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CONSTRUCTION SOLUTIONS

Reliable expertise you can trust.

If you require help developing products or systems; site services or independent investigation; or simply help choosing the right product for the job, Solid Grey are here to help.

With over 20 years experience of developing construction products, coupled with an extensive knowledge of the associated product standards and the practical methods used on site, we have the expertise to provide an economic solution to your problems.

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Partners

Here at Solid Grey we aim to provide Reliable Expertise you can Trust.

For that reason we take great care in choosing other companies and suppliers to partner with. When we partner with a company you can be sure that they are the experts in their field, pushing the boundaries of their specialism and providing unrivalled quality products, service and technical back-up....

...just like us!

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FSC Technologies

With a unique R&D background developed in more than 30 years, FSC Technologies is providing game-changing solutions to the building materials industry enhancing product performances and competitiveness that results in new market opportunities for your improved products.

With FLEXSTREN technology, we are introducing a new method to give concrete products a flexural behavior that overcomes the limitations of steel reinforcement (concrete cover and steel corrosion). The FLEXSTREN technology consists in applying a post-compression with a loaded and oriented high tensile strength composite material to dry cast concrete products after hardening. FLEXSTREN can be used in the production of large flexible paving slabs; concrete pipes without steel reinforcement; ultra-thin -walled pipes; high-strength aerated concrete blocks; and drycast railway sleepers.

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INNOVATIVE STRUCTURAL TECHNOLOGIES

for the Construction, Aerospace, Mechanical, and Energy Industries

Compliant with the new environmental requirements,
they bring a radical innovation on the way to build structures, manufactured products, infrastructures, and utilities

FLEXSTREN
Precast Concrete & Utilities

PAT
Cast in situ

FSC TECH

The Next Normal in Construction

How disruption is reshaping the world's largest ecosystem

Mc Kinsey – June 2020

Changes in market characteristics	Future industry dynamics	Emerging disruptions
Customer demand Persistent cost pressure from tight public budgets and housing-affordability concerns Increasing need for adaptable structures Increasing owner and customer sophistication Evolving customer needs and greater focus on total cost of ownership Increasing complexity of projects Higher demand for simplified and digital interactions Increasing sustainability requirements and demands for safety performance	1 Product-based approach 2 Specialization 3 Value-chain control and integration with industrial-grade supply chains 4 Consolidation 5 Customer-centricity and branding 6 Investment in technology and facilities 7 Investment in human resources 8 Internationalization 9 Sustainability	**Industrialization** FSC New production technology—enabling industrialization and shift toward off-site production **New materials** FSC New-material technology—new, lighter-weight materials enabling improved logistics **Digitalization of products and processes** Digitalization of processes and products and shift toward more data-driven decision making—digital will impact: • Operations—smart buildings and infrastructure • Design—BIM,[1] BIM objects • Construction and production—BIM, project management, Industry 4.0 • Channels—digital sales channels and distribution/logistics **New entrants** FSC New breed of players—disrupting current business models
Construction inputs and characteristics Persistent scarcity of skilled labor Changing logistics equation resulting from new materials and modules		
Market rules and regulations Stricter regulation on safety and sustainability Changing regulations and incentives for modern methods of construction, enabling more standardization		

New Game-Changing Products that exceed the limits set by current technologies

Underground Infrastructure

- CONCRETE PIPES

Buildings and Enclosures

- BLOCKS AND WALL SYSTEMS
- PAVERS
- MANHOLE COVERS

Railway

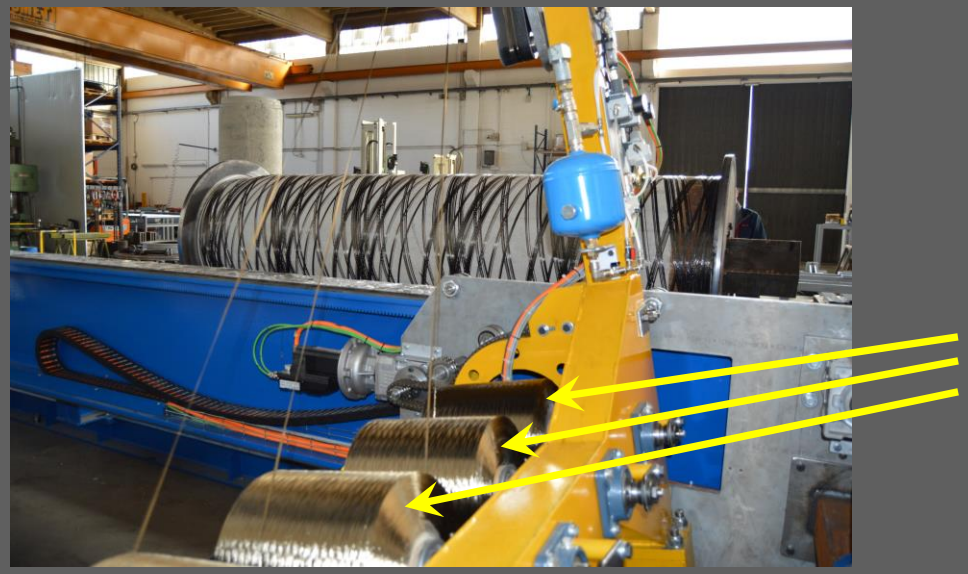
- RAIL TIES
- CATENARY POLES
- RAILCAR BOGIES

Structural Precast

- SEGMENTAL BRIDGES
- BEAMS & COLUMNS SYSTEMS
- MULTIAXIAL POST COMPRESSION SYSTEM (PAT)

The FLEXSTREN Technology

- A fiber roving (glass or basalt) impregnated with resin, is wrapped in tension around a precast concrete product, applying a post-compression
- The post-compression imparts flexural strength
- The number of wrapping laps determines the amount of compression / flexural strength given to the concrete



