ALFA OWC ARRAY NUMERICAL AND PHYSICAL MODEL TESTING

BRET BOSMA[1], TED BREKKEN, PEDRO LOMONACO, BRYONY DUPONT, CHRIS SHARP, AND BELINDA BATTEN

[1]*Bret Bosma, Oregon State University, 3550 SW Jefferson Way, bret.bosma@oregonstate.edu*

If wave energy technology is to mature to commercial success, array optimization could play a key role in that process. This poster will outline physical and numerical modeling of an array of five oscillating water column wave energy converters. Numerical model simulations are compared with experimental tank test data for a non-optimal and optimal array layout. Results show a max increase of 12% in average power for regular waves, and 7% for irregular waves between the non-optimized and optimized layouts. The numerical model matches well under many conditions; however, improvement in the numerical model is needed to accommodate for phase shifts. This poster outlines the process of numerical and physical array testing, providing methodology and results helpful for researchers and developers working with wave energy converter arrays.

In this poster, modeling techniques will be outlined and compared to preliminary results from the test data. The information presented here is part of a larger project on Advanced Laboratory and Field Arrays (ALFA), funded by the U.S. Department of Energy. Content will build upon a paper presented at EWTEC in 2017 [1] where a single device was modeled, tested, and characterized. Array placement decisions were based on research in genetic algorithms where initial results were also presented at EWTEC in 2017 [2]. Preparation of a paper based on this work to be presented at EWTEC 2019 is underway.

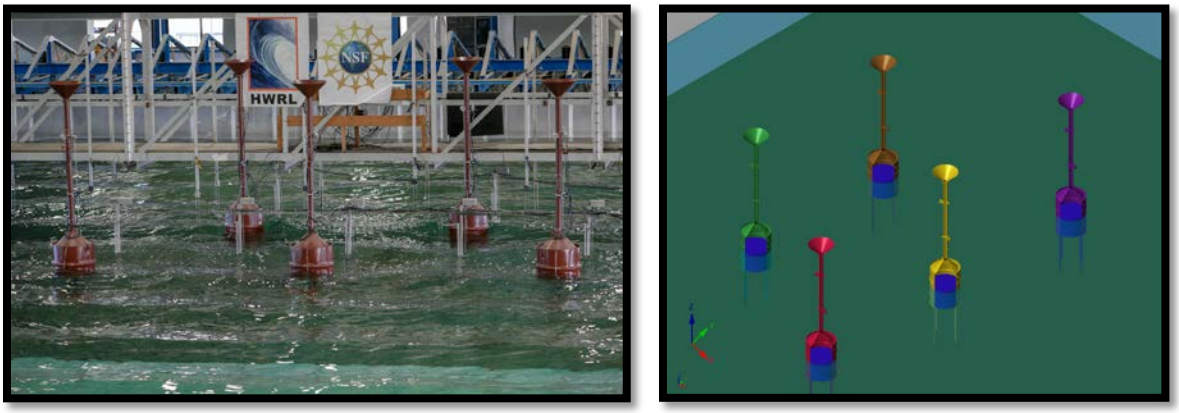

FIGURE 1. PHYSICAL AND NUMERICAL MODEL TESTS.

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REFERENCES

[1] B. Bosma, T. Brekken, P. Lomonaco, A. McKee, B. Paasch, and B. Batten, "Physical Model Testing and System Identification of a Cylindrical OWC Device," in *12th European Wave and Tidal Energy Conference [accepted]*, 2017.

[2] C. Sharp, B. DuPont, B. Bosma, P. Lomonaco, and B. Batten, "Array Optimization of Fixed Oscillating Water Columns for Active Device Control," in *Proceedings of the Twelfth European Wave and Tidal Energy Conference*, University College Cork, Ireland, 2017, pp. 1016\hyphen 1–1016\hyphen 10.