

Accepted Manuscript

Influence of width and thickness of composite laminates on the flexural behavior of reinforced concrete beams and slabs

Alberto Turco, Massimiliano Bocciarelli, Antonio Nanni, Carlo Poggi

PII: S0263-8223(16)33036-7
DOI: <http://dx.doi.org/10.1016/j.compstruct.2017.06.024>
Reference: COST 8611

To appear in: *Composite Structures*

Received Date: 30 December 2016

Revised Date: 11 April 2017

Accepted Date: 7 June 2017



Please cite this article as: Turco, A., Bocciarelli, M., Nanni, A., Poggi, C., Influence of width and thickness of composite laminates on the flexural behavior of reinforced concrete beams and slabs, *Composite Structures* (2017), doi: <http://dx.doi.org/10.1016/j.compstruct.2017.06.024>

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.

INFLUENCE OF WIDTH AND THICKNESS OF COMPOSITE LAMINATES ON THE FLEXURAL BEHAVIOR OF REINFORCED CONCRETE BEAMS AND SLABS

Alberto Turco¹, Massimiliano Bocciarelli², Antonio Nanni³, Carlo Poggi⁴

Abstract

Over the last few years externally bonded carbon fiber reinforced polymer (CFRP) laminates have become a popular technique for retrofitting reinforced concrete (RC) existing structures. This paper presents an experimental study on 10 RC members externally reinforced with different architectures of CFRP laminates in order to investigate the influence of the composite configurations on the structural behavior of RC members. American guidelines ACI 440.2R and Italian Code CNR-DT 200 are employed for comparison with the experimental results. Numerical models are also developed to simulate the behavior of the FRP-RC members with the aim to simulate the different failure modes observed in various strengthening configuration. One conclusion is that the Italian Code CNR-DT 200 results to be more conservative with respect to ACI 440.2R. Finite element analyses provide good predictions of the experimental evidences in terms of load-deflection, load strain diagrams, and crack distribution and lead to an accurate prediction of the debonding failure and the post-failure response.

Keywords: Fiber reinforced polymers; Reinforced concrete; Flexural strengthening; Experimental results; Numerical analysis

¹ Graduate Student, ABC Department: Architecture, Built Environment and Construction Engineering, Politecnico di Milano, Piazza Leonardo da Vinci 32, Milano, Italy, 20133, Email: albertoturco1@gmail.com

² Associate Professor, ABC Department: Architecture, Built Environment and Construction Engineering, Politecnico di Milano, Piazza Leonardo da Vinci 32, Milano, Italy, 20133, Email: massimiliano.bocciarelli@polimi.it

³ Professor and Chair, Department of Civil, Architectural, and Environmental Engineering, University of Miami, 1251 Memorial Drive, Room MEB 325, Coral Gables, FL, 33146, Email: nanni@miami.edu

⁴ Full Professor, ABC Department: Architecture, Built Environment and Construction Engineering, Politecnico di Milano, Piazza Leonardo da Vinci 32, Milano, Italy, 20133, Email: carlo.poggi@polimi.it

Download English Version:

<https://daneshyari.com/en/article/4911814>

Download Persian Version:

<https://daneshyari.com/article/4911814>

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