

Lay-up

Due to the difficult times in shipping, we are experiencing more vessels being taken out of operation for lay-up.

This document provides owners with guidelines and recommendations regarding vessel lay-up. The owner should contact their classification society, underwriter and flag state before the vessel is laid up.

Lay-up types

There are two types of lay-ups:

Cold lay-up, which applies to vessels that have been taken out of commercial operation and are subject to the recommendations presented in this document, and/or any recommendations issued by the Classification Society, Flag State and/or Port Authority.

Hot lay-up or Idling, which applies to vessels that, when applicable, are subject to the recommendations presented in this document and/or any recommendations issued by the Classification Society, Flag State and/or Port Authority, but are still in operation and may be idling for a period awaiting the next cargo. Returns for hot lay-up or Idling are granted for Hull & Machinery insurance only.

Premium Returns

Lay-up return will be granted for Hull & Machinery and Protection & Indemnity only.

Hull & Machinery

The Association will acknowledge lay-up for Hull & Machinery Insurance as follows:

Cold lay-up with a reactivation time exceeding one week.

Members are entitled to lay-up returns if the period exceeds 30 days, i.e. for any such period the return will be calculated from Day 1. Days of arrival, departure and shifting will be deducted. The Member must comply with any recommendations issued by the Classification Society, Flag State and/or Port Authority. If a claim arises due to the recommendations referred to above not being followed, the Association will not be liable for that claim. Returns are not granted for periods when the vessel is undergoing repairs or if compensation for a total loss has been paid.

Hot lay-up or Idling with a reactivation time between 24 hours and one week.

Members are entitled to lay-up returns for any period in excess of 30 days, i.e. the return will be calculated from Day 31. Days of arrival, departure and shifting will be deducted. If and when applicable, Members must comply with any recommendations issued by the Classification Society, Flag State and/or Port Authority. If a claim arises due to the recommendations referred to above not being followed, the Association will not be liable for that claim. Returns are not granted for periods when the vessel is undergoing repairs or if compensation for a total loss has been paid.

Lay-up rate schedule

The association has the discretion at all times to individually assess any lay-up, and apply a relevant rate.

Lay-up type	Maximum return Pro-rata	Minimum rate Pro-rata
Cold lay-up <i>Taken out of commercial operation and laid up in safe port as per recommendations from Classification Society</i>	50%	0.1
Hot lay-up <i>Still in commercial operation and laid up in safe port</i>	25%	0.1
Idling <i>e.g. at anchorage</i>	10%	0.1

Applications for subsequent returns

Applications for lay-up returns must be made in writing no later than 30 days after the expiry of the insurance period, or at the absolute latest by 31 January of the year after the lay-up commenced. Returns are credited to the Member when the policy year expires.

Applications for upfront returns

Returns may be granted upfront in respect of cold lay-up or hot lay-up. Regarding the former, upfront returns will be granted after the expiry of the excess period provided for within the relevant Hull & Machinery conditions. In respect of the latter, an upfront return will only be granted for the idling period exceeding 30 days.

Lay-up rate schedule

The association has the discretion at all times to individually assess any lay-up, and apply a relevant rate.

Protection & Indemnity

The Association will acknowledge lay-ups for Protection & Indemnity Insurance as follows:

Cold lay-up with a reactivation time exceeding one week

Members may be allowed up to 50% premium returns for vessels laid up in a safe port for more than thirty (30) consecutive days, subject to reduction of crew and no cargo onboard.

No premium return is granted for vessels less than 500 GT, or for tugs, barges or passenger ships/ferries in coastal trade.

Returns are not granted for periods when the vessel is undergoing repairs. If and when applicable, Members must comply with any recommendations issued by the Classification Society, Flag State and/ or Port Authority. If a claim arises due to the recommendations referred to above not being followed, the Association will not be liable for that claim.

Lay-up type	Pro-rata return
Cold lay-up <i>Taken out of commercial operation with reduced crew and no cargo onboard. Laid up in safe port as per recommendations from Classification Society</i>	0-50%

Applications for subsequent returns

A claim for lay-up returns should be made to the Association as soon as possible, however, at the latest 12 months after expiry of the P&I policy year. Sufficient information has to be supplied in order for the Association to calculate the return.

