



Verification and compliance with sulphur cap regulations

Executive Summary

The existing compliance procedure of documentary evidence, stating the sulphur content of fuel oil supplied, laid down in regulation 18 of Annex VI, MARPOL 73/78, may be falsified because there are significant financial benefits in the use of poor quality high sulphur fuels. Hence, there will be every possibility that a ship entering European waters could be using high sulphur fuel oil instead low sulphur. However, the procedure uses information that forms a part of the existing bunkering process and therefore has the minimal cost implications.

Any compliance procedure developed should be based on the trading pattern of ships and its ease of policing. This then governs the type of procedure or technology used and its effectiveness. The most effective procedure to ensure compliance would be to control at source as applied by the Sulphur in Liquid Fuels Directive, 99/32/EC, with the responsibility of the member state to prohibit the sale of fuel oil with sulphur content higher than the set limits. However, shipping being a global industry with ships trading within and outside European waters the procedure will only be effective in reducing European sulphur emissions by 40%.

For ships entering European waters on a regular basis, it may be made mandatory to fit sulphur in fuel or SO_x measuring equipment. Such instruments can be used not only to demonstrate compliance with legislation but also be used as a part of an emissions trading scheme. In this case the measuring equipment also needs to be linked with a time record of the ships position.

A review of the existing sulphur in fuel measurement technology has shown that most of the detection techniques are through combustion of a small quantity of fuel (oxidative techniques) and needs a sample of fuel to be extracted from the system for a test to be completed. This can be avoided by fitting an X-Ray Fluorescence (XRF) on line measuring instrument upstream of the inlet to the engine. However, the cost of such instrument is approximately £40,000 with additional costs for calibration and on going maintenance by an expert technician. The analysers capable of measuring SO_x in the exhaust gas can be divided into extractive and non-extractive system, the former being permanently installed in a remote location analysing gas samples extracted from the uptake with capability of measuring emissions from multiple engines, and the latter carrying out in-situ analysis without extraction. The analysers are of the UV fluorescence type using a zinc ray lamp as the UV source.

The use of the Automatic Identification System (AIS) which is a ship broadcasting system that operates on the VHF maritime band to transmit and receive ship specific information could be used to transmit bunker related information during the ships transit through European waters. The method is simple in the sense that it is utilising an existing system to transmit additional information and has minimal cost implications. However, the accuracy of the system is dependent on the estimation of predicted fuel consumption.

Remote sensing was seen to be a very desirable method for verifying compliance with legislation as it does not involve the ship operator in anyway. However, the cost of such remote sensing instrument and its associated equipment is would be expensive.

The practice to maintain documentary evidence of fuel oil quality standards laid down under regulation 18 of Annex VI of MARPOL 73/78 must be firmly adhered to so that a legally sound method can be put forward to carry out court proceedings against a suspect vessel. Due to the possibilities of falsification of documentary evidence and samples, and also the cost and labour associated with undertaking a high percentage of investigation calls for additional verification procedures. These additional verification procedures should be designed to allow identification of possible non-compliance warranting a more detailed default investigation. Based on studies conducted in this work it was found that the AIS and remote sensing provide the most promising solution and it is recommended that further study should be conducted.