

BUNKERSPOT

THE FINAL COUNTDOWN

WILL SHIPPING PLAY
BY THE RULES?

INSIDE:

VESSEL FINANCE

FUEL TESTING

ARCTIC SHIPPING

INSURANCE

Smooth operator

A loss of engine lubricity may be an unintended side effect of ECA requirements. Peter Weide of MarShip UK analyses the problem

The trend towards higher biologically-sourced energy and the global commitment to reducing sulphur has led to the use of bio-diesel and ultra low sulphur diesel (ULSD). While we all understand the rationale behind this introduction in terms of the environment and health, it has brought a huge range of side effects in relation to storage, combustion, ignition and lubricity of hydrocarbon fuels.

While most people may be familiar with the microbial problem (Diesel Bug), many underestimate or are unaware of the effects of loss of lubricity caused through the process of removing the sulphur.

Most are aware of the reasons behind the reduction in sulphur, and indeed reducing the sulphur levels in fuel also decreases the acids formed in engine combustion chambers, offering the promise of extended engine oil life. On the face of things, therefore, the reduction of sulphur is highly positive in terms of engine wear and tear – however, there is more to the story than meets the eye.

In short, as legislation instigated sulphur reduction in emission control areas (ECAs), the oil companies responded with low sulphur diesel and began phasing it into the supply chain.

But, if ULSD is so good for the environment and promises extended engine life, why are there concerns about using it? As low sulphur emissions became mandatory, oil refiners had to develop new technologies to reduce the sulphur content in order to meet the emission standards, and the issue is in the refining process used to remove the sulphur. The most cost effective way is to use a chemical process called hydro-processing. During hydro-processing, sulphur is removed and replaced by hydrogen resulting in a cleaner burning fuel with improved performance. Unfortunately, as hydrogen is a highly reactive

element it also reacts with other components in the fuel, removing the polar and aromatic compounds that provide conventional diesel fuel with adequate lubricating capability.

All diesel injection equipment has some reliance on diesel fuel as a lubricant, meaning its lubricating properties are extremely important, especially for rotary and distributor type fuel injection pumps in today's modern common rail injection systems. In these pumps the moving parts are lubricated by the fuel itself as it moves through the pump rather than the engine oil.

Other diesel fuel systems, such as injectors, unit injectors, unit pumps, and in-line pumps, are also partially fuel-lubricated. In these systems the mechanism typically consists of a plunger or needle operating in a sleeve or bore: the fuel is used to lubricate the walls between the reciprocating piece and its container. The lubricity of the fuel is an indication of the amount of wear or scarring that will occur between two metal parts covered with the fuel as they come into contact with each other. Low lubricity fuel may cause higher wear and scarring, thereby shortening component life.

Ironically, as the ECA results in decreased sulphur levels, poor lubricity results in increased emissions through wear – a conundrum in itself.

Taking this together with increased fuel consumption from excessive pump wear and even potential catastrophic failure means that vessel managers are duty bound to do something to aid lubricity as a fundamental of responsible vessel management. It is no longer 'nice to have' – it's a 'must have'.

We know that without lube oil a diesel engine will grind itself to a premature death. That statement now holds true for the fuel components.

The International Council on Combustion

Engines (CIMAC) has set up a sub-group to advise on how best to deal with engines running on low sulphur fuel. In its document – *Guideline for the operation of marine engines on low-sulphur fuel* – CIMAC highlights lubricity as one of the most important issues to consider, and states that lubricity characteristics can be restored using lubricity improving additives. Clearly, until a lubricity specification is written and followed, the responsibility to maintain the lubricity and reliability of diesel engines rests firmly with the end user.

Luckily, compensating for the loss of the vital components that aid lubricity is relatively straightforward. MarShip UK specialises in keeping the vital components of the engine (fuel, oil and air) in tip top condition. Working with one of the biggest global chemical additive manufacturers and suppliers to the world's largest oil companies we have produced a number of additives aimed at addressing specific fuel problems as opposed to the commonly promoted 'catch all' where the customer is buying chemicals in an additive package that are not needed.

Ships equipped with large diesel tanks only need lubricity. With today's modern common rail engines and extremely fine tolerances, while MarShip UK's DieselAid-L will keep them lubricated, DieselAid LD deposit control stops gumming and trumpets, etc. from forming on nozzles – but that's a whole new story!

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