

Hydrogen as fuel in combustion engines

The course is designed to provide students with know-how and knowledge in the fundamentals of hydrogen as combustion engine fuel, of hydrogen-driven engines and gas turbines, and of the fuel system for hydrogen in marine and on-shore applications.

Course contents

1. Hydrogen as combustion engine fuel
2. Hydrogen-driven engines
3. Fuel system for hydrogen-driven power generation, incl. safety

3. Safety and legislation, and fuel system

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Safety and legislation – Part 1

- Introduction to requirements for improving the safety and health protection of workers
- Classification of hazardous places

Safety and legislation – Part 2

- Introduction to requirements for equipment and protective systems to be used in potentially explosive atmospheres
- Introduction to requirements for handling and storing dangerous chemicals, and Pressure Equipment Directive

Safety and legislation – Part 3

- Greenhouse Gas Strategy of the International Maritime Organisation
- Current maritime legislation related to hydrogen fueled ships (SOLAS, IGF Code)
- Examples of projects on hydrogen fueled ships

Options of hydrogen storage

- Compressed hydrogen
- Liquefied hydrogen
- Metal hydrides
- Liquid organic hydrogen carriers
- Comparison of energy density in various hydrogen storage solutions

Fuel system

- Simplified fuel system for compressed hydrogen
- Simplified fuel system for liquid hydrogen

Safety risks in hydrogen use

- Physicochemical characteristics of hydrogen
- Safety risks in use of liquid hydrogen
- Safety risks in use of gaseous hydrogen