



# **Commercial Jet Boat Maintenance Guideline**

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# Forward

The New Zealand Commercial Jet Boat Association has created this guideline for commercial jet boat operators. The purpose of this guideline is to:

- establish a high standard of jet boat maintenance
- help build a common understanding of good practice jet boat maintenance across New Zealand.

Maritime New Zealand supports this guideline. It should help commercial jet boat operators to prepare their jet boat maintenance programmes, which are required by Maritime Rule Part 82.

It is important to note that the good maintenance practices will change over time. Jet boat maintenance is something that operators should continually improve.

## Disclaimer

This industry developed guidance provides high level good practice guidance to assist operators to operate safely and comply with legal requirements, including requirements set out in the maritime rules. The guidance is not a substitute for the rules themselves, which are the law. The maritime rules can be found at: [maritimenz.govt.nz/rules](https://maritimenz.govt.nz/rules)

This guidance is intended to provide activity-specific safety information for operators of commercial jet boats. Operators remain subject to the law, including the Maritime Transport Act 1994 and the Health and Safety at Work Act 2015. For more guidance on maritime safety requirements, including Maritime New Zealand's health and safety guidance for work on board ships, and where ships are workplaces, refer to our resources page: <https://www.maritimenz.govt.nz/hsua>

## Interpretation and Terms

- **SOP** means a Safe Operational Plan under Maritime Rule Part 82.
- **Critical Parts** means parts on a jet boat that are deemed critical, or are of consequence should a partial or total failure occur, for aspects of safety and or practicality.
- **Technician/ Technical staff and/or Mechanic** means an employee whose primary role and duties are of a technical nature involving care and maintenance of company jet boats.
- **Red Tag or Danger Tag** refer to a hazard or condition isolating warning device whose function is to prevent use and warn of an asset's condition.
- **Product or component** means anything that comprises of, or is intended to comprise, any part of a jet boat.
- **Operate** means to use a New Zealand commercial jet boat or cause or permit the jet boat to be used, whether or not the person is present with the jet boat. An operator should have a commercial jet boat operator certificate.
- **OEM** means Original Equipment Manufacturer.

# 1 Introduction

- 1.1 An operators must have a maintenance programme described in their SOP. The operator should consider building the maintenance practices outlined in this guideline into their maintenance programmes. The operator should tailor their maintenance programme to suit the local environmental conditions they operate in.
- 1.2 Maritime Rule Part 82 requires operators to develop and transparent system of record keeping. Quality record keeping is a key input into how the operation delivers quality assurance.
- 1.3 Once established, all maintenance and maintenance support systems should incorporate the following:
  - A system for recording mechanically related or electrically related events or incidents; this should be used to support maintenance or system improvements.
    - A system of recording substantial engineering changes undertaken on a vessel, including how and what due diligence was undertaken to support the engineering change.
    - Use of current manufacturers manuals only (where available)
    - Conformity to manufactures service schedule.
  - A way to notify all staff who may need to know all or some of the following:
    - defects
    - incidents
    - corrective actions
    - mitigations
    - inspections

This may be through memos, tool box meetings, or other suitable means. Operators with more than three technical staff, should use a system of information bulletins or circulars.

## 2 Maintenance Checks and Schedules

- 2.1 This section sets out good practice information on how to comply with the requirement in Part 82 for all commercial jet boat operators to have a maintenance programme. Operators should define scheduled service/ inspection intervals in their SOP.
- 2.2 All jet boat maintenance, should be carried out following the manufacturer's provisions or recommendations. Service intervals should not be longer than the manufacturer's specified service limit and should consider the operating conditions and environment.

Service intervals may be made shorter if it results in an improved overall maintenance schedule. Manufacturers' defined intervals can be amended only if the manufacturer supports the change.

Standard practice is to keep a record of manufacturer's maintenance intervals, and correspondence with manufactures.

All maintenance should be carried out using check sheets, or similar, to ensure consistency and that standards are met.

- 2.3 Operators should carry out a daily pre-operational inspection, which should include, but is not limited to, the following:
- Inspection of steering system including:
    - helm
    - steering wheel
    - turnbuckle,
    - cables
    - drive chain and links to cable
    - D shackles
    - steering pulleys
    - security and safety systems, (lock wire, backup systems and associated equipment)
  - Reverse control system.
  - Accelerator cables, pedal and hinge system, return springs and associated equipment
  - Engine free of leaks or defective components
  - Engine fluid levels, drive belt condition, battery connections, engine mount security and condition, cooling lines and systems.
  - Drive line condition and security of fasteners
  - Fuel system, lines, water traps drain if needed, filters – no leaks, damage, kinked lines
  - Safety equipment present, fire extinguishers' pressures and condition
  - Essential equipment operates, bilge pumps, radio
  - All seating is secure, safe, and functional
  - Jet unit checks as defined by manufacturer
  - Inspect the hull condition. Is hull free of cracks or other damage that may affect performance characteristics?

