

## Project Info



11 / 09 / 17



CC5™ Batched Rolls



2,800m<sup>2</sup>



Longitudinal/ Vertical  
layers



Pasir Gudang,  
Johor Bahru, Johor



Edup Design Sdn Bhd



CC5™ used to  
remediate slope, guard  
rails and footpaths  
around a recreational  
lake



*Completed installation in Pasir Gudang Bahru, Malaysia*

In September 2017, Concrete Canvas® GCCM\* (CC) was used to remediate a number of slopes, guard rails and footpaths surrounding a recreational lake in Pasir Gudang, Johor Bahru in Johor, Malaysia.

The local council had planned to use sheet pile to remediate the slopes and rectify the problem of water seeping into the surrounding soil. However, CC was specified due to the overall cost savings for the project compared to sheet pile and other alternatives. CC can also be installed without the requirement of heavy plant and machinery, which would cause disturbance to the public and the usability of the lake and surrounding area during works.

The lake is used for recreational purposes and sees a vast number of visitors throughout the week due to its central location to the town. The slopes around many parts of the lake were deteriorating and allowing water from the lake to seep into the soil and destabilise the concrete foundations of guard rails. Most of the concrete walls had cracked and broken, and soil around them was collapsing into the lake, creating voids which were becoming dangerous for visitors. Due to the erosion caused by the water loss, the footpath was also in need of replacement.

The works were carried out by Edup Design Sdn Bhd for Pasir Gudang Municipal Council.

\*Geosynthetic Cementitious Composite Mat







*Sections where erosion has caused the soil slope to collapse into the lake*



*Voids created by erosion behind retaining walls*



*Original rip-rap slope sections*



*Guard rails collapsing into lake due to erosion*

Prior to commencement of the CC installation, the slopes were levelled and cracks and damage to the existing retaining concrete walls were remediated using gabions which were submerged into the lake alongside the wall. The void between gabions and slopes were filled with rocks until the surface was level with the adjacent slope. The CC was then laid.

Following the delivery of the CC batched rolls to site, the material was transported by hand to the areas requiring remediation and unrolled. The leading edge of the material was fixed at the crest of the slope using steel pegs where possible, or concrete wall plugs where a concrete surface was present. Where necessary, the material was cut to required length or trimmed to accommodate existing infrastructure, and the ends of the CC were secured within the lake using small rocks.

When installing CC, there is a two-hour window following hydration of the material in which it can still be manipulated and installed successfully before it begins to set. As a result, CC can be installed directly into live water courses, as well as stagnant water, making installation in the lake itself achievable.

The installation was repeated along the areas of the slope which required remediation, with the material being hydrated using water from the lake.





*Screws were used to joint overlapping layers of CC*



*Ground pegs and concrete wall plugs were used to fix the CC*



*Poured concrete used to seal edges of CC and prevent further ingress*



*The material was able to accomodate curved sections of slope*



*Completed section*



*CC buried in anchor trenches to preserve grassy areas above slope*





*Completed slope protection installation*

In total, 2,800m<sup>2</sup> of CC5™ were installed in 30 days, with 8-9 hours spent on the installation each day.

The project was a great success, with the Pasir Gudang Municipal Council commenting on how impressed they were by CC's performance and the short amount of time needed to complete the project. The Council have been so pleased with the outcome of the project that they are looking to specify CC for a slope protection project at a sewage plant.