

Project Info



04 / 03 / 19



CC5™ and CC8™ Bulk Rolls



9750m²



Transverse and Longitudinal layers



Ahafo, Ghana



Ropeak Limited



CC5™ and CC8™ were used to provide slope protection and drain lining at the Ahafo Mill Expansion project site



Completed slope protection installation section

The Ahafo Mill Expansion (AME) Project, carried out at a Newmont Ghana Gold Limited (NGGL) site in Ahafo, Ghana will increase mill capacity to nearly ten-million tonnes by adding a crusher, grinding mill and leach tanks to the circuit. The expansion supports more efficient processing of harder, lower grade ore from existing surface mines, as well as Ahafo's stockpiles and the Subika underground mine.

Concrete Canvas® (CC) GCCM* was specified as a solution for slope protection for slopes adjacent to the new reinforced earth wall, protection of earth wall footings and lining of slope toe drains for conveyance of slope runoff to the adjacent sump pump.

The length of the slope varied from 5m to 30m, while gradients were typically 1:1.5 but as steep as 1:1 in some areas. The toe drain measured approximately 2m wide in profile.

Stone pitching was originally planned for specification for the slope protection and toe drain lining. However, due to the dangers associated with working on slopes of this scale and their limited access, along with the slow installation process for stone pitching, a more feasible solution was sought.

The client, NGGL, and contractor, DRA, approached Concrete Canvas Ltd for a solution that would enable limited exposure, safe working conditions and, of course, technical competency.

*Geosynthetic Cementitious Composite Mat



Concrete Canvas® can be installed with minimal plant requirement and with no back spray, debris or rebound associated with traditional concreting methods, reducing risks for contractors. The material is up to 10 times faster to install than alternatives, and can be installed with no requirement for specialist training, equipment or personnel, reducing time on site and costs.

Furthermore, the rainy season in the Ahafo region of Ghana runs from April to August each year. The CC installation began in early March, making timely completion of this aspect of the project of paramount importance. CC can also be installed in wet weather conditions due to its 2-hour workability period following hydration. The nature of the site meant that continuance of works in the wet could be dangerous for installation crews working with conventional materials, like stone pitching. As a result, CC was chosen in place of stone pitching.

Prior to installation, all vegetation and sharp protruding rocks were removed from the slope profile. The slopes were then raked free of detritus material and voids filled with cement stabilised gravel. Anchor trenches measuring 300mm deep were excavated a metre behind the crest and at the toe of the slopes. These would later be used to capture the material edges before being backfilled to prevent water ingress below the material. In the drains, the profile was excavated according to capacity requirements. Longitudinal fall and shallow termination anchor trenches measuring 100mm deep were created adjacent to the drains for the capturing of material.



Slope section prior to works



Installation site



Slope section following ground preparation



Bulk roll on standing frame-mounted spreader beam for deployment



Deployment of CC bulk roll



Joining CC overlaps with stainless steel screws



Termination of CC to existing wall



Installation progress

The specified bulk rolls of CC5™ and CC8™ were transported to site by Hiab crane and positioned behind the crest of the slopes for deployment. A standing frame-mounted spreader beam was used to deploy the CC, which was then cut to required length for installation in order to minimise wastage at the toe of the slope following deployment, or within the drain channel.

Layers of CC were installed with a minimum 100mm overlap. These overlaps were jointed using 30mm stainless steel screws at maximum intervals of 150mm. The material edges were secured within the anchor trenches through the overlaps with 300mm long galvanized steel pegs. On the slope face, additional anchor pegs, both barbed and galvanized, with nut fastened washers, were installed at 3,000mm spacing to all overlaps. CC was terminated against the RE Wall by pre-drilling and fastening at 100mm spacing with M8 mechanical anchors.

Following installation, CC was hydrated using pumped water from a 5,000 litre storage tank which was filled daily. Following initial hydration, CC was hydrated at 30-minute intervals a further three times to ensure sufficient saturation in the high temperatures experienced. All personnel working on the slopes were harnessed and used rope access for safe and secure installation of CC.



Hydration



Corner section



Section of slope: post-hydration (left) and pre-hydration (right)



Completed CC lined slope sections

Installation was completed over a 2-month period, inclusive of site preparation and changes to work sequencing. The area adjacent to the toe of the slopes was highly congested with other construction activities taking place, however, the contractor, Ropeak were still able to maximise productivity with installation in these challenging conditions.

The project has been deemed a success by both the client and consultant. None of the parties involved had used CC before, but were extremely happy with its ease of installation, suitability for the project requirements, safe handling capacity, speed of installation and costs. The CC installation project was completed on time, before the start of the rainy season, and with no injuries. A total of 9,000m² of CC5™ were installed on the slope, and a further 750m² of CC8™ within the drains.