Yours faithfully
The Swedish Club



Lars Rhodin

Encl.

- Recommendations for lay-up

Recommendations for Lay-up

1. Introduction

The recommendations in this document are of a general nature, and to that end owners need to employ measures that are specific to each particular vessel type and location of the lay-up. In addition, it is vital that owners note any specific recommendations issued by the original supplier of equipment to the ship, which may override any general guidelines contained in this document. Depending on the location of the lay-up, vessels may be subject to local regulations, which are not dealt with below.

2. Objective

This document is designed to assist owners in preparing their vessels for a lay-up period. In addition it provides guidance regarding safe and cost-efficient maintenance during the lay-up period.

3. Initial phase

Preparations for a lay-up should be carried out by members of the crew, the owner's technical shore staff, or a contractor's competent personnel, and in consultation with the Classification Society office.

4. Hot & cold lay-up

4.1. Choice of lay-up condition

The choice of lay-up condition will generally be determined by a consideration of technical and commercial trade-offs (advantages and disadvantages) for the following factors:

- The time the vessel will be in lay-up condition
- The time that will be needed to reactivate the vessel
- The owner's drive to reduce overhead running costs
- The relocation of the vessel to its next intended destination and
- The age of the vessel and the vessel's value in respect to scrap value

4.2. Hot vessel lay-up (24-hour reactivation)

This lay-up condition is suitable for up to one month out of service. In this condition, the vessel is held within Classification and Flag State requirements although the number of crew may be reduced in line with the certified minimum safety manning limits. The machinery will be kept operational but various economies may be made. The vessel will be located in an area close to the potential cargo trade routes.

4.3. Hot vessel lay-up (one-week reactivation)

This lay-up condition is suitable for up to 12 months out of service. In this condition, the manning is reduced below the trading limit and in agreement with the Flag State, the Classification Society and other local authorities and insurance companies. In this condition, most ports will only grant a temporary permit to lay-up a vessel in port, provided that Class and Flag surveys are carried out. Under these circumstances there may be local restrictions on vessel operations, e.g. restrictions on the transfer of oily bilge water.

4.4. Cold vessel lay-up (three-week reactivation)

This lay-up condition is suitable for up to five years out of service. In this condition, the manning is in line with emergency requirements to deal with fire, flooding, mooring and security watch. Cold lay-up locations are generally remote so access to the vessel is likely to be limited. On reactivation, the vessel may need to go directly to dry-dock before trading, depending on the extent of hull marine growth. It is important that all preparations during cold lay-up are well documented because the crew changes may be significant.

For critical equipment it is advisable to consult the original equipment manufacturers to ensure there have not been any significant updates and to ensure the equipment is working as intended. Furthermore, any remedial work required on reactivation is likely to be extensive and unpredictable, e.g. renewal of alarm systems due to obsolescence.

5. Location considerations

The local requirements applicable to specific lay-up locations and mooring arrangements are normally determined by the relevant port authority. However, the owner should consider the following factors before selecting lay-up locations:

- The extent of shelter from open seas, strong winds, swell, surges and strong currents
- The proximity to shipping routes
- The proximity to wrecks, submerged pipes, cables and other sea-bottom hazards
- The proximity to known environmental factors e.g. tropical cyclones, hurricane areas, ice-strong tides
- The water depth regarding under water clearance at extreme low tides versus excessive water depth regarding anchor chain limitations
- The characteristics of the seabed regarding anchor-holding capability (which may require confirmation by diving inspection)
- The availability of local tug assistance
- The characteristics of the windage area
- Limitations of the mooring equipment. Access to and the readiness of additional moorings.
- The capacity and capability of the crew during normal and heavy weather conditions
- The reliability and frequency of local weather forecasts and warnings
- The proximity to other vessels and related traffic hazards in the vicinity and
- The scope of local emergency preparedness plans and services for potential fires, flooding, security incidents, mooring failures or medical emergencies

6. Mooring arrangements

6.1. General requirements

The mooring arrangements will depend on the selected lay-up site conditions, readiness of the main machinery and manning levels. The arrangements will include a vessel's own anchoring equipment augmented by stern anchoring arrangements, permanent buoying facilities or mooring to shore.

