BY CHRISTIAN INGVORSEN

Ballast water tests show that fresh water offers unique challenges

Ballast water treatment tests warn ship owners about the possible shortcomings of International Maritime Organization (IMO) approved systems in fresh water. DESMI Ocean Guard was the first company to conduct IMO tests with a UV based system in this type of water and encountered some unexpected challenges.

Ballast water treatment is a hot topic in the shipping world at the moment and with the anticipation of up to 70,000 vessels that will need to install the equipment before 2019, companies are doing their best to make sure that their systems are ready for the market when the demand is there.

However, it is a new field and not much experience has been gathered yet. That became very clear to the company, who chose to test their ballast water treatment system in fresh water also. The reason why it was never done before is because IMO – Resolution 174(58) only requires tests in two of three water types – fresh water with salinity lower than 3‰, brackish water with salinity between 3-32‰ and high salinity water with salinity over 32‰. And so far, only the last two types have been used for tests by other companies offering UV-based concepts.

DESMI Ocean Guard equipment installed.

Surprises in fresh water

DESMI Ocean Guard A/S, established by A.P. Moller-Maersk A/S, DESMI A/S and Skjølstrup & Grønborg ApS, decided that fresh water tests are very relevant since many of the larger harbours are fresh water harbours either the entire year round like Antwerp, or for periods of the year, such as Hamburg and Bremerhaven. The same applies to several Asian harbours that are of strategic importance to A.P Møller-Maersk. Therefore, a water treatment system that is approved by IMO but has only been tested in salt or brackish water might unexpectedly deliver unsatisfying test results.

The company has finalized the required land-based tests at the accredited test institute in Hundested (Denmark) which is owned and operated by DHI, whose expertise and assistance is greatly appreciated.

The water is treated in three steps – filtration, UV radiation and ozone generated *in situ* by the UV-system. First tests were carried out in brackish water and the results were compatible with IMO regulations right away. The fresh water tests, however, presented an unexpected outcome. They showed that too many large organisms (over 50 microns) could get through the system. It made specialists wonder, since the filter mesh is 40 microns, which was enough to effectively remove organisms larger than 50 microns in brackish water.

Finding their own answers

Since no similar tests have been done before,

the company's specialists had to find the answers themselves. It turned out that different fresh water species are much softer than the ones living in higher salinity water, because the latter are usually protected by hard shells. Therefore, fresh water organisms could easier squeeze through the tight filters.

The IMO regulations are very strict when it comes to larger organisms. Three water samples are taken and the average amount of organisms over 50 microns cannot be larger than 10 organisms per cubic metre, whereas when it comes to smaller organisms, 10 per millilitre are permitted.

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Monitoring the equipment.

This suggested to our specialists that the filter, which to begin with had seemed to be the simplest and least important part of the system, had a vast impact on the success of the test results. After evaluating a few different and novel ways to use the filter, the best method was successfully used to pass the IMO tests in fresh water. DESMI Ocean Guard has a patent pending related to the novel way of using the filter.

Shipboard tests

Right now the system is on board a container vessel, *Thurø Maersk*, for the IMO shipboard test. The first two out of three required tests have already been successfully completed. At present, DESMI Ocean Guard is waiting for the required 6 month test interval to pass before the final test can be finalised by March 2012. The system will be type-approved shortly after this.

Editor's Note: Christian Ingvorsen has worked for DESMI Ocean Guard since its foundation on 25 June 2009. He is a Marine Engineer, having come up through the A.P. Moller-Maersk apprentice system in 1985. Christian has worked within the marine environment business area since 1990, mostly concentrating on oil spill response equipment from DESMI Ro-Clean. He now concentrates solely on developing ballast water treatment systems for DESMI Ocean Guard.