- 2.4 The operator should also consider doing post-trip checks. Post-trip checks can identify any issues that might need addressing before the next trip and allow sufficient time to get parts and carry out any maintenance that is needed. Post-trip checks are ultimately a matter for operators and how they manage their maintenance regime.
- 2.5 The operators should have a way of verifying that all maintenance tasks have been completed and the boat is safe to return to service post maintenance.

### 3 Critical Parts

- 3.1 Operators should establish a schedule of critical parts relevant to their operation, however, should include the mandated components as defined in section 3.6.

The service life limits for critical parts should be derived from the following:

- Manufacturers' mandated life limits.
  - Existing industry known service life limits, corrected for operating conditions and application variances.
  - Historical serviceability data.
  - Learnings derived from data obtained from technical or mechanical events.
  - External consultation, for example:
    - design engineers
    - consultants
    - technical bulletins
    - manufacturers communications
    - information provided by MNZ
    - other relevant good practice information
- 3.2 Operators should establish a schedule in their SOP that defines the Critical Parts of their jet boat fleet, and the service life limit and or inspection intervals for each.
- 3.3 Changes to any of the critical parts life limits or removal of a critical part from the schedule should be recorded, including process and justification.
- 3.4 Operators should include a replacement latitude for their Critical Parts schedule for extenuating circumstances. This latitude should not exceed 10% of any time accumulated through vessel usage.
- 3.5 Critical Parts can be categorised as follows
- **Service Life Limited** when a defined interval of time is achieved the component is removed from service.
  - **Overhaul Limited**, critical parts that once a specified in-service time is achieved the component is inspected and or overhauled and returned to service.
  - **Combination of Overhaul and Service Life Limited** a component that utilises both may have a defined inspection / overhaul interval, and additionally a maximum in service life limit.

3.6 A minimum standard for Critical Parts should include, but not be limited to, the schedule below:

*Note: an operator mandated interval should not exceed a manufacturer's interval when available*

*Note: the below are not a legal requirement but can be used as an example*

<b>CRITICAL PART</b>	<b>INSPECTION / OVERHAUL</b>	<b>SERVICE LIFE LIMIT MAXIMUM</b>
Steering helm assembly	Overhaul and crack testing at an operator and or OEM defined interval	Defined by operator or OEM
Steering cables	Periodic inspections/ service of full system as defined by operator and or OEM	Replace at 1000 hours
Steering tillers and components attached	Periodic inspections/ service of full system as defined by operator and or OEM	Defined by operator or OEM
Steering pulleys	Periodic inspections/ service of full system as defined by operator and or OEM	Replace at 1000 hours
Steering nozzle Hamilton HJ212/213	Crack test interval as defined by OEM. Steering tiller stop inspection as defined by OEM. Periodic inspections/ service of assembly as defined by operator and OEM	Defined by operator or OEM
Any device linking the major components within the steering to any other, for example: rose joins, chain, chain links, tie rod or link bar.	Periodic inspections/ service of full system as defined by operator and or OEM	Defined by operator or OEM
Reverse control cables or rod ends (manual reverse) where fitted	Periodic inspections/ service of full system as defined by operator and or OEM	Defined by operator or OEM
Fire suppression	Annual independent certification	Defined by operator or OEM
Throttle cables	Periodic inspections/ service of full system as defined by operator and or OEM	Defined by operator or OEM
Fuel pumps on single engine petrol powered vessels	Periodic inspections/ service of full system as defined by operator and or OEM	Defined by operator or OEM
Fuel cell	Periodic inspections/ service of full system as defined by operator and or OEM. 1000hr pressure test interval.	Optional if defined by operator or OEM
Safety equipment	Periodic inspections/ service of full system as defined by operator and or OEM	Annual check and replace at manufacturer's recommendations
Hull	Conclusion of daily use. Periodic inspections/ service of full system as defined by operator and or OEM	Optional if defined by operator or OEM



Other components of significance to safe vessel operation	Periodic inspections/ service of full system as defined by operator and or OEM	Optional if defined by operator or OEM
Electrical systems and fuse boxes	Periodic inspections/service of full system as defined by the operator and/or OEM	Operational if defined by the operator or OEM

## 4 Single Point Failure Risks

- 4.1 Single point failures are a component or system that poses a risk to safe operation of a vessel should a full or partial failure occur. Single point failures cannot always be managed by engineering means but, in some cases, mitigated by process or other systems.
- 4.2 Operators must have a thorough understanding of all single point failures that are inherent within their fleet, especially critical control systems on their vessels.
- 4.3 All operators should review their fleet periodically or after engineering changes have been made to identify existing, new, or emerging single point failure risks, and ensure measures are in place to mitigate risks.
- 4.4 An operator may identify particular items as a single point failure risk and mitigate these through inclusion as a critical part.

