

STOCKPILE CONTAINMENT IN RIEBEECK WEST QUARRY

RIEBEECK WEST, WESTERN PROVINCE, ZA

GEOTECHNICAL / REINFORCED SOIL WALLS

Product: Terramesh[®] System

Problem

The mining of limestone produces waste rock which needs to be stockpiled within a dump area.

At the end of life of the mine, the waste rock dump needs to be rehabilitated to agricultural land. A condition of rehabilitated mine lands is that the gradient of the finished surfaces must be no more than 10° from horizontal to minimise the potential erosion of the cultivated slopes.

At Riebeeck West, the waste rock dump is located adjacent to an area of renosterveld (high conservation-value vegetation) and a natural water course. A solution was required that enabled the planned capacity of the waste rock dump could be met without impacting on either the closure requirements for agricultural land, the renosterveld or the water course, whilst still remaining within the original waste rock dump footprint.

Solution

Analysis revealed that a 12m high vertical containment structure was required to provide capacity for the waste rock dump at the appropriate gradient. The structure would be located adjacent to the watercourse and the renosterveld. This will allow the waste rock dump to have an 8° angle at maximum capacity without impacting on the original footprint of the dump.

Working with Maccaferri Southern Africa, product engineers, SRK Consulting, determined that the near vertical wall would be constructed cost-effectively using the Terramesh[®] System.

Terramesh[®] is used to construct reinforced soil structures. A unit consists of a continuous horizontal panel of woven steel-wire mesh geogrid with an integral gabion fascia unit. This makes the system efficient and economic to construct as there is no complex connection to be made between the grid and the facing unit. Installation is quicker and there is less potential risk of errors and omissions during construction.

The fascia unit is filled with hard durable rock-fill in the same manner as a gabion and the geogrid tail is then sandwiched between layers of compacted structural backfill. Wherever possible, Maccaferri attempts to reuse site-won material as structural backfill to these Terramesh[®] reinforced soil structures.

Client:

PPC CEMENT

Main contractor:

PPC CEMENT

Designer:

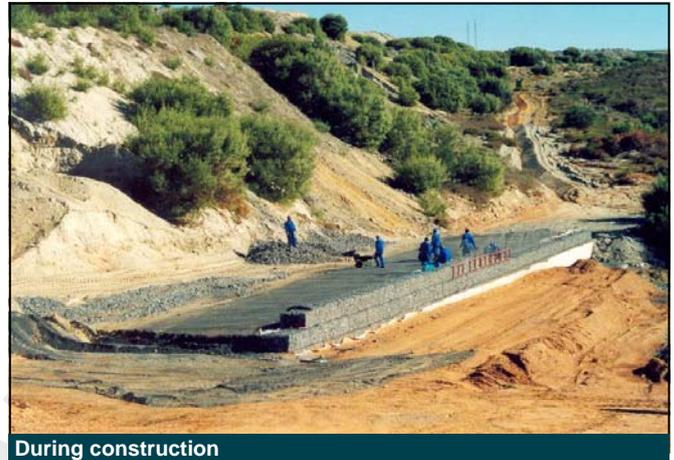
SRK CONSULTING

Products used:

TERRAMESH SYSTEM[®]

Date of construction

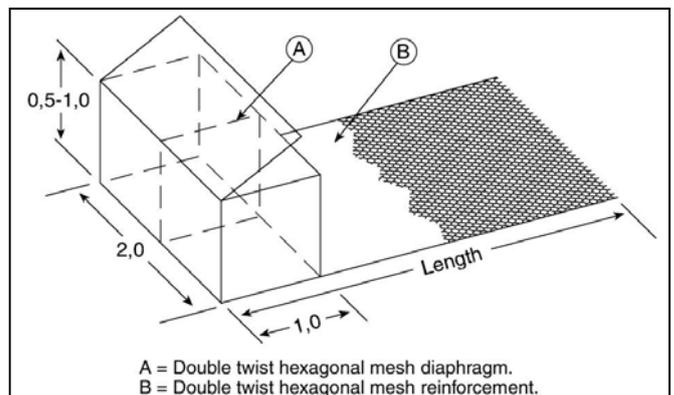
JULY '03 -OCT '06



During construction



Structure nearing full height



Typical Terramesh unit

In Riebeeck West, limestone from the quarry was used to fill the baskets, whilst graphitical limestone, crushed to approximately 10mm was used for the reinforced fill.

This proved to be an excellent structural backfill material, requiring minimal compaction to achieve the design requirements. A 3m deep foundation layer of large limestone boulders covered with a crushed layer of limestone aggregate was used to give a level founding surface.

The foundation layer also performed as a drainage layer for water permeating through the dump into the water course.

Benefits

- A very neat finish on the front face is being achieved by using a gabion frame as formwork during construction. The baskets are tensioned longitudinally using a fencing wire tensioner together with an H-shaped frame before packing.
- Local labour is being used from the mine enabling them to learn new skills and they are being used to their full potential when not busy with their daily mining tasks.
- Locally available rockfill was being used from the mine, reducing project cost and pollution caused through the import of structural materials from off-site.



During construction



Geogrid tails of Terramesh units



Completed structure

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