### Accepted Manuscript

Estimation of a matrix-fiber interface cohesive material law in FRCM-concrete joints

Tommaso D'Antino, Pierluigi Colombi, Christian Carloni, Lesley H. Sneed

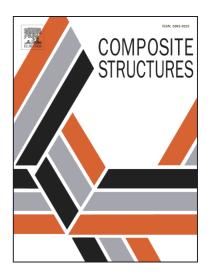
PII: S0263-8223(18)30558-0

DOI: https://doi.org/10.1016/j.compstruct.2018.03.005

Reference: COST 9452

To appear in: Composite Structures

Received Date: 7 February 2018 Accepted Date: 6 March 2018



Please cite this article as: D'Antino, T., Colombi, P., Carloni, C., Sneed, L.H., Estimation of a matrix-fiber interface cohesive material law in FRCM-concrete joints, *Composite Structures* (2018), doi: https://doi.org/10.1016/j.compstruct.2018.03.005

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

## **ACCEPTED MANUSCRIPT**

# Estimation of a matrix-fiber interface cohesive material law in FRCM-concrete joints

Tommaso D'Antino<sup>1\*</sup>, Pierluigi Colombi<sup>1</sup>, Christian Carloni<sup>2</sup>, Lesley H. Sneed<sup>3</sup>

<sup>1</sup>Politecnico di Milano, 20133 Milano, Italy

<sup>2</sup>University of Bologna, 40126 Bologna, Italy

<sup>3</sup>Missouri University of Science and Technology, Rolla, MO, 65409 USA

#### Abstract

The application of composite materials to strengthen existing structural elements is a valid alternative to traditional strengthening techniques. Fiber reinforced cementitious matrix (FRCM) composites have been successfully employed to strengthen existing reinforced concrete (RC) and masonry structures in bending, shear, torsion and to confine axially loaded elements. Although failure of FRCM strengthened elements depends on different parameters, such as the composite and substrate geometrical and mechanical properties, debonding at the matrix-fiber interface is generally the failure mechanism. Therefore, the study of the bond behavior of FRCM composites is a key topic to develop reliable design procedures. Numerous experimental campaigns were carried out recently to study the bond behavior of different FRCM composites. An analytical model is employed in this paper to describe the bond behavior of FRCM-concrete joints and different trilinear cohesive material laws are defined based on the experimental results. The experimental and corresponding analytical load response, strain profile, slip profile, and shear stress profile along the bonded length are compared. An analytical formulation of the bonded length needed to fully develop the stress-transfer mechanism at the matrixfiber interface, i.e. the effective bond length, is provided for the trilinear cohesive material law employed.

-

<sup>\*</sup>Corresponding author: Phone: +390223994352. Email: tommaso.dantino@polimi.it

#### Download English Version:

# https://daneshyari.com/en/article/6703516

Download Persian Version:

https://daneshyari.com/article/6703516

<u>Daneshyari.com</u>