

## Geosynthetic Tubes in Coastal Structures a Better Substitute for Shorter Planning Horizon: A Case Study

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**Abstract :** Coastal engineering structure is conventionally designed for a shorter planning horizon usually 20 years. These structures are subjected to different offshore climatic externalities like waves, tides, tsunamis etc. during the design life period. The probability of occurrence of these different offshore climatic externalities varies. The impact frequently caused by these externalities on the structures is of concern because it has a significant bearing on the capital /operating cost of the project. There can also be repeated short time occurrence of these externalities in the assumed planning horizon which can cause heavy damage to the conventional coastal structure which are mainly made of rock. A replacement of the damaged portion to prevent complete collapse is time consuming and expensive when dealing with hard rock structures. But if coastal structures are made of Geo-synthetic containment systems such replacement is quickly possible in the time period between two successive occurrences. In order to have a better knowledge and to enhance the predictive capacity of these occurrences, this study estimates risk of encounter within the design life period of various externalities based on the concept of exponential distribution. This gives an idea of the frequency of occurrences which in turn gives an indication of whether replacement is necessary and if so at what time interval such replacements have to be effected. To validate this theoretical finding, a pilot project has been taken up in the field so that the impact of the externalities can be studied both for a hard rock and a Geosynthetic tube structure. The paper brings out the salient feature of a case study which pertains to a project in which Geosynthetic tubes have been used for reformation of a seawall adjacent to a conventional rock structure in Alappuzha coast, Kerala, India. The effectiveness of the Geosystem in combatting the impact of the short-term externalities has been brought out.

**Keywords :** climatic externalities, exponential distribution, geosystems, planning horizon

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