

Unclear future for fuel may benefit additives as an option

Solutions to new Marpol emissions regulations taking full effect in 2015 include advances in engine combustion, scrubbers, LNG, and low sulphur fuels; **Michael Herson*** found that acceptance of fuel additives as a viable alternative still presents a number of challenges

Suppliers, and their customers, believe sales of marine fuel additives will grow in future. The significant finding of a survey carried out by The Strategy Works was that growth in this market has come about due to the changes in the deteriorating quality of marine bunker fuel, and because the dynamics of international trade require an increase in vessel operational flexibility. The survey was based on over 30 interviews with manufacturers of marine fuel additives and the shipping companies that use their products.

TSW's research with shipping companies confirms that about a third of large vessels are slow steaming. For example, a leading shipping company based in the Middle East reported that, in general, its ships were running at 25 per cent to 45 per cent MCR, mostly because of the cost of fuel and the company's general environmental policy.

NYK Lines also introduced slow steaming for its container ships in 2006 to reduce fuel consumption. Kobune Goto, deputy general manager of NYK's Fleet Upkeep Group, said: "We are now expanding it to all of our fleet, including charter vessels."

Albert Leyson, marketing manager for the fuel management product line of Drew Marine, confirmed that, and said: "Slow steaming has an increased probability of generating more incombustible diesel exhaust particulates that accumulate on heat recovery transfer surfaces in stack economisers."

Ian Crutchley, technical co-ordinator for Marine EMEA at Innospec, said: "Operating the engine continuously at a low load – well outside what it's designed for – may result in very poor combustion. This can lead to a significant increase in the deposits inside the engine, particularly in the turbocharger and the exhaust system, which can be significantly reduced by fuel additives."



An engineer takes a sample for soot measurement

Today's marine fuel additives market is dominated by two global giants: Wilhelmsen Ships Service of Norway, and US-owned Drew Marine. Both companies have been established for more than 100 years and market their own brands. Other companies in the market which formed part of this survey are: Aderco of Canada, Innospec, PRI and EcoEmissions of the US; Renergi of Norway; UK-based companies Infineum and Soltron; Bycosin of Sweden, and major Japanese shipping lines Nippon Yuka Kogyo (NYK) and Mitsui OSK Lines (MOL), which manufacture additives for their own use.

While some manufacturers offer a single-product solution, most supply a range of additives to cope with different scenarios, which include combustion improvers to enhance the burning of heavy fractions and reduce soot deposits; sludge dispersants; stabilisers for heavy fuel oil blends; lubricity improvers to compensate for the lower sulphur content in distillate fuel; corrosion inhibitors to tackle the effects of metals in the fuel; detergents to keep engines cleaner, which

helps to reduce maintenance costs and boost engine efficiency; and demulsifiers to separate water-in-oil emulsions within the fuel. The top sellers are mostly combustion improvers or sludge dispersants.

Virtually all additives are blended chemicals, with the exception of Soltron, which is enzyme-based and acts as a catalyst, constantly improving the state of the fuel. Most products are dispensed as liquids that are added directly to the fuel, while EcoEmissions' approach is to inject a platinum-based catalyst as a vapour into the engine's air intake to encourage better combustion. Some products, like Aderco's 2050 or Renergi's Mergi, are supplied as a concentrate to facilitate distribution.

NYK Lines has a single, in-house production source – NYK group subsidiary Nippon Kogaku Kogyo – for its range of additives, which includes a sludge dispersant that has produced impressive results. "The main reason for using the sludge dispersant is fuel cost savings, which are about 2 per cent," Mr Goto said.

Meanwhile, Mitsui OSK Lines has gone one

step further by teaming up internally with Taihokohzai, Japan's largest fuel additive manufacturer, to develop its own 'bespoke' product, Taicrush HD, which improves combustion and sludge dispersion, lowers fuel consumption and reduces soot deposits. During product trials on 106 voyages of a Japanese coastal ferry, under uniform sailing conditions, fuel efficiency improvements of between 1.12 per cent and 1.46 per cent were recorded, according to MOL.

"Our strategy is firstly to introduce Taicrush HD to about 900 ships in our fleet," said Yoshikazu Kawagoe, general manager of the technical division in MOL's ship planning and development group. "Based on the evidence we gather, MOL and Taihokohzai are ready to sell the product to third parties."

In addition to the operational requirements, and varying quality of the fuel oil, the industry is facing the introduction of low-sulphur fuel. Jonas Östlund, product manager at Wilhelmsen Ships Service, said: "Switching from HFO to low-sulphur MGO to comply with the ECA emissions limit will bring fundamental changes in global shipping operations – as well as to the additives business – as diesel becomes the standard marine fuel."

