Abstract

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Prediction of the Suspended Sediment Crossed and at the Lee of an Artificial Submerged Reefs using Numerical Model

Climate change is bringing considerable pressures on coastal countries. Income from coastal tourism is reliant on healthy beaches and reliable flood defense infrastructure. However, to replace existing defences with traditional defences would require large capital expenditure and recompense to landowners near the seafront. For example, the Alexandria government spent more than GBP 50 million to construct a new breakwater to protect 2.0 km length of its sandy beaches from flooding. The constructed breakwater consists of natural stones and concrete blocks (Soliman and Reeve, 2009). Construction of submerged reefs offshore, to induce breaking in the larger storms waves, can be used as an alternative. This would provide a cost-effective alternative. The comparison between the environmental impacts of conventional shore protection structures and artificial reefs shows that the artificial reef is more “user-friendly.” The artificial reef has the advantages of its construction lower costs and needs less heavy equipments in comparison with the conventional shore protection structures. In this paper, information about the response characteristics of the coastal environment due to Artificial Submerged Reef (A.S.R) will be illustrated. A numerical model which is able to predict the suspended load sediment crossed and at the lee of the A.S.R will be presented and discussed. Validation and Verification of the numerical has been obtained and presented. The paper will also include model results analysis and discussions. The main conclusions of this study are that the A.S.R can be classified according to their designing function into two main functions: ? Sand trapping sediment structures. ? Beach protection structures.