



# SAFETY MANAGEMENT MANUAL

## 10.1 MAINTENANCE PROGRAM

Originator:	Approved By:
Hank Ayers	Albert F. Suchy

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### 1. Purpose

The purpose of this procedure is to set forth the maintenance system for vessels and their equipment managed or operated by Woods Hole Oceanographic Institution.

### 2. Scope

The scope of this instruction is to provide guidance in the maintenance of the ships and their equipment operated by the Ship Operations Group at WHOI. The maintenance included in this procedure includes both preventative maintenance and repair maintenance.

### 3. General

The maintenance program on vessels operated by the Ship Operations Group has several facets that work together to strive to keep the vessels operating efficiently and dependably. For the most part, the maintenance program can be divided into reactive and preventative maintenance. Both components are documented in various ways and this procedure is designed to identify the different components and the method used to document them.

- A. The reactive component of the maintenance program consists of the response to the conditions emerging on the vessel due to the failure of the equipment or various components. When something breaks, it needs to be fixed. This activity is documented in **NS5**.
- B. The preventative component of the maintenance program consists of three activities. These activities are scheduled or planned maintenance, vibration analysis, and oil analysis. These activities are undertaken to prevent failures before reactive maintenance has to be performed.

**NS5** is central to the planned maintenance activities. This electronic system features:

- the ability to order parts and maintain an inventory record
- it schedules routine (planned) maintenance
- it documents all maintenance (planned and reactive)
- it provides service request capabilities for outside repair assistance
- it maintains inventory and machinery histories.
- the maintenance portion of the program automatically interfaces with the inventory portion to consume spares from inventory upon completion of maintenance activities.



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1. Routine maintenance and inspections of equipment that occur on a weekly basis or less frequently will be in **NS5**. This includes the inspection of safety equipment and the disassembly of equipment.
2. Vibration monitoring: Each vessel managed by the Ship Operations Group is equipped with a vibration monitoring system. All major pieces of equipment have been set up for this monitor system. The engineering department, under the direction of the Chief Engineer, uses this system to periodically monitor each piece of equipment. While the vessel is in normal operation, monitoring is conducted quarterly at a minimum. Equipment condition may change the frequency that monitoring is conducted.
3. Lube oil analysis consists of periodical sampling of oil from specific key pieces of equipment and sending the samples to a laboratory for analysis. The frequency varies with the number of hours placed on the equipment and the service that the piece of equipment is engaged in.

#### 4. **Responsibility**

Ultimately the maintenance of the vessel is the responsibility of the Master of the vessel. This responsibility is delegated to each department for the efficient maintenance of the vessel. Changes of maintenance responsibilities are at the discretion of the Master.

Each department head is responsible for ensuring that all maintenance activities are documented in **NS5**. It is at the discretion of each department head to determine the level of **NS5** activity that shall be deferred to subordinates. While the activity may be deferred, the responsibility remains with the department head. All "A" rated equipment maintenance will be recorded in **NS5**.

It is the responsibility of each department head to review the recommended maintenance set forth by the manufacturer of equipment or systems under his/her control. This maintenance is then established in **NS5**.

#### 5. **Recording**

Each department head must ensure that all maintenance performed by his/her department is entered in **NS5**.

#### 6. **Job Safety Analysis for Non-Standard Jobs**

The following page is a list of activities, their hazards and the methods to mitigate their hazards for non-standard jobs. The job safety analysis for standard jobs is included in their description in **NS5**.



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### Job Safety Analysis (JSA)

<u>Activity</u>	<u>Hazard</u>	<u>Mitigation</u>
Opening SW	Flooding	Secure valves, tag out, advise watchstanders
Opening SW	Shock	Secure valves, tag out, advise watchstanders
Open strainer	Flooding	Advise watchstanders, open slowly, ensure holding
Using chemicals	Chemical exposure	Read MSDS, wear PPE
Secure unit	Unintended discharge	Lock out/tag out and advise watchstanders
Remove unit	Unintended discharge	Lock out/tag out and advise watchstanders
Complete replacement	Unintended discharge	Leak test system
Secure unit	Unintended start	Lock out/tag out and advise watchstanders
Drain oil	Personnel exposure	Wear PPE
Dispose of oil	Pollution	Properly dispose of oil
Change filters	Pollution	Properly dispose
Open access	Fall	Guard access
Tank entry	Asphyxiation	Confined space entry procedure
Inspect tank	Slip/fall	Proper footwear/exercise care
Exit tank	Fall other	Secure tank access
Greasing	Pollution	Wipe up excess grease
Exercise valves	Unintended supply disrupt	Advise watchstanders
Operational test	Unintended interrupt	Notify watchstanders
Inspect connections	Shock	Log out/tag out
Megger	Shock	Lock out/tag out
Work at heights	Fall from height	Wear climber harness
Weights overhead	Head injuries	Wear PPE
Work on heavy equip.	Foot injuries	Wear PPE
Test relief valve	Eye hazard by debris	Wear PPE
Handle oil	Personnel exposure	Wear PPE
Run equipment	Noise	Wear PPE
Test equipment	Unintended shutdown	Advise watchstanders
Move unit	Back injury	Safety awareness
Taking readings	Rotating machinery	Remove loose clothing/Use caution around rotating equipment