Contribution ID: **27**

Type: **Paper**

Numerical CFD Prediction of the Asymmetrical Shaft Unbalance During Ship Maneuvers

Wednesday, 15 June 2022 11:20 (20 minutes)

As it is well known, during ship manoeuvres the propellers experience strong inflow variations. These can be ascribed to two main aspects. The first relates to the ship average speed reduction during the maneuverer itself, particularly evident for high rudder angles (as for turning circles cases). The second reason is the generated ship wakes, which become strongly asymmetrical due to the assumed ship navigation conditions. These modifications of the inflow to the propellers directly generate a variation of the propellers load and, consequently, variations of the requested engine power.
For specific engine layouts typical of twin-screw ships where, for instance, the two shaft lines are mechanical interconnected, the revolution rate of both the propellers are kept equals, generating strong mechanical stresses to one of the shaft lines.
This aspect needs to be accounted for during the preliminary design stages with the aim to improve the overall ship design by selecting the best engine layout or by adopting some control logic of the propulsion system.
The present paper explores the possibility (and the attainable level of accuracy) of predicting the shaft unbalance during strong manoeuvres by employing proper CFD tools in the case of some benchmark ships available in the literature. In particular, the attention is focused not only on the overall performances but also on the hydrodynamic features that causes the propeller load variations and the possible design strategies to reduce or monitor these effects.

Primary authors: VILLA, Diego (Univerisity of Genova); GAGGERO, Stefano (Università di Genova)

Presenter: VILLA, Diego (Univerisity of Genova)

Session Classification: 1B

Track Classification: Stability, Seakeeping, Maneuverability