed 5A with pressure vessel  |
| Breather hoses | Main engines and generators | **D** | **MSA** | Including air filter/separator hoses and separator to intake |
| Induction hoses | Main engines and generators | **D** | **MSA** |  |
| Vent hoses | Battery box extraction system | **D** | **MSA** |  |
| **Bilge** |
| Bilge suction hoses, both fixed and wondering | Bilge and sullage system | **C** | **WCC** |  |
| Bilge discharge hoses – connected to hull valves below the waterline | Bilge | **C** | **WCC** | These must be treated as Cat C due to the flooding risk |
| Bilge discharge hoses – NOT connected to hull valves below the waterline | Bilge | **D** | **WCC** |  |
| **CO2** |
| Fixed CO2 discharge hoses | Generator CO2 suppression system | **B** | **MSB** |  |
| **Dieso** |
| Fuel system, all hoses except filling lines | Main engines, generators, tanks | **B** | **FSC** | All fuel hoses |
| Fuel system filling line | Tanks | **C** | **FSD** |  |
| **Exhaust** |
| All exhaust hoses | Main engine and generators | **C** | **SWD** | All exhaust hoses are Cat C due to the risk posed from exhaust/SW leaks into compartment |
| **Grey Water** |
| Grey water hoses connected to underwater hull valves | Grey water system | **C** | **WCB** | These must be treated as Cat C due to the flooding risk |
| Grey water hoses NOT connected to underwater hull valves | Grey water system | **C** | **WCB** | These may be treated as Cat C |
| **Hydraulic (RAIDER/TRACKER only)** |
| All steering system hydraulic hoses | Steering system | **A** | **HYD** | These are treated as Cat A due to the consequences of failure of this essential safety critical system |
| **Sea Water** |
| Seawater cooling systems | Main engines, generators | **C** | **SWD** |  |
| AC seawater cooling system | AC system | **C** | **SWC** |  |
| **Sewage** |
| Sewage hoses connected to underwater hull valves | Sewage system | **C** | **WCA** | These must be treated as Cat C due to the flooding risk |
| Sewage hoses NOT connected to underwater hull valves | Sewage system | **C** | **WCA** | These may be treated as Cat C |
| **Lub Oil** |
| Pressurised Main Engine LO hoses  | Main engines  | **B** | **LOA**  |  |
| Oil drain hoses  | Gearboxes | **C** | **LOB** | These are the drain hoses from the gearbox |
| **Vent** |
| Fresh water tank breather/filling line | Fresh water system  | **D** | **MSA** |  |
| **Fresh Water** |
| Fresh water tank filling line | Fresh water system | **C** | **FWB** | Cat C due to hygiene reasons |
| **Water/Glycol** |
| All on-engine coolant hoses | Main engines and generators | **B** | **FWA** | Cat B due to risk posed by engine failure. Includes calorifier supply/return hoses |

Section 9.18 Arctic 24 & 28 FHA Categories & Classifications

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **System** | **Equipment** | **Cat** | **Designated** | **Comments** |
| **Hydraulics** |
| Steering gear |   | **A** | **HYD** | These are treated as Cat A due to the consequences of failure of this essential safety critical system. |
| **Fuel Systems** |
| Petrol Fuel supply, all hoses except filling lines | Fuel Lines | **A** | **FSC** | Low pressure, non-exposed.Inspection of hose connectors every year. Due to their location the hose lengths do not require annual examination. |
| Diesel Fuel supply, all hoses except filling lines | Fuel Lines | **B** | **FSC** | Low pressure, non-exposed and low flammability. Inspection of hose connectors every year. Due to their safe, benign location the hose lengths do not require annual examination but will be replaced every 5 years instead of 10. |
| Fuel system filling line |   | **C** | **FSD** |   |
| **Bilge** |
| Bilge, all discharge and suction hoses. |   | **C** | **WCC** | Manual bilge pump. Discharges over transom so no risk of flooding. |
| **Vent** |
| Drains/Vents/Breathers |   | **D** | **MSA** |   |

