Cavitation Erosion Risk Assessment on a Full-Scale Propeller Behind a RoRo Container Vessel

Themistoklis Melissaris*, Sören Schenke† and Tom C.J. van Terwisga◊

* Wartsila Netherlands BV,
5151 DM Drunen The Netherlands;
Delft University of Technology,
Delft 6700 AA, The Netherlands
E-mail: themis.melissaris@wartsila.com

† Delft University of Technology,
Delft 6700 AA, The Netherlands
E-mail: S.Schenke@tudelft.nl

◊ Delft University of Technology,
Delft 6700 AA, The Netherlands
Maritime Research Institute Netherlands (MARIN),
Wageningen 6700 AA, The Netherlands
E-mail: t.v.terwisga@marin.nl

ABSTRACT

Cavitation is generally unavoidable and occurs in almost every propeller. Extensive cavitation may cause severe damage on the propeller blades and give an opposite design trend to fuel efficiency. Propeller designers need to find a balance between propeller efficiency and cavitation extent. Nowadays, cavitation erosion is mainly estimated from model tests, thus the cavitation safety margins are quite high. However, it is critical to know the extent where cavitation is not harmful in operation. Therefore, cavitation erosion risk assessment is imperative, already in the design stage, to reduce safety margins and design more efficient propellers close to the limits.

In this study, the cavitation erosion risk is assessed on the propeller blades of the RoRo container vessel NDS Provider. The erosion model used in this study is based on the energy balance approach as has been reported by Leclercq et al (2017) and further improved by Schenke and Terwisga (2019). The method has already been tested successfully for erosion assessment on hydrofoils and model propellers (Melissaris et al (2019)), but it is the first time this method is applied on a ship scale case. The results are validated against measurements and high-speed video observations during the EROCAV project.

REFERENCES

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