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IN THE SCHOOL OF OCEAN AND EARTH SCIENCE AND TECHNOLOGY AT THE UNIVERSITY OF HAWAI'I AT MĀNOA

The Evolution of Large-Amplitude Gravity Waves in Deep Water - A Second Look

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MSB 114

Monday, December 9

3:50-4:30 pm Seminar

Abstract

The standard approach to the determination of the performance of offshore platforms in severe seaways consists of an analysis procedure that uses a model of the hydrodynamic properties of the platform together with a model of the several seaways of varying intensity. The focus of this research is to investigate the consequences of the choice of seaway model in this process. In particular, the statistical properties of two different seaways are explored: the standard model using a set of superimposed Airy waves, and a sophisticated nonlinear seaway model using Green-Naghdi (GN) theory. It is found that the statistical properties of extrema of the wave elevation time history and the associated wave particle velocities at the free surface predicted by the standard model are quite different from those predicted by the GN theory. Since important design considerations, particularly the slamming impacts of deck superstructures in severe seaways, depend on these two properties, this research calls into question the appropriateness of the standard wave model.

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