

Numerical Study for the Estimation of Hydrodynamic Current Drag Coefficients for the Colombian Navy Frigates Using Computational Fluid Dynamics

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Abstract : Computational fluid dynamics (CFD) has become nowadays an important tool in the process of hydrodynamic design of modern ships. CFD is used to model any phenomena related to fluid flow in a control volume like a ship or any offshore structure in the sea. In the present study, the current force drag coefficients for a Colombian Navy Frigate in deep and shallow water are estimated through the application of CFD. The study shows the process of simulating the ship current drag coefficients using the CFD simulations method, which is conducted using STAR-CCM+ software package. The Almirante Padilla class Frigate ship scale model is investigated. The results show the ship current drag coefficient calculated considering a current speed of 1 knot with a 90° drift angle for the full-scale ship. Predicted results were compared against the current drag coefficients published in the Lloyds register OCIMF report. It is shown that the simulation results agree fairly well with the published results and that STAR-CCM+ code can predict current drag coefficients.

Keywords : CFD, current draft coefficient, STAR-CCM+, OCIMF, Bollard pull

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