MARSH

Emissions Regulations: Concerns for the Marine Industry

CONTENTS

EXECUTIVE SUMMARY

Along with carbon emissions, nitrogen oxides (NOx), and particulate matter (PM), sulphur emissions (SOx) create greenhouse gases that can seriously damage the environment and pose a danger to human health. The exhaust gas produced by diesel powered maritime vessels has been one of the major contributors to the increase in SOx emissions in the atmosphere in recent years, especially in areas of the world that are busy with maritime trade.

New regulations putting in place lower caps on SOx limits will bring challenges to the marine industry. Shipowners need to consider strategies for reducing emissions, or risk vessels becoming uncompliant and, possibly, unseaworthy.

REGULATORS ENFORCE MANDATORY SOX REDUCTIONS

As far back as 2009, it was known that shipping contributed about 9% of global SOx pollution levels.[1] The diesel fuel that commercial vessels use and its resultant exhaust emissions has a sulphur content originating from the sulphur that naturally occurs in crude oil, which the refining process cannot completely remove.[2]

In 1997, following mounting pressure on the marine industry to reduce the sulphur footprint of commercial vessels, the International Maritime Organisation (IMO) amended Regulation 13 of the International Convention for the Prevention of Pollution from Ships (MARPOL) with Annex VI, which entered into force on May 17, 2005, focusing on the prevention of air pollution from ships.[3]

Annex VI was to be the vehicle through which reducing maximum limits on SOx emissions was to be phased in between 2005 and 2020, and was initially set globally at 4.5%. At that time, this did not pose insurmountable problems for the ship operating community, as a 4.5% cap could be complied with by means of diligent operation of ships' engines using traditional high sulphur fuel oils (HFSO).

It has been recognized that high marine traffic areas (such as the North Sea in Europe) were particularly vulnerable to the build-up of high levels of SOx emissions from commercial ships. Endorsed by the IMO, a North European Emissions Control Area (ECA) was set up in 2008, limiting the permitted sulphur emissions from ships to 1.5% (see Figure 1). This limit was subsequently reduced to 1% in 2010.

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FIGURE 1 North European Emissions Control Area
Source: Marsh

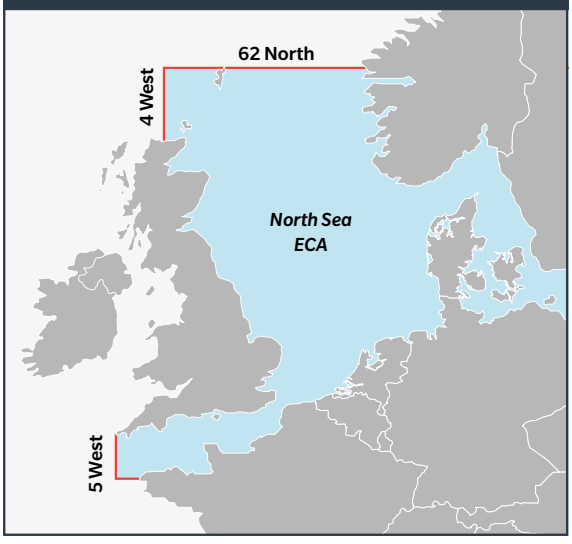
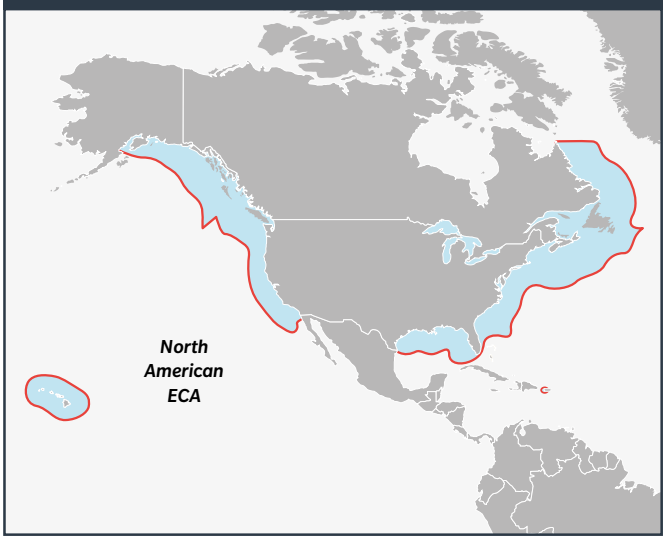


