# **VESSEL LAY-UP PLAN**

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1. **INTRODUCTION**
   1. The m/v *Nonsuch* will be laid-up at *Noplace* from 22/22/22 to 33/33/33.
2. **PURPOSE**
   1. The purpose of this Plan is to preserve the vessel during a lay-up period. It will largely replace the operational Planned Maintenance System (PMS) of the vessel.
   2. This Plan will take into account the following:

* the safe shut-down of all machinery not required whilst laid-up
* the successful preservation (or maintenance as required for lay-up) of all machinery
* the avoidance of any damage and/or material deterioration when the vessel re-enters service
  1. This Plan should be implemented when the ship ceases trading.
  2. For economic reasons, some of the machinery will not be maintained in working operation and the associated PMS will not apply.
  3. The vessel’s propulsion machinery shall be at a state of readiness as determined by the Master.
  4. For the period of lay-up, the vessel will be manned in accordance with the Safe Manning Certificate, as a minimum requirement.

1. **LOCAL AUTHORITIES**
   1. Whilst at anchor the vessel should comply with all applicable requirements of the local maritime authorities. The provision for the minimum sailing notice should be clearly understood.
2. **PREPARATION & PLANNING** 
   1. All machinery that is going to remain out of service for a period longer than 30 days and is not subject to overhaul or repair before the end of the lay-up period of the ship, should be maintained in accordance with this Plan.
   2. Machinery that is not considered vital during the lay-up period, but requires repair or overhaul, should be inserted into a ‘Lay-up Work List’. Such repairs/maintenance shall be completed prior to the vessel entering service. When repair/maintenance has been completed, the machinery will be subject to the Lay-up maintenance programme according to this Plan.
   3. Machinery that will remain in normal operation during the Lay-up period will remain under the control of the existing PMS.
3. **CERTIFICATION**
   1. **Classification Society**
      1. Class shall approve the Vessel Lay-up Plan.
      2. A Class Surveyor may also inspect the ship to verify that Vessel Lay-up Plan have been implemented.
      3. At the discretion of Class all certificates may be the suspended and replaced with a Lay-up Certificate.
   2. **Maritime & Flag Administration**
      1. The Owners or their recognised representative will inform the Administration regarding the planned Lay-up of the vessel.
4. **GANGWAY**
   1. Close to the gangway/ramp the following shall be available:

* damage control plan and a fire plan of the vessel
* stretcher and a medical first aid kit.
* brochure containing additional safety information for external personnel
  1. A second emergency exit from the ship should always be available, easy to open and readily accessible.

1. **FIRE & SAFETY ROUNDS**
   1. On-watch personnel should be provided with suitable portable radios and a ‘period-call’ procedure should be implemented in order to verify the crewmember carrying out ‘rounds’ remains safe.
   2. The Fire watch patrol should make Fire & Safety Rounds throughout the vessel which shall include a passage through the engine room.
   3. If any dangerous condition is located, the Officer on the Bridge and the Engineer Officer on Watch should be notified immediately.
2. **MINIMUM CREW**
   1. The Master and Chief Engineer should ensure that minimum Deck & Engine Officers and Crew are onboard and available at any time, to ensure that a fire team is available and the safety of the vessel can be managed.
3. **LAY-UP MAINTENANCE PROGRAMME**
   1. Some machinery and systems will require continued operation or readiness. These will be identified by the Chief Engineer (e.g. diesel generator) and will continue to be maintained as per the PMS.
   2. Other machinery and systems will not require any Lay-up maintenance and will be clearly identified by the Chief Engineer.
   3. Systems and machinery that need preserving during the Lay-up period will follow four phases:

* **Close-down** (as machinery is stopped)
* **Periodic** (during long periods of machinery stoppage -after ‘Close-down’)
* **Re-start** (before re-starting machinery)
* **Re-commissioning** (tests and trials prior to re-entering service)
  1. Various factors can influence deterioration of machinery (e.g. environmental condition, kind of installation and their exposure & vulnerability).

### CLOSE-DOWN MAINTENANCE

* 1. **Introduction**
     1. Procedures and operations for preparing and protecting machinery during a long period out of service will be notified in this part of the Lay-up Plan.
     2. These operations should be carried out when the machinery is stopped by the ship crew. They should proceed in compliance with manufacturers and Class instructions.

