Passive control of vortex-induced vibration of a sphere.\textsuperscript{1} ANCHAL SAREEN\textsuperscript{2}, University of Minnesota, JOHN SHERIDAN, KERRY HOURIGAN, MARK THOMPSON, Monash University — Although passive methods for controlling vortex-induced vibrations (VIV) are extensively studied for a circular cylinder, such methods remain unexplored for a basic three-dimensional bluff body, a sphere. In this study, we use a surface trip wire as a passive method to control sphere VIV. The effect of a surface trip is experimentally investigated for varying diameter ($1.25 \times 10^{-2} \leq k/d \leq 6.63 \times 10^{-2}$) and stream wise location ($\phi = 20^\circ - 70^\circ$ from the stagnation point) of the trip wire for a wide range of reduced velocities ($3 \leq U^* \leq 20$). It was found that the vibration amplitude decreases progressively with the increase in the stream wise location angle ($\phi$) of the trip wire. The control was highly effective in mode II and mode III of the VIV response with maximum reduction of up to 97.8\% for $\phi = 60^\circ$. Interestingly, thicker trip wires ($k/d > 1.25 \times 10^{-2}$) were more effective in mode I, but showed a galloping response for higher reduced velocities.

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