



Subgrade Stabilisation Kaapmuiden, Gauteng

Case Study

Project: Subgrade Stabilisation, Kaapmuiden

Client: Transnet Freight Rail

Date: February 2011

Consultant: RCE Consulting Engineers

Product: TriAx™

Contractor: Transnet Capital Projects RME

Quantity: 2 500 m²

On a key junction of the busy Transnet freight rail route to South Africa's border with Mozambique, only five days possession could be spared to reconstruct a critical turnout and scissors crossing.

By using Tensar TriAx geogrid to mechanically stabilise the new sub-ballast layer, the contractors were able to complete the task and restore operation within schedule, minimising costly delays.

The 300m long section at Kaapmuiden station, which covers an area of about 2,500 m², lies at the junction of one line from Hoedspruit, with two lines from Komatipoort which are rated for 20 ton axle loadings. They connect with two lines to Nelspruit, and a turnout to the freight yard. Site space for work was tightly constrained by platforms, buildings and vehicle crossings, putting further stress on project time.

Contractors Transnet Capital Projects RME, and consulting engineers RCE, also had to contend with the rainy season which has caused significant damage to rail routes in South Africa during 2011, and threatened additional delays to contracting work.

"Because of these many constraints, the engineers and Transnet decided to take advantage of the proven load bearing capacity of aggregate mechanically stabilized with TriAx," comments Garth James, Director of Tensar geogrid specialist Kaytech Engineered Fabrics.

"This solution required only 200mm of quality imported sub-ballast aggregate, instead of the standard 400mm of unstabilised material, saving days of site time as well as the cost of aggregate."

"Additionally, using a TriAx solution meant that the sub-grade only needed excavation and replacement to 350mm, which reduced the risk of contractors damaging cables and services buried at 600mm."



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The contractors ripped the sub-grade to 350mm before replacing and compacting it. Then a layer of TriAx TX160 geogrid was laid out over the sub-grade and covered with 200mm of imported G1 grade aggregate, compacted to 88%. Although G4 was originally specified, the high grade G1 was more readily available at the time needed. Over this sub-ballast layer were laid 200mm of ballast, then 220mm thick concrete sleepers, and the track completed with 150mm rail I beams.

The formation repair project at Kaapmuiden is part of a five year Transnet programme of rail route refurbishment. The section is on a strategic line which carries heavy goods such as ferrous and chrome ores to Mozambique's ports for export; as a major contributor to South Africa's export trade, any track downtime is very costly.



Picture 1: TriAx™ TX160 being installed



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Picture 2 & 3: During Installation



Picture 4: Completed Turnout