Abstract Submitted
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An Experimental Study of Spilling Breakers in the Presence of Wind and Surfactants[1] X. LIU, D. WANG, J. H. DUNCAN, University of Maryland — Spilling breaking waves in the presence of light-wind and surfactants are studied experimentally in a wind-wave tank. The breaking waves are mechanically generated with a single wave maker motion that produces a weak spilling breaker in clean water without wind. The crest-profiles of the waves along the center plane of the tank are measured with a cinematic laser-induced fluorescence (LIF) technique. It is found that with a wind speed lower than 2.3 m/s, the wave breaking is initiated with the formation of a bulge-capillary-wave pattern on the forward face of the wave crest. This pattern is dominated by surface tension and is qualitatively similar to the pattern found without wind and surfactants, Duncan et al. (1999). The slope of the back face of the wave crest decreases rapidly with increasing wind speed and the geometrical parameters describing the bulge are found to be linearly proportional to the surface wind drift speed. The physics of the effect of surfactants on these parameters is explained by a longitudinal wave theory.

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J. H. Duncan
University of Maryland

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