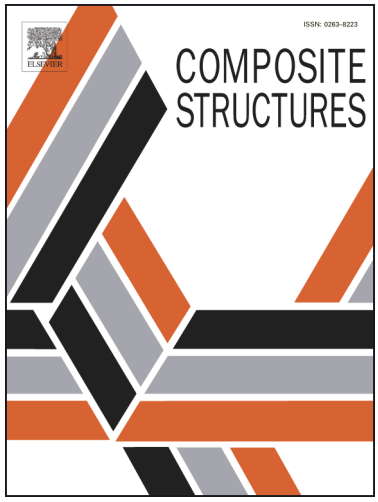

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INFLUENCE OF WIDTH AND THICKNESS OF COMPOSITE LAMINATES ON THE FLEXURAL BEHAVIOR OF REINFORCED CONCRETE BEAMS AND SLABS

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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

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