



CONCRETE CANVAS SHELTERS™

Rapidly deployable concrete shelters

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RAIL
- 
ROAD
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MINING
- 
PETROCHEM
- 
AGRO
- 
UTILITIES
- 
PUBLIC WORKS
- 
DEFENCE
- 
DESIGN
- 
SHELTER

- 
Winner
Technical Innovation Award
- 
Innovation Award
ICE Wales Cymru Awards 2017
- 
2014 Fast Track 100
16th fastest growing
company in the UK
- 
2014 Queen's Award
for Enterprise in
Innovation
- 
2013
Macrobert Award
Finalist
- 
2013 Innovation Award Winner
Railtex Exhibition
- 
2012 R&D 100
Award winner
R&D Magazine
- 
2009 Winner
Material ConneXion Medium Award
Material of the Year
- 
D&AD Yellow Pencil Award
Winner
Product Design

Concrete Canvas Shelters™

Concrete Canvas Shelters (CCS) are rapidly deployable hardened shelters that require only water and air for construction.

CCS have two major advantages over conventional tented shelter:

Operational: CCS enable a hardened structure from day one of an operation. They provide much better environmental protection, increased security and vastly improved medical capability.

Financial: CCS have a design life of over 10 years, whereas tents wear out rapidly and must then be replaced. CCS are a one stop solution, saving effort and cost over the lifetime of medium to long term operations.



CCS25 deployment, Saudi Arabia, 2009



CCS50 deployment, South Wales, 2008



Internal view of a docked CCS25 and CCS50, South Wales

The key to CCS is the use of inflation to create a surface that is optimised for compressive loading. This allows thin walled concrete structures to be formed which are both robust and lightweight. CCS consist of a revolutionary cement based composite fabric (Concrete Canvas) bonded to the outer surface of a plastic inner which forms a Nissen-Hut shaped structure once inflated.

CCS Keyfacts

A 25sqm CCS can be deployed by 2 people in less than 1 hour and is ready to use in only 24 hours.

Force protection

The compressive structure of CCS has been modelled to be covered with sand or earth (berming) to provide protection against small arms fire and shell fragments.

Insulating

CCS concrete shells have good thermal properties. When buried they provide excellent insulation and a very large thermal mass.

CCS are far more durable than tenting with a design life of over 10 years.

Sterile

The sealed plastic inner of a CCS means it can be delivered sterile.

Fire resistant

Concrete Canvas (CC) is fire-safe, does not contribute to the surface spread of flames, has a low level of smoke development and minimal hazardous gas emissions. CC has achieved Euro-class classification B-s1, d0. Each shelter is lined with a flame retardant fibre reinforced polyethylene inner with a B1 (DIN 4102-01 05/98) fire rating.

Secure

The hard shell and lockable doors of a CCS provide a level of security not possible with soft skinned structures, protecting stores, equipment and personnel.

CCS provide all the benefits of a permanent structure without the associated cost and time delays.

CCS Deployment



1

Delivery

CCS are supplied folded in polyethylene, airtight, water and rot proof sacks within ISPM15 heat treated timber/ply panel crates.



2

Inflation

An electric fan is activated which inflates the plastic inner to lift the structure until it is self supporting. The shelter is then pegged down with ground anchors around the base.



3

Hydration

The CCS is then hydrated by spraying with water. Water does not need to be potable and sea water may be used.



4

Setting

The Concrete Canvas cures in the shape of the inflated inner and 24 hours later the structure is ready to use. Access holes can be cut to allow the installation of services.



Earth Berming

CCS structures have been modelled to withstand a very high distributed compressive load, enabling berming by sandbags, local fill material or snow. This gives the shelters excellent thermal properties and can provide protection against shrapnel, blasts and small arms fire. The above shows CCS buried using a cellular geo-textile product to provide force protection.



CCS Data Sheet

Concrete Canvas Shelters (CCS) are rapidly deployable structures that can be deployed by two people in less than 24 hours. There are two shelter sizes available, the CCS25 and the CCS50 with respective deployed areas of 25 and 50sqm. CCS are prefabricated structures consisting of Concrete Canvas fixed to an inflatable inner with integral steel door sets at each end. CCS are deployed in four stages; Delivery, Inflation, Hydration and Setting.

