

Project Info



24 / 02 / 2020



CC5™ Bulk Rolls



23,700m²



Vertical layers



Ras Al Khair, Saudi Arabia



FOQSCO



CC5™ used to provide bank erosion protection to an RSA pond required for Bauxite liquor storage.



Completed CC bank erosion protection installation

In February 2020, Concrete Canvas® GCCM* was specified for a project in Ras Al Khair, Saudi Arabia, where an erosion prevention measure was required for embankment side walls.

The site is owned by the client Ma'aden Aluminium, a joint venture between mining company Ma'aden and American aluminium production company ALCOA. The client required a solution which could provide bank erosion protection to a newly constructed RSA (residue storage areas) pond which would be used to store Bauxite liquor produced by the company. Two ponds had already been constructed and were in operation; however, it had been witnessed in the existing ponds that winds would create waves in the stored liquor which would then cause erosion of the slopes over time, exposing the lining beneath the soil and damaging any existing infrastructure such as pipe sleepers at the crest of the slope.

Several solutions were considered for this project, including Geogrid, a Composite Geotextile System and a Bituminous Geotextile were all considered for the project. The Geogrid and CGS were considered but were eliminated as the products did not fully meet the client's requirements. The Bituminous Geotextile and Concrete Canvas® (CC) were both tested by third party labs with Bauxite Liquor to establish their ability to withstand the erosion caused by the liquid. The Bituminous Geotextile was unable to meet CC's chemical resistance to Bauxite and was therefore specified due to being the ideal solution. The rapid installation rates of CC were also a significant advantage.

*Geosynthetic Cementitious Composite Mat





Site prior to works



Anchor trenches were created prior to installation



CC bulk rolls deployed from slope crest



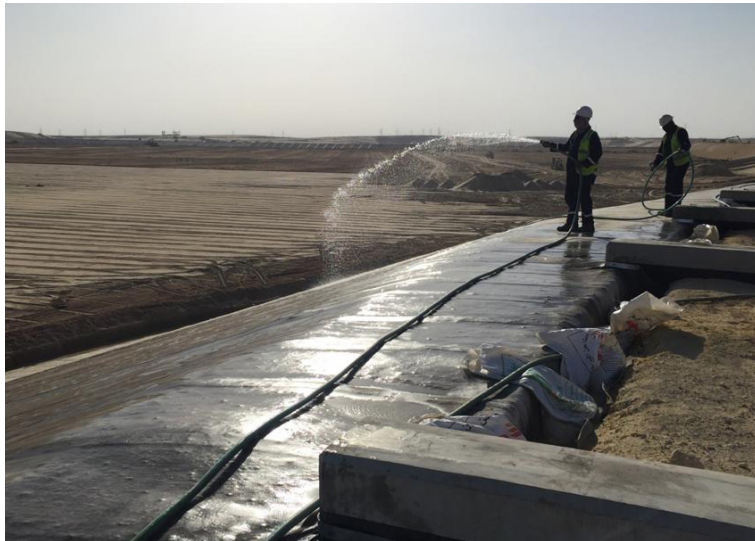
CC laid vertically



Screws inserted in a zig zag pattern to joint overlaps



Steel bars and bolts used for CC to concrete terminations



Hydration



Anchor trenches backfilled to prevent ingress below material



CC easily accommodates existing infrastructure



Completed installation



A total of 23,700m² of CC5™ were installed

Prior to the installation, the slope was graded and compacted to ensure a smooth surface on which to install the CC. Anchor trenches were then prepared at the crest and toe of the slopes, with the contractor taking care to ensure the excavation of the anchor trenches did not disturb or damage the lining below the top soil.

Bulk rolls of the specified CC5™ were mounted on a spreader beam and suspended from a boom truck at the crest of the slopes for easy deployment. The material was unrolled down the slope, laid vertically with subsequent layers overlapping the last by 100mm. The leading and trailing edges of each length of CC material were captured within the anchor trenches and secured to the substrate using ground pegs at 0.5m intervals. The material below each overlap was hydrated and the upper layer replaced prior to jointing of the overlaps using stainless steel screws applied in a zig zag pattern at 50mm centres. Once each section was completed, the material was hydrated using a water tank and hose with sprinkler head attachment and the anchor trenches backfilled using marl. Where CC terminated against concrete sleepers, stainless steel strips and bolts were used to prevent ingress below the material and ensure a neat termination detail.

A total of 23,700m² of CC5™ material were installed by contractor FOQSCO. A team of ten carried out the works over 24 days, with around ten hours worked per day in hot, dry conditions.

This rate of installation would not in any way be possible using conventional concrete and was not technically viable with the alternative solutions considered for the project. The client had provided a very tight deadline for this project, as they had to make part of the pond operational. The use of CC on this project meant the installation was completed well before the deadline. The project was highly successful, particularly in terms of time savings and ease of installation for the contractor.