Study for the force and flow around multi-column structure

***Bo ZHOU[1], †Xiaoshuang HAN[2], Xikun WANG[2], and Soon Keat TAN[2]**

[1]School of Naval Architecture & Ocean Engineering, Dalian University of Technology, China
[2]Maritime Research Centre, Nanyang Technological University 639798, Singapore

*Presenting author: bozhou@dlut.edu.cn
†Corresponding author: hanxiaoshuangdd@hotmail.com

Abstract

Column-supported structures are commonly used in offshore and marine engineering. Research in the hydrodynamic characteristics of multiple columns (cylinders) is the key to design and construct deep-sea platforms. In this study, the hydrodynamic characteristics of the multi-column structure are to be systematically investigated under the influence of current. The gap ratios of g/D are set as 0.6 and 2, respectively, and the incident angles α ranges from 0 to 30°. The Reynolds numbers are 8,000 and 12,000. The study indicated that several distinct flow patterns exist depending on the spacing ratio and subcritical Reynolds number for turbulent flow. The incident angle α plays an important role for the variation of mean drag and lift coefficients at various pitch ratios.

Keywords: Hydrodynamic characteristics; Deep-sea multi-column structure; Force coefficients