Task 6.7 – Hurdle technologies Review

Executive Summary

A number of techniques are tested to treat ballast water including thermal treatment, biological de-oxygenation, oxicide method (both hydrogen peroxide and ozone), Ultrasound treatment (US) and Ultraviolet radiation (UV). These techniques are tested at laboratory scale and full scale onboard or large scale onshore.

Combinations of techniques (thermal treatment and de-oxygenation, thermal treatment and hydrogen peroxide, UV and hydrogen peroxide and UV and US) are tested on lab scale. It is expected that the combination of techniques is more effective or more efficient in treating marine organisms in ballast water.

Based on the laboratory and the full scale results of the individual techniques, the expected results of the combination of techniques at full scale are assessed.

For thermal treatment and de-oxygenation savings in energy consumption, while maintaining an acceptable treatment time is possible. Problems with corrosion and structural stress need to be adressed carefully.

For thermal treatment with hydrogen peroxide no benefit as compared to only hydrogen peroxide treatment is identified. Possibly applying thermal treatment may reduce the treatment time for the hydrogen peroxide process, but at increased costs. Also corrosion and structural stresses need to be adressed.

Ultraviolet combined with hydrogen peroxide appears to be more effective with possible savings on the amount of hydrogen peroxide used.

Ultraviolet in combination with Ultrasound is more effective, saving energy while achieving a higher effectiveness.

For all options, additional experimental work is required at full scale to obtain quantitative data and be able to optimize the working conditions for all of the techniques. Also a combination with mechanical filter techniques requires full scale experiments, as this appeared to be benefical from the laboratory tests.