Univ.-Prof.
Prof. h.c. (Moscow State Univ.)
Dr.-Ing. Dipl.-Wirt. Ing.
Thomas Gries
Direktor

Kira Heins
Construction Composites

Mein Zeichen: KH
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Projekttitel:	OrthoPreg Development of a low-impregnation reinforcement textile with orthogonally equivalent strengths for the production of glass-fibre concrete components
Partner:	Albani Group GmbH & CO. KG Villa Rocca GmbH
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Förderträger:	„Zentrales Innovationsprogramm Mittelstand - ZIM“ des Bundeministerium für Wirtschaft und Energie

Mission Statement

The development of a glass fibre (AR glass fibre) resistant to alkaline environments in the 1970s created the possibility of permanently reinforcing concrete with glass fibres. Initially, only short fibres were used. In the next development stage, textiles made of AR glass fibres were also used, so that the new form of reinforcement could be positioned precisely and thus used efficiently in terms of resources. Grid-like textiles made of glass and carbon fibres with different strength values in the orthogonal directions (warp and weft direction) are still used today. Common components made of textile-reinforced concrete are currently façade panels.

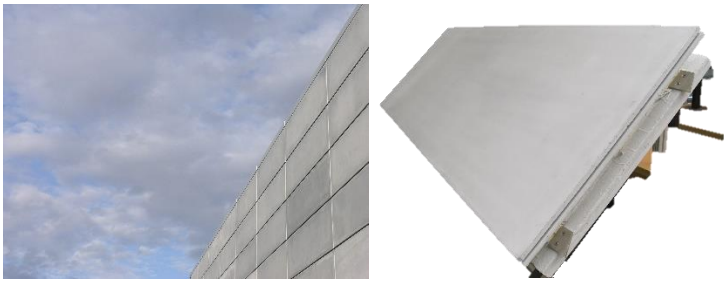

Abbildung 1: Façade made of textile reinforced concrete (left); façade panel (right)

In the case of commercially available reinforcements, there is a difference between the tensile strength of the warp and weft directions of 3 - 12 %, but in some cases also up to 50 %. The structural engineer measures the component using existing linear design concepts according to the smaller value. This means that the capacity of the textiles is insufficiently used, resources are wasted and material costs increased. In addition, reinforcing textiles often have a polyester impregnation of >20% by mass based on the fibre content. These impregnated textiles are not suitable for use as GFB, e.g. in facades, as they lead to a sudden failure of the panel with dangerous spalling.

Approach

OrthoPreg serves the development of a glass fibre reinforcement with equivalent strengths in the orthogonal directions and the reduction of the impregnation proportion to <5 mass % for a delayed failure safe behaviour of components. The aim is to reduce the material costs for reinforcement by 15%. The parameters damaging the yarn during the knitting process are investigated in order to maintain the textile strength in both directions. The coating process is adapted for the use of low-viscosity materials. In addition, a design concept is being developed for the OrthoPreg reinforcement so that structural engineers can draw conclusions about the component properties without having to repeat material tests.

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Contact

Kira Heins, M. Sc.
Tel.: +49/(0)241/80 49130
kira.heins@ita.rwth-aachen.de

Institut für Textiltechnik der RWTH Aachen University
Otto-Blumenthal-Str. 1
52074 Aachen
Fax: +49/(0)241 80 224 22
http://www.ita.rwth-aachen.de