Abstract Submitted
for the DFD13 Meeting of
The American Physical Society

Suppression of Vortex Induced Vibrations by Fairings YUE YU, Brown University, HONGMEI YAN, YIANNIS CONSTANTINIDES, OWEN OAKLEY, Chevron Energy Technology Company, GEORGE KARNIADAKIS, Brown University — Fairings are nearly-neutrally buoyant devices, which are fitted along the axis of long circular risers to suppress vortex induced vibrations (VIV) and possibly reduce the drag force. Here we study numerically how VIV can be practically eliminated by using free-to-rotate fairings. Since the mass ratio and rotational inertia are both low for the fairings, direct numerical simulations based on standard flow-structure interaction algorithms fail because of the so-called added mass effect. To resolve this problem we introduce fictitious methods and successfully stabilize the simulations. In particular, we investigate the effect of rotational friction C_f on the stabilization effect of the fairings. We found that there exists a critical value for the rotational friction, and when C_f is close to this value, large oscillations and unsymmetrical trajectories can be observed for the riser but for smaller C_f values VIV are suppressed substantially.

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Date submitted: 02 Aug 2013 Electronic form version 1.4