

Abstract Submitted
for the DFD15 Meeting of
The American Physical Society

The effect of a large upstream bluff body on the flow through and around an array of cylinders CHRISTIAN KLETTNER, University College London — Risers from the sea floor to installations at the sea surface are an integral part of the flow assurance of deep sea oil exploration, which has become necessary in the last decade. These risers are subjected to various hydrodynamic forcing, particularly sea currents, wakes of upstream installation members and surface waves, which can result in vortex or wake induced vibrations and these in turn can result in riser fatigue or collision. The free stream flow past groups of cylinders has been studied numerically in two- and three-dimensions for $Re \sim O(10^3)$ (based on the cylinder diameter) by Nicolle & Eames (2011) (direct numerical simulations) and Chang & Constantinescu (2015) (large eddy simulations) respectively. In this study we will be focusing on the first two aspects listed above, specifically laboratory experiments and high resolution numerical simulations will be performed to investigate the effect of an upstream truss on an array of cylinders. The main diagnostic will be how varying the void fraction of the array of cylinders affects the frequency and magnitude of the drag and lift forces on the cylinders.

Christian Klettner
University College London

Date submitted: 01 Aug 2015

Electronic form version 1.4