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Near Wake Flow Topology of a Blunt Trailing Edge Profiled Flat Plate LAKSHMANA SAMPAT DODDIPATLA, ARASH NAGHIB LAHOUTI, PhD Candidate, The University of Western Ontario, HORIA HANGAN, Professor, The University of Western Ontario, KAMRAN SIDDIQUI, Associate Professor, The University of Western Ontario — Wake flows behind two dimensional bodies are unstable due to formation of spanwise von Karman vortices accompanied by three dimensional streamwise instabilities, also referred to as rolls and ribs, respectively. These three dimensional instabilities lead to two distinct instability modes (Mode A and Mode B), or a combination of the two, depending on the flow Reynolds number and the profile geometry. It has been observed that the ribs wrap around the rolls, progressively distorting them. Therefore, enhancing the action of streamwise vortices can lead to early suppression of the spanwise von Karman vortices accompanied by the reduction of fluctuating lift and base drag. The present investigation seeks to better understand these near wake instabilities for blunt trailing edge profiled bodies of various aspect ratios, for flow Reynolds numbers ranging from Re(d)=500 to Re(d)=2200, and various inlet conditions. Planar Laser Induced Fluorescence (PLIF) visualizations and measurements are performed in the near wake to study and characterize the topology of streamwise and spanwise vortices.

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