Hidraulikai mérnöki tevékenység

Coastal defence and flood protection - Scharbeutz, Germany

Coastal defence and flood protection

- **Project name**
  Coastal defence and flood protection in the city of Scharbeutz, Germany
- **Client**
  City of Scharbeutz, Scharbeutz, Germany
- **Planning and supervision**
  WTM Engineers GmbH, Hamburg, Germany
- **Construction**
  becker bau GmbH, Neustadt i. H., Germany
- **Product**
  Secutex® Soft Rock R 601
  Secugrid® 30/30 Q1

Naue

Fig. 1: Top sand container layer wrapped with Secugrid® 30/30 Q1

Fig. 2: Geotextile sand container as scour protection for sheet pile wall

Flood protection with funds from the state of Schleswig-Holstein, Germany

The approx. 5.4 km long coastline of Scharbeutz, a popular tourist destination, features a wide sandy beach with a beach wall, promenade, road and buildings behind it. This stretch of coast is largely unprotected from storm surges from the northeast.

Previously, the sea wall offered limited flood protection but was inadequate for severe storm surges. The wall was too low and unable to withstand high water levels and wave impact. Severe erosion during Baltic storm surges led to total failure of flood protection.

To protect residents, coastal defences were improved with support from the state of Schleswig-Holstein.

Coastal protection in harmony with nature

The aim was to ensure permanent and reliable protection against storm surges while preserving local infrastructure, nature and tourism. A sustainable, cost-efficient solution was needed, balancing technical, ecological and social requirements.

As the site lies in a protected biotope, an environmental impact study and a landscape conservation plan were conducted and coordinated with conservation authorities.

Compact design was required - the best solution was a flood protection wall

Several options were examined. The only available space for the system was the 15–30 m wide strip between the promenade and beach. A dyke was not feasible. A compact, landscape-compatible construction method was needed.

The best solution proved to be a flood protection wall located approx. 4.0 m behind the promenade, allowing full integration into the beach wall. The embankments were landscaped and planted to blend with the environment.

The wall consists of a non-anchored sheet pile wall with a reinforced concrete superstructure and scour protection using geotextile sand containers.

Erosion and scour protection with Naue Secutex® Soft Rock

To minimise erosion and absorb wave energy, a geotextile sand container system was installed on the waterside of the wall. Naue Secutex® Soft Rock containers were installed in five layers and filled with local sand.

The top layer, not bearing loads from above, was made larger and wrapped with Naue Secugrid® 30/30 Q1 geogrid, which was tension-proof connected to the concrete wall.

In front of the container structure, a flexible toe protection of sand containers was installed. Secugrid® 30/30 Q1 was wrapped around the containers and placed beneath the rear bottom layer for secure positioning. This allows the system to adapt to changing terrain in case of scour formation.

Saving costs and resources

Using locally available sand for filling saved on material transport, costs and environmental impact. If crushed rock had been used, approx. 60,000 t of granular fill would have been needed.

After completion, the beach wall was rebuilt by backfilling previously stored sand and the surface was planted.

Entrances and access roads to the beach were formed as stakes and can be closed with dam beams during storm surges. The structure now provides protection against flooding up to a design level of NN+2.50 m.

The system blends into the local landscape and townscape and, together with the promenade redesign and beach avenue extension, significantly increases the attractiveness of the coastal area.