FIGURE 2 North American Emissions Control Area
Source: Marsh



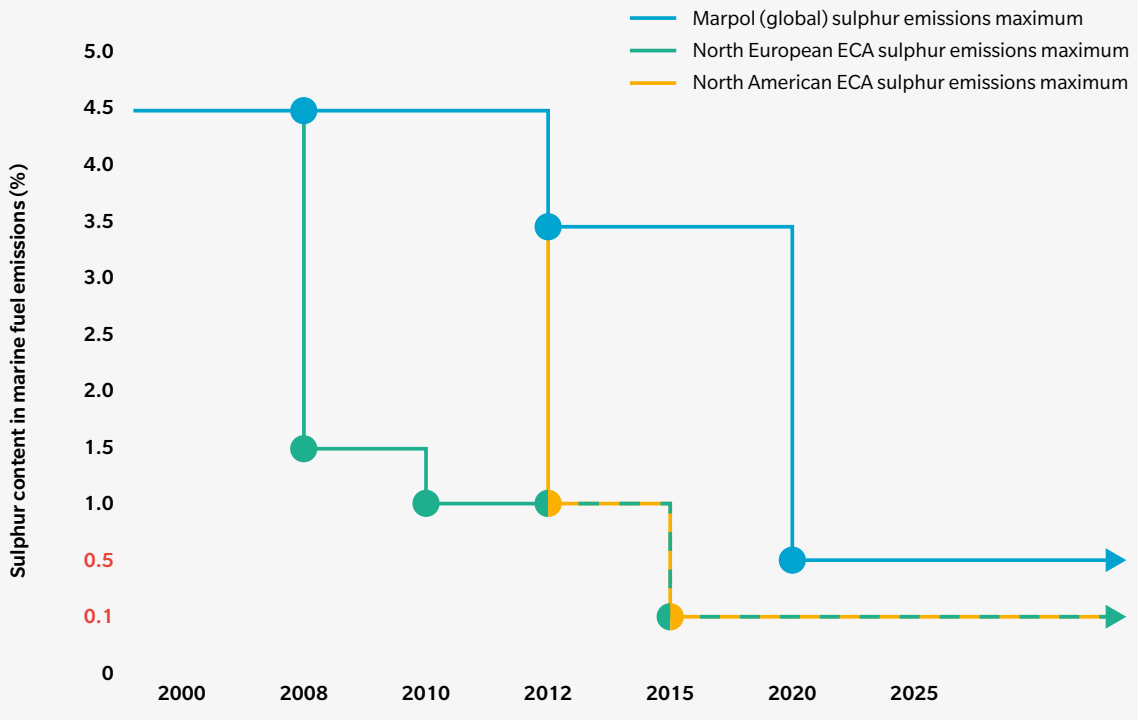
These new levels would be difficult to achieve with HFSO. The introduction of low-sulphur fuel oils (LSFO) in marketable quantities by oil companies in recent years has meant that existing engines could be "switched over" from using HSFO in most global areas, to LSFO as vessels approached and entered the North European ECA. In 2010, the European ECA maximum cap for permitted SOx emissions was reduced to 1.0%.

Similar concerns over levels of SOx emissions were evident in the US and Canada. Consequently, the IMO endorsed the setting up of a North American ECA (see Figure 2). In 2012, under a revised and considerably strengthened Annex VI to MARPOL, the North American ECA limit was, like its North European equivalent, set at 1%.[4] At the same time, the global cap (outside of the two ECAs) was reduced from 4.5% to 3.5%.

At the start of 2015, the maximum permitted caps on sulphur emissions in both the North American and North European ECAs was reduced from 1% to 0.1%.[5] To demonstrate that these new rules were going to be rigorously enforced, there were reports as early as January 2, 2015 that samples of the exhaust fumes from vessels operating inside the US-administered waters of the North American ECA were being collected by the US Coastguard to check on compliance. However, outside the two ECAs, vessels could continue to legally burn fuels that emitted up to 3.5% sulphur. Under Annex VI to MARPOL, the IMO announced that, on January 1, 2020, the global cap on sulphur emissions will be reduced to 0.5% from the current 3.5%.

It is not possible to achieve these low levels of sulphur emissions using traditional HSFO that has not been treated before the exhaust gases are released. At the time of the announcement of the regulatory changes, many in the industry doubted the 2020 timeline for SOx reductions would be adhered to, but, with no indication that this will be the case, ship operators are now faced with some stark choices if they are to remain compliant with Annex VI of the MARPOL convention (see Figure 3).

