

Laid-up bunkers

Tim Wilson looks at the practical considerations associated with managing fuel oil during a vessel's lay-up

In early 2007, a shipping company's business calendar would probably not have had the term 'lay-up' written against one or more of its ships. Today, finding a safe anchorage for an extended lay-up is becoming a challenge. Ships are now being stacked in some areas to the point of blocking the horizon. There are few shipping companies that have not had to consider laying up ships – indeed many have already done so. The market realities of the global economic downturn have now reached the marine industry.

There are wide-ranging considerations that need to be addressed; not least what to do with the remaining fuel on board, some of which will be needed for the duration of the lay-up and reactivation, the remaining will be surplus to demand.

The choice of the lay-up condition will be determined by a number of influencing factors, the core ones being: the time the ship will be in lay-up, the time needed for reactivation, the owner's drive to reduce overhead running costs.

The lay-up process should be meticulously carried out and well documented, retained and passed on as necessary in order to simplify and ensure safe re-activation within the prescribed time to bring the ship back into service. Remember that the reactivating crew are unlikely to be the same crew who prepared the ship for lay-up.

Although there can be any number of lay-up configurations, the following four lay-up conditions are typical, these being:

- hot-ship lay-up (one-day reactivation) This lay-up condition is suitable for up to around one month out of service. In this condition, the ship 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 ship will be located in an area close to the potential cargo trade routes

- hot-ship lay-up (one-week reactivation) This lay-up condition is suitable in the order of 12 months out of service. In this condition, the ship manning is reduced

below the trading limit and in agreement with the Flag State, the Classification society and insurance companies together with specific requirements from the local port authorities. In this condition, most ports will only grant a temporary permit to lay-up a ship in port, provided that Class and Flag surveys are carried out. Under these circumstances there may be local restrictions on ship operations, such as restrictions on the transfer of oily bilge water.

- cold-ship lay-up (three-week reactivation)

This lay-up condition is suitable for periods leading up to five years out of service. In this condition, the ship manning is in line with emergency requirements to deal with fire, flooding, mooring and security watch, indeed there may not be anybody living on board. Cold-ship lay-up locations are generally remote, so access to the ship is likely to be limited. On reactivation, the ship may need to go directly to dry-dock before trading, depending on the extent of hull fouling. It is important that all preparations during cold-ship lay-up are well documented because almost certainly the crew who laid the ship up will not be involved in the reactivation.

- long-term-ship lay-up (three-month reactivation).

This lay-up condition is suitable for vessels over five years out of service. In this extended condition, the preparations will be comprehensive to the extent that original equipment manufacturers (OEMs) should be consulted for critical equipment. Furthermore, any remedial work required on reactivation is likely to be extensive and unpredictable, such as renewal of alarm systems due to obsolescence. Several ships will be laid-up in this condition side-by-side to minimise supervision costs.

Of course, at the outset of a lay-up period, its eventual duration is hard to predict. Inevitably, owners will be optimistic and plan only for a few weeks or months out of service and are likely to adopt the hot-ship conditions. However, where those hopes are not realised then it would be necessary to move the ships into the three-week reactivation condition, and under exceptional circumstances a long-term lay-up may be necessary.

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Lloyd's Register offers a wide range of services that can assist with the lay-up and reactivation of ships. These independent services help reduce the risks associated with lay-ups, and can be provided individually or as a tailor-made package.

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The bunkers

Having established the lay-up condition, one of the first considerations should be the bunker fuel, well before the ship reaches the intended lay-up period. This allows for the possibility of having to de-bunker fuel that may be deemed unsuitable for long term lay-up condition, such as a fuel with high pour point, or to simply realise some of the assets. Consideration, however, must be given to ensuring sufficient bunkers remain on board to reach the nearest bunker station at the time of reactivation, bearing in mind that hull fouling may have accumulated during lay up hence increasing drag and the need for more fuel.

Storage tanks

Marine bunkers are stored in the most unfavourable of environments. This presents a range of concerns, such as a wide band of temperature fluctuations, humidity and potential for water contamination, all of which will influence the fuel's storage life and condition. The question of how long the fuel will remain in a satisfactory state is difficult to predict due to many influencing factors. However, experience has shown that, for the most part, petroleum-derived fuels will remain in a homogenous and stable condition and can remain on board for extended periods of many months or even years – providing some basic precautions are implemented and, where possible, routine fuel management processes are maintained.

Bunker fuel should be aggregated into a minimum number of storage tanks, keeping storage tanks either totally full or empty. If two differently-sourced bunkers have to be mixed to do this, one should ensure that the fuels are compatible with one another before mixing. If they are not, mixing must be avoided, and the fuels need to remain segregated, otherwise an unstable condition of the aggregated fuel may occur, which would severely impede reactivation. The sludge tank contents should be emptied and the tank cleaned.

