

Evaluation of New Alternative Method for Beach Nourishment

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ABSTRACT

Beach fills do not alter the erosive conditions that lead to the need for nourishment. As a result, the nourishment of beaches becomes a continuous and expensive cycle. Despite the economic importance of this problem, there is no clear agreement or guideline for the best nourishment strategy. In the other hand, beach nourishment plan related to cross-shore sediment transport and sand particle size. The investigation of cross-shore sediment transport is complex due to the variability of factors contributing to sediment motion. The knowledge of cross-shore sediment transport is important to be able to predict shoreline change. In this study two laboratory experiments were conducted with the goal of finding more effective nourishment strategy. Also, sorting effect of sand of mixed grain size was investigated numerically and experimentally (Dibajnia, 1996).

KEY WORDS: Nourishment; beach profile; cross-shore; sediment transport; hydraulic model test.

INTRODUCTION

Sandy beaches, providing spectacular landscape, recreational resources such as sea bathing and living space, have been our indispensable assets. The sandy beach conducts a significant role of a natural protector while preserving the natural environment and having an effective wave dissipating function. Moreover, it has not only provided a habitat of marine life but also played a role of sea water purification. However, nowadays due to beach erosion caused by several reasons, the sandy beach is being faced of the capacity loss. A significant and urgent emphasis is given to take long-term and defensive measures in order to sustain the eroding sandy beaches (Kim, 2002).

In general, the establishment of coastal structures has been developed into one of the most widely-used methods of coastal protection. Furthermore, the installation of such coastal structures demands immense influx of construction cost and discourages the view of the coastal landscape.

However, sometimes the local scour is happened around structures and

also the secondary beach erosion caused by the establishment of coastal structures as countermeasures. It is noted that in order to cope with such a great number of problems, beach nourishment, a technique used to restore an eroding beach naturally without the establishment of any coastal structures, became another effective tool of coastal protection measure for beach erosion.

Beach nourishment is an optimum technique used to restore an eroding or lost beach or to create a new sandy shoreline by supplementing sand from other areas. However, due to the fact that beach nourishment is the nourishment performance only with sand, it requires periodic sand fill or renourishment as a countermeasure of the possible secondary erosion. As a result, a considerable amount of maintenance is being imposed. On top of that, in terms of the sand grain size, beach nourishment is practiced using larger-sized grain compared to the existing one on the beach. A serious attention should be paid that this might give users an unpleasant feeling. Therefore, this study has attempted to give insight to the optimum beach nourishment strategy by suggesting newly created beach profile through a two-dimensional hydraulic model test.

INTRODUCTION TO THE PROBLEMS OF EXISTING BEACH NOURISHMENT AND NEW BEACH PROFILE

As noted, beach nourishment technique, due to the fact that the sandy beach is renourished only with sand, causes a concern of second erosion by waves after the initial beach-fill. This not only requires periodic beach-fills, but eventually aggravates the total cost of beach nourishment performance and maintenance.

When the beach nourishment practice is conducted, somewhat bigger-sized sand grain is generally used rather than grain having the same size with existing one on the beach. However, when adopting the larger sized sand grain, a great caution is required because this can give the users an unpleasant feeling.

By taking all the circumstances into the consideration, the study presents the following beach profile: as shown in Fig. 1, and Fig. 2, larger sand grain is used in the foreshore while the same-sized grains