
ABSTRACT**APPLICATION OF EQUILIBRIUM BAY CONCEPT
TO BEACHES BETWEEN DETACHED BREAKWATERS**

Autor: Gustau Solé Díaz
Tutor: José A. Jiménez Quintana

Beaches between detached breakwaters, also called pocket-beaches, are a usual method to restore regressive coasts. There are several pocket-beaches in the Mediterranean coast of Spain, and the shoreline response is often different from what was expected.

Design of pocket beaches has been always based in the use of natural equilibrium bay methods. This paper wants to be able to find a specific method for designing beaches between detached breakwaters, with the purpose of increase the quality in the prediction of the shape of Mediterranean pocket-beaches in the future.

Several methods for describing natural equilibrium bays shape have been studied. Three methods have been selected, because their good adaptation to the specific characteristics of pocket-beaches. They are the logarithmic method from Silvester, the parabolic method from Hsu-Evans, and finally, a method based in circumferences developed by Silvester, specific for pocket-beaches with small gap.

To evaluate the quality of the methods, some pocket-beaches of the Catalan coast have been studied. They are three groups of beaches located in the villages of Sant Antoni de Calonge, Cunit and Cambrils.

Before the application of the methods, an analysis of wave data has been necessary with the purpose of finding the mean incident wave direction on each beach.

Some parameters has been developed to give a physical view of the quality of the methods. The most representative parameter is the average of deviation between the real shoreline and the estimated shoreline.

The application of the methods to the whole beaches concludes that pocket-beaches shoreline shape can be approximated with accuracy by a double parabola. This paper gives a correlation between the parabola coefficients and the obliquity of incident wave, in the way to minimize the error between the real shoreline and the estimated shoreline in the analysed beaches.

On the other hand, some empirical relationships have been studied. This relationships involve characteristic parameters of the shoreline shape of pocket-beaches. This paper develops an empirical relationship for estimating the volume of sediment necessary to reach the minimum wide of the beach desired.

Finally, an actuation protocol of pocket-beaches design is given and an example of application is developed.