

Accepted Manuscript

Simultaneous Flexural and Punching Strengthening of RC Slabs according to a New Hybrid Technique Using U-Shape CFRP Laminates

Joaquim A.O. Barros, Mohammadali Rezazadeh, João P.S. Laranjeira, Mohammad R.M. Hosseini, Mohammad Mastali, Honeyeh Ramezansafat

PII: S0263-8223(16)32067-0

DOI: <http://dx.doi.org/10.1016/j.compstruct.2016.10.009>

Reference: COST 7835

To appear in: *Composite Structures*

Received Date: 10 March 2016

Revised Date: 18 August 2016

Accepted Date: 5 October 2016



Please cite this article as: Barros, J.A.O., Rezazadeh, M., Laranjeira, J.P.S., Hosseini, M.R.M., Mastali, M., Ramezansafat, H., Simultaneous Flexural and Punching Strengthening of RC Slabs according to a New Hybrid Technique Using U-Shape CFRP Laminates, *Composite Structures* (2016), doi: <http://dx.doi.org/10.1016/j.compstruct.2016.10.009>

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.

Simultaneous Flexural and Punching Strengthening of RC Slabs according to a New Hybrid Technique Using U-Shape CFRP Laminates

Joaquim A.O. Barros¹, Mohammadali Rezazadeh², João P.S. Laranjeira³, Mohammad R.M. Hosseini⁴, Mohammad Mastali⁵, Honeyeh Ramezansfat⁶

ISISE, Dep. Civil Engineering, School Engineering, University of Minho, Campus de Azurém, 4800-058 Guimarães, PORTUGAL; ¹barros@civil.uminho.pt, ²rz.h.moh@gmail.com, ³joaopslaranjeira@gmail.com, ⁴hoseini_engineer@yahoo.com, ⁵m.mastali@civil.uminho.pt, ⁶honeyrscivil@gmail.com

ABSTRACT:

One of the main concerns related to flat reinforced-concrete (RC) slabs is the slab's punching capacity. Punching can occur not only due to a deficient transverse reinforcement, but also when the flexural capacity of the slab needs to be increased. To increase the flexural capacity, carbon-fiber-reinforced-polymer (CFRP) composites have been applied according to near-surface-mounted (NSM) or external-bonded-reinforcement (EBR) techniques, while for the punching strengthening CFRP reinforcements have been applied according to embedded-through-section (ETS) technique. To take advantage of strengthening benefits of the NSM and ETS techniques, in the present paper a new type of CFRP laminate of U-shape is used by adopting a novel hybrid technique for the simultaneous flexural and punching strengthening of existing RC slabs. Besides, this hybrid technique aims to provide a better bond performance for the ETS and NSM CFRPs by improving the anchorage conditions. Moreover, a higher resistance to the susceptibility of occurrence of other premature failure modes, like concrete cover delamination, is offered by using this hybrid technique. A 3D nonlinear finite-element (FE) model is developed to simulate the experimental tests by considering the nonlinear behavior of the constituent materials. The experimental program and numerical model are described, and the relevant results are analyzed.

Keywords: Flexural strengthening; punching shear strengthening; RC slabs; CFRP reinforcement; FE model.

Download English Version:

<https://daneshyari.com/en/article/4917940>

Download Persian Version:

<https://daneshyari.com/article/4917940>

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