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Experimental Study of Wake Instabilities of a Blunt Trailing Edge Profiled Body at Intermediate Reynolds Numbers[1] ARASH NAGHIB-LAHOUTI, PHILIPPE LAVOIE, University of Toronto, HORIA HANGAN, University of Western Ontario — The periodic shedding of von Kármán vortices is the primary instability in the wake of nominally 2D bluff bodies, beyond a critical Reynolds number around 45-49. When Reynolds number passes a second threshold, which can be as high as 700 depending on profile geometry, secondary instabilities emerge and accompany the von Kármán vortices. For most bluff bodies, these instabilities appear as pairs of counter-rotating streamwise vortices, and spanwise undulations of the von Kármán vortices. The mechanism and scale of these instabilities depend on the bluff body geometry and Reynolds number. The focus of the present study is to identify and characterize the dominant secondary instability in the wake of a blunt trailing edge profiled body at intermediate Reynolds numbers between 8,000 and 20,000 based on the body thickness. The experiments, which include PIV and hot-wire measurements in the wake, complement previous studies involving the same bluff body at higher and lower Reynolds numbers, and make it possible to determine the scale and mechanism of the secondary instability at intermediate Reynolds numbers.

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