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Numerical Prediction of Symmetric Water Impact Loads on Wedge Shaped Hull Form Using CFD

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ABSTRACT

Over the past two decades high-speed vessels have extended their service areas from protected waters to the open ocean where frequent and large water impacts can result in structural damage. The accurate prediction of slamming loads, and their consequences on light-weight high-speed vessels, is an essential element of efficient structural design. The aim of this work is to understand and accurately predict the behavior and local slam loads of quasi-2D wedge shaped hull forms impacting water. The computed results, using finite-volume Computational Fluid Dynamics (CFD), are validated against drop test experimental data and compared to a previously published numerical simulation using Smoothed Particle Hydrodynamics (SPH). The CFD results show good agreement with the experimental measurements.

Keywords: Computational Fluid Dynamics; Slamming; Drop Test