Abstract

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Enviromental and economical benefits of changing from marine diesel oil to natural gas fuel for short voyage – high power passenger ships

Although the actual level of marine air pollution is unclear, the contribution of ships to global emissions can be roughly indicated as being in the following ranges: nitrogen oxides (NOx), 10–20 per cent carbon dioxide (CO2), 2–4 per cent sulphur oxides (SOx), 4–8 per cent. Several studies, which aim to minimize and reduce the maritime environmental pollution by the gas emissions from ships, have shown that there are different methods by which this can be achieved. This paper shows that the use of natural gas as the main fuel on board ships is considered to be the optimum Selection for this purpose as regards the environmental and economic issues. A short-voyage ship of high power rating is deemed to be suitable for naturalgas application to obtain the maximum environmental and economic benefits. As a case study, this paper discusses the environmental and the economic benefits of using natural gas as an alternative to diesel oil on board one of the high-speed passenger ships operating in the Red Sea area between Egypt and the Kingdom of Saudi Arabia. The study illustrated that NOx, SOx, particulate matter, and CO2 emissions were reduced by 72 per cent, 91 per cent, 85 per cent, and 10 per cent respectively. In addition, the cost of both fuel consumption and maintenance operation demonstrated reductions by 39 per cent and 40 per cent respectively.