

FCSHIP / New-H-Ship –

impact on RCS for fuel cells on ships

Eirik Nyhus / DNV Research

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MANAGING RISK



FCSHIP

Main particulars

- **EU shared-cost RTD project in GROWTH Programme**
- **Intended as a start for marine related EU R&D in FC-Technology**
- **2 years duration (July 2002 - June 2004)**
- **21 partners from 6 countries (NO, NL,D,UK,I, FIN), incl. Class Societies GL, LR, Rina, DNV**
- **Financial scope:
2500 kEuro with 1400 kEuro EU contribution**
- **Originates as a joint effort from previous EU TNs (TRESHIP/MARPOWER)**



FCSHIP

Project objectives

- **Define the end users' demand for the application of FC onboard ships**
- **Evaluate safety and operational demands for ships equipped with FCs**
- **Assess the potentials (economically and environmentally) for maritime use of FC**
- **Provide a "roadmap" for further R&D on FC application on ships**



Safety: Conclusions

- **Safe FC-Systems for ships are possible. No major obstacles have been detected.**
- **International consensus with respect to safety requirements is most important due to internationality of shipping. As a first step the consensus among the participating class societies demonstrate that this international common understanding is possible.**
- **International cooperation of class societies in R&D is important to ensure equal knowledge and international accepted safety requirements**
- **A number of further RTD is needed to solve the problems and to guaranty the necessary level of safety**
- **Experience and R&D is needed for reliability, availability records of FC-Systems.**



Identified gaps and validations needs

- **Experiences from demonstration and pilot projects**
- **Hazard analysis and Risk assessment for different FC system types and applications**
- **Analysis of risks caused by ship/ship collision**
- **Evaluation of fire and explosion risk for the storage and transfer of fuel with low flammability limit including the FC system components**
- **Determination of tightness against leaks of FC system components and assessment of influence for ventilation**
- **Development and validation of requirements for the special ambient conditions of ships (e.g. acceleration, vibration, salt, temperature, humidity) ...**



New-H-Ship - Basic project data

- **Project coordinator/responsible; Icelandic New Energy (INE)**
- **Total resource allocation 34.5 man-months / €545 000.**
- **10 partners from 5 countries (Iceland, NO, NL, D, I), incl. Class Societies GL, DNV**
- **50% funded through EU funding / DG Research**
- **Nominal start date Feb. 1 '04. However, contract signed end of '04.**



Project part-goal – relevant to RCS

“The aim of the work ... is to identify technical, societal and other obstacles (showstoppers) beforehand related to the shipboard system, and propose mitigating activities where necessary.”



Main tasks

- Task 1*** **Compiling and synthesis of information;
Recognition of input from relevant projects.
Lead: DNV.**
- Task 2*** **Identification of project stoppers and mitigating
actions. Proposed further relevant R&D.
Lead: DNV.**
- Task 3** **Identification of supporting European activities,
overview of activities US / Japan.
Lead: INE.**
- Task 4** **Pre-screening of potential partners and critical risk
elements for a real demonstrator
Lead: MTU.**

* Relevant for RCS related activities



Project status wrt. RCS

- **Project in progress, no final results/publications yet**
- **Ship-ship collision analysis work started by GL, with emphasis on risk for hydrogen leakage**
- **Lack of clear international standards and class rules is a significant barrier to FC implementation on ships (for ships; only GL guidelines published 2002 at present, though rule development work is in progress at DNV)**
- **RCS for use of FC fuels other than hydrogen perhaps more critical for rapid ship deployment of FC technology (e.g. methanol, LNG, LPG)**

