COMPOSITES REINFORCEMENTS FOR SUSTAINABLE CONCRETE

An Opportunity for the Pultrusion Industry

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Collapse of reinforced concrete structures due to steel reinforcement corrosion could be the most immediate vulnerability resulting from climate change...

Source: Boston Guide, October 2014

https://vimeo.com/144433359
Chlorides in seawater, air and de-icing mix cause de-passivation of the steel and consequent corrosion phenomena.
Technology developed over the last two decades has made available GFRPs to replace steel reinforcement when the durability of a structure is of concern.
COMPOSITE REINFORCEMENT AS A SOLUTION

Use of cements without chloride limits would give cement manufacturers the opportunity to:

- Use solid waste as kiln fuel (co-generation)
- Add kiln dust (byproduct that currently requires disposal) back to the clinker

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SEACON: Sustainable concrete using seawater, salt-contaminated aggregate and non-corrosive reinforcement
WHAT IS INFRAVATION?

Advancing innovative, near-market materials or processes, that will make highway infrastructure sustainable.

**GOAL**
Advancing innovative, near-market materials or processes, that will make highway sustainable.

**SEACON**
Sustainable Concrete

- **LAST LONGER**
- **COST LESS**
- **PERFORM EFFICIENTLY**
- **ONE OUT OF NINE FINALISTS**
- **SELECTED FROM 103 PROPOSALS**
WHO IS IN THE GAME?

PARTNERS

- Miami
- Politecnico di Milano
- ATP (construction composites)
- Owens Corning

COLLABORATORS

- Titan America
- Buzzi Unicem
- Acciaierie Valbruna
- FDOT (Florida Department of Transportation)
CURRENT PROJECTS AMERICA

Seawall Rehabilitation
Former Kennedy Compound,
Palm Beach, Florida USA

Miami MetroRail – MIA
(2010)
2.4 Miles of elevated rail

Rehabilitation of dry dock #4
at Pearl Harbor, Hawaii

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CURRENT PROJECTS EUROPE

Under Bosfor Slab
Istanbul, Turkey

Fori Imperial Station
Rome, Italy

Durandy Tramway Station
Nice, France

34 M d'ARMATURE

© Courtesy of ATP
RIYADH METRO SAUDI ARABIA
FRP MARKET POTENTIAL

- Global concrete reinforcements, exposed to corrosion is ~$25B/~35MM tons market with annual demand growth @ 3%.
- FRP rebar market is >1% of global demand @ $200MM, including basalt, carbon fibers and other alternatives.
- One of the fastest growing composites applications @ 9% CARG, driven by fast adoption and regional standards.

Source: “FRP Rebars Market in Construction Industry” Report by MarkestandMarkets
SUSTAINABILITY @ OWENS CORNING

Dow Jones Sustainability Indices
In Collaboration with RobecoSAM

Owens Corning is the group leader for Building Products on the Dow Jones Sustainability World Indices

Listed to Dow Jones Sustainability World Index (6th year) and Building Products Industry Leader in 2016 (4th year)
SUPPORTING PULTRUSION WORLDWIDE

OWENS CORNING AT A GLANCE

- Leader in glass science for more than 30 years
- 200+ researchers in 5 R&D centers
- Worldwide manufacturing of Type 30® direct roving

- Amarillo, TX
- Mexico City, MX
- Rio Claro, BR
- L’Ardoise, FR
- Gous, RU
- Taloja, IN
- Yuhang, CN
- Doudian, CN
**Inventor of Type 30® Single-End Roving**  
with a long history of introducing innovative, robust products that meet stringent performance and quality requirements throughout the value chain

**Broad range of glass fiber products**  
offers customers more specialized combinations of polymer/resin matrix and reinforcement options

**Globally available** products manufactured in multiple facilities providing unrivaled supply redundancy

**Local technical support** combined with global account coordination provides customers with outstanding response times and vital market intelligence
Thank you!