Abstract Submitted
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Measurement of the Bubbles Entrained in a Translating Axisymmetric Plunging Laminar Jet[1] M. TAVAKOLINEJAD, M. SHAKERI, P. CHANG, J.H. DUNCAN, Department of Mechanical Engineering, University of Maryland — Air entrainment induced by a translating axisymmetric laminar vertical water jet as it impinges onto the free surface of a quiescent pool of water is studied experimentally. The experiments are performed in a towing tank that is 24 ft long, 2.5 ft wide and 3 ft deep. When the jet is stationary, the water surface around the jet impact site is smooth and no air is entrained. When the jet is moving horizontally, a depression of the free surface forms directly downstream of the jet. Air is entrained from the cusp formed at the bottom of the leading edge of the depression. Previously presented high-speed flow visualization movies of the entrainment process have show that the bubbles enter the water when vortices from the jet shear layer pass over the cusp and that these bubbles are initially trapped within the vortices. Further downstream, two regions of bubbles are formed. Close behind the jet and near the free surface there is a region of large irregular shaped bubbles with relatively high rise velocity. Deeper in the water and extending further downstream there is a region of small diameter bubbles with lower rise velocity. The results of shadowgraph measurements of the size distributions of the small bubbles in fresh and salt water are presented. In the presence of salt water, a larger number of small diameter bubbles is found.

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