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Concrete Canvas

Technical Guide SP1.4

Concrete Canvas is a flexible, concrete impregnated fabric that hardens when hydrated to form a thin, durable, water proof and fire resistant concrete layer.

Applications

- Ditch Lining
- Slope Protection
- Outfalls
- Bund Lining
- Remediation of existing structures
- Areas with difficult access
- Mining Vent Walls

Product Attributes

- Rapid Installation
- Easy to Use
- Lower Project Costs
- Eco-Friendly
- Strong and durable
- Design life of 50 years

Quality

ISO 9001:2008 Quality Management Standard

The go to organisation for civil and rural water product solutions

HYNDS

Concrete Canvas allows concrete construction without the need for plant or mixing equipment. Simply position the Concrete Canvas and just add water.

Concrete Canvas consists of a 3-dimensional fibre matrix containing a specially formulated dry concrete mix. A PVC backing on one surface of the Canvas ensures the material has excellent impermeability. The material can be hydrated either by spraying or by being fully immersed in water. Once set, the fibres reinforce the concrete, preventing crack propagation and providing a safe plastic failure mode. CC is available in 3 thicknesses: 5, 8 and 13 mm.

Applications

Ditch Lining

CC can be rapidly unrolled to form a ditch or channel lining. It is significantly quicker, easier and less expensive to install than conventional concrete ditch lining and requires no specialist plant or equipment. CC can be laid at a rate of 200sqm/hr by a 3 man team.

Slope Protection

The concrete is pre-mixed so there is no need for mixing, measuring or compacting. Just add water.

Bund Lining

The speed and ease of installation mean CC is more cost-effective than conventional concrete, with less logistical complexity.

Remediation

CC can be used to rapidly reline and refurbish existing concrete structures suffering from environmental degradation and cracking.

Mining Vent Walls

CC is able to be installed faster with less workers. Important in a hazardous environment.

Benefits

- CC can be laid at a rate of 200sqm/hour, up to 10 times faster than conventional concrete solutions.
- CC is available in man size portable rolls for applications with limited access.
- CC is a low mass, low carbon technology which uses up to 95% less material than conventional concrete for many applications.

FIG. 1 Concrete Canvas applications

- The speed and ease of installation mean CC is more cost-effective than conventional concrete, with less logistical complexity.
- The PVC backing on one surface of the Canvas ensures that the material has excellent impermeability. For containment applications where a 100% waterproof seal is required, it is recommended to use CC as a protective overlay in combination with an appropriate sealed membrane liner. CC is not recommended as the sole barrier layer where 100% impermeability is critical.
- The fibre reinforcement prevents cracking, absorbs energy from impacts and provides a stable failure mode.
- CC has good weather performance and will not degrade in UV.
- CC has good drape characteristics and will closely follow the profile of any ditch or embankment. The material can negotiate tight bends and fit around existing infrastructure. Unset CC can be cut or tailored using basic hand tools.

Codes	Thickness (mm)	Bulk Roll Size (m^2)	Roll Width (m)	Mass (unset) (kg/m^2)	Density (unset) (kg/m^3)	Density (set) (kg/m^3)
CCAN5	5	200	1.0	7	1500	+30-35%
CCAN8	8	125	1.1	12	1500	+30-35%
CCAN13	13	80	1.1	19	1500	+30-35%

