

Project Info



17 / 12 / 21



CC5™ Bulk Rolls



5,600m²



Vertical layers



Pedra Branca Mine, Agua Azul do Norte, State of Para, Amazon Region



ROXOR Services and Equipment Rental EIRELI



CC5™ used to provide erosion protection to slopes at the entrance of the Pedra Branca Mine.



Completed CC5™ Installation

In December 2021, Concrete Canvas® CC5™ GGCM* was used to provide erosion protection on slopes located at the entrance to a Box Cut of the Pedra Mine in Agua Azul do Norte in the State of Para, preventing weathering of the surrounding soils.

An erosion protection solution was required to prevent further erosion of the soils on the steep slopes located at the entrance of the Pedra Mine, as the initial construction of the infrastructure for the exploration of the mine left the slopes around it stripped of vegetation, leaving them susceptible to weathering and erosion.

A number of methods were initially considered for the project, including shotcrete and Turf Reinforcement Geomats. However, these options were rejected due to the difficulty of application. Raw materials for shotcrete were unavailable in the region and the installation would have interfered with mine operations. Turf Reinforcement Geomats are designed to allow vegetation to establish and provide erosion protection to the soils beneath, but using these would have introduced a potential maintenance regime on the steep slopes to control the vegetation growth. These factors drove the decision to use the Concrete Canvas® GGCM, as compared to the other options, the client decided that CC5™ provides a more suitable solution for fast construction and extreme environmental conditions, while ensuring operations continued and maintenance was reduced long term.

*Geosynthetic Cementitious Composite Mat





Mine entrance prior to works carried out



Contractors filling slope irregularities with sand-cement bags



CC5™ secured with 500mm steel pegs at the base of the anchor trench



A crest drainage channel was formed in CC and the anchor trench back filled with soil



CC5™ overlaps secured with sealant and 25mm screws



CC5™ hydrated with the use of a hose



CC5™ fully hydrated

CC5™ is a **Type I GCCM** and is defined in **ASTM D8364**, it is suitable for use on slope protection applications and was chosen for this project to suit the abrasion, wear and loading requirements. CC5™ is also **BBA** certified with durability in excess of 120 years when used to provide erosion control.

The works were carried out by ROXOR Services and Equipment Rentail EIRELI for AVB Mineracao Ltda, OZ Minerals and Australian Mining Group.

Prior to works commencing the slopes had to be prepared, which consisted of cleaning and removing the existing vegetation and filling any voids with sand-cement bags to correct any irregularities and create a uniform profile.

When all preparation works to the slopes were completed, the CC5™ was brought onto site in Bulk Rolls and were craned into place with the use of a spreader beam, laid vertically down the 25m slopes with 100mm overlaps to each adjacent layer. At the crest of the slope an anchor trench was dug and the CC5™ was secured with 500mm steel pegs and back filled with earth. Just in front of the anchor trenches, a crest drain was formed by excavating and draping the CC into it. This could collect any surface runoff and divert water away from the slope face and entrance of the mine. The slopes were too steep to secure the overlapping layers of CC5™ without the use of safety climbing equipment, so the contractors abseiled down the slopes and secured each overlap with an 8mm thick continuous bead of Concrete Canvas Ltd approved adhesive and 25mm stainless steel screws, installed every 200mm by a self-feeding screwdriver.

When installing the workforce had to deal with high-temperatures above 30°C and daily precipitations. To counter the adverse conditions, water trucks were brought onto site daily and pumped water via hose to allow CC5™ to be frequently hydrated throughout the day.

The installation was carried out by 6 installers on three different fronts and took a total of 57 days, with CC5™ taking 25 days to install. The client was satisfied with the delivery and implementation of CC5™ and is willing to expand the application on site.