

Abstract

Effects of Cross Shore Profiles on the Sustainable Design of Coastal Structures

The performance of the existing coastal structures at different locations along Alexandria coastline, Egypt was re-examined. These coastal structures have been constructed (1998-2002) on Alexandria coastline during the phase of widening the coastal road. The constructions of these coastal structures, although protected the coastal road but didn't maintain the sandy beaches. El-Sharnouby & Soliman (2011) studied the behaviour of these structures during a storm. This paper investigates the benefits of complementing the existing structures by adding limited modification. Three areas of different profiles & types of coastal protective works along Alexandria shoreline were selected to investigate their performance. The first area "Shatby" has a narrow sandy beach that is protected by a vertical seawall of 3-5 m above sea water level. The second area "Sporting" was protected by a revetment of 20-30 m width with 10 ton concrete cubic blocks. In the third area "Loran", revetment protected the shoreline against further erosion with beach profile completely covered by blocks. Reeve et al. (2008) used a two dimensional Reynolds-Averaged Navier-Stokes (RANS) numerical model to obtain wave run-up & overtopping characteristics. This model was based on the work of Liu et al. (1999) & Lin & Xu, (2006). A proposed artificial offshore submerged breakwater was introduced to determine its impact on wave runup. Beach profile data were collected by Coastal Research Institute monitoring program for the Alexandria coastal area. Profiles' surveying were carried out from a constructed land baseline to a water depth of 10.0 m below the M.W.L. The wave characteristics used at the three surveyed profiles are: significant wave height $H_s = 1.00$ m, dominant wave period = 6.0 sec with wave direction from N to NW.