Monitoring of the Post-Construction Coastal Management in Namae Beach

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ABSTRACT

Most shoreline protection efforts need maintenance program to continue to perform effectively. To ensure that the performance of coastal protections will fulfill all agreed function, they have to be designed, constructed and maintained well (Pilarczyk and Zeidler, 1996). These could be achieved by implementing a monitoring program for the structure and the nearby beaches coupled with wave and other environmental measurements (Dean and Dalrymple, 2002). This monitoring effort is performed by conducting field investigation in Namae Beach and supported by numerical simulation and 3D Hydraulic Model Test. The monitoring process must be actively pursued after the implementation of coastal management plan at Namae Beach.

KEY WORDS: management; monitoring; evaluation; field investigation; numerical simulation; wave-induced current.

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.

In general, the establishment of coastal structures has been developed into one of the most widely-used methods of coastal protection. Various approaches exist for shoreline stabilization that can be broadly classified as structural and non-structural. Verified non-structural approaches are limited to beach nourishment. This method has the advantage that it deals with the sand deficit directly by the addition of new sand into the beach which under wave action spreads out to the adjacent beaches.

Structural approaches encompass many possibilities, including revetments, seawalls, breakwaters and artificial reefs. Hydraulic and coastal structures are one of the means to solve a water management or a coastal problem. Coastal erosion is one of the most frequent coastal problems. Of course, it is possible and desirable to combine structural approaches with beach nourishment such that the additional sand retained in the area of interest is the sand placed in conjunction with the structural project rather than sand trapped and prevented from its natural pathway to the adjacent beaches.

A comprehensive approach has been proposed to deal with beach erosion problems in Korea. This approach consists of coastal protection and management efforts, both with structural and non-structural approaches. Namae Beach, located on the east coast of Korea, has lost one of its crucial key functions as a sandy beach due to recent significant beach erosion. Furthermore, the buildings behind the shoreline have been immensely damaged by induced high waves.

To ensure that the performance of coastal defense works will fulfill all agreed function with satisfactory reliability and without excessive damage and associated maintenance, monitoring program consisting of periodic surveys at the structure and the nearby beaches coupled with wave and other environmental measurements should be implemented. Regular review based on monitoring result and performance investigation is necessary to assess if goals are being achieved or not.

The objectives of this study are to establish a shoreline monitoring system for post-construction project in Namae Beach, South Korea, to be included in the long-term shoreline protection as one part of a baseline data set, and also to collect information on shoreline changes and identify unpredicted conditions which might weaken the stability or safety of a coastal structure. Another objective is to prevent the need for massive reconstruction of shoreline protection through proper maintenance.