

Abstract

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Shoreline response to submerged breakwater: Case study of Alexandria city, Egypt

Submerged coastal structures are widely perceived to be capable of providing beach protection, without the adverse impacts (including loss of beach amenity and aesthetic considerations) often associated with more conventional structures such as revetments and groins. However, as submerged structures have only recently been adopted for beach protection, the shoreline response to these structures is not well understood at present. This paper presents the shoreline changes due to the construction of submerged breakwater. A case study of submerged breakwater was constructed at Alexandria coastal area to stabilize the eroded beach. The breakwater system consists of one main parallel part and two overlapping parts approximately 150 to 300 meters offshore. Total length of the breakwaters is 2555 meters with water depth ranges from 2.5 to 8.5 meter. Width of the breakwater crest ranges from 36 to 46 meters with crest level 0.5 meter less than the low sea water level. The construction of the breakwater was started in April 2006 and completed in July 2008. A monitoring plan for the shoreline has been applied. A bathymetry surveying has been done in years 2006, 2008, 2009 and 2010. These data are presented and analyzed in this paper to introduce the shoreline response due to the construction of the submerged breakwater. The analysis of the collected data shows that the beach width varied from 30 to 100 meter compared to 0.0 to 20 meter before installation with stable sediment leeward of the breakwater under storm conditions.