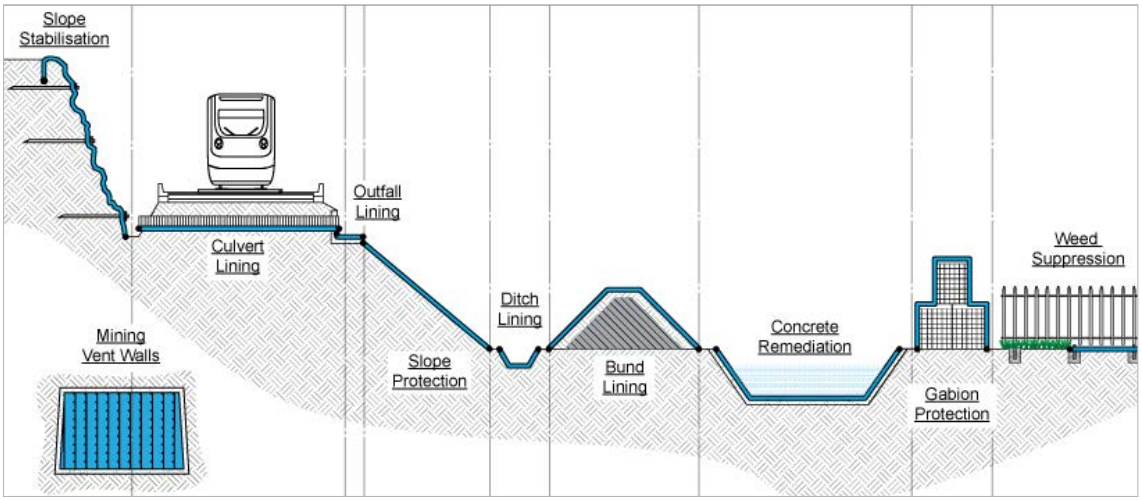

FIG. 2 Application examples

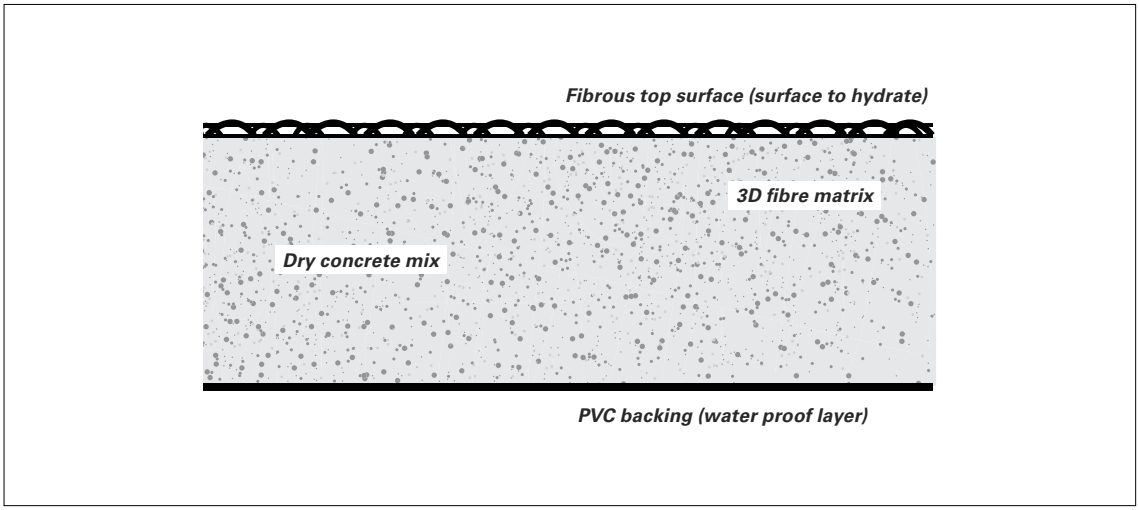

FIG. 3 Cross section

FIG. 4 Concrete Canvas

Pre-set Process

Setting Working Time

1-2 hours subject to ambient temperature.

CC will achieve 80% strength at 24 hours after hydration.

Method of Hydration

Spray the fibre surface with low pressure / high volume water until it feels wet to touch for several minutes after spraying.

Re-spray again after 1 hour if:

Installing CC5, installing CC on a steep or vertical surface, or installing in warm climates.

Notes

- *CC cannot be over hydrated and an excess of water is always recommended.*
- *Minimum ratio of water: CC is 1:2 by weight.*
- *Do not jet high pressure water directly onto the CC as this may wash a channel in the material.*
- *CC can be hydrated using saline or non-saline water.*
- *CC will hydrate and set underwater.*
- *CC has a working time of 1-2 hours after hydration. Do not move CC once it has begun to set.*
- *Working time will be reduced in hot climates.*
- *CC will set hard in 24 hours but will continue to gain strength for years.*
- *If CC is not fully saturated, the set may be delayed and strength reduced. If the set is delayed, re-wet with a large excess of water.*

Post-set information

Typical strengths and physical characteristics

- Compressive tests based on ASTM C109 – 02 (initial crack)
  - 10 day compressive failure stress 40 MPa
- Bending tests based on BS EN 12467:2004 (initial crack)
  - 10 day bending failure stress 3.4 MPa
  - 10 day bending Youngs modulus 180 MPa

Abrasion Resistance

- (DIN 52108) Max 0.10 gm/cm^2
  - Similar to twice that of OPC

Manning's Value

- (ASTM D6460) n = 0.011

CBR Puncture Resistance

- EN ISO 12236: 2007 (CC8 & CC13 only)
  - Min. Push-through force 2.69kN
  - Max. Deflection at Peak 38mm

Impact Resistance of Pipeline Coatings

- (Standard Test Method) ASTM G13 (CC13 only) Passed

Freeze-thaw testing

- (ASTM C1185) 200 Cycles

Freeze-thaw testing

- (BS EN 12467:2004 part 5.5.2) Passed

Soak-Dry testing

- (BS EN 12467:2004 part 5.5.5) Passed

Water Impermeability

- (BS EN 12467:2004 part 5.4.4) Passed

Reaction to Fire

- CC has achieved Euroclass B certification:
  - BS EN 13501-1:2007+A1:2009 B-s1, d0
- CC has achieved MSHA approval:
  - 30 CFR, Part 7, Subchapter B, Section 7.24 Passed

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