## 5 Record keeping and paperwork

### 5.1 Documents

- A full record of all maintenance documents and forms should be kept for the life of the vessel. These documents should be legible and complete. Where documents are required by the Rules, they should contain all the required information and be kept for the life of the vessel.
- Operators should not remove or deface records in anyway.
- When any maintenance is carried out, detailed descriptions of the work undertaken and parts that have been replaced must be included in maintenance records.

### 5.2 Maintenance Log Records

- All maintenance records must be kept for the boat they belong to while it is owned by the operator. If the boat is transferred to another operator, the maintenance records for the vessel should be transferred as well.

The maintenance logbook should clearly identify the boat it refers to and be kept in a tidy condition. Entries should be detailed, accurate, and complete.

- The maintenance logbook entry should include:
  - date
  - boat hours
  - a clear explanation of the fault
  - work carried out to rectify the fault
  - name and signature of the person or persons completing the rectification.
- Maintenance log record entries must not be removed, or defaced, white out products should never be used in maintenance records.

## 6 Training

- 6.1 Operators should have a system to ensure all technicians and personnel carrying out maintenance are either suitably experienced and trained or supervised for the task they conduct. Suitable records that reflect previous and ongoing training must be kept for each person carrying out maintenance
- 6.2 Personnel that are not qualified or trained to do maintenance work should be supervised by an experienced or trained maintenance technician and should be approved by the Operator.

## 7 Standards

- 7.1 To ensure a minimum level of basic engineering standards, operators should adopt the following standards:

### Electrical

- Electrical systems should be installed in a way that they cannot be adversely affected by any other component, and in a way that they cannot adversely affect other components.
- All electrical wiring should be suitable for the operating conditions and electrical loads. Where a manufacturer specifies a minimum cable size, this should be complied with.
- All wiring should be adequately secured either in rigid conduit or protective sleeving. If not, then use effecting clamp retainers such as P-clamps.
- Any time electrics pass through a bulkhead or metal partition, the wires should be protected from degradation for example by using glands or non-conductive edging.
- Batteries should be designed for marine use, and of a suitable size to meet engine and ancillary peak demands. They should also be kept in a dry and well ventilated position.
- Batteries should be suitably retained to ensure they would not move under force.
- Battery terminals should be of sound, corrosion free condition, adequately secured, and of a size suitable to meet peak amperage demands.
- Electrical systems should be fitted with a master electrical isolation device which isolates at least one, and ideally both, batteries poles.

- Operators should ensure that the flexing of wires cannot apply a mechanical load to the fuses. Also, the fuse boxes should be mounted in such a way to avoid them being subject to the direct vibration of something significant, such as an engine.

### **Fuel Systems**

- Fuel hoses should be installed in a way where they cannot reasonably be affected by vibrations or from any other component on the jet boat.
- All line fittings and connectors should be fit for the purpose and where possible be as per the manufacturer's recommendations, or a higher specification.
- All fuel hoses should be of a suitable grade for the fuel type, rated to pressure relevant to engine fuel pump pressures, and of a suitable size for the engine supply demands. Fuel hoses should conform to international standards for fire protection.
- All fuel hoses or lines should be installed in a way that they are kept safe from any potential source of heat.
- Engines should be fitted with air filtration systems that are suitable to the operating conditions, air filters, or flame traps.
- Fuel tanks should be checked to make sure they are secure, the vents are clear, there are no leaks, and the fittings are secure.

## **8 Incidents and Mechanical Events**

Part 82 requires o/Operators to have procedures for:

- recording and reporting all accidents, incidents, and mishaps to Maritime New Zealand
- investigating accidents, incidents, and mishaps
- reviewing accidents, incidents, and mishaps for causes and trends.

8.1 Operators should have a system for reporting and recording mechanical or technical events. This data should be collated and used to drive maintenance, inspection, and service life limit intervals, identify and manage risks to safe operation, and instill a proactive maintenance culture within the operation.