

Alcohol [Spirits] and Ethers as Marine Fuel

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ABOUT THE PROJECT

Alcohol and ethers are interesting fuel alternatives that have not previously been demonstrated in marine engines. SPIRETH tests the use of methanol and di-methyl ether (DME) based fuels in a full-scale pilot project in order to find the best environmental and economic alternative for a sustainable and successful maritime transport industry.

THE OBJECTIVE

The main objective is to test the fuels methanol and di-methyl ether (DME) in marine engines in a full-scale pilot project. Two project test streams were defined as follows:

- DME: Develop a methanol to DME conversion process plant for ship-board operation, and test the plant and the DME fuel mix on board a Ropax vessel with an adapted diesel auxiliary engine.
- Methanol: A full scale marine diesel engine is to be converted to run

efficiently on methanol and tested in a laboratory.

THE RESULTS

Initial project results have shown that it is feasible to convert ships to operate on methanol and DME-based fuels, and these fuels are viable alternatives to reduce emissions. On-board arrangements for methanol storage, distribution, and handling have been designed and installed on the Stena Scanrail, a Ropax vessel operating between Gothenburg and Frederikshavn. An OBATETM (On Board Alcohol to Ether) process unit for dehydrating methanol to a fuel mix of DME, water, and methanol was designed and installed on-board the ship.

A retrofit solution was also developed for conversion of a ship's main diesel engine to methanol operation, for testing in a laboratory. Low emissions, high efficiency, robust solution and cost effective conversion were key factors considered when evaluating the different combustion concepts and design solutions. Diesel combustion

of methanol with pilot fuel ignition was determined to be the preferred combustion retrofit concept.

The risk & safety analysis in SPIRETH has contributed to the development of ship classification society rules for methanol as a ship fuel. The work has also contributed to the International Maritime Organization's draft IGF code (International Code of Safety for Ships using Gases or Other Low-Flashpoint Fuels). SPIRETH has been of key importance in the development of methanol as a marine fuel and in showing that it is a viable alternative, particularly in the Nordic region and the Baltic Sea. Methanol based fuels can contribute to a more environmentally sustainable shipping industry, through lower emissions levels and the potential for fuel production from renewable feedstocks and energy sources.

PROJECT PARTNERS

SSPA (SE), ScandiNAOS (SE), Stena Rederi (SE), Wärtsilä (FI), Haldor Topsoe (DK), Methanex Corporation (CA) and Lloyds Register EMEA (UK).