Section 9.19 Army Workboat (AWB) FHA Categories & Classifications

| **System** | **Equipment** | **Cat** | **Designated** | **Comments** |
| --- | --- | --- | --- | --- |
| **Hydraulics** |
| Steering gear |  | **A** | **HYD** | These are treated as Cat A due to the consequences of failure of this essential safety critical system. |
| **Lubricating Oil** |
| Pressurised LO hoses | Main engines, generators | **A** | **LOA** | These are Cat A because of the risk of catastrophic main engine failure as a result of hose failure.  |
| Main FL system | Gearbox oil cooler | **C** | **LOA** |   |
| **Fuel Systems** |
| Fuel supply, all hoses except filling lines | Main engine, lift pump, water trap, filters etc. | **B** | **FSC** | Low pressure, non-exposed and low flammability. Assuming that the hoses are fully accessible and can easily be examined every 2 years without cost.  |
| Fuel system filling line |   | **C** | **FSD** |   |
| **Salt Water Systems** |
| SW cooling systems  | Main engines, generators | **C** | **SWD** |   |
| AC SW cooling system | AC system, condenser | **C** | **SWC** |   |
| **Fresh Water** |
| FW cooling systems | Main engines | **B** | **FWA** | Cat B due to risk posed by engine failure. Includes calorifier supply/return hoses. |
| Potable water | Hot & Cold fresh water systems. Sinks, showers & washbasins. Tank filling line. | **C** | **FWP** | Cat C due to hygiene reasons. |
| Tech FW system | Windscreen wash supply | **D** | **FWB** |   |
| **Water Contaminated** |
| All black water system hoses | Heads & holding tank | **C** | **WCA** |   |
| All grey water system hoses | Sinks, showers & washbasins | **C** | **WCB** |   |
| **Bilge** |
| Bilge, all discharge and suction hoses. |   | **C** | **WCC** | All discharge valves above water level. |

|  |
| --- |
| **Exhaust**  |
| All exhaust hoses | Main engine, generators | **C** | **SWD** | All exhaust hoses are Cat C due to the risk posed from exhaust/SW leaks into compartment. |
| **AFFF** |
| Fixed AFFF system |   | **B** | **MSB** | Any hoses on the AFFF system are to be treated as Cat B. |
| **Vent** |
| Drains/Vents/Breathers |   | **D** | **MSA** |   |

Section 9.20 Avon Searider (ASR) FHA Categories & Classifications

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **System** | **Equipment** | **Cat** | **Designated** | **Comments** |
| **Fuel Systems** |
| Fuel supply, all hoses | Main engine, lift pump, water trap, filters etc. | **A** | **FSC** | Petrol OB - low pressure, exposed and high flammability.Assuming that hose stays with the Small Craft and not removed with fuel tank.  |
| **Vent** |
| Drains/Vents/Breathers |   | **D** | **MSA** |   |
| **Inflation** |
| All inflation hoses |   | **D** | **CAE** |   |

Section 9.21 Combat Support Boat (CSB) & Dive Support Boat (DSB) FHA Categories & Classifications

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **System** | **Equipment** | **Cat** | **Designated** | **Comments** |
| **Hydraulics** |
| Steering gear |   | **B** | **HYD** | These are treated as Cat B due to the low consequences of failure of this system compared to propeller driven craft. |
| Waterjet Bucket |   | **B** | **HYD** | Failure results in bucket slowly falling, causing Small Craft to go astern. |
| **Lubricating Oil** |
| Pressurised LO hoses | Main engines. | **A** | **LOA** | These are Cat A because of the risk of catastrophic main engine failure as a result of hose failure.  |
| Main FL system | Gearbox oil cooler, waterjets. | **C** | **LOB** |   |
| **Fuel Systems** |
| Fuel supply, all hoses except filling lines  | Main engine, lift pump, water trap, filters etc. | **B** | **FSC** | Low pressure, non-exposed and low flammability. Inspection of hose connectors every year. Due to their safe, benign location the hose lengths do not require 2 annual examinations but will be replaced every 5 years instead of 10. |
| Fuel system filling line |   | **C** | **FSD** |   |
| **Salt Water Systems** |
| SW cooling systems  | Main engines. | **C** | **SWD** |   |
| **Fresh Water** |
| FW Cooling | Main Engines, intercooler, oil cooler, turbocharger, exhaust manifold | **B** | **FWA** | Cat B due to risk posed by engine failure. Check for JUBUILEE CLIPPED  |
| **Bilge** |
| Bilge, all discharge and suction hoses. |   | **C** | **WCC** |   |
| **Exhaust** |
| All exhaust hoses | Main engine, generators | **C** | **SWD** | All exhaust hoses are Cat C due to the risk posed from exhaust/SW leaks into compartment. |
| **Vent** |
| Drains/Vents/Breathers |   | **D** | **MSA** |   |

