

# Adjusting to change

New statistics from the French Ministry of Environment would seem to support earlier US Coast Guard findings over loss of propulsion during fuel changeovers in emission control areas. Ian Crutchley of Innospec looks at the facts and discusses the role of fuel additives in mitigating the risks

Statistics have been made publically available by the French Ministry of Environment (Maritime Affairs Directorate) which indicate that vessel loss of propulsion (LOP) incidents during English Channel transits more than doubled in 2015 compared to the previous four years. This equates to one ship in less than every two days losing control, which presents a significant safety concern as the English Channel is one of the busiest, highly monitored and narrowest sea passages in the world.

Where details are available, the data suggests that in many cases the causes behind these incidents were related to fuel changeovers, and the majority of incidents occurred near the western emission control area (ECA) boundary.

Can it be pure co-incidence that in January 2015 the sulphur limit in ECAs dropped to 0.1%, thereby requiring fuel changeovers in transit?

For operators transiting in and out of these areas, this typically means an in-transit fuel changeover from high sulphur heavy fuel oil (HFO), to 0.1% sulphur marine gasoil (MGO) or ultra-low sulphur fuel oil (ULSFO).

A similar regulation was implemented in Californian waters on 1 July 2009, mandating changeovers to MGO/marine diesel oil (MDO) as per California Air Resources Board (CARB) regulations.

The US Coast Guard (USCG) reported a significant increase in LOP in California from this date, with one of the reasons cited as the compatibility of the two fuels during changeover from HFO to MDO/MGO.

Based on this previous experience, concerns were raised at the end of 2014 regarding the fuel changeover, just before the

implementation of the new sulphur limit in ECAs. However, until now, statistics, such as those published by the USCG, have not yet been released by any equivalent organisation in the European Union (EU) for the North Sea and English Channel ECA.

To date, shipping associations and shipowners have not reported any major issues. Typically they report only that 'fuel changeover procedures are in place' and 'crews are well trained'.

In France, three Maritime Resource Coordination Centres (MRCC) are located along the coast of the English Channel, each covering different areas of the ECA. Ships are requested to report to the ap-

propriate MRCC when approaching the three Traffic Separation Schemes (TSS) located in the Channel, through a mandatory reporting system. Any defects that interrupt their passage in the TSS must be immediately reported to the MRCC in charge.

Some examples of Defect Reports (DEFREP) are LOP, blackout, and loss of steering, and this article seeks to determine if more DEFREPs have been reported to the MRCCs since 1 January and also if these DEFREPs are related to fuel changeover problems.

Annual reports, where relevant statistics can be found, are published by each MRCC.

The statistics from the three MRCC in the English Channel show that LOP incidents have doubled in 2015, against previous four years, and these problems are frequently linked to the fuel changeover from HFO to 0.1% MGO (or equivalent).

With regard to Figure 2 (overleaf), it should be noted that vessels which have resolved a LOP issue within 30 minutes are not included in DEFREP statistics. It also stands to reason that MRCC Gris-Nez would see less DEFREPs due to the distance from the SECA boundary, and changeover location. Furthermore, as LOP can happen up to eight hours after commencing changeover, westbound traffic would likely be out of MRCC jurisdiction when any LOP occurs. Therefore, it is possible that more incidents occur westbound but go unreported as DEFREPs.

The fuel changeover process carries with it a number of risks, which need to be managed accordingly. These may be, but are not limited to:

- Poor changeover/fuel switch procedures
- Compatibility of fuels – heavy

'Until now, statistics, such as those published by the USCG, have not yet been released by any equivalent organisation in the European Union (EU) for the North Sea and English Channel ECA'

‘The statistics from the three MRCC in the English Channel show that LOP incidents have doubled in 2015, against the previous four years’

- sludging which can cause fuel starvation to machinery
- Poor lubricity of MGO which can cause excessive fuel pump leakage and restarting issues
- Too rapid a changeover, causing fuel pumps to seize or gasification of fuel system.

