

Annex A – About ballast water management

Ballast water is seawater that ships take on or discharge, in order to ensure their stability. During this process, billions of tons of ballast water are transferred across international waters annually. Ballast water carries a wide variety of marine organisms, including micro-organisms, phytoplankton, and zooplankton. While most species will not survive the voyage, some do thrive to form viable populations when discharged into their new environment. These newly-established alien species can be harmful to humans and the biodiversity of the local marine ecosystem, as well as threaten local fishing industries. In the USA alone, it has been estimated that the cost of such invasive species could be as high as US\$138 billion a year¹.

Globally, there is a heightened awareness of the consequences caused by the transfer of non-native organisms through ballast water. The International Convention for the Control and Management of Ships Ballast Water and Sediments was adopted by a Diplomatic Conference at the International Maritime Organization (IMO) in 2004. This has agreed upon a quality standard for discharged ballast water. According to the Convention, ships are to install and use an on-board ballast water management system by 2016. There are some estimated 60,000 ships that will require ballast water management systems. The ballast water treatment market is estimated to be US\$34 billion. For more details on the convention, read:

<http://www.imo.org/about/conventions/listofconventions/pages/international-convention-for-the-control-and-management-of-ships%27-ballast-water-and-sediments-%28bwm%29.aspx>

Ballast water management systems must be able to cope with high discharge rates over short periods of time. The method which have traditionally adopted is to design a buffer facility in the system. These designs typically lead to a significant increase in the size of the system, as well as higher energy consumption. Ballast water treatment is still in its early days, as authorities' concern over the quality of discharged ballast water only began in the 21st century. Over the last five years, several new technologies have been developed for the treatment of ballast water. These include physical technologies, such as filtration, hydrocyclone separation and ultrasonication, as well as chemical technologies, such as UV radiation, biocides, ozonation and chlorination.

Mechanism of BlueSeas Ballast Water Management System

The BlueSeas BWMS involves a number of processes. During the ballasting, sea water is pumped through a physical treatment device to remove larger organisms and debris. It then enters an electrochemical chamber, where a few key chemical reactions occur, leading to the formation of chemically powerful free radicals and other disinfectants. These are effective in disinfecting organisms in water, and preventing their re-growth in the ballast water tank.

Once the ship docks at the next harbour, it may need to discharge the ballast water (called as de-ballasting). An engineering measure is performed in order to ensure that the disinfectant level is 20 times less than the level in normal drinking water.

¹International Maritime Organisation