Development of guidelines for the design of concrete structures, reinforced, prestressed or strengthened with advanced composites

Results in Brief

Concrete gets composite reinforcement

Reinforced steel concrete structures are the most widely used structural material in the world. However, in Europe alone, billions of Euros are spent each year in maintenance and repair of structures where spalling, fracturing and erosion have taken effect. Composite reinforced polymers are currently promising better resistance to these damaging factors.

Because concrete has an inherent weakness in that it cannot withstand tension, concrete designs are manufactured with steel rods that prevent the tension from occurring within the concrete itself. It is these steel rods that give reinforced concrete both its name and resistance. However, because even the tension in the rods can be overcome under massive forces such as earthquakes, concrete structures have been known to fail and collapse.

The introduction of fibre reinforced composites into concrete designs does not herald invulnerability of concrete structures, but does look promising enough to enhance their strength and durability considerably.
Especially when employed in lateral reinforcement or confinement of pre-stressed steel links at the construction stage.

Composites offer improved performance of strengthening reinforced concrete columns and also in the flexural elements involved. An additional setback to traditional methods is that steel rods used in reinforcement are prone to corrosive elements, thus weakening the structural integrity. Composite materials prove far more resistant to corrosion and therefore offer better longevity of concrete structures.

Since the confining material can be pre-tensioned so that their full potential is attained prior to the fracture of concrete, the enhancement of ductile and strength is guaranteed. Currently, large scale testing is being planned with the developers looking for assistance in further development of the technology as well as software and tools for the application of the technology.

**Project Information**

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<th>Overall budget</th>
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