

## Guidelines for Laying up Vessels

### 1. Introduction

These guidelines are designed to assist Members in preparing vessels for lay-up and for maintaining them in a safe and efficient condition during a period of lay-up, and to facilitate subsequent reactivation whilst minimising the risk of P & I claims. Such claims could typically be for wreck removal, injuries to crew, and pollution of the local environment, particularly arising from the leakage of oil leakage, or other contaminants or the leaching of antifouling. Other possible claims could arise from damage to third party property, including other vessels, underwater cables or pipelines, pleasure craft, aquaculture installations, beaches and reefs.

Ships that are laid up will be subject to the statutory requirements of all relevant national, port and other authorities, the recommendations of the relevant Classification society, and agreement of Hull & Machinery insurers. These guidelines are subject to compliance with all such requirements and recommendations.

Shipowners should note that the specific requirements of original equipment manufacturers may take precedence over the general guidelines presented in this document with regard to the procedures for lay-up and long term protection and maintenance of that equipment.

In order to efficiently lay up a vessel the shipowner will decide on the likely period of inactivity, the need to reduce overhead costs, the extent of reduction in manning and possible locations. There will be other commercial considerations including the time and cost needed for reactivation and the age and value of the ship.

A full risk assessment should be carried out by the shipowner or operator prior to commencing the lay-up of a vessel. This needs to cover the safety and suitability of the location, the safety of the vessel, crew, moorings and environment and also the preservation of the vessel and machinery.



Written procedures for the lay-up, manning, inspections and machinery maintenance and subsequent reactivation should be prepared so that all likely risks can be suitably managed. If necessary professional guidance should be sought.

Records of all lay-up activities should be retained on board and copies placed safely ashore to assist with subsequent reactivation. Data, including software and settings on all electronic equipment should be backed up and similarly maintained on board and ashore.

If lay-up and reactivation procedures are not correctly carried out, serious long term damage to the vessel and machinery can be caused. One area of particular uncertainty is that modern vessels have a large amount of sophisticated computer equipment, including machinery control systems and navigational equipment. There is little current experience that these systems will re-boot when a vessel is reactivated after a long lay-up and then operate correctly.

It should be noted that these guidelines are of a general nature and are not intended to be complete or covering all circumstances or vessel types. They may need to be modified to suit a particular ship or situation.

### 2. Lay-up Criteria

There are two basic criteria that the lay-up procedures are designed to meet:

- (a) To maintain the safety, security and protection of the vessel, crew, and the local environment.
- (b) To preserve and maintain the vessel's hull and machinery by providing protection against corrosion and static seizure.

The vessel can be laid up either in "Hot" or "Cold" mode. For the purposes of these guidelines these conditions are defined as follows:

Hot Lay-up: any vessel that has been laid up with reduced crew but which may have

some element of the ship's machinery still operating, e.g. generators.

**Cold Lay-up:** any vessel that has been laid up with no ship's machinery operating. The vessel may be fitted with a temporary on deck generator or connected to shore power to run de-humidifiers and for other purposes, through cables external to the ships switch boards.

"Hot" lay-up is usually relatively short term and means that the vessel will have some of the machinery working and a reduced number of crew on board. Flag State and Class requirements will continue to apply. The advantages are that a vessel can be easily laid up and reactivated with less cost, time and effort.

"Cold" lay-up for a longer period requires the vessel to be moored in a secure and safe location and all systems are shut down. There will be the minimum ongoing maintenance to prevent deterioration of the hull structure and machinery. A specialist lay-up crew may be employed, or possibly only a watchman from a contracted 'housekeeping' company will be on board for much of this period to deal with fire, flooding, moorings and security watch. The main disadvantage of a cold lay-up is the degradation of the hull, machinery and equipment. Re-commissioning may require dry docking and machinery overhaul and can take several weeks or even months.