FIGURE 3 The Reductions in Permitted SOx Emissions 2008 - 2020
Source: Marsh



Ship operators are now faced with some stark choices if they are to remain compliant.

OPTIONS FOR COMPLIANCE WITH MARPOL ANNEX VI

Realistically, there are three methods of compliance with the impending reduction in the permitted levels of sulphur emissions that shipowners should be considering. Although these options are likely to achieve the same goal, all three undoubtedly involve considerable cost to shipowners and have advantages as well as disadvantages.

OPTION 1 – USE LOW-SULPHUR FUEL (LSFO)

Low-sulphur fuel is created by an extended refining process, during which a greater percentage of the sulphur content is removed. When used as fuel in ships, it will automatically produce exhaust gases containing considerably less SOx.

ADVANTAGES

LSFO can be used in most existing, conventional marine diesel engines and should produce acceptable reductions in SOx emissions, without the need to install further, hugely expensive scrubbing equipment.

DISADVANTAGES

- **Cost:** The longer and more involved refining process in making LSFO much more expensive than LFSO compared to traditional HSFO. It can cost up to 50% more,[6] therefore greatly increasing the running costs of vessels.
- **Availability:** Even with there being only two ECAs at the moment, there have been reports of a lack of availability in LSFO,[7] as oil companies work to switch production to this relatively new (and more involved) refining process. Some ports have inadequate supplies of this LSFO. While this has only been a comparatively minor headache (with just two ECAs along a ship's global route), once there is wholesale shifting to the use of LSFO globally, the supply of adequate amounts of LSFO will come under considerable strain, which may serve to increase prices even further.
- **Catalytic (cat) fines:** The marine industry, including the Gard P&I club[8] and the maritime press,[9] have expressed considerable concern regarding the build-up of cat fines inside ships' engines that use LSFO. These cat fines consist of small particulates of aluminum or silicon, introduced into LSFO during its longer refining process. As we have already seen with vessels that regularly visit the two existing ECAs and opt for using LFSO, added maintenance costs, diligent, regular checks for cat fine build-up by ship's engineering staff, and expensive cleaning of engine cylinders are all vital if engine breakdown or power reductions due to cat fine build-up are to be avoided.

OPTION 2 – CLEAN THE EXHAUST GASES BETTER BEFORE THEY ARE RELEASED

Manufacturers are competing to provide ever-improving, increasingly efficient exhaust gas cleaning systems (scrubbers) that can be installed on vessels that continue to operate using HSFO. These scrubbers work by scrubbing the exhaust gases produced by ship engines with greater efficiency before their release into the atmosphere, to achieve the levels of emission that are acceptable.

ADVANTAGES

If these scrubbers work, then it may be possible to continue to use HFSO as fuel, and, with HSFO currently being only two-thirds the price of LSFO,[10] continued use of HSFO would help keep the fuel costs down, especially as it is anticipated that the price of HSFO may reduce significantly, once 2020 arrives. As Paul Fanning, Editor of *Marine Propulsion & Auxiliary Machinery* has concluded,[11] adopting this approach may be a clever move. With the current, plentiful supply of HSFO around the world, there should be no issue over finding adequate supplies in ports, at least for the time being. The risks associated with the cat fines found in LSFO would also be reduced, therefore avoiding the expense involved in monitoring and removing them.

DISADVANTAGES

- **Cost:** The installation of new, adequate scrubbing equipment can be very costly. It has been suggested[12] that it may cost up to US$10 million to install such equipment per vessel. For many vessels, such a financial outlay will not be viable, especially for older, smaller vessels. However, such equipment costs may be mitigated by the lower fuel costs. For example, if a vessel were to consume 150 metric tons of fuel per day, the price differential between HSFO and LSFO could see the cost of such equipment paid for out of the fuel cost savings per ship within two years of operation.[13]

- **Breakdown:** Relying on the scrubbers to achieve the low levels of permitted SOx emissions required would expose ship operators to huge operational headaches should scrubbing equipment ever break down while the vessel is at sea. If there is no alternative LSFO stored on board, the vessel, unable to scrub its exhaust fumes adequately, may be forced to stop immediately and turn off its engines, or risk being fined/impounded for breaching the new MARPOL emissions limits after January 1, 2020. Ships' crews will need considerable training if they are to use such new and complex equipment correctly, if the vessel is to achieve the hoped for exhaust gas scrubbing efficiency.
- **Supply:** While HSFO may be in plentiful supply around the world now, as more operators switch to LSFO, we can expect a reduced availability of HSFO over time, as refining companies switch the focus of their production of maritime fuels to LSFO.

