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[Session L28: Industrial Applications I: Turbines and Engines](#)

3:35 PM–5:19 PM, Monday, November 19, 2012

Room: 32A

Chair: John Cimbala, The Pennsylvania State University

Abstract ID: BAPS.2012.DFD.L28.5

Abstract: L28.00005 : Experimental study of the lift and drag characteristics of a cascade of flat plates in a configuration of interest for tidal energy converters

4:27 PM–4:40 PM

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Authors:

Faical Fedoul
(University of Malaga (Spain))

Luis Parras
(University of Malaga (Spain))

Carlos del Pino
(University of Malaga (Spain))

Ramon Fernandez-Feria
(University of Malaga (Spain))

Wind tunnel experiments are conducted for the flow around both a single flat plate and a cascade of three parallel flat plates at different angles of incidence to compare their lift and drag coefficients in a range of Reynolds number about 10^5 , and for two values of the aspect ratio of the flat plates. The selected cascade configuration is of interest for a particular type of tidal energy converter. The lift and drag characteristics of the central plate in the cascade are compared to those of the isolated plate, finding that there exist an angle of incidence, which depends on the Reynolds number and the aspect ratio, above which the effective lift of the plate in the cascade becomes larger than that of an isolated plate. These experimental results, which are also analyzed in the light of theoretical predictions, are used as a guide for the design of the optimum configuration of the cascade which extracts the maximum power from a tidal current for a given value of the Reynolds number.

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