STUDY ON HEAT UTILIZATION OF MAIN ENGINE EXHAUST GAS FOR WATER BALLAST TREATMENT

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ABSTRACT

This research is aimed to study the possibility of heat utilization of main engine exhaust gas for water ballast treatment on ship. IMO (International Maritime Organization) had issued a regulation governing the content of micro-organisms contained in ballast water. The study was conducted on MT. Plaju tanker having by PT. Pertamina and built by PT. Dok & Perkapalan Surabaya.

The method used is a heat treatment, where the heat from the exhaust gas is used to heat the ballast water. The mechanism of heat exchange using a heat exchanger by continuously circulation process until the desired output temperature would be obtained.

From the analysis, Heat exchanger have been designed is tube bank type with crossflow flow characteristics, the horizontal position, type of tube is lowfin. The arrangement of tube is staggered and the number of tube is 609. The dimensions of the initial heat exchanger that has been planned according to available space on the ship are 0.9 m x 1 m x 0.65 m. The pump power needed for ballast water treatment is equal to 845.9 watts. The time needed for processing is 12 hours. Heat exchangers have been able to raise the expected temperature of 25°C to - 80 °C. From these results the micro-organisms contained in ballast water including bacteria, phytoplankton, zooplankton will die. It can be concluded that the potential for flue gas heat can be used in ballast water treatment processes.

Key Word : Exhaust Gas, Heat Exchanger, Microorganism, Water Ballast Treatment.