Research Topics

DANIELE MELIDEO, PhD

Hydrogen Storage

Development and validation of 0D and CFD models to optimize fast refueling strategies and thermal management of hydrogen gaseous tanks. Work spans adsorption-based storage to enhance capacity and heat removal, and numerical studies of liquid hydrogen sloshing to quantify loads and boil-off.

Hydrogen mobility

Design and assessment of hydrogen solutions for maritime transport, including retrofit concepts for Ro-Ro vessels and fuel-cell propulsion for inland waterways. Operational logistics are streamlined through swappable H_2 tank-tainers, enabling efficient bunkering while maintaining safety and uptime.

Hydrogen safety

Investigation of hydrogen releases and dispersion in confined spaces using targeted experiments and validated CFD. Results inform risk assessments, ventilation and mitigation strategies, and best practices through contributions to the European Hydrogen Safety Panel.

DESTEC

DESTEC - Department of Energy, System, Territory and Construction Engineering -
University of Pisa

Hydrogen Storage

Hydrogen Storage

1. CFD and 0D model validation
   - Filling strategies
   - CFD simulation of hydrogen tank
   - 0D simulation of refuelling processes
2. Hydrogen adsorption
3. Liquid hydrogen sloshing phenomena

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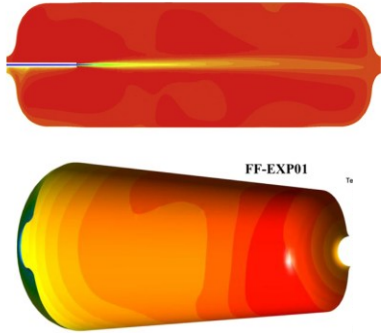

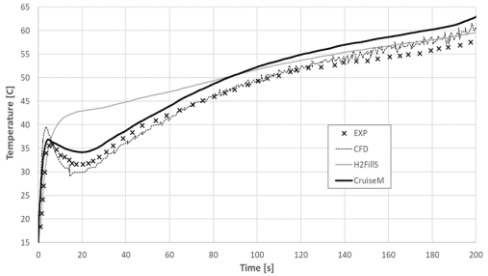

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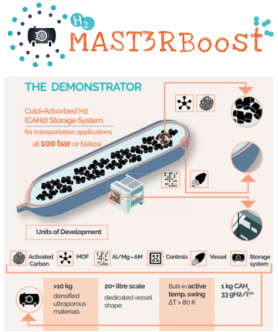

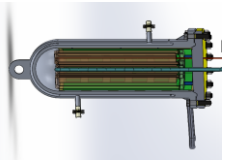

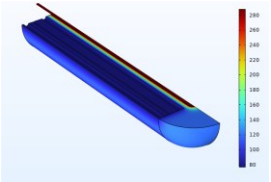

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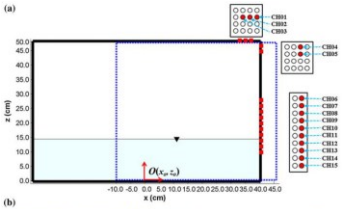

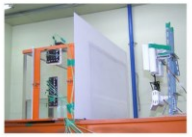

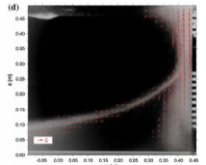

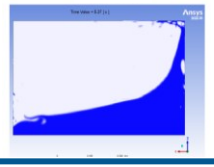

Hydrogen Mobility

Hydrogen Mobility

1. Retrofitting of Ro-Ro vessels
2. Hydrogen fuel cell-powered inland shipping using swappable H2Tank-Tainers

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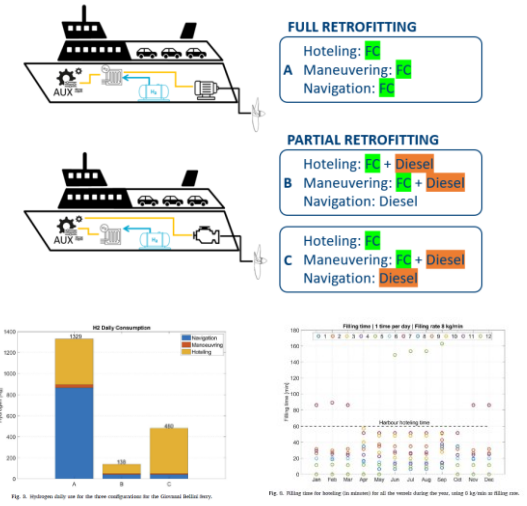

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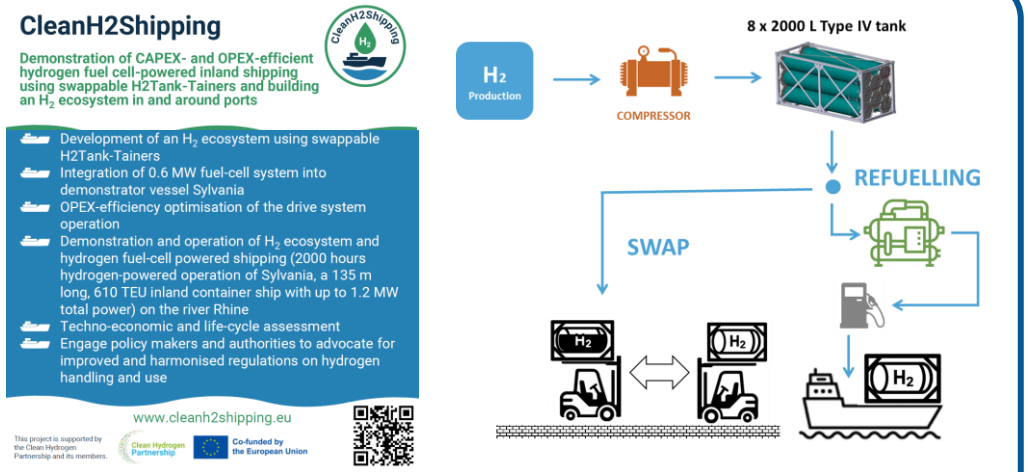

Hydrogen Safety

Hydrogen Safety

1. Release of hydrogen in confined space
2. CFD studies of hydrogen dispersion

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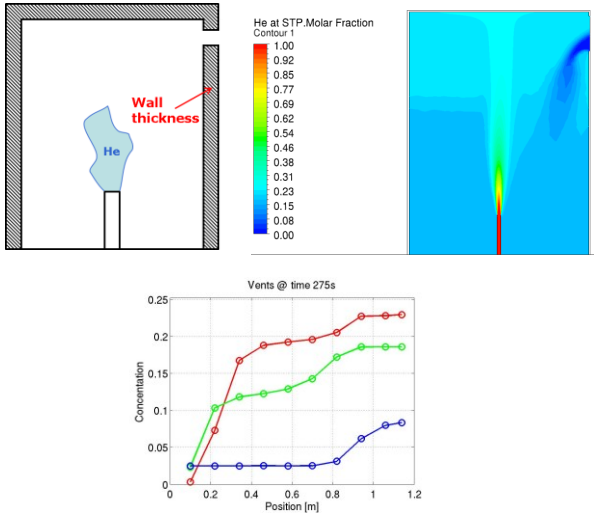

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