SLOPE PROTECTION

Project Info

- 07 / 10 / 20
- CC5™ Bulk Rolls
- 17,200m²
- Vertical layers
- Kuwait - KNPC Mina Al Ahmadi Clean Fuels Project (CFP)
- Al Kulaib International Trading Co.
- Slope protection for all boundary slopes at the East & South of the MAA-CFP

Completed Slope Protection works

In October 2020, Concrete Canvas® GCCM* (CC) was used to provide slope protection for all the boundary slopes East and South of Mina Al Ahmadi Clean Fuels Project (MAA-CFP), located in Kuwait. The main contractor that carried out the works was Al Kulaib International trading Co.

During heavy periods of rainfall in the winter season, the slopes on the east and south of the MMA-CFP fence gate were being eroded, inceasing the risk of flooding within the area. Erosion control and slope protection applications were needed to mitigate the risks.

CC5™ is a Type I GCCM as defined in ASTM D8364, it is suitable for use on soil subgrades and was chosen for this project to suit the abrasion, wear and loading requirements. CC5™ is also BBA certified with durability in excess of 120 years when used in erosion control applications.

As the work issued by KNPC was on an emergency basis to mitigate the risk of flooding, conventional concrete was considered against Concrete Canvas. However, CC had a huge advantage over conventional concrete from a logistical perspective as transporting equipment, machinery and material to the site for the use of conventional concrete would have caused delays and distruption to site. Whereas with CC, it is quicker and easier to install, with contractors needing less equipment, material and man power.

*Geosynthetic Cementitious Composite Mat

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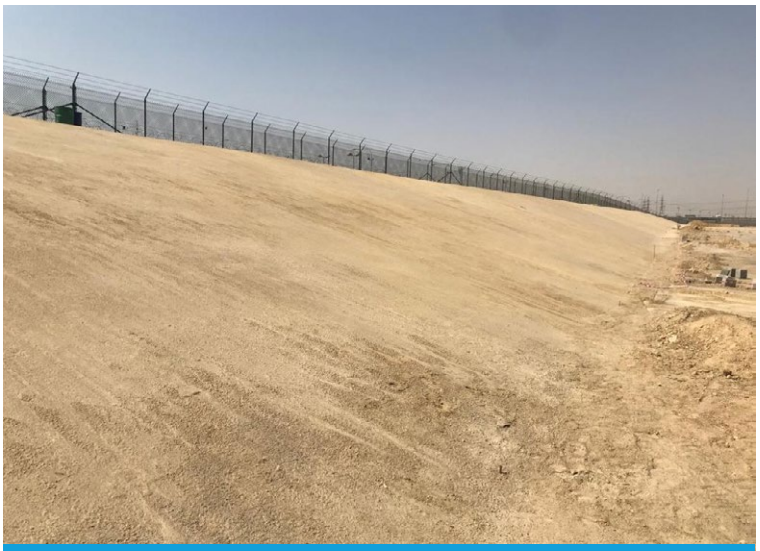
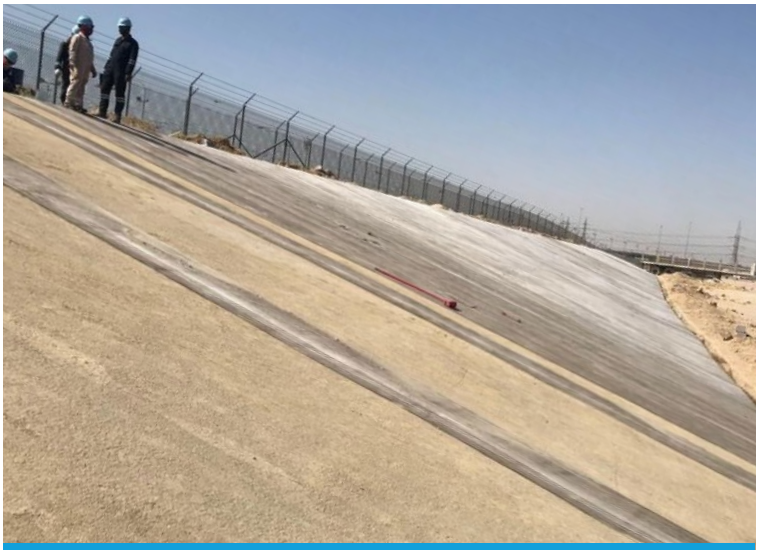
Slopes excavated and re-profiled

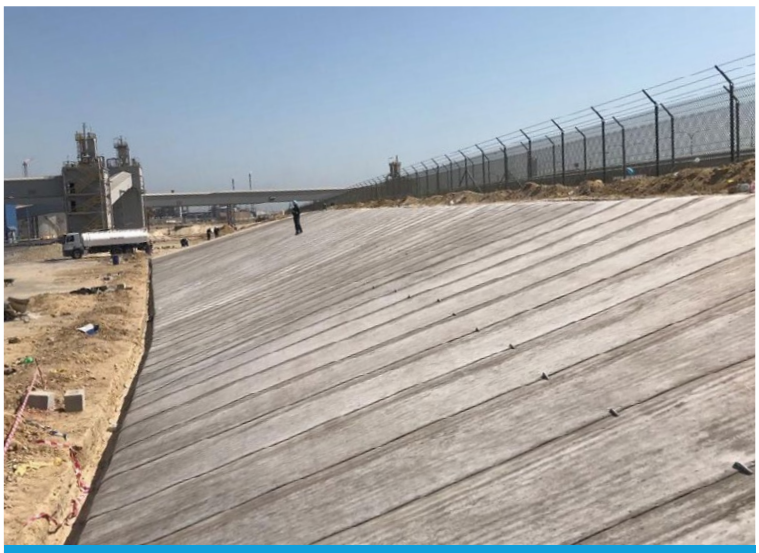


Re-profiled slopes

CC5™ Bulk Roll installed with the use of a spreader beam



CC5™ laid vertically down the slope



CC5™ pegged and hydrated

Anchor trench backfilled with concrete

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Completed works

Prior to CC5™ being installed the slopes were excavated and profiled, with the soil compacted to create a uniform surface devoid of any protusions and voids. Once the slopes were prepared anchor trenches were dug at both the crest and the toe of each slope.

CC5™ is an easy material to install with tools that are readily available. The CC material was delivered in Bulk Rolls and were suspended in the air from a spreader beam to ease the installation process. The material was deployed vertically down the slope faces and cut to the desired length using basic hand tools, with each edge of CC5™ captured within the anchor trenches and secured with galvanised J pegs. Adjacent layers of CC were positioned with each overlapping by 100mm. Each overlap was then jointed using 30mm long stainless steel screws, inserted in a zigzag pattern at 50mm spacing, with one row 10mm from the edge and the second at 50mm from the edge. Following the installation, CC5™ was then hydrated using mobile water tankers and a hose. Finally the anchor trenches at the crest and the toe of the slope were backfilled with poured concrete to prevent ingress and potential undermining and to provide a neater termination.

17,200m^2 of CC5™ was successfully installed over the course of 15days, with works having to be complete before the winter season.

The project was successful. The civils contractor installed CC to create the desired uniform aesthetic while still providing the required performance. When the rains arrive the excess water runoff drains down the slopes as expected. The project itself resulted in major cost savings, with the main factors including logistics and equipment mobilisation to site, application costs and project duration which ultimately reduces costs of man power.

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