##### Safety equipment preparation

* + 1. Lifeboats
* Lifeboat safety equipment shall be removed and placed in a suitable store on-board the ship. If the vessel is at anchor/buoys during lay-up, consideration shall be given to maintaining one lifeboat on each side of the vessel in operational readiness
* Drain plugs will be open.
* Engine starting batteries will remain in place, adequately protected with Vaseline
* One outboard lifeboat will be left in service and available in the case of emergency
* All lifeboat engines to be tested weekly which shall be recorded in the Engine Log Book
  + 1. Lifeboat davits.
* Greasing programme to be maintained - all greasing points and wire ropes
  + 1. Sea water fire-fighting system
* All fire pumps shall be ready to start in service. One fire pump should be always be electrically connected and left in the automatic mode
* Topping-up pump and autoclave should be checked
* The emergency fire pump should be tested weekly
* The above to be recorded in the Engine Log Book
  + 1. Emergency diesel generator
* The emergency generator should be ready to start in automatic mode, with electrical pre-heating on
* The alternator should be ready to start with electrical pre-heating on
* To be tested weekly and recorded in the Engine Log book
  + 1. Emergency batteries
* Normal PMS maintenance to be continued
  + 1. Oily water separator
* To be cleaned and washed and left full, using fresh water
  + 1. Fire flaps
* Normal PMS maintenance to be continued
  + 1. All crew shall attend a Fire & Boat Drill on a monthly basis. This shall be recorded in the Deck Log Book and Official Log Book (if applicable).
    2. The Master shall hold a monthly Safety & Environmental Protection Committee as per the normal operating procedure.
    3. The Master shall ensure that the ‘permit to work’ system is operated as per the normal operating procedure. E.g. hot work and entry into enclosed spaces.
    4. Charts and marine publications will continue to be corrected according to the Notices to Mariners received. Form SAF 2 Monthly Chart Report will be sent to the office.
  1. **Preparation of propulsion plant**
     1. Main Engines
* Two engines (one on each side) should always be ready to start at the notice period set by the Master
* The engines should be run on diesel-oil (gasoil) to minimise fuel injector, injection pump, piping and feed system cleaning
* When engines are stopped, indicator valves should be opened and the machinery should be on turning gear
* The fresh water cooling circuit should be kept filled and ready (with heating system on the two engines that are in stand-by)
  + 1. Reduction gears
* System filled and ready
  + 1. Propeller shafts and bearings
* Ready for use
  + 1. Controlled Pitch Propeller systems
* Ready for use
  + 1. Automation and propulsion control system
* The system should be maintained under electrical/control air supply, in order to avoid problem due to air humidity condensation
  1. **Diesels/Generators**
     1. Diesel engines
* The minimum number of engines that can carry the total load required to operate the vessel with bow thruster running should be ready to start
  + 1. Alternators
* Leave heaters in service on alternators in order to avoid humidity condensation
  1. **Boilers / Steam system**
     1. Leave one boiler in operation
     2. Burner Side

Before stopping the second boiler:

* flush the boiler feed fuel system with diesel-oil
* clean the fuel filters
* clean the burner and combustion chamber taking care to remove all residuals
* blow compressed air through screen tubes (gas side) in order to avoid the presence of humidity and any acid formations with the consequential deterioration of the metal
  + 1. Water/Steam Side
* Blow down before stopping the boiler, in order to evacuate mud from the bottom and clean piping thoroughly
* Wash using a suitable chemical de-scaling solution
* Rinse adequately with fresh water and then neutralise
* Renew completely the water charge and dosing with maintenance chemicals
  + 1. Steam Side

Three different preservation options are proposed:

* + - 1. Wet preservation

Fill the boiler completely making sure that all the air flows out from the boiler vents, then segregate.

* + - 1. Dry preservation

After completion of 10.5.3. operations, empty the boiler and when cold saturate with nitrogen, low pressure (0.3 bar) – segregate.

* + - 1. Active preservation

Set-up the boiler for periodical starting on diesel-oil.

