

**Title:** Ice Force Modeling for DP Control Systems

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**Abstract**

In conventional applications of DP systems, the environmental forces acting on the vessel arise from three sources: wind, waves and current. Existing DP technology is based on tried and true techniques of wind force feedforward and stochastic state estimation techniques for the current and waves. How well the system models, and therefore predicts, the forces acting on the vessel, directly influences the station keeping capability.

For a vessel operating in ice-covered waters, the dominant force will most likely arise from ice pushing against the hull. Therefore, the ability of the control system to predict, or estimate, the total ice-induced forces acting on the vessel and to counteract them with the thrusters is of great importance.

In this paper, the authors describe the development of numerical and physical models to characterize the ice loading of dynamically positioned vessels and how this information might improve the station keeping capability. This work is being carried out by the Institute for Ocean Technology (IOT), a research facility operated by the National Research Council of Canada.

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