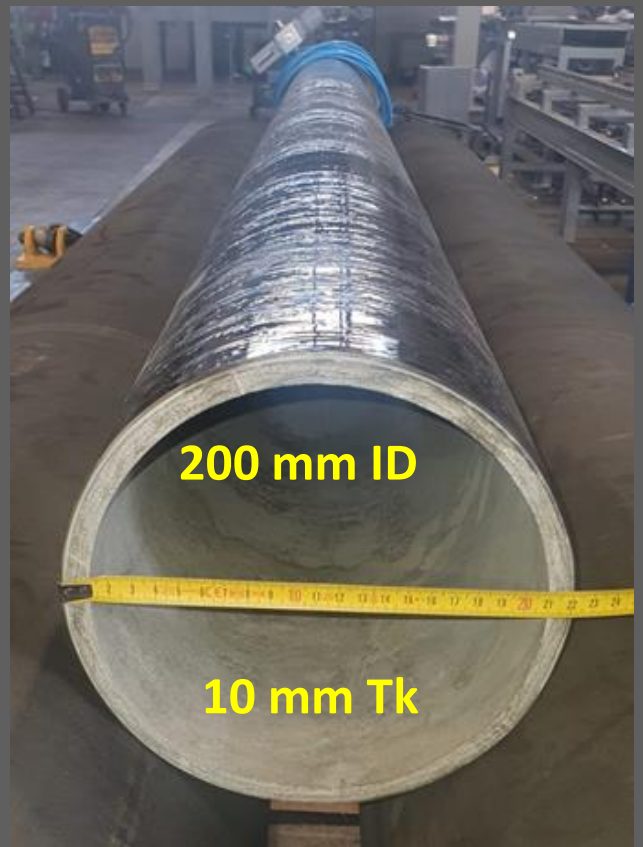
New functionalities for current Concrete Pipes

- REPLACEMENT OF THE STEEL REINFORCING WITH THE WRAPPING
- PRESSURE CAPABILITIES MORE THAN 3.5 BAR
- LAID ON AGGRESSIVE SOILS
- JACKING PIPES WITH ADDITIONAL AXIAL CAPACITY
- THE WRAPPING IS APPLICABLE TO NON-REINFORCED PIPES

New FLEXSTREN Ultra-Thin Concrete Pipes, from 150 mm ID (6’’)

To bring back concrete pipes in the small diameter sizes

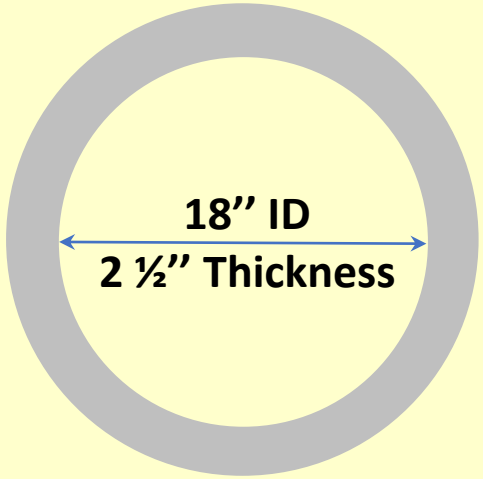
They are a new concept Concrete Pipe with a thickness 1/20 - 1/25 of the ID, and are superior to any other type of Pipe in terms of cost, sustainability and functionality: they can be laid on aggressive soil, are capable of pressure application more than 3.5 Bars, exhibit semirigid behavior, less expensive bedding and back filling vs fiber / plastic pipes



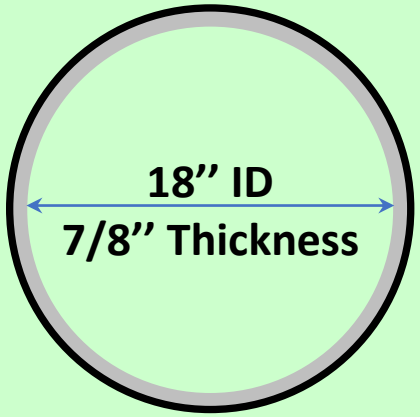
Comparison

C76 Reinforced Concrete Pipe
18'' ID – 2 ½'' Thickness
Class III – Wall B

Concrete Pipe wrapped with FLEXSTREN (no steel reinforcing)
18'' ID – 7/8'' Thickness



Raw material CO2 Footprint Saving 62%
Raw Material Cost Saving 66%



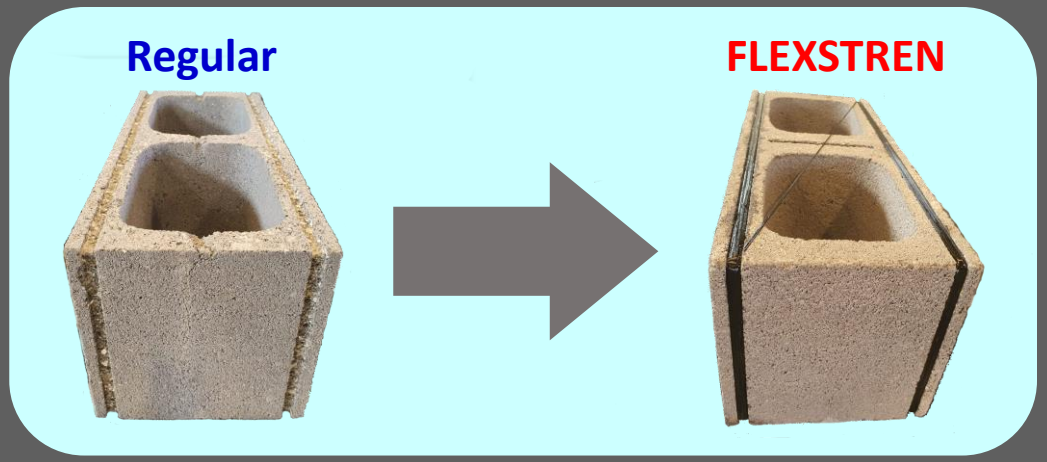
Highly automated production process consisting of a new production method for the pipes from 6'' to 24'' ID + a post process for the wrapping

The FLEXSTREN Ultra-Thin Concrete Pipes have better functionalities than any other Pipes.

