

ROCKFALL PROTECTION AT IRON ORE MINE PARABURDOO MINE, WESTERN AUSTRALIA

ROCKFALL PROTECTION

Product: PVC coated double twist woven rockfall protection mesh

Problem:

The Paraburdoo Mine is an iron ore mine located in the Pilbara region of Western Australia. The mine is owned and operated by Rio Tinto Iron Ore.

A rock slope within the mine was exhibiting signs of instability and required stabilisation to ensure the ongoing safety and operations within the Paraburdoo mine.

Solution:

A rockfall drapery system was required for a rocky 40°, 60m high slope near the primary crusher at Paraburdoo. Rocks falling from the slope could interrupt operations, logistics, or cause health and safety issues for the mine operatives.

The project Consulting Engineer, Coffey Mining, required certain technical parameters for the rockfall protection measures to contain falling rocks; 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.

The crest-line anchorage comprised 5.8m long, 28mm-500/550 MPa threaded steel bars at 2.4m centres. Hemispherical ‘domed’ nuts and 150x150x12mm bearing plates were used to connect the DT rockfall netting to the anchors through a longitudinal cable encapsulated within the mesh. Due to the presence of a thicker selvedge wire at the ends of the mesh roll, overlapping is not required and therefore wastage is minimal. The adjacent rolls were connected together using high tensile stainless steel clips as per the ASTM A313 specification.

Client:

RIO TINTO IRON ORE

Main contractor:

SPECIALISED GEO

Engineer:

COFFEY MINING

Products used:

DOUBLE TWIST ROCKFALL PROTECTION MESH

Date of construction

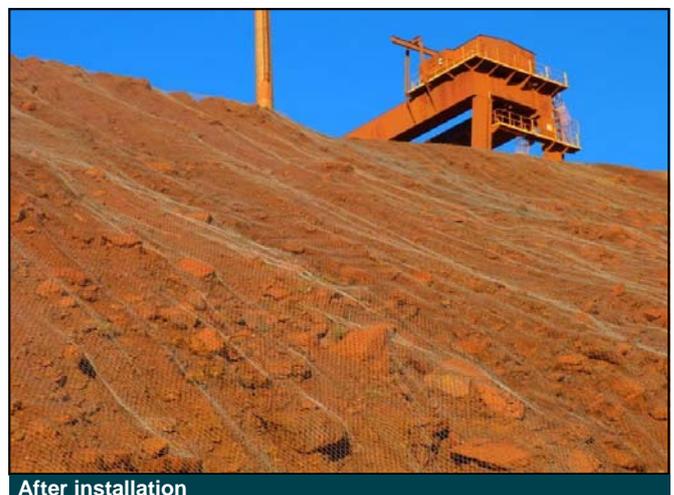
MARCH 2011



Before construction



During installation



After installation



The 60m high rocky slope



Double twist punch testing in progress

Using Maccaferri Mac.R.O.2 Drapery Design Software, the total stress in the drapery was calculated, based upon a 2.5m x 1.5m toe debris pocket with appropriate load factors.

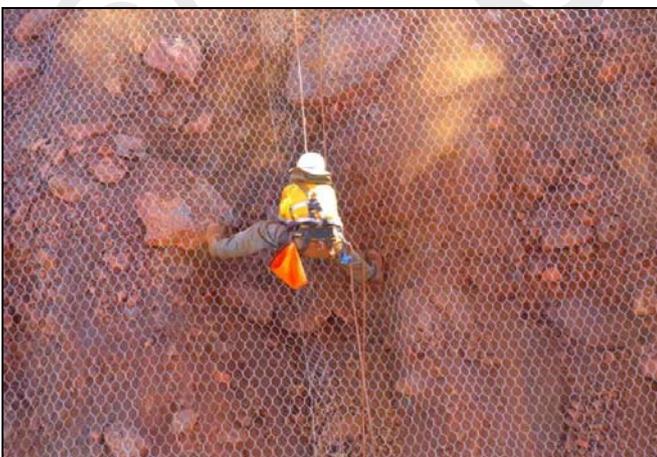
The Maccaferri double twist rockfall netting fulfilled the tensile strength requirements with a suitable safety factor proving it to be an economical and fit-for-purpose solution.

Specialised Geo, a specialist contractor, was awarded the rockfall protection installation contract. 6500m² of double twisted rockfall netting mesh was installed in only three weeks (including anchor drilling, grouting and conformance testing).

Maccaferri and its partners work closely with specialist rockfall protection installers and engineers. Maccaferri's comprehensive Rockfall Protection and Natural Hazard Mitigation system portfolio ensures that clients are offered cost effective and technically sound solutions. Solutions include traditional drapery, high strength meshes for drapery and secured/bolted facings, dynamic rockfall barriers, debris flow, attenuator and hybrid barriers and high capacity rockfall embankments.



Mesh deployment using a spreader frame



Connecting adjacent rolls with the pneumatic tool

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