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A Parametric Investigation of Breaking Bow Waves using a 2D+T Wave Maker[1] E.A. MAXEINER, M. SHAKERI, J.H. DUNCAN, Department of Mechanical Engineering, University of Maryland — An experimental study of bow waves generated by a 2D+T (Two Dimensions plus Time) wave maker in a tank that is 14.8 m long, 1.2 m wide and 2.2 m deep is presented. Rather than simulating a specific ship hull, here we use a parametric set of wave maker motions with each parameter simulating a common feature of a ship hull form. Three categories of wave maker motions are used: "slap" (rotation of the wave board (held flat) about the keel), "fixed" (translation the wave board while it is upper part remains flat and at a fixed angle relative to horizontal), and "full" (simultaneous rotation and translation). The wave maker motions are run over a range of speeds and, in the "fixed" cases, over a range of angles. The temporal histories of the wave profiles were measured using a cinematic LIF technique. The relationship between various geometrical features of the waves and the wave maker motion parameters is explored. Each category of wave maker motions produces waves that develop and break in markedly different ways, thus highlighting the complex nature of bow waves. The wave crest speeds vary between 2 and 2.5 times the maximum speed of the wave maker and, for a given class of wave maker motion, vary with wave maker speed.

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