### 3. Safety of Lay-up locations

London's hull & machinery insurance market historically maintained a record of around 400 approved locations worldwide. However subsequent changes in infrastructure and conditions at some of these sites could mean that they are no longer suitable. Because of increases in vessel sizes many old locations are no longer suitable for modern tonnage. Consideration should therefore be given to each proposed new location which may need to be surveyed before being approved as safe. Furthermore, the safety of any particular lay-up location should be monitored after the commencement of a vessel's lay-up since this may be adversely affected by changing conditions such as increased congestion.

The risk assessment of the location and method of lay-up needs to address the following:

- 3.1 Degree of shelter provided from open seas, wind, waves, swell, etc.
- 3.2 Method of mooring vessels: including ships berthed alongside, at buoys, lying at anchors, stern moorings, anchored rafts of several vessels, etc.
- 3.3 Detailed climatological information from the best sources available relating to the likely maximum force and direction of wind, waves and swell, and incidence of cyclones, hurricanes, ice, etc. Reliability of local weather forecasting services and the potential windage of vessels, containers on deck, etc.
- 3.4 Bathymetry and anchorage depth and type of holding ground, with diver or sonar surveys as appropriate, local currents and tides. The depth of water should be sufficient for vessels to remain afloat at all stages of the tide with sufficient under keel clearance.
- 3.5 Space available or number of designated lay-up positions and suitable access and egress channels, pilotage, tug assistance during mooring, etc. Proximity of passing traffic and other moored vessels, and proximity to any obstructions, wrecks, underwater cables or pipelines.
- 3.6 Details of local authorities and availability of tugs, fire fighting, medical & safety services.
- 3.7 Availability of services such as fresh water, waste disposal, shore power and repairers, replacement equipment and moorings, etc.
- 3.8 Security of location.
- 3.9 Assessment of likely hull fouling due to marine growth at the location, and any local corrosive discharges or effluent.
- 3.10 Proximity of any commercial aquaculture, including fish farms and oyster beds, water intakes, coral reefs, beaches, etc.
- 3.11 Facilities for shore monitoring of vessel position, remote GPS monitoring etc.

### 4. Lay-up arrangements

Planning of the arrangements will involve consideration of the following criteria:

- 4.1 The method and safety of the mooring and all the various activities relating to the safety of the vessel, crew and environment.
- 4.2 Approval of all relevant arrangements by Flag State, Port State, Harbour or any other relevant authorities, Classification, Hull & Machinery and P & I insurers and their appointed surveyors.
- 4.3 The preservation of the vessel and her machinery and equipment to prevent damage or deterioration, and to facilitate subsequent safe reactivation.

### 5. Manning

- 5.1 The Owners must retain sufficient crew on board to carry out the lay-up preparation. The crew can be reduced as work progresses until the vessel is finally de-manned or reduced to an agreed skeleton crew. If the vessel is to be unmanned, the lay-up contractors should provide watchmen to ensure the security of the vessel, and personnel to carry out maintenance routines.
- 5.2 Reductions in manning below minimum manning levels should be agreed with the relevant Flag State, local Port State or harbour authority and any necessary dispensation obtained.

### 6. Mooring arrangements

Mooring arrangements can vary considerably, depending upon the location chosen, and are dictated by topography and bathymetry. For example vessels may be laid up alongside a suitable berth in a sheltered port. In fjords or similar locations ships are often moored using anchors forward and wires to the shore aft. In sheltered bays or rivers they may be laid together in rafts, bow to stern, secured by anchors or buoys at both ends. In some benign areas they could be anchored using a running mooring with both anchors laid out. The moorings will also depend on the required state of readiness of main machinery and manning levels.





- 6.10 Suitable fendering must be placed between ships and between ship and quay.
- 6.11 Positions of anchor chains, wires and mooring lines to be varied at regular intervals to prevent uneven wear in way of contact points such as hawse pipes, fairleads, winches, etc.
- 6.12 Anchor lights and fog signals should be fully operational, and additional deck lighting will be required if the lay-up location is close to shipping lanes.

