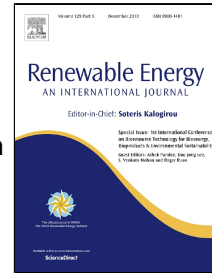


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Enhancement of Hydrodynamic Performance of An Oscillating Water Column With Harbour Walls

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1 ENHANCEMENT OF HYDRODYNAMIC PERFORMANCE OF AN 2 OSCILLATING WATER COLUMN WITH HARBOUR WALLS

3 Daniel Raj. D⁽¹⁾, Sundar. V⁽²⁾ and Sannasiraj. S.A⁽³⁾

4 *Abstract*

5 *A comprehensive experimental investigation on the effect of resonant length and the*
6 *opening angle of harbour walls integrated with an Oscillating Water Column (OWC) under*
7 *random sea state has been carried out. The random sea state is entitled to be the reference*
8 *parameter for analysing the performance of the OWC under controlled conditions. The*
9 *results on the variations of volume flux of water inside the OWC chamber, pneumatic*
10 *pressure and relative capture width are depicted as a function of relative water depth for*
11 *different configurations of the harbour walls in a dimensionless form. The presence of the*
12 *harbour walls has enhanced the performance characteristics of the OWC. Further, the length*
13 *and inclination of the harbour walls were varied to achieve a relative capture width, RCW*
14 *(ratio of output power to the input power) of 75% more than that from the OWC without*
15 *harbour walls. The details of the models, experimental set-up, testing procedure, results and*
16 *discussion on the aforementioned study are presented.*

17 **Keywords:** *Wave energy; Oscillating Water Column; Physical model; Harbour walls;*
18 *Relative Capture Width.*

19 **1. Introduction**

20 A changeover from the fossil fuel-based power generation to renewable energy technologies
21 is overbearing to alleviate the effect of global warming and meet the power requirement of
22 the fast emergent world population. Regardless of the enormous energy potential of ocean
23 waves, utilization of wave power on a commercial scale still seems difficult. Quite a few
24 innovative technologies have been proposed over the past few decades among which the
25 Oscillating Water Column is one of the major and widely recognized devices. This partially

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