CONCRETE CANVAS

SLOPE PROTECTION



In April 2018, Concrete Canvas[®] GCCM^{*} (CC) was used to protect two sections of slope, four drainage headwalls and a drainage channel near a residential area in Panama.

The slopes are situated next to a river which, during the rainy season, can see water levels rising to the point of affecting the base of the slope, causing instability. As a result, it was decided that the slope should be protected.

Shotcrete was considered but would have been much costlier and more time consuming. At the time of installation, the rainy season was also beginning, which would affect the development of the application of shotcrete. Due to its cost, speed and safety advantages, CC was specified for the project, with bulk rolls of CC5[™] chosen. The works were carried out by Geosynthetic Engineering Services S.A. (SIGSA Panama).

To provide greater logistical efficiency, the various aspects of the site were measured, the installation planned and the material cut in the warehouse prior to installation. Anchor trenches were then excavated, and vegetation and debris were removed from the substrate before it was re-graded and levelled. Sand was used to fill gaps around the drainage heads and in certain sections of the slope, to provide a uniform finish and level substrate on which to lay the CC, ensuring intimate contact between the material and the ground.

*Geosynthetic Cementitious Composite Mat



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CC was laid down slope faces and overlaps iointed using screw



CC installed within drainage channel leading to rive





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The pre-cut lengths of CC5[™] were transported to the site and laid in place by hand, with 100mm overlaps at each joint. The edges of the material were secured within the anchor trenches using ground pegs or metal bars and screws where required, depending on the state of the compacted surface. The CC below overlaps was then hydrated and the joints sealed using an adhesive sealant and jointed with screws at 150mm intervals. The CC was then hydrated fully. Once installation was completed, the anchor trench at the crest of the slope was backfilled and the substrate compacted, while the trench at the toe was fixed with U-shaped metal staples and backfilled using mortar. Where the slope connected with a lower drainage channel, the material was laid continuously from the crest, down the slope and along the channel, before terminating in an anchor trench on the far shoulder of the channel. For this section, the anchor trenches were backfilled and the installation completed in the same way.

A total of 3,800m² of CC5[™] was installed in 10 days by a team of 5 at the start of the region's rainy season.

CC has a window of 2 hours following hydration in which it is still workable, meaning any inclement weather or heavy rain experienced during the installation would not hold up the works. It is also impossible to over-hydrate CC.