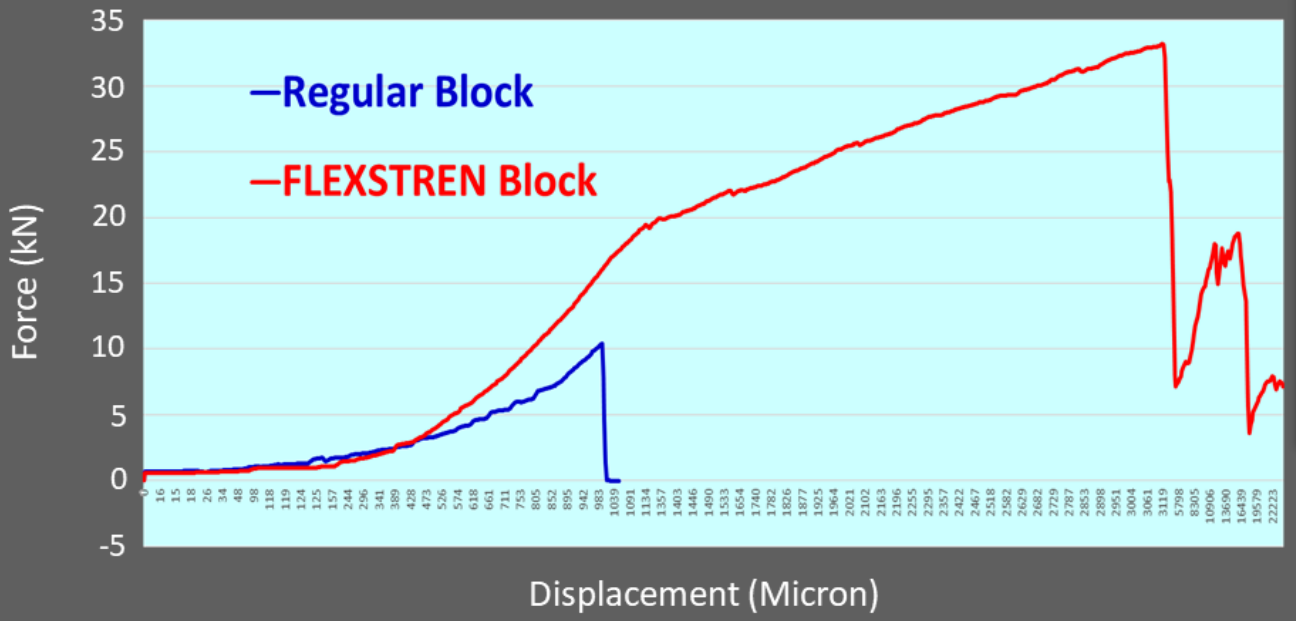
Features	FLEXSTREN Ultra-Thin	Concrete Pipe	Plastic Pipe
Semirigid behavior			
Robustness, Fire Resistance			
Durability, Eco-Sustainability			
No-Leaks, Pressure Capabilities			
Can be laid on aggressive soil			
Cost			

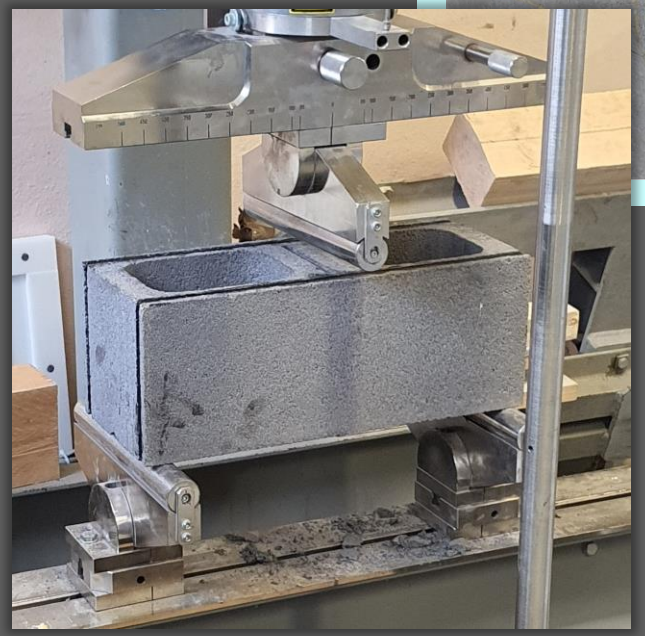
WRAPPED BLOCKS

for a fast Block Wall Construction



The post-compression imparted by the FLEXSTREN wrapping improves the flexural strength of the block

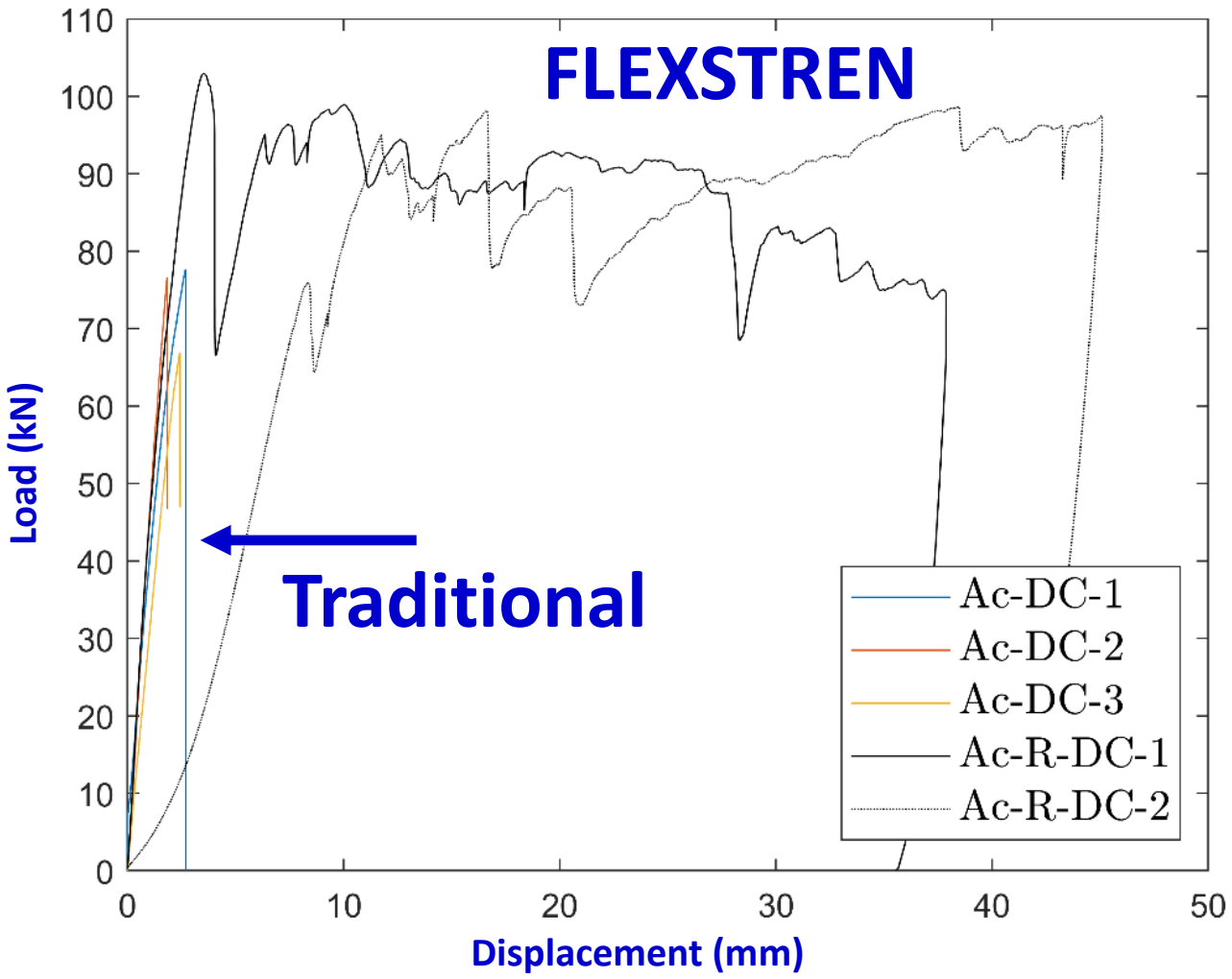




The blocks are connected together by gluing the fibers that surround them, using polyurethane or other resin-based glue.

