SLOPE PROTECTION

Project Info

- September 2020
- CC5™ Bulk Rolls
- 900m²
- Vertical layers
- Hilton, South Africa
- Adferiad
- CC used to provide a slope protection solution to an earth cutting to prevent erosion and damage to surrounding buildings

Completed slope protection installation in Hilton, South Africa

Project Introduction

In September 2020, Concrete Canvas® (CC) GCCM* was specified as a slope protection solution to provide erosion to an earth cutting situated behind a tree nursery in Hilton, South Africa.

The cutting, situated behind client Mondi PLC's tree nursery, was prone significant erosion caused by run-off. As a result, there was continuous disruption to the nursery operations as well as damage caused to the facilities from time to time as boulders were dislodged from the slope face. Hilton is subject to a very wet rainy season that continuously poses a risk of these boulders coming loose and causing damage to Mondi's assets. Mondi therefore required a slope protection solution which would prevent future disruption and damage.

The works were carried out by Adferiad for Mondi PLC, with consultation provided Loretz & Associates. Support was provided throughout by Concrete Canvas Ltd's partner, Kaytech.

*Geosynthetic Cementitious Composite Mat

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Specifying Concrete Canvas® GCCM

Access to the slope was very limited due to its close proximity to the perimeter electric fencing and the back of the tree nursery building. Options such as sprayed concrete or construction of a mechanically stabilised earth (MSE) wall were therefore infeasible due to access restraints, potential for damage to the fence or building during installation, and potential disruption to operations at the nursery.

Concrete Canvas® was considered due to its ease of installation; the material can be cut to required lengths and deployed by hand where necessary, reducing or eliminating the requirement for plant and large vehicles on site, simplifying the installation process and reducing the risk of disruption and damage to the site and nursery. CC is also flexible and easy to manipulate, a significant advantage on sites where accessibility is a concern.

As a result of its properties, CC was chosen for the project. A 5mm thick variant of the material (CC5™) was specified in bulk roll format.

Slope before works

Rocks and boulders removed and slope face trimmed

Anchor trenches created at crest of slope

Geotextile laid as a filtration layer between CC and slope

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Installation of Concrete Canvas® GCCM

Prior to the installation of CC, large rocks, loose stones and all vegetation was carefully removed from the slope face, which was then trimmed to provide a more uniform profile on which to install the CC.

As per the design specifications, a geotextile was laid on the slope face to act as a filtration and separation layer below the CC. The CC bulk rolls were mounted on a spreader beam, dispensed from a stand positioned at the crest of the slope and cut to required lengths. These lengths of CC were then deployed vertically down the slope face with the material ends at the crest secured within a 300mm deep anchor trench. CC at the toe was terminated onto the existing concrete drain with masonry fixings at 200mm spacings. Lengths of CC were laid so as to overlap the last by 100mm, with stainless steel screws inserted along the overlaps at 100mm centres, positioned 30mm from the edge of the overlapping layer. No sealant or other jointing methods were used on this project so as to allow for the dissipation of any subsoil water permeating through the substrate. The geotextile layer below the CC allows the water to flow between the layers, without risk of further erosion to the slope below.

Once the installation was completed, the CC was hydrated twice at 60-minute intervals to saturation and then a final hydration was given at the end of each day's installation. Following hydration, the anchor trenches were backfilled with a cement stabilised non-erodible gravel and compacted with a mechanical rammer.

Bulk rolls dispensed at crest of slope and deployed vertically down slope face

CC installed over geotextile barrier layer

Hydration of CC

Open side edge buried in anchor trench

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Site before works

Site after ground preparation

Site after completion of works

Project Outcome

A total of 900m^2 of CC5™ were installed by a team of six over the course of a week. An average of 200m^2 were installed per day. The project has been deemed a great success and CC has met all the client's requirements.

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