

TECHNICAL TEXTILES – PART XX

REF: TT/ MAR 2022/ WK 5

BuildTech or Construction Textile

Textile used in buildings and construction are known as Buildtech or Construction textile. These textiles are used in the construction of buildings, dams, bridges, tunnels and roads. Textile materials are used in indoor as well as outdoor for surface as well as inner applications. There are distinct areas of use of textiles as geotextiles and construction textiles.

Since ages textiles are used as building materials right from temporary houses like tents to permanent and durable building materials such as fiber-reinforced composites. Nonwoven glass and polyester fabrics are widely used in roofing applications and other fibers are used as breathable membranes to prevent moisture penetration of walls.

Textile reinforced concrete (TRC) - Textile fibers are used with concrete to improve its properties, protection against UV and electromagnetic radiations. It is a type of reinforced concrete in which the steel reinforcing materials are replaced by textile materials. Instead of using a metal cage inside the concrete, a fabric cage is used inside the same. Steel has been used in concrete as reinforcement for over the years. But steel reinforcement is prone to corrosion reducing the effectiveness of bar resulting in breaking of the concrete. It was found that durability of structures can be increased by replacing steel reinforcement by textile reinforcement. TRC is used to extend the life-span of existing structures that are undergoing deterioration or need upgrading of their mechanical performance to withstand higher static and dynamic loads.

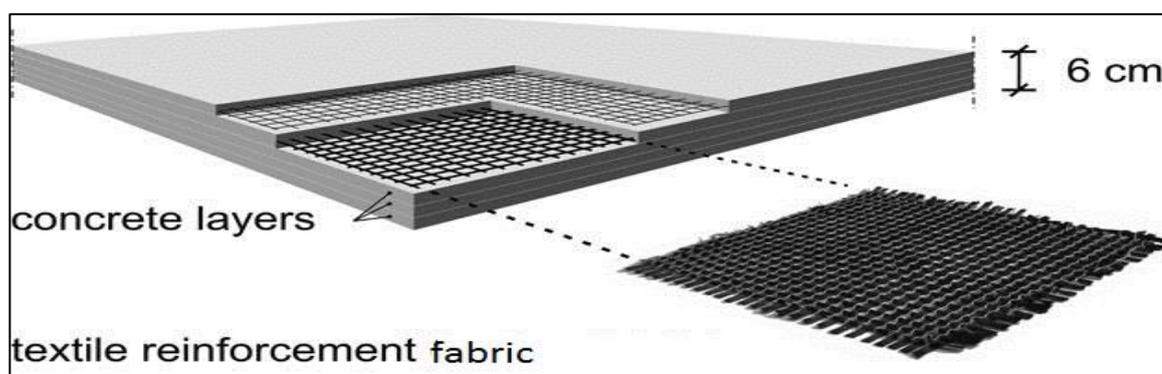


Fig 1.1 Textile reinforced concrete

Ref: onlinelibrary.wiley.com



Textile Reinforced Concrete (TRC) consists of fine-grained mortar and high strength textile fabrics. Textiles used are multifilament yarns having high tensile strength usually made of carbon, basalt, alkali resistant glass or polymer materials. Carbon fibers are inert and compared to other fibers has superior characteristics in terms of tensile strength and modulus of elasticity. But carbon has high cost. Alkali resistant glass is found to be the most cost-effective as compared to carbon fiber. It is widely used in various applications such as precast constructions, repair, rehabilitation and structural strengthening of existing structures.

Another important aspect of textile-reinforced concrete is the permeability of the textile. Textile is open enough for the concrete to flow through, while remaining stable enough to hold its own shape. The placement of the reinforcement is important to the final strength of the piece. The textile material must also have a high tensile strength and high elongation before breaking than the concrete surrounding it.

TRC and other textile composite materials used in the construction sectors gives lightweight structures with high durability and quality surfaces. They also offer resistance to factors such as **creep**, degradation by chemicals and pollutants in the air or rain and the effects of sunlight and acid.

CREEP
The slow continuous deformation of a viscoelastic fiber under a constant load is called creep.
The magnitude of the creep depends on the properties of viscoelastic material.
Viscoelasticity is the property of a material/fiber that exhibit both viscous and elastic characteristics when undergoing deformation.

References:

1. <https://www.technicaltextile.net/>
2. <http://bch.in/>
3. <https://iopscience.iop.org/>
4. <https://textilevaluechain.in>

.....To be continued.....

UNSCRAMBLE THE JUMBLE WORDS
ERCETOCN
TYDULIBIRA
DERGGNIOUN
NOLGEAIONT

Last week`s Answers: 1) RIBBON 2) CAPILLARY 3) COMPUTER 4) BONDING

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