

Abstract

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Numerical study for small negative freeboard wave overtopping and overflow of sloping sea wall

an extended version of the model of Lin and Liu (1998) is applied to study the cases of small negative freeboard wave overtopping and overflow of seawalls. The model computes a finite difference solution to the incompressible Reynolds equations for the mean flow field and the equations for the turbulent field are obtained on a non-uniform mesh. The free surface locations are presented by the volume of fluid (VOF) data on the mesh. The extended model includes the capability of simulating flows in porous media (Liu et al., 1999), which use the resultant spatially averaged equations to describe the mean motion of flow, and also uses an internal source function to generate waves. The model performance is being compared against laboratory models and other numerical models, (see Soliman et al. (2003)). The model reproduces the results of the well-known weir equation very well and is then used to investigate combined discharge due to overflow and wave overtopping of impermeable seawalls for increasing wave activity for a range of negative level freeboard values. Results for irregular wave attack are presented together with suggested extensions of design formulae.