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Effect of Trailing Edge Shape on the Unsteady Aerodynamics of Reverse Flow Dynamic Stall ANDREW LIND, ANYA JONES, University of Maryland — This work considers dynamic stall in reverse flow, where flow travels over an oscillating airfoil from the geometric trailing edge towards the leading edge. An airfoil with a sharp geometric trailing edge causes early formation of a primary dynamic stall vortex since the sharp edge acts as the aerodynamic leading edge in reverse flow. The present work experimentally examines the potential merits of using an airfoil with a blunt geometric trailing edge to delay flow separation and dynamic stall vortex formation while undergoing oscillations in reverse flow. Time-resolved and phase-averaged flow fields and pressure distributions are compared for airfoils with different trailing edge shapes. Specifically, the evolution of unsteady flow features such as primary, secondary, and trailing edge vortices is examined. The influence of these flow features on the unsteady pressure distributions and integrated unsteady airloads provide insight on the torsional loading of rotor blades as they oscillate in reverse flow. The airfoil with a blunt trailing edge delays reverse flow dynamic stall, but this leads to greater downward-acting lift and pitching moment. These results are fundamental to alleviating vibrations of high-speed helicopters, where much of the rotor operates in reverse flow

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