

### FAST-TRACK TIP WALL IN COLLIERY OPTIMUM COLLIERY, MPUMALANGA, ZA

#### GEOTECHNICAL / REINFORCED SOIL WALLS

**Product:** Terramesh<sup>®</sup> System and MacRES concrete panel wall system

##### Problem

Located within the heart of Mpumalanga's coal mining belt, Optimum Colliery is owned and operated by BHP Billiton Energy Coal South Africa. Producing 13M tonnes of coal per year, Optimum Colliery is a major export driven mine, shipping its product by sea to global markets via the Richards Bay Coal Terminal. The colliery also supplies lower grade thermal coal to feed Eskom power stations in the region.

In 2007, to meet ongoing demands and to ensure maximum operational efficiencies, Optimum Colliery authorised the construction of a new 1000 t/h run of mine (ROM) tip facility to replace the existing Optimus tip. This tip had reached the end of its operational life and other factors such as recurring seasonal flooding ruled, out a cost-effective refurbishment.

The new 14m high tip facility was designed with an operational life (as opposed to design life) of 10 years in line with the mine's production planning. Accurate project management would be necessary to maintain mine operations during the construction phase.

60% of the material passing through the tip is <150mm ROM product, with the balance being 150mm-700mm bulk size. A static grizzly located at the top of the receiving bin (grid opening 600mm x 500mm) accommodates a feed size up to 750mm. This material then passes down through the primary and secondary vibrating feeders, handling 700 t/h and 300 t/h respectively, before discharging onto the existing overland conveyor system, equipped with a 2.1m wide belt travelling at 1m/s to the new primary crusher installation some 180m away.

##### Solution

Following assessment of available retaining wall types, the 14m high structure was to be constructed using a combination of Maccaferri's Terramesh<sup>®</sup> and MacRES<sup>™</sup> systems. This combination would enable the wall to be constructed within the tight project timeline. Project engineers, DECO Consulting worked with Maccaferri Southern Africa on the design of the solution.

Consideration was given to the construction being entirely from Terramesh<sup>®</sup>. However, although this would have been very cost effective, the time to install it would have been longer, impacting on the strict project timeline.

Client:

BHP BILLITON

Main contractor:

RBD CONSTRUCTION

Designer:

DECO CONSULTING

Products used:

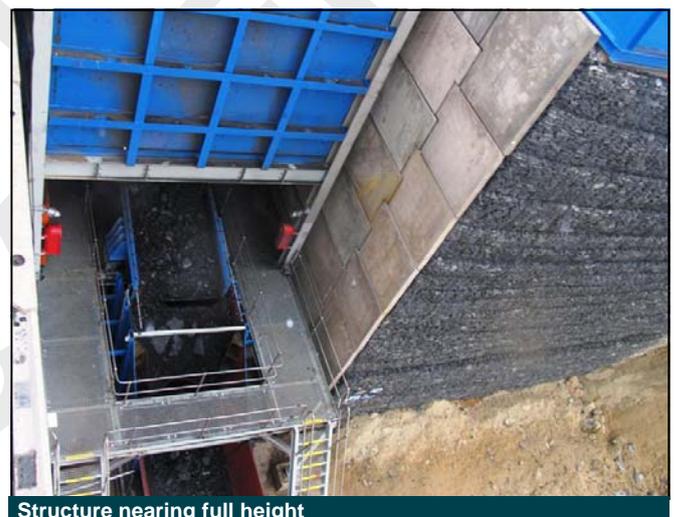
TERRAMESH SYSTEM<sup>®</sup>, MACRES

Date of construction

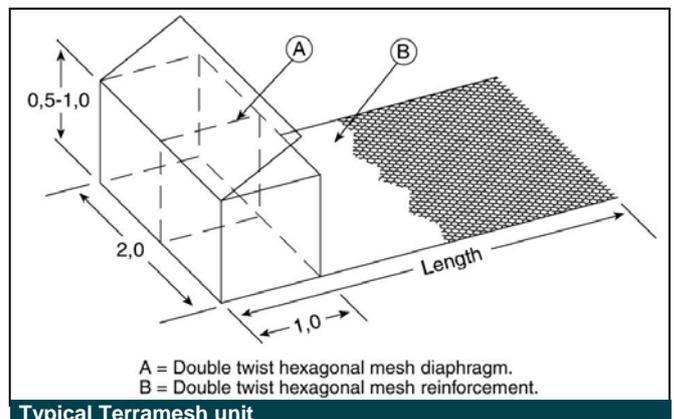
NOV '07- JAN '08



During construction



Structure nearing full height



Typical Terramesh unit

RBD Construction commenced on site in November 2007 with the retaining wall structure and tip access ramp being completed in January 2008. The mechanicals were commissioned in mid February 2008.

The reinforced soil section consisted of 40,000m<sup>3</sup> of material with access ramps to the bin adding 293,000m<sup>3</sup>; with a slope gradient of 7%, the 16,2m wide ramp could accommodate the 200t rigid dump trucks (with a maximum 80t payload) in each dumping cycle.

The reinforced soil structure was founded upon a 3m thick dolomite layer.

This project heralded the first use of MacRES<sup>™</sup> concrete panel system within the South African Mining sector. This soil reinforcement system features Paraweb<sup>®</sup> polymeric strip reinforcement, sandwiched between layers of compacted structural backfill. The Paraweb<sup>®</sup> is attached to precast concrete facing panels, mounted vertically.

Terramesh<sup>®</sup> is also 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<sup>®</sup> reinforced soil structures.



Typical deployment of Paraweb strip reinforcement  
(image from another project for illustration purposes)



Completed structure

## Officine Maccaferri S.p.A. Global Headquarters

Via JF Kennedy 10, 40069 Zola Predosa (BO) - Italy

T: (+39) 051 6436000 F: (+39) 051 236507

E: comes@maccaferri.com

[www.Maccaferri.com](http://www.Maccaferri.com)