

Project Info



Autumn 2014



CC5™ Bulk Rolls



5,202m²



Transverse layers



Seattle, Washington, USA



Western Refinery Services (WRS)



CC5™ was used to line a drainage channel used to divert runoff water along a slope and prevent it coming into contact with a new gas line

MILLIKEN INFRASTRUCTURE™
A Milliken COMPANY



Section of completed channel

In late 2014, Concrete Canvas® GCCM* (CC), branded Concrete Cloth™ in the US, was used to line a drainage channel used to divert rainfall and runoff water from coming into contact with a new gas line in Seattle, WA.

The new gas line had been installed on a steep 2:1 slope, which faced severe erosion issues due to the effects of heavy Pacific Northwest rainfall. A conventional rip-rap drainage channel was installed to control runoff, however, just weeks later, excess runoff water bypassing the faulty channel began eroding the soil near the gas line and potentially destabilising the bedding material around the pipe.

A regional technical manager from Milliken Infrastructure Solutions (the licensed manufacturer of CC in the USA), along with erosion control distributor ACF West, reviewed the site and developed a plan to correct the problem. The goal was to direct the water down the slope and eliminate erosion caused by heavy water flow. Options were considered for repairing the area without disturbing the existing pipe, while also providing a low-maintenance, environmentally friendly option, and as required by the Federal Energy Regulatory Commission (FERC), the ground surface also had to remain at the same level as pre-construction.

*Geosynthetic Cementitious Composite Mat





Site prior to installation



CC was laid transversely

The options considered included poured concrete, which was unrealistic due to site access restrictions and FERC requirements; Turf Reinforcement Mats (TRMs), which require constant maintenance to ensure healthy vegetation growth and effective hydraulic performance; Articulate Concrete Blocks, which would also be difficult to install due to the access restrictions; and the installation of a pipe, which would need to be set on the ground, impacting the gas line. Gabions were also considered but would have too much impact on the area and would be difficult to transport.

The final option considered was GCCMs*. It was agreed that this option would be the best to employ due to its ability to offer quick installation with limited disturbances to the area, advanced hydraulic performance capabilities and natural blending with the surrounding area over time.

Concrete Canvas, or Concrete Cloth, was selected based on significant savings associated with its installation and maintenance in comparison to four alternatives. CC causes minimal disturbance during its installation, due to its ability to be installed in limited-access areas, and its rapid installation rates.

The works were carried out by WRS (Western Refinery Services).

Bulk rolls of CC5 were positioned at the crest of the berm and deployed, with the material installed transversely with overlaps of approximately 100mm, which were jointed using 19mm self-tapping screws at 300mm intervals. Sika 1-A sealant was then used to prevent water ingress along the joints. The edges of CC were either captured in an anchor trench, which was then backfilled and compacted with an asphalt road base material, or fixed to existing concrete infrastructure using masonry bolts. In areas where the berm had eroded to the extent of no longer meeting height requirements, sandbags were used to elevate it prior to CC installation. Infrastructure such as pipework was easily accommodated due to the drape characteristics and flexibility of the CC. Once installation was completed, the material was hydrated using a high volume mounted hose and water hydrant.

In total, 5202m² of CC5™ were installed in just 7 days. The use of CC has resulted in drastically reduced maintenance costs for the site, as well as improved impermeability and fire resistance of the berm. The client was very happy with the outcome of the project and are looking to install CC on other berms across their vase oil and gas network.



Ground preparation was carried out by digger and with hand tools



Completed section of hydrated channel