

Project: 75 & 77 Heberden Ave Rockfall Protection
Date: April 2016
Designer: Engeo Ltd
Contractor: Solutions 2 Access Ltd
Location: Sumner, Christchurch



RB1500Plus (MEL>1500kJ) Catch Fence

The property at 77 Heberden Ave, Sumner was affected by rockfall following the September 2010 earthquakes which was recorded as a magnitude 7.1 on the Richter scale. The area since continued to be profoundly affected by aftershocks resulting in some properties being 'Red Zoned' by council/CERA, meaning they are no longer safe to be occupied due to the rockfall risks unless some form of protection work can be carried out.

During the earthquakes, rocks detach from mid and upper slope outcrops (as a result of seismic shaking that induces horizontal and vertical movements) and they roll and bounce down the slopes posing a significant threat to the infrastructure/properties and the public below. The design process starts with identifying the source area, determining if the problem at source can be eliminated or controlled i.e. preventing the rocks from falling by anchoring or meshing over them; or removing them by scaling methods. If source control is not possible; protection structures such as a **Green Terramesh Bund** an **ETAG 027 certified catch fence** or **hybrid fence system** can be constructed between the mid-slope and toe of the slope to intercept falling rocks with high kinetic energy. The type of protection structure(s) depends on a number of design considerations such as the footprint, access, proximity to the structure to be protected, slope stability and ease of maintenance.

A catch fence with a maximum energy level of 1500kJ was identified by the engineer as the most appropriate protection structure for this particular project. Typically, a rockfall simulation trajectory analysis will be performed by the engineer to determine the bounce height and estimated kinetic energy. Geofabrics supply the full range of Maccaferri ETAG027 energy certified rockfall fences starting from 100kJ to 8,500kJ. The intercepting component (panels, posts, base plates, upper and lower ropes, energy dissipaters, up-slope and lateral ropes) used in the rockfall fence are fully tested against impact under the stringent ETAG 027 test procedure. The performance of the fence along with the measurements used to calculate the maximum energy rating are recorded after which a certificate is issued stating their energy level among others.



Base plate on concrete plinth footing



ICAF Spiral Rope Anchors



Completed fence side view

The up slope and lateral rope anchors are normally included as part of the 'kit set' in the fence. However, foundation elements are not an ETAG 027 requirement being site specific and their design (anchor type and length) can be adjusted if necessary to accommodate the soil conditions in the engineer's design. Loading requirements are provided to the engineer for the anchor design.

The total fence length involved for this project was a 70m single section, with a post height at 4m and spacing of 10m. The installation of the fence took the specialist contractor less than 1 month to complete.

What is ETAG 027?

ETAG 027 – Guideline for European Technical Approval of Falling Rock Protection Kits is a document containing guideline for full scale testing of rockfall fences. This guideline standardised the test methods and allows manufacturer to specify the energy level the fence is capable to withstand as well as an indication of the performance in terms of residual height and expected deflection. All Maccaferri fences are ETAG 027 certified exceeding Category A performance i.e. residual height >60%*.

*ETAG 027 requires >50% for Category A fence



Completed RB1500Plus (MEL>1500kJ) Rockfall Catch Fence

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