KISH P&I CLUB

KISH P & I LOSS PREVENTION CIRCULAR KPI-LP-154-2014
(Top tips by EXXONMOBIL for Marine Fuel Purchasing)

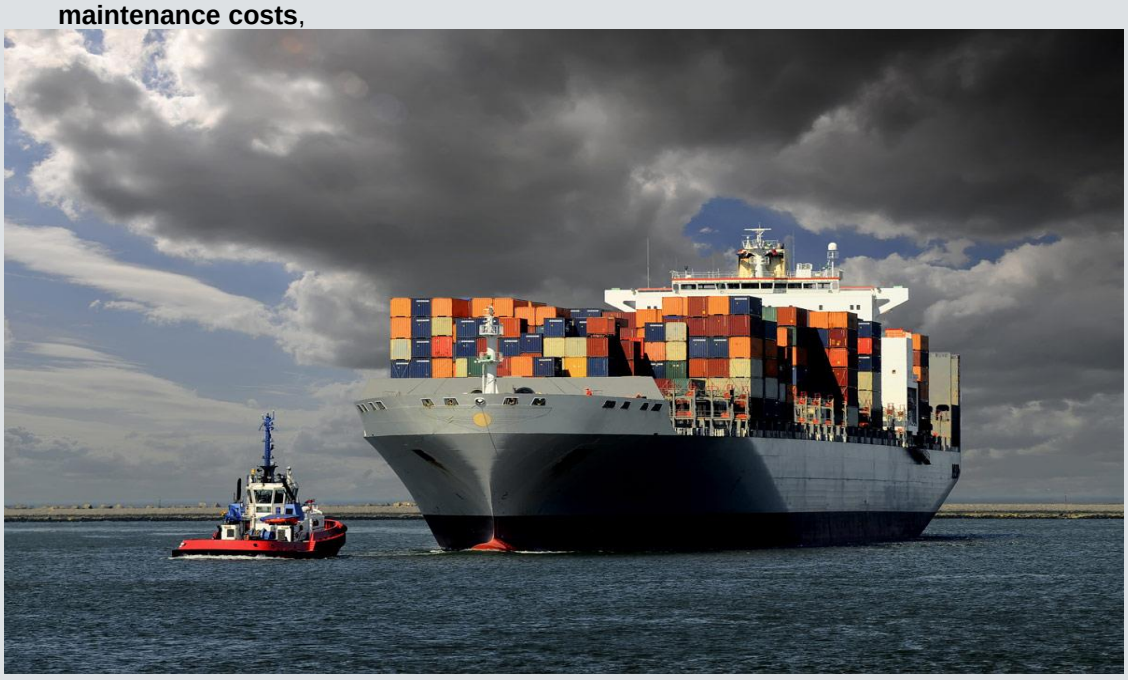
►The Importance:
The following circular quotes ExxonMobil Marine Fuels & Lubricants top-tips to help vessel owners and operators achieve the best value when purchasing marine fuel. It is estimated that these top-tips have the potential to save marine operators *US$3 per every metric ton of marine fuel (The purchase cost of water in the tank at the 0.5% water level, based on a fuel cost of US$600/mt, is the equivalent of US$3/mt).*

These considerations are particularly important for the total operating cost and bring up issues such as:

- ✓ ISO 8217:2012 Permitted water levels could have the potential for financial impact of up to US$6,000 worth of marine fuel per delivery, *(A 0.5% water level would amount to 10mt per 2,000mt fuel delivery. Based on a fuel cost of US$600/mt, this is the equivalent of US$6, 000)*
- ✓ **Poor fuel stability could cause engine damage and increase maintenance costs**,
- ✓ **Major engine builders recommend aluminium and silicon levels at engine inlet to be well below ISO 8217: 2012 levels.**

►The Guidance:
The advice from ExxonMobil Marine Fuels & Lubricants for marine operators is to consider the following five key fuel quality factors:

1-Water content - ISO 8217:2012 permitted water content compliance level is 0.5%. If marine fuel is supplied at the 0.5% compliance level; this could potentially cost US$6,000 per purchase for a 2000mt stem, and the water should be removed prior to burning. Water removed from marine fuel prior to use may then add a further disposal cost of up to US$3,000. Additional maintenance costs may also be incurred to remove resulting sludge from the purification systems.



2-Metal content - Aluminium and Silicon in marine fuels, known as catalytic fines, have the potential to cause significant engine damage. This could lead to substantial repair costs and potential vessel delays. ISO 8217:2012 and ISO 8217:2005 allow for levels of catalytic fines up to 60mg/kg and 80mg/kg respectively. Major engine builders typically recommend the level of catalytic fines should be less than 15mg/kg at the engine inlet. The low levels help limit catalytic fine removal efforts, reduce abrasive wear on critical engine components and potentially avoid the cost of additional maintenance and possible breakdowns.

3-Marine fuel stability - To help meet the lower sulphur levels specified in changing marine industry regulations, there may be a tendency to blend marine fuel from a variety of different sources which may cause the resultant blend to become incompatible. Unstable fuels have the potential to cause sludge or heavy deposits to build up which may prove costly to resolve and may impede vessel performance.

4-Calculated Carbon Aromaticity Index (CCAI) level - CCAI level is the indicator of marine fuel combustion quality and it's important that it is neither too high nor too low. Poor quality marine fuel with an inappropriate CCAI level, caused by incompatible blend components, could cause poor combustion and has the potential to impact vessel performance. ISO 8217:2012 states a max limit of 870 for most common residual marine fuel grades.

5-Laboratory analysis - Finally, it is recommended that the best practice is to send fuel samples to an approved laboratory for analysis. This allows operators to understand the quality of the marine fuel received and how to manage the marine fuel system on board their vessels.

Additional note: The calculated carbon aromaticity index (CCAI) is an index of the ignition quality of residual fuel oil. The running of all internal combustion engines is dependent on the ignition quality of the fuel. For spark-ignition engines the fuel has an octane rating. For diesel engines it depends on the type of fuel, for distillate fuels the cetane numbers are used. Cetane numbers are tested using a special test engine and the existing engine was not made for residual fuels. For residual fuel oil two other empirical indexes are used: CCAI and Calculated Ignition Index (CII). Both CCAI and CII are calculated from the density and kinematic viscosity of the fuel.

Formula for CCAI:

$$CCAI = D - 140.7\log(\log(V + 0.85)) - 80.6 - 210\ln\left(\frac{t + 273}{323}\right)$$

D= density at 15°C (kg/m^3) - V= viscosity (CST)- t = viscosity temperature (°C)