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Effect of Mean Angle of Attack Modulation on Dynamic Stall KYLE HEINTZ, THOMAS CORKE[1], University of Notre Dame — Wind tunnel experiments at $M = 0.2$ were conducted on a cambered airfoil instrumented with surface pressure transducers that was oscillated with two independent frequencies. The primary input, f_1, corresponds to a range of reduced frequencies, while the slower, secondary input, f_2, drives the modulation of the mean angle of attack, thus varying the stall-penetration angle, α_{pen}. Various combinations transitioned different regimes of dynamic stall from "light" to "deep". Results suggest that when α_{pen} is falling between consecutive cycles, the aerodynamic loads do not fully recover to the values seen when α_{pen} is rising, even though the airfoil recedes to $\alpha_{pen} < 0$ during each oscillation. The experimental data is presented in terms of load coefficients, aerodynamic damping, and their phase relationships to pitch angle.

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