



Contribution ID: 76

Type: Paper

## Prediction of propeller shaft vibration using potential panel method and FEM

Propeller shaft vibrations can be an issue on many types of ships, specially passenger vessels. The main cause of this problem can be due to unsteady hydrodynamic forces acting on the propeller surface.

The problem is assessed first using a BE model to predict propeller forces and moments on the hub and then using FE model to predict vibration on places of interest, inside the vessel.

The hydrodynamic part uses a potential panel method formulation where (locally) constant source and doublet panels are distributed on the propeller surface to fulfill the no penetration boundary condition. The Kutta condition is fulfilled shedding a force-free wake of doublet panels iteratively, until periodically stable forces on hub are detected. These periodic forces are then used as the input data for a FEM vibratory analysis of the structure. At the end, the vibrations are evaluated on places, where measurements were physically taken during sea trials.

Simulation results are compared with measured data and results are presented and discussed.

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**Track Classification:** Comfort on board