

Translucent Concrete

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MEEN 3344-001

11:00-11:50 MWF

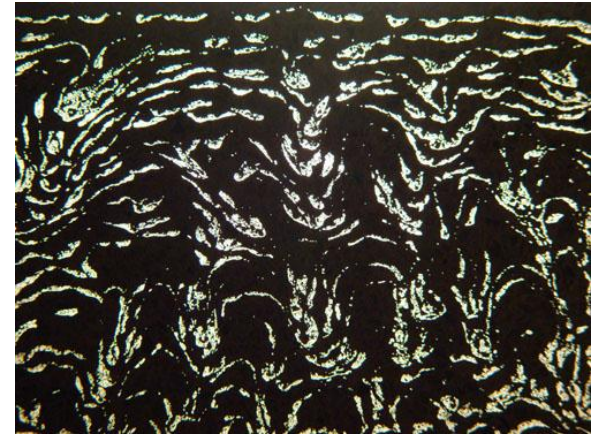


How is it Made?

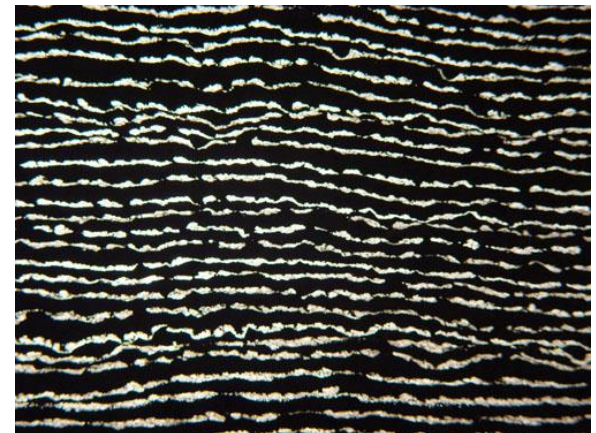
- Mostly the same as regular concrete
- Glass fibers are spread throughout the aggregate and cement mix.
- Small layers of the concrete are poured on top of each other and infused with the fibers and are then connected
- Process is tedious and costly
- Big reason why this product costs so much.

Two configurations of fibers:

1) Organic



1) Layered



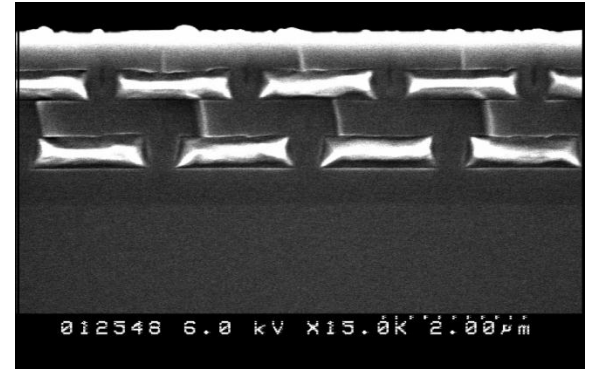
What are its Properties?

- Carries the same amount of light through a brick no matter how thick it is
- The light carried maintains its original color
- Weighs about the same as conventional concrete
- 96% traditional aggregate and cement, 4% glass fibers
- Can be manufactured in any color upon request
- Normally sold in bricks

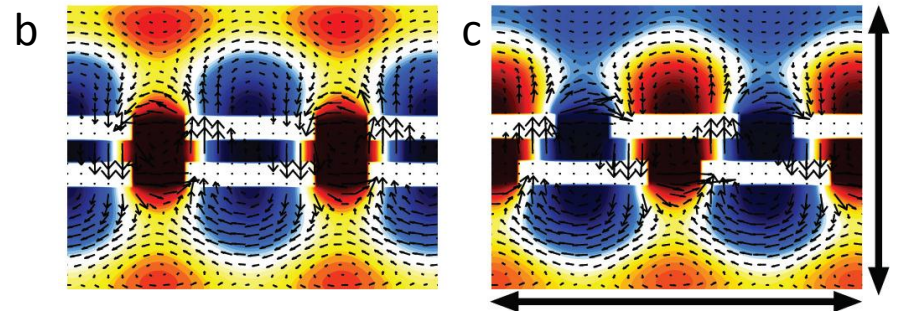


Why does it Work?

- Based on Nano-Optics
- Light passes as much light when tiny slits are placed directly on top of each other as when they are staggered
- Principal can carry because glass fibers in the concrete act like the slits and carry the light across



(a) electromagnetic field (EM) distribution around a single array of slits; (b) EM distribution around a double array of aligned slits; (d) EM distribution around a double array of staggered slits.



Is it Structurally Sound?

Yes,

It is comparable to
classic concrete and
has already been used
in a variety of
structures

Desks



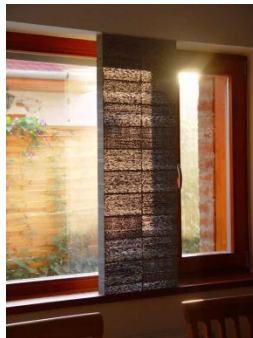
Logos



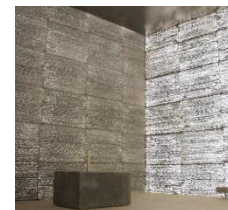
Monumental Architecture



Residential Architecture



Religious
Architecture



Lamp



Is it Expensive?

- Currently more expensive
- Due to:
 - tedious manufacturing process
 - only made in a small factory in Hungary run by inventor Aron Losonsczi
- Possible production tradeoff to United States or Japan
- Maybe less expensive in future

Thickness [mm]	EXW Price [EUR/m ²]	Minimum order quantity [m ²]
25	845,-	7
30	935,-	6
40	1105,-	5
50	1275,-	4
60	1455,-	3
80	1800,-	2,5
100	2140,-	2
150	3010,-	1
200	3880,-	1



Is it Worth it?

- Depends on the buyer and the project
- Adds an interesting property to a strong material
- Could take fiber optics in a new direction
- Definitely looks cool nonetheless



Sources

Internet:

<http://www.litracon.hu/>

http://www.danubiusmagazin.hu/magazin/tortenelem/uvegbe-ton_e.html

Textbook:

Fundamentals of Materials Science and Engineering by William D. Callister Jr. and David G. Rethwisch Chapter 15

Technical Journal:

Optics and Photonics News September 2008 issue “Using Nano-Optics to Control the Phase of Light”