OPTION 3 – USE LNG (OR LIQUID HYDROGEN) AS THE FUEL SOURCE

To avoid the issues associated with fuel oil completely, some vessels are using alternative types of fuel, such as liquefied natural gas (LNG), which is a considerably "greener" alternative to oil. Vessels designed to carry LNG as cargo have already been using some of the cargo they carry to fuel the vessel.[14]

Another fuel source being seriously considered for the future is liquid hydrogen, which, if it were to become commercially viable, could eradicate the emission of greenhouse gases from shipping.[19]

ADVANTAGES

This cleaner technology would generally reduce SOx emissions by 90% – 95% and is seen as probably the longer-term solution to the ship fuel emissions issue. It is also likely to attract subsidies or other incentives from national governments to attract shipowners to adopt this solution.[15]

DISADVANTAGES

- **Cost:** In most cases, it would not be economically viable to convert existing ships to run on LNG. An existing, conventional marine diesel engine cannot be switched to run on LNG, and the vessel would need to be re-engined, which would prove costly.[16]
- **Supply:** Few ports have the storage or refueling capability to support the large-scale adoption of LNG fuel. In many ports, LNG is currently not available at all.
- **Loss of cargo space:** One of the main reasons why shipowners are hesitating over the adoption of LNG as fuel is the large amount of space on board vessels that the fuel store and insulation equipment require. Larger ships may have to sacrifice up to 3% of their cargo space in order to store the LNG and its associated equipment on board.[17] On a 20,000 - TEU+ vessel, that may mean as much as 500 TEU in lost earnings. The subsequent loss of revenue to the ship operator may not be viable. Recent announcements of orders for the latest generation, 22,000 TEU containerships[18] have demonstrated differing views within the shipowning world about the fuel type these vessels will use, with some being ordered with diesel engines, while others will be fueled by LNG.

There is a fourth option – do nothing for now. But, the purpose of this paper is to point out some of the dangers in adopting that fourth option.

From 2020, the global cap on sulphur emissions will be reduced to 0.5%.

THE RAMIFICATIONS OF NON-COMPLIANCE WITH THE SOx REQUIREMENTS OF MARPOL

Faced with a decision with huge cost implications, shipowners are considering all options on how to tackle sulphur emissions, perhaps one of which is to do nothing, for now. They may feel justified in coming to this conclusion when they see what resulted from the attempted mandatory imposition of the Ballast Water Convention (2004) (BWC) requirements in September this year.[20]

Confusion over the level of ballast water purification required and the cost and acceptability of equipment required to achieve compliance with the BWC made it necessary to relax the implementation of this convention, amending it to be brought in over a phased period between now and 2024. However, shipowners are advised not to assume the same might happen with Annex VI of MARPOL. Coming to this conclusion about when the reduction in the sulphur cap will come into effect, this may be misguided, following the recent statements by IMO reinforcing their commitment to the introduction of the sulphur cap in 2020.[21]

The IMO has recently made it clear that it is determined to see this amendment take force on January 1, 2020. Dr. Edmund Hughes, technical officer of the Marine Environment Division for the IMO, said recently at the European Refining Technology conference in Athens that the global reduction from the current 3.5% sulphur limit would "enter into force on January 1, 2020 without any delay."[22]

While there have been some warnings in the maritime press about what non-compliance with the 2020 cap on SOx emissions may mean with regards to a vessel's obligations under charter contracts, Marsh's concerns are primarily centered on what non-compliance by January 1, 2020 may mean on a vessel's insurances, especially as questions have been voiced in some quarters over a vessel's continued "seaworthiness."[23]

The English Marine Insurance Act (1906) (MIA), which, despite some amendments recently introduced under the Insurance Act 2015, is still in force today, codified the insurance aspects of many centuries of law cases concerning seaworthiness of vessels. Section 39 of the MIA covers the issue of seaworthiness for both voyage and time insurance policies. As far as time policies are concerned (the type of policy most commonly used for commercial vessels during most of their working lives), the warranty of seaworthiness is less stringent than it is under a voyage policy, so suggesting "unseaworthiness" may not have been the best tactic to use. Nearly all marine hull and machinery policies on commercial cargo vessels (in addition to the rules of most protection and indemnity (P&I) insurance associations and of most fixed premium P&I insurance providers) include a classification warranty, requiring the vessel to be and to remain in class throughout the insured period. Additionally, many marine cargo policies include The Institute Cargo Classification Clause (Cl.354 1.1.2001), requiring the overseas carrying vessel to be adequately classed. Loss of classification status for a vessel would historically have had serious implications for the continued cover under hull and P&I insurance.

