

Project Info



10 / 07 / 19



CC5™, CC8™ and
CC13™ Bulk Rolls



3000m²



Vertical layers



Al Bahah, Saudi Arabia



FOQSCO



CC was installed as a
slope protection solution
for a road-side hill to
prevent erosion and
reduce risk of rock fall
onto the road



FOQSCO



Completed installation in Al Bahah, Saudi Arabia

A road-side slope in Al Bahah, Saudi Arabia was posing a risk to road users and therefore required lining. Surface erosion caused by rainfall loosens the slope substrate, risking rockfall from the slope damaging the road and endangering road users. The slope measured 20m in width, with a height ranging from 5.5m to 22m.

Shotcrete was considered for the project but would have required closure of the road to prevent back spray and rebound causing issues for road users, as well as specialist labour and heavy plant. Shotcrete would also be a more time consuming and costly option.

Concrete Canvas® (CC) GCCM* was found to be the ideal and chosen solution due to its rapid installation rates, ease of use and cost savings in comparison to more traditional methods. Additionally, CC allowed for a much cleaner install, with none of the issues associated with the rebound from shotcrete, while also providing a more organic, natural looking finish. The works were carried out by FOQSCO for the Ministry of Transport.

To prepare the slope for installation, large or protruding rocks and vegetation were removed using shovels and a pickaxe. Anchor trenches were then cut into the crest and toe of the slope using a JCB backhoe and excavator, which would later serve as a means to bury the CC edges and provide a neater termination.

*Geosynthetic Cementitious Composite Mat





The slope's unstable substrate was at risk of endangering road users



Anchor trenches were dug mechanically at the crest and toe



Deployment of CC bulk rolls from the slope's crest



Joining overlaps using stainless steel screws



A team of 13 worked on the project



CC's flexibility allowed for close contact between the slope and material



CC was painted following install to allow the material to blend in more successfully with the surrounding environment

Bulk rolls of all three thicknesses of CC – CC5™, CC8™ and CC13™ - were delivered to site and when required, mounted onto a spreader beam and hung from a JCB and excavator for deployment. All three thicknesses were used on this project for evaluation purposes, allowing the client to monitor the performance of each for reference should they opt to use CC in future projects.

A geotextile was placed on the slope to protect the CC from snagging during deployment. The rolls were then lifted to the crest of the slope, with the leading edge placed in the pre-prepared anchor trench, secured using ground pegs and then rolled down the slope face. This method was repeated for the total width of the slope requiring lining, with subsequent layers overlapping the last by 100mm.

The material was hydrated below the overlap, and the overlapped joints then screwed together using stainless steel screws. At the toe, the edge of the CC was captured and secured within the anchor trench, as with the crest. Drainage pipes were also installed at the bottom of the slope to ensure the flow of rain and waste water. Once installation was completed, the material was hydrated using a water tank and hose attachment, the anchor trenches were backfilled using poured concrete and reinforced with steel bar beams. CC was painted after installation.

The installation was carried out in a total of 12 days, with the installation team working an average of 10 hours per day. Over 3000m² of CC material was installed in dry conditions and moderate temperatures. The project was a great success in terms of both time savings and installation ease. If the same project had been carried out using conventional concrete, the team estimate it would have taken in excess of 3 months to complete.

View the full case study video [here](#).