

Abstract Submitted  
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**Flow induced vibrations in arrays of irregularly spaced cylinders<sup>1</sup>**

GORDON TAUB, Univ of Florida - Gainesville, SÉBASTIEN MICHELIN, LadHyX-Département de Mécanique, Ecole Polytechnique - CNRS, 91128 Palaiseau, France — Historically the main industrial applications of cylinder arrays in cross flows favored regular arrangements of cylinders. For this reason, most past studies of Flow Induced Vibrations (FIV) in large cylinder arrays have focused on such arrangements. Recently there has been some interest in generating renewable energy using FIV of bluff bodies. In such applications it will likely be beneficial to enhance, rather than suppress FIV. It is not known a priori if regular or irregularly spaced arrays are most adequate for this type of application. In this study, wind tunnel experiments were conducted on one regularly spaced array and four different irregularly spaced arrays of cylinders in a cross flow. Each arrangement of cylinders was examined under eight different orientations to a cross flow ranging between 10 m/s and 17 m/s. The average amplitude of vibration of the cylinders was found to highly depend on arrangement and orientation. The typical amplitude of vibration of the rods in the irregular arrangements were found to be an order of magnitude larger than that of the regular array. A simple model was proposed in order to predict if a given arrangement was likely to produce large oscillations, and the validity of the model was examined.

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