

Marine Propellers and Propulsion

Editor

Alfred Eckstein



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Preface

Marine propellers and propulsion is in fact a complex, multidisciplinary topic with implications for design, construction, operation and research. A propeller is a rotating fan as a structure used to drive the ship using the power generated and transmitted by the ship's primary engine. The transmitted power is converted from rotational motion to generate a thrust that gives the water momentum, leading to a force acting on the ship and pushing it forward. Boats are able to maneuver them in the water with propulsion forces. Although there were initially limited numbers of ship propulsion systems, there are many innovative systems with which a boat can be equipped in the present era. The propulsion of the ship today is not just about good movement of the ship in water also includes the use of the best propulsion method to ensure a much better safety standard for the marine ecosystem and cost efficiency.

This book offers comprehensive and gradual coverage to marine engineers and anyone dealing with propulsion and hydrodynamics with the necessary knowledge to do the job. This book combines a wide range of propulsion technology knowledge, a multidisciplinary and international topic.

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Hydro-Structure Analysis of Composite Marine Propeller under Pressure Hydrodynamic Loading

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ABSTRACT

This paper aims to predict the hydrodynamic characteristics and structural analysis of the marine propeller under pressure hydrodynamic loading. Because of the loading on the propeller blade, it goes under significant deformation that may affect the hydrodynamic performance of the propeller. Thus, the blade deformation of a propeller due to fluid pressure should be analyzed, considering hydro-elastic analysis. The propeller was made of anisotropic composite materials, and the geometry of the propeller is for one skew angle. First, the hydrodynamic pressure loading is obtained by FVM and then the deformation of the blade due to this pressure was calculated. Next, the pressure load for deformed propeller is achieved; it is again repeated to obtain the new deformed propeller. This procedure is repeated to converge the thrust, torque and efficiency. We present all results of the pressure distribution, hydrodynamic characteristics, stress and deformation of the propeller.

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