

Abstract Submitted
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Effect of mass ratio on fluid induced motions of a circular cylinder with strips¹ ASHWIN VINOD, ARINDAM BANERJEE, Lehigh University
— The objective of the current experimental work is to investigate the effects of mass ratio on Fluid Induced Motions, such as vortex induced vibration (VIV) and galloping, of elastically mounted circular cylinders attached with strips to their outer surface. Although the effect of mass ratio on VIV of a smooth circular cylinder is well documented in literature, however, their effects on circular cylinders with strips, capable of inciting galloping oscillations haven't been investigated and could have potential applications in the domain of vibration based energy harvesters. In the current work, three different mass ratios were tested, out of which, one falls below the critical mass in vortex induced vibration of a circular cylinder. The strips used for the experiments included sandpaper strips of prescribed roughness and smooth strips with no roughness, both of which served as surface protrusion based mechanisms of altering the flow around the cylinder. Interesting variations were observed in the amplitude, frequency response and the power spectrum, depending on the mass ratio of the oscillating system tested.

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