

Accepted Manuscript

An experimental investigation on the bond behavior of steel reinforced polymers on concrete substrate

Francesco Ascione, Marco Lamberti, Annalisa Napoli, Ghani Razaqpur, Roberto Realfonzo

PII: S0263-8223(17)31872-X

DOI: <http://dx.doi.org/10.1016/j.compstruct.2017.08.063>

Reference: COST 8821

To appear in: *Composite Structures*

Received Date: 16 June 2017

Revised Date: 9 August 2017

Accepted Date: 16 August 2017



Please cite this article as: Ascione, F., Lamberti, M., Napoli, A., Razaqpur, G., Realfonzo, R., An experimental investigation on the bond behavior of steel reinforced polymers on concrete substrate, *Composite Structures* (2017), doi: <http://dx.doi.org/10.1016/j.compstruct.2017.08.063>

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.

An experimental investigation on the bond behavior of steel reinforced polymers on concrete substrate

Francesco Ascione^a, Marco Lamberti^a, Annalisa Napoli^a, Ghani Razaqpur^b,
Roberto Realfonzo^{a*}

^aDepartment of Civil Engineering, University of Salerno, Italy

^bDepartment of Civil Engineering, McMaster University, Hamilton, Canada

Corresponding author: rrealfonzo@unisa.it

ABSTRACT

Steel Reinforced Polymer (SRP) systems have recently emerged as an attractive solution for the external strengthening of reinforced concrete structures. They entail unidirectional fabrics made out of high tensile strength steel cords that can be externally bonded to the substrate via wet lay-up, using either epoxy or polyester resin. Currently, research about the behavior of SRP strengthening systems for concrete structures is evolving but further systematic and comprehensive studies are still needed to ensure the consistency and reliability of the studies performed to date. The present paper contributes to expanding the existing knowledge by presenting the results of an extensive experimental program devoted to investigate the bond behaviour between SRP and concrete substrate. To this purpose, a number of SRP strips were bonded to concrete blocks by a thixotropic organic matrix and the lap joint was subsequently subjected to direct shear tests performed in displacement control. Besides the concrete strength, the following study parameters were considered: (a) the concrete surface roughness in the bonded region, (b) the density of the steel fabric, (c) the ratio of the epoxy covered concrete surface width to the SRP strip width, and (d) the bonded interface length.

Keywords: Steel Reinforced Polymer (SRP), Concrete, Debonding, Experimental Testing, Single Lap-Shear Test.

1 INTRODUCTION

In the field of external strengthening and repairing of existing structures made of traditional materials such as concrete and masonry, Fibre Reinforced Polymer (FRP) has attracted a great deal of attention world-wide due to its ease of application, ability to limit the aesthetic impact of the repair work on the original structure, and its adequate reversibility for historical or artistic reasons. Currently, almost all applications of FRP involve FRP made with glass fiber (GFRP), carbon fiber (CFRP) and to a lesser extent aramid fiber (AFRP). Due to the enormous amount of research and the substantial accumulation of knowledge over the past three decades, substantive design standards and guidelines have been developed in a number of countries. Among these, one can mention the American Concrete Institute guidelines (ACI, 440.2R-17), the Canadian Standards Association Standard (S806-12), the Japan Society of Civil Engineers Specifications (JSCE-97), the European (Ceb-Fip-01) and Italian guidelines (CNR-DT200 R1/2013) [1]-[5]. A State-of-the-Art of the

Download English Version:

<https://daneshyari.com/en/article/4917779>

Download Persian Version:

<https://daneshyari.com/article/4917779>

[Daneshyari.com](https://daneshyari.com)