The effects of seafloor roughness on nearshore wave transformation and breaking

by

Ty Dempsey
Department of Ocean and Resources Engineering
University of Hawaii at Manoa

Wednesday, April 28, 2004 3:30 PM Holmes 211

The effects of seafloor roughness on wave transformation and breaking are considered. The presence of roughness along the seafloor has dissipative effects on nearshore gravity waves which lead to change in wave energy and breaking dynamics. Roughness dissipation is seen through viscous skin drag, turbulent eddy dissipation, porosity, permeability, and saltating sediment. Through recent research, there has been successful parameterization of the scale and behavior of roughness for certain situations, such as moveable bed ripples and uniform sediment over a smooth bottom. However once the roughness becomes more complex, the parameterization and knowledge of the behavior of roughness is not well understood. While many coastal locations have sediment bottoms in which roughness has minimal effects on wave dissipation and can be successfully modeled, it seems that other locations (particularly tropical reef shelves) may have significant dissipation in which accurate modeling would be necessary. The parabolic, mild-slope equation, combined refractive and diffractive model REF/DIF 1 will be used to show the magnitude of various types of roughness over a shoaling wave and its breaking properties.

Wave friction and sea bed roughness

by

Vasco Nunes
Department of Ocean and Resources Engineering
University of Hawaii at Manoa

Wednesday, April 28, 2004 3:30 PM Holmes 211

The purpose of this research is to measure and quantify the sea bed roughness of a coral reef in a delimited area in the Kewalo basin area in the island of Oahu. Such observations will be performed via a high resolution sea bed survey calibrated by point specific physical observations. The survey will make use of an altimeter, an ADCP, a GPS, small boat, a laptop and the ability to perform quick and efficient diver-based observations of the sea bed. By using such tools and using statistical analysis as well as some water wave mechanics it is expected to quantify the sea bed roughness using existing formulas as well as investigate new relationships. It is also hoped to relate a wave friction factor or/and an energy dissipation factor to the study area.