Behavior of ship changes drastically, when it moves from deep to shallow water. In the recent years much research is going on the ship hydrodynamics for practical navigation problems in getting ships safely into existing harbors. Investigation of ship behavior in restricted water depth may helpful during sea trials in speed reduction criteria where larger depth is not available near the coastline. The proper estimation of ship resistance and squat is influence largely on the power calculation in the design stage. The present work describes the effect of shallow water on the ship resistance at different speed using Computational Fluid Dynamics (CFD) techniques. A comparison in the drag on the hull is illustrated between depth restriction and infinite depth water. This paper provides a wide introduction into the problems of modeling of the restricted water depth effects on the ship behavior, specifically resistance using CFD.

References

- Edward V. Lewis, Editor, Principle of Naval Architecture, Volume II, SNAME.
- T. Jiang (Mercator University, Germany), Investigation of Waves Generated by Ships in Shallow Water.
- Hoyte C. Raven, A computational study of shallow-water effects on ship viscous resistance, Maritime Research Institute Netherlands.
- Anatoly Lyakhovitsky, Shallow water and Supercritical Ships, Backbone Publishing Company, USA.
- J. Holtrop and G. G. J. Mennen, An approximate power prediction method.
- Star CCM+, Tutorial manual, Motion.
- Y. M. Ahmed, Numerical simulation for the free surface flow around a complex ship hull form at different Froude numbers, Alexandria University, Alexandria, Egypt, 2011.

Index Terms
Computer Science
Information Sciences
Keywords

Shallow Water  Depth to Draft ratio  Numerical Grid  Depth Froude Number
Critical Speed
Domain
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Eulerian Multiphase
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Karpov’s Method.