

ROCKFALL PROTECTION - ADF UNLOADING TERMINAL TOM PRICE, WESTERN AUSTRALIA

ROCKFALL PROTECTION

Product: Steelgrid MO

Problem:

Due to weathering, erosion processes and geological conditions, a 135m long by 5m to 9m high, exposed rock slope required surficial stabilisation on the Tom Price Fuel Terminal site.

Solution:

AECOM, the project consulting engineers identified three forms of slope surface treatment:

Zone 1 - Displayed a visible joint/shear system and identified as having potential planar rock failure surfaces.

To limit boulder detachment movement in this zone, a combination of Maccaferri Steelgrid[®] MO and rock bolts was specified. The Steelgrid[®] MO is a high strength woven steel composite of double twisted woven mesh and high tensile steel cables woven into the mesh during manufacture. This patented combination of mesh and cables within one product, produces a system that offers high strength at extremely low strains.

Zone 2 - Consisted of interbedded sandstone and shale dipping gently back into the slope. The outcropping material appeared to be iron cemented, tectonically deformed, fine grained siltstone/shale. In this area, traditional Maccaferri Rockfall protection mesh was used to reinforce a 100mm layer of shotcrete. The flexible, double twisted woven wire mesh offers flexibility, conforms well to slope irregularities and is able to maintain intimate contact with the slope surface during shotcreting. Strips of drainage geocomposite were included to introduce the necessary groundwater drainage requirement behind the shotcrete facing.

Zone 3 - An unsecured passive rockfall drapery system was identified as be the most appropriate solution in Zone 3. Here Maccaferri Rockfall protection mesh was anchored at the top of the slope and unsecured at the toe. Its purpose is to contain falling rocks behind a steel wire mesh curtain, allowing them to fall in a controlled manner to the foot of the slope.



Before construction



During construction



After construction

Client:

RIO TINTO

Contractor:

SPECIALISED GEO

Engineer:

AECOM GROUND ENGINEERING

Products used:

MACCAFERRI STEELGRID[®]
DOUBLE TWIST ROCKFALL PROTECTION MESH

Date of construction

2011

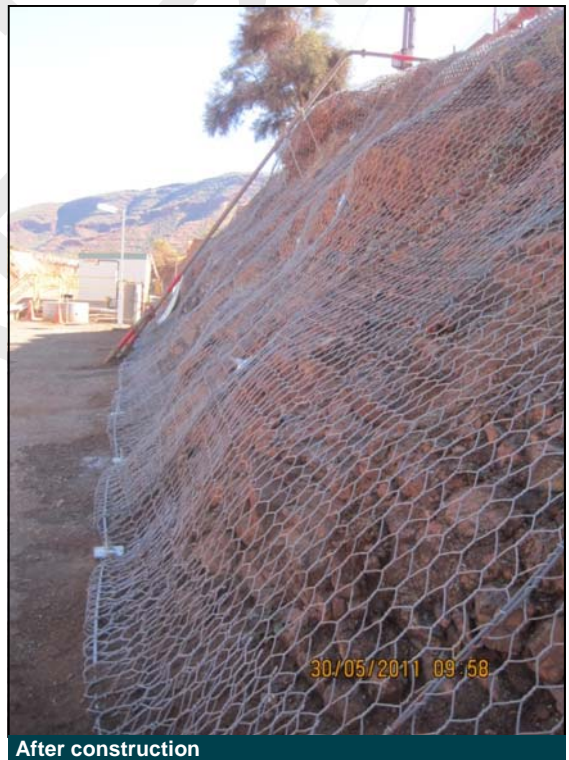


Installation, showing crest line and anchorages

Project specialist contractor, Specialised Geo, attached weights at the toe of the slope in Zone 3, to prevent the mesh lifting away from the slope and providing the necessary dampening effect should a rockfall detachment occur.

The drapery netting selected has to fulfil a number of project specific technical requirements as specified by the project consulting engineer, Aecom; the netting mesh had to be a double twisted hexagonally woven mesh with Class A Zinc/Aluminum galvanising in accordance with EN10244-2, with additional PVC protection. The mesh needed to have a valid British Board of Agrément (BBA) certificate and be able to demonstrate (via independent laboratory testing) a minimum 85% strength retention when one wire is cut during a punch test as per the ASTM A975-97 specification.

This last requirement is particularly important as it replicates what can happen in the field during a rockfall event. Chain link type "single twist mesh netting" can retain around 25% of their strength in the same test procedure due to the mesh unravelling. Double twisted rockfall netting has the locked / stitched connection between wires, which prevents the spread of any local puncture damage. Double twist mesh is the only rockfall mesh type to have a widely accepted, standardized test method (ASTM A975) to evaluate its technical properties.



After construction

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