Section 9.22 Delta FHA Categories & Classifications

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **System** | **Equipment** | **Cat** | **Designated** | **Comments** |
| **Hydraulics** |
| Steering gear |   | **A** | **HYD** | These are treated as Cat A due to the consequences of failure of this essential safety critical system. |
| **Compressed Air** |
| Self-Righting System | Gas bottles | **A** | **CAD** | Cat A as highly critical safety appliance.  |
| **Fuel Systems** |
| Fuel supply, all hoses except filling lines | Main engine, lift pump, water trap, filters etc. | **A** | **FSC** | Cat A as Petrol OB - high flammability. |
| Fuel system filling line |   | **B** | **FSD** | Cat B as Petrol OB - high flammability. |
| **Bilge** |
| Bilge, all discharge and suction hoses. |   | **C** | **WCC** | All discharge valves above water level. |
| **Vent** |
| Drains/Vents/Breathers |   | **D** | **MSA** |   |

9.23 Hard Hulled Riverine Craft (HHRC) FHA Categories & Classifications

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **System** | **Equipment** | **Cat** | **Designated** | **Comments** |
| **Fuel Systems** |
| Fuel supply, all hoses  | Main engine, lift pump, water trap, filters etc. | **A** | **FSC** | Petrol OB - low pressure, exposed and high flammability. |
| **Vent** |
| Drains/Vents/Breathers |   | **D** | **MSA** |   |

Section 9.24 Inshore Raiding Craft (IRC) / Medium Inflatable Boat (MIB) / Whiskey 525 (W525) FHA Categories & Classifications

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **System** | **Equipment** | **Cat** | **Designated** | **Comments** |
| **Fuel Systems** |
| Fuel supply, all hoses  | Main engine, lift pump, water trap, filters etc. | **A** | **FSC** | Assumed most Small Craft use petrol outboard.If Small Craft fitted with a Diesel Cat B.  |
| **Vent** |
| Drains/Vents/Breathers |   | **D** | **MSA** |   |
| **Inflation** |
| All inflation hoses |   | **D** | **CAE** |   |

Section 9.25 Offshore Raiding Craft (ORC) FHA Categories & Classifications

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **System** | **Equipment** | **Cat** | **Designated** | **Comments** |
| **Hydraulics** |
| Steering gear |   | **B** | **HYD** | These are treated as Cat B due to the low consequences of failure of this system compared to propeller driven craft. |
| Waterjet Bucket |   | **B** | **HYD** | Failure results in bucket slowly falling, causing Small Craft to go astern. |
| **Lubricating Oil** |
| Pressurised LO hoses | Main engines. | **A** | **LOA** | These are Cat A because of the risk of catastrophic main engine failure as a result of hose failure.  |
| Main FL system | Gearbox oil cooler, waterjets. | **C** | **LOB** |   |
| **Fuel Systems** |
| Fuel supply, all hoses except filling lines | Main engine, lift pump, water trap, filters etc. | **B** | **FSC** | Diesel IB - low pressure, non-exposed and low flammability. |
| Fuel system filling line |   | **C** | **FSD** |   |
| **Salt Water Systems** |
| SW cooling systems  | Main engines, intercooler, oil cooler, turbocharger, exhaust manifold | **C** | **SWD** |   |
| **Fresh Water** |
| FW Cooling | Main engines. | **B** | **FWA** | Cat B due to risk posed by engine failure.  |
| **Bilge** |
| Bilge, all discharge and suction hoses. |   | **C** | **WCC** |   |
| **Exhaust** |
| All exhaust hoses | Main engines. | **C** | **SWD** | All exhaust hoses are Cat C due to the risk posed from exhaust/SW leaks into compartment. |
| **Vent** |
| Drains/Vents/Breathers |   | **D** | **MSA** |   |

