Experimental Study on Effective Bond Length of Basalt Textile Reinforced Mortar Strengthening System: Contributions of Digital Image Correlation

Carmelo Caggegi, Denise Sciuto, Massimo Cuomo

PII: S0263-2241(18)30596-7
DOI: https://doi.org/10.1016/j.measurement.2018.07.003
Reference: MEASUR 5687

To appear in: *Measurement*

Received Date: 31 March 2018
Revised Date: 28 June 2018
Accepted Date: 2 July 2018

Please cite this article as: C. Caggegi, D. Sciuto, M. Cuomo, Experimental Study on Effective Bond Length of Basalt Textile Reinforced Mortar Strengthening System: Contributions of Digital Image Correlation, *Measurement* (2018), doi: https://doi.org/10.1016/j.measurement.2018.07.003

Experimental Study on Effective Bond Length of Basalt Textile Reinforced Mortar Strengthening System: Contributions of Digital Image Correlation

Carmelo Caggegi[a*], Denise Sciuto[b], Massimo Cuomo[b]

Keywords: *Textile reinforced mortar, Reinforcement, Effective bond length, Digital image correlation, DIC, masonry*

Abstract

Textile reinforced mortar (TRM) strengthening systems appear to be a preferred solution for reinforcing historical masonry structures. At present, the study of testing methods that are more appropriate for defining the mechanical design parameters is of major interest for the scientific community. The experimental research presented in this paper was carried out to define the effective bond length of a Basalt TRM system applied to a homogeneous substrate. In order to achieve this goal, several series of specimens, characterised by different bond lengths, were analysed by means of shear tests. The use of digital image correlation permitted the definition of the displacement and strain fields related to the reinforced specimen surfaces and an improved description of the debonding phenomena recorded during the tests.

[a]*University Claude Bernard Lyon 1, Laboratory of Composite Materials for Construction (LMC2), Site Bohr, 82 Boulevard Niels Bohr, Campus de la DOUA, 69622 Villeurbanne Cedex, France,* e-mail: carmelo.caggegi@univ-lyon1.fr

[b]*Department of Civil and Environmental Engineering, University of Catania, V. le A. Doria, 6, 95125 Catania, Italy,* e-mails: denisesciuto@gmail.com, cuomo@dica.unict.it

*Corresponding author

1 INTRODUCTION

The use of textile reinforced mortar (TRM) composites in the strengthening of historical structures has become widespread in the past several years. These materials are composed of a textile embedded in a mortar matrix [1][2][3]. TRM strengthening systems are applied to the external surfaces of structural elements, and are characterised by their small thickness (approximately 1 cm) and low weight. The textiles used to construct these composites are frequently composed of carbon, glass, basalt, PBO or Aramid fibres [4]. The mortar matrix may be characterised by cement- or lime-based mortar. The durability of the textiles embedded in the mortar matrix is a central issue in the TRM reinforcement framework [5]. With regard to composite materials characterised by epoxy resin (fibre reinforced polymer (FRP)), TRM exhibits effective water permeability and resistance to high-temperature exposure [6][7].