## 7. Security, Safety, Protection and Environment

The purpose is to provide and maintain the following:

Ideally, a full mooring analysis will be carried out to ensure that the proposed mooring arrangements will be safe, allowing for the possible maximum peak wind force from the most unfavourable direction in the planned location, obtained from 10 year environmental return figures.

The following points should be considered:

- 6.1 The moorings must be sufficient to hold against the most severe wind expected from the most unfavourable direction. High profile vessels such as car carriers, passenger/cruise ships and container vessels with container stacks will require allowances to be made for the additional windage when assessing the mooring arrangements.
- 6.2 To minimise windage and improve anchor holding, tankers should take about 30% deadweight ballast, and bulk carriers should have maximum ballast.
- 6.3 Anchors should be well pulled in, with the chains as straight as possible and stretched tight. A normal scope on the anchor is 10 shackles, but more can be used.
- 6.4 If there is any doubt regarding anchors holding they should be picked up and re-laid, and a diver put down where necessary. Anchor positions should be marked with buoys to show locations and to facilitate recovery if slipped.
- 6.5 If wires are used astern, they must be under even tension and kept taut.
- 6.6 Except in special circumstances, mooring for lay up on a single anchor is generally considered to be unsatisfactory.
- 6.7 Final lay-up draft marks forward & aft to be painted conspicuously with white lines on port and starboard sides.
- 6.8 Rigging of emergency towing lines fore and aft, ready for use, without adjustment, should the vessel need to be towed off. Also emergency means of quick release of moorings should be provided if propulsion machinery cannot be brought into operation.
- 6.9 Multiple vessels laid up together, either alongside a berth or anchored or moored in groups or "rafts", should be of a similar size. When moored in rafts, vessels are normally not more than six abreast and anchored so that they are heading in alternate directions and secured bow to stern. Vessels alongside should normally be not more than three abreast and all heading in the same direction. The arrangements for mooring, fire safety, manning and security of any other vessels in the group should also be checked, particularly if not in the same ownership or management.

- 7.1 For a "Hot" lay-up, a sufficient number of qualified ship's officers and crew should be onboard in order to maintain a full time fire, flooding, mooring, safety and security watch over the vessel. For a "Cold" lay-up efficient, independently powered fire and flooding alarms and/or warning lights/whistles/klaxons to be fitted in machinery spaces, bilges and other spaces as deemed appropriate. Remote monitoring to be utilised where relevant.
- 7.2 A fire fighting capability to be provided through the continuous operational availability of emergency equipment and apparatus. Emergency fire pump to be inspected and maintained in a fully workable condition to ensure its reliable operation.
- 7.3 The minimisation of fire risk through the removal of all flammable material not required during lay-up, including chemicals and paint, gas freeing and cleaning of tanks and relevant compartments and by the employment of safe working practices to minimise sources of ignition. All fire dampers to be inspected and freely operable. Dampers not required for essential ventilation to be closed.
- 7.4 Safe access for boarding or movement between vessels via a suitable gangway with adequate lighting.

- 7.5 Evacuation facilities through the operational upkeep of lifeboats/life rafts.
- 7.6 Security on board by means of limiting any access to the vessel as well as securing and sealing of external doors into the accommodation and other spaces. Provision of suitable alarm systems with remote monitoring.
- 7.7 Provision of a safe working environment for crew on board or for watchmen and maintenance crews.
- 7.8 Any enclosed spaces to be ventilated and tested as necessary prior to entry.
- 7.9 Oil tanks to be drained, cleaned and maintained in gas free condition and tested at regular intervals, and all oil pipelines drained and cleaned prior to long term lay-up.
- 7.10 Arrangements should be made for the safe containment and frequent removal of garbage & sewage produced by crew or watch personnel.
- 7.11 Minimise risk of air pollution.
- 7.12 Assess risks of local contamination from vessel's paint coatings during long term lay-up.
- 7.13 Emergency generator should be operated at least weekly under electrical load.

