ROCKFALL PROTECTION SYSTEMS

Product: STEELGRID MO

Problem
The Trans-Baikal Railway, headquartered in Chita, runs for over 3300km and serves Zabaykalsky Krai and Amur Oblast in south eastern Russia. The railway administration faced the problem of providing effective protection of the railway line against rockslides along a substantial section of the line.
The rockslide hazard was greatest over a section with a total length of 412 m and a height from 42 to 120 m with an intermediate shelf.
The rocks of the local massif consist of highly weathered metamorphic shales. Throughout the entire service life of the railroad, the operations department have had to remove rocks and slope debris from the tracks, which impacted on the train schedule. Therefore, the solution had to remove the rockfall hazard, thereby reducing the regular clean-up burden and help make the trains run on-schedule.

Solution
Alternative measures to prevent rockslides were considered, including those from Maccaferri’s range of rockfall mitigation systems. Site data was entered into the MAC.RO rockfall protection design software. Analyses revealed the optimum solution was the use of Steelgrid MO high strength drapery. Steelgrid MO is a double twist woven steel wire mesh into which high tensile steel cables are woven.

The rock slopes were first scaled before commencing the Steelgrid MO installation work. The Steelgrid was secured at the top of the slope to a lateral steel cable, anchored into the slope crest. The spacing and capacity of the anchors and tensile capacity of the Steelgrid is dependent upon the height of the slope and the loads expected on the mesh. This includes the mass of rock debris, contained by the mesh as well as any snow or ice loads which can significantly increase the system strength requirements.

Client:
TRANS-BAIKAL RAILWAY
Contractor:
SPETSSTROYMONTAZH LLC
Consultant:
MACCAFERRI GABIONS CIS LLC
Products used:
STEELGRID MO
Date of construction
SEPTEMBER 2007
To improve contact between the mesh and the rock surface, the Steelgrid was additionally anchored at intervals to the slope in accordance with the material anchoring design model. Additional anchors were also installed in large fracture zones.

The project was successfully implemented and the solutions prevented rocks from sliding and falling onto the railway tracks.

Maccaferri Steelgrid is becoming increasingly popular as it offers cost-effective high strength rockfall protection to slopes.

Traditional double twist mesh, which has been in use for over 50 years, is supplemented by high tensile steel cables, woven into the mesh at intervals. The spacing between steel cables is varied to alter the strength of the mesh required. Typical strengths are between 50 and 160kN/m. If required, transverse high-tensile steel cables can also be woven into the mesh making the bi-oriented product; Steelgrid BO

The double twist mesh in Steelgrid offers significant advantages over other meshing systems, for example, high tensile wire single-twisted mesh systems;

- The double twist mesh is flexible. It can conform to the rock slope if needed without additional bolting
- It is easy to unroll on the rock-face, unlike single twist (chain link) style meshes, which can get caught upon themselves during deployment, causing delays and increased time on the slope face
- If wires within the mesh are damaged or broken, the double twist construction will not unravel and maintains 85% of its strength even when a wire is broken. Single twist meshes unravel when damaged
- Maccaferri MacRO 2 software assists the designer in the design of drapery on slopes Steelgrid does not require specially shaped, expensive anchor plates to work effectively.