Lloyd's Register of Shipping, for example, has told Marsh that its regulations "....require that ships comply with all requirements of the National Administration and all applicable mandatory international IMO and ILO Conventions and Codes (including amendments thereto)." However, they added that, before a vessel has its classification status suspended or withdrawn, a specific decision to do so would need to be made by the Society's classification committee, and that the Register views the role of a vessel's registration state as central to these decisions.

The registration state of a vessel (its "flag state") issues convention certificates per vessel for the international conventions it has ratified into its own national law, (including MARPOL), as evidence that the vessel is compliant. If a vessel fails to comply with the requirements of the MARPOL Convention, then it would effectively be in breach of the flag state national law, and the vessel's MARPOL certificate may be withdrawn, or at least suspended, by the flag state. Such action could have considerable significance for the vessel's continued insurance cover, as historically a breach of warranty within marine insurance conditions has had dire effects on the insurance (Section 33 of the MIA).

However, the effect of the Insurance Act 2015 must now also be taken into consideration.

While the new Act, which came into force in August 2016, does not change what constitutes vessel "seaworthiness", it does affect the understanding of the power of warranties. Where the relevant sections of the Insurance Act 2015 have not been contracted out of by insurers, then Sections 10 - 11 of the Act may affect whether a warranty breach (such as breaching international regulations over vessel sulphur emissions) could be used by insurers as grounds to avoid claims after January 1, 2020.

For insurers to argue that the warranty breach can deny cover, the Act has introduced the need for there to be a causational link between a breach of a warranty and a loss that actually occurs. If the insured can show "...that the non-compliance with the term could not have increased the risk of the loss which actually occurred in the circumstances in which it occurred," (Section 11(3) of the Insurance Act 2015), then insurers might no longer be able to avoid liability for the loss that the previous regulation may have allowed. For example, it may be difficult to prove that emitting smoke from the ship's funnel that contained excessive amounts of sulphur, could have affected a collision or a grounding event claim.

However, the need to prove that "causational link" before insurers could avoid claims might not apply when the warranty in question is deemed to be "a term defining the risk as a whole" (Section 11 (1) of the Insurance Act 2015). Underwriters may claim that breaching international conventions and losing flag state convention certification status (and possibly having class withdrawn or suspended) is so fundamental to the risk that such a breach alters their understanding of the "risk as a whole," regardless of any link with the loss that happened.

Given the novelty of this phrase appearing within the Insurance Act 2015, there is not, at present, any case law to provide guidance on how courts might decide such cases, or what their interpretation of "defines the risk as a whole" might be. Therefore, shipowners are advised not to assume that insurance cover will continue to remain in place under all circumstances following a breach of the MARPOL Convention Annex VI after January 1, 2020.

Owners of vessels that are subject to the MARPOL Convention are advised to address this whole issue with some urgency, as the decision to install new equipment on existing vessels will not only be expensive, but also time consuming. Installing new, additional equipment cannot be done overnight. As January 1, 2020 approaches, Marsh envisages large numbers of vessels seeking to book space in repair yards for the installation of new equipment or conversion to LNG, in an effort to comply with the MARPOL requirements. Delays in yard space availability are likely to occur, as well as possible shortages in supply of new equipment being available at that time. Latecomers risk finding that convenient or preferred yards have no room and, being unable to comply with the new sulphur cap rules by 2020, may risk their vessels becoming non-compliant.

Now is the time that decisions need to be made about how to comply with the 2020 Annex VI requirements, especially if operators know their MARPOL-applicable vessels are unable to achieve the low levels of sulphur emissions that will be required.

Marsh envisages large numbers of vessels seeking to book space in repair yards for the installation of new equipment or conversion to LNG, in an effort to comply with the MARPOL requirements.

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