This generates a very strong structural bond that opens up new possibilities for structural applications.

The wall assembly built with the FLEXSTREN technology exceed of many times traditional constructions



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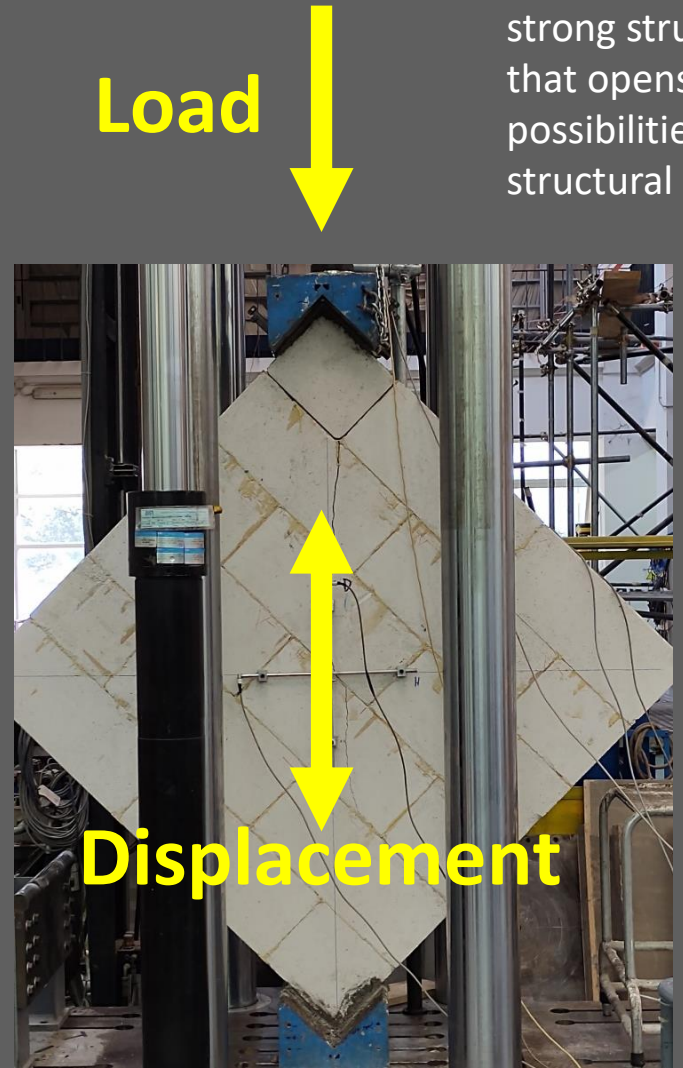
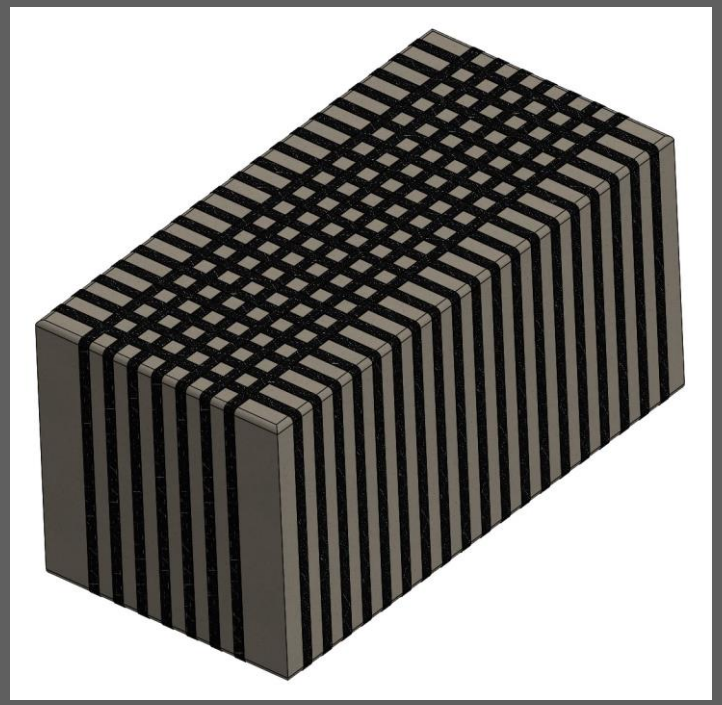
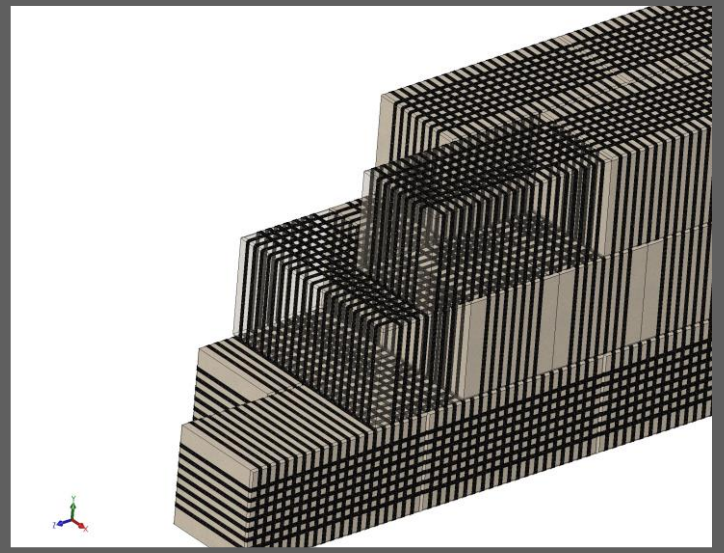


