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Experimental Investigation of Tip Vortex Control Using a Half-Delta Shaped Tip Strake JENNIFER PEREIRA, McGill University — Due to their undesirable lift-induced drag effects, the control of tip vortices remains a challenge for the aviation industry. Naturally, most types of control devices involve tip vortex alleviation and thus focus on altering the flow at the wingtip. One such device is a half-delta shaped strake that when added to the wingtip could not only reduce induced drag by improving end effects but also increase lift through the delta wing LEV lift. To investigate and better understand this concept a rectangular planform NACA0012 wing was fitted with a 65° sweep half-delta shaped tip strake and force measurements were obtained at a chord Reynolds number of 2.7×10^5. This data was complimented with seven-hole probe flowfield measurements over the tip and in the near field. Results were compared to the rectangular planform wing (baseline wing), a sharp 65° sweep half-delta and full delta wing for direct comparison and to better understand the flow physics involved. The effect of both streamwise location, angle of attack and strake setting were examined. It was found that the strake acts much like a delta wing albeit with a strengthened LEV that prematurely breaks down. The broken down LEV then results in a tip vortex which is much more diffused than its baseline counterpart. In order to quantify this effect, the Maskell model was used to calculate the induced drag of both the baseline wing and the strake at various angles of attack and strake settings.

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