



Review of High Temperature Thermal Treatment

Executive Summary

The objective of this report is to summarise the achievements of 3 years of research on High Temperature Thermal treatment systems and provide guidelines to ship designers and operators. As part of the MARTOB project, a laboratory-scale system was designed and tested with artificial seawater containing a range of organisms usually found in ballast water. Subsequently, a modular pilot-scale treatment system with maximum capacity of 50 t/hr was designed and manufactured at Newcastle University. The system was successfully tested onboard Don Quijote (combined car and truck carrier) during a 2 week testing voyage in the Mediterranean.

As far as operational cost is concerned, high temperature thermal treatment (HTTT) is possibly one of the most expensive solutions to BW treatment. Although investment in capital cost is within the range of other treatment techniques. Simplicity of design, user friendliness, compatibility with other systems onboard ship and safety in operation are of those advantages that HTTT enjoys when compared to other non-conventional treatment facilities. As far as biological effectiveness is concerned, there seems to be a close agreement and great possibility of achieving IMO's requirements, although this must be still tested and verified at greater extent.

There is still a possibility of optimising the design and system structure based on ship's particulars, pump capacity, available steam and many other design factors.

We have been able to develop a methodology as well as a computer programme which could provide guidelines and detailed information to system designers, heat exchanger manufacturers, ship operators, and ship owners if they have decided to implement HTTT as their BW treatment system, either as a stand-alone facility or in combination with other treatment techniques.

Two computer programmes in executable format have been developed and are made available on MARTOB website. These two programmes provide detailed design and economic information for users of such system at any level of technical or operational responsibility.