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# Use of DIC technique for investigating the behaviour of FRCM materials for strengthening masonry elements

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## ABSTRACT

Numerous experimental programs have been conducted in recent years to understand the potential benefits of different types of external reinforcement systems aimed to reduce the seismic vulnerability of existing structures. The Fibre Reinforced Cementitious Mortar (FRCM) materials are spreading as an alternative strengthening technique to the traditional use of Externally Bonded - Fibre Reinforced Polymer (EB-FRP) systems, for both structural and non-structural members of civil and industrial buildings.

The behaviour of FRCM materials depends on numerous parameters and it is, in general, more complex than what observed for the more traditional EB-FRP ones, mainly due to the presence of a cement-based adhesive. Both tensile and bond tests can help researchers and manufacturers in optimizing the strengthening system. In this framework, the potential of the Digital Image Correlation (DIC) technique for monitoring the behaviour of FRCM systems is very high. Nevertheless, the accuracy of such a monitoring technique is good enough only if sensitivity analysis and critical post-processing of results are performed.

Recently, several tests were performed in a Round Robin Test (RRT) initiative involving several laboratories and concerning tensile tests on different types of FRCM systems and bond tests on the same reinforcements applied to masonry elements. The experimental results of the tests performed by two of these laboratories are compared in this paper in order to investigate the effect of set-up on both the global performance and the local bond behaviour of three FRCM systems (glass, basalt, steel). The results allow also to evidence benefits and weaknesses of using DIC technique for monitoring tests on FRCM systems.

**Keywords:** FRCM systems, masonry, tensile tests, bond tests, DIC technique

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