ORE SEMINAR

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OCEAN AND RESOURCES ENGINEERING

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

A wave-flume study of scour at a pile breakwater: solitary waves

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3:30 - 4:30 pm Seminar

Abstract

Understanding the sediment transport and the resulting scour around coastal structures such as piles under local extreme conditions is important for the stability of foundations of various coastal structures. As a part of combined experimental and multi-phase numerical study of scour around coastal pile structures, this study reports a wave-flume experiment investigating the scour at a pile breakwater, which consists of a row of closely spaced piles. Solitary waves were considered in this study. A simple procedure in the experiment was introduced to eliminate possible multiple reflection of a solitary wave inside the flume. An underwater laser scanner and a point probe were used in combination to provide high resolution data for the bed profiles around the pile breakwater under the effect of multiple solitary waves. Effects of incident wave height and local water depth on the maximum scour depth, maximum sand dune height, maximum length of scour hole and the total scoured sediment volume were examined. An empirical method was proposed for understanding the equilibrium scour depth at the pile breakwater under the effect of multiple solitary waves. The results from this experiment provides good source for validation of multiphase hydrodynamic and sediment transport models under transient flow.

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