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Fiber-to-mortar bond behavior in TRM composites: effect of embedded length and fiber configuration

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ABSTRACT

The use of Textile Reinforced Mortar (TRM) composites for Externally Bonded Reinforcement (EBR) of reinforced concrete (RC) and masonry structures has attracted several attentions during the last years. The effectiveness of these composites in structural reinforcement is significantly dependent on the TRM-to-substrate and the fiber-to-mortar bond behavior. Despite the importance of the latter, that controls the crack distribution on these composites, have received few attentions and is relatively unknown.

This paper presents a combined experimental and analytical study on the effect of fiber-embedded length and configuration on the pull-out response. From the obtained results, bond-slip laws are proposed for TRM composites made of unidirectional and bidirectional grids. The tests are performed on a (unidirectional) steel-based and a (bidirectional) glass-based TRM composite as common reinforcing systems. A comparison is also made between the results obtained from single-fiber pull-out tests and conventional single-lap shear bond tests to highlight the differences/similarities between these two test methods.

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