

Abstract Submitted
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Unsteady cavitation dynamics over a pitching NACA0015 hydrofoil¹ ANUBHAV BHATT, HARISH GANESH, S. L. CECCIO, University of Michigan — Cavitation due to flow unsteadiness is a significant source of unwanted noise and erosion in hydrodynamic applications. Quantifying underlying cavity structure and unsteadiness can help determine the erosive potential and ‘aggressiveness’ of the cavity to make suitable hydrodynamic design changes. This study focuses on the cavitation dynamics over a NACA0015 hydrofoil (165mm chord) subject to pitching motion at different cavitation numbers (1.3 to 3.5), using time-resolved X-ray densitometry and high-speed cinematography. In addition, synchronized unsteady surface pressure and cavity static pressure measurements are also performed. The dynamics of the cavity collapse as the foil pitches between pre-set angles of attack (10 to 0deg and 7 to 0deg) is studied at different angular accelerations. The effect of this pitching motion on cavity evolution and collapse mechanisms (re-entrant jet induced and bubbly shockwave driven) is reported.

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