



The influence of the types of marine fuel over the Energy Efficiency Operational Index

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One of the main concerns of our society is certainly the environment protection. The international efforts for maintaining the environment clean are various and this paper refers to the efforts in the maritime transport field. Marine pollution consists of the water pollution and also the air pollution. Regardless of the delay in recognizing the later type of pollution, it rapidly gains many organizations to argue on it. The first step was including a dedicated annex (Annex VI) in the International Convention for the Prevention of Pollution from Ships, in 1997, which seeks to minimize the airborne emissions from ships. In order to control and minimize the air pollution, the International Maritime Organization has also developed a series of measures for monitoring the emissions. These measures are grouped in three main directions: technical, operational and management related. The subject of our study is the concept of Energy Efficiency Operational Index (EEOI), developed to provide ship-owners with assistance in the process of establishing the emissions from ships in operation, and to suggest the methods for achieving their reduction. As a monitoring tool, EEOI represents the mass of CO₂ emitted per unit of transport work. The actual CO₂ emission from combustion of fuel on board a ship during each voyage is calculated by multiplying total fuel consumption for each type of fuel (e.g. diesel oil, gas oil, light fuel oil, heavy fuel oil, liquefied petroleum gas, liquefied natural gas) with the carbon to CO₂ conversion factor for the fuel in question. The performed transport work is calculated by multiplying mass of cargo (tonnes, number of TEU/cars, or number of passengers) with the distance in nautical miles corresponding to the transport work done. Using the software developed by the author it will be emphasized the variation of the EEOI value for one vessel using different types of fuel for the voyage's legs (distance to discharge port, distance to loading port, the period of time the vessel is idle or in port, days at anchor), according to the Engine Log Book. The main consumers considered are main engine, diesel generators, boiler and inert gas generator, and the types of fuel used will be according to the marine legal requirements for each port of call. The results for the quality parameter EEOI and the average cost of achieving them will be included in compared cost-to-quality graphs, in order to underline the profitability of the studied methods for minimizing the air emissions.