

SESSION: Innovation and development**MARS Themes:**

Innovation and development

Title:

Inversion and Extreme Value Analysis of Ice Loading on Propulsion Shaft of the SA Agulhas II

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Abstract:

Probabilistic estimates of ice impact loading on the propulsion systems of vessels designed to operate in polar waters are necessary to assess the adequacy of current design specifications. Over the course of 13 days of operations in sea ice, high frequency inboard shaft line deformation measurements were recorded aboard the SA Agulhas II, and inversion of the dataset performed to determine ice loading on the port-side propeller. The inversion method filters out resonant vibration of the propulsion shaft around its natural frequency and is implemented as a rapid algorithm developed for application to long time series full voyage data as well as real-time monitoring. Extreme value analysis of inferred ice-induced impact loading in active ice navigation was conducted to obtain distribution parameters for 1-second interval ice loading maxima. The resulting annual exceedance probability curves allow the loading specification used in the design of the propulsion systems for the SA Agulhas II to be considered in the context of risk exposure classes.

Format:

Oral presentation

Keywords: (add ; between keywords)

Propulsion system; Health monitoring; Ice impact loading; Extreme value analysis