- Accommodation spaces maintained at 45 - 55 % relative humidity.
- 8.3 Regular turning of rotating machinery to prevent corrosion and damage to bearings, seizure and component distortion.
- 8.4 Application of preservatives and suitable lubricants to external equipment and machinery not within the dehumidified spaces.

## 9. Preparation Procedures

- 9.1 All water/steam systems and tanks within the controlled spaces, except those required for the lay-up operation should be drained of free water (including bilge areas), dried and left open to the dehumidified atmosphere. Non-return valve internals should be removed where necessary to improve air circulation within the systems.
- 9.2 Hull Structure.
  - 9.2.1 Underwater area must be adequately protected with sacrificial anodes and hull potential to be maintained and monitored at a satisfactory level.
  - 9.2.2 Ballast tanks should be maintained either full or empty. During a long lay-up ballast tanks should be protected by means of preservatives or sacrificial anodes.
  - 9.2.3 All sea valves are to be fully closed and secured, with hand wheels locked or removed and electrical power isolated from automatic valves. Internal blank flanges or external welded steel blanks should be fitted where considered necessary. External sea suction to be closed off by divers using fibreglass or wooden blanks fitted with neoprene seals and provided with a pocket so that a biocide brick can be inserted to prevent marine growth in the grids.
  - 9.2.4 The stern seal to be checked externally by divers to ensure there are no ropes or lines penetrating into the seal assembly that could result in leakage. Stern tube oil header tank levels to be regularly monitored.
  - 9.2.5 A safe access to the Vessel must be provided for contractors, watchmen and maintenance crews.

## 9.3 Accommodation.

If a vessel is laid up unmanned then:

- 9.3.1 In addition to external sealing arrangements all sanitary fittings to have openings sealed and water supply systems isolated.
- 9.3.2 All excess or unnecessary equipment, stores and provisions should be off-loaded, particularly in long term lay-up situations. Store rooms should be cleaned and doors secured in open position.
- 9.3.3 All cabin linen to be stowed in a central locker in clean condition, mattresses stood on edge and all cupboard and cabin doors secured in open position.
- 9.3.4 All navigation and communication systems to be isolated (except local trans/receiver) and room doors left open to ensure good air circulation.
- 9.3.5 Accommodation spaces to be sprayed with insecticide to prevent infestations of cockroaches etc.
- 9.3.6 Lighting circuit breakers to be opened where relevant leaving only the emergency lighting circuits in use during lay-up.
- 9.3.7 Potable water tanks and system to be drained and sterilised prior to lay-up and left open to atmosphere and subsequently suitably flushed to sterilise system prior to reactivation.
- 9.4 External Equipment.
  - 9.4.1 All moving and working parts of deck fittings to be proved free and thoroughly coated with preservative grease. Crane cabs to be secured and sealed and control positions covered and secured.
  - 9.4.2 Arrangements to be made for the regular turning of steam/hydraulic deck machinery on air. Internals of engines and all working parts will be regularly lubricated.
  - 9.4.3 Lifeboats and davits to be kept in good working order, being regularly lowered and the engines run on test.
- 9.5 Internal Machinery, Boilers & Equipment.

Individual machinery and boilers within the dehumidified spaces should be treated as recommended by the manufacturers and Class.

## 8. Preservation & Maintenance

The objective is to eradicate accelerated corrosion and seizure. Specific guidance should be obtained from machinery manufacturers and the Classification Society. General procedures should include:

- 8.1 Effective sealing of machinery spaces, bridge and accommodation areas from external atmospheric conditions, particularly in locations where high humidity levels exist.
- 8.2 Controlled dehumidification of internal air spaces (including void spaces within machinery and pipelines) to prevent sweating and humidity corrosion damage, as well as moisture absorption into electrical cables and fittings.
  - Main Machinery spaces maintained at 30 - 50% relative humidity.



