

# Marine Lubricants: A Hidden Seaworthiness Risk

This Risk Alert highlights the importance of exercising due diligence in the procurement and onboard management of marine lubricants, particularly in the context of potential supply chain disruptions.



Marine lubricants are vital for the functioning of a vessel's propulsion, power generation, and auxiliary machinery. Inadequate lubrication can result in increased wear, reduced performance, or even catastrophic failures of critical machinery, thereby directly affecting the vessel's safety and operational reliability.

During service, marine lubricants are subject to degradation and consumption, influenced by mechanical stress, thermal cycles, and exposure to contaminants. Consequently, there is a constant need either to replenish or completely replace these lubricants to sustain optimal machinery performance and reliability. In anticipation of these replenishment and replacement needs, lubricant stocks are maintained on board vessels. These stocks must be monitored and replenished to maintain adequate onboard supplies throughout the voyage and safeguard machinery reliability, thereby ensuring the vessel's seaworthiness.

Where the non-availability or quality of lubricants is determined as the proximate cause of a casualty, a Ship Owner is likely to face questions as to the seaworthiness of the vessel and whether proper due diligence had been exercised, especially if the vessel commenced the voyage with insufficient lubricant stock or had knowledge of the deteriorated state of the in-service lubricant.

Marine lubricants are broadly categorised into:

- **Mineral oil lubricants** derived by refining crude oil.
- **Synthetic lubricants** which are chemically engineered derivatives of natural gas and other base materials.

With the production of most marine lubricants dependent on either crude oil or natural gas base stocks, geopolitical issues such as sanctions, trade restrictions, or conflicts in oil-producing regions, may affect both the availability and pricing of marine lubricants. Consequently, vessel owners and managers must remain vigilant to these external factors, as disruptions can lead to operational delays, increased costs, and the necessity to source alternative lubricant types or grades. Such supply chain uncertainties underscore the importance of robust procurement strategies and contingency planning for maintaining vessel seaworthiness. These factors need to be considered in developing lubricant management policies, plans and procedures in the Safety Management System (SMS).

## 1. Lubrication Management Plan (LMP)

The LMP is a vessel specific plan developed by adhering to the recommendations made by the Original Equipment Maker (OEM), and in consultation with the lubricant supplier.

Key considerations in developing the plan include:

- Lubricant suppliers approved by the OEM.
- Equipment specific lubricant grades recommended by the OEM.
- Minimum lubricant quantities to be maintained onboard.
- Lubricant storage, handling and testing procedures.
- Guidelines on compatibility issues between lubricants.
- Lubricant in-service quality testing regime.
- Protocol for procuring lubricants from alternative lubricant suppliers.

## 2. Planned Maintenance System (PMS)

The PMS is a vessel specific system on inspection and maintenance of equipment on board ships, with work orders encompassing the condition monitoring of in-service lubricants.

Key considerations that should be included are:

- Inspection and maintenance work orders derived from OEM recommendations as a minimum and supplemented by internal learning and industry best practices.
- Work orders for onboard and laboratory lubricant testing regimes.
- Work orders for condition or running hours based lubricant replacement.

## 3. Lubricant Procurement

A typical ocean-going vessel will be expected to have sufficient lubricant quantities stocked onboard to meet replenishment or renewal requirements. Exact quantities required will depend on various key operational, commercial and technical considerations including:

- Duration of the voyage.
- Trading pattern (liner or tramping)
- Vessel trading area in terms of stock availability
- Anticipation of potential non-availability of lubricants
- Unit cost of lubricants at ports within the trading area
- Storage capacity
- Consumption rates
- Minimum stock retention policy

Typically, lubricant stock for consumed lubricants such as cylinder oils should be calculated as

*Planned stock = (Daily consumption × Expected days to next supply) + Operational safety margin + Contingency stock*

The Strait of Hormuz represents a critical chokepoint in the global supply chain for base oils and finished marine lubricants. In periods of heightened geopolitical tension affecting the region, disruptions, delays or constraints on lubricant availability may be foreseeable, even where no immediate shortage has yet materialised. In such circumstances, the operational reliability of critical machinery increasingly depends on the effectiveness of onboard procedures, monitoring regimes and forward procurement planning.

Against this backdrop, Members are encouraged to review their Safety Management System (SMS) to ensure that policies, procedures and planned maintenance controls relating to lubricant management are sufficiently robust to address potential supply disruption, support operational continuity, and demonstrate the exercise of due diligence.

### **Supportive Information**

For further information on this or other Loss Prevention topics please contact the Loss Prevention Department, Steamship Insurance Management Services Ltd.

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