

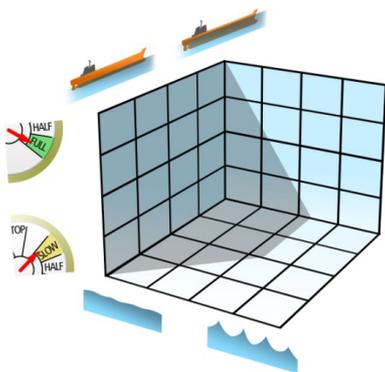
Designing ships for real-life conditions

Design For Sea Joint Industry Project

Background

For many years ships have been operating at only two loading conditions, design condition and ballast condition. Developments in the work economy have changed operational profiles of ships both from a speed point of view as well as larger variations in loading conditions. This makes the traditional practice of designing a ship for maximum speed and loading outdated. Ship designs should be optimised for the operational conditions the ship is expected to encounter.

The holy grail of ship design for service is graphically shown below. A ship design should be optimised for the complete matrix of loading, speed and environmental conditions the ship encounters frequently. A number of steps such as understanding the operational conditions, defining a method for contract evaluation and validation of tools for "off-design" conditions have to be made before this approach will become common practice.

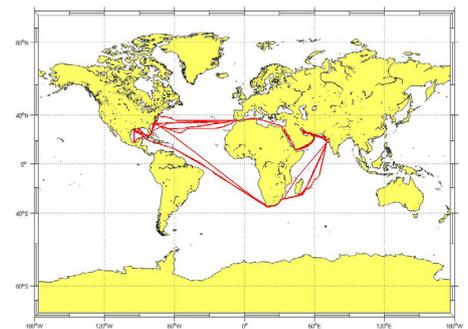


As a first step the Design For Sea JIP will focus on understanding the operational conditions of ships with special attention for the environmental conditions a ship encounters. Common day practice account for the environmental conditions using a Sea Margin of 15%. DeFoS will study operational Sea Margins and develop a method to

more accurately determine the Sea Margin based on operational area and ship main particulars.

Objectives

- Quantify the operational Sea Margin for a number of ship types;
- Simulate ship voyages to determine environmental load and required Sea Margin;
- Develop formulation to calculate Sea Margin in early ship design stage;
- Develop a method to validate EEDI and f_w during sea trials;
- Demonstrate EEDI and f_w validation.



Scope

Based on onboard measurement data from ship owners, the actual operational profile of four ships will be determined. This operational profile consists of information on the use of the vessel (draught, speed and power) and the environment (wind and wave conditions). The same trips for these four ships will be simulated using MARIN's route simulator Gulliver. Gulliver simulations will furthermore be done on an extended set of ship types and routes to create a database of operational Sea Margin for different ship types and routes. Based on this database a calculation method will be developed to determine the Sea Margin of a ship in an early design stage.

In the DeFoS JIP trials will be performed to validate the calculation of both the EEDI and the f_w proposed by IMO. By performing trials in various environmental conditions the weather dependent factor can be validated. The trials will furthermore show a method to validate the EEDI during sea trials.



Deliverables

- Operational profile and Gulliver simulations to determine operational Sea Margin for four ships
- Gulliver simulations of operational Sea Margin for the Sea Margin database
- Calculation method to determine Sea Margin in early design stage
- EEDI and f_w evaluation method and results

Schedule

December 2012:	Signing of participation agreements
November 2013:	Kick-off
December 2013:	Completion

Organisation & information

In order to have technical input and to share results and costs, DeFoS JIP is conducted as a joint industry project. The project meetings will be held as part of the Vessel Operator Forum.



Ship owners, operators as well as designers and ship yards are invited to participate in the DeFoS-JIP. The full proposal is available on request.



For more information on the DeFoS JIP please contact MARIN Trials & Monitoring,
Maarten Flikkema
T +31 317 493 336
E M.Flikkema@marin.nl