Pre-deployment (Crate) dimensions				
Unit	Length (m)	Width (m)	Height (m)	Weight (kg)
CCS25	2.61	2.30	1.13	1900
CCS50	2.90	2.24	1.70	3100

Post-deployment dimensions				
Unit	Length (m)	Width (m)	Height (m)	Internal Area (m ²)
CCS25	5.00	5.60	2.45	25.00
CCS50	9.50	5.60	2.60	50.00

General Specification			
Unit	Water Requirement (L)	Deployment Time (min)	Cot Space Available
CCS25	1000	60	4-6
CCS50	2000	120	8-10

Packaging

CCS are supplied in polyethylene, airtight, water proof, rot proof sacks within ISPM15 heat treated timber/ply panel crates.

Modularity

CCS structures are designed as part of a modular system; units can be docked together to create arrays of structures to suit operational requirements.

Inflatable Inner

Each CCS has a flame retardant reinforced polyethylene inflatable inner with internal hanging tabs (maximum load 20kg/tab). Disinfecting with high chlorine concentration will not damage the inner.

Door System

Each CCS has a vented entrance at each end with push to close latch inside and outside locking handles. The steel door blades have LPCB certification up to LPS 1175 SR3 and are fire rated up to 6 hours. Die cast zinc door latches.

Port/Conduits/AC

Small openings for services can be cut or drilled into the Concrete Canvas shell. The inflatable inner has two manifolds for AC/Ducting access.

Disposal/Demolition

CCS can be demolished using basic tools. The thin walled structure has a very low mass leaving little material for disposal.

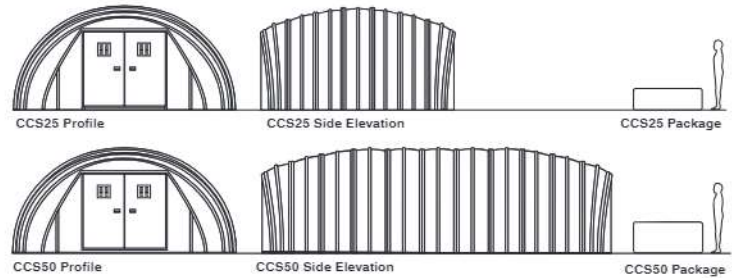
Requirements for deployment

Both CCS variants can be deployed by 2 people. A CCS50 will require a vehicle or winch to aid with the unfolding of the shelter prior to inflation. Each shelter is provided with the ground pegs required for inflation.

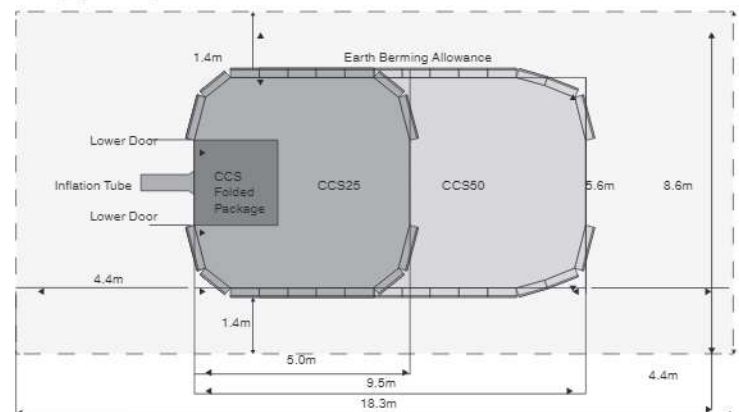
Patent Information

Patent/Granted: AE (766/2011), AE (932/2006), AP (AR/P/2011/005842), AU (2010209524), AU (2005254788), BR (PI1005309-3), CA (2655054), CA (2749991), CA (2570592), CL (01809-2011), CN (201090005835.6), CO (11-092824), EP (2027319), EP (2393970), EP (1786162), GB (2455008), HK (12100037-1), ID (W00 2011 02625), IL (214350), IN (5429/DELNP/2011), IN (20/DLNP/2007), JP (2011-546952), KR (10-2011-7020005), MN (4878), MX (MX/a/2011/007902), NY (P/2011003536), NO (20070245), NZ (594923), OM (OM/P/2011/00162), PH (1-2011-501468), RU (2386767), SG (201105143-0), TH (1101001935), US (12/903984), US (US-2010-0293417-A1), US (13/146886), US (7721749), VN (1-2011-02023), ZA (2009/00222), ZA (2011/06289), ZA (2007/0471) and other patents pending.

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CCS Deployment Footprints



Site preparation

CCS do not require foundations or hard surfacing for deployment. However it is recommended that the site be relatively flat and with any protruding rocks or vegetation removed.

Inflation Unit

Each CCS shelter is supplied with a 110 or 240V filter fitted inflation unit and controller as required.

Design Life

CCS have a design life of over 10 years