

Abstract Submitted
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The convective behavior of a dynamic stall vortex at low Reynolds number JOHN HRYNUK, US Army Research Lab - Aberdeen — Dynamic stall is a fundamental flow phenomenon that is commonly observed in biological flight and rotorcraft. Under certain conditions a leading edge vortex forms generating large but temporary lift forces. A common assumption for the convective behavior of the dynamic stall vortex (DSV) is that it convects downstream after forming and diffuses while convecting away. However, experiments on a NACA 0012 full span wing at Reynolds number of 12,000 showed the dynamic stall vortex undergoing a behavior that did not resemble diffusion as it convected downstream. Instead, the DSV was observed to compress in a specific region downstream of the wing. A comparison between the DSV behavior and convection of bluff body shedding, which occurred after the DSV was no longer present will be shown. A better understanding of this vortex breakdown method for the dynamic stall vortex at low Reynolds number may help improve vortex methods and CFD for studying dynamic stall.

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