Challenges with the use of exhaust gas scrubbers

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Gard loss prevention executive Siddharth Mahajan has written on the challenges connected to the use of scrubbers, noting that there were concerns associated with both of the two most popular options to comply with IMO 2020; that is, the use of compliant fuels or the deployment of SOx Exhaust Gas Cleaning Systems (EGCS, or "scrubbers").

Mahajan said that what was important was that, after an incident occurs, the maritime industry should learn and prevent similar cases repeating.
Mahajan noted that there would be an estimated nearly 3,000 vessels with scrubbers installed by 2020. For the majority of owners and their crew members, scrubber systems would be new technology and, as with any new system, teething problems were to be expected.

The writer said that Gard had handled a few scrubber related claims and the article looked back at cases where there had been a breakdown of or damage to or by the scrubber.

Fire during retrofitting of scrubber

Scrubber installation required extensive hot work to facilitate the extension of the funnel area and attaching the scrubber tower to the vessel’s structure. In this instance, later investigations revealed that crew had requested that the yard cover the openings, but this was not done. The fire risk to scrubber packing during the hot work activity had not been identified by yard personnel, and many of them were not aware that internal components of the scrubber were combustible. These fire incidents arising from shortcomings in hotwork safety procedures were not unique to scrubbers and could occur in any location onboard a ship where welding, cutting or grinding works are undertaken.

Sea water ingress due to corrosion

Scrubber waste is corrosive. The writer said that Gard had seen a few incidents where, within 10-to-15 months of the open loop scrubber being installed, corrosion of overboard distance piece or in its immediate vicinity had resulted in water ingress into areas such as the engine room, ballast tanks and cargo holds.
An absence of, or poor application of, protective coatings on the inside of the pipe and at the

welds, along with poor application of paint on hull plating near the washwater discharge were identified as the causes of accelerated corrosion. In all these cases, temporary repairs to plug the leak were carried out by divers followed by permanent repairs at a yard.

Scrubber damage due to poor workmanship and thermal shock

There was a case where a vessel was regularly trading in Northern Europe and had installed an open loop scrubber. It had to changeover to low sulphur fuel when visiting a port that had regulations in place banning discharge of washwater from open loop scrubbers. It was still required to run the scrubber in dry mode, that is, with washwater supply pumps turned off, to allow for the passage of hot exhaust gasses with a temperature of nearly 400°C. After departure from port, washwater pumps would be started and cold sea water sprayed through the nozzles inside the scrubber. During inspection of the scrubber by crew, damage was noticed to the nozzles, demister housing and the drains.

A survey was carried out and indicated a variety of concurrent causes, such as thermal shock, poor workmanship by the yard, and poor design. The scrubber had been in service for nearly two years.

Gard noted that, since, like any other equipment or machinery on the ship, scrubbers were not immune from breakdown and damage. It therefore recommended that owners of ships fitted with scrubbers should:

Fires during retrofitting: Fire risks could be mitigated by following hot work safety procedures. The risk assessments carried out prior to the work should cover which parts of the scrubbers were flammable. These should be protected during the hot work by covering any openings to prevent sparks from finding their way to these parts. Measures should also be put in place to prevent transfer of any heat generated during metal cutting, welding, grinding, and other hot work activities. Owners should ensure that the yard workers who would ultimately be undertaking these hotwork activities be aware of these risks and appropriate barriers be put in place to shield these areas. Crew members were advised to monitor the hot work activities themselves, rather than just rely on the yard safety watchman. Firefighting equipment should be maintained in a ready to use state and crew should be familiar with how to use them.

Ingress of water due to corrosion: The metallic distance piece would normally be coated for enhanced protection. There should be a regime to measure the wall thickness. For many classification societies this is a survey item. Any reduction in thickness would be indicative of a breakdown of the coating. For leakages from welded joints and holes or cracks in the hull, the quality of workmanship and the paint application should be scrutinized. The bilge alarm and pumping arrangements should be checked regularly so that the crew would be alerted of and could respond to any water ingress.

Damage due to poor workmanship and thermal shock: When in operation, the scrubber unit is

subject to different types of stresses, which test the quality of the welding and housing structure. Supervision by owners during the time of installation would help mitigate this risk. With regards to design related issues, owners were recommended to collaborate with manufacturers to mitigate such risks. In this particular case of thermal shock, as preventive action, shipowners changed the design and installed a water cooling system for the scrubber which would continuously run in a closed loop when the scrubber was operating in dry mode.
"As a general note, owners should also consider approaching their scrubber manufacturers and request them to regularly share technical failure related scrubber incidents occurring on ships belonging to other owners", Gard said.