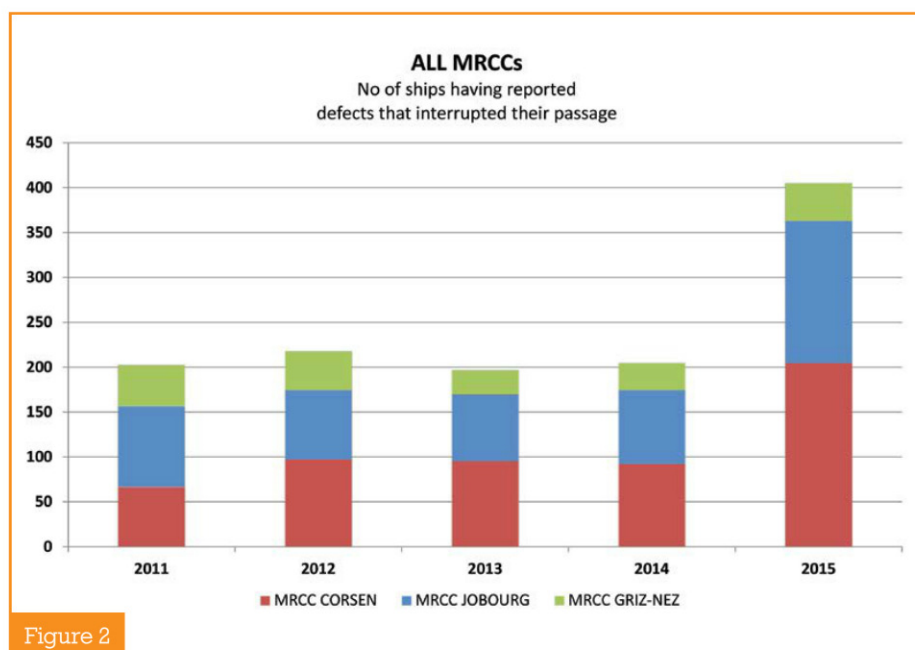
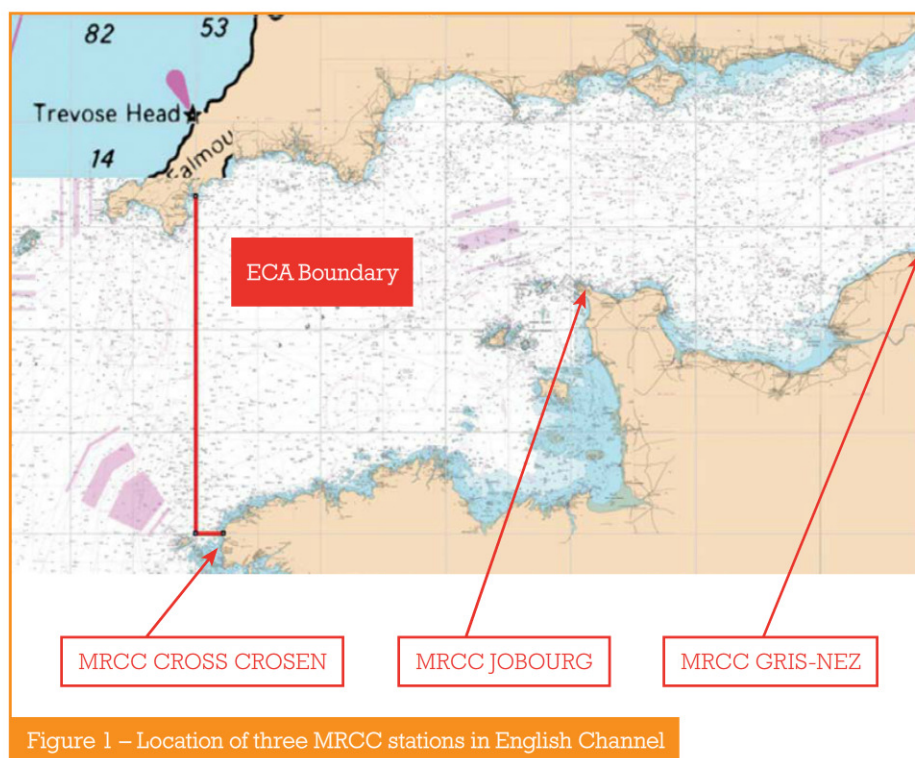
The direct consequences of a LOP incident can be an increase in risk for the safety of navigation of vessels in the the busiest international seaway in the world, as well as problems with excessive leakage and restarting engines due to worn fuel pumps from MGO operation.