* + 1. Condensate Coolers
* Drain and wash condensate coolers, using fresh water, drain and segregate
* Drain and rinse circuits and ancillary equipment using clean seawater.
* Drain and segregate condensate circuits
  1. **Fuel oil and lub-oil purifiers**
     1. When machinery is stopped, overhaul and then grease all metallic parts with oil.
     2. Disembark all sludge from sludge tanks to port reception facilities.
  2. **Reverse Osmosis**
     1. Carry out the chemical cleaning, following the manufacturer's instructions for the preservation of this equipment.
  3. **Bow/Stern thruster electric motors**
     1. Prepare electrical heating device in order to avoid humidity condensation.
     2. Grease all exposed parts, making particular attention to the bearings.
  4. **Steering gear**
     1. Prepare heating device (as infrared lamps/lights) on the hydraulic pumps electric motors.
     2. Protect with grease all exposed components.
  5. **Protection of fin stabilisers**
     1. Protect all exposed components with grease. Prepare electrical heating devices, to avoid humidity condensation.
     2. Wash oil/water cooler using fresh water and segregate when empty.
  6. **Air conditioning & ventilation system** 
     1. Screw compressors.
* Clean electric motors and prepare electrical heating device
  + 1. Ancillaries
* Empty and wash cooling sea water system piping, pumps and ancillaries (using fresh water), drain and segregate
* Empty condensers and wash using fresh water (low pressure), then drain and segregate when empty and dry
  + 1. Chilled water system
* Empty, rinse, drain and segregate piping and chilled water pumps
* Empty the evaporators on the waterside and wash them using fresh water then drain and segregate
  + 1. Gas system
* Empty machinery, to avoid refrigerating gas leaks, segregating and transferring the gas it into suitable gas receivers
* Fill the system with nitrogen at low pressure to protect the machinery
  + 1. Machinery in AC stations/ventilation
* Remove all fan drive belts in order to be able to start several motors without any increase/peak of electrical consumption
  + 1. Compressors automation and control system
* Maintain the electrical supply to the control board in order to maintain function integrity
  1. **Provisions store refrigerating system protection.**
     1. Prepare the electric motor heating devices.
     2. Empty and rinse the sea water system with fresh water, drain and segregate (pumps and piping).
     3. In order to avoid any refrigerating gas leaks, empty machinery and transfer / segregate the gas it into suitable gas receivers.
     4. Protect the machinery by filling the system with low-pressure nitrogen (0.3 bar in cold conditions).
  2. **Grey and black water systems.**
     1. Toilet system
* If possible maintain the system in service alternative shut down the sea water flushing (this in order to minimise the risk of flooding) and then use fresh water to flush
  + 1. Collecting tank system.

1. **Periodic Maintenance**
   1. **Introduction**
      1. During lay-up machinery will be maintained in order to keep their full efficiency and in readiness for re-starting.
      2. Manufacturers and Class instructions/procedure will be followed for the conservation.
   2. **Safety systems conservation**
      1. Lifeboats

* All lifeboats should be inspected weekly
* During this control the batteries will be checked and will be maintained under charging
* As frequent as possible due to weather conditions foldable canopy (canvas cover) should be opened in order to dry humidity inside the lifeboat
* Lifeboats engine, inverter and rudder should be started/tested at least every 7 days
  + 1. Lifeboats davits
* Check davit conditions weekly and, where necessary, exposed components should be re-greased for protection
* Each lifeboat should be lowered to the embarkation deck monthly
* Check brakes and electric motor insulation
  + 1. Sea water fire-fighting system
* All devices, autoclave and pressurisation pump should be checked daily
* All hydrant connections should be checked monthly
  + 1. Sprinkler system
* All sprinkler stations (as per PMS) should be periodically checked
  + 1. Emergency generator
* Should be tested weekly (as per PMS)
  + 1. Emergency batteries
* The electrolyte (level, density) and elements voltage should be checked weekly
  + 1. Oily water separator
* Start the equipment circulating fresh water every 15 days
* Keep clean the oil content meter / oily water indicator
  1. **Propulsion system conservation**
     1. Main engines
* Start the cooling water pump daily, circulating the fresh water and activate electrical heating in order to keep the engines warm and to better preserve cylinder heads and liners gaskets
* Start weekly the electrical lub-oil pump for turning the engine on turning-gear. Stop the engine in a different position (check flywheel marks) each time
  + 1. Propeller shaft and bearings
* Turn the propeller shafts on a weekly basis. During this operation drop lubricating oil on the bearing manually, in order to renew the oil film on the working surface of the shaft/bearing
  + 1. Controllable Pitch Propeller system
* Start the system weekly - check the oil to verify water is not present
* Note: test the system with turning gear off
  + 1. Automation and propulsion control system
* Verify system function daily
* Check UPS and batteries conditions
  1. **Diesel/Generators**
     1. Diesel engines (for engines not in operation)
     2. Start the lub oil priming pump weekly - operate engine turning gear with indicator valves open.
  2. **Boilers / Steam system**
     1. In the case of wet preservation, no other operation should be necessary.
* Only the weekly running of the combustion air fan of the boiler is required, in order to “wash” the internal atmosphere with fresh air
  + 1. In the case of dry preservation, the nitrogen pressure should be checked daily and topped-up if necessary.
    2. In the case of active preservation, boiler should be started on a weekly basis with gasoil until steam blows from the boiler.
  1. **Fuel and lub-oil purifiers**
     1. No additional operation to carry out.
  2. **Reverse osmosis**
     1. No additional operation to carry out.
  3. **Bow & stern thrusters**
     1. Daily inspection of the thruster room and check fluid level.
     2. Hand turning of the machine weekly.
  4. **Steering gear/rudder**
     1. Daily inspection of the steering gear room and check fluid levels.
     2. Start the hydraulic pumps weekly.
  5. **Fin stabilisers system**
     1. No particular operation to carry out.
     2. Keep adequately greased all the exposed components and check the hull seals daily.
  6. **Air conditioning system & ventilation system**
     1. Hand turn compressor electrical motors weekly.
     2. Hand turn sea cooling water pumps weekly.
     3. Hand turn “chilled” water pumps weekly.
     4. Record pressure and gas level in gas receivers daily, using the gas leak detector.
     5. Start fan electric motors in a/c stations (with driving belts removed) weekly
     6. Check a/c automation control panel and the Stal compressor panel daily.
  7. **Provisions store refrigerating system**
     1. Rotate compressors weekly.
     2. On a daily basis, check the tightness (with a gas leak detector) of the gas receiver and check the quality of the seal.

