Large-scale laboratory measurements of wave run-up over a rubble-mound breakwater

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Most laboratory experiments of wave run-up on coastal structures have been conducted using small-scale models of such structures. Consequently, there have always been uncertainties regarding the possible scale effects when results from small-scale models are employed in prototype situations. In view of this, the primary objective of the present study is to carry out laboratory measurements of wave run-up over a comparatively large-scale model of the type of rubble-mound breakwaters employed in the many small-craft fishery harbours in Sri Lanka.

The experiments were carried out in a two-dimensional, regular wave flume of length 40 m, width 2 m and depth 2.13 m over a rubble-mound breakwater constructed to a scale of about 1:15 with respect to typical prototype conditions in Sri Lanka.

At the outset, a series of run-up measurements made over a smooth slope for a range of the breaker parameter (ζ_0) to examine the reliability of the present experimental set-up showed good agreement with previous work.

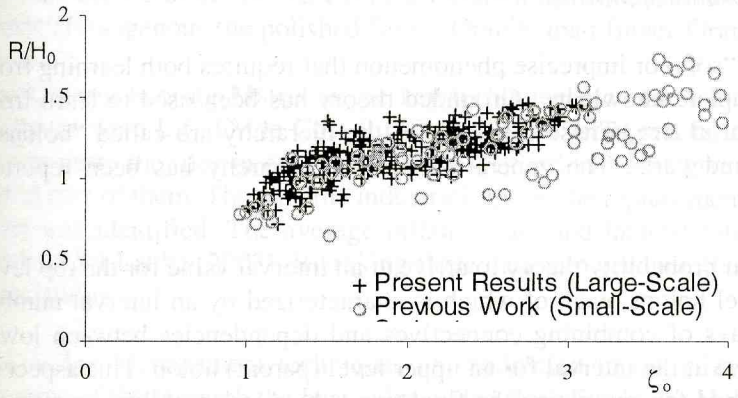

Fig.1. Comparison of present measurements of wave run-up over a large-scale rubble-mound breakwater with small-scale results.

We now examine in Fig. 1 the measured values of wave run-up over the rubble-mound breakwater model. The results show large scatter, however, it is clear that the relative run-up (R/H_0, where, R is the run-up and H_0 is the deep-water wave height) increases steadily with ζ_0 for $1 < \zeta_0 < 3$. We also see that the present large-scale measurements do not show any significant deviation from the small-scale measurements (scale ~ 1:60), reported in the literature.