## Abstract Submitted for the DFD15 Meeting of The American Physical Society

Wake-induced vibrations Tandem Cylinders<sup>1</sup> in RAVI CHAITHANYA MYSA, RAJEEV KUMAR JAIMAN, National University of Singapore — The upstream cylinder is fixed in the tandem cylinders arrangement. The downstream cylinder is placed at a distance of four diameters from the upstream cylinder in the free stream direction and is mounted on a spring. The dynamic response of the downstream cylinder is studied at Reynolds number of 10,000. The transverse displacement amplitude of the downstream cylinder is larger compared to that of single cylinder in the post-lock-in region. The transverse dynamic response of the downstream cylinder in the post-lock-in region is characterized by a dominant low frequency component compared to shed frequency, which is nearer to the structural natural frequency. The interaction of upstream wake with the downstream cylinder is carefully analyzed to understand the introduction of low frequency component in the transverse load along with the shed frequency. We found that the stagnation point moves in proportional to the velocity of the cylinder and is in-phase with the velocity. The low frequency component in the stagnation point movement on the downstream cylinder is sustained by the interaction of upstream wake. The frequencies in the movement of the stagnation point is reflected in the transverse load resulting in large deformation of the cylinder.

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