

NOZZLE MIXING METHODS FOR SHIP BALLAST TANKS

Background. Cargo ships that transport goods around the world can carry nonindigenous species in ballast water. The release of the ballast water from the ships is a major transport mechanism for the nonindigenous aquatic organisms. Cargo ships pump ballast water on board to ensure stability and balance. When the ships enter port, the ballast is released and thus the introduction of nonindigenous species to local waters.

Nonindigenous species are having a dramatic negative effect on marine, estuarine, and freshwater ecosystems in the United States and abroad. Negative effects include alteration of the structure and dynamics of the ecosystem, including the killing off of native species. The inventors have made a relatively inexpensive and time effective system and method to treat ballast water without compromising the stability of the ship in order to prevent the spread of nonindigenous species.

Abstract. The present invention is directed to a system, method, and apparatus for treating ship or barge ballast water. The system includes a ballast tank storing ballast water and one or more nozzles located in the ballast tank. One or more pumps supply a biocide into the ballast tank and water to the nozzles. The nozzles are strategically located in the ballast tank to circulate the ballast water and mix the biocide with the ballast water without removing the ballast water from the ballast tank to a separate mixing and treatment area located outside the tank either onboard or off of the ship or barge. This method allows for a blend of biocide and neutralizing compounds.

Opportunity. Large vessels can carry in excess of 200,000m³ of ballast, which is released in varying amounts at or when approaching cargo loading ports. In the US alone it is estimated that more than 50 million metric tons of ballast water from foreign ports is transported annually. The EPA estimates that globally more than 10,000 different marine species each day may be transported across the oceans in the ballast water of cargo ships.

The international maritime community, under the direction of the International Maritime Organization (IMO) developed the

“International Conventions for the Control and Management of Ship’s Ballast Water and Sediments,” in 2004, which is aimed at preventing the introduction of unwanted aquatic organisms and pathogens through the discharge of ballast water and sediments. The IMO Convention calls for either a ballast exchange or treatment.

Recently adopted US Coast Guard regulations require all ships calling at US ports and intending to discharge ballast water must either carry out exchange or treatment, in addition to hull fouling and ballast tank sediment management. However, the US is adopting forms of the IMO standards and the exchange requirement for existing vessels will change to a treatment only by 2016. There are an estimated 70,000 cargo ships operating on the seas worldwide. It would cost the shipping industry billions of dollars to install and maintain permanent mixing systems in all ballast tanks on existing ships. Further, ships have varying ballast tank configurations which can complicate a mixing process using traditional methods. This invention overcomes the ballast tank configuration while being a quick and cost effective answer to becoming compliant and combating exotic aquatic species.

Keywords

- nonindigenous aquatic species
- ballast water management
- ballast water treatment

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This technology is protected under U.S. patent application 14/402,131. The U.S. Geological Survey is looking for a partner to further the commercialization of this technology through a license agreement. Interested parties should contact:

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