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Interaction between leading and trailing edge vortex shedding: effects of bluff body geometry ZACHARY TAYLOR, GREGORY KOPP, UWO, ROI GURKA, BGU — Elongated bluff bodies are distinguished from shorter bluff bodies (e.g., circular cylinders) by the fact that they have separating-reattaching flow at the leading edge as well as having vortex shedding at the trailing edge. Engineering examples of these bodies include heat exchanger fins and long-span suspension bridges. We have performed experiments on elongated bluff bodies of varying geometry. These experiments have been performed at Reynolds numbers $O(10^4)$ based on the thickness of the model. Both surface pressure measurements (using 512 simultaneously sampled pressure taps) and PIV are used to quantify the flow fields of these bodies. The leading edge separation angle is controlled by changing the leading edge geometry. It is observed that the size of the leading edge separation bubble increases with increasing leading edge separation angle. As the size of the leading edge separation bubble increases, it is shown to continually decrease the shedding frequency for a given elongation ratio. It is suggested that the shedding frequency is diminished because the trailing edge vortex shedding is affected by the structures being shed from the leading edge separation bubble. The implications of this competition between leading and trailing edge flows will be explored.

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