Abstract

Ibramim S Sedek

Enhancing energy efficiency for new generations of containerized shipping

The present paper aims to study the best methods that can be applied to improve energy management onboard container ships of large capacity. Container ships of class A13, A15, and A19 are considered. Those ships are taken as a reference to evaluate the impact of the proposed methods from the viewpoints of environmental and economic aspects. Their calculated energy efficiency values are 3.94, 4.28, and 16.29 gCO2 per ton. Nautical mile, respectively. Ship class A19 appeared as the best ship in terms of emissions rates that can be reduced annually with reference to the transported cargo. These rates are 3.4, 149.9, 13.8, 5677, and 1.8 kg/TEU for SOx, NOx, CO, CO2, and PM emissions, respectively. To enhance energy management for the A13, the ship will be forced to decrees its speed by 45 percent. The proposed concept will fulfill with 2023-year legislations by rate of 5860 $ per each ton CO2 decreased. Alternatively, applying the strategy of LNG fueled engine for container ship class A19 can expand the energy measure about 9.34% at yearly operating reduction by 24.7 million dollars.