

Abstract Submitted  
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**Upstream blockage effect on the thrust force of a marine hydrokinetic device** GIULIO SOLIANI, MARIA LAURA BENINATI, Bucknell University, MICHAEL KRANE, ARNOLD FONTAINE, Penn State University — The study evaluates the interaction of two model marine devices axially arranged one in front of the other, in a tandem configuration. Particular focus is given to the change that occurs in the thrust of the downstream marine hydrokinetic (MHK) device when the spatial arrangement of the two elements is varied. At critical spacing there is no thrust generation. The study is motivated by the need to predict the thrust behavior of MHK devices and determine the minimum separation distance to avoid the no thrust condition. The downstream element is a two-bladed, horizontal axis turbine, while the upstream blockage is a perforated disk with similar geometric properties intended to approximate the wake of the MHK device. Testing is conducted in the flume facility at Bucknell University. Experiments are performed for a fixed range of spacing between the perforated disk and the turbine. For each separation distance, the span-wise velocity profile upstream and downstream of the turbine is measured, as well as the device's rotational speed. The turbine's thrust coefficient is calculated. Plots of the thrust coefficient as a function of spacing depict the minimum separation distance to avoid the no thrust condition.

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