The service tank for the distillate fuel, in particular, should be kept full to ensure sufficient fuel supply for routine power requirements for maintenance and safety measures, dictated by choice of lay-up condition. A full tank will reduce the

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risk of condensation and rate of oxidation. Emergency generator and fire pump diesel tanks should be kept full. Heavy fuel oil (HFO) settling and service tanks may be drained back to the storage tanks; again this is most probably only more suited for the cold and extended reactivation lay-up conditions. Reactivation will only require initially the distillate fuel and it would be prudent to fill the HFO service tank with freshly-purified HFO during the reactivation period.

Lifeboat engine fuel tanks may be exposed to the worst of the ambient conditions and it therefore may be prudent to drain these tanks for the extended cold lay-up conditions of one year or more. This would ensure fresh distillate fuel was filled into the tanks at the start of the reactivation period and any risk of fuel degradation due to oxidation or microbial contamination would be eliminated. However, this may only be applicable for the long lay-up and reactivation conditions and whether there are any crew actually living on board. In the event that tanks are emptied, each engine must be clearly marked with a placard that the fuel tank is empty.

Pour point

It is important that the quality characteristics of all bunkers, in each of the storage tanks, are verified and methodically logged in the oil record book, with particular attention being given to the pour point of each fuel. If the fuel is to be retained onboard this will only be possible if the pour point is such that the fuel will remain fluid despite the minimum ambient temperatures to which

the ship will be exposed to during the lay-up period. Once a fuel has solidified it should be remembered it is *not* possible to simply re-liquefy the fuel by activating the tank heating arrangements.

Sampling

Sampling of HFO tanks at upper/middle/lower and bottom locations on an annual basis for the extended periods of more than one year – or at least at the start and certainly prior to reactivation – is essential in order to be able to effectively monitor any possible deterioration of the fuel condition. The sampling process for the fuels and lubricants should be in place for the lay-up procedure and clearly logged.

Water, sedimentation

Water will accumulate due to condensation, leaking tank lids and pipe connections, etc. Sedimentation will occur over time, so one should circulate the fuel in the storage tanks to limit the degree of sludge accumulation. Upon reactivation, drawing from the high suctions where available will always be advisable.

Microbiological activity

For distillate fuels, particular attention should be given to the risk of microbiological activity, which can lead to corrosion of tanks and piping systems and further lead to filter blocking at start-up. This microbial activity may also occur in lubricating and hydraulic systems. Where possible, keep water accumulations to a minimum by ensuring tank drains are regularly checked, keeping water levels down, since it is always at the oil/water interface that such activity will begin. For extended periods, tank bottom samples at the water/fuel interface should be taken to monitor microbial activity. Some may suggest that a biocide could be added to the fuel to prevent microbiological degradation. However, it is strongly recommended that specialists are consulted to assess any potential adverse side effects before any attempt is made to do this or any other treatment. It may be more prudent not to treat the fuel if the fuel treatment has not been used before.

Fuel system

In all circumstances, the HFO fuel system

should be flushed through thoroughly with distillate fuel; this includes all fuel transfer lines and the purification plant. This may best be done by running the machinery plants on distillate fuel for a period, thereby ensuring that the HFO has been totally cleared from the system. All HFO connections to the gauges and pressure sensors and other measuring equipment are to be bled to ensure that the lines are free from HFO. Hot filters and heaters need to be flushed and drained. Cartridge filters may need to be removed, depending on the extent of the lay-up period; the filters would need marked with a placard if this were the case. The purifiers should be thoroughly cleaned after the distillate flush through. Purifier plant manufacturer guidelines usually have specific instruction for extended lay-up periods, and these

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should be carefully adhered to. Fuel tank air vent gauzes should be checked for cleanliness and integrity. Save-all drip trays must be cleaned.

For cold and extended reactivation periods, engine fuels valves may be

removed and overhauled and stored outside the engine room. Specific engine manufacturer's guidelines should be adhered to here as differences of opinion may reside here.

It may be prudent to clearly placard all valves for fuel tanks, fuel lines, steam system, ballast, compressed air and others which have been specifically closed or opened for the lay-up condition, in such a way that for reactivation the sequence may be easily reversed by crew who are unfamiliar with the machinery plant.

In this article we have only considered general guidelines and any company placing a ship into lay-up must refer to ship specific type and machinery manufacturer's guidelines and/or seek specialist services to ensure all factors are considered for lay-up.



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