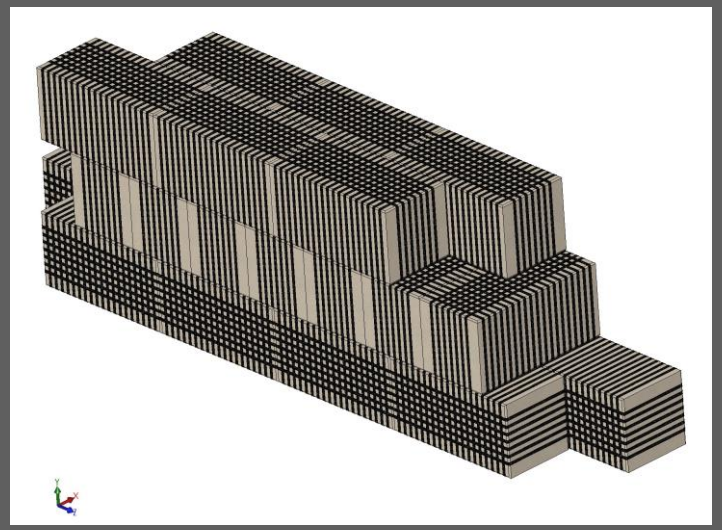
FSC TECH

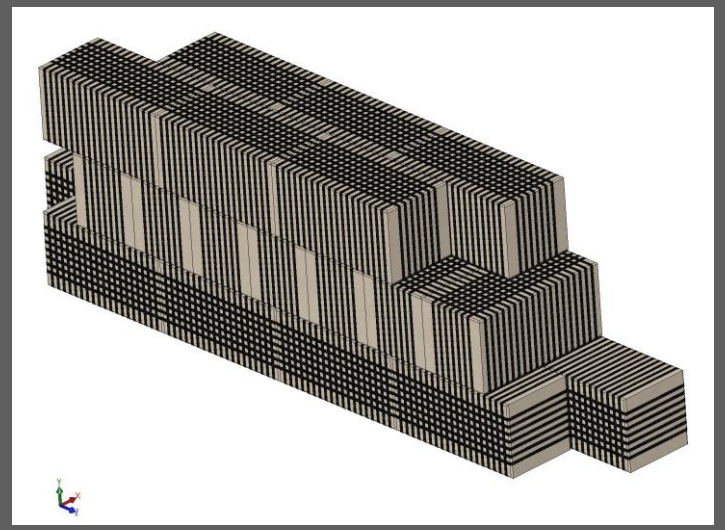
WRAPPED BLOCKS

Explosion Proof Bunkers







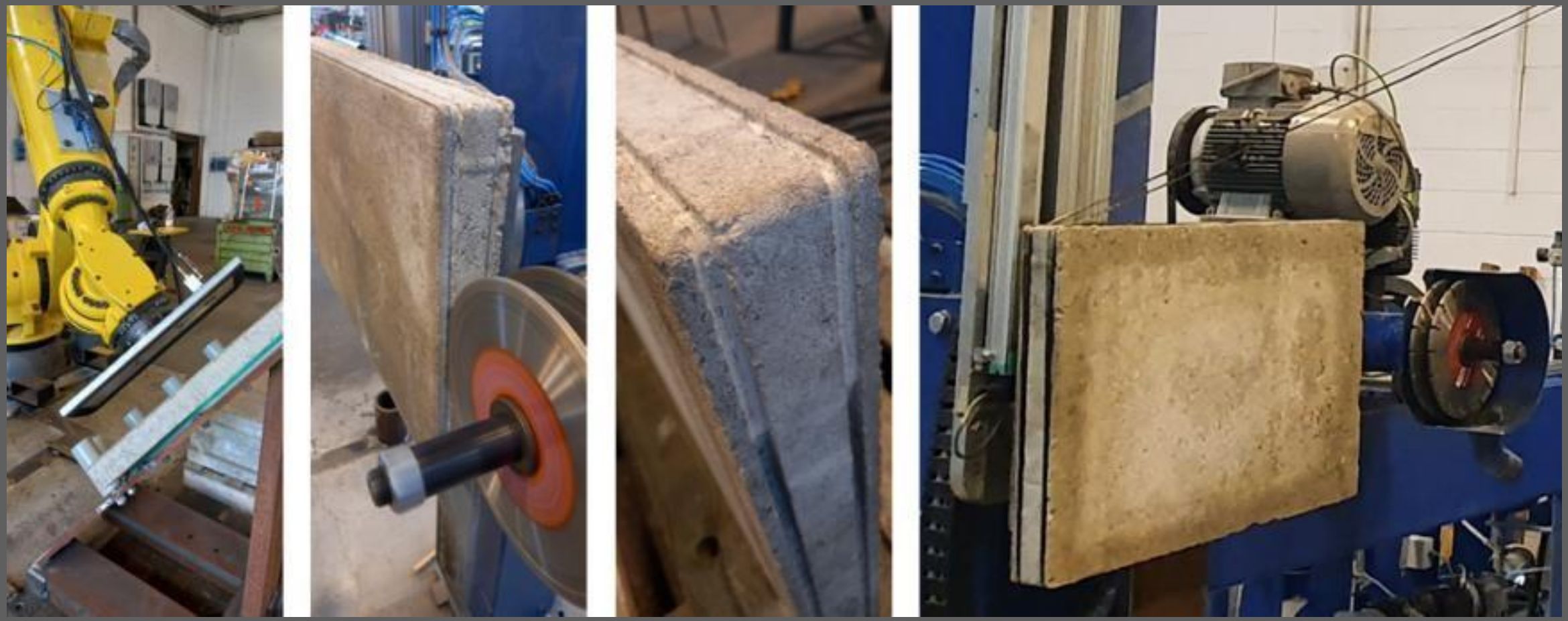


FLEXSTREN provides FLEXURAL STRENGTH for PAVERS

Such “wrapped” pavers can deform a lot, crack in the tensioned sides but NO CRACK IS SHOWN AT THE TOP.

