

Abstract Submitted
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The Effects of Surfactants on Breaking Wind- and Mechanically Generated Waves¹ X. LIU, J.D. DIORIO, J.H. DUNCAN, University of Maryland, G.M. KORENOWSKI, Rensselaer Polytechnic Institute — The effects of surfactants on breaking waves that are generated by both wind and a mechanical wave maker are studied experimentally. The waves are generated in a tank that is 11.8 m long, 1.1 m wide and 1.8 m high (1.0 m of water, wind speeds up to 10 m/s). The wave maker, which resides at the upwind end of the tank, can be used alone or to superimpose a wavetrain with frequencies of up to 3 Hz on a wind wave system. Wave profiles along the center plane of the tank are measured with an LIF technique that utilizes a high-speed digital movie camera. An anamorphic lens system is used to expand the vertical resolution of the images in order to more precisely measure the small scale features of the free surface. The measurement system is mounted on an instrument carriage that can be set to move along the tank with the speed of the breaking crests. Measurements are performed with water mixed with various concentrations of Triton X-100, a soluble surfactant. Surface dynamic properties are characterized with a Langmuir trough combined with a Wilhelmy plate and longitudinal wave device. Surface concentrations of surfactants are measured with a second harmonic generation technique. The effect of the surfactant on the frequency of occurrence of small-scale breaking events is studied and correlated with the measured surface dynamic properties.

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James Duncan
University of Maryland

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