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Empirical parametric study of fluid-structure interaction at high Reynolds number[1] GRANT DOWELL, MICHAEL MCPHAIL, MICHAEL KRANE, CENGIZ CAMCI, Penn State University — An experimental parametric study of a fluid-structure interaction is presented, in order to identify appropriate conditions for in-depth measurements for validation of fully-coupled fluid-structure interaction solvers. The structure is a rigid, square cross-section beam, to which is attached a thin, flexible, rectangular membrane. The rigid beam is mounted perpendicular to the incident flow, and the flexible element is mounted to the rigid element, parallel to the flow direction, so that it interacts with wake of the rigid element. Time-resolved flexible element motion is captured from two directions using high-speed video, for a range of flexible element aspect ratio, stiffness, and Reynolds number based on flow speed and rigid element dimension. Image processing was then used to characterize the frequency and amplitude of flexible element flap and twist modes.

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