CONCRETE CANVAS®

CHANNEL LINING

Project Info

- 20 / 06 / 14
- CC8™ Bulk Rolls
- 2,090m²
- Transverse layers
- Sherston, Wiltshire, UK
- BAM Nuttall
- CC8™ used to line a drainage ditch at the top of a rail embankment to prevent slip

Completed channel 3 years after installation

In June 2014, Concrete Canvas® GCCM* (CC) was used to line a drainage channel located at the top of a railway embankment in Sherston, Wiltshire, UK. The works took place as part of the Great Western Electrification programme (GWEp), which involves raising and replacing various bridges, upgrading tunnels and carrying out safety improvement work to parapets between London and Cardiff. In this instance, local rail bridges were being elevated which resulted in the need to remove a nearby aqueduct which couldn't be repositioned. The drainage channel was designed to replace this loss of water management capacity and to prevent slip of the embankment through surface erosion and saturation.

Site access was limited due to the close proximity of the rail line and plant was only accessible via rented farm space, so speed of install was paramount. CC was specified due to its ease of and speed of install, which significantly reduced time on site and cost of access. With a fall of only 2mm, an unlined V ditch was deemed unsafe as ground and surface water would not drain correctly and cause risk of slip. Both an unlined ditch or a pipe work option would require regular and expensive maintenance, placing CC8™ as the most cost-effective solution. Installation was carried out by BAM Nuttall with consultancy provided by Network Rail in conjunction with ADAS (the Agricultural Development Advisory Service).

The trapezoidal ditch was excavated using 4T plant with V-bucket. It measured approximately 1m in depth, 750mm wide at the base with 60 degree banks. The overall profile varied along its length so a transverse layup was specified to maximise material efficiency. The profile was typically 2.2m wide and terminated into culverts at either end.

*Geosynthetic Cementitious Composite Mat

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Remote site location

The channel was graded prior to installation

Bulk rolls were delivered to site

The CC was laid transversely and cut, once laid, using a hand saw

Loose rock was removed from the invert so that there was intimate contact between the CC and the base of the ditch. Bulk rolls of CC8™ were called off in staggered deliveries to site providing logistical flexibility in line with the rate of install. The bulk rolls were deployed from spreader beam equipment to maximise speed of install. The material was unrolled into the ditch transversely and cut to specific profile length. Each layer overlapped the previous by 100mm in the direction of water flow before being fixed to the substrate using 250mm ground pegs at the crests of the ditch. Overlapped layers were screwed together to create a monolithic structure using 30mm screws applied with an auto-feed screwdriver at 200mm centres. The overlaps were not sealed to prevent any build up of hydrostatic pressure by allowing water ingress through weep paths. Finally the CC8™ was hydrated using a 1000L bowser and hose with a diffused spray nozzle before applying sandbags to compress the joints during setting.

CC8™ is an effective weed suppressant and will prevent root growing vegetation, reducing the future maintenance costs of the channel. However, the textured top surface of CC will naturally green over in time creating an organic finish more sympathetic with the surrounding environment. CC also has a very low wash out rate and low alkali reserve meaning that it was not required to treat the run off from installation.

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Ground pegs were used to fix the CC

Screws were used to joint overlaps of CC

Over 2,000m² of CC was used for the installation

Hydration was given via hose

The completed channel

A wider view of the finished installation

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The installation site was very close to a railway line, and therefore presented site access issues for the installation team

The CC8™ was installed over a 6 week period at a rate of up to 60 linear meters per day by a team of 7, in high temperatures, without requirement to take possession of the line. The install was deemed a huge success due to the time savings and cost effectiveness of using CC8™ over conventional concreting methods and is being considered for additional areas under the GWEp scheme.

"Great first impression, we've not used it before but would definitely do so again. It's easy to apply and doesn't require any complex methods; you just need to put it in place and add water. There are so many different applications for it, I will definitely be using it on future projects."

Richard Foster
Sub Agent, BAM Nuttall Rail

Three years after the installation, the site was revisited to review the performance of the CC8TM material and establish how effective it has been in providing drainage to the site. It was established that the channel and CC material are performing as designed, with the channel effectively preventing further erosion and slip in the surrounding area.

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