1. **Re-start Maintenance**
   1. **Introduction**
      1. Before the ship re-enters service, some important maintenance operations should be carried out on machinery stopped for a long time.
      2. The instructions of the machinery manufacturer and any Class requirements should be followed for this machinery.
   2. **Emergency battery system**
      1. In advance of the re-entering service, carry out a complete emergency battery discharge (to verify the capacity of the system) and then recharge.
      2. Replace any elements necessary.
   3. **Air conditioning system & ventilation system**
      1. Compressors

* Follow start-up instruction of manufacturer
  + 1. Sea cooling water system
* Refill the system and circulate seawater continuously
  + 1. “Chilled” water system
* Install connections to reverse flow direction in the system and a fine mesh filter on the circulating pump.
* Back flush cold a/c units and systems agitating any “mud” in the units and then circulate and filter
* Complete 2 fresh water changes (if not galvanised piping, dose with a protecting chemical)
  + 1. Refrigerating gas system
* Before recharging the gas, complete a seal test of the system with a low gas pressure charge in order to avoid major loss of gas
* Complete a similar seal test before the nitrogen discharge, the vacuum creation and the re-charge of the refrigerating gas
* Before refilling the sea and fresh water circuits, test the internal systems by connecting the gas leak detector to circuit drains and/or vents
* Avoid starting the air conditioning compressors with low gas inside in order to avoid any internal damage
  + 1. Air conditioning compressors automation system
* Before re-starting, check all machinery safety devices and control functions
* The automation in all air conditioning stations should be tested simulating sensor readings

#### Re-commissioning Tests and Trials

* 1. During the machinery re-start phase, list all work and tests required to confirm machinery operation and safety functions are in order.

#### Restoring Operation Conditions

* 1. The normal operations PMS must be re-commissioned.
  2. This re-commissioning will include updating the PMS with relevant events and maintenance from the laid-up period.
  3. The Continuous Hull & Machinery Survey (CHS & CMS) will be re-started as per Class reports and the Class Survey List.

#### Reporting

* 1. The following Company Forms to be forwarded during vessel Lay-up.

|  |  |  |
| --- | --- | --- |
| No. | Title | Frequency |
| OP04 | Deck Log Book | Monthly |
| OP05 | Landing Report | As required |
| OP20 | Masters Handover Form | As required |
| OP22 | Quarterly Survey Status | Quarterly |
| OP30 | Maintenance Report Diesel Generator | As required |
| OP33 | Maintenance & Repair Report (non diesel) | As required |
| OP36/37 | Engine Log Book | Monthly |
| OP38 | Monthly Lub Oil Report | Monthly |
| OP39 | Monthly Chemical Stocks Report | Monthly |
| OP41 | Auxiliary Machinery Monthly Report | Monthly |
| OP42 | Chief Engineers Handover Form | As required |
| OP45 | Monthly Battery Report | Monthly |
| OP46 | Survey Report (Class) | As required |
| OP47 | Maintenance Report – Main Engine | As required |
| OP48 | Quarterly Safety Devices Report | Quarterly |
| OP49 | Monthly Stock of Gas | Monthly |
| OP65/66 | Purchase Requisitions | As required |
| SAF02 | Monthly Chart Report | Monthly |
| SAF04/04a | LSA/FFE Planned Maintenance Report | Monthly |
| SAF07 | Minutes of Safety, Health & Hygiene Committee Meeting | Monthly |
| SAF11 | Near Miss Report | As required |
| SAF14 | Crew Accident Report | As required |
| SAF15 | Incident Report | As required |

15.2. Other Forms may be forwarded as required.