For crews, urgent remedial action has to be carried out in stressful situations and tug services may be required to restore the safety of the vessel and other transiting vessels.

Subsequent delays may affect the commercial operations and increase fuel consumption in order to make up for lost time afterwards. These incidents can also have a negative impact on company reputation.

In order to minimise the risks linked to the fuel changeovers, shipowners and managers should ensure that changeover procedures are in place, and that crew members have a comprehensive understanding of those procedures. The use of fuel treatments for HFO and MGO has also demonstrated a significant improvement in fuel changeovers and commingling compatibility, both in laboratory studies and in real life situations.

The application of additives in marine fuels is commonplace, and has been for many years.



There are several drivers for this, but market acceptance is seen to be growing due to persistent fuel-related operational issues, and the proven ability of additives to overcome them.

Changing over fuel types is a complex task and requires close care and attention to ensure that potential issues are mitigated. In particular, when changing between HFO and MGO or ultra low sulphur fuel (ULSFO), the temperature dif-

ferential and risk of thermal shock in the fuel pumps means that the process can take time to complete, often more than an hour.

During this time, paraffinic distillate fuel is mixed at an increasing ratio with aromatic residual fuel, with a high risk of incompatibility. Such a situation can lead to excessive sludging, resulting in rapid filter blocking which, in the worst case scenario, leads to engine starvation and a loss of propulsion.

## 'The use of fuel treatments for HFO and MGO has also demonstrated a significant improvement in fuel changeovers and commingling compatibility, both in laboratory studies and in real life situations'

Since 2012, Innospec has conducted a number of detailed studies into simulated changeover scenarios. These included HFO to MGO/ULSFO scenarios in anticipation of the 0.10% sulphur ECA ruling in 2015. The study mixed various fuels at several ratios from 0% to 100%, and results confirmed a significant risk of incompatibility during changeover. The risk profile showed no appreciable difference whether the fuels used were of good or poor quality.

The study also tested the efficacy of additives to improve the compatibility. Results showed that the use of additives such as Innospec's Octamar range of products can sig-

nificantly reduce the effects of fuel switchovers.

A highly versatile HFO stabiliser, Octamar BT-25 is added to the HFO at a ratio of 1 litre to 20 metric tonnes (mt) of fuel. This product acts to suspend the asphaltenes in the fuel, and prevent them from flocculating and creating sludge. By doing this, when the paraffinic distillate is introduced into the mixture, the asphaltenes have lower tendency to flocculate and create heavy sludge. Additionally, the product will keep fuel systems clean, decreasing the solvency cleaning effect of the introduced MGO/ULSFO.

Octamar LI-5 Plus is a Lloyds Register-verified multifunctional product which is

added to the MGO at a ratio of 1 litre to 4 mt. Its stabiliser and dispersant technologies act to reinforce the stabilisation of the HFO asphaltenes upon mixture, and disperse any agglomerations of sludge that may form. Further, its lubricity improving properties will act to reduce fuel pump wear, and prevent excessive leakage and starting problems when operating on MGO.

The new sulphur limit implemented on 1 January is mentioned in the MRCC reports as a possible reason for the increase of DEFREPs reported by the ships transiting through the English Channel. It is clear that more data should be collected before drawing any definitive conclusion. However the graphic shown in this feature is self-explanatory and it simply cannot be a coincidence to see a 98% DEFREP increase in 2015 compared to the 2011-2014 average.

 **Ian Crutchley**  
Business Development Manager  
– Marine Specialties (EMEA)  
Innospec Ltd

 Email: [ian.crutchley@innospecinc.com](mailto:ian.crutchley@innospecinc.com)  
Web: [www.innospecinc.com](http://www.innospecinc.com)

# Hedging Done Right

A fuel hedging strategy should be customized according to your specific needs. At CTA Financial our approach to fuel risk management is designed to maximize your profitability and reduce your risk. Whether you are protecting the profit margin on your next COA or managing a fuel budget, CTA Financial can provide the hedging tools to fit your business.

Contact:  
[info@ctafin.com](mailto:info@ctafin.com)  
[www.ctafin.com](http://www.ctafin.com)  
+1-212-655-9537

**CTA**  
FINANCIAL

Risk management  
Fuel hedging  
Exotic forex

Trading in derivatives including commodity futures, swaps, options and foreign exchange products may involve substantial risk.