Abstract Submitted
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On the Effect of Structural Response on the Hydrodynamic Loading of a Free-Falling Wedge[1] CHRISTINE IKEDA, Virginia Polytechnic Institute and State University, BRANDON TARAVELLA, University of New Orleans, CAROLYN JUDGE, United States Naval Academy — High-speed planing craft are subjected to repeated slamming events in waves that can be very extreme depending on the wave topography, impact angle of the ship, forward speed of the ship, encounter angle, and height out of the water. The current work examines this fluid-structure interaction problem through the use of wedge drop experiments and a theoretical prediction. The experimental program consisted of two 20° deadrise angle wedges dropped from a range of heights, $0.15 \leq H \leq 0.6$ m, while pressures and accelerations of the slam were measured. The first wedge had a rigid bottom, and the second wedge had a flexible bottom. Both experiments are compared with a non-linear boundary value flat cylinder theory in order to determine the effects of flexibility on the hydrodynamic pressure. The code assumes a rigid structure, therefore, the results between the code and the first experiment are in good agreement. The second experiment shows pressure magnitudes that are lower than the predictions due to the energy required to deform the structure.

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