

Project Info



July 2018



CC5™ Wide Rolls



5,600m²



Transverse and Longitudinal layers



Agria, Volos, Greece



Anelixis Constractions & Silver Palm



CC8™ and CC13™ used to line containment bunds at a petroleum tank farm owned by ELINOIL Hellenic Petroleum Company S.A.



Completed CC lined bund area floor

In July 2018, Concrete Canvas® (CC) GCCM* was used to line containment bunds at a petroleum tank farm in Agria, Volos, Greece.

The original concrete at the containment bund of liquid fuel tanks had cracked due to bad weather conditions, resulting in the requirement for CC to increase their impermeability and to prevent the surface of slopes from weathering and surface slip. The overall project involved laying CC around seven containment bunds as well as on vertical slopes and intermediate areas of the facility.

Traditional concrete combined with shotcrete (gunite) was considered initially, but the main disadvantage of this option was the possible damage and inevitable mess caused by the rebound which would add significant cost and risk, particularly when installed next to sensitive infrastructure such as a tank farm.

In addition, this solution would have been more time consuming and would put the tank farm out of operation for an extended period of time, which was impossible.

The site access was also poor, so CC was the best option as it can be installed with basic equipment and closely follows the substrate profile while accommodating existing pipework, tank interconnections, etc.

*Geosynthetic Cementitious Composite Mat



As an alternative, the use of a geotextile was also proposed. However, it was established that this solution would not be durable enough to cope with the weathering erosion and rocky slopes that required protection.

Due to its high resistance to UV degradation, 50 year lifespan and easy and fast installation, CC was specified as the ideal solution which would also provide a safe installation.

The works were carried out by Anelaxis Constructions for ELINOIL Hellenic Petroleum Company S.A., with consultation services provided by SILVER PALM SM Pte Ltd Greece.

In preparation for the installation of CC, all plants, rocks and debris were removed from the substrate in order for soil preparation to be carried out. The existing surfaces of the tank floors were cleaned and quarry sand applied to eliminate voids under the CC.

The CC was mounted onto a spreader beam hung from a crane. The 2-wide rolls were then unrolled from the top of the slopes, with the team ensuring an overlap of 100mm between layers. The CC was cut to required length to prevent wastage and accommodate the varying height of the slope.



Slope around tank prior to works



Vertical slope and bund floor prior to works



Removal of tree from slope prior to installation



CC 2-wide rolls deployed from spreader beam from slope crest



Length of CC deployed down slope and along bund floor



Cutting CC to required length to prevent wastage



Drilling into rockface to allow fixing of CC to slope



Fixing of CC to concrete wall at slope crest using Hilti nails

The product was initially secured by fixing to the concrete surfaces with 37mm x 3.5mm Hilti nails with 23mm steel washers to prevent pull through. Between concrete walls and the crest of vertical slopes, 12mm x 250mm J-pegs were used to anchor layers of CC to the ground at 2m intervals. The slope's rocky surface was drilled and 14mm x 200mm anchor bolts used to secure the material to the substrate. All overlaps were sealed with an adhesive sealant and jointed using 25mm screws at 200mm intervals using an auto-fed screwdriver prior to hydration.

The material was hydrated with sea water. Due to the high temperatures of around 35°C, hydration was carried out for over an hour twice to ensure adequate hydration.



Adhesive sealant used to joint overlaps and prevent ingress



Overlaps on bund floor jointed using screws



Screws and Hilti nails used to joint and fix CC to slope



Hydration



Completed bund floor area installation



Completed slope and bund floor installation

*Completed installation section*

A total of 5,600m² of CC5™ were installed in 14 days by a team of 9 people in inclement weather due to consistently high temperatures and intense rainfall, and despite limited access on site.

ELINOIL S.A. once again trusted CC to provide erosion protection, weed suppression and to reduce permeability on their tank farm. Impressed by the result, the company commented on the product's unique ability to be installed even during heavy rainfall, which would halt progress for installation of conventional concreting methods. CC also allowed the tank facility to remain in operation, provided fast and easy installation and has proven to be the ideal choice for the company's facilities around Greece.