

Abstract Submitted
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Passive pitching of splitters in the trailing edge of elliptic cylinders LIU HONG, YAQING JIN, HAOTIAN QIU, LEONARDO P. CHAMORRO, University of Illinois at Urbana Champaign — The pitching of hinged splitters in the trailing edge of elliptic cylinders was experimentally studied at various angle of attack AoA of the cylinder, Reynolds numbers, splitter length, aspect ratio AR of the cylinder and freestream turbulence levels. High-resolution telemetry and hotwire anemometry were used to characterize and gain insight on the dynamics of splitters and wake flow. Results show that the motions of the splitters contain various dominating modes, f_p and f_v , which are induced by the mean flow and wake dynamics. High turbulence dampens the coherence of the regular vortex shedding leading to negligible f_v . For sufficiently long splitter, namely twice of the semi-major axis of the cylinder, dual vortex shedding mode exists close to the leading and trailing edges of the splitter. In general, the splitters oscillate around an equilibrium position nearly parallel to the mean direction of the flow; however, a skewed equilibrium is also possible with a strong recirculation region of low AR and high AoA. Flow measurements indicate that although the splitter pitching exhibits two dominant vortex shedding modes in various configurations, only the higher frequency is transmitted to the wake.

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