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Why do tankers keep exploding? - Waypoints article

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Oil/chemical tanker blasts are still happening despite the implementation of updated requirements for inert gas systems.

Amendments to the SOLAS Convention (Chapter II-2, Regulation 4 - 5.5) required new-build oil and chemical tankers of 8,000dwt and above to have an inert gas (IG) system fitted from 2016. Prior to this it was for oil tankers of 20,000dwt and above, but the Bow Mariner disaster of 2014 was one of many incidents that influenced this change. This chemical tanker exploded whilst undergoing tank-cleaning operations, sadly killing 21 of her 27 crew.

Worryingly, however, tanker explosions are still occurring despite these regulatory amendments. This has been reflected in the Club's recent claims experience, examples of which include the following:

- On September 28, 2019, two explosions and a fire on Stolt Groenland injured several crew and firefighters. The explosion has been linked to a deck rupture above a cargo tank which in turn ignited styrene monomer vapour in the tank.
- On September 7, 2020, residual fumes from a cargo tank on Trung Thao 36-BLC are thought to have caused the explosion which blew several of her 12 crew overboard and resulted in the death of one.
- An explosion on board General Hazi Aslanov on October 24, 2020 caused three fatalities among her 13 crew. Again, fumes in the empty tanks were the suspected cause, although investigators are examining the possibility that fire safety requirements were violated.

In all these cases, there was extensive damage to the vessels and contamination of the marine environment.

To understand why tankers explode in the first place, we need to consider the basics of the fire triangle: fuel, heat and oxygen. The cargo itself is the fuel, including its vapour. The heat source or spark may result from electrostatic discharge caused by static accumulation due to the flow of liquid cargo during operations or tank cleaning.

Given that we have one part of the triangle here and a high risk of the second part occurring, it is necessary to lower the oxygen percentage to less than 11% so that combustion is not possible. For this we use an inert gas (IG) generator or nitrogen plant which supplies inert gas with oxygen content of not more than 5% to maintain a positive pressure inert atmosphere in the cargo tanks of not more than 8% oxygen in accordance with SOLAS. This is in relation to flammable liquid cargoes with a flashpoint of less than 60°C.

The common factor in the examples of tanker explosions given above is that all three ships were built before 2016, highlighting a fundamental concern – that there is no legal obligation for older vessels to retrofit an inert gas system. Newer vessels are accordingly costlier to operate as these not only have to invest in such systems, but also have to consume more fuel to run them. Some operators might be tempted to opt for an older, cheaper tonnage, but this automatically compromises safety and increases risk during operations.

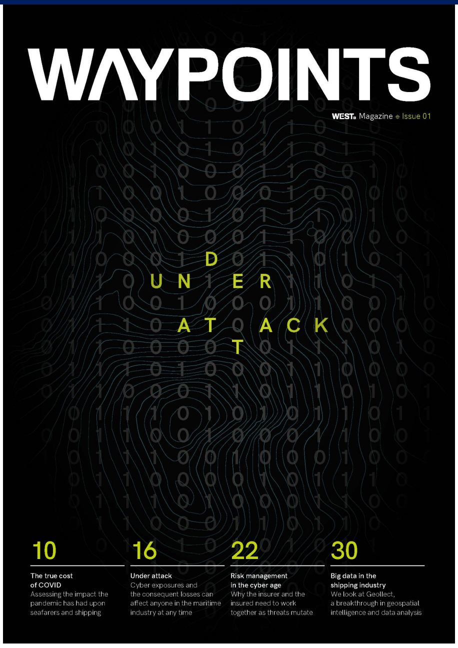
Crews on older tankers must therefore implement best-practice strategies for explosion prevention in the absence of IG systems, encompassing thorough hazard identification and risk assessment programmes, and optimising the effectiveness of their vessels' safety management and planned maintenance systems. These measures should be applied in accordance with guidelines from the ICS and OCIMF, namely the International Safety Guide for Oil Tankers and Terminals (ISGOTT) and Tanker Safety Guide: Chemicals. Officers in charge of cargo operations also need to undergo extra training as per STCW for oil and chemical cargoes.

The importance of also incorporating the internationally recognised guidelines into the company's Safety Management Systems (SMS) by ships' managers cannot be understated. Doing so not only demonstrates that good seamanship techniques and tanker operations have been considered but also recognises the importance of ensuring safety. As such, amending for new technological advancements and information as well as regular evaluation of Permits to Work and Risk Assessments becomes embedded in practice so that when the SMS mandatory review is conducted by ship and shoreside management, procedures are not found lacking.

Until the minimum legal standards are raised to include the fitting of an IG system on all tankers, the probability of unnecessary explosions and consequent loss of life remains high. It is clear to see from previous incidences and the increase in more stringent legislation over the years that inert gas is the prime factor in reducing the risk to mitigate tanker fires and explosions.

However, there is still a large group of tankers that are not required to have an IG system in place. Although chartering a tanker that has an IG system in place is safer, it has larger operating costs due to the extra fuel required to run the IG system. Choosing the cheaper charter automatically reduces the safety operating standards and in turn increases the risks during operations. Although some terminals have a requirement that all tankers regardless of size are fitted with an IG system, others only recommend that they do.

So the recommendation is straightforward; regardless of size, all newbuild oil and chemical tankers should be fitted with a SOLAS compliant IG system and all older tankers should be retrofitted or upgraded to have a SOLAS compliant IG system during their next special survey or major refit.



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