

Development of hydrogen fuel propulsion plants for ocean-going ships

Our company aims to develop the technology necessary to establish a propulsion system (main propulsion engine, auxiliary engine, hydrogen supply equipment, etc.) to realize ocean-going vessels that use hydrogen fuel as a zero-emission fuel. Together with Mitsui E&S Co., Ltd., we participated in a project “Maritime Industry Aggregation and Coordination Promotion Technology Development Support Project” of the Ministry of Land, Infrastructure, Transport and Tourism (FY2021 to FY2023).

First, as basic research, we visualized hydrogen combustion and injection in a constant-volume chamber and conducted combustion tests using an RCEM (Rapid Compression Expansion Machine) device to understand the hydrogen combustion mechanism. Next, we constructed a single-cylinder test engine and hydrogen supply facility, which were completed in March 2023. We started hydrogen combustion tests from April 2023, and achieved world’s first 96% GHG reduction compared to diesel and high output power equivalent to LNG gas engine for a medium speed engine. We also succeeded in identifying the design, structural requirements, and operating parameters necessary for stable hydrogen combustion.

(Main spec. of single cylinder engine : Cylinder bore dia. 230mm, Output 200kW, Engine speed 900min⁻¹)

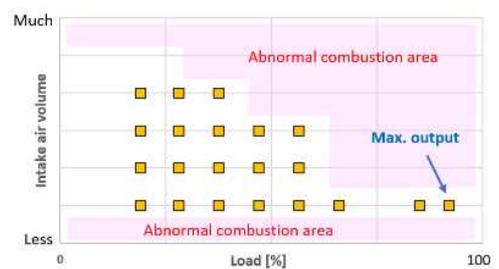
The results were reported to the Ministry of Land, Infrastructure, Transport and Tourism in March 2024, and the series of projects was successfully completed. Going forward, we will continue to conduct research and development toward the practical application of hydrogen fuel engines and work to achieve decarbonization of ships.



Single-cylinder test engine



Hydrogen supply equipment



Test result : Output vs Intake air volume

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