

## Project Info



11 / 06 / 13 and  
24 / 04 / 15



CC5™ Bulk Rolls



1250m²



Vertical layers



Pozuelo dde Alarcón,  
Madrid, Spain



TEDECON on behalf  
of Metro Ligero Oeste



CC5™ used to prevent  
rainwater runoff  
infiltrating a slope and  
causing slip.



Completed installation

In June 2013, Concrete Canvas® GCCM\* (CC) was used to protect a slope located in Pozuelo Oeste Station, Pozuelo de Alarcón, Madrid, Spain.

Rainwater runoff was infiltrating the slope and risking slip, posing a severe threat to the railway line at the slope's base. Shotcrete was considered, however this would have created large amounts of rebound, requiring the closure of the railway line and the need to protect the surrounding sensitive infrastructure. Rope access was required due to the steepness of the slope, and the proximity of the rail line and nearby road caused further access issues. The works were carried out by TEDECON for Metro Ligero Oeste.

The slope was graded and any vegetation or loose rocks were removed to ensure CC was in intimate contact with the substrate. A channel was cut into the crest of the slope, allowing the rainwater to be channelled toward the existing water management infrastructure, namely a channel running down the side of the slope and another channel at the toe. An anchor trench was excavated adjacent to the channel to prevent water ingress under the CC.

Bulk rolls of CC5™ were delivered to site and mounted onto a spreader beam hung from a crane. The CC was spooled transversely down the slope with an overlap of 100mm created between layers, before being fixed at the crest with ground pegs inserted every 500mm.

\*Geosynthetic Cementitious Composite Mat







*Site before works began*



*Prepared slope, drainage channel and anchor trench*



*CC5™ spooled down slope*



*Pegs inserted every 500mm prior to screwing*

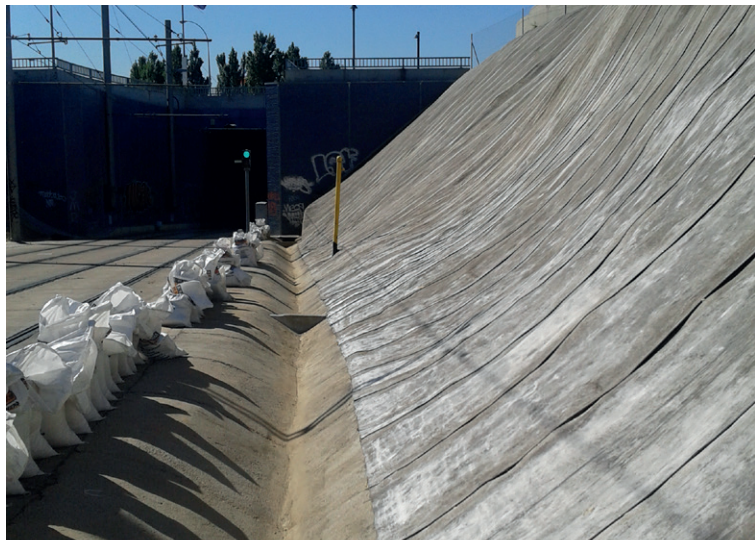


*Hydration*



*Fixing to existing concrete infrastructure*

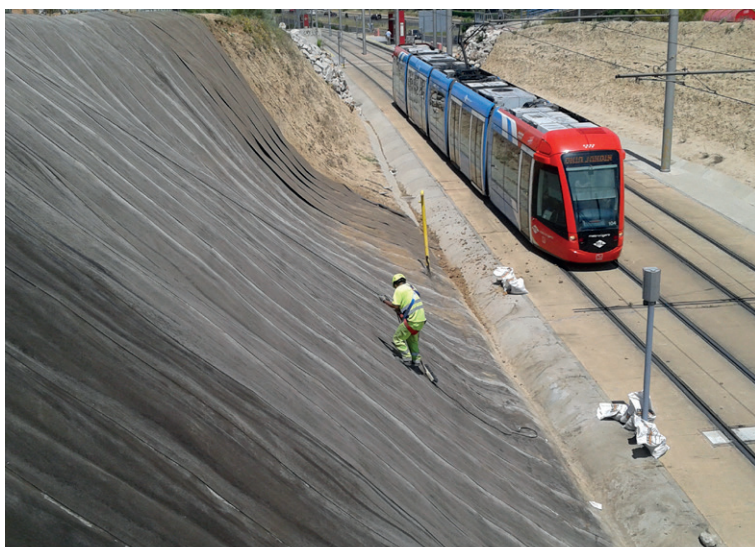




*Drainage channel at toe of slope*



*Backfilled anchor trench and drainage channel*



*Completed section of slope*



*Completed installation*

The overlaps were sealed and screwed with 20mm screws at 500mm centres and masonry screws were used to fix the CC to the existing concrete infrastructure. Hydration was achieved using a 5000L water bowser and hose with spray nozzle attached. Once hydration was complete, the anchor trench was backfilled to prevent undermining of the CC. The CC was rehydrated after 1 hour to counteract the affects of surface evaporation due to the high temperatures.

In total, 600m<sup>2</sup> of CC5™ were installed by 5 people in just 4 days, with daytime temperatures averaging 35°C. The client, Metro Liger Oeste, was impressed by the speed and ease of install. The train line was able to remain open for the duration of the works, resulting in minimum disruption to the rail service. Additionally, the reduced time on site and ease of installation provided a safer working environment for those installing the CC.

The client specified this installation as a trial, deliberately choosing a slope which would be more challenging to line to see how CC would perform. After two years the client approved CC for further use and immediately specified CC to line the slope on the opposite side of the track. The process was much the same, with the slope graded and any vegetation removed before installation. An anchor trench was cut at the shoulder before bulk rolls of CC5™ were unrolled down the face of the slope. Ground pegs were used to fix the CC to the substrate and the overlaps were sealed and screwed at 200mm centres.





*Substrate before works began*



*Prepared slope opposite existing CC installation*



*Ground pegs and anchor trench*



*Screws inserted every 200mm*



*Train line remained open throughout the install*



*Both completed CC installations*