

Investigating the Performance of Caisson Seawalls against Waves-Induced Force

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Abstract

The aim of present study is to estimate the wave-induced force acting on a vertical rigid, a semi-porous and a porous caisson-type seawalls using physical modeling. For this purpose, random sea waves in wide range of wave heights and periods, with variety of water depth were considered for the experimental test. Comparison of the measured values of maximum wave forces (F_{max}) for three walls revealed that the wave-induced forces acting on the semi-porous and porous seawalls were more than the impermeable plane seawall. These increments were calculated as about 28% and 46%, respectively. The semi-porous and porous seawalls showed better performance in wave energy dissipation and in wave reflection decreases in comparison with the rigid impermeable seawall. In addition, it was found that the F_{max} increased with the increase of the wave steepness (H_s/L_p) and the decrease of the relative water depth (d/L_p). Based on the lab measurements and multiple regression analysis, new empirical equations have been proposed to predict the maximum wave force acting on each of the above mentioned seawalls.

Keywords: *Wave force, Caisson seawall, Physical modelling, Random waves.*
