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**The Role of the Separation Point in Streamwise VIV of Cylinders of Various Cross-sectional Shapes** STAVROULA BALABANI, NEIL CAGNEY, University College London — Vortex-Induced Vibration (VIV) is a classic fluid-structure interaction problem and can lead to fatigue damage and catastrophic failure of bodies in cross-flow. VIV acting in the streamwise (flow) direction is relatively poorly understood compared to that acting in the transverse (lift) direction, but can have a very significant effect of the overall response of structures with two or more degrees of freedom (DOFs). We present time-resolved PIV measurements of the wake and structural response of cylinders with a range of cross-sectional shapes, including circular, elliptical, triangular and square. The response of a circular cylinder is characterised by two response branches, in agreement with previous studies. However, it is shown that for geometries with fixed separation points, no significant VIV is observed and vortex-shedding does not lock-in to the vibration frequency. This finding suggests that the fluid excitation caused by the interaction between the cylinder displacement and the shear layers is reliant on the ability of the separation point to vary. It also suggests that control of the separation points may be an effective means of restricting VIV of multi-DOF bodies.

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