Albert Leyson, marketing manager at Drew Marine, agrees that the legislation has – and will continue to have – a tremendous impact on the shipping industry, which will also have to contend with lubricity and injector-fouling issues as the sulphur content and injection equipment tolerances decrease.



Fuel treatment additives are connected to the fuel system

Ralph Lewis, VP (technical) of PRI, also agrees that the reduced lubricity of low-sulphur fuels is a major concern: "The industry is still not that well-informed on this issue. There's a lot of evidence to show that marine fuel pumps that are designed to pump heavy fuel do not operate well on these fuels and tend to wear faster."

Within the industry there are differences of opinion about how fast the volume of fuel additives sales is increasing. Drew Marine is already seeing the impact, and claims there was a significant increase in sales of Amergy XLS in 2010 as a result of the 0.1 per cent sulphur requirement by the European Union. At Innospec, Mr Crutchley is also bullish, and said: "We picked up 44 new customers last year, mainly because of these additives. Sales in Europe increased by 20 per cent and a lot of that was new business."

Mr Lewis also reports a dramatic annual increase in the sales of PRI-D which, by using a method known as thermal stability, stabilises the fuel for long-term storage, thereby providing the appropriate lubricity and quality for the fuel.

However, Eric Holmes, market development manager at Wilhelmsen Ships Service (formerly Nalfleet), sees it as more of a timing issue: "We have developed a fuel lubricity product, but it has been slow to take off despite a lot of interest from customers. The reason for this is that the sulphur level isn't yet at a low enough point to affect the lubricity so adversely."

Fuel additives manufacturers are hoping for an endorsement from the engine manufacturers. At Drew Marine, Mr Leyson said: "Our core customers that believe in the chemistry of our products have essentially eliminated their fuel related problems."

However, engine manufacturers are against an endorsement of fuel additives. Kai Juoperi, head of fluids technology at Wärtsilä, summed up the company's position: "If customers are using fuels fulfilling the ISO 8217:2010 fuel standard, as well as original spare parts, and maintaining the engines according to the maintenance schedule, the continuous use of fuel additives is not recommended."

Dorthe Jacobsen, fuel oils development manager at MAN Diesel, supported this view: "We tell our customers to buy slide valves...if they will be running low loads then to install turbocharger cut outs, and then we see very little issues if their engines are running correctly."

However, Mr Leyson is of the opinion that there will be changes in fuel quality once the industry starts to adopt the new ISO 8217 fuel specification. "Furthermore, since sulphur content is not stipulated for the residual fuel oil grades, it is possible that fuel suppliers will blend down to meet, say, 1.0 per cent sulphur maximum level required by ships operating in ECAs.

"If the resultant blend is unstable, ships not using a fuel conditioner/stabiliser will have increased sludging in storage tanks and centrifuges while handling the fuel. Drew Marine will definitely see an increase in demand by ships calling on US and Canadian ports between now and August 2012, when the new ECA [US and Canada] is implemented. The increase will be in fuel conditioner/stabiliser type additives such as Amergy 222 for residual fuels and Amergy XLS for distillate fuels, and micro biocide type additives like Amerstat 25."

Owners, though, are reluctant to use fuel additives due to warranty issues. The frustration on this position from the engine manufacturers' perspective is summed up by Geoff Grice, marine business development manager at Innospec: "What we're all striving for is to get a reference from an engine manufacturer, but you are very unlikely to get a reference, despite showing good results. Most of the fuel additive people have a 'no objection letter' or 'no harm certificate' from the manufacturers to say if you use this additive it won't damage our engine."

The industry still faces tough new legislation, and the future direction of how to meet this requirement is far from clear. However, there are a number of alternatives. Advances in engine combustion technology, coupled with the use of external technologies such as scrubbers and exhaust gas recirculation, are a possibility. The use of alternative fuels is another, with LNG, LPG and MDO being actively considered.

The acceptance of fuel additives as a viable alternative still presents a number of challenges for the manufacturers. Even though additives are now widely accepted within the global shipping industry, there remains a hard core of non-believers. "Some of the big companies don't use additives because the technical manager, or somebody at a senior level, decides not even to give them a try," says Per Anderssen, Renergi's joint owner, voicing the suppliers' frustrations.

It is clear that the future is by no means certain, and there are difficulties with all the alternatives to meeting the new legislation. However, in the end market forces will decide, according to Mr Juoperi, who said: "When the new legislation comes into force, customers will have to choose whether to operate their engines on distillate fuel or to install an exhaust gas scrubber. The main driver in that decision will be the price difference between distillate fuel and heavy fuel." **MP**

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