CONCRETE CANVAS®

Concrete on a Roll

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MADE IN UK

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Concrete on a Roll

The Queen's Awards for Enterprise: International Trade 2019

Board of Trade Winner 2018

Ground Engineering Awards 2017 — Winner Technical Innovation Award

ice award winner 2017 — ICE Wales Cymru Project Awards — Innovation Award ICE Wales Cymru Awards 2017

BBA Approval Inspection Testing Certification — Certificate 19/5685 — British Board of Agrément Certified

CPD Certified — The CPD Certification Service — Certified CPD Provider

IGS — Corporate Member

Exporting is Great — Britain & Northern Ireland — Proud Supporter of Exporting is Great

RAIL ROAD MINING PETROCHEM AGRO PUBLIC WORKS UTILITIES DEFENCE DESIGN SHELTER

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Concrete Canvas® GCCM

Concrete Canvas® is part of a revolutionary new class of construction materials called Geosynthetic Cementitious Composite Mats (GCCMs) which replace conventional concrete in erosion control applications. It is a flexible, concrete filled geotextile that hardens on hydration to form a thin, durable and water proof concrete layer. Essentially, it's *Concrete on a Roll*™. Concrete Canvas® GCCM (CC) allows concrete construction without the need for plant or mixing equipment: just add water.

CC consists of geosynthetic fibrous top surface and a 3-dimensional fibre matrix filled with a specially formulated dry concrete mix covering an intergral PVC backing layer. CC is hydrated either by spraying or by being fully immersed in water and 24 hours later, the material has set and is ready for use. Once set, the fibres reinforce the concrete, preventing crack propagation and providing a safe plastic failure mode.

Concrete Canvas® GCCM User Benefits

Rapid Install
CC can be laid at a rate of 200m²/hour, up to 10 times faster than conventional concrete solutions.

Easy to Use
The concrete is pre-mixed so there is no need for on site mixing, measuring or compacting. CC is also available in hand portable Batched Rolls for applications with limited access. CC can be installed in the rain.

Lower Project Costs
The speed and ease of installation mean Concrete Canvas® GCCM is more cost-effective than conventional concrete, with less logistical complexity.

Lower Carbon
CC can provide more than 60% CO_2e savings when used to replace conventional poured concrete for erosion control applications.

Concrete Canvas® GCCM Key Properties

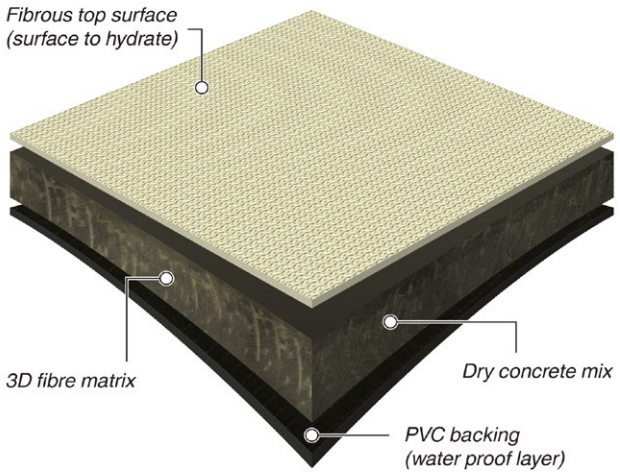
Durable
CC is 5 times as abrasion resistant as standard OPC concrete, has excellent chemical resistance, weathering performance and UV resistance. CC is BBA certified with a durability in excess of 120 years when used in erosion control applications.

Flexible
Unset CC has good drape characteristics and will closely follow the ground profile and fit around existing infrastructure. Unset CC can be cut or tailored using basic hand tools.

Strong
Once cured the fibre reinforcement reduces cracking, absorbs energy from impacts and provides a stable failure mode.

Prevents Erosion
The PVC backing helps ensure that water cannot come into contact with the subgrade and create scour or erosion, even if different settlement occurs.

Concrete Canvas® GCCM section



Concrete Canvas® GCCM Section

CC Batched Rolls

CC Bulk Roll

The Importance of ASTM D8364 - Standard Specification for GCCM Materials

Over the past decade, the use of Geosynthetic Cemintitious Composite Mats (GCCMs) to provide durable surface erosion control solutions has gained global acceptance. In 2021, ASTM D8364 'Standard Specification for GCCM materials' was published and is an internationally recognised performance standard, specifying the minimum performance requirements for three Types of GCCMs to provide differing levels of erosion protection.

ASTM D8364 is an essential tool for all GCCM users, making specifying the right product easier for the designer whilst ensuring they meet minimum performance requirements, helping to ensure project success.

Concrete Canvas Ltd manufacture 3 types of CC to align with ASTM D8364: CCT1™, CCT2™ amd CCT3™ which are Type I, Type II & Type III GCCMs respectively.

