



Determination of Optimum Cross-section for Oran Highway Revetment

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Revetments are shore parallel, sloping coastal structures which are built to provide protection from the negative effects of the sea. The revetment mentioned in this study is located in the City of Oran, Algeria and is currently under construction. This study investigates the determination of the optimum revetment cross section for Oran highway, considering both the hydraulic stability of the revetment and economy. The existence of cliffs in the region and the settlement of the City of Oran created a necessity to re-align Oran highway; therefore, it was shifted towards the Gulf of Oran. Approximately 1 km of the highway is to be constructed on the Mediterranean Sea due to the new alignment. In order to protect the sea side of the road from the adverse effects of the sea, a revetment was designed. The proposed cross section had an armour layer composed of 23 tons of antifer units and regular placement of armour units was recommended. In order to check the hydraulic stability of the proposed section, physical model tests were performed in the laboratory of LEM (Laboratoire d'Etudes Maritimes) in Algeria, using the pre-determined design wave conditions. The physical model tests revealed that the trunk of the revetment was totally damaged. Accordingly, the proposed section was found insufficient and certain modifications were required. The first modification was made in the arrangement of armour units, changing them from regular to irregular. After testing the new cross section, it was observed that the revetment was vulnerable to breaking wave attack due to the toe geometry and thus the toe of the revetment had to be re-shaped. Therefore, the second option was to reduce the toe elevation. It was observed that even though the revetment trunk was safe, the damage in the toe was not in acceptable limits. The new cross section was found insufficient and as the final option, the weight of the antifer units used in the armour layer was increased, the toe length of the structure was increased and the size of the armour units in the toe was decreased. After the modifications, the new section was tested physically and it was selected as the most optimum option.

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