"What Happens in Water" The use of Hydrodynamics to Improve DP

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Abstract

For dynamic positioning the most important factors determining the positioning capability are carried through the water. The thrusters act in water to generate the forces needed to keep on station and the waves and current cause – besides wind - the major forces pushing the vessel off station.

Hydrodynamic research has been carried out to quantify the effectivity of a thruster in model scale operational conditions. It shows that degradation effects may occur due to inflow and cross flow, and due to waves if this causes ventilation effects. Other investigations show that the water accelerated by the thruster may have effect on other hull parts so that the net force generated is less than expected. In the paper examples of such degradation effects will be shown

As excitations, the wave drift forces acting on the vessel may be of significant magnitude. Incorporating a real time estimate of these forces in the DP control system allows improved DP, similar to what has been obtained by wind feed forward. In the paper a method will be described for such real time estimating, and results will be presented of application of wave feed forward on model scale.

The application of the hydrodynamic information is useful for the large deep water DP drilling rigs, ship shape or semi-submersible, extending their operational limits and saving fuel cost.

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