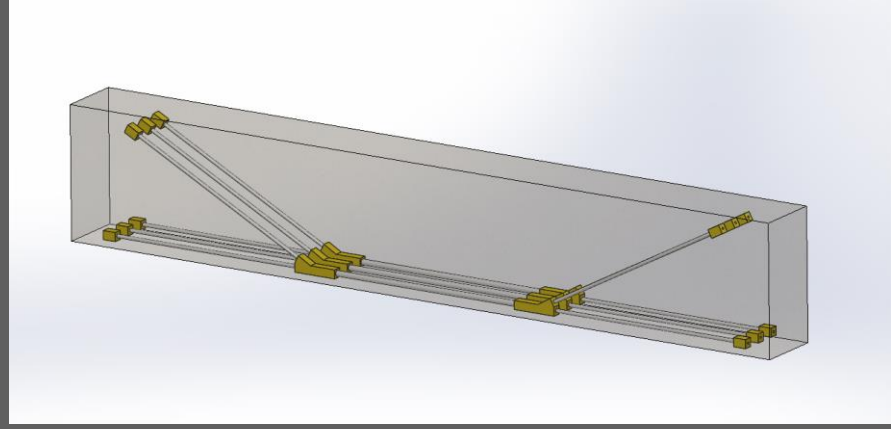
By reducing the load, the paver exhibits an elastic behavior and returns to its original shape.

FLEXSTREN provides FLEXURAL STRENGTH for PAVERS



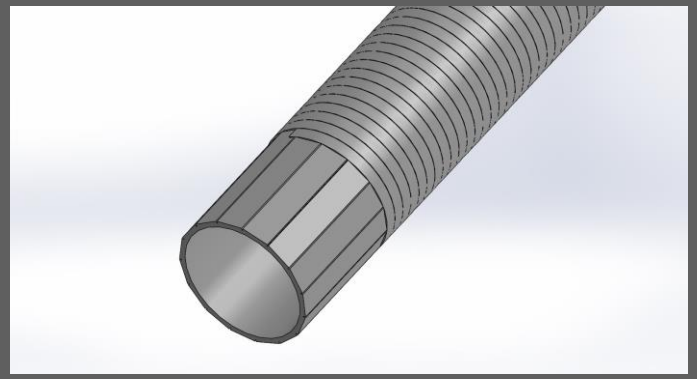
PAT

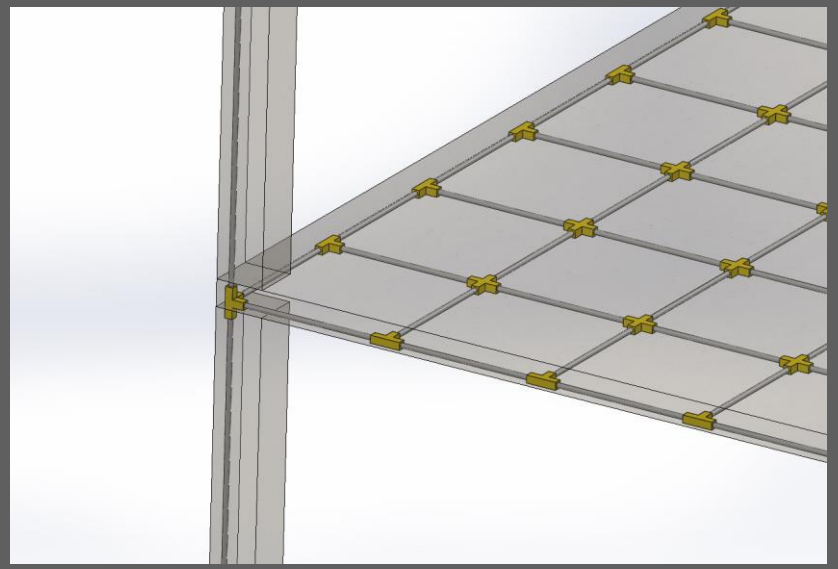
(Pressure Activated Tendon)



How it works

- A special tube wrapped with the FRP tape is placed under pressure causing it to stretch in the axial direction
- After concrete casting and curing, the pressure is removed, and this causes a post compression in the concrete
- This post compression can be multi axial

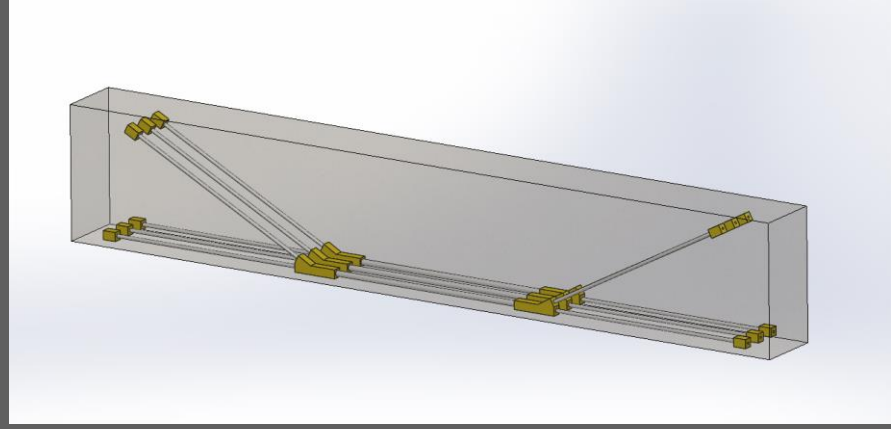




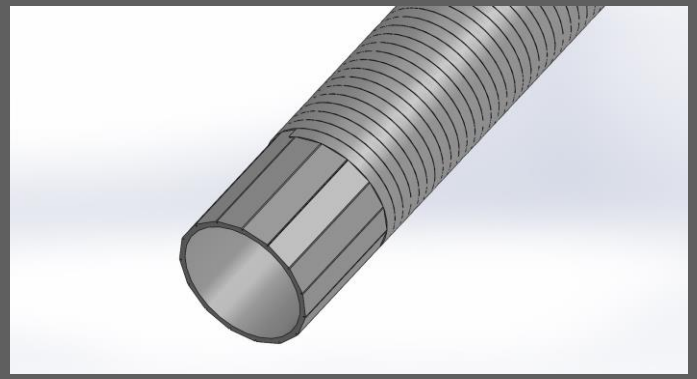
PAT

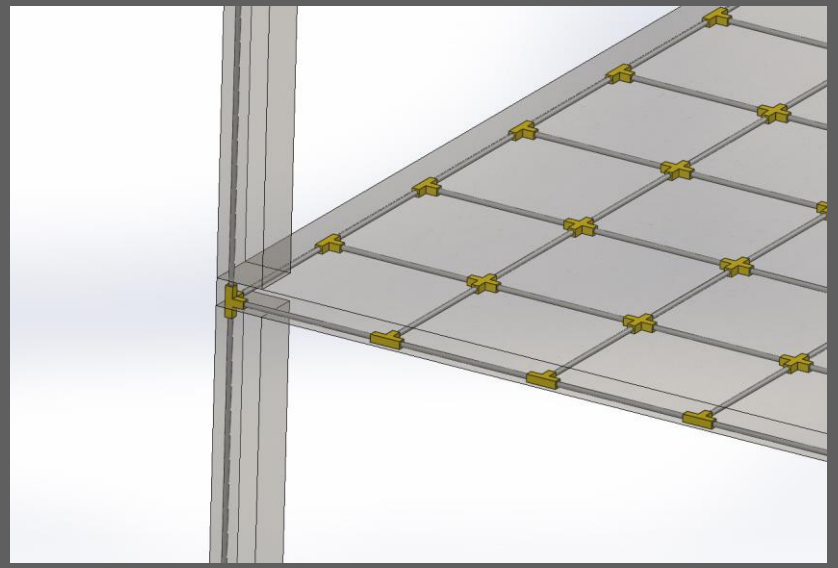
(Pressure Activated Tendon)

