MSEW
Product: MACRES® T AND PARAWEB® SOIL REINFORCEMENT

Problem
Assmang Manganese mine required a total of 4 retaining systems, approximately 7.5m high to accommodate tipper trucks, imposing up to 250kPa pressure in vertical direction on the top slabs of the walls.

The initial design was for a standard in-situ cast cantilever concrete wall, yet due to a increase in construction time and a cost reduction, StefStocks approached Maccaferri for an alternate solution.

The region where this solution was required also faced a problem, as it consisted of materials with soft founding properties.

The filling soil used for the wall was material coming from the mineral production that, being a manganese mine, shown an unit weight of 28kN/m3, which added to the bearing capacity problem.

Solution
After design related meetings with StefStocks and DRA Mineral Resources, who were the projects design engineers and managers, a Macres® T system, with high strength geosynthetic reinforcement strips was utilised.

Two separate systems were constructed, each consisting of 2 walls facing each other. DRA designed a 1m concrete slab spanning from one wall to the other for the trucks to drive onto, tip through a grizzly onto a conveyer system below. The trucks can then continue driving in the same direction onto their next destination.

This “true abutment” design and the weak soils called for:

- Various soil tests to be done, resulting in a structural backfill material, consisting of a blend of the Manganese and sand
- A minor foundation improvement utilising materials on site, by excavating under the foundation, filling and compacting
- Reinforcement lengths of the Paraweb® to be increased, thus spreading the loads over a larger area.

Client: ASSMANG MANGANESE MINE
Main contractor: STEFSTOCKS
Designer: DRA MINERAL RESOURCED
Products used: MACRES® T, PARAWEB®
Date of construction OCTOBER 2015 TO DECEMBER 2015
Benefits & Features:

- As the panels were cast by StefStocks Civils and the installation was done by StefStocks Roads and Earthworks, independent expertise could be called on

- A high strength concrete mix was used so the panels could be stripped in within 24 hours

- The walls element design of the wall was done by Maccaferri Technical Department using in-house MacRes software based on SANS 207:2006 coherent gravity method

- Construction drawings were supplied, comprising of plans, sections and elevations.

- Due to the high pull out pressures applied to the ParaWeb® Soil Reinforcement, from a result of the large loads, steel loops were cast into the panels to form the connection point for the Soil Reinforcement

- On site training (not full time) was supplied by Maccaferri, which ensured that the walls were constructed quickly and correctly