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GLOBAL STUDY OF THE BEHAVIOUR OF TEXTILE REINFORCED MORTAR UNDER TENSILE STRESS

Pello Larrinaga[*], José T. San-José[† *], David García[*], Leire Garmendia[*] and Carlos Chastre[+]

[*] Tecnalia
C/Geldo, Edificio 700, 48160, Derio, Spain
e-mail: pello.larrinaga@tecnalia.com, web page: http://www.tecnalia.com

[†] Faculty of Engineering of Bilbao (UPV-EHU)
Alameda Urquijo s/n, 48013, Bilbao, Spain
e-mail: tomas.sanjose@tecnalia.com, web page: http://www.ehu.es

[+] Faculdade de Ciências e Tecnologia
Universidad Nova de Lisboa
2829-516, Caparica, Portugal
e-mail: cmcr@fct.unl.pt, web page: http://www.fct.unl.pt/

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Abstract. *In recent years Textile Reinforced Mortar (TRM) has focused the efforts of several research institutions. This material has proven to be an effective strengthening technology for masonry and reinforced concrete structural elements [1]. TRM is presented as an evolution of the well-known Fibre Reinforced Polymer (FRP). During the last decade, FRP has gained an important position in the strengthening business, becoming the most favourite strengthening material for several designers due to its effectiveness, durability and easiness to install. Nevertheless, FRP presents some drawbacks that advise against its use in certain situations, a space which could be filled with TRM, a more economic material. By the use of textile fabrics as reinforcement core and mortar as matrix, the application range covers from retrofitting erected structures to the production of new building members.*

The fascinating possibilities of TRM, also named Textile Reinforced Concrete (TRC), have motivated varied studies about this technology, from macro to micro scale. The loading-bearing behaviour of TRM material is influenced basically by material mechanical properties and amount and alignment of the textile reinforcement [2]. However, other features, apparently less important, have a direct effect which must not be neglected. This paper studies globally some parameters that affect the pure tensile behaviour of TRM composites. For this purpose commercial textiles and mortars have been used in the campaign.

Hence, several tensile specimens (600x100x10mm) were tested within this project. Number of textile layers, thickness of the matrix, cell size, coated or uncoated rovings are some of the studied parameters in an experimental campaign which includes the use of 4 different

strengthening materials: glass, carbon, basalt and steel hardwire. Besides, the dynamic response of TRM under tensile loads was also tested in this paper. The experimental results were compared with analytic approximations present in the bibliography and, therefore, a numerical model was carried out looking for a possible use in future works.

Fig 1. Pure tensile test setup.

Finally, the effectiveness of Textile Reinforced Mortar as strengthening material is checked in two different structural members: stone arches and reinforced concrete beams under flexure loads. The results present TRM as promising retrofitting solution and show the possibility of further studies and researches.

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