

Newbiggin by the Sea, United Kingdom

Newbiggin Bay Coastal Protection Scheme

Client: Wansbeck District Council
Period: April 2007- November 2007
Location: Newbiggin by the Sea U.K.
Dredging Contractor: Westminster Dredging Co.

PROJECT BACKGROUND

Newbiggin by the Sea was once a seaside resort, with the residential area focused around the bay. The beach has severely eroded over the years. If the coastline would continue to recede, sea walls could begin to collapse, imperilling coastline properties. The falling beach levels and increased risk of seawall failure led to a strategy and proposal to import beach fill, along with construction of an offshore breakwater to retain material.

MAIN CHARACTERISTICS

Boskalis expanded the existing beach and protected it from erosion.

The project involved:

- > Replenishing the beach with 500,000 tonnes of new sand
- > Building a 200-meter breakwater in the bay to ensure new sand is not eroded
- > Enhancing the beach promenade to make the area more attractive to visitors.

One of the challenging aspects of the project was the fact that sand had to be generated from a licensed area off the coast of Lincolnshire, nine hours away from Newbiggin. Once the sand had been transported to the site, shallow waters required the vessels to anchor 1.5 kilometers offshore.

Furthermore, the project included the placement of the sculpture 'The Couple': two five-meter-high bronze figures, mounted on a steel piled structure, incorporated into the body of the breakwater. The sculpture is a focal point of the government-funded



a)

a): Breakwater rock core construction, incorporating pile foundations for the structure to support the sculpture.

b): Construction and storage of the 10 tonne concrete 'Coreloc' armour units.

c): Location map.

regeneration of Newbiggin by the Sea. The £10 million coastal project aims to revive the town after two decades of economic decline that saw its thriving mine industry and grain port fade. 'The Couple' is the UK's first permanent offshore sculpture. It is located 300 meters out to sea.

WORKING METHOD

In order to protect the bay, work commenced with the construction of the breakwater, firstly laying a geotextile fabric before placing the rock core on the seabed. Altogether 60,000 tonnes of rock and concrete armour were used to build the offshore breakwater. 300,000m³ of beach recharge was then dredged and pumped ashore, in just 3½ weeks, by the Trailing Suction Hopper Dredger 'Oranje'. This vessel was deployed in order to reduce the impact of the long journey to dredge sand. Her 15,850m³ capacity and loaded sailing speed of over 15 knots meant fewer trips. The vessel won sand from a licensed area near Skegness, before linking up to a 1½ km pipeline running into the bay at Newbiggin.



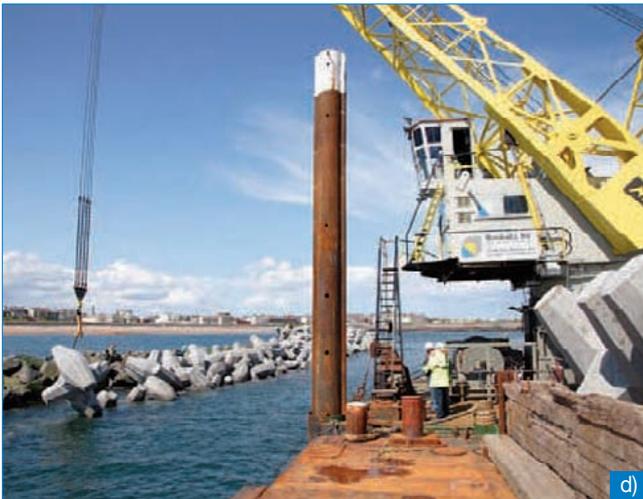
b)

PROTECTION OF THE SCULPTURE

The sculpture was surrounded by a protective layer of 'Core-locs' – interlocking concrete blocks which dissipate more wave energy than a natural stone



c)



d)



e)



f)



g)

structure. The foundations and receiving piles were laid during low waters whilst placing the rock core. 3.9m³ Coreloc (concrete armour) units were then placed as the upper armour layer, with a 5 tonne rock armour toe.

With the foundations of the piled structure stable within the breakwater core, the upper section of the structure was then placed, with the legs rising at an angle to accommodate a deck on which to mount the sculpture. The figures were carefully lifted into place by the crane barge 'Strekker', before being bolted permanently on to their new home, looking out to the North Sea.

d): Placement of the 'Coreloc' layer, using GPS grid software aboard the crane barge 'Strekker'.

e): Beach recharge, comprising 300,000 cubic metres of sand.

f): Lifting the sculpture.

g): 'The Couple' at sea.

h): Placement of 'The Couple'.



h)

COOPERATION AND COMMUNICATION

As the local community was sceptical about the dredging operations, every effort was made to cooperate with the community and helping people understand what was happening and why it was necessary. A dedicated website was created with photographic and video information, and a viewing platform was constructed for local residents to observe progress.

RESULT

In October 2008 the Newbiggin project received the Civil Engineering Award. The British 'Construction Industry Awards' are the Oscars of the construction world. The 'Civil Engineering Award' category focuses on projects with a value of between 4 and 60 million euros. The jury was very impressed by the project: "This is a first-class civils project which arrests serious sea erosion, safeguarding the physical and economic centre of the town. The Newbiggin project is what civil engineering is all about: doing the job required but also benefiting the community. The project in Newbiggin has restored the community's sense of pride and boosted its confidence in the future", according to the report of the jury. Some 7,500 residents hope to benefit from the development.