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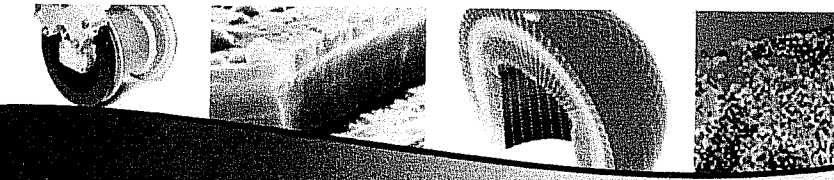

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INFLUENCE OF ROVING LINEAR DENSITY AND REINFORCEMENT STRUCTURAL DENSITY IN TEXTILE REINFORCED CONCRETE PERFORMANCE

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The development and replacement of conventional construction materials, by better performing ones, is receiving a great deal of attention by the textile and civil engineering scientific communities. The use of fibrous materials as reinforcement for cementitious matrices is one of its many applications that have resulted in new product developments.

Due to its inherent low tensile strength, concrete requires reinforcement in applications where significant tensile stresses are applied. Steel reinforced concrete is widely used in the construction industry, being one of the most important building materials. However, corrosion of steel is one of its most serious problems which lead to a limited service life. Textile Reinforced Concrete (TRC) is a new approach to concrete reinforcement which has been developed in the last years in order to eliminate steel corrosion problems and improve the serviceability and performance durability of concrete structures. Easy handling, transportation and placing in site, corrosion resistance and the ability of fibre orientation in the load application directions are the main reasons for its use. Besides, the use of fibrous materials allows the production of thin and lightweight elements that are corrosion-resistant, durable, low cost and with increased load-bearing capabilities whilst significantly improving its ductility.

The current research work consists in the development and application of directionally oriented fibrous structures (DOFS) as a concrete reinforcement material, in order to overcome the main disadvantages of steel - corrosion. E-glass fibre DOFS reinforced concrete elements were produced and the influence of the rovings linear density and the *wovenlike* grid structural density on the reinforced concrete mechanical behaviour was studied. This paper reports on the work that is being undertaken at the University of Minho concerning the development of directionally oriented fibrous structures to be used as a concrete reinforcement material. Several glass fibre *wovenlike* DOFS were produced varying two parameters: roving linear density (tex) and reinforcement structural density (rovings/cm). Self-compacting concrete (SCC) slabs were reinforced by DOFS structures and their bending behaviour was evaluated. The criteria used to choose E-glass fibre for producing the DOFS were adequate tensile properties, low thermal conductivity and good relation quality/price. SCC was the selected concrete type due to its specific features namely high tensile properties and not requiring vibration for placing and compaction.

Keywords: Fibres; Fibrous structures; Self-compacting concrete; Textile reinforced concrete.

NOTES