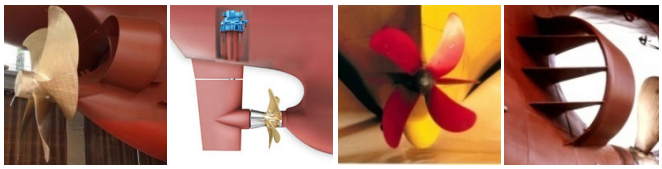
MARIN

Challenging wind and waves

Linking hydrodynamic research to the maritime industry

REFIT 2SAVE JIP



Background

In the present shipping, sustainability requires optimum fuel economy of ships. Not only is the cost of fuel a large share of the operational costs, it also has a direct impact on the bottom line figures. Slow steaming has been widely accepted as a direct way to reduce fuel consumption. At the same time regulations are underway to reduce emissions of ships in operation. One of the measures to improve existing ships is to fit highly efficient propellers and rudders or to equip them with energy saving devices (ESDs) such as nozzles and fins aiming to improve the flow around the aftbody. Such replacements or additions, referred to as "Refit", are normally combined with a docking. Suppliers of such appendages claim fuel efficiency gains of 2 up to 8%. However, such figures are normally weakly supported. As these appendages all work in the boundary layer of the vessel, computational analysis require advanced viscous flow CFD which are often not validated for this type of application. Model tests are also hampered by the viscous effects which lead to unquantified scale effects. Finally, proper full-scale trials are rare since they require an extra docking to distinguish the effects of hull cleaning and refit. Yet, for ship owners and operators a reliable quantification of the potential fuel reduction is essential for a proper business case. At the same time insight into the physical working of the device is also required to optimise the working and effect.

Objective

The REFIT JIP intends to quantify the effect of various commercial available refits on fuel consumption on ships in service.

At the same time the project will provide insight into the physics of these selected refits. The foreseen refits to evaluate include stator fins (container/ferry/roro) and wake equalizing ducts (bulkers and tankers).

Also a specially designed 3-bladed propeller for slow speed steaming will be tested and evaluated. Final selection of devices and ships will be made by the participants companies.

Scope

For selected ships & refits (to be offered by participating owners and suppliers) the effect of the refits on fuel consumption will be determined through dedicated trials. Also the physics of the working will be investigated and explained. For this purpose the following activities are foreseen for each selected ship/refitting:

- Design refit for selected vessel (supplier/yard/owner).
- Speed trial original ship after 1st docking (cleaning) (MARIN/owner).
- Fit the refit in 2nd docking (yard).
- 2nd Speed trial & analysis (MARIN/owner).
- CFD & model testing to investigate the physical working of the refit and to determine reliability and accuracy of predictions (MARIN).
- Design integrated 2/3 bladed propulsion.

Organisation

REFIT will be conducted as a 2-year JIP in close co-operation with owners, operators, yards and refit suppliers. MARIN will act as JIP manager, sign participation agreements with all members and issue subcontracts. All participating companies will be represented in the REFIT JIP Steering Group with meetings during the Vessel Operator Forum (www.vesseloperatorforum.com) hosted by one of the members every 6 months. Presentations, reports and other relevant info will be posted on the confidential project website.

Deliverables

- Fuel consumption reduction per refit.
- Insight into physics of refits.
- Applicability of CFD and model tests.
- Integrated 2/3 bladed propulsion design.

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