

Railway Cutting Rockfall Protection

Parwan, Victoria



TYPE OF PROJECT
Slope Protection

YEAR OF CONSTRUCTION
2018

CLIENT
V-LINE

CONTRACTOR
Coleman Rail

DESIGNER
GHD

PROD. RELATED
MacArmour & SteelGrid (7,250 M2)

Challenge

Along the Ballarat rail line in Parwan, Victoria, a robust solution was required for **340 m of rail cutting** to prevent rockfalls from collecting in the cess drain. Observed rockfalls on site were generally small ($<0.3 \text{ m}^3$); however, the presence of weaker material at the base of the cutting increased the potential for overhang development and ongoing instability.

The cutting comprised three lithologies across two configurations: competent columnar jointed basalt overlying pillow basalt/hyaloclastite, and basaltic and alluvial derived clays overlying competent columnar basalt. The affected sections were approximately **7 m high** with an average slope angle of **50°**, requiring an effective and durable rockfall mitigation solution. In addition, a new **0.50 m high crest bund** was required to assist with drainage control.



Top anchoring using Galmac-coated wire rope and



Installation of the Steelgrid® using rope access techniques

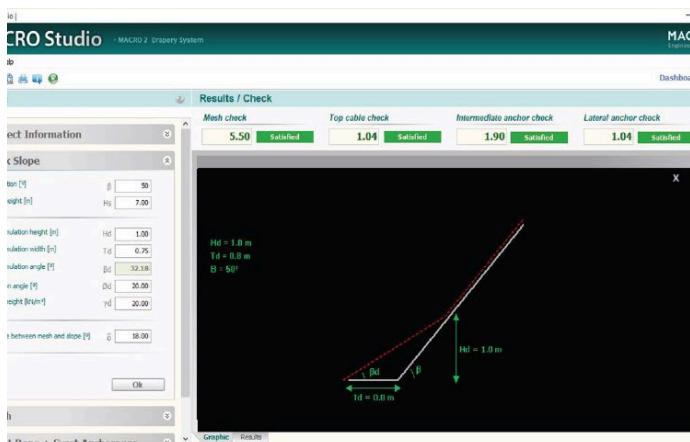
Solution

An engineered rockfall protection system was developed to suit the site's geological and operational requirements. Rockfall mesh drapery design proposals were developed using the Maccaferri MACRO design software suite, supported by specialist design input and modelling to optimise performance and constructability, together with standard details, drawings, and installation guidance.

For locations containing weaker and dispersive hyaloclastite and clay materials, **Steelgrid® rockfall mesh** combined with a permanent erosion control blanket was specified. Steelgrid® was selected for its high stiffness, high tensile strength at low strain, and high punch resistance with low deformation. The system combines Double Twist steel wire mesh with integrated high tensile steel wire ropes to improve load distribution and reduce strain within the drapery system.

A total of **7,250 m² of Steelgrid® MO300L** was installed using rope access techniques. Anchors were installed at both the crest and toe of the slope. Installed as a drapery system, the mesh hangs in front of the slope to guide detached rock material safely to the toe while attenuating energy through reduced bounce and block velocity.

The works were successfully delivered within planned rail shutdowns, ensuring safe, efficient, and uninterrupted rail operations.



Drapery stability analysis using MACRO design software



Completed Steelgrid rockfall mesh system