FLAIR

Final Year Project 2016

Fluids Laboratory for Aeronautical and Industrial Research (www.flair.monash.edu.au)

Characteristics of flow-induced vibration of bluff bodies

A 12-credit-point Final Year Project for 1-2 students studying Mechanical or Aerospace Engineering

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Background

Flow-induced vibration (FIV) is a critical problem in many fields of engineering. This is particularly so for oil risers and other offshore structures in offshore engineering (see Figure 1), and buildings in civil engineering. In these fields it can lead to undesired impacts on the fatigue life of structures, which can potentially result in structural damage or catastrophic failure. This project seeks to better understand the fundamental characteristics of FIV of bluff bodies.

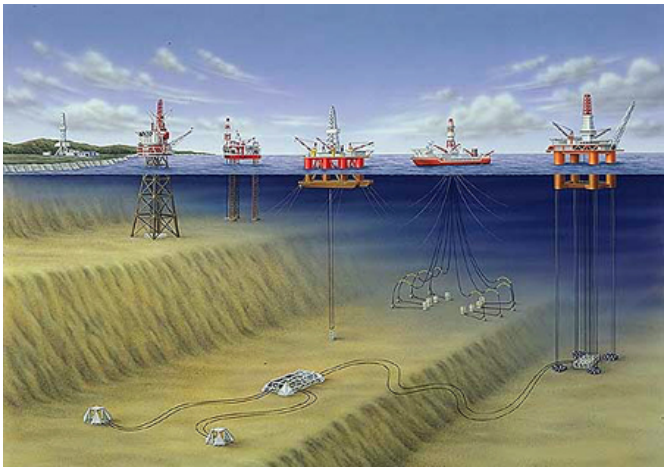

Figure 1: FIV problems in offshore engineering (image taken from www.mms.gov).

Project description

In this experimental project, it is required to design and construct different bluff body models with low mass to adapt to an existing air-bearing rig (shown in Figure 2). The fluid-structure interaction of bluff bodies experiencing flow-induced vibration are characterised by the vibration amplitude, frequency, and also the relative phase between the fluid force and the body movement over a range of fluid speed. The experiments will be conducted in the Water Channel Laboratory of FLAIR (www.flair.monash.edu.au).

Student requirements

This project will suit 1-2 students that have a strong understanding of fluid mechanics, competency with MATLAB, and basics of signal processing. The project will be 12 credit points.

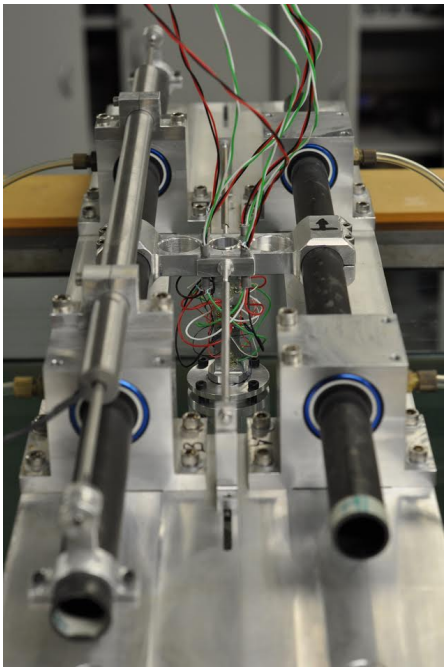

Figure 2: Experimental rig to study FIV of bluff bodies.