Section 9.26 Pacific 22 (PAC22) & Pacific 24 (PAC24) FHA Categories & Classifications

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **System** | **Equipment** | **Cat** | **Designated** | **Comments** |
| **Hydraulics** |
| Steering gear |   | **B** | **HYD** | These are treated as Cat B due to the low consequences of failure of this system compared to propeller driven craft. |
| Waterjet Bucket |   | **B** | **HYD** | Failure results in bucket slowly falling, causing Small Craft to go astern. |
| **Compressed Air** |
| Self-Righting System | Gas bottles | **A** | **CAD** | Cat A as highly critical safety appliance.  |
| **Lubricating Oil** |
| Pressurised LO hoses | Main engines. | **A** | **LOA** | These are Cat A because of the risk of catastrophic main engine failure as a result of hose failure.  |
| Main FL system | Gearbox oil cooler, waterjets. | **C** | **LOB** |   |
| **Fuel Systems** |
| Fuel supply, all hoses except filling lines | Main engine, lift pump, water trap, filters etc. | **B** | **FSC** | Low pressure, non-exposed and low flammability. Inspection of hose connectors every year. Due to their safe, benign location the hose lengths do not require 2 annual examinations but will be replaced every 5 years instead of 10. |
| Fuel system filling line |   | **C** | **FSD** |   |
| **Salt Water Systems** |
| SW cooling systems  | Main engines, intercooler, oil cooler, turbocharger, exhaust manifold | **C** | **SWD** |   |
| **Fresh Water** |
| FW Cooling | Main engines. | **B** | **FWA** | Cat B due to risk posed by engine failure.  |
| **Bilge** |
| Bilge, all discharge and suction hoses. |   | **C** | **WCC** |   |
| **Vent** |
| Drains/Vents/Breathers |   | **D** | **MSA** |   |

Section 9.27 Pacific 28 (PAC28) FHA Categories & Classifications

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **System** | **Equipment** | **Cat** | **Designated** | **Comments** |
| **Hydraulics** |
| Steering gear |   | **A** | **HYD** | These are treated as Cat A due to the consequences of failure of this essential safety critical system. |
| **Lubricating Oil** |
| Pressurised LO hoses | Main engines. | **A** | **LOA** | These are Cat A because of the risk of catastrophic main engine failure as a result of hose failure.  |
| Main FL system | Gearbox oil cooler. | **C** | **LOB** |   |
| **Fuel Systems** |
| Fuel supply, all hoses except filling lines | Main engine, lift pump, water trap, filters etc. | **B** | **FSC** | Low pressure, non-exposed and low flammability. Inspection of hose connectors every year. Due to their safe, benign location the hose lengths do not require 2 annual examinations but will be replaced every 5 years instead of 10. |
| Fuel system filling line |   | **C** | **FSD** |   |
| **Salt Water Systems** |
| SW cooling systems  | Main engines, intercooler, oil cooler, turbocharger, exhaust manifold | **C** | **SWD** |   |
| **Fresh Water** |
| FW Cooling | Main engines. | **B** | **FWA** | Cat B due to risk posed by engine failure.  |
| **Bilge** |
| Bilge, all discharge and suction hoses. |   | **C** | **WCC** |   |
| **Vent** |
| Drains/Vents/Breathers |   | **D** | **MSA** |   |

