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Editorial

Marine Engines Performance and Emissions

María Isabel Lamas Galdo

Escola Politécnica Superior, Universidade da Coruña, 15001-15011 A Coruna, Spain; isabel.lamas.galdo@udc.es

Marine engines are key components in most ships. Nowadays, diesel engines power most of the ships in the world. These engines are efficient in comparison with other thermal machines, but emit harmful species such as nitrogen oxides, soot, carbon dioxide, sulfur oxides, carbon monoxide, etc. Several international, national, and regional policies have been developed to limit pollutants from engines. In the marine field, the European Commission and the Environmental Protection Agency limit emissions in the European Union and the United States, respectively. On an international level, the International Maritime Organization (IMO) regulates pollution and other aspects. In 1973, the IMO adopted Marpol 73/78, the International Convention for the Prevention of Pollution from Ships, designed to reduce marine pollution. Due to these increasingly restrictive regulations, several pollution reduction methods have been developed in recent years. In recent years, many primary and secondary reduction techniques have been proposed and employed in marine engines. Some methods directly improve combustion such as exhaust gas recirculation, water addition, modification of the injection process, etc. Other methods are based on exhaust gas after treatments, such as selective catalytic reduction systems. Nevertheless, the increasingly restrictive legislation makes it very difficult to continue developing efficient reduction procedures at competitive prices, and alternative fuels become another possible solution.

The performance of marine engines is vital for the efficiency, environment, and safety. Besides, it is very important to reduce emissions as well as dependency on fossil fuels. Current engines require specific knowledge to reduce, as soon as possible, consumption and emissions. Innovative solutions are being increasingly developed in the recent years. The improvement of both computational and experimental techniques makes it possible to develop new solutions

This Special Issue contains 12 peer-review scientific papers about developments in the research of marine engines performance and emissions. These papers were developed by 39 authors from The Netherlands, Finland, Sweden, Korea, Slovakia, China, Chile, Ukraine, Poland, and Spain. Most papers discuss emissions from marine engines [1–9], and others discuss performance, such as control technology [10], and turbocharger compression [11,12]. Puškár et al. [1] and Sui et al. [2] analyzed alternative fuels. Perez and Reusser [3] optimized the emissions profile using a shaft generator with optimum tracking-based control scheme. Winnes et al. [4] analyzed a scrubber. Kim et al. [5] analyzed the intake and exhaust system. Lamas et al. [6] analyzed NOx reduction using ammonia injection and compared with water injection. Witkowski [7] analyzed several methods to reduce emissions. Lehtoranta et al. [8] analyzed a methane oxidation catalyst for LNG (Liquefied Natural Gas) ships. Lamas et al. [10] analyzed the injection system. Homišin et al. [10] analyzed an electronic constant twist angle control system suitable for torsional vibration tuning of propulsion systems. Shen et al. [11] developed a marine two-stroke diesel engine MVEM (Mean Value Engine Model) with in-cylinder pressure trace predictive capability and a novel compressor model. Finally, Píštěk et al. [12] developed a mistuning identification method of integrated bladed discs of marine engine turbochargers.

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