

Wharf and Embankment Rehabilitation



INDUSTRY

Industrial

STRUCTURE

Wharf and embankment

PROBLEM

Wharf Erosion

LOCATION

Queensland, Australia

DURATION / YEAR

9 days / 2015

TECHNOLOGY

Uretek Deep-Injection,
Bayer Resin

BUSINESS UNIT

Mainmark Australia

Summary

A wharf facility serving an important mining operation in a very remote location on the Far North Queensland coast needed to be restored.

Heavy seas and extreme tidal activity had eroded the backfill out from under the wharf slab through the rock seawall, making the wharf unsafe for bearing the heavy loadings.

Proximity to the Great Barrier Reef World Heritage Area demanded an environmentally sensitive solution to stabilise the seabed and seawall embankment.

In just 9 days, Mainmark re-supported the wharf slab in order to safely bear the typical loadings of 90 tonnes or more.

Objectives

The objectives were:

1. To seal the seawall to prevent water penetration and to stop concrete loss during the void filling,
2. to consolidate the sand bed and re-support the rock seawall,
3. to fill small voids under the slab and around the edge of the mass void fill (330m³),
4. and to ensure full support and weight-loading of the wharf slab, to mitigate any flexing during crane operations.

Solution

The Mainmark solution provided the client with cost savings due to the small equipment footprint, the small volume of materials to be brought in by barge, and the

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speed of application; requiring very short down-time.

Mainmark utilised an innovative range of materials and application technologies in 3 phases:

Firstly, Uretek polyurethane grout was injected into the sandy base of the toe of the rock wall embankments. This stabilised the sands and silts of the seabed.

Secondly, the rocks forming the seawall embankments were agglomerated by injection of dual component resin within the voided matrix of the walls. This material is hydrophobic and completely environmentally inert. The injected material expanded, filling voids, and adhered to the rocks, agglomerating them and binding them together, and so substantially improving the structure of the embankments.

Thirdly, approximately 330m³ of voids beneath the wharf slab area were filled and the slab was undersealed and completely re-supported. Resin was used also for this process, being injected via 16mm Ø holes in a grid pattern covering 90m². The area was preloaded with the wharf crane. After injection, re-support of the whole area was confirmed by laser level indicating a uniform lift of 3mm - 5mm.

The wharf area seabed and the seawall embankment were stabilised. The weight bearing capacity of the stabilised wharf slab was completely restored.

The Mainmark technology proved very cost-effective compared with complete removal and replacement.

The client's managers were extremely happy with the end result and the professional approach by Mainmark and the attending crews.