

Abstract Submitted
for the DFD15 Meeting of
The American Physical Society

Structural Affects on the Slamming Pressures of High-Speed Planing Craft¹ CHRISTINE IKEDA, 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 CFD code. In the first set of experiments, a rigid 20-degree deadrise angle wedge was dropped from a range of heights ($0 \leq H \leq 0.6$ m) and while pressures and accelerations of the slam even were measured. The second set of experiments involved a flexible-bottom 15-degree deadrise angle wedge that was dropped from from the same range of heights. In these second experiments, the pressures, accelerations, and strain field were measured. Both experiments are compared with a non-linear boundary value flat cylinder theory code in order to compare the pressure loading. 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.

¹Funding from University of New Orleans Office of Research and Sponsored Programs and the Office of Naval Research

Christine Ikeda
University of New Orleans

Date submitted: 28 Jul 2015

Electronic form version 1.4