Section 9.28 Rigid Raiding Craft (RRC) FHA Categories & Classifications

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **System** | **Equipment** | **Cat** | **Designated** | **Comments** |
| **Hydraulics** |
| Steering gear |   | **A** | **HYD** | These are treated as Cat A due to the consequences of failure of this essential safety critical system. |
| **Lubricating Oil** |
| Pressurised LO hoses | Main engines. | **A** | **LOA** | These are Cat A because of the risk of catastrophic main engine failure as a result of hose failure.  |
| Main FL system | Gearbox oil cooler. | **C** | **LOB** |   |
| **Fuel Systems** |
| Fuel supply, all hoses except filling lines | Main engine, lift pump, water trap, filters etc. | **B** | **FSC** | Low pressure, non-exposed and low flammability. Inspection of hose connectors every year. Due to their safe, benign location the hose lengths do not require 2 annual examinations but will be replaced every 5 years instead of 10. |
| Fuel system filling line |   | **C** | **FSD** |   |
| **Salt Water Systems** |
| SW cooling systems  | Main engines, intercooler, oil cooler, turbocharger, exhaust manifold | **C** | **SWD** |   |
| **Fresh Water** |
| FW Cooling | Main engines. | **B** | **FWA** | Cat B due to risk posed by engine failure.  |
| **Bilge** |
| Bilge, all discharge and suction hoses. |   | **C** | **WCC** |   |
| **Vent** |
| Drains/Vents/Breathers |   | **D** | **MSA** |   |

Section 9.29 Cutlass Class Royal Navy Patrol Launch (RNPL) FHA Categories & Classifications

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **System** | **Equipment** | **Cat** | **Designated** | **Comments** |
| **Hydraulics** |
| Steering gear |   | **B** | **HYD** | These are treated as Cat B due to the low consequences of failure of this system compared to propeller driven craft. |
| Waterjet Bucket |   | **B** | **HYD** | Failure results in bucket slowly falling, causing Small Craft to go astern. |
| **Lubricating Oil** |
| Pressurised LO hoses | Main engines, generators. | **A** | **LOA** | These are Cat A because of the risk of catastrophic main engine failure as a result of hose failure.  |
| Main FL system | Gearbox oil cooler | **C** | **LOB** |   |
| **Fuel Systems** |
| Fuel supply, all hoses except filling lines | Main engine, lift pump, water trap, filters etc. | **B** | **FSC** | Diesel IB - low pressure, non-exposed and low flammability. |
| Fuel system filling line |   | **C** | **FSD** |   |
| **Salt Water Systems** |
| SW cooling systems  | Main engines, generators. | **C** | **SWD** |   |
| AC SW cooling system | AC system, condenser. | **C** | **SWC** |   |
| **Fresh Water** |
| FW cooling systems | Main engines | **B** | **FWA** | Cat B due to risk posed by engine failure. Includes calorifier supply/return hoses. |
| Potable water | Hot & Cold fresh water systems. Sinks, showers & washbasins. Tank filling line. | **C** | **FWP** | Cat C due to hygiene reasons. |
| Tech FW system | Windscreen wash supply | **D** | **FWB** |   |
| **Water Contaminated** |
| All black water system hoses | Heads & holding tank. | **C** | **WCA** |   |
| All grey water system hoses | Sinks, showers & washbasins. | **C** | **WCB** |   |
| **Bilge** |
| Bilge, all discharge and suction hoses. |   | **C** | **WCC** | All discharge valves above water level. |
| **Vent** |
| Drains/Vents/Breathers |   | **D** | **MSA** |   |

Section 9.30 Survey, Reconnaissance and Patrol Boat (SRPB) FHA Categories & Classifications

