CASE STUDY

Double Twist Mesh

Project: Bridge 60A Rail Line Extension
Date: November 2007
Client: ONTRACK NZ
Location: Swanson, Auckland

GEOFABRICS®

Gabions

Part of the ongoing Ontrack New Zealand double rail track upgrading works for the Auckland Region included the requirement to widen the bridge across Candia Road to cater for an additional railway lane. The site had limited space available for the construction of a shallow slope between the existing railway embankment and stream adjacent to the bridge.

A steeper reinforced soil embankment was chosen to solve the problem of space as well as having the ability to support the heavy loads expected during placement of the bridge elements.

The choice of facing also presented some problems as there were not only the technical and durability issues to be considered but also speed of construction when working adjacent to a working rail network.

The design of the 7m high reinforced soil embankment considered the short term load case for a 300 tonne crane on the level platform, the critical case being 625kPa on one leg, as well as the long terms loads that include a 4m high vertical faced anchored earth wall to be constructed at a later date on the platform for the purpose of the rail line extension.

A number of stability checks had to be considered to take into account the various potential failure modes and external load cases including:

- Internal & Compound Stability - the critical circles from the wall toe are forced back into the retained soil zone due to layers of geogrid reinforcement
- Global Stability - this is to investigate deeper seated potential failure circles behind the reinforced soil block and anchored earth block
- Wedge Stability - potential sliding at the base

Site prior to construction

Lower prefilled gabion section

Placement of geogrid & fill

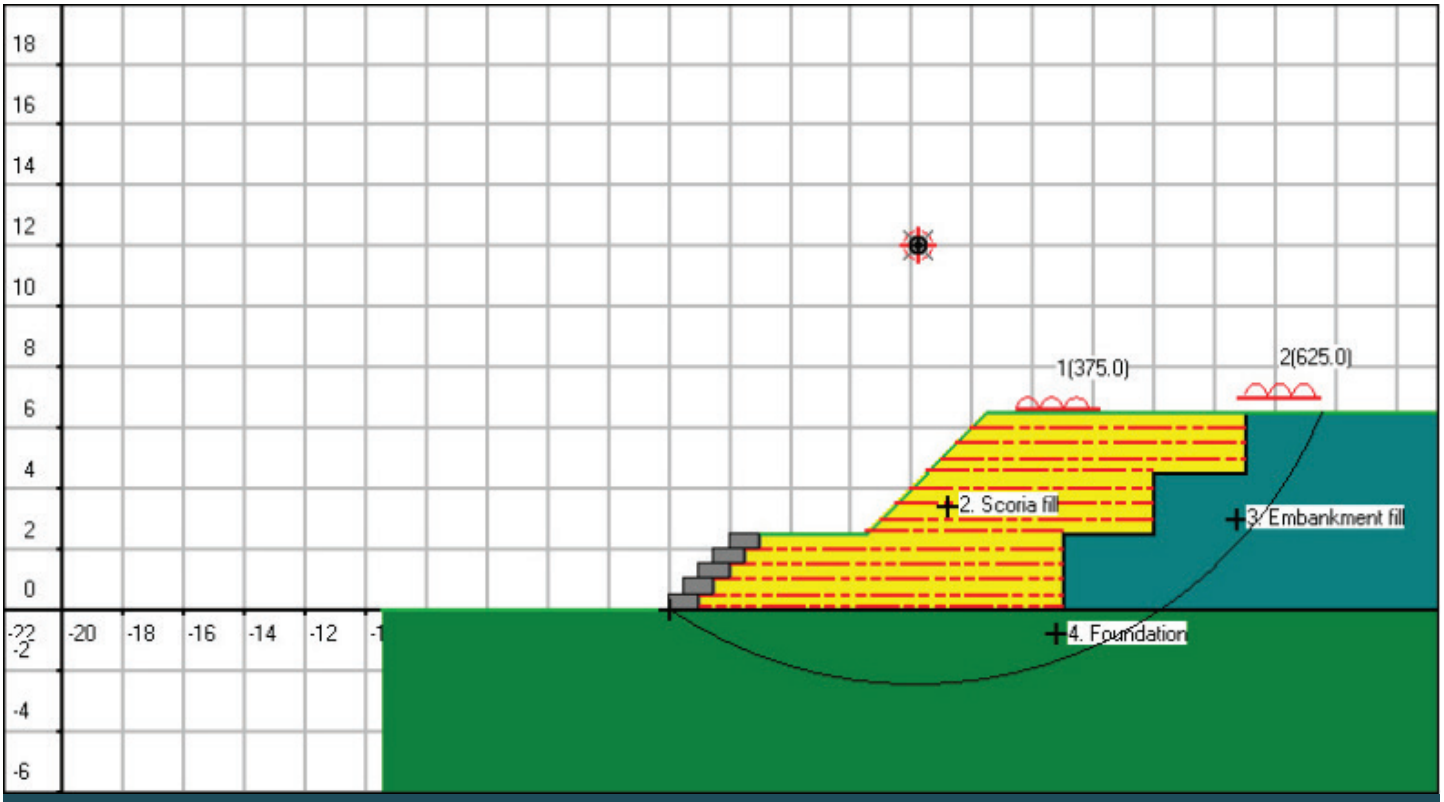
Prefilled **gabions** with ballast stones were selected for the facing of the structure. These could be mechanically placed to form the steeper face for the lower 2.5m within the design flood zone and a 45 degree slope constructed on top to provide a platform sufficiently wide for a 300 tonne crane to be positioned and operate from.

The placement of the prefilled **gabions** provided a rapid method of front face construction, a highly frictional and free draining scoria fill, along with Tensar geogrid reinforcement ensured that construction could continue in a range of weather conditions with minimal interruption to the construction program.

Gabions were prefilled so that they were not within the critical path of the project installation schedule.

No deformations or distress to the structure was observed during the critical phase of placement of the bridge elements. These observations supported the design principles adopted for this site.

300T crane operation



Section showing a typical circular analysis for crane loads