- 9.6 Electrical Installation.
  - 9.6.1 Electrical power to be provided by a portable diesel generator or shore power when available. This will minimise the utilisation of the vessel's own emergency generator which can then be laid up if necessary. Temporary cables to be supplied and safely installed as necessary.
  - 9.6.2 Full insulation tests to be carried out on all distribution systems and motors at the commencement of lay-up and subsequently at regular intervals, readings recorded and submitted to Owners.
  - 9.6.3 The condition of external motors to be monitored by taking regular insulation readings and if the condition deteriorates to a point where it would be detrimental to the motor then, where possible, it should be removed and stowed in a dehumidified area. Heating arrangements of the electrical equipment must be provided.
  - 9.6.4 Electrical/printed circuit boards are to be kept dry and excessive temperatures avoided. The equipment may require specialist protection and specialist testing during subsequent reactivation.
- 9.7 Documentation and Record Keeping.
  - 9.7.1 All work carried out during lay-up preparation to be carefully recorded, documented and photographed. Data settings etc., in electronic equipment and computers to be backed up. Copies of such records to be held by owners and also retained on board during the lay-up period for use during subsequent reactivation.
  - 9.7.2 All machinery and equipment components removed from their normal location to be properly labelled and stowed adjacent to the parent unit within the dehumidified spaces. The parent unit to be marked with appropriate labels where such components have been removed. Apertures/inspection openings where covers have been removed for air circulation to be covered with fine mesh wire gauze to prevent ingress of foreign matter.
  - 9.7.3 External equipment removed to within the dehumidified spaces to be properly stowed, the storage location

carefully recorded and the normal location site labelled.

- 9.7.4 Any spares or equipment subsequently removed for operational purposes such as transfer to other operational vessels to be recorded for replacement during later reactivation.
- 9.7.5 Log books of all activities on board to be maintained throughout the lay-up period.

## 10. Inspections

The objective is to conduct regular inspections either by the remaining crew or a contracted service company and to carry out tests on structure, machinery and equipment to ensure that the standard of preservation is maintained. Inspection and maintenance regimes should be fully documented in advance of lay-up and may include daily, weekly, monthly or annual activities. Full procedures and necessary records are to be maintained. Computer software for this purpose is commercially available. The Owner should receive detailed monthly reports from the crew or contractors on the findings of the scheduled inspections and tests.

Such checks will include:

- 10.1 Frequent checks of mooring and fendering arrangements.
- 10.2 Frequent checks of embarkation, lighting and other safety systems.
- 10.3 Frequent checks on communication systems.
- 10.4 Regular soundings of bilges, tanks and other spaces.
- 10.5 Regular checks on the operation of emergency equipment and apparatus, fire, leakage, security systems and alarms.
- 10.6 Visual checks on 'controlled' space sealing arrangements.
- 10.7 Measurement checks on relative humidity levels within 'controlled' spaces.
- 10.8 Visual checks on protective coatings of all external machinery and equipment.
- 10.9 Live tests of emergency fire pump and system.

- 10.10 Measurement checks of electrical circuit insulation continuity.
- 10.11 Visual checks on all occupied storage tank levels.
- 10.12 Periodic underwater survey by qualified diving contractor.

## 11. Maintenance During Lay-Up

Lay-up routines to be carried out throughout the laid up period by remaining crew or contractor, including checks as listed in section 10.

- 11.1 To prevent seizure of the main engine and auxiliary engines, compressors, pumps and other rotating equipment, they are to be regularly turned with lubrication. Machinery to be stopped in a different position each time. Specific guidance should be obtained from machinery manufacturers.
- 11.2 At least one stores crane should be in good working order for use during the lay-up period, and have valid load test certificates issued.



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