

Soft techniques for coastal protection in Greece - GR

1. Policy Objective & Theme

- ADAPTATION TO RISK: Managing impacts of climate change and safeguarding resilience of coasts/coastal systems

2. Key Approaches

- Technical

3. Experiences that can be exchanged

The application of two 'soft' shore protection methods (i.e. beach nourishment and submerged breakwaters) will help the users in the functional design of these techniques.

4. Overview of the case

Design and implementation of detached submerged breakwaters and beach nourishment for the protection of a Greek coast (Paralia Katerinis).

5. Context and Objectives

a) Context

The most acute environmental problem of Greek coastal areas is increasing beach erosion. The main reasons for the increasing beach erosion of the islands of the Greek Archipelago are: (1) sea level rise and the other climatic changes (extreme events and changes in the annual frequency of the winds), (2) the reduction of sediment supply from the hinterland of the islands due to the construction of dams and water reservoirs and (3) construction of ports and harbours. The above reasons, and especially the third one, results in a significant erosion (e.g. in the order of 30 m in Paralia Katerinis beach in Thermaikos Gulf, northern Greece).

b) Objectives

Beach nourishment and construction of submerged breakwaters in Greece is almost an unknown procedure. Only a few beach nourishment cases in Greece have been reported while only 'hard' coastal structures are used for shore protection. The objectives of recent studies are to design and apply environmental friendly methods to tackle the severe problem of beach erosion in coastal areas. Also the case will be an example to help Greek coastal engineers in the functional design of such structures.

6. Implementation of the ICZM Approach (i.e. management, tools, resources)

a) Management

A specialist team (senior coastal engineers and university staff members) has been established to study the beach erosion problem and to design appropriate protection schemes. The prefecture of Pieria and the Greek Ministry of Infrastructures finances and supervises the implementation of the work, i.e. construction of the breakwaters and beach nourishment.

b) ICZM Tools

Advanced numerical models, developed by the research coastal engineering team have been used to study the erosion problem and to design the 'soft' shore protection methods. By using the numerical models the simulation of waves, wave-induced currents and sediment transport processes has been obtained. Firstly the models applied to understand the causes of erosion by simulating the existing conditions. The main cause of erosion was the construction of a fishing harbour.

Then, different cases have been applied, concerning the number of the breakwaters, the length of the breakwaters, the distance from the shoreline, the transmission coefficient, the free-board. The above applications led to the adoption of the final optimum solution. Experience gained in EU projects SAFE and DELOS were also used for the functional design.

7. Cost and resources

The study was funded by the Municipality of Paralia Katerinis (costing ca. €120.000). The construction works are funded by the Greek Ministry of Infrastructures (costing ca. €3.000.000).

8. Effectiveness (i.e. were the foreseen goals/objectives of the work reached?)

The study and its implementation offer a new advanced and environmental-friendly approach to coastal protection in Greece.

9. Success and Fail factors

The project is under construction.

10. Unforeseen outcomes

The main problem, raised during implementation was the source of the significant amount of sand to be used for beach nourishment.

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13. Sources

- 'Confrontal of Paralia Katerinis beach erosion' 2004. Research project of Aristotle University of Thessaloniki, funded by Municipality of Paralia Katerinis.