CONCRETE CANVAS®

DITCH LINING

Project Info

- 05 / 12 / 13
- CC8™ Bulk Rolls
- 7,250m²
- Transverse & Longitudinal layers
- Albania, La Guajira, Colombia
- MERT S.A.S
- CC8 used to line ditches at a mine, to provide drainage and prevent erosion

Completed section of ditch

In December 2013, Concrete Canvas® (CC) GCCM* was used to line twelve drainage ditches at a mine in Albania, Colombia, dealing with both natural rain water as well as man-made drainage issues caused by the local mining activity.

The original ditches were carved from the substrate with no extra lining and had varying lengths and profiles. As no lining had been incorporated the original ditches suffered from extreme erosion and were causing damage to the local environment, the National Authority for Environmental Permits (ANLA) required the urgent installation of a protective lining to prevent any further damage to the surrounding environment. Problems included cracking, undercutting and root growing vegetation and debris restricting water flow and exacerbating the issues of erosion.

A geo-membrane and gabion combination was considered, however CC was specified due to its ability to cope with the existing pipe work, accommodate the variance of profile and the ease at which baffling could be created. Furthermore, the speed of installation was key due to the possible use of financial penalties should drainage measures not be in place by March 2014. The use of CC meant measures could be in place ten times faster than using conventional concrete meaning penalties could be avoided completely.

The works were carried out by MERT S.A.S.

*Geosynthetic Cementitious Composite Mat

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DITCH LINING

Severe vertical erosion and vegetation growth

Slope and ditch erosion, cracking and vegetation

Erosion, spalling and debris

Cracking and undercutting of ditch walls

Prior to installation, the ditches were cleared of vegetation, loose soil and rock to ensure intimate contact with the substrate, before being graded to 45°. For the transverse layups, bulk rolls of CC8™ were delivered to site and cut to specific lengths to reduce wastage, these were then positioned and fixed in place using 13mm x 400mm ground pegs. Adjacent layers of CC were overlapped by 100mm in the direction of water flow and jointed using 3mm x 20mm zinc screws at intervals of 200mm. For longitudinal layups, a spreader beam and plant were used to unroll the CC along the length of the ditches. These were fixed in place using ground pegs every 1.5m and, again, jointed screws. Both layups were sealed with Sista FT 101 sealant along every overlap.

Slope protection was also needed in places, due to the existing pipe infrastructure and changes in elevation. CC allowed the slope protection and ditch lining to be installed almost seamlessly. Once the ditch was lined, further layers of CC8 were added, overlapping the CC used to line the ditch and extending up the slope, accommodating the existing pipe infrastructure. These layers were overlapped, sealed and screwed in place.

Baffling was also needed in a steep ditch known as 'Caida Potreito' to dissipate the water's energy, and prevent fast flowing water from undercutting the substrate. The ditch was graded to 45° before pairs of sandbags were offset at 2m intervals on either side at 45° angles to the direction of water flow, creating a meandering path to reduce the flow velocity. CC was then layered over them, fixed with ground pegs, and jointed with sealant and screws.

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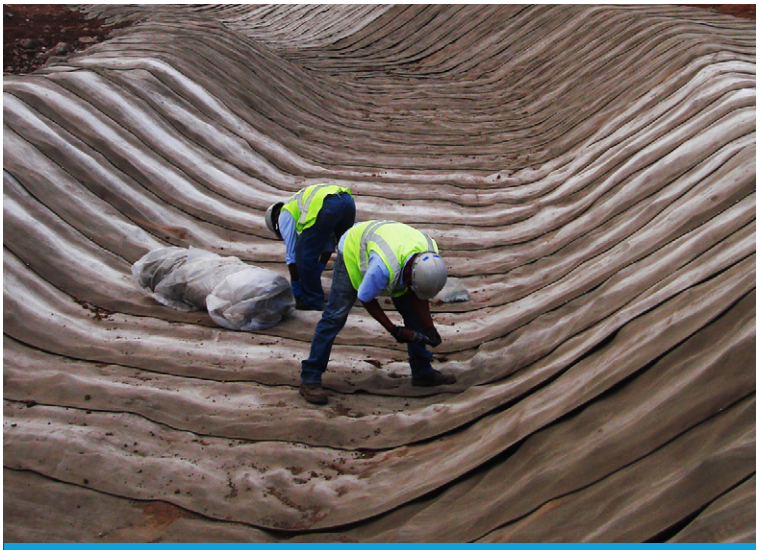
The ditches were cleared of debris and graded

CC8 was cut to length and then positioned



The overlaps were sealed and screwed

Sandbags were used to provide compression during setting

Hydration

Finished ditch

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The ditch below the slope was lined with CC8

This was then overlapped with the CC8 being used for slope protection

The CC8 was anchor trenched at the top of the slope

Placement was at 2m intervals (offset) to create a meandering route

The ditch with one layer of CC8 in place

The finished ditch with baffling

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DITCH LINING

A stepped change in height

Existing pipe infrastructure detail

CC8 laid longitudinally

CC8 laid transversely and anchor trenched

Ditch panorama

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DITCH LINING

Completed ditch

The CC was able to accommodate sharp bends, corners, sudden changes in depth and existing pipework. It also provided a natural, organic finish sympathetic to the environment, which will naturally blend in with its surroundings over time. CC8™ was specified due to the high flow rate expected and risk of debris being present in the water. In addition, installation was conducted in temperatures of 34 degrees Celsius - the speed of installation meant a reduced risk of dehydration and sunburn to the labourers.

The material was hydrated using a water truck and due to CC having a very low wash out rate and a low alkaline reserve, treatment of the run off from installation was not required.

The ditch linings were installed consecutively by a team of six over a seven week period, in high temperatures and under a tight deadline. The client was very pleased with the results and the ANLA officials visited the site and gave their approval of the lining, which allowed mining works to continue without financial penalty.

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