The choice of mooring arrangements should be in line with the following general requirements:

- When vessels are laid-up to buoys or anchored, they should be moored to prevent swinging in the wind or due to tidal changes

- When vessels are anchored, the chain cables must not be capable of twisting or cross contact, and anchors must be placed to avoid tripping
- Additional stern anchoring arrangements will be required for single anchor vessels
- Anchor cables should be led and protected to prevent chaffing against the vessel
- Where laid-up vessels are subjected to wave movement or surges, anchor cables should be periodically moved to shift points of wear on them
- Anchored vessels should have ample chain scope provided, i.e. cable lengths should ideally be around seven times the water depth. In any event, the local port authorities should be consulted for their knowledge of prevailing conditions
- Anchor lights and fog signals should be fully operational and additional deck lighting will be required if lay-up is near shipping lanes
- Vessels should be sufficiently ballasted to reduce windage, roll and surge, with due regard to hull stresses. Furthermore, when draught is finally established, it is advantageous to paint clearly visible reference marks at the bow and stern, just above the water line, as an external indicator of hull integrity (leakage)
- An emergency means for the quick release of all moorings should be provided and arrangements for towing should be readily available if propulsion machinery cannot be brought into operation
- All anchors should be provided with marker buoys
- The windlass and mooring winches, if electronically driven, should be provided with an adequate source of electrical power for intermittent and emergency operation; and
- Day and night anchor dragging GPS position fixing (or compass bearings) should be established and monitored on a regular basis

6.2. Vessels moored in groups

When vessels are to be laid-up in groups, mooring arrangements should be as above with the following additional requirements:

- Adjacent vessels should be similar in size to avoid differential surging motions and they should be ballasted to similar freeboards to permit breast lines to be directly led
- Vessels should ideally be anchored in alternate directions (alongside bow to stern), in even numbers to provide equal anchor holding power at both ends of the group
- The fore and aft direction of each vessel should be parallel to prevailing strong winds
- Breast mooring lines should be provided, sufficiently tensioned and be of similar stretch characteristics
- Sufficiently sized fendering arrangements should be provided alongside, at areas of possible contact with other vessels or shore structures and
- If the auxiliary engine on one vessel is used to supply power to other vessels, it is recommended that all vessels are electrically connected to avoid stray currents

7. Class status during lay-up

7.1. Class notation

Vessels that are laid-up immediately after service will be maintained in Class without periodic surveys until the due date for the special survey. If a vessel remains laid-up beyond the due date for the special survey, the Class notation 'Laid-up Surveys Overdue' (LUSO) will be assigned. The owner will

subsequently be given the option of having the vessel declassified, or carrying out inspections to maintain the 'Laid-up Surveys Overdue' notation.

8. Manning levels

Ideally, owners should conduct a risk assessment for the expected hazardous events that may occur at any time of the day during lay-up regarding the planned manning level. The risk assessment should account for the following onboard scenarios

- Fire
- Flooding
- Heavy weather
- Security breach

The extent to which onboard risks can be mitigated is largely determined by the manning level. Port authorities may have their own requirements for the minimum crew onboard. Technical attendance will usually be necessary and the extent of this will depend on the location and expected duration of the lay-up, as well as the nature of the vessel's dehumidification programme and the number of adjacent vessels.

The crew will be required to carry out routine maintenance and monitoring which may be performed on a regular visitation basis. It is recommended that at least one engineer officer and one deck officer be stationed on each vessel, unless vessels are laid-up in a group.

The deck and engineer officers must be capable of operating essential equipment that is critical to the lay-up operation. Owners should assess the flooding risks in the machinery spaces posed by various manholes being left open for drying salt water coolers and other equipment in the engine room.

It is recommended that the owner seek guidance from the vessel's Flag state, insurer and local authorities to agree the final manning levels onboard during lay-up.

9. Record keeping

The owner should carefully prepare a log of all the measures taken during the implementation of a lay-up programme, to ensure easy and orderly reactivation in future. In particular, an inventory of the entire vessel's equipment that is moved ashore should be prepared, to monitor the extent of cannibalisation of spares to sister ships in the fleet that are still trading.

10. Navigation

Where there is a permanent lay-up crew onboard the vessel, they should be provided with an updated chart of the lay-up area, whereas all remaining chart folios may be taken ashore. The correct navigation signals and lights should be provided.