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Concrete Canvas® GCCM Applications

Channel Lining

CC can be rapidly unrolled to form a ditch or channel lining. It is significantly faster, easier and less expensive to install than conventional concrete channel lining and requires no specialist equipment. The matting can be laid at a rate of 200m^2 per hour by a 3 person team.

Slope Protection

CC can be used to protect slopes from surface erosion. Compared to shotcrete it is typically faster to install, more cost effective, requires less specialist plant equipment, and eliminates the risks associated with rebound and debris.

Bund Lining

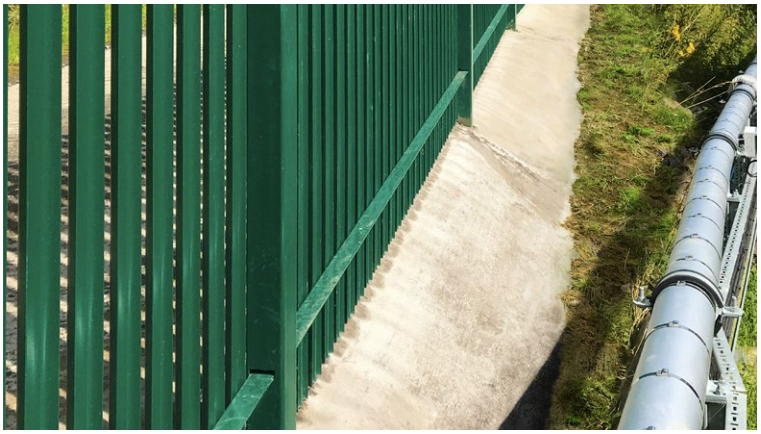
CC provides a cost-effective alternative for lining secondary containment bunds. It acts as an effective weed suppressant, reducing maintenance costs.

Its ability to be installed quickly reduces time on site, whilst the availability of hand-portable Batched Rolls allows for installation in areas with reduced access.

Weed Suppression

CC is used to provide effective, durable and long-term weed suppression, reducing de-vegetation requirements and associated maintenance costs.

CC can be used where de-vegetation is required to maintain operational and health and safety requirements, or where limited access and sensitive infrastructure prevents the use of traditional methods.



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Remediation

CC can be used to rapidly re-line and refurbish existing infrastructure suffering from environmental degradation and cracking. CC lined structures can be returned to operation in 24hrs from installation.

Unlike structures re-lined with traditional concrete, the internal volume of CC lined structures is maintained ensuring that the channel design flow capacity is preserved.

Culvert Lining

CC can be used to extend the durability of new build culverts and to upgrade existing structures, preventing the need for asset replacement.

The speed, ease and flexibility of CC offers significant technical and financial advantages, whilst offering a durable means of providing erosion protection. CC is used to replace, poured or sprayed concrete and bitumen coatings.

CC Properties (Pre-set)

	Test Method	Unit	Typical Values		
			CCT1™	CCT2™	CCT3™
GCCM Classification	ASTM D8364	Type	I	II	III
Thickness	BS EN 1849-2	mm	5	7	11
Roll Width		m	1.0	1.1	1.1
Area of CC per Batched Roll		m^2	10	5	N/A
Area of CC per Bulk Roll		m^2	170	125	80
Mass per Unit Area	BS EN 1849-2	kg/m^2	8	12	19
Density	BS EN 1849-2	kg/m^3	1550-1750		
Density Increase on Curing		% Increase	15-25		
Working Time from Hydration (refer to the CC Hydration Guide)		Hours	1 to 2		
Embodied CO_2 Saving (cradle to grave for CCT2™ as a % of poured concrete - refer to CC CO_2 Report)	ISO 14040	% Saving	62		

CC Properties (Post-set)

(Hydrated by full immersion in accordance with ASTM D8030)

	Test Method	Unit	Typical Values		
			CCT1™	CCT2™	CCT3™
Compressive Strength of Cementitious Mix - 28 Day (water/cementitious materials ratio to ASTM D8329)	ASTM D8329	MPa	45	60	65
Flexural Strength - 1 Day - Initial Flexural Strength (MD)	ASTM D8058	MPa	>4.0		
Flexural Strength - 1 Day - Final Flexural Strength (MD)	ASTM D8058	MPa	>10	>6	>6
Freeze - Thaw Resistance (retained Initial Flexural Strength after 200 cycles)	ASTM C1185	%	80		
Chemical Resistance (refer to CC Chemical Resistance)	BS EN 14414	-	Passed		
Abrasion Resistance (cementitious barrier depth of wear)	ASTM C1353	mm/1000 Cycles	0.15		
Durability (See CC BBA Certificate 19/5685)		Years	120		

Please refer to the Concrete Canvas® Data Sheet for additional information on testing and data.

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