Multiaxial post compression by hydraulic system with FRP



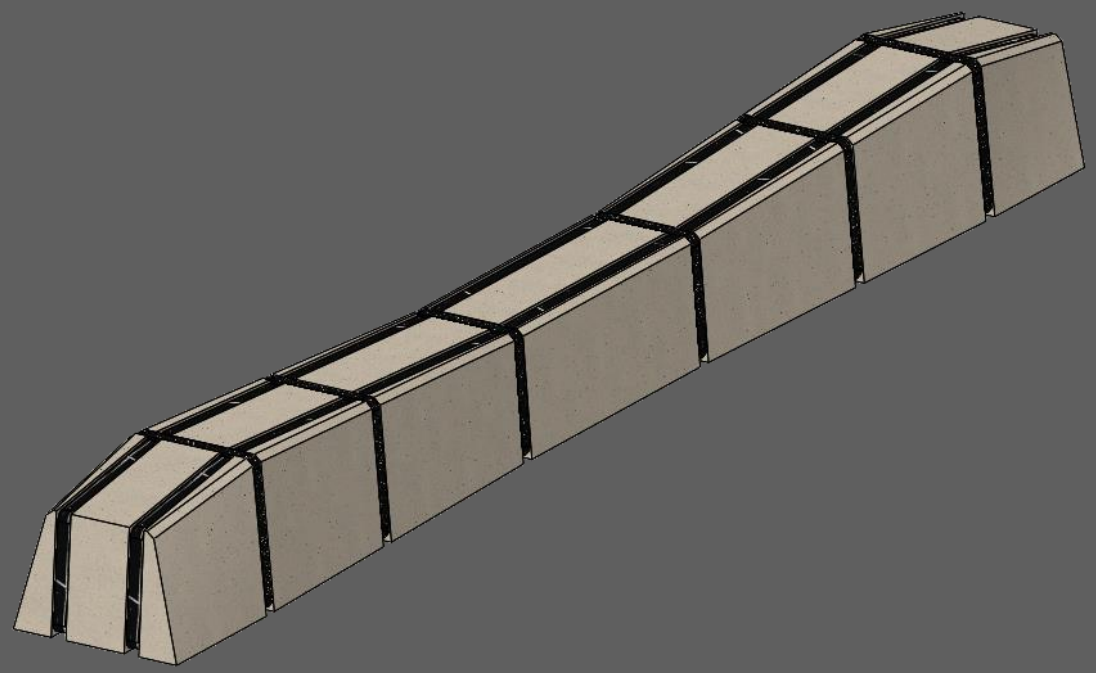
- It is addressed to replace steel reinforcing in cast in situ
- Also applicable to joint less roads and airport runways (very low maintenance and long life)
- for highly fire resistant and seismic resistant buildings





FLEXSTREN

DRYCAST RAILWAY SLEEPERS CORROSION FREE



ADVANTAGES VS. TRADITIONAL CONCRETE SLEEPERS:

- Longer life cycle due to the elimination of steel reinforcing
- High productivity due to immediate demolding process, resistance to freeze-thaw cycles by the use of dry cast concrete, any cracking does not lead to failure, electrical conductivity free
- Reduced relaxation losses compared to steel reinforcement, it is easy to make low volumes of custom shapes, low cost sleepers
- Possibility to insert objects sensitive to deformations due to the passage of trains, which can generate energy, and transmit information
- The winding reinforcement can reduce vibrations when trains pass

FLEXSTREN Catenary Poles

They are Catenary Poles produced with a concrete core which is then post compressed axially and circumferentially by wrapping a composite around the outside diameter

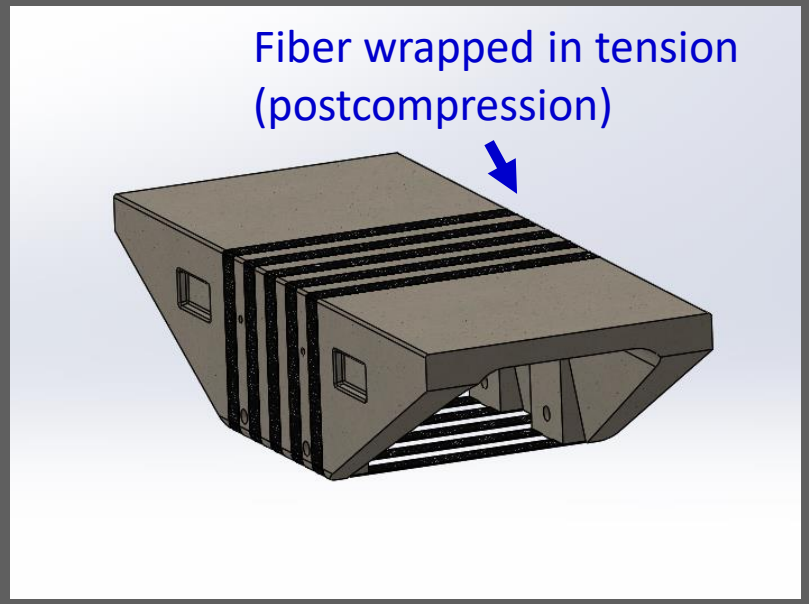
ADVANTAGES VS. GRP AND TRADITIONAL POLES:

