

Paper-JT- 046: Estimation of Exhaust Ship Emission from Marine Traffic In the Straits of Singapore and Batam Waterways Using Automatic Identification System (AIS) Data

Hendra Saputra^{a*}, Jaswar Koto^b, Mufti Fathonah Muvariz^a, Sapto Wiratno Satoto^a, Vivien Diawani^a

^aDepartment of Mechanical Engineering, Politeknik Negeri Batam, Parkway Street Batam Center, Batam, Kepulauan Riau 29461, Indonesia

^bDepartment of Marine Technology, Faculty of Mechanical Engineering, Universiti Teknologi Malaysia

*Corresponding author: hendrasaputra@polibatam.ac.id

ABSTRACT

This study focuses on the Strait of Singapore and Batam Waterways area because it is one of the world's most congested straits used for international shipping. The study aims to estimate exhaust gas emission and the concentration of emission to several areas around the strait. This is accomplished by evaluating the density of shipping lanes in the strait by using the data which obtained by Automatic Identification System (AIS). MEET methodology is used to estimate emissions from ships. The results show 1268 total number of ships through the strait on September 27, 2014 at 06.00 am-08.00 am produces total exhaust emission for NO_x, CO, CO₂, VOC, PM and SO_x are about 7406.43 g/second (13,52%), 19776.38 g/second (36,10%), 7891.50 g/second (14.40%), 4621.51 g/second (8.44%), 295.93 g/second (0.54%), 14796.57 g/second (27.01%), respectively. The ships under the Singapore flag contribute approximately 40.73% of total emissions in the Strait of Malacca followed by Panama, Indonesia and Malaysia 21.41%, 5.65%, 3.11%, respectively. Ships under Malaysia and Indonesia rank of third and fifth respectively of the total emission rates.

Keywords: exhaust ship emissions, Automatic Identification System (AIS), MEET methodology, straits of Singapore, Batam Waterways