SESSION: Innovation and development

MARS Themes:

Innovation

Title:

A Longitudinal Study of the Open-Water Performance of an Ice-Class Vessel

Author(s): add rows below if more authors

B.J. Steyn, A. Bekker

Affiliation: add rows below for more affiliations

Department of Mechanical and Mechatronic Engineering, Stellenbosch University

Abstract:

Periodic ice navigation impacts the performance of a ship. The effects of fouling on ship performance have been extensively researched and have partly motivated standards such as ISO 19030 to be developed to help manage this detrimental phenomenon. However, not much literature or data is available on how ship performance is affected by periodic ice navigation. The propulsive performance of a research and supply vessel operating in the southern hemisphere from a full-scale measurement repository of key voyages spanning ten years to reveal the short- and long-term consequences of ice navigation. To achieve this, a deterministic ship performance model is constructed from standard methods to account for adverse non-reference in-service conditions and isolate performance loss due to hull and propeller degradation. A data conditioning procedure is developed to refine the dataset, and performance indicators are employed to quantify the performance results insightfully. The findings of the performance investigation shed light on key issues, such as the aptness of dry-docking intervals and the effectiveness of hull coatings in resisting fouling and ice abrasion. This study not only quantifies open-water performance before and after ice navigation but also examines performance intermittently during ice navigation, specifically during operations in polynyas, to determine the extent of fouling loss per distance due to ice scouring.

Format:

Oral presentation

Keywords: (add ; between keywords)

Modelling; Performance; SA Agulhas II; Ice; Open water; Biofouling; Anti-fouling Coating damage