

ROCKFALL PROTECTION

Products: PVC Coated Rockfall Netting

Problem

On February 2007, a slip occurred on a cut slope adjacent to a road near Waihi Hill after an extended period of wet weather. The slip debris from the slope resulted in the entire road being covered thereby blocking all traffic movement. It was fortunate that there were no road users passing by at the time of occurrence.

Opus Consultants called in Avalon Industrial Services Ltd to carry out emergency scaling and de-vegetation of the loose surface and slip margins. Avalon staff carried out an investigation and stability assessment which showed a geology consisting of fractured lava flows interbedded with poorly cemented rubbly ash; materials which are inherently unstable when at such steep angles.

Hand scaling was completed and a significant overhang in one area was re-profiled using explosives. Following scaling, the slip face contained rocks likely to continue to fall over time, presenting an unacceptably high risk to road users. Measures needed to be taken to mitigate the rockfall risk.

Solution

There are two approaches to rockfall mesh; 'Active installations' or 'Passive' installations. A passive rockfall mesh is a draped curtain which contains falling rock, guiding it safely to the base of the slope. The site at Waihi hill was ideally suited to a passive mesh installation. A works design and specification, incorporating Maccaferri Double Twist Rockfall Mesh, was put together by Avalon and Opus and proposed to NZTA.

Passive measures do not prevent the rocks from detachment, but focus on containing and intercepting the falling rock. This approach reduces the energy of the rock mass and subsequent damage potential thereby eliminating the risk to the infrastructure and its users. There are various passive systems available depending on the site condition and level of protection.

Maccaferri suggested a passive measure using a drapery system consisting of Maccaferri Woven Double Twist Rockfall Netting to cover up the entire slope face. Anchors were installed at the crest of the slope with steel ropes to support the load of the netting and any debris load.

Client name:

NZ TRANSPORT AGENCY

Main contractor name :

AVALON INDUSTRIAL SERVICES LTD

Consultant:

OPUS CONSULTANTS

Products used:

PVC COATED ROCKFALL NETTING

Construction date:

JULY 2008



Eroding slope face prior to rockfall netting



Avalon staff abseiling down the slope to place anchors



Anchor at the toe of the slope

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The drapery system does not prevent the detachment of the rocks rather it is designed to contain the rock within the mesh and control the rock movement down the slope over time. Depending on the shoulder width the debris falling to the toe of the slope can either be collected in an open ditch or as chosen for this site the debris is collected at the base of the netting. Over time the debris will accumulate in the mesh which can be easily removed as part of the inspection and maintenance for the road section. This would involve a temporary traffic diversion whilst the base cable is loosened to release the debris for removal.

Maccaferri double twist mesh (hexagonal shape) was chosen because it has a long history of performance in these applications as it does not unravel should any damage or a break occur in one of the wires. Simple single twist mesh (chain link) shows a much higher reduction in performance and tensile strength should a single break occur in the body of the mesh.

The entire (600m²) rockfall protection netting installation was completed within the time frame proposed by Avalon Industrial Services Ltd who are well experienced in this field of work having carried out many installations using Maccaferri product.



Final checks to the completed rockfall netting structure



Completed rockfall netting structure

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Quality System AS/NZS ISO 9001:2000

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