CASE STUDY

Geogrid

Project: Wellington Station Entry 3 Tracking Project
Date: Feb 2009 - Jan 2010
Client: KiwiRail
Location: Wellington

GEOFABRICS®

Tensar TriAx® Geogrid

Wellington railway station is a very busy commuter base, with trains going through the yards every 10 minutes in the morning and evening peak. A new track was required (900m) into the Wellington railway station, increasing lines from 2 to 3 for the new electric passenger trains. This would minimise the existing delays caused by commuter services due to concurrent approach/depart of North Island and Wairarapa services. Construction was to be done over very poor subgrades and puggy clays and had to have minimal interference with the other lines. This meant the usual excavation method and replacement of ballast would be difficult through the wet months, especially with the tight deadlines imposed by KiwiRail. The use of both a geotextile and geogrid enabled the use of heavy machinery even through the wettest period, enabling completion of the work in the required period.

The nature of the ground meant separation and reinforcement were both required. Due to the deadlines imposed by the client on this project, the use of both the geotextile and geogrid minimised the digouts required (offering a large cost saving in aggregate) and enabled construction even through the wettest periods. The CBR of the subgrade and the size of the new ballast required determined the use of the most suitable geotextile **bidim® A29** (which was supplied in both 4 & 6m widths). The long term traffic loading and minimal long term deflections required were met through the use of **Tensar TriAx® 170**. As the combination of both separate geotextile and geogrid was able to be taylor made to the specifics of the site, cost savings were achieved. In areas where the subgrade was extremely puggy and CBR can be below 1, a double layer of **Tensar TriAx® 170** was installed, with a maximum spacing of 300mm between the layers. The roll widths of **bidim®** ensured that wastage was kept to a minimum, using the appropriate width where required.

This project was staged, in the end approx. 14 separate stages were completed, over a construction period of a year.

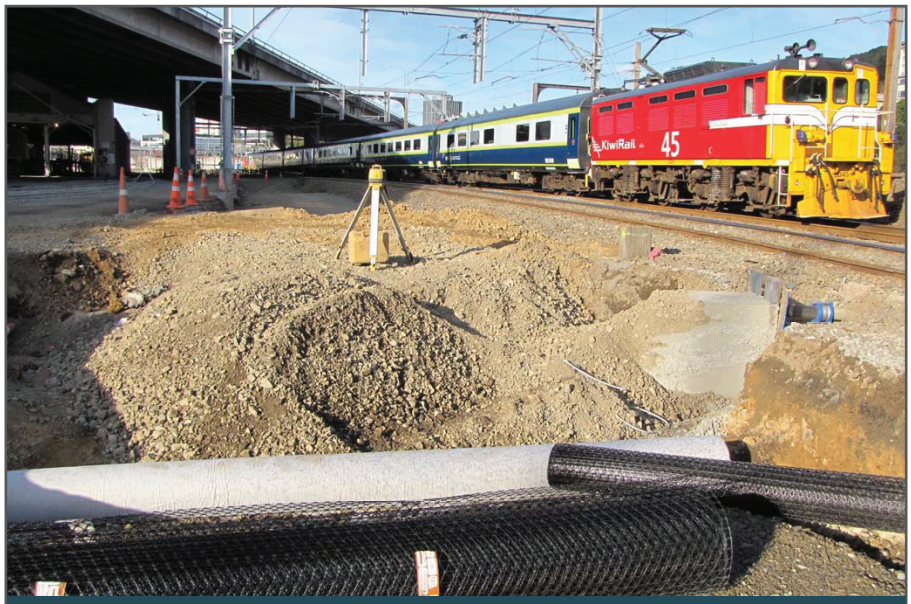
Preparation of subgrade for geotextile and first layer of geogrid

Example of ballast used

Section near completion

95% of the work could only be achieved without train services running. As the weekends were the quietest time and lines could be blocked, 24 hour construction by the contractor enable stages to be completed as required. Bulk digouts through the project were done, so figures for installation not easily determined. A combination of 13, 20, & 23 tonne excavators, 30 tonne dumper and trucks were used on site both to excavate fill, cart and place the new ballast.

KiwiRail now incorporate the use of bidim® geotextiles and **Tensar TriAx®** into their designs for new track replacements, including the recent DART projects.



Rail in use

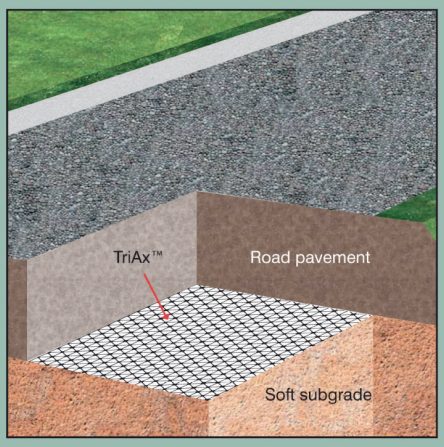
How Tensar® TriAx™ Geogrids work.

Using over 30 years' experience in ground stabilisation, **Tensar®** has radically re-engineered the fundamental structure of geogrids to create the revolutionary **TriAx™**, based on one of the most efficient and stable structural forms – triangles..

The aggregate particles interlock within the triangular apertures and the efficient, deep rib profile of **TriAx™** helps to confine aggregate, which combined with the isotropic stiffness, creates a mechanically stabilised layer with exceptional performance.

It has been shown that **TriAx™** outperforms even **Tensar®** biaxial geogrids. When compared with an unreinforced aggregate layer, a mechanically stabilised layer incorporating **TriAx™** geogrids can:

- Reduce the excavation needed.
- Control differential settlement.
- Increase bearing capacity.
- Cut construction CO^2 emissions by up to 50%.



Tensar® TriAx™ Geogrid Cross Section