11. Safety equipment. Systems and alarms

All safety equipment considered necessary for the safety of the vessel and the crew, should be periodically examined and maintained in a satisfactory condition. For example, sufficient breathing apparatus and floatation escape devices should be provided and maintained.

Fire extinguishers should be regularly inspected and where foam or CO₂ systems are installed, the system should be maintained in a fully operable condition. All fire dampers should be inspected to be freely operable and regularly greased, whereas dampers that are not required for essential ventilation should be closed.

The emergency fire pump should be regularly inspected and maintained in a fully working condition to ensure its reliable operation. An international shore connection should be retained in an accessible position. The fire main should be drained via a small-bore drain to prevent freezing (and subsequent overpressure).

Bilge level and fire alarm systems should be arranged to operate as audible and visible alarms, as follows: (a) within the living quarters when the vessel is permanently attended; or (b) where the vessel is unattended, to operate the ship's whistle or an equivalent alarm. If a laid-up vessel is in 'electrical dead ship' condition, bilge and fire alarms must be independently powered.

Warning notices should be placed in conspicuous places advising staff of the dangers of entering enclosed spaces. Pump rooms, tank spaces, cofferdams, etc. should not be entered unless they are proved to be gas free, and the normal safety precautions have been taken.

Furthermore, no repairs should be carried out in cargo or fuel tanks, pump rooms, etc. unless special arrangements have been made and dangerous spaces have been proved gas free.

The owner should provide approved oxygen and explosion meters where the type of vessel requires such safety equipment. A sufficient number of approved safety torches should be available onboard. In many ports, the harbour master will require bulk carriers and tanker vessels to be issued with a gas free certificate prior to lay-up and will expect that the gas free status be maintained during the lay-up. Some authorities may require the periodic renewal of the gas free certificate throughout the lay-up period, e.g. at three-month intervals.

12. Protecting equipment during lay-up

12.1. Wet or dry ballast tanks

Ballast tanks should be laid-up in either a wet or dry condition. Ballast tanks can be stored in a completely empty and dry condition with as much water removed from the tank as possible, e.g. the tanks can be dried by forced venting.

Alternatively, ballast tanks should be completely filled by flooding (including deck headers and vent pipes) with chemically treated water to inhibit corrosion. Filled ballast tanks should then be checked at the air pipes for liquid loss on a weekly basis, and topped up as required. Ideally, owners should hang corrosion coupons (steel plates) within filled ballast tanks to monitor the effectiveness of the chemical corrosion inhibitor. These coupons will enable the crew to monitor the inhibitors' effectiveness and to determine when further chemical dosing is required.

12.2. External hull protection

The hull should always be protected against corrosion. The paintwork of the parts above the water line, deck and superstructures should be renewed and examined and maintained at regular intervals

during lay-up. To protect the external hull below the waterline (particularly in contaminated waters) it is recommended that the impressed current system (if fitted) should be continuously operated.

Impressed current cathodic protection systems should be regularly examined, maintained and monitored (specifically, current outputs and hull potentials). Sacrificial anodes mounted on the hull should be renewed where necessary before lay-up and these should be regularly examined.

If a laid-up vessel has no impressed current protection, sacrificial anodes can be suspended at regular intervals around the hull below the waterline. This precaution is particularly important if a laid-up vessel is moored near a structure with its own impressed current protection system (such as a jetty or another vessel). In the event, the hull's electrical potential should be periodically checked along the underwater side area with portable voltmeters.

12.3. Internal hull protection

Hold covers, cargo tanks and other hatch covers, watertight doors and closing appliances should be securely closed and sealed, unless required for access or ventilation. Flame screens on fuel tank air pipes should be in good condition.

Empty tanks, holds, pump rooms, small machinery spaces, storage spaces, lockers and other similar areas should be kept in a dry condition. For this purpose, dehumidification is recommended but the extent of its use is dependent upon the type of ship, its condition, the lay-up location and the climatic conditions.

Fuel oil bunker tanks should be kept full or should be cleaned and gas freed. When kept full a regular check for liquid loss should be made. A biocide may be added to the fuel to prevent microbiological degradation; specialists should be consulted to assess any adverse side effects.

Fresh water tanks should be cleaned and recoated where necessary and chain lockers should be cleaned, dried and coated.

