

## Research Trends and Results

# Protect the sand dune (regarded as a natural dike) using the “Sand pack” -Beach scarp recession preventive works-

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### 1. What is the “Sand pack”?

“Sand pack” is a large GeoTextile bag filled with beach material collected on site or shared with the beach nourishment. Although it is applied in foreign countries, problem has been whether it is applicable or not to the Japanese beach composed of coarse-sand-containing beach material formed by hard waves grown by the steeply sloped sea floor. If the sand pack was proved applicable, it is expected to see earlier accomplishments of the beach prevention effect taking advantage of its merit of short period construction work and economic efficiency.

### 2. Collaborative research and editing of the “Guide line to the Beach scarp recession preventive works (draft)”

Coast Division has performed the collaborative research called “Research on the performance evaluation technology of the sand back fill work in the beach conservation” from the fiscal year 2010 to 2012. In that research, we have carried out the hydraulic model test of the sand bag, durability test for sand bag material, construction experiments on site, follow-up monitoring, and so on and organized performance evaluation methods.

As a result, it was proved that the lifetime of the bag material becomes shorter near the shore line on the sand eroding beach, since those beaches are always attacked by tireless waves propagating over steep topography. On the other hand, we also found that the abrasion external force is smaller if there was wide sand beach on the front even in the coast facing the outer sea, which performed the bag lifetime longer to approximately ten years or more. Accordingly we have decided to make a proposition of the practical use of the sand pack to the Beach bank scarp retreat recession preventive construction works of the sand dune as its application based on such characteristics. As we have carried out the site test on Sumiyoshi area of Miyazaki coast shown in photo 1, we have made a summary of the result of that collaborative research as the Guideline to the Beach bank retreat preventive construction work (draft).



Photo 1 Preventive effects to the earth fill on the back

### 3. Beach scarp recession preventive works

Fig. 1 shows the cross section of the Beach scarp recession preventive works. The construction work consists of the standalone sand pack laminated body and beach nourishment earth fill located on the front of the beach fill, in which sand covering beach nourishment is implemented on the laminated sand pack if necessary. The laminated sand pack and beach nourishment fill on the back have the function to decrease the denudation of the lower part of the beach due to waves and prevent the beach bank from retreating. The Guideline (draft) shows how to set the cross section of the Beach scarp recession preventive works, the sand pack weight assessment method, evaluation method of the tension reacting on the bag material, how to set the abrasion external force and climatic aging deterioration external force, calculation method of the required force for the bag material, performance evaluation test method and so on.

In the proximity of Oidanohama, Miyazaki coast shown in photo 2, it was decided to adopt the Beach scarp recession preventive works taking advantage of the experience of the site test on the Sumiyoshi proximity and concept of the Guideline (draft)

#### 【Reference】

- 1) Coast Division HP <http://www.nilim.go.jp/lab/fcg/>

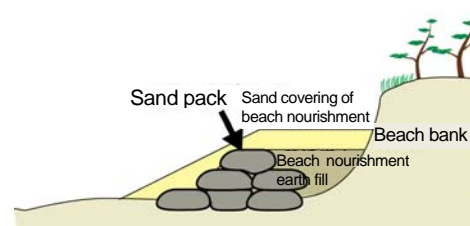


Fig. 1 Cross-section of the Beach scarp recession preventive works



Photo 2 Proximity of Oidanohama that the first Sand pack project is being carried out