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **System** | **Equipment** | **Cat** | **Designated** | **Comments** |
| **Hydraulics** |
| Steering gear (Internal) |   | **A** | **HYD** | These are treated as Cat A due to the consequences of failure of this essential safety critical system. Due to their safe, benign location the hose lengths do not require annual examination as this would require removal of engines. Connectors can be inspected annually. |
| Transom Hoses (External) |   | **B** | **HYD** | Annual inspection, but due to their location external to the craft and harsh conditions, these are changed every 2 years. (8 FHA’s). |
| **Lubricating Oil** |
| Pressurised LO hoses | Main engines. | **A** | **LOA** | These are Cat A because of the risk of catastrophic main engine failure as a result of hose failure. Due to their safe, benign location the hose lengths do not require annual examination as this would require removal of engines. Connectors can be inspected annually. |
| Main FL system | Gearbox oil cooler. | **C** | **LOB** |   |
| **Fuel Systems** |
| Fuel supply, all hoses except filling lines  | Main engine, lift pump, water trap, filters etc. | **B** | **FSC** | Low pressure, non-exposed and low flammability. Inspection of hose connectors every year. Due to their safe, benign location the hose lengths do not require 2 annual examinations but will be replaced every 5 years instead of 10. |
| Fuel system filling line |   | **C** | **FSD** |   |
| **Salt Water Systems** |
| SW cooling systems  | Main engines. | **C** | **SWD** |   |
| **Fresh Water** |
| FW cooling systems | Main engines | **B** | **FWA** | Cat B due to risk posed by engine failure. Includes calorifier supply/return hoses. |
| **Bilge** |
| Bilge, all discharge and suction hoses. |   | **C** | **WCC** |   |
| **Exhaust** |
| All exhaust hoses | Main engine, generators | **C** | **SWD** | All exhaust hoses are Cat C due to the risk posed from exhaust/SW leaks into compartment. |
| **Vent** |
| Drains/Vents/Breathers |   | **D** | **MSA** |   |

Section 9.31 Sea Class Vahana Workboats (including HMS MAGPIE) FHA Categories & Classifications

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **System** | **Equipment** | **Cat** | **Designated** | **Comments** |
| **Hydraulics** |
| Steering gear |   | **B** | **HYD** | These are treated as Cat B due to the low consequences of failure of this system compared to propeller driven craft. |
| Waterjet Bucket |   | **B** | **HYD** | Failure results in bucket slowly falling, causing Small Craft to go astern. |
| Crane |  | **A** | **HYE** | Crane maximum operating pressure 200 BAR, harsh environment |
| Crane | Hydraulic Power Unit (HPU) | **B** | **HYI** | Non-harsh environment |
| **Lubricating Oil** |
| Pressurised LO hoses | Main engines. | **A** | **LOA** | These are Cat A because of the risk of catastrophic main engine failure as a result of hose failure.  |
| Main FL system | Gearbox oil cooler, waterjets. | **C** | **LOB** |   |
| **Fuel Systems** |
| Fuel supply, all hoses except filling lines  | Main engine, lift pump, water trap, filters etc. | **B** | **FSC** | Low pressure, non-exposed and low flammability. Inspection of hose connectors every year. Due to their safe, benign location the hose lengths do not require 2 annual examinations but will be replaced every 5 years instead of 10. |
| Fuel system filling line |   | **C** | **FSD** |   |
| **Salt Water Systems** |
| SW cooling systems  | Main engines. | **C** | **SWD** |   |
| **Fresh Water** |
| FW cooling systems | Main engines | **B** | **FWA** | Cat B due to risk posed by engine failure. Includes calorifier supply/return hoses. |
| Potable water | Hot & Cold fresh water systems. Sinks, showers & washbasins. Tank filling line. | **C** | **FWP** | Cat C due to hygiene reasons. |
| Tech FW system | Windscreen wash supply | **D** | **FWB** |   |
| **Water Contaminated** |
| All black water system hoses | Heads & holding tank. | **C** | **WCA** |   |
| All grey water system hoses | Sinks, showers & washbasins. | **C** | **WCB** |   |
| **Bilge** |
| Bilge, all discharge and suction hoses. |   | **C** | **WCC** |   |
| **Exhaust** |
| All exhaust hoses | Main engine, generators | **C** | **SWD** | All exhaust hoses are Cat C due to the risk posed from exhaust/SW leaks into compartment. |
| **Vent** |
| Drains/Vents/Breathers |   | **D** | **MSA** |   |