

# Lay down and dry



was supplied in 200-metre bulk rolls, called off in 16 staggered deliveries to match the progress of the work by contractor Trent Construction. An installation rate of 800 m<sup>2</sup> per day was achieved, using a six-man crew. The contractor found that when adverse weather prevented work on refurbishment of the bunds themselves, its crew could switch to lining the sections it had already finished refurbishing, so reducing the overall delay due to bad weather. They also found that Concrete Canvas could cope with 90-degree turns, pipe protrusions through bund walls and terminations at buttress walls.

Each bulk roll of CC5 was positioned at the top of the bund and unrolled to the required length on either side; it was then cut to length using utility knives. Subsequent layers were applied in the same way, positioned so as to overlap the previous layer by 100 mm. Once each section was completed, the Concrete Canvas was hydrated using a fire hose from the nearby water main. Before it hardened, each edge was folded back and a sealant was applied; the edges were then unfolded and secured by 30-mm screws. The sealant creates an impermeable joint while the screws provide the mechanical bond between the overlapped layers. Within 24 hours, the lining had set sufficiently to allow traffic to pass over it as work continued on installing kerbs and drainage ditches on the inside of the bund.

## Different applications

Since then Concrete Canvas has notched up a series of further successes. In October 2013 it was specified as the surfacing material for 60-metre high cuttings around the Queensland Curtis LNG plant in Australia, the world's first liquefaction plant converting coal-seam gas into LNG. Concrete Canvas was specified over conventional lining solutions such as shotcrete or reinforced concrete on the basis of cost and time considerations, while it also offered additional benefits in terms of getting the material to the site.

The lining was needed to protect the newly cut batters from erosion by wind and long-term environmental damage, which could cause a slip. Bulk rolls of CC5 and CC8 were delivered to the site and mounted on a spreader beam before being cut to length. The

## BUNDING The idea of a 'geosynthetic cementitious composite mat' is not exactly intuitive. But call it 'Concrete Canvas' and you get a better idea of what it is and what it can offer to the storage industry

Concrete Canvas is described by its owners as "part of a revolutionary new class of construction materials". Put simply, it is a flexible, concrete-impregnated fabric that hardens when water is added and forms a thin, durable and water-resistant concrete layer.

"Essentially, it's concrete on a roll," explains Concrete Canvas Ltd, the UK-based company that is now promoting the idea to the global tank storage industry for use in erosion-control applications such as bund lining, ditch lining, slope protection and the lining of tertiary containment lagoons.

On the face of it, Concrete Canvas has plenty going for it. It is, for instance, easy and quick to install. The company says it can be laid at a rate of 200 m<sup>2</sup> per hour, up to ten times faster than conventional concrete application methods. It can be installed in wet weather conditions, and is ready to go in just two hours after hydration. It is supplied in easy-to-handle rolls that are 'man-portable', making it easier to apply in situations with limited access. And, in today's world where

sustainability is so important, Concrete Canvas points out that it is a comparatively low-mass, low-carbon technology, using up to 95 per cent less material than conventional concrete in many applications; up to 200 m<sup>2</sup> can be delivered on a single pallet, enough to replace two full mixer trucks.

As to performance, Concrete Canvas says the product prevents surface erosion due to weathering, has better abrasion resistance than traditional methods, is easy to conform to the organic profile of the substrate, acts as an effective weed inhibitor, and has a minimum design life of 50 years when installed correctly. Finally, it tends to 'green over', with moss growing on the fibrous top surface, helping it to blend in with its surroundings.

Concrete Canvas is supplied in three different grades, with thicknesses of 5 mm ('CC5'), 8 mm ('CC8') and 13 mm ('CC13'); all three grades can be used to line bunds, depending on the level of traffic expected. CC8 is also used to line drainage channels in and around refineries as a cost-effective alternative to half-cut clay or concrete pipes.

## Proving the concept

So much for the theory, how does Concrete Canvas work in practice? The company reports on a number of successful installations in the past few years. Back in 2012 it was called in to line refurbished secondary containment bunds at a marine storage terminal in the UK; the bunds surrounded a series of tank farms used to store hydrocarbons.

