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Hysteretic memory and end plate effects on the response of a flexible cylinder undergoing Vortex-Induced Vibrations (VIV) ERSEGUN DENIZ GEDIKLI, JASON M DAHL, Ocean Engineering Department, University of Rhode Island — The response of rigid cylinders undergoing VIV has been observed to be hysteretic with respect to the nominal reduced velocity, as transition of the wake is delayed dependent on whether the flow has been slowed down or sped up. In the present study, a similar behavior is observed for a flexible, tension-dominated cylinder, however the hysteretic behavior is shown to affect the transition between excited modes. The test cylinder has diameter of 6.35 mm, aspect ratio of 40 and mass ratio of 3.76. The dynamic response of the cylinder is measured visually, by tracking 26 dots along the span of the cylinder using two high-speed cameras between the Reynolds number of 1080 and 4660. It is observed that a clear memory effect exists, where the speed at which transition between the first mode and second mode excitation in the cross-flow direction changes dependent on whether the flow is increasing or decreasing in speed. A second series of experiments is conducted to investigate end plate effects on the flexible cylinder. Experiments are conducted with and without an end plate located at the end pivot point on the cylinder. Clear differences are observed between each condition illustrating the strong three-dimensional behavior of vortex shedding behind the flexible cylinder.

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