

Project Info



02 / 01 / 16



CC8™ Bulk Rolls



1,640m²



Transverse layers



Glyncorwg, UK



Jim Davies Engineering /
The Coal Authority



CC used to provide
scour protection to a
series of mine water
drainage channels in
South Wales.



[CLICK TO
WATCH VIDEO](#)

Completed CC lined mine water drainage channel

In January 2016, Concrete Canvas® GCCM* (CC) was used to line and provide scour protection to a series of mine water drainage channels at Glyncorwg Colliery, South Wales.

Set in the Afan Valley, South Wales, Glyncorwg Colliery is a disused mine that closed in the 1970s but continues to discharge bright orange ochre deposition downstream. The mine water treatment measures at Glyncorwg include approximately 500 linear metres of channels directing contaminated water through a series of reed beds, cascades, settlement ponds and weirs which run parallel to the river Corrwg.

The channels had previously been lined with an LLDPE liner protected by a nonwoven geotextile, which had degraded over many years due to UV exposure, puncture and wear, which would ultimately lead to contamination of the Corrwg. Vegetation had also established in the invert of the channels, forming blockages and risking overspill.

Site access was limited due to the proximity of the river Corrwg and the presence of a weak bridge. CC was specified as a long term protective replacement to the deteriorated geotextile and liner solution, having proved successful on previous contracts.

*Geosynthetic Cementitious Composite Mat





Completed CC lined mine water drainage channel

CC is a popular solution for the lining of mining drainage channels due to two key properties: firstly, the concrete used in the CC material is resistant to acids, particularly the sulphuric acid typically found in drainage waters associated with the oxidation of sulphides through coal mining.

Secondly, after limited exposure to mildly acidic waters the surface of CC forms a thin activation layer with strong biocidal properties. This limits the growth of the bacteria which catalyse the oxidation of sulphides, thereby reducing the rate at which waters acidify. CC therefore offers a more durable and chemically resistant lining option compared to conventional concretes, as well as offering greater protection to the surrounding environment.

The works were carried out by Jim Davies Engineering with, and for, the Coal Authority.



Ditch section showing deteriorated geotextile and LLDPE liner beneath



Temporary damming of channel sections prior to CC installation



Deployment of CC8™ material in bulk rolls via spreader beam equipment



Fixing of CC layers within an anchor trench using steel ground pegs

In preparation for the installation, sections of the drainage channels were dammed off with water flow directed further downstream, and anchor trenches were cut into the shoulders of the channels. The channels were then cleared of debris and deteriorated sections of geotextile whilst the liner was left in-situ.

The CC was unrolled on the flat and cut to specific profile length, before being positioned into the ditch with subsequent layers overlapping the previous by 100mm. The CC was fixed to the substrate using steel ground pegs inserted through every overlap within the anchor trenches. The overlaps were then jointed using stainless steel screws at 200mm centres. Hydration was achieved using a bowser and hose combination with spray nozzle attached, after which the anchor trenches were backfilled.

Sections of the channel were beyond the reach of plant equipment and required the manual transportation of the materials across a narrow bridge and up a steep slope. CC allowed for a concrete solution to line these drainage channel sections where it would have been impossible to use conventional concrete options.



Joining adjacent layers of CC with an autofed screw driver



Backfilling anchor trenches after hydration of CC



Completed north section of CC lined drainage channel network

1640m² of CC8™ were installed just over 4 weeks to provide durable, long term scour protection to the network of drainage channels. Install rates of over 200m² per day were achieved in often severe weather and poor ground conditions. CC has a delayed setting window of 2 hours, giving contractors time to install the material in extremely wet conditions without the fear of premature setting. Following the success of the installation, similar schemes within the region are being considered by the Coal Authority for remediation using CC as a rapidly installed, low logistical footprint and environmentally friendly measure of mine water treatment work improvements.

CC provides excellent resistance to UV degradation, puncture and freeze-thaw action, whilst being resistant to acids, alkalis and sulphates. It has a minimum design life of 50 years for the most arduous of applications and will significantly prolong the life and serviceability of the drainage channels for decades to come.

A variant of CC called CC Hydro™ was launched in 2015, incorporating a reinforced geomembrane and welding strip with the original product. This increases the level of impermeability of the product to 10-12m/s, allows for testable thermally welded joints and could replace a plastic liner and protective nonwoven geotextile option with an all-in-one solution. CC Hydro™ is being considered for lining newly opened drainage channels and settlement ponds at other mining sites in the UK.



Section of channel inaccessible by plant which would have been impossible to line with conventional concrete methods



Man portable batched rolls of CC8™ were carried across the narrow foot bridge and up the steep bank



Culvert interface



Completed section of CC lined mine water drainage channel