Abstract Submitted
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Vortex-Induced Vibration and Galloping of a Flexible Square Prism.[1] RONALD COLMON, YAHYA MODARRES-SADEGHI, University of Massachusetts Amherst — We have studied flow-induced oscillations of a tension-dominated flexible beam with a square cross-section placed perpendicular to the incoming flow. The prism with an aspect ratio of 32 was fixed at its both ends and placed in the test-section of a recirculating water tunnel. The Reynolds number was varied from 400 to 2400. Tracker points were evenly spread along the length of the prism, on two perpendicular sides, in order to measure the prism's displacements in the crossflow (CF) and inline (IL) directions. Displacements of these points were tracked using two synchronized high speed cameras. It was found that at low reduced velocities the first and then the second structural modes were excited in the CF direction, together with the second and the fourth modes in the inline direction, resulting in vortex-induced vibration with "figure 8" trajectories. At higher reduced velocities, the amplitude of oscillations increased dramatically, and galloping-type oscillations were observed.

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