

## Dike protection against erosion and scour due to flooding

The Roy Hill project, Pilbara region, Australia

The Roy Hill Project is a 55 million tonne per annum (Mtpa) iron ore mining, rail and port project being developed in West Australia's Pilbara region. Situated approximately 115 kilometres north of Newman, Roy Hill is a world-class, low phosphorus, Marra Mamba iron ore deposit.



Product  
Enka®-Fix

Functions  
Erosion control  
Scour protection

Contractor  
Marecon

Volume  
94,000 m<sup>2</sup>

### Challenge

The dikes, which protect a part the iron ore mining against flooding, need to be protected against erosion and scour in case flooding occurs. The durability of the construction is important and therefore every component used in this project has to have a design life of 85 years (under marine conditions). The original design was a traditional rock revetment with a nonwoven filter. As the project was built on a remote place, the transportation cost of the rock was very high. Also the price for quality rock was elevated. So new alternatives imposed themselves.

### Solution

Bonar delivered 94,000 m<sup>2</sup> of Enka-Fix to the Roy Hill Project. Flexible concrete mats are used as an erosion control system in case of flooding. Enka-Fix combines the weight of the ballast with a filter by means of a very durable woven/looped fabric. Concrete blocks were cast upon Enka-Fix before installation. The loops on the fabric provide an extremely strong connection between concrete block and woven fabric. The finished panels were brought to site by truck.



Transportation of the 2.6 m width flexible concrete mattresses



Installation of the product



Enka-Fix is strong enough to lift the concrete mats in the air



The anchorage trench was filled with concrete



The panels itself were fixed with metal pins

A durability of 85 years in marine conditions is required. The woven fabric plays a crucial role to maintain the stability of the structure. Bonar developed a woven fabric by adding stabilisers to the extrusion process. In this way the oxidation resistance increased. The woven was tested according to the new norm EN ISO 13438 which also defines the test procedure for a durability of 100 years.

Also the UV resistance is important. The product needs to withstand 200 kLy. By adding stabilisers and carbon black to the extrusion process Bonar was able to reach the required durability.

#### Benefits of the solution

- Enka-Fix offers a unique combination of ballast and filtration in one product.
- Easy and fast installation (all-in-one go)
- Durability up to 100 years
- Cheaper solution than rock revetment (depending on availability of rock)
- Better alternative for articulating block mats, gabion mats,...

#### Result

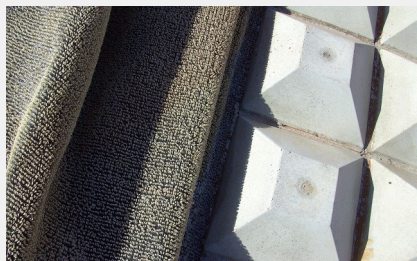
A fast and cheap solution was offered by Bonar to replace traditional rock revetment. The stability of the structure is assured by Enka-Fix and its connection to the concrete.

#### Products used



#### Enka<sup>®</sup>-Fix

A highly durable woven provided by 3D loops.



#### The full system

Concrete blocks are cast upon Enka-Fix