

PROTECTION OF PARKER POINT DUMPER FACILITY DAMPIER, WESTERN AUSTRALIA

ROCKFALL PROTECTION

Product: PVC coated double twist woven rockfall protection mesh

Problem:

Rio Tinto is one of the world's leading producers of iron ore. Their three shipping terminals, Parker Point, East Intercourse Island and Cape Lambert in the Pilbara region of Western Australia, are managed as a single port system. Each terminal has facilities for train unloading, product stockpiling, blending and ship loading. The assets at Parker Point include two car dumpers, four shipping berths and two ship loaders with a capacity of 100 million tonnes per annum.

Solution:

It was identified that the nine rock cuttings adjacent to Car Dumper 3 (CD3) at Parker Point were intrinsically stable. However there was potential for rock falls from an individual rock or a number of unravelling rock detachments through slope relaxation and weathering. It was therefore decided that a mesh drapery system was required to safely contain rock debris that may fall from the slope.

An initial independent report (by others), suggested that a light weight (2mm Ø), collapsible, galvanised single twist mesh should be used as the drapery system. The client however showed concern that this mesh type is so highly flexible and would exhibit great deformation under load, that debris accumulation at the toe of the slope behind the mesh may impede on road users. Also, given the close proximity of the site to the ocean, the presence of highly alkaline ground water, meant that this mesh (which is only galvanised to Class B in accordance with EN10244-2) would not fulfil the required design life of the project.

Specialised Geo, the successful tendering contractor on the project proposed the use of GalMac[®] galvanised (95%Zn 5% Al Alloy to Class A EN10244-2) with an additional PVC coating, double twist woven rockfall protection. The client evaluated the performance and cost benefits associated with this mesh type and agreed that it met the demands of the project. This mesh type is classified as possessing 'moderate stiffness' and 'moderate strength' (<60KN/m) making it ideal for use as a drapery system on these 12m high slopes. The double twist technology ensures that this mesh configuration does not unravel in the event of wire breakage.



Before construction



Shotcrete sprayed over the mesh in some locations



Installation of the PVC coated double twist netting

Client:

RIO TINTO

Main contractor:

SPECIALISED GEO

Products used:

DOUBLE TWIST ROCKFALL PROTECTION MESH

Date of construction:

2005-2009



View of the installed double twist mesh on one of the rock slopes

Geofabrics Australasia provided a drapery proposal to Specialised Geo using the Mac.R.O.2 design software. The software utilises Muhunthan B. et al. (Washington State DOT, 2005) to design the mesh, the catenary theory to design the top cable and the Bustamante-Doix theory to design the top anchors.

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.

Selection of the optimum solution is based upon the analysis of the project site conditions (geology, topography, environment and static and dynamic loading conditions) and client requirements (design life, risk and maintenance commitments).

Maccaferri double twist (DT) mesh is available in a variety of strengths and corrosion protection coatings to suit exposure and design requirements. The mesh can be supplied with a range of installation accessories including C-rings and pneumatic lacing tools to increase productivity. Due to the presence of a thicker selvedge wire at the sides of the mesh roll, overlapping between laterally adjacent rolls of mesh 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.



One of the slopes protected with double twist rockfall mesh

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