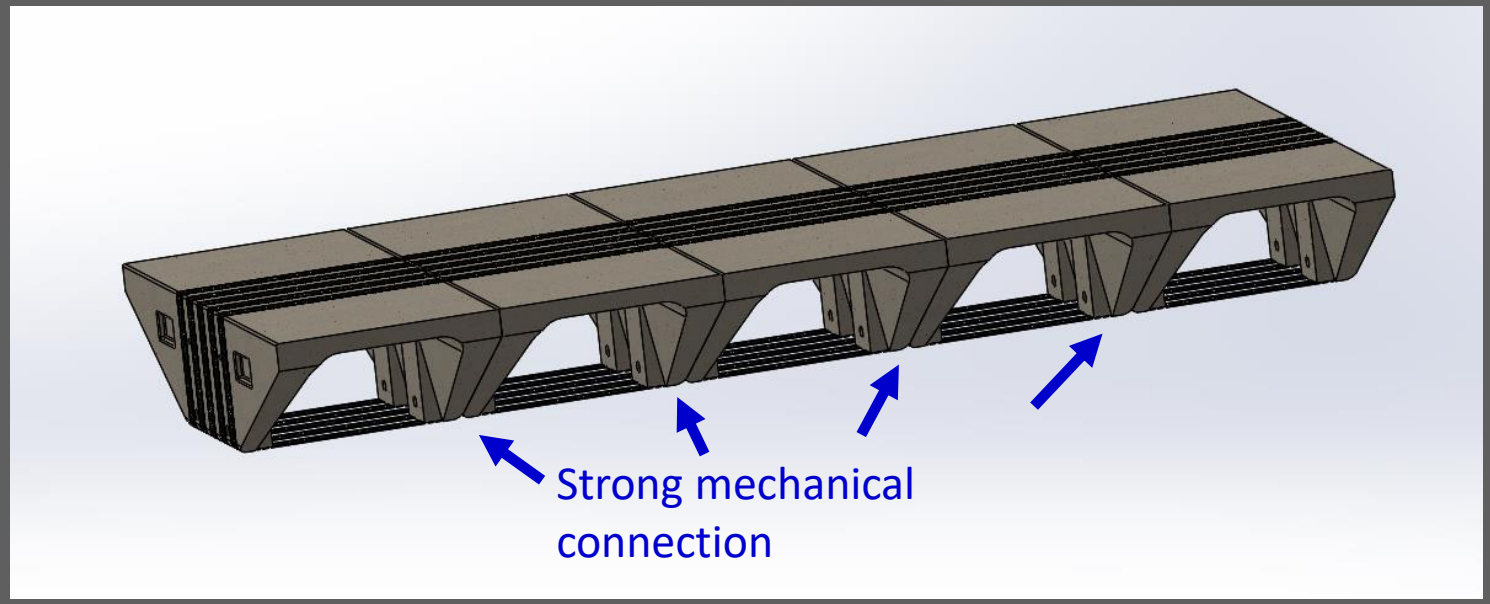
- It has an initial cost lower than traditional poles
- It has a very low conductivity
- It has a lower environmental footprint than any other pole material
- It has a service life that will be equal or better than a GRP pole

STRUCTURAL PRECAST

FLEXSTREN makes possible the assembly of innovative post compressed elements without the need of use post tensioning wires long as the span.

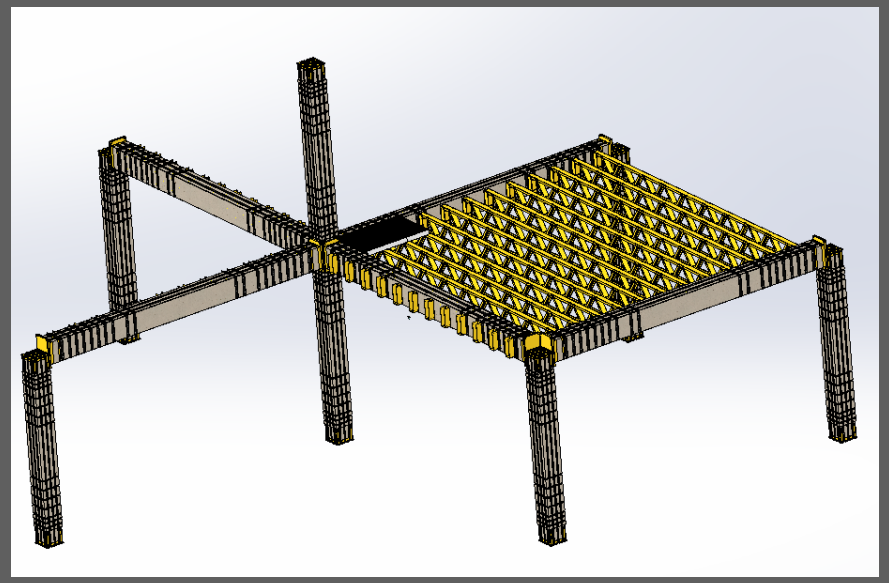
The post compression by wrapping allows to have a strong mechanical connections between segments.

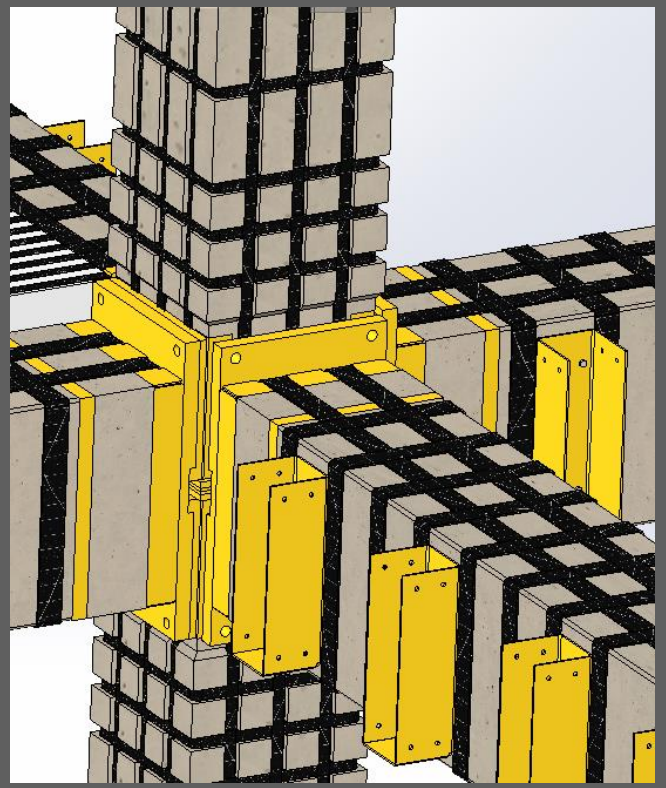




STRUCTURAL PRECAST

FLEXSTREN allows to build very high performance structural frames with full moment connection created from highly standardized elements with completely dry installation, similar to that of the steel structures





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