

Project Info



13 / 07 / 20



CC8™ Bulk Rolls



727m²



Transverse layers



Merthyr Tydfil,
South Wales



Jim Davies Civil
Engineering Ltd



CC used to remediate
an existing concrete
channel to extend its
design life



The Coal
Authority



Completed channel remediation installation in Merthyr Tydfil

In July 2020, Concrete Canvas® (CC) GCCM* was specified by Jim Davies Civil Engineering Ltd as a remediation solution for an existing Coal Authority-owned concrete channel.

The channel conveys constant flows arising from an underground drainage tunnel situated on Aberfan Tip. The Coal Authority's proactive inspection and maintenance programme identified the need to futureproof the existing channel. The channel in question measures 120m in length by 4m wide, with an invert 1m deep and 2.5m wide.

The client, The Coal Authority, sought a lining solution which could be used to remediate the damaged channel and extend its design life while maintaining its hydraulic capacity.

Initially, the contractor had considered cutting a new channel to be lined with CC8™, or to remove the existing concrete channel and line the regraded structure.

Access to the site was severely restricted due to thick woodland and no permanent road. As a result, conventional solutions with large logistical footprints were ruled-out, including cutting a new channel to be lined with concrete or CC8™, or removing and replacing the old concrete rip-rap.

*Geosynthetic Cementitious Composite Mat



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Prior to the CC installation, extensive de-vegetation was required with supervision of an ecologist, with trees and undergrowth having to be removed to create an 8m wide access lane adjacent to the channel.

A temporary pipeline was then installed using 500mm twin wall carrier pipe. The flows were dammed by utilising the culvert headwall at the top of the channel using a waterproof membrane and sandbags and the water allowed to flow through the temporary pipeline to de-water the channel.

Large pebbles at 100mm in diameter had been embedded into the invert to create baffles. These were removed and the resulting voids filled with fast-setting concrete.

A 30m stretch on the steeper section of the channel was then regulated by placing timber shuttering in the invert and pouring concrete steps with a backfall to form a cascade in order to reduce the flow velocity. This provided a uniform surface on which to install the CC. Finally, the verge on each shoulder of the channel was cleared of topsoil and vegetation.



Site prior to works



Shuttering was installed for installation of concrete base



Spring dammed and pumped from top of channel to allow works



Stream diverted to lower channel through temporary pipeline

Bulk rolls of the specified CC8™ were delivered to site and deployed via a spreader beam suspended from an 8T excavator. The installation began downstream to ensure overlapping layers of CC were shingled in the direction of water flow to prevent ingress.

Holes were drilled into the concrete and stone and Galvanised M10 75mm long through-bolts then fed through the CC into the holes beneath. This method was used to both secure the material to the concrete channel along the edges, and also to join the overlapping layers as stainless-steel screws were not a viable option for this stage. Each through-bolt was placed at centres not exceeding 500mm with a 25mm stainless steel washer holding the CC in place.

At several points along the channel, pipes protruded through the concrete into the channel invert. In these instances, the CC was easily cut to fit around the pipes. Grout was then applied to seal the cut edges and prevent water ingress between the CC and concrete channel.

Once installation was completed at the end of each day, a pump was used to hydrate the CC. Soil was then used to bury the edges of the CC to prevent ingress.



Rocks removed from channel invert and voids filled with fast setting concrete



CC deployed from excavator and spreader beam



CC was cut to required lengths for each channel section



Subsequent layers of CC overlapped by 100mm



Holes drilled through CC into concrete below for installation of throughbolts



CC was able to accomodate steps created as baffling solution



CC edges secured to concrete channel and later backfilled



CC cut to accomodate pipe protrusions and edges sealed with grout



CC termination detail using steel clamping bar



Completed installation



CC remediated channel back in operation

A total of 727m² of CC8™ were installed over a two-week period, with an initial three weeks required prior to installation for the site and channel preparation works. The client and contractor both deemed the project a success.

The installed CC8™ will ensure that the life of the channel will be extended by up to 120 years in accordance to the 120-year durability of the material as certified by the British Board of Agrément.

The 8mm thick CC material will provide a durable, hard armoured protective layer to the channel without reducing its hydraulic capacity. The low logistical footprint of CC8™ meant it was easily transported to site without the need for excessive heavy plant or equipment.