Abstract Submitted
for the DFD12 Meeting of
The American Physical Society

An experimental study of vortex induced vibrations of inclined flexible cylinders BANAFSHEH SEYED-AGHAZADEH, YAHYA MODARRESSADEGHI, University of Massachusetts — When a flexible cylinder is placed in flow, vortices are shed downstream of the cylinder. If the vortex shedding frequency is close to one of the natural frequencies of the structure, the cylinder undergoes vortex induced vibrations. If the cylinder is placed with an angle with respect to the incoming flow (an inclined flexible cylinder) the flow will have a component normal to the long axis of the cylinder and a component in the axial direction. For small angles of inclination, the influence of the axial flow component can be neglected and the cylinder can be treated as a cylinder placed normal to the flow. In the current research, we investigate the degree to which this assumption is valid experimentally. A flexible cylinder with different values of tension along the cylinder is placed at various angles of inclination in the test section of a recirculating water tunnel. The cylinder is clamped at both ends and the transverse displacement of the cylinder at the first mode of vibration is measured using a non-contacting displacement sensor. These measurements together with the flow visualization results are used to investigate the influence of the axial component on the cylinder response at various angles of inclination.

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Date submitted: 03 Aug 2012 Electronic form version 1.4