12.4. Deck equipment

For deck machinery, all bright parts exposed to the atmosphere should be greased and machinery internals should be protected with oil and sealed to prevent ingress of moisture and air. Any mooring ropes or soft fibre materials, which are sensitive to ultraviolet (UV) light degradation, should be stowed out of the sun.

Cargo and other lifting gear wires and blocks not retained in use should be dismantled, greased and stored and gear that is not dismantled should be protected with grease and covered.

12.5. Accommodation areas and outfitting

12.5.1. Accommodation areas

Personnel living onboard should be accommodated in one area to allow all other areas to be dehumidified, or at least provided with heaters, to reduce humidity to an acceptable level. If the ship's galley is being used by lay-up staff, the galley exhaust fans and grease trap should be regularly inspected and cleaned.

For all unoccupied areas, the humidity level in accommodation areas should be reduced and maintained at 45-55% relative humidity (RH) by dehumidifiers. This is particularly important for spaces such as the radio room, bridge and other spaces housing electrical equipment and machinery. It is recommended that the humidity level in relation to critical areas and equipment is checked regularly.

Ships linen and napery should be stored in one single dry compartment with mattresses stowed on their edge to assist free air circulation.

All provision room, cabin and cabinet doors should be secured in the open position. Water services in unoccupied areas should be shut off and drained and sanitary fittings and toilet bowls should be sealed.

Scuppers and liquid seals should be treated to prevent freezing under normal climatic conditions.

12.5.2. Outfitting

“On hire” equipment such as gas bottles, etc. should be returned to suppliers, or an agreement may be reached regarding reduced hire charges and insurance premiums.

Electricals on deck and telephones, telegraphs, etc should be covered and sealed in moisture absorbing desiccant bags.

All loose navigational equipment, chronometers, sextants, etc not required during the lay-up period should be removed and placed in locked storage.

The engine workshop, electrician’s workshop and deck workshop tools and loose equipment not required during the lay-up should be cleaned, greased and put into locked storage.

All loose gear, lifeboat gear, rescue boats and similar equipment should be removed, protectively coated and placed in locked storage, except for retained safety equipment.

Medical and lifeboat perishables should be removed ashore (or to another vessel, as required).

Any foodstuff, pyrotechnics (particularly expiry date stamped), cotton waste, matches, etc not required during lay-up should be removed ashore.

Broached drums of chemicals should be removed ashore.

12.6. Machinery

12.6.1. General machinery

The temperature in machinery spaces should be maintained above 0°C (32°F). Dehumidifying equipment should be installed to protect machinery spaces from atmospheric corrosion, by maintaining relative humidity within the range of 30-50% RH. Power should be available for continuous operation of the dehumidifiers and the occasional turning of machinery. To achieve humidity control of the machinery space, funnel openings, grills, ventilator openings, doors, etc should be closed and sealed. Access to the space should be restricted to two openings only and it is advantageous if these

are double air lock doors. Certain types of gasket and seal materials in the machinery room may subsequently degrade if they are exposed to dry dehumidified air over an extended period of time.

All bilge valves should be cleaned, overhauled and proved operable.

Tank tops in engine rooms, boiler rooms, pump rooms, and hold areas should be hosed down, bilges cleaned and dried.

Any liquid leaks should be repaired.

Air conditioning and refrigerant systems should be pumped down to the liquid receiver and all valves secured and tagged with a note of the liquid level.

All lubricating oil in systems and used oil storage tanks should be thoroughly centrifuged at temperatures above 82°C (180°F) to kill any microbes. Samples should be taken and analysed by the oil suppliers to confirm stability, freedom from moisture and microbiological contamination. Contaminated oil should be renewed.

Where lubricating oil sumps and storage tanks are vented to the atmosphere above deck-level, the venting arrangements should be sealed and alternative ventilation should be arranged into machinery spaces.

All sea inlet valves and overboard discharge valves should have spindles greased, valves closed and hand wheels removed and wired to valves except those required for use during lay-up in connection with fire extinguishing, pumping out or watch personnel duties.

In order to prevent excessive fouling, the sea suction openings (except for the emergency fire pump) should be blanked at the shell opening or protected with a slow acting biocide.