Work started in October 2012 and was completed the following July. It involved application of 25,500 m<sup>2</sup> of CC5, which

## STORAGE

pieces were then lifted into place on the slope using an excavator and fixed to the substrate using deck spikes before being hydrated. In this job, a total of 15,730 m<sup>2</sup> of CC5 and CC8 was applied.

A similar job was undertaken last year in Sakhalin, a remote island in the Russian Far East that is also the site of LNG developments. CC8 was used to line a drainage ditch at the Chayvo Onshore Processing Facility; the ditch was located in front of living quarters and there was a danger that an unlined ditch could lead to erosion undermining the quarters and the nearby road.

Not surprisingly, the weather in Sakhalin makes it very difficult to carry out engineering work; Concrete Canvas offered not only the promise that the job could be done in time, but also that it could be applied using the limited resources available.

The ditch was re-graded using an



excavator and cleared of vegetation. A zoom boom and spreader bar were used to lift the CC8 bulk rolls and manoeuvre them into position; sections were cut to length and applied in the same fashion as before.

The installation was considered a huge success, Concrete Canvas says. Not only could the work be completed in a single and short summer season, but it also avoided the very high cost of obtaining pourable concrete, put at up to \$2,750 per m<sup>3</sup>.

### Quicker than pouring

In May 2014 Concrete Canvas was also chosen as a means of providing erosion control for a supporting embankment under

a bridge at a water injection site at an oil and gas field in southern Iraq. Erosion was occurring due to environmental weathering, predominantly by rain, that was causing surface slip and threatening to destabilise the embankment. A low-cost and rapid solution was needed; installation of a concrete slab was seen as more expensive and time-consuming.

The contractor, Fiafi Group, levelled and compacted the surface and then applied lengths of CC8, which were overlapped, pegged down, sealed and secured with screws, as in the other applications. A bowser was used to supply water for the hydration process.

# TESTED. TRUSTED.

The MK3 Safeload semi-automatic bottom loading coupler is the first and only coupler on the market to have an extended "wrap around" trigger design. This unique feature ensures maximum safety and security of connection between the adaptor and coupler, drastically reducing the risk of product leakage. Maybe this is why it's the only coupler on the market with a 3 year warranty?

Find out more at [www.fortvale.com](http://www.fortvale.com)



Concrete Canvas is proud of the fact that Fiafi managed to lay 2,000 m<sup>2</sup> of CC8 in just two days, with a team of eight people, including supervisors. Traditional solutions would have taken up to seven days, it says. Furthermore, the crew was working in temperatures of up to 40°C and in 95 per cent humidity.

A more recent job involved the lining of an extinguishing lake in Germany. The original poured concrete structure had cracked and spalled, resulting in excessive water loss. The owner had considered removing the existing basin and rebuilding it using poured concrete and form work, but this would have taken a long time and put the basin out of operation for an extended period.

Instead, contractor Bau-Konzept used CC5 to line the existing structure, after first cleaning the failing concrete and applying mortar to the larger cracks to eliminate voids



under the lining.

Installation of 900 m<sup>2</sup> of CC5 took five workers just four days, despite some inclement weather. The client was very impressed with the result and has since instigated a bund lining trial and is planning to line another 6,000-m<sup>2</sup> extinguishing basin with Concrete Canvas. The alternative method of using poured concrete would have

taken at least a month to complete.

Concrete Canvas has been around for only a few years, yet it is already being used by most of the top ten oil and gas companies in the world. The company will be exhibiting at StocExpo this month and at FPS Expo in the UK in April; visitors should stop by and grab hold of some Concrete Canvas.

[www.concretcanvas.com](http://www.concretcanvas.com)



**FORT VALE**<sup>®</sup>

CALDER VALE PARK SIMONSTONE LANE  
SIMONSTONE BURNLEY LANCASHIRE BB12 7ND UK  
TEL: +44 (0) 1282 687100 WWW.FORTVALE.COM SALES@FORTVALE.COM