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Optical Tracking Measurement on Vortex Induced Vibration of Flexible Riser with Short-Length Buoyance Module DIXIA FAN, Massachusetts Inst of Tech-MIT, HONGLIN DU, Tianjin University, MICHAEL TRIANTAFYLLOU, Massachusetts Inst of Tech-MIT — We address experimentally the vortex induced vibrations (VIV) of long flexible cylinders. We employ optical tracking, using an array of high speed cameras. Compared to strain gauges and accelerometers, this non-intrusive approach, allows direct measurement of the flexible cylinder displacement with far denser spatial distribution. The measurements reveal essential features of flexible cylinder VIV, including complex geometries such as cylinders containing short-length buoyancy modules, with module to cylinder diameter ratio of 1:3.2 and module to bare cylinder length ratio of 1:1. The experiments are conducted with aspect ratio of 170 and 3 different coverage ratios, of 100%, 50% and 20%. The measurements demonstrate bi-frequency response due to excitation from both buoyancy module and bare cylinder, at low Strouhal number, down to values of 0.08, and the generation of traveling wave patterns.

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