Service tanks for fuel oil should be filled with centrifuged oil to ensure an ample supply of reliable fuel for reactivation. Inlet and outlet valves on oil tanks that are not in use should be shut and their hand wheels removed and wired to valves.

Air receivers should be drained and mopped dry and where dehumidifiers are used, air bottles should be left with the manhole covers removed. (Depending on the lay-up strategy one air bottle may be kept at full pressure at all times to facilitate starting the auxiliary or main engines. In this case, the emergency air compressor should be operated weekly to top up the receiver).

The steering gear should be power operated hard-over to hard-over weekly and stopped with a tiller amidships. The rams, bearings and rudder carrier should be greased. Machinery space ventilators should be closed and sealed.

12.6.2. Diesel machinery

Main engine crankcases should be supplied with dehumidified air that is suitably vented at the opposite end of the engine.

Water-cooled systems for the main engine should be completely drained, washed with fresh water and left open to the atmosphere.

Air starting valves should be dismantled and lubricated.

Fuel valves should be removed, overhauled and stored outside the engine.

All bright work should be protected with a smear of grease or oil.

Engines including all shafting should be turned weekly to circulate oil (i.e. one complete turn plus one quarter turn). Cylinder lubricants should be operated by hand before turning.

Ideally, diesel generators should be maintained in operational condition and operated (rather than simply turned) once per week for about a two-hour period.

The emergency generator should be operated on a weekly basis under load.

12.7. Steam plant

The fireside of boilers should be cleaned particularly the areas where soot accumulates. Fireside water washing is best carried out with a water alkaline solution that neutralizes the acidic deposits, and on completion the fireside insulation and brickwork should be thoroughly dried.

For periods of up to three months, a wet method can be used for laying-up boilers. This involves filling with boiler feed water and venting the boiler drum through the air vents, until the boiler is completely full. A slight hydraulic pressure may be maintained to preclude the ingress of any air into the boiler. The quality of the fill water should be checked regularly.

For lay-up in excess of three months boilers should be drained and stored with the drums and header doors open to ensure maximum air circulation.

The fuel oil system should be drained and filled with gas or diesel oil.

12.8. Water systems

All SW and FW systems and pumps that are not in use, should be washed with fresh water, drained and left open to the atmosphere when a dehumidifier is in use. (Otherwise they should be left full of suitably treated clean water).

Any pumps, for which power is not available, should be turned weekly by hand.

Dehumidifiers should be suitably equipped with vent trunking to forcibly ventilate heat exchangers, condensers and steam piping, after the removal of the appropriate inspections covers, crank doors, non-return valves, etc.

12.9. Propellers and shafting

If the vessel is to be laid-up for a period of more than one year, it should be anticipated that the vessel may subsequently be towed to a dry dock on reactivation, depending on hull marine growth. In this

event, it is prudent to prepare and have ready some means of locking the vessel's main shafting prior to laying-up. This will ensure that the vessel meets standard towing requirements on departure for the dry dock.

12.10. Electrical, electronic and software systems

Of particular concern when laying-up modern ships is the large amount of computer processing equipment onboard. It is very important that preventative measures are taken to ensure that the equipment containing printed circuit boards is kept dry and free of moisture, and excessive temperatures are avoided. The electric supply systems in modern ships might include sophisticated electronic DC to AC conversion systems (with diode bridges, triac-diac, thyristors, etc). This equipment may require specialist protection and specialist testing during reactivation.

Precautions need to be taken regarding the large amount of computer software onboard so that back-ups are available for reactivation should computers fail to boot up or restart on their own. This may take the form of keeping all programs and databases (for planned maintenance, etc) duplicated ashore.

Heating or dehumidification techniques should be employed to prevent condensation within:

- a) the main and emergency generators and switchboards
- b) all motors and starters associated with propulsion machinery, pumping duties, steering gear, cargo handling, deck machinery and domestic services
- c) all radio and navigational equipment, and
- d) all engine, boiler and wheelhouse control consoles.

Anti-condensation heaters should be provided for major components outside the heated or dehumidified areas.

The electrical apparatus on deck should be covered and sealed with desiccant bags inside to absorb moisture. Bags should be changed/reactivated at the manufacturer's recommended intervals.

Heaters should be distributed throughout the machinery space to maintain reasonable temperatures and prevent condensation. Electric motors, starters, switchboards, control equipment, must be provided with heating arrangements. If all electrical areas are covered by dehumidifiers then the extent of heating may be reduced.

Deck electrical apparatus should be covered and sealed containing desiccant bags within.

Batteries should be cleaned and greased, and the electrolyte topped up if they are not of the maintenance-free type. Lead acid batteries should either be removed from the vessel, or should be trickle-charged onboard at a rate recommended by the battery manufacturer. Alkaline batteries should be fully charged and disconnected from any possible load.

All circuits supplied from the main and emergency switchboards should be isolated in turn and the insulation resistance between cores and earth should be measured and recorded from each circuit on a regular basis. Ideally, manually operated electrical circuit breakers should be left in the open position.

13. Spares

The removal of spares from a laid-up vessel needs to be strictly recorded and controlled to determine spares purchases at the time of reactivation. (Additionally, if the laid-up vessel is inspected by potential purchasers, the obvious absence of machinery components may affect any valuation of the vessel). If the vessel keeps spare main shafts such as turbo charger, pumps, etc, bolted and hung from bulkheads, it may be prudent before a long lay-up to rotate these through 180 degrees to balance distortion ('age droop').

14. Periodic maintenance and operation

A programme for regular maintenance, inspection, and periodic operation (or turning) of machinery should be prepared at the start of the lay-up. A record of all maintenance work should also be kept.

Regular maintenance should be carried out in line with the guidelines in Section 12 above. Any regular maintenance programme should focus on, but not be limited to, the following equipment and systems:

- At least one store or cargo crane should be kept operational (and regularly tested) for lay-up duties, e.g. lifting diesel oil onboard for the deck generator, etc.
- Sea valves should be periodically operated
- Ballast, cooling water and steam systems in wet lay-up should be periodically sampled to verify the effectiveness of the chemical inhibitor, and corrosion coupons in ballast water tanks, etc. should be periodically checked to monitor the extent of any corrosion
- All safety equipment needed for the personnel onboard should be regularly examined including fire extinguishers and fire dampeners. CO2 bottles and foam tank contents may be examined less frequently, for example, on an annual basis. Oxygen levels should be measured in any sealed spaces containing CO2 bottles, prior to entry
- The ship's whistle should be operated periodically
- All rotating machinery, electric motors, hydraulic motors and radar scanners should be turned or operated at monthly intervals by hand, mechanically or with normal power
- Air conditioning and reefer plant refrigerant circuits should undergo regular leak testing
- The main electrical circuit's insulation continuity should be periodically measured and other additional activities as deemed necessary by original equipment manufacturers

15. Periodic inspections

In addition to periodic maintenance and operations activities, owners should conduct specific inspections and testing on structures, machinery and equipment through established techniques, to ensure that the standard of preservation is maintained.

The owner should receive detailed monthly reports from the crew or contractors on the findings of scheduled inspections and tests. The report should also contain details of any essential remedial work considered necessary to repair faults or restore adequate lay-up protection.

Ideally, the owner will periodically prepare consolidated summary reports detailing such repairs (or decisions to postpone repairs until the time of reactivation).

Any repairs or remedial work to equipment or lay-up protection that is essential to maintaining the integrity and safety of the vessel or crew, should be undertaken immediately.

A regular inspection and testing programme should focus on, but not be limited to, the following:

- Visual checks on controlled space sealing arrangements
- Measurements of relative humidity levels within controlled spaces
- Visual checks on protective coatings of all external machinery and equipment
- Visual checks on oil levels in machinery sumps
- Visual checks on all filled or wet systems for leaks (e.g. hydraulic fluids, fuel, lubrication oil, refrigerant, water, etc)
- Electrical measurements of batteries
- Visual checks during testing of emergency fire pumps, lifeboat engines, emergency generators, bilge and fire alarms, etc
- Visual checks of mooring, fenders, etc
- Visual checks of storage tank levels
- Visual checks of open machinery, pressure vessels, heat exchangers, etc. within dehumidified spaces
- Underwater visual checks of the external hull by a qualified diving contractor
- Visual checks of boiler fire sides and water sides (for drained boilers) for dryness
- Electrical measurements of the cathodic protection system and
- Visual checks of essential fire, flooding, and security