

Abstract

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Hydrodynamic Performance Characteristics of Open and Ducted DP/DT Thrusters

Existing available systematic propeller tests provide useful data base to help the designer understand the factors which influence propeller performance under various operating conditions. They also provide design diagrams, and/or charts, which will assist in Selecting the most appropriate dimensions of actual propellers to a particular ship applications. Some information pertaining to stationary operation is not explicitly given by these tests. Typical examples of stationary low speed applications includes tug boats, fishing vessels, dynamic/ tracking and heavy lift vessels. This work emphasizes the importance of parameters necessary required to assess the performance of thrusters in the stationary low speed mode using available systematic thruster tests. Open propellers hydrodynamic performance was first examined at low zero advance speeds based on a number of performance criteria. These are the magnitude of both thrust (or Bollard pull) generated and torque consumed, and their derivative with respect to axial flow. In addition to thrust to power ratio thruster effectiveness. These criteria was assessed in relation to thruster geometrical particulars (blade area, pitch, number of blades, ...etc). The above parameters were also assessed for ducted propellers and a comparison was made using the open propellers as basis. Effects of duct particulars were examined